Is it time to rethink education and training? Learning how to perform under pressure
An observational study

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Abstract

Emergency medicine workers are exposed daily to various stressors, especially work-related stress, which have been aggravated by the current SARS-CoV 2 pandemic and impact their physical and mental wellbeing. Nonetheless, although the efficacy of programs and strategies to improving the health of medical staff and patient care has been demonstrated, such programs and strategies are scarce. To assess the prevalence, types and consequences of stress in emergency medical workers in healthcare institutions and explore tools to cope with stressful situations at workplace. Two surveys were conducted. Survey 1 assessed the subjective stress levels and stressors of 21 emergency medicine professionals. Survey 2 was conducted amongst 103 healthcare workers at 3 hospitals in Germany. It comprised selected aspects of the German Mental Risk Assessment and a validated workload scale. None. The answer frequencies on Likert scales were descriptively evaluated. Survey 1: Emergency medical professionals experienced and reported the following high stress levels in acute situations: multitasking during a complex situation; factors associated with the work environment; fear of not appropriately controlling the situation; and lack of sleep. Survey 2: The highest stress levels were experienced in the areas "work environment" and "work organization." The highest scores on the workload scale were obtained for statements on work division, exhaustion, insufficient patient care due to time constraints, regulations, and lack of information. Approximately 80% of healthcare workers had experienced emotionally stressful situations at the workplace, and > 30% had lost a colleague to suicide. There are effective and proven methods to learn how to deal with stress that can easily be established in everyday clinical practice. Healthcare workers are subjected to numerous stressors in their work environment and observe the consequences of these stressors on their own and their colleagues' wellbeing. Coping strategies for high-pressure reduces and resists the job- immanent pressure and stress in healthcare workers.

Keywords: education and training, perform under pressure, mental health, patient safety

1. Introduction

To achieve high quality medical care, healthcare professionals are mediated with high levels of knowledge and technical skills on a regular basis. However, soft skills for stress coping strategies are not part of medical education and training, and mental toughness is not acquired through experience by itself. Clinical practice indicates that, regardless of the level of training and years of clinical experience, the ability to maintain a confident and focused mental state must be understood, learned, and trained. Emergency medicine is characterized by a high medical workload – the profession is intrinsically linked with high pressure moments when 1 must immediately make the right decisions and put them into practice within a short amount of time.[1] Moreover, acute events often entail the experience of serious illness and potential loss of a patient, posing a high psychological and emotional stress to the attending physician and staff. Emergency clinics are staffed

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24/7, and hence night shifts and long working hours that lead to lack of sleep may severely impair work-life balance and ultimately result in burnout syndrome. In the newly published ICD-11,[2] burnout syndrome has been redefined but is still listed as a Z-diagnosis. Burnout is described as a syndrome "resulting from chronic stress at work that is not successfully coped with." Burnout is characterized by 3 dimensions: a feeling of exhaustion; increasing mental distance or negative attitude toward 1's job; and reduced professional performance. Burnout is highly prevalent amongst emergency physicians, with rates above 70% being reported.[3–5] Factors triggering burnout include[1] an increasing load of administrative tasks that have to be completed in addition to the medical workload,[3] problems and miscommunication/lack of communication with coworkers or superiors,[4] lack of work-life balance,4 low financial appreciation and job satisfaction,5 and a heavy mental load due to stress and sleep deprivation.[5,6] Burnout consequences are severe, affecting mental (e.g., insomnia, depressive disorders, suicidal ideation) and physical (e.g., cardiovascular, gastrointestinal diseases, etc.) well-being. Additionally, affected individuals report increased job dissatisfaction, resulting in increased cynicism, which affects teamwork and leads to absenteeism and resignation. The latter 2 exacerbate the already strained staffing situation in hospitals and have a corresponding impact on adequate patient care in the long term.

