



Review Article

Enhancing Research Resilience in Team Members of Emergency Medicine Departments Investigating Traumatic Brain Injury by Addressing Burnout-Related Confusion

Carol Nash 

History of Medicine Program, Department of Psychiatry, Temerty Faculty of Medicine, University of Toronto, Canada

KEYWORDS

traumatic brain injury research
burnout in emergency medicine
burnout-related confusion
burnout reduction programs

ABSTRACT

Regarding TBI patients, team members of EMDs experience substantial difficulties that lead to burnout. These limitations impede their ability to conduct research and have created lags in the research productivity of this medical specialty. Consideration is lacking for burnout-related confusion in the reduced investigative progress of these research teams. Over the ten years of an author-facilitated burnout reduction program, a significant number of researchers who sought help reported burnout-related confusion. This finding may be relevant to EMD teams researching TBI patients. Following a review of burnout in this medical specialty, an examination of the difficulties that impede TBI research in EMDs reveals a composite picture of researchers as likely experiencing burnout-related confusion. Regarding the author's ten-year burnout reduction program based on a structured series of 28 writing prompts, there is an identification of the extent to which researchers experience burnout-related confusion. Also presented is the range of health-related research stalled as a result. All researchers engaged in the program were able to restart their research upon completing the intervention process. Following the success of this program, an offered template permits the restarting of the encumbered TBI research. The intent is to aid in reducing possible burnout-related confusion of team members in EMDs investigating TBI. This work represents the first review of the extent of burnout confusion experienced by researchers in the context of EMDs. The results of the burnout-reduction program offer an option for supporting EMDs in resolving medical team burnout, aiming to increase their TBI research.

*CORRESPONDING AUTHOR

Carol Nash; History of Medicine Program, Department of Psychiatry, Temerty Faculty of Medicine, University of Toronto, Canada; Email: carol.nash@utoronto.ca

ARTICLE INFO

Received: 6 June 2026 | Revised: 15 June 2026 | Accepted: 30 June 2026 | Published Online: 1 July 2026
<https://doi.org/> <https://doi.org/10.65773/cr.2.2.144>

COPYRIGHT

Copyright © 2026 by the author(s). Published by Explorer Press Ltd. This is an open access article under the Creative Commons Attribution 4.0 International (CC BY 4.0) License (<https://creativecommons.org/licenses/by/4.0>)

1. Introduction

The focus of this review is the research programs of medical teams in emergency medical departments (EMDs) regarding traumatic brain injury (TBI). TBI is a common reason for presenting to emergency departments [1]. The moderate/severe type of TBI is increasing [2,3]. The purpose of this review is to propose a means of resilience in these medical teams regarding burnout. It does so by considering their burnout as a possible result of burnout-related confusion affecting their research productivity. This study is valuable because TBI is often not undertaken by EMDs, resulting from the high level of burnout of these medical team members [4-7].

To accomplish this review, an investigation of recent research regarding burnout in EMDs follows an examination of the impediments to TBI research by EMDs. The suggestion is that the team members of EMDs researching TBI contend with burnout-related confusion when experiencing burnout, and that this confusion represents a reason for stalled research programs.

In one author-designed burnout reduction program for researchers, participants identified burnout-related confusion as the most prevalent symptom of their burnout, implicating it as the cause of their inability to restart their interrupted research. The program, offered in three different formats over the ten years, involved the participants responding to a structured series of 28 burnout-related writing prompts. Although the results of this program in other respects are well-studied [8-17], only one publication from 2025 examines the types of research projects impeded by researcher burnout resulting from burnout-related confusion [18]. Revealed is the range of research topics by participants during the ten years of offering the burnout reduction program. Considered is the number of researchers who experienced such confusion and the extent of burnout-related confusion regarding their burnout over the years they engaged in the program.

This review proposes that completing the prompts of a 28-step writing prompt template may promote increased research productivity in burned-out medical teams of EMDs investigating TBI. The template is similar to the author-designed burnout reduction program. It would do so by providing a structure for organizing their thoughts regarding their research as part of a team, as it has done for other researchers. Offered, then, is a modified template of the burnout reduction program. Its design is especially for EMD team member researchers of TBI. The aim is to reduce burnout-related confusion in burned-out EMD researchers through completing, sharing, and compiling structured writing prompt responses regarding TBI research.

2. Complications to Research on TBI by Team Members of EMDs

Investigating the type of complications experienced by medical teams of EMDs is relevant to understanding the precursors to their burnout.

A 2025 study [3] analyzing the epidemiological characteristics of TBI from 1990 to 2021 found that the global incidence rate of TBI decreased. However, the proportion of moderate/severe TBI has increased significantly, indicating that the injuries have become more severe during this time. Additionally, although there has been an overall decrease in these injuries, the incident rate for elderly victims of falls has increased, and is expected to continue in this direction as the global population ages [1]. Limited geriatric resources and rising numbers of elderly TBI from falls challenge EDMs [19].

A 2024 systematic review [20] notes that time limitations direct the high-pressure environment of the emergency department. Team interactions commonly result in conflict at multiple levels. Found in that review are reasons for these conflicts: a lack of trust in staff, bias towards certain groups, patient complexity, communication failures, differences in practices, high workload, ambiguities regarding patient responsibility, power imbalances, and a

competitive workplace culture. Each of these problems in the emergency room contributes to reducing EMD team members' focus on research regarding TBI patients.

Difficulties in obtaining informed consent from TBI patients pose a substantial problem for EMD research [2]. Additionally, proxies are often unavailable or, when making burnout-related decisions, cannot be located [21]. The time frame for making these decisions is usually short [21] and depends on the available resources [22]. Options in these emergency circumstances when informed consent is not possible are deferred consent [23] and Exception from Informed Consent [24]. However, the ethical appropriateness of these options can be a concern for EMDs when conducting TBI research [23-25]. In such cases, consent by an independent physician is another option [26]. However, the most recent research on this topic found that this alternative was the least likely to be employed at only 3% [21].

When researching TBI, EMDs make numerous technical decisions under high-pressure conditions [27]. A 2022 Lancet report [2] found that selecting appropriate patients for Computed Tomography (CT) scans allows early identification of lesions that can result in hospital admission or life-saving surgery. Yet, the same study notes that current decision-making on CT scans is inefficient, with 90–95% of scanned patients having no intracranial injury, although subjected to radiation risks. The same report found that the decision to measure blood-based biomarkers is a valuable addition to such research, when the decision is to use them. At the time of the 2022 report, there was only one vendor of such assays having regulatory clearance in Europe and the USA—an additional impediment to TBI research.

Although working in emergency medicine, EMDs investigating TBI must also consider whether the patient outcome has long-term effects on their quality of life [28]. Thus, the type of research undertaken needs to estimate the expected long-term result for the patient, and not only consider the acute phase. According to a 2024 report [29], there has been a rapid development of TBI research over the last twenty years. It has received increasing epidemiological attention, based on the reduction of the incidence of TBI and, thus, decreasing the future social burden. Therefore, a concentration on epidemiological research is considered the type of research that might produce breakthroughs in TBI. Nevertheless, the decision to undertake this research is burdensome when the TBI fatality rates remain high [30], and, regarding those patients who survive, they, their family members, and their providers lack preparedness to manage the TBI as a chronic condition [31]. Further complicating the decision to conduct research, biopsychosocial and environmental factors are found to significantly influence acute clinical presentation, recovery, and the outcome of TBI [32].

Published in 2022 [33], a study found that the authors of clinical research on TBI were 86.5% white and 59% male; additionally, the first authors were 92.6% white. The same study found that most study participants were male (68%) and that NIH-funded TBI trials did not recruit non-white subjects. Nevertheless, identified in 2023 [34], native Americans have the highest rate and number of deaths regarding TBI compared with all other racial/ethnic groups, while black Americans are significantly more likely to incur such injuries from violence when compared with non-Hispanic whites. Additionally, all minorities are more likely to have worse functional outcomes when contrasted with non-Hispanic whites [34]. The fact that the little research on the most vulnerable groups to experience TBI is by EMDs who are not members of these groups is a significant limitation, representing outsider research bias [35]. This lack of focus on research regarding native and black Americans leads to poorer outcomes for these marginalized groups [36,37].

The complications regarding EMDs researching TBI go beyond acute concerns in the emergency room and long-term effects on the patient. Additionally, in 2015, the United States Centers for Disease Control and Prevention (CDC) removed unspecified head injuries from its case definition of TBI surveillance, making investigation of long-term morbidity trends increasingly difficult [38]. Originating from the CDC constraints on identifying TBI in clinical

settings, a 2024 publication suggests that an alternative surveillance approach is to collect TBI data using a self-report survey [39].