The prevalence of substance abuse amongst medical professionals are particularly high in those specializing in emergency medicine, especially those in training and residency.[7–9] Although it is well known that acute and emergency medicine is characterized by a dynamic, demanding and stressful environment, there are few established structures in place to address and counteract the emergency workers' situation. The World Health Organization has declared 2021 the "*Year of Health and Care Workers*" in an international campaign.[2] This campaign showed the need to address the health and resilience of people working in the healthcare sector. Nonetheless, because of the needs of healthcare workers are differently perceived by authorities, support systems to improve the situation of health care workers within the organizational unit are rarely in place.[10] Primary interventions are necessary to prevent a deterioration in physical and mental health throughout professionals' medical career, rather than secondary approaches to treat the already manifested consequences such as burnout and addiction.[11–13] To understand, learn, and train on how to perform under pressure can enable appropriate preparation for sophisticated stressful situations and improve overall employee performance. Importantly, lack of appropriate coping skills for stressful situations aggravates the already impaired physical and mental state and contributes to exhaustion and burnout.[5,11] Providing emergency medical professionals with mental skills can also prepare them for everyday stresses and the special conditions of acute and emergency medicine, thereby helping them deal with acute stressful situations, and increase their resilience and performance.[14–16] Thus, system-immanent problems and ultimately patient care and safety could be improved in the future by implementing stress management programs for medical staff.[17,18]

The impact of the current SARS-CoV 2 pandemic on the physical and mental health of healthcare workers has been demonstrated with increased and ongoing stress and a higher than ever need to provide specific support to prevent burnout.[17,19] The aim of the present study was to examine which factors cause stress, their frequency, and their impact on physical and mental wellbeing of medical staff. Furthermore, recent literature was screened to identify strategies for stress alleviation in healthcare workers. To this end, the following 3 research questions were addressed: What factors are perceived as stressful by acute and emergency medical staff?; What factors are perceived as stressful in acute and emergency medicine by people who attend a seminar dealing specifically with the topic of how to cope with

stress?; Which factors for relieving and dealing with stress can be identified for the above-mentioned target group through a literature review?

2. Methods

Three approaches were chosen to answer the research questions: 1 quantitative study for a larger sample to identify aspects of stress (study 1 for research question; 1 quantitative study for a smaller sample of individuals proactively learning about stress management in a seminar setting (study 2 for research question; 1 literature review to identify aspects that may be supportive in dealing with stress for the target group medical staff (study 3 for research question 3).

2.1. Study 1

Study 1 investigated the stress situation of medical staff (N = 103, 52.4% female, mean age 40 ± 11,88 years) at 3 hospitals in southern. Data collection took place September – October 2021. The sample consisted of medical specialists (65%) and physicians in residency training (35%). The respondents had a mean work experience of 11.86 ± 12.51 years. Around 77.45% worked fulltime, 56.31% were working in the OR, 16.50% in IMC/ICU, and 6.8% in the emergency room. The questionnaire comprised: selected aspects of the German Mental Risk Assessment (work task, organization, environment, stressful events) that were rated on a 10-point-Likert-Scale; and a validated workload scale (5-point Likert scale), according to Baumberger et al[20]; the answer frequencies were evaluated for each question using descriptive statistics.

2.2. Study 2

Study 2 conducted a short quantitative survey of medical staff (N = 21) in a medical lecture (Topic "How to cope with stress"). They were asked to evaluate their own stress levels and stressors contributing to stressful situations on a 5-point-Likert-Scale (0 = not stressed–5 = extremely stressed). All participants were physicians (57 % female, 43 % male).

2.3. Study 3

To generate results for answering research question 3, a targeted literature review was conducted in medical literature databases (PubMed, Science Direct, Cochrane Library) to identify stress-coping strategies targeted at healthcare workers.

3. Results

3.1. Study 1

Results of selected aspects of the German Mental Risk Assessment (Likert Scale ranging from 1 = no stress to 10 = highest level of stress in different areas of their workplace) show that the highest stress level is experienced in the work environment and the work organization (Fig. 1).

Figure 2 shows the results of the workload scale, in which each workload aspect was rated on a 5-point Likert scale. This psychometric response scale allows responders to choose their level of agreement (1: *strongly disagree* – 5: *strongly agree*). Here, higher scores correspond to a more significant overall workload (overall scale), greater "coordination and information problems" (subscale 1), and more "psychophysical overload" (subscale 2). Therefore, the workload scale is reliable. The Cronbach's alpha value for the items used to measure workload is $\alpha = .79$ (coordination and information problems subscale: $\alpha = .74$, psychophysical overload subscale: $\alpha = .73$).

Selected aspects from
German Mental Risk Assessment
[mean]
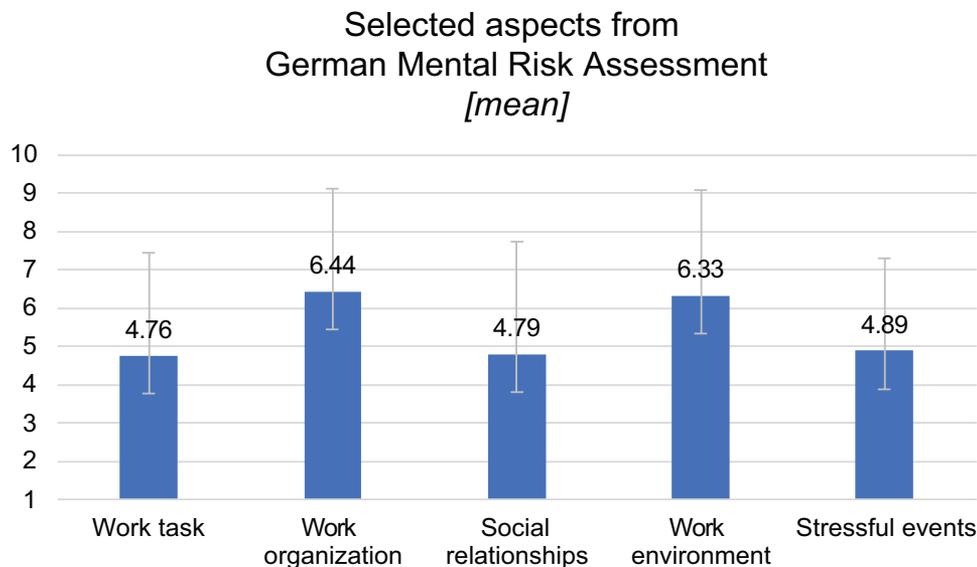
Figure 1. Selected aspects of the German mental risk assessment as indicated by medical staff (N = 103) from 3 different hospitals in Germany.

On an item basis, the highest scores were obtained for statements on work division, exhaustion, and insufficient patient care due to time constraints, regulations, and lack of information. Participants rated their overall workload at the scale level as $M = 2.96$ ($SD = 0.47$). In the "coordination and information problems" subscale, the mean score was $M = 2.90$ ($SD = 0.56$). The subscale "psychophysical overload" was rated with an average of $M = 3.16$ ($SD = 0.64$).

3.2. Consequences of stress at the workplace

Approx. 80% of respondents had experienced emotionally very stressful events at work during the past 2 years (Fig. 3). Nearly 70% of respondents stated that they know colleagues who have left their profession due to stress, and over 30% of respondents stated that they had lost colleagues to suicide in their team. Within the average work experience of 11.86 years, an average of 11.87 stressful events were mentioned. Some of the respondents stated that they had experienced more than 100 stressful events in their careers.

3.3. Study 2

On a scale from 0 = not stressed to 5 = extremely stressed, the physicians rated their current stress level at the time of the survey on average as 2.2 (SD = 0.83, Min = 1, Max = 4), their average stress level as 3.1 (SD = 0.53, Min = 2, Max = 4), and their stress level during an acute situation as 4.0 (SD = 0.86, Min = 2, Max = 4 Fig. 4). The most frequent stressor during an acute situation was the requirement for multitasking during a complex situation, followed by factors associated with the work environment, a fear of not appropriately controlling the situation, and lack of sleep (Fig. 5). The emergency physicians were also asked to describe their behavior under stress. The most frequently stated consequence of stress was difficulty in concentrating and thinking clearly, followed by increased blood pressure (Fig. 6).

3.4. Study 3: Literature search

The results of the literature search yielded the following findings. Emergency workers need to be educated regarding their stress response and taught how to cope with and reduce stress effectively. Among others, the positive effects of successful stress management are an increased sense of control and an increased ability to concentrate. Ultimately, these positive effects are relevant not only to emergency workers affected by stress but also to the successful treatment of the patient. Based on the results, it can be recommended to offer interventions with the following content and structure for the target group:

3.5. Becoming aware of dysfunctional stress related thoughts

Based on the transactional stress model, the effect of stress can be reduced through cognitive training by becoming aware of dysfunctional stress related thoughts.[21] In high stress situations, some individuals tend to react with counterproductive, stress-increasing thoughts like "I have to do it on my own," or "I am not allowed to make mistakes." These thoughts might exacerbate the perceived stress. Analyzing 1's own typical cognitive stress response (e.g., own confrontation with irrational evaluations) and then actively working towards changing it (e.g., practicing stress-reducing activities, which counteracts specific thoughts like "I am allowed to ask for help") is a standard approach in cognitive stress reduction.[22]