3. Organizational Factors Affecting Burnout in EMDs

The value of medicine as a calling that promotes pride in professional achievement is a value in conflict with the increasing corporate culture of hospitals [40]. Hospitals in general, and EMDs specifically, have a role in mitigating team member burnout by shifting from individual-focused resilience training to systemic, operational interventions. Several factors influence this change, including adequate staffing, predictable scheduling, and workflow optimization, which aim to reduce cognitive fatigue [41,42]. Administrative changes to decrease team member burnout are identified as most effective at a departmental level rather than through the larger institution. The reason is that team pride is departmental [43]. Changes that departmental management can make include (1) maintaining equality among team members and (2) giving lower-status members capacity-building support. The basis of these changes should be the understanding that all team members are vital to the EMD in promoting a shared identity [44].

The shift to electronic record-keeping places responsibility on individuals. A lack of team-wide responsibility is a significant contributing factor to increasing burnout [45,46]. A recent scoping review of electronic health records and burnout identified six main causes: (1) the time taken for documentation and related tasks, (2) poor record design, (3) the increased workload from record-keeping, (4) the creation of overtime work, (5) inbox alerts demanding immediate attention, and (6) fatigue from information regarding medication refills and test results [47]. Electronic health record messaging creates a source of often non-reimbursable patient care, producing a previously unknown source of burnout [48]. A 2024 publication [49] notes that one way to reduce EMD burnout in team members is through the use of standardized smartphrases. They help to streamline workflow while simultaneously improving trauma team compliance with best practice guidelines for TBI. The finding is that using these smartphrases reduces unnecessary imaging and ICU admissions.

Women and minorities are increasingly entering emergency medicine; however, their representation remains uneven. As of 2022, women accounted for approximately 35% of EMD residents, but minority representation growth remains a challenge in achieving demographic parity with the broader population [50]. Yet, regardless of the increases, there has been little perceived change in the “white supremacy culture” of EMDs as part of a broader problem in medicine [51]. The lack of change represents a leading cause of burnout in these underrepresented groups [52,53]. A recent systematic review and meta-analysis [54] found that women team members in EMDs experience burnout to a greater degree than men. They are more susceptible to emotional exhaustion and have a lower sense of personal accomplishment. In contrast to men, institutional talent management approaches that recognize their greater tendency to burnout may be helpful [55].

One area affected by organizational factors is a lack of consideration regarding four behavioral domains that divide team members' professionalism: respect, integrity, excellence, and responsibility [56]. Respect by team members regards having compassion for others [57]. However, those with greater compassion are more likely to experience burnout from compassion fatigue [58]. In contrast, self-compassion, developed from personal respect, reduces team member burnout [59]. As a commitment to ethical practice, those who feel forced to make decisions contrary to their ethical sense compromise the integrity of the team. This feeling of compromise produces moral distress [60]. The sense of personal responsibility in individual team members to perform at a superior level, combined with their perfectionism, promotes burnout [61]. Team members must be less committed to individual perfection to work effectively in what has become the corporate culture of medicine. The reason is that such perfectionism represents one of the primary predictors of physician burnout [62]. There is an association between impostor syndrome and burnout in EMD team members [63]. In developing countries, perfectionistic tendencies include difficulty setting

boundaries and a lack of self-care practices, which increase vulnerability to burnout. These additional problems result from the challenges of work environments with resource and systemic limitations [64,65]. In Israeli physicians, maladaptive perfectionism represents a significant risk factor for suicidality [66].

Beyond the psychological factors that concern professionalism, there must be a consideration of individual psychological factors of team members to initiate systemic change to reduce burnout in EMD team members. The finding is that the personality traits of emotional intelligence and self-efficacy are those most relevant in preventing burnout [67]. From this perspective, emotional intelligence includes the following. Understanding and coping with individual emotions and feelings regarding job performance and demands. This emotional intelligence necessitates organizational support—especially for EMD nurses [68]. Self-efficacy represents a team member's ability to influence their work environment to improve performance. It is considered particularly relevant for promoting resilience in EMD staff [69]. The recommendation is that healthcare leadership and policymakers create educational programs and offer counseling for EMD team members. These programs and counseling should be available for women to enhance their emotional intelligence and self-efficacy [70], with targeted support for EMD nurses [71].

A well-known and relevant approach to personality traits is the Big Five. This approach represents a five-factor model [72] validated in 1987 [73]. Higher levels of neuroticism, lower agreeableness, greater conscientiousness, less extraversion, and reduced openness together demonstrate higher levels of burnout, according to a 2023 systematic review [74]. These negative traits represent the Type D (distressed) personality type. This type is associated with emergency care personnel [75]. Type D personality is a combination of high negative affect and high social isolation, producing poor health outcomes [76]. For physicians, this includes self-medication that may lead to substance misuse [77]. These personal traits must be taken into consideration when recruiting for EMD staff to create the best fit for the stresses associated with the EMD—especially if TBI research is to be supported [78].

4. Recent History of Burnout in EMDs

Shortly before the COVID-19 pandemic, burnout in EMDs was well-documented as representing a global [79] and alarming problem [80]. One that varied depending on job resources, and the organizational culture [81], with those team members registering higher personal fulfillment and resilience associated with lower burnout [82]. In contrast, a large number of administrative tasks, plus poor human relations, predicted it [83]. The interventions studied during that time with the most potential to reduce burnout in EMDs were those that were individual-focused, including both educational and mindfulness-based interventions [84].

With the pandemic, the incidence of burnout among EMDs became one of the highest among employee types [85]. The reasons for this burnout went beyond the pre-COVID-19 ones of administrative tasks and compromised human relations. Additional concerns were (1) the worry about virus infection, and (2) stigma from attending to the acute symptoms of patients regarding it [86]. Consequently, not only was there an increase in burnout in these physicians during COVID-19, but also, the symptoms of anxiety with a risk of PTSD became evident [87,88]. Significantly, unlike other specialties [89], this increase in burnout did not result in diagnostic errors [90], nor was gender a determinant [91].

In comparison with the pre-COVID-19 period, there was a decrease in emergency room visits during the pandemic. With the end of the pandemic, these visits increased gradually. The result was overcrowding in emergency rooms [92,93] that caused an increase in patient mortality and morbidity [94]. The result is a further increase in burnout among emergency medical physicians lacking sufficient resources to meet patient demand [95].

5. Burnout-Related Burnout Confusion in EMDs

The demonstration is that team members of EMDs encounter (1) significant time constraints, (2) staff conflict, (3) technical challenges regarding TBI, (4) often lack ethically acceptable informed consent for TBI interventions, (5) results that can have a substantial effect on the entire life course of the patient and their family, (6) systemic requirements hampered by CDC changes, (7) conflicts with their professional integrity in contending with hospital corporate culture, (8) challenges with electronic record-keeping, (9) inequitable representation of women and minorities, and (10) a lack of institutional consideration of detrimental behavioral factors and personality traits that promote burnout. Additionally, the recent history of burnout faced by team members of EMDs is increasing, especially in response to COVID-19. The result is that the team member burnout in EMDs is significant and complicated, decreasing their ability to conduct TBI research. The question is, do these detrimental burnout-producing complications result in confusion associated with EMDs investigating TBI research?

The most recent definition of confusion is from the 2014 *International Handbook of Emotions in Education*. That work defines it as a learning emotion occurring “when there is a mismatch of information, a violation of expectations, and other clashes of cognition during the processing of information” [96] (p. 292). In that definition of confusion, four qualities identify the effect of TBI research on EMD. There is (1) an emotion demonstrated, (2) a mismatch of information, (3) a violation of expectations, and (4) other clashes of cognition with information processing. Examining each of the limitations described regarding EMD team members that result in burnout, it appears that the complications affecting those researching TBI meet all of the requirements for burnout-related confusion.

The studies regarding objective measures of burnout-related confusion are in their infancy. A recent study notes that confusion resolution from competency succeeds; however, failing this, frustration from confusion increases, leading to disengagement [97]. Another report has decoded brain activity in recognizing confusion during reasoning using electroencephalography (EEG) signals. The findings are (1) significant differences in the band power of delta, theta, alpha, beta, and lower gamma waves between confused and non-confused conditions, and (2) confusion relating to higher attentional and cognitive load [98]. This study notes that confusion is not an isolated learning emotion—it changes as other cognitive or affective states are modified. To improve their performance and learning experience, producing resilience, the report stresses that learners understand their affective states. As such, for EMD team members to develop the resilience necessary to decrease their confusion, they require a method that helps them understand their affective states. Only then can they fruitfully begin to engage in TBI research.