3.6. Find a positive mind set and increase positive self-verbalization

In stressful situations, cue stimuli can trigger memories of similar past situations. Unfortunately, these are often negative memories, which then might lead to further negative thoughts ending in a vicious circle (e.g., negative thoughts lead to an overall negative mindset, which then lead to increased fear, stress, which again trigger more negative thoughts). Therefore, training for a positive mindset and building confidence for a positive outcome (e.g., by focusing on what is done well or employing positive self-verbalization according to Meichenbaum) might reduce the perceived stress.[23]

3.7. Have alternatives for successful management of a stressful situation

Acute stress is thought to impair frontal functions, which are relevant for attention processing.[24] In high stress situations and depending on the hypothalamic – pituitary – adrenal stress

Workload
(validated scale, Bartholomeyczik, 2014. Adapted with regard to
addressing the target group: medical staff)
[mean]
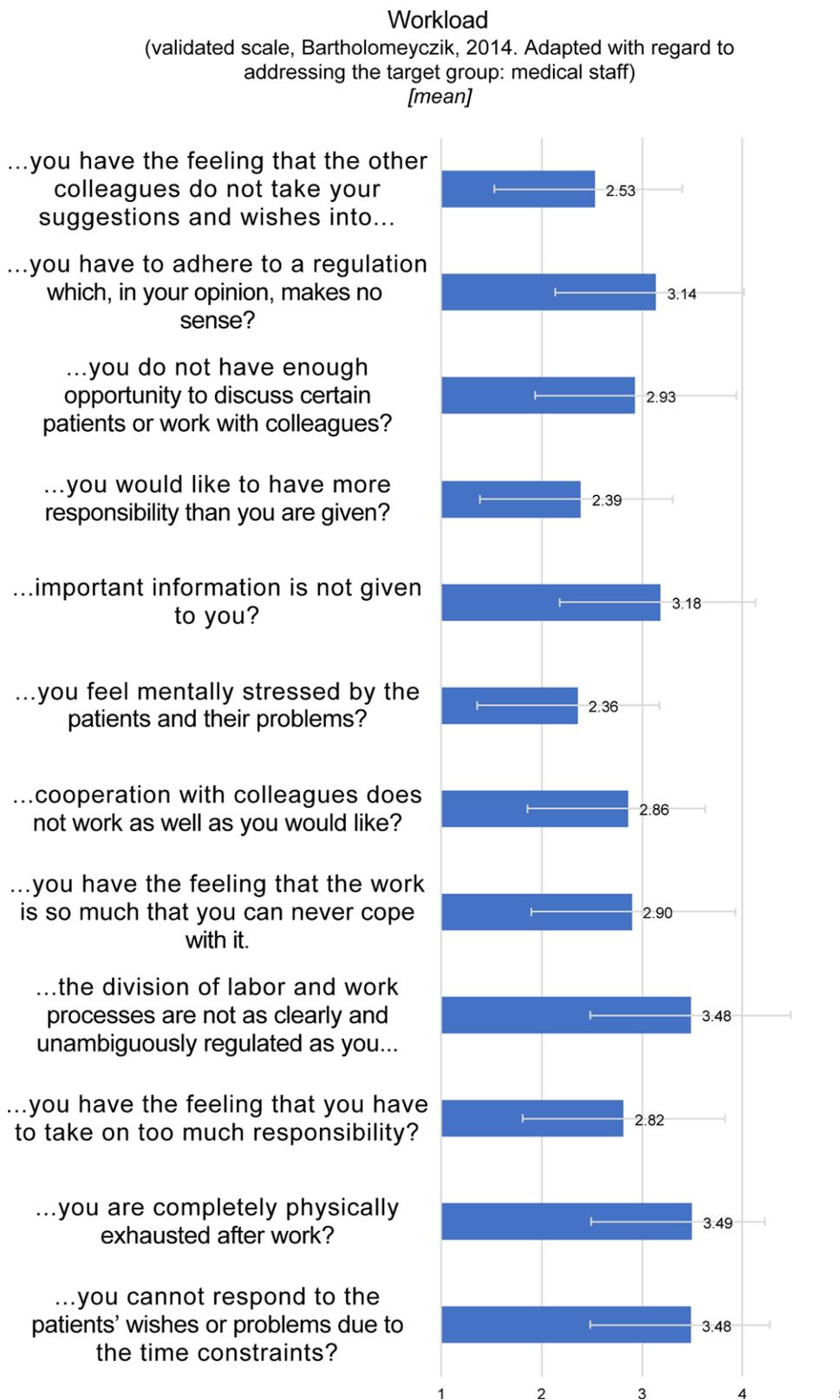
Figure 2. Workload according to Bartholomeyczik et al 2014 (5-point Likert scale).