6. A burnout Reduction Program

A successful burnout-reduction program for EMD personnel to increase their TBI research is one that mitigates burnout-related confusion. The hospital-based burnout reduction program offered by the author/facilitator from 2015 to 2025 represents this type of program. During this period, it had two consecutive versions. The first version, offered from 2015 to 2022, was the Health Narratives Research Group (HeNReG). It was a free, 28-session, 2-hour weekly in-person author-facilitated meeting. Participants responded to writing prompts, sharing their responses with the group. As stream of consciousness writing [99-101], these responses were a reflection of the affective state of the researcher at the time of writing. The HeNReG was for health researchers at any stage in their research careers who self-identified as experiencing burnout. The HeNReG became a weekly two-hour online Facebook meeting during the COVID-19 restrictions from 2020 to 2022 [9,11-17]. The second version, the Health Narratives Research Process (HeNReP), was provided from 2022 to 2025 as a one-on-one response to the writing prompts on the Messenger app, representing a dialogue between the participant and facilitator [8-10]. The participant's preferred schedule dictated the receipt of the writing prompts. The final participant response ended this HeNReP intervention. All publications on the details of the HeNReG [9,11-17] and HeNReP [8-10] are publicly available in peer-reviewed journals. However, following the informed consent agreement, participant contributions in the Facebook groups, Messenger

app, the feedback forms, and emails are private. Permission granted by the participants was for anonymous reference only.

While participating in either program, some members of both the HeNReG and the HeNReP voluntarily shared their experience of burnout-related confusion with the author/facilitator. The examination of the content and structure of publications and author-archived records is a form of chronological descriptive ordering [102]—“chrononarratology” [103]— for those who did share their experiences.

Over the ten years of the yearly burnout-reduction intervention, 134 researchers, representing all stages of research careers and various specialties, participated (Table 1). Reports of confusion numbered 69. For the in-person HeNReG, the lowest percentage of those reporting confusion in any year was 43%, while the highest was 78%. During the two years of the online HeNReG, those stating confusion were approximately equal (45% and 42%). The lowest percentage of confusion for the HeNReP was in its first year, 14%. In its final year, 100% of participants noted confusion. However, this result was an artifact of the small number of participants in this one-on-one intervention. The results of the HeNReP are included in this assessment to demonstrate that the modification from group meetings to one-on-one online participation did not negate finding burnout-related confusion for this program.

Table 1. HeNReG and HeNReP participant # by academic year, participant reporting of confusion, and percentage of participants reporting confusion.

	HeNReG: 2015–2022							HeNReP: 2022–2025			All
Parameters	2015/ 2016	2016/ 2017	2017/ 2018	2018/ 2019	2019/ 2020	2020/ 2021	2021/ 2022	2022/ 2023	2023/ 2024	2024/ 2025	2015- 2025
Participant #	10	11	18	17	23	20	19	7	7	2	134
Confusion	6	7	14	8	10	9	8	1	4	2	69
% confused	60	64	78	47	43	45	42	14	57	100	51

Source: For the HeNReG from [11] and for the HeNReP from [10], both publications by the author.

The 69 reports of confusion were attributable to 33 participants (Table 2). All participants in the program were able to return to their research as a result of the narrative intervention. However, thirteen participants reengaged with the HeNReG, the HeNReP, or both at some point during the ten years to reduce their burnout when they perceived it had developed again. Each time the program was completed, as either the HeNReG or the HeNReP, participants were able to reengage with their interrupted research.

Table 2. The years of their participation in the burnout reduction program for the 33 unique participants who reported confusion.

	HeNReG: 2015–2022							HeNReP: 2022–2025		
Participant	2015/2016	2016/2017	2017/2018	2018/2019	2019/2020	2020/2021	2021/2022	2022/2023	2023/2024	2024/2025
1	X		X	X			X			
2	X	X	X							
3	X	X					X		X	
4	X									
5	X	X								
6	X									
7		X		X	X					
8		X	X	X	X		X			
9		X								

Participant	HeNReG: 2015–2022							HeNReP: 2022-2025		
	2015/2016	2016/2017	2017/2018	2018/2019	2019/2020	2020/2021	2021/2022	2022/2023	2023/2024	2024/2025
10		X								
11			X	X	X	X	X			
12			X	X	X	X				
13			X							
14			X	X	X	X	X			
15			X							
16			X							
17			X							
18			X							
19			X			X	X			
20			X							
21				X	X					
22					X					
23					X	X				
24					X					
25						X				
26						X	X		X	X
27						X				
28						X				
29						X				
30							X			
31								X		
32									X	
33									X	

Source: Data from yearly self-descriptions provided by each participant, archived by the author/facilitator.

The types of research abandoned for a time due to burnout-related confusion can be considered in relation to the Sustainable Development Goals (SDGs) [104]. Over the ten years of the intervention (Table 3). Fourteen investigators were unable to continue with research related to SDG 3 (Good Health and Well-being), eleven stopped researching topics relevant to SDG 9 (Industry, Innovation, and Infrastructure), and eight neglected topics concerning SDG 11 (Sustainable Cities and Communities). Although the investigations cover a wide range of health-related topics, none regarded research by EMDs on TBI, primarily because none of the participants over the ten years were EMDs who investigated TBI.

Table 3. Participant number, the type of research: SDG 3 (Good Health and Well-being), SDG 9 (Industry, Innovation, and Infrastructure), SDG 11 (Sustainable Cities and Communities), and the stalled research program.

Participant	SDG	Stalled Research Related to Health
1	9	Developing memristors to understand early brain development
2	3	Stresses associated with early childhood trauma
3	11	Accepting Alzheimer's Disease within an expressive arts community
4	3	Caregiver stress associated with long-term family care
5	11	Promoting breastfeeding in incarcerated women with newborns

6	3	Narrative expression as a stress release for burnout
7	9	Determining limits to depicting mental health through sequential art
8	3	Making psychological treatment more accessible to the general public
9	9	Delivering a superior product for medical cannabis use
10	3	Improving pharmacist/patient dialogue
11	3	Recovery from psychological trauma
12	3	Narrative analysis to improve symptoms of depression
13	11	Social costs of anxiety
14	11	Diaspora and its long-term effects
15	11	Phenomenology of men charged with crimes but not yet convicted
16	9	Medical information and communication in medical education
17	9	Development of clinical identity to thrive and grow
18	9	Patient and caregiver access to palliative care
19	9	Assessing historical contributions in medical administration
20	3	Role of lived experience in maintaining nursing practice
21	3	Working with chronic illness viewed through disability studies
22	11	Lack of expected credentials, impeding a health research career
23	3	Connection between creativity and mental health
24	9	Interference of socialized medicine with the medical duties of care
25	11	Role of health research in planetary improvement
26	3	Comfort and joy in maintaining social worker case management
27	3	Sustaining mental health in a prolonged job search
28	9	Effect of preference for administration duties on research productivity
29	9	Attracting viewers to a lived-experience health improvement website
30	9	Cost of depression without medication or professional assistance
31	11	Relationship between environmental ethics/anthropology and health
32	3	Progression of mild athletic injuries to life-threatening conditions
33	3	Inseparability and interdependence of the arts and health

Source: Data from yearly self-descriptions provided by each participant, archived by the author/facilitator.

Table 1 and **Table 2** reveal the number of participants who identified burnout-related confusion over the program's ten years. **Table 3** presents the diverse range of research topics affected by researchers abandoning their investigations. The purpose of these tables is to present that burnout-related confusion has been a consistently reported phenomenon and that its reporting has been regarding disparate research fields. Both the HeNReG and HeNReP have helped reduce burnout-related confusion. This result explains why a version of their method may be appropriate for EMDs researching TBI.

7. Aid in Reducing Burnout-Related Confusion in EMDs Regarding TBI Research

The finding is that EMDs have a high degree of burnout and are affected by numerous difficulties. This finding explains the complications [2,20,27,28,35,38,40,48,54,56,67,75] in conducting TBI research by EMDs, especially as a result of the COVID-19 pandemic [85]. The result was burnout-related confusion. This type of confusion represents a continuing reason for some participants of the author's narrative research programs to re-engage with the offered

burnout reduction program. However, are the complications for EMDs regarding their burnout similar to the experience of the researchers participating in the author's ten-year burnout reduction program? If so, are they sufficient to make it reasonable to recommend a modification of this program to EMDs?

This review has identified several features of the type of burnout reduction program that might aid EMD team members in augmenting their TBI patient research. In [19], the finding is that the interventions most likely to reduce burnout in EMDs were those that were individual-focused, including both educational and mindfulness-based interventions. Additionally [98], advises the importance of researchers understanding their affective states to reduce burnout. Several publications have identified EMDs as having ethical concerns about conducting research on TBI patients without their informed consent [21,23,24]. Moreover, the most successful EMD research on TBI patient outcomes and social burden improvement is epidemiological [29]. Considering these disparate studies together, EMDs may make their most important contribution to TBI research by comprehensively considering epidemiological factors. They should do so using an individual-focused, educational, and mindfulness-based intervention that moderates their affective state, rather than risking ethical compromise by a lack of appropriate informed consent [84].

The EMD team members face consistent on-call duties that include emergency surgeries demanding significant administrative charting. These factors leave them little time to participate in burnout reduction interventions [108,109]. It might be ideal for the EMD team to participate in an in-person group meeting, similar to the original HeNReG. This would permit colleagues to share their responses to the prompts and ask each other supplementary questions regarding their answers. These additional questions by group members were considered by HeNReG participants to be one of the most significant features to improving their hopeful resilience [16] and team mindfulness [11,107], permitting them to restart their research programs. However, with little time to spare and few opportunities for all team members to meet together in person, EMD administrators must offer interventions that take into consideration the limited time availability of team members and the difficulty of them meeting together.

A modified version of the narrative program for burnout reduction in researchers originated by the author can meet the criteria of one that can increase TBI research. It can do so by being individually focused, mindfulness-based, directed to revealing affective states, and permits the support of epidemiological TBI research. Additionally, this modification is one that is easily administered by the EMD. The type of modification corresponds to the 2024 publication, suggesting that a research approach for EMDs is collecting TBI data using a self-report survey [39]. Such a program could be named the EMDs Narrative Research Process for TBI Studies. An acronym would be the ENRePTS. Appendix A presents suggestions for the 28 writing prompts for EMDs researching TBI for this program. Their presentation would be an online form. Team members would complete the form as time allowed in the course of completing their necessary administrative charting for patient cases. Although the prompts could differ from those offered in Appendix A, the order of the when, where, who, what, how, and why questions, and their number, should remain the same. This order and number have been found optimal over the past ten years of the burnout reduction program. Having a similar structure, this version does not require a facilitator, unlike the ten-year, author-offered programs for reducing burnout in researchers. Instead, these writing prompts are presented at once, as completable forms by any EMDs with a TBI patient. The finished forms are the epidemiological tool, representing the recommended self-report survey [39].

EMD administrators can collect these forms and summarize their entries. The results could then be shared with team members online. They would be encouraged to offer interpretations of the results. The research outcome might be from various perspectives. One might consider the replies to any one of the six types of questions. Manuscripts could be written on the responses to questions related to when, where, who, what, how, or why. Another paper might focus on all the descriptions of the TBI presentations associated with the EMD. With relevant information from team

members together on one form, researching and writing these different types of studies—and individual case studies—is simplified.

A further way of organizing the content of these ENRePTS is by research type: human interaction, standards of living, organizational structures, and planetary medicine—as the types organized for the author-designed narrative process in Table 3. These research types are common to the Sustainable Development Goals (SDGs) [104]. Emergency medicine focuses on SDG 3 (Good Health and Well-being), specifically targeting universal access to early trauma care, reducing injury mortality, and managing the lifelong chronic disability associated with TBI [108]. Regarding SDG 11 (Sustainable Cities and Communities), EMD team member research might focus on the epidemiology of TBI. They could do so by researching fall-prevention strategies and urban infrastructural design to lower the incidence of violent trauma [109]. EMD administrators can also aid in increasing research on TBI regarding SDG 9 (Industry, Innovation, and Infrastructure). They can do so by evaluating the use of telemedicine and informatics systems to standardize brain injury data across hospital networks [110].

Particularly relevant to this review is that completing the ENRePTS form is a convenient and appropriate structure to organize the thoughts of the EMD personnel, minimizing burnout-related confusion and, consequently, the burnout they may experience. Having this simple method of thought organization is particularly relevant during periods when burnout in EMD team members increases as a result of pandemics like COVID-19 [85]. As an objective epidemiological tool, representing the recommended self-report survey [39], it will encourage EMD team members researching TBI to moderate their affective state [108]. It will also permit an increased range of research participants [34] and researchers [33]. Moreover, it will encourage the most effective testing [2] and treatment decisions [32], and reduce the possibility of any long-term quality of life changes for the TBI patient [28]. The demonstration is that confusion resolution from competency succeeds, and frustration from confusion leads to disengagement [97]. Completing the ENRePTS would serve to increase competency in epidemiological research on TBI by EMDs. Additionally, it would reduce frustration from confusion and produce the type of documentation aid that could re-engage EMD team members with their TBI research.

8. Limitations

This review examined several aspects of EMD team members researching TBI. Those concerning the complications to research on TBI, burnout in EMD personnel, burnout-related confusion in EMD team members, and the burnout reduction program are each supported by peer-reviewed research. In contrast, there has been no testing of the proposed use of the burnout reduction program as a template for reducing possible research confusion in EMD personnel researching TBI. This lack of testing is a limitation. It is a suggestion that requires a study of EMD team members researching TBI who have expressed burnout-related confusion as a symptom of their burnout to investigate. Suggesting or implementing a program for a specific demographic without testing it on that group reflects a generalizability bias. With a lack of external validity, the program's success cannot be generalized beyond the specific group of burned-out researchers in which it was originally tested [111-113]. Nevertheless, it was from reviewing the results of the author-created burnout reduction program that the idea of the possible relevance for EMD personnel investigating TBI became apparent. This narrative research process has been successful in restarting the research programs of researchers from disparate fields related to health. The suggestion is that a modification to the narrative research program could be a relevant intervention for EMD team members.

9. Conclusion

This review examined various facets of the problem of the paucity of research on TBI conducted by EMDs. To increase the amount of such research, the purpose was to propose a means of mitigating burnout in team members by increasing their resilience. The proposed method was to re-engage their research by eliminating possible burnout-related confusion through a 28-step, author-devised program. The incidences of moderate/severe TBI and of elderly falls represent increasing presentation types in emergency departments, necessitating additional research. A simple, administrable method by EMDs is the author-created method to reduce burnout-related confusion. It is a method that may increase such research.

Abbreviations: traumatic brain injury (TBI); emergency medicine departments (EMDs); National Institutes of Health (NIH); United States Centers for Disease Control and Prevention (CDC); electroencephalography (EEG); Health Narratives Research Group (HeNReG); Health Narratives Research Process (HeNReP); EMDs Narrative Research Process for TBI Studies (ENRePTS)

Funding

This research received no external funding.

Data Availability

The data supporting the findings are the cited research and the yearly self-descriptions provided by each HeNReG and HeNReP participant, archived by the author/facilitator.

Conflict of Interest

The author declares no conflict of interest.

Acknowledgments

The author assumes full responsibility for the content of this work. There was no use of AI in the creation of the manuscript.

Appendix A

Template for an ENRePTS, a narrative process tailored to EMDs researching TBI patients to aid in reducing burnout-related confusion in connection with burnout.

Order	First Word	Body of Question
1	Describe	the presentation of the TBI patient
2	When	did the TBI occur
3	When	did the patient arrive at the emergency department
4	When	was the patient first seen
5	When	was the patient assessed
6	Where	in the world did the TBI occur
7	Where	in the brain does the TBI affect
8	Where	has the patient undergone tests

9	Where	has the patient received treatment
10	Who	is providing informed consent for the patient
11	Who	brought the patient to the emergency department
12	Who	witnessed the TBI
13	Who	was the cause of the TBI
14	What	actions led to the TBI
15	What	is the diagnosis
16	What	is the prognosis
17	What	has been challenging regarding treating the TBI
18	How	was the TBI treated
19	How	likely is it that the patient will recover fully
20	How	long until the patient can return home
21	How	much will the TBI change the lifestyle of the patient
22	How	much support will the patient require to engage in daily activities
23	Why	did the TBI happen when it did
24	Why	did the TBI occur where it did
25	Why	was this particular patient involved in a TBI
26	Why	does the TBI affect the area of the brain that it does
27	Why	was the treatment option selected
28	Why	is this TBI case relevant to be involved as part of a research program

References

- [1] Backus, B. E., Moustafa, F., Skogen, K., Sapin, V., Rane, N., Moya-Torrecilla, F., Biberthaler, P., & Tenovuo, O. (2024). Consensus paper on the assessment of adult patients with traumatic brain injury with Glasgow Coma Scale 13–15 at the emergency department: A multidisciplinary overview. *European Journal of Emergency Medicine*, 31(4), 240–249. <https://doi.org/10.1097/MEJ.0000000000001140>
- [2] Maas, A. I. R., Menon, D. K., Manley, G. T., Abrams, M., Åkerlund, C., Andelic, N., Aries, M., Bashford, T., Bell, M. J., Bodien, Y. G., Brett, B. L., Büki, A., Chesnut, R. M., Citerio, G., Clark, D., Clasby, B., Cooper, D. J., Czeiter, E., Czosnyka, M., ... Zemek, R. (2022). Traumatic brain injury: Progress and challenges in prevention, clinical care, and research. *The Lancet Neurology*, 21(11), 1004–1060. [https://doi.org/10.1016/S1474-4422\(22\)00309-X](https://doi.org/10.1016/S1474-4422(22)00309-X)
- [3] Yan, J., Wang, C., & Sun, B. (2025). Global, regional, and national burdens of traumatic brain injury from 1990 to 2021. *Frontiers in Public Health*, 13, 1556147. <https://doi.org/10.3389/fpubh.2025.1556147>
- [4] Dixon, E., Murphy, M., & Wynne, R. (2022). A multidisciplinary, cross-sectional survey of burnout and wellbeing in emergency department staff during COVID-19. *Australasian Emergency Care*, 25(3), 247–252. <https://doi.org/10.1016/j.auec.2021.12.001>
- [5] Moscu, C.-A., Marina, V., Anghel, A.-D., Anghel, M., Dragomir, L., & Ciubară, A. (2023). The impact of work-related problems on burnout syndrome and job satisfaction levels among emergency department staff. *Behavioral Sciences*, 13(7), 575. <https://doi.org/10.3390/bs13070575>
- [6] Butoi, M. A., Belghiru, V. I., Puticiu, M. I., Tat, R., Golea, A., & Rotaru, L. T. (2026). Burnout and biological biomarkers in emergency and acute-care healthcare workers: A systematic scoping review with evidence mapping. *Medicina*, 62(3), 526. <https://doi.org/10.3390/medicina62030526>
- [7] Kraus, M., & Fischer, M. (2025). Burnout in the emergency department: Survey of prevalence and modifiable risk factors. *Western Journal of Emergency Medicine*, 26(5), 1397–1403. <https://doi.org/10.5811/westjem.24872>

- [8] Nash, C. (2025). Unresolved depression on alleviating health research burnout. *Journal of Biomedical Research & Environmental Sciences*, 6(8), 1143–1156. <https://doi.org/10.37871/jbres2172>
- [9] Nash, C. (2025). Psychosocial outcomes from self-directed learning and team mindfulness in public education settings to reduce burnout. *Societies*, 15(7), 181. <https://doi.org/10.3390/soc15070181>
- [10] Nash, C. (2025). Historical study of an online hospital-affiliated burnout intervention process for researchers. *Journal of Hospital Management and Health Policy*, 9, 7. <https://doi.org/10.21037/jhmhp-24-87>
- [11] Nash, C. (2023). Team mindfulness in online academic meetings to reduce burnout. *Challenges*, 14(1), 15. <https://doi.org/10.3390/challe14010015>
- [12] Nash, C. (2020). Report on digital literacy in academic meetings during the 2020 COVID-19 lockdown. *Challenges*, 11(2), 20. <https://doi.org/10.3390/challe11020020>
- [13] Nash, C. (2021). COVID-19 limitations on doodling as a measure of burnout. *European Journal of Investigation in Health, Psychology and Education*, 11(4), 1688–1705. <https://doi.org/10.3390/ejihpe11040118>
- [14] Nash, C. (2021). Doodling as a measure of burnout in healthcare researchers. *Culture, Medicine, and Psychiatry*, 45(4), 565–598. <https://doi.org/10.1007/s11013-020-09690-6>
- [15] Nash, C. (2021). Online meeting challenges in a research group resulting from COVID-19 limitations. *Challenges*, 12(2), 29. <https://doi.org/10.3390/challe12020029>
- [16] Nash, C. (2022). Enhancing hopeful resilience regarding depression and anxiety with a narrative method of ordering memory effective in researchers experiencing burnout. *Challenges*, 13(2), 28. <https://doi.org/10.3390/challe13020028>
- [17] Nash, C. (2020). Challenges identifying and stimulating self-directed learning in publicly funded programs. In C. S. Keator (Ed.), *The digital era of learning: Novel educational strategies and challenges for teaching students in the 21st century* (pp. 259–300). Nova Science Publishers.
- [18] Nash, C. (2025). Confusion: A debilitating and persistent psychosomatic symptom of burnout among researchers. *Journal of Clinical and Basic Psychosomatics*. Advance online publication. <https://doi.org/10.36922/JCBP025380074>
- [19] Barrett, C. A., Goetting, M. G., Lyerla, R., & Fogarty, K. (2025). Subsequent emergency department visits in geriatric mild traumatic brain injury: Relationship with fall, payor, and discharge outcome. *Healthcare*, 13(11), 1236. <https://doi.org/10.3390/healthcare13111236>
- [20] Tjan, T. E., Wong, L. Y., & Rixon, A. (2024). Conflict in emergency medicine: A systematic review. *Academic Emergency Medicine*, 31(6), 538–546. <https://doi.org/10.1111/acem.14874>
- [21] Kompanje, E. J. O., van Dijck, J. T. J. M., Chalos, V., van den Berg, S. A., Janssen, P. M., Nederkoorn, P. J., van der Jagt, M., Citerio, G., Stocchetti, N., Dippel, D. W. J., & Peul, W. C. (2020). Informed consent procedures for emergency interventional research in patients with traumatic brain injury and ischaemic stroke. *The Lancet Neurology*, 19(12), 1033–1042. [https://doi.org/10.1016/S1474-4422\(20\)30276-3](https://doi.org/10.1016/S1474-4422(20)30276-3)
- [22] Yue, J. K., & Deng, H. (2023). Traumatic brain injury: Contemporary challenges and the path to progress. *Journal of Clinical Medicine*, 12(9), 3283. <https://doi.org/10.3390/jcm12093283>
- [23] Noori, Z., Vianen, N. J., van Lieshout, E. M. M., Kompanje, E. J. O., Maissan, I. M., Verhofstad, M. H. J., & van Vledder, M. G. (2024). Deferred consent in emergency trauma research: A qualitative study assessing the healthcare professional's opinions. *Injury*, 55(11), 111759. <https://doi.org/10.1016/j.injury.2024.111759>
- [24] Edwards, C., & Johnson, K. D. (2021). Understanding exception from informed consent in planned emergency research. *Journal of Emergency Nursing*, 47(3), 503–506. <https://doi.org/10.1016/j.jen.2020.12.008>
- [25] Mahon, N., Hays, L. M. C., Coy, E., Ainscough, K., Burrell, A., Gordon, A. C., Rochwerg, B., Wang, C.-M., Harvey, D., Parekh, D., Goligher, E., Toal, F., Saito, H., Marshall, J. C., Stewart, J., Gobat, N., Webb, S., Tolppa, T., McAuley, D. F., & Nichol, A. D. (2026). Views on consent approaches used in emergency and critical care research: A rapid, systematic review. *Trials*, 27(1), 308. <https://doi.org/10.1186/s13063-026-09592-9>
- [26] Jawa, N. A., Boyd, J. G., Maslove, D. M., Scott, S. H., & Silver, S. A. (2023). Informed consent practices in clinical research: Present and future. *Postgraduate Medical Journal*, 99(1175), 1033–1042. <https://doi.org/10.1093/postmj/qgad039>
- [27] Reale, C., Salwei, M. E., Militello, L. G., Weinger, M. B., Burden, A., Sushereba, C., Torscher, L. C., Andrae, M. H., Gaba, D. M., McIvor, W. R., Banerjee, A., Slagle, J., & Anders, S. (2023). Decision-making during high-risk events: A systematic literature review. *Journal of Cognitive Engineering and Decision Making*, 17(2), 188–212. <https://doi.org/10.1177/15553434221147415>

- [28] Dams-O'Connor, K., Juengst, S. B., Bogner, J., Chiaravalloti, N. D., Corrigan, J. D., Giacino, J. T., Harrison-Felix, C. L., Hoffman, J. M., Ketchum, J. M., Lequerica, A. H., Marwitz, J. H., Miller, A. C., Nakase-Richardson, R., Rabinowitz, A. R., Sander, A. M., Zafonte, R., & Hammond, F. M. (2023). Traumatic brain injury as a chronic disease: Insights from the United States Traumatic Brain Injury Model Systems Research Program. *The Lancet Neurology*, 22(6), 517–528. [https://doi.org/10.1016/S1474-4422\(23\)00065-0](https://doi.org/10.1016/S1474-4422(23)00065-0)
- [29] Ye, Z., Li, Z., Zhong, S., Xing, Q., Li, K., Sheng, W., Shi, X., & Bao, Y. (2024). The recent two decades of traumatic brain injury: A bibliometric analysis and systematic review. *International Journal of Surgery*, 110(6), 3745–3759. <https://doi.org/10.1097/JS9.0000000000001367>
- [30] Zhang, D., Sheng, Y., Wang, C., Chen, W., & Shi, X. (2024). Global traumatic brain injury intracranial pressure: From monitoring to surgical decision. *Frontiers in Neurology*, 15, 1423329. <https://doi.org/10.3389/fneur.2024.1423329>
- [31] Kersey, J., Wang, W., Rojas Serrano, N., Cunningham, M., Hammond, F. M., & Corrigan, J. D. (2025). Qualitative examination of chronic care needs of individuals with traumatic brain injury. *Archives of Physical Medicine and Rehabilitation*, 106(10), 1548–1556. <https://doi.org/10.1016/j.apmr.2025.06.012>
- [32] Nelson, L. D., Wilson, L., Albrecht, J. S., Arciniegas, D. B., Barthélemy, E. J., Fontaine, S. N., Gardner, R. C., Juengst, S. B., Pappadis, M. R., Ponsford, J., Thomas, D. G., Yeates, K. O., Dams-O'Connor, K., Manley, G. T., Maas, A. I. R., McCrea, M. A., Awwad, H. O., Doperalski, A., & Umoh, N. (2025). Toward more holistic early traumatic brain injury evaluation and care: Recommendations from the 2024 National Institute of Neurological Disorders and Stroke Traumatic Brain Injury Classification and Nomenclature Initiative Psychosocial and Environmental Modifiers Working Group. *Journal of Neurotrauma*, 42(13–14), 1023–1037. <https://doi.org/10.1089/neu.2024.0569>
- [33] Venkatesh, S., Bravo, M., Schaaf, T., Koller, M., Sundeen, K., & Samadani, U. (2022). Consequences of inequity in the neurosurgical workforce: Lessons from traumatic brain injury. *Frontiers in Surgery*, 9, 962867. <https://doi.org/10.3389/fsurg.2022.962867>
- [34] Maldonado, J., Huang, J. H., Childs, E. W., & Tharakan, B. (2023). Racial/ethnic differences in traumatic brain injury: Pathophysiology, outcomes, and future directions. *Journal of Neurotrauma*, 40(5–6), 502–513. <https://doi.org/10.1089/neu.2021.0455>
- [35] Mohler, E. C., & Rudman, D. (2022). Negotiating the insider/outsider researcher position within qualitative disability studies research. *The Qualitative Report*, 27(6), 1511–1521. <https://doi.org/10.46743/2160-3715/2022.5047>
- [36] Kersey, J., Garcia, P., Evans, E., Ahonle, Z. J., Jethani, P., Arango-Lasprilla, J. C., Kumar, D., Lequerica, A. H., Morel Valdes, G. M., Salinas, P., & Parrott, D. (2025). Underrepresentation of participants from marginalized racial and ethnic groups: A secondary analysis of the cognitive rehabilitation literature. *Archives of Rehabilitation Research and Clinical Translation*, 7(2), 100431. <https://doi.org/10.1016/j.arrct.2025.100431>
- [37] Watson, J. D., Perrin, P. B., & Arango-Lasprilla, J. C. (2025). Disparities between Native Americans and White individuals in global outcome trajectories over the 5 years after traumatic brain injury: A model systems study. *PLOS ONE*, 20(4), e0321279. <https://doi.org/10.1371/journal.pone.0321279>
- [38] Neuroth, L. M., Tang, Y., Waller, A. E., & Harmon, K. J. (2025). Implications of case definition selection on traumatic brain injury trends: A controlled interrupted time-series analysis of North Carolina emergency department data. *Annals of Epidemiology*, 111, 82–86. <https://doi.org/10.1016/j.annepidem.2025.09.017>
- [39] Daugherty, J., Peterson, A., Waltzman, D., Breiding, M., Chen, J., Xu, L., DePadilla, L., & Corrigan, J. D. (2024). Rationale for the development of a traumatic brain injury case definition for the pilot National Concussion Surveillance System. *Journal of Head Trauma Rehabilitation*, 39(2), 115–120. <https://doi.org/10.1097/HTR.0000000000000900>
- [40] Wojda, P. J. (2025). Physician burnout: The making of a crisis. *Health Care Analysis*, 33(1), 15–34. <https://doi.org/10.1007/s10728-024-00496-w>
- [41] Moss, M. (2025). Mitigating burnout: The role of healthcare organizations. *ATS Scholar*, 6(3), 267–279. <https://doi.org/10.34197/ats-scholar.2024-0153PS>
- [42] Razai, M. S., Kooner, P., & Majeed, A. (2023). Strategies and interventions to improve healthcare professionals' well-being and reduce burnout. *Journal of Primary Care & Community Health*, 14, 21501319231178641. <https://doi.org/10.1177/21501319231178641>
- [43] Brown, E. S., Palka, J., Helm, S. V., & Kulikova, A. (2022). The relative importance of reputation and pride as predictors of employee turnover in an academic medical center. *Health Care Management Review*, 47(1), 66–77. <https://doi.org/10.1097/HMR.0000000000000301>

- [44] Shnapper-Cohen, M., Dolev, N., & Itzkovich, Y. (2023). Social identity in a public hospital: Sources, outcomes, and possible resolutions. *Current Psychology*, 42(16), 13975–13986. <https://doi.org/10.1007/s12144-022-02729-4>
- [45] Yan, Q., Jiang, Z., Harbin, Z., Tolbert, P. H., & Davies, M. G. (2021). Exploring the relationship between electronic health records and provider burnout: A systematic review. *Journal of the American Medical Informatics Association*, 28(5), 1009–1021. <https://doi.org/10.1093/jamia/ocab009>
- [46] Trocin, C., Lee, G., Bernardi, R., & Sarker, S. (2025). How do unintended consequences emerge from EHR implementation? An affordance perspective. *Information Systems Journal*, 35(1), 39–70. <https://doi.org/10.1111/isj.12526>
- [47] Muhiyaddin, R., Elfadl, A., Mohamed, E., Shah, Z., Alam, T., Abd-Alrazaq, A., & Househ, M. (2022). Electronic health records and physician burnout: A scoping review. *Studies in Health Technology and Informatics*, 289, 481–484. <https://doi.org/10.3233/SHTI210962>
- [48] Budd, J. (2023). Burnout related to electronic health record use in primary care. *Journal of Primary Care & Community Health*, 14, 21501319231166921. <https://doi.org/10.1177/21501319231166921>
- [49] Shen, A., Lemke, D., Bloom, M., Maya, M., Alban, R., Margulies, D. R., et al. (2024). Leveraging an EHR tool to improve provider adherence to the modified brain injury guidelines. *The American Journal of Surgery*, 238, 115982. <https://doi.org/10.1016/j.amjsurg.2024.115982>
- [50] Cleveland Manchanda, E. C., Ling, A. Y., Bottcher, J. L., Marsh, R. H., Brown, D. F. M., Bennett, C. L., & Yiadom, M. Y. A. B. (2022). Three decades of demographic trends among academic emergency physicians. *Journal of the American College of Emergency Physicians Open*, 3(4), e12781. <https://doi.org/10.1002/emp2.12781>
- [51] Banerjee, A., & Tan, A. (2022). Forced to uphold white supremacy, until we couldn't anymore. *The Lancet*, 400(10366), 1840–1841. [https://doi.org/10.1016/S0140-6736\(22\)02366-2](https://doi.org/10.1016/S0140-6736(22)02366-2)
- [52] Mulder, L., Garcia, E., Sirintrapun, S. J., Kundu, I., & Soles, R. (2024). Examining the role of diversity, equity, and inclusion in mitigating workforce burnout in laboratory medicine. *American Journal of Clinical Pathology*, 161(2), 130–139. <https://doi.org/10.1093/ajcp/aqad123>
- [53] Legha, R. K., & Martinek, N. N. (2023). White supremacy culture and the assimilation trauma of medical training: Ungaslighting the physician burnout discourse. *Medical Humanities*, 49(1), 142–146. <https://doi.org/10.1136/medhum-2022-012398>
- [54] Thakur, S., Chauhan, V., Galwankar, S., Lateef, F., Daniel, P., Cakir, Z., Lugo, K. M., Basnet, S., Bildik, B., Azahaf, S., Vural, S., Difelyi, B. H., & Moreno-Walton, L. (2025). Gender disparities and burnout among emergency physicians: A systematic review by the World Academic Council of Emergency Medicine–Female Leadership Academy for Medical Excellence. *Western Journal of Emergency Medicine*, 26(2), 338–346. <https://doi.org/10.5811/westjem.29331>
- [55] Lyubarova, R., Salman, L., & Rittenberg, E. (2023). Gender differences in physician burnout: Driving factors and potential solutions. *The Permanente Journal*, 27(2), 130–136. <https://doi.org/10.7812/TPP/23.023>
- [56] Song, X., Li, H., Jiang, N., Song, W., Ding, N., & Wen, D. (2021). The mediating role of social support in the relationship between physician burnout and professionalism behaviors. *Patient Education and Counseling*, 104(12), 3059–3065. <https://doi.org/10.1016/j.pec.2021.04.025>
- [57] Jemal, K., Hailu, D., Mekonnen, M., Tesfa, B., Bekele, K., & Kinati, T. (2023). The importance of compassion and respectful care for the health workforce: A mixed-methods study. *Journal of Public Health*, 31(2), 167–178. <https://doi.org/10.1007/s10389-021-01495-0>
- [58] Kartsonaki, M. G., Georgopoulos, D., Kondili, E., Nieri, A. S., Alevizaki, A., Nyktari, V., & Papaioannou, A. (2023). Prevalence and factors associated with compassion fatigue, compassion satisfaction, burnout in health professionals. *Nursing in Critical Care*, 28(2), 225–235. <https://doi.org/10.1111/nicc.12769>
- [59] Román-Calderón, J. P., Krikorian, A., Ruiz, E., Romero, A. M., & Lemos, M. (2024). Compassion and self-compassion: Counterfactors of burnout in medical students and physicians. *Psychological Reports*, 127(3), 1032–1049. <https://doi.org/10.1177/00332941221132995>
- [60] Riedel, P.-L., Kreh, A., Kulcar, V., Lieber, A., & Juen, B. (2022). A scoping review of moral stressors, moral distress and moral injury in healthcare workers during COVID-19. *International Journal of Environmental Research and Public Health*, 19(3), 1666. <https://doi.org/10.3390/ijerph19031666>
- [61] Johnson, K. M., Slavin, S. J., & Takahashi, T. A. (2023). Excellent vs excessive: Helping trainees balance performance and perfectionism. *Journal of Graduate Medical Education*, 15(4), 424–427. <https://doi.org/10.4300/JGME-D-23-00003.1>

- [62] Martin, S. R., Fortier, M. A., Heyming, T. W., Ahn, K., Nichols, W., Golden, C., Saadat, H., & Kain, Z. N. (2022). Perfectionism as a predictor of physician burnout. *BMC Health Services Research*, 22(1), 1425. <https://doi.org/10.1186/s12913-022-08785-7>
- [63] Batur, A., Aksan, A., Meneksedag, Y., & Karaca, M. A. (2023). Impostor phenomenon and burnout syndrome among emergency physicians: A cross-sectional study. *Archives of Environmental & Occupational Health*, 78(7–8), 379–388. <https://doi.org/10.1080/19338244.2023.2272122>
- [64] Thampi, A. G., & Pai, K. (2022). Can psychological capital protect perfectionist from burnout? A cross-sectional study among healthcare professionals in India. *Indian Journal of Positive Psychology*, 13(3), 238–243. <https://doi.org/10.15614/ijpp/2022/v13i3/218207>
- [65] Al-Worafi, Y. M. (2024). Burnout among healthcare professionals in developing countries. In Y. M. Al-Worafi (Ed.), *Handbook of medical and health sciences in developing countries: Education, practice, and research* (pp. 1–29). Springer. https://doi.org/10.1007/978-3-030-74786-2_224-1
- [66] Kleinhendler-Lustig, D., Hamdan, S., Mendlovic, J., & Gvion, Y. (2023). Burnout, depression, and suicidal ideation among physicians before and during COVID-19 and the contribution of perfectionism to physicians' suicidal risk. *Frontiers in Psychiatry*, 14, 1211180. <https://doi.org/10.3389/fpsyt.2023.1211180>
- [67] Ungur, A.-P., Bârsan, M., Socaciu, A.-I., Râjnoveanu, A. G., Ionuț, R., Goia, L., & Procopciuc, L. M. (2024). A narrative review of burnout syndrome in medical personnel. *Diagnostics*, 14(17), 1971. <https://doi.org/10.3390/diagnostics14171971>
- [68] Huang, H., Su, Y., Liao, L., Li, R., & Wang, L. (2024). Perceived organizational support, self-efficacy and cognitive reappraisal on resilience in emergency nurses who sustained workplace violence: A mediation analysis. *Journal of Advanced Nursing*, 80(6), 2379–2391. <https://doi.org/10.1111/jan.16006>
- [69] Chen, H., Cao, Z., Zhang, X., Duan, H., Jiang, S., & Cai, C. (2025). The association between perceived stress and resilience among medical staff during public health emergencies: Mediating effect of self-efficacy. *BMC Psychology*, 13, 1167. <https://doi.org/10.1186/s40359-025-03496-0>
- [70] Kiran, W., & Nuzhat-ul-Ain. (2024). Trait emotional intelligence, secondary trauma self-efficacy, and compassion fatigue among doctors. *Forman Journal of Social Sciences*, 4(2), 1–20. <https://doi.org/10.32368/FJSS.20240428>
- [71] Dong, A., Pan, Y., & He, F. (2025). A model for predicting secondary traumatic stress in emergency nurses: The roles of occupational stress, empathy, and psychological resilience. *Frontiers in Medicine*, 12, 1712821. <https://doi.org/10.3389/fmed.2025.1712821>
- [72] McCrae, R. R., & Costa, P. T., Jr. (2003). *Personality in adulthood: A five-factor theory perspective* (2nd ed.). Guilford Press.
- [73] McCrae, R. R., & Costa, P. T., Jr. (1987). Validation of the five-factor model of personality across instruments and observers. *Journal of Personality and Social Psychology*, 52(1), 81–90. <https://doi.org/10.1037/0022-3514.52.1.81>
- [74] Angelini, G. (2023). Big five model personality traits and job burnout: A systematic literature review. *BMC Psychology*, 11, 49. <https://doi.org/10.1186/s40359-023-01056-y>
- [75] Somville, F., Van der Mieren, G., De Cauwer, H., Van Bogaert, P., & Franck, E. (2022). Burnout, stress and Type D personality amongst hospital/emergency physicians. *International Archives of Occupational and Environmental Health*, 95(2), 389–398. <https://doi.org/10.1007/s00420-021-01766-z>
- [76] Jandackova, V. K., Koenig, J., Jarczok, M. N., Fischer, J. E., & Thayer, J. F. (2017). Potential biological pathways linking Type-D personality and poor health: A cross-sectional investigation. *PLOS ONE*, 12(4), e0176014. <https://doi.org/10.1371/journal.pone.0176014>
- [77] Ryan, E., Hore, K., Power, J., & Jackson, T. (2023). The relationship between physician burnout and depression, anxiety, suicidality and substance abuse: A mixed methods systematic review. *Frontiers in Public Health*, 11, 1133484. <https://doi.org/10.3389/fpubh.2023.1133484>
- [78] Riva, S., Antonietti, A., & Iannello, P. (2025). Personality, cognitive, and emotional factors in the emergency department: Complementary physicians' profiles. *Emergency Care Journal*, 21(3). <https://doi.org/10.4081/ecj.2025.13631>
- [79] Zhang, Q., Mu, M.-C., He, Y., Cai, Z.-L., & Li, Z.-C. (2020). Burnout in emergency medicine physicians: A meta-analysis and systematic review. *Medicine*, 99(32), e21462. <https://doi.org/10.1097/MD.00000000000021462>
- [80] Lim, R., Van Aarsen, K., Gray, S., Rang, L., Fitzpatrick, J., & Fischer, L. (2020). Emergency medicine physician burnout and wellness in Canada before COVID-19: A national survey. *Canadian Journal of Emergency Medicine*, 22(5), 603–607. <https://doi.org/10.1017/cem.2020.431>

- [81] Crowe, R. P., Fernandez, A. R., Pepe, P. E., Cash, R. E., Rivard, M. K., Wronski, R., Anderson, S. E., Hogan, T. H., Andridge, R. R., Panchal, A. R., & Ferketich, A. K. (2020). The association of job demands and resources with burnout among emergency medical services professionals. *Journal of the American College of Emergency Physicians Open*, 1(1), 6–16. <https://doi.org/10.1002/emp2.12014>
- [82] Jyothindran, R., d'Etienne, J. P., Marcum, K., Tijerina, A., Graca, C., Knowles, H., Chaudhari, B. R., Zenarosa, N. R., & Wang, H. (2020). Fulfillment, burnout and resilience in emergency medicine—Correlations and effects on patient and provider outcomes. *PLOS ONE*, 15(10), e0240934. <https://doi.org/10.1371/journal.pone.0240934>
- [83] Verougstraete, D., & Hachimi Idrissi, S. (2020). The impact of burn-out on emergency physicians and emergency medicine residents: A systematic review. *Acta Clinica Belgica*, 75(1), 57–79. <https://doi.org/10.1080/17843286.2019.1699690>
- [84] Xu, H. G., Kynoch, K., Tuckett, A., & Eley, R. (2020). Effectiveness of interventions to reduce emergency department staff occupational stress and/or burnout: A systematic review. *JBIS Evidence Synthesis*, 18(6), 1156–1188. <https://doi.org/10.11124/JBISRIR-D-19-00252>
- [85] Chor, W. P. D., Ng, W. M., Cheng, L., Situ, W., Chong, J. W., Ng, L. Y. A., Mok, P. L., Yau, Y. W., & Lin, Z. (2021). Burnout amongst emergency healthcare workers during the COVID-19 pandemic: A multi-center study. *The American Journal of Emergency Medicine*, 46, 700–702. <https://doi.org/10.1016/j.ajem.2020.10.040>
- [86] Gualano, M. R., Sinigaglia, T., Lo Moro, G., Rousset, S., Cremona, A., Bert, F., & Siliquini, R. (2021). The burden of burnout among healthcare professionals of intensive care units and emergency departments during the COVID-19 pandemic: A systematic review. *International Journal of Environmental Research and Public Health*, 18(15), 8172. <https://doi.org/10.3390/ijerph18158172>
- [87] Chang, J., Ray, J. M., Joseph, D., Evans, L. V., & Joseph, M. (2022). Burnout and post-traumatic stress disorder symptoms among emergency medicine resident physicians during the COVID-19 pandemic. *Western Journal of Emergency Medicine*, 23(2), 251–257. <https://doi.org/10.5811/westjem.2021.11.53186>
- [88] Rodriguez, R. M., Montoy, J. C. C., Hoth, K. F., Talan, D. A., Harland, K. K., Ten Eyck, P., Mower, W., Krishnadasan, A., Santibanez, S., & Mohr, N. (2021). Symptoms of anxiety, burnout, and PTSD and the mitigation effect of serologic testing in emergency department personnel during the COVID-19 pandemic. *Annals of Emergency Medicine*, 78(1), 35–43.e2. <https://doi.org/10.1016/j.annemergmed.2021.01.028>
- [89] Gandhi, T. K., & Singh, H. (2020). Reducing the risk of diagnostic error in the COVID-19 era. *Journal of Hospital Medicine*, 15(6), 363–366. <https://doi.org/10.12788/jhm.3461>
- [90] Newman-Toker, D. E., Peterson, S. M., Badihian, S., Hassoon, A., Nassery, N., Parizadeh, D., Wilson, L. M., Jia, Y., Omron, R., Tharmarajah, S., Guerin, L., Bastani, P. B., Fracica, E. A., Kotwal, S., & Robinson, K. A. (2022). Diagnostic errors in the emergency department: A systematic review (Comparative Effectiveness Review No. 258). Agency for Healthcare Research and Quality. <https://doi.org/10.23970/AHRQEPCCER258>
- [91] Alanazy, A. R. M., & Alruwaili, A. (2023). The global prevalence and associated factors of burnout among emergency department healthcare workers and the impact of the COVID-19 pandemic: A systematic review and meta-analysis. *Healthcare*, 11(15), 2220. <https://doi.org/10.3390/healthcare11152220>
- [92] Stirparo, G., Kacerik, E., Andreassi, A., Pausilli, P., Cortellaro, F., Coppo, A., Migliari, M., Albonico, A., Sechi, G. M., Zoli, A., & Signorelli, C. (2023). Emergency department waiting-time in the post pandemic era: New organizational models, a challenge for the future. *Acta Biomedica Atenei Parmensis*, 94(S3), e2023122. <https://doi.org/10.23750/abm.v94iS3.14262>
- [93] Kurt, B. F., Güven, O., & Selçuk, H. (2023). The effect of the COVID-19 pandemic on emergency department (ED) admissions in the only hospital of city center ED. *Cureus*, 15(9), e44527. <https://doi.org/10.7759/cureus.44527>
- [94] Sartini, M., Carbone, A., Demartini, A., Giribone, L., Oliva, M., Spagnolo, A. M., Cremonesi, P., Canale, F., & Cristina, M. L. (2022). Overcrowding in emergency department: Causes, consequences, and solutions—A narrative review. *Healthcare*, 10(9), 1625. <https://doi.org/10.3390/healthcare10091625>
- [95] Lin, K.-H., Selvanayagam, N., Patnaik, S., & Kuo, C.-Y. (2025). Burnout among physicians and nurses working in intensive care units and emergency departments: A systematic review and meta-analysis. *Journal of Emergency Nursing*, 51(4), 702–720. <https://doi.org/10.1016/j.jen.2025.02.007>
- [96] D'Mello, S. K., & Graesser, A. C. (2014). Confusion. In R. Pekrun & L. Linnenbrink-Garcia (Eds.), *International handbook of emotions in education* (pp. 289–310). Routledge.

- [97] Muis, K. R., Kohatsu, M., Pekrun, R., & Li, S. (2025). Confusion and confusion regulation: An empirical investigation of the emotion regulation in achievement situations model. *Contemporary Educational Psychology*, 80, 102350. <https://doi.org/10.1016/j.cedpsych.2025.102350>
- [98] Xu, T., Wang, J., Zhang, G., Zhang, L., & Zhou, Y. (2023). Confused or not: Decoding brain activity and recognizing confusion in reasoning learning using EEG. *Journal of Neural Engineering*, 20(2). <https://doi.org/10.1088/1741-2552/acbfe0>
- [99] Dimililer, Ç., & Kurt, M. (2019). The impact of collaborative writing and the stream of consciousness technique on writing. *Khazar Journal of Humanities and Social Sciences*, 22(3), 71–99. <https://doi.org/10.5782/2223-2621.2019.22.3.71>
- [100] Coppola, P., Allanson, J., Naci, L., Adapa, R., Finioia, P., Williams, G. B., Pickard, J. D., Owen, A. M., Menon, D. K., & Stamatakis, E. A. (2022). The complexity of the stream of consciousness. *Communications Biology*, 5(1), 1173. <https://doi.org/10.1038/s42003-022-04109-x>
- [101] Çapkinoğlu, G., & Erbay, M. (2023). The relationship of the stream of consciousness technique defined in literature with architecture. *AM Journal of Art and Media Studies*, (30), 231–243. <https://doi.org/10.25038/am.v0i29.565>
- [102] Sukhera, J. (2022). Narrative reviews: Flexible, rigorous, and practical. *Journal of Graduate Medical Education*, 14(4), 414–417. <https://doi.org/10.4300/JGME-D-22-00480.1>
- [103] Birke, D., von Contzen, E., & Kukkonen, K. (2022). Chrononarratology: Modelling historical change for narratology. *Narrative*, 30(1), 26–46. <https://doi.org/10.1353/nar.2022.000>
- [104] Nash, C. (2025). Regarding the UN Sustainable Goals of Well-Being, Gender Equality, and Climate Action: Reconsidering reproductive expectations of women worldwide. *Sexes*, 6(1), 13. <https://doi.org/10.3390/sexes6010013>
- [105] Lu, D. W., Lee, J., Alvarez, A., Sakamoto, J. T., Bird, S. B., Sundaram, V., Lall, M. D., Nordenholz, K. E., Manfredi, R. A., & Blomkalns, A. L. (2022). Drivers of professional fulfillment and burnout among emergency medicine faculty: A national wellness survey by the Society for Academic Emergency Medicine. *Academic Emergency Medicine*, 29(8), 987–998. <https://doi.org/10.1111/acem.14487>
- [106] Jachmann, A., Loser, A., Mettler, A., Exadaktylos, A., Müller, M., & Klingberg, K. (2025). Burnout, depression, and stress in emergency department nurses and physicians and the impact on private and work life: A systematic review. *Journal of the American College of Emergency Physicians Open*, 6(2), 100046. <https://doi.org/10.1016/j.acepjo.2025.100046>
- [107] Nash, C. (2023). Team mindfulness for healthcare burnout reduction. *Journal of Mental Health Disorders*, 3(1), 16–17. <https://doi.org/10.33696/mentalhealth.3.017>
- [108] Khattak, A. F., Mediratta, S., Venturini, S., Smith, B. G., Dubetz, P. T., Barthélemy, E. J., Turgeon, A. F., Menon, D. K., Gulek, B. G., Ganau, M., Mangat, H. S., Hendrick, K., Baber, T. U., Sherwan, Y., Ocal, E., Park, K. B., Johnson, W. D., Servadei, F., Rosseau, G., ... Khan, T. (2026). Global recognition of traumatic brain injury as a chronic and notifiable condition: A post-WHA78 advocacy commentary. *Brain Sciences*, 16(2), 134. <https://doi.org/10.3390/brainsci16020134>
- [109] Karaboue, M. A. A., Ministeri, F., Sessa, F., Nannola, C., Chisari, M. G., Cocimano, G., Di Mauro, L., Salerno, M., & Esposito, M. (2024). Traumatic brain injury as a public health issue: Epidemiology, prognostic factors and useful data from forensic practice. *Healthcare*, 12(22), 2266. <https://doi.org/10.3390/healthcare12222266>
- [110] O'Neil, M. E., Krushnic, D., Clauss, K., Baker-Robinson, W., Hannon, S., Cameron, D. C., Cook, L., Niederhausen, M., Kaplan, J., & Brenner, L. A. (2024). Harmonizing federal interagency traumatic brain injury research data to examine depression and suicide-related outcomes. *Rehabilitation Psychology*, 69(2), 159–170. <https://doi.org/10.1037/rep0000547>
- [111] Degtiar, I., & Rose, S. (2023). A review of generalizability and transportability. *Annual Review of Statistics and Its Application*, 10, 501–524. <https://doi.org/10.1146/annurev-statistics-042522-103837>
- [112] Peters, U., Krauss, A., & Braganza, O. (2022). Generalization bias in science. *Cognitive Science*, 46(9), e13188. <https://doi.org/10.1111/cogs.13188>
- [113] Beets, M. W., Weaver, R. G., Ioannidis, J. P. A., Geraci, M., Brazendale, K., Decker, L., Okely, A. D., Lubans, D., van Sluijs, E., Jago, R., Turner-McGrievy, G., Thrasher, J., Li, X., & Milat, A. J. (2020). Identification and evaluation of risk of generalizability biases in pilot versus efficacy/effectiveness trials: A systematic review and meta-analysis. *International Journal of Behavioral Nutrition and Physical Activity*, 17, 19. <https://doi.org/10.1186/s12966-020-0918-y>