response time course, attentional selection switches from a thoughtful top- down control to a bottom-up control.[25] Thus, instead of relying on our knowledge to understand a situation and to guide our behavior (e.g., deciding what is most relevant to the task), the salience of stimuli dominates our thinking, resulting in a deficient controllability of irrelevant, stimuli that distracts us.[26] In order to maintain the ability to act, it is therefore advisable to prepare alternative courses of action in advance, example, to simulate a typical high stress situation. This increases the probability of not making decisions based on

Consequences of stress at work
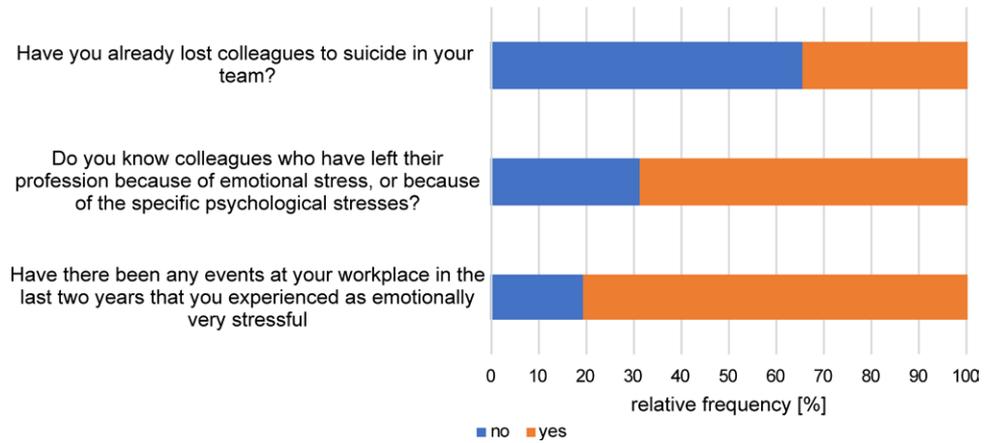
Figure 3. Consequences of stress at work.

Stress level of physicians
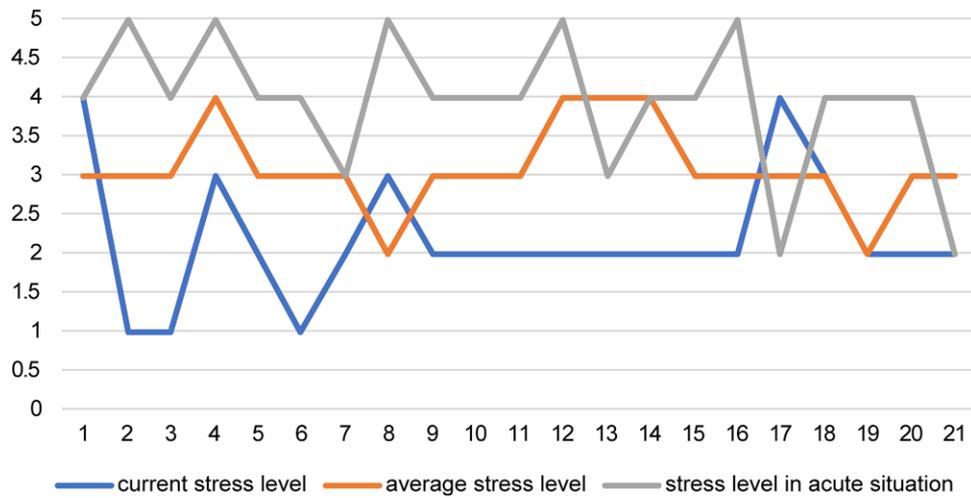
Figure 4. Stress level of emergency physicians during the survey, on average, and during an acute situation.

Stressors for physicians in acute situations (%)
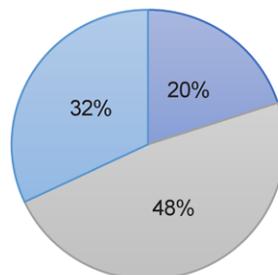
- institutional stressors: exhaustion, concerns about job consequences, unclear hierarchy
- situational stressors: multitasking, noise, disturbance during decision making, lack of coordination
- personal stress amplifiers: self-doubt, fear of mistakes, lack of experience

Figure 5. Stressors for emergency physicians during an acute situation.

Reaction of physicians to stress (%)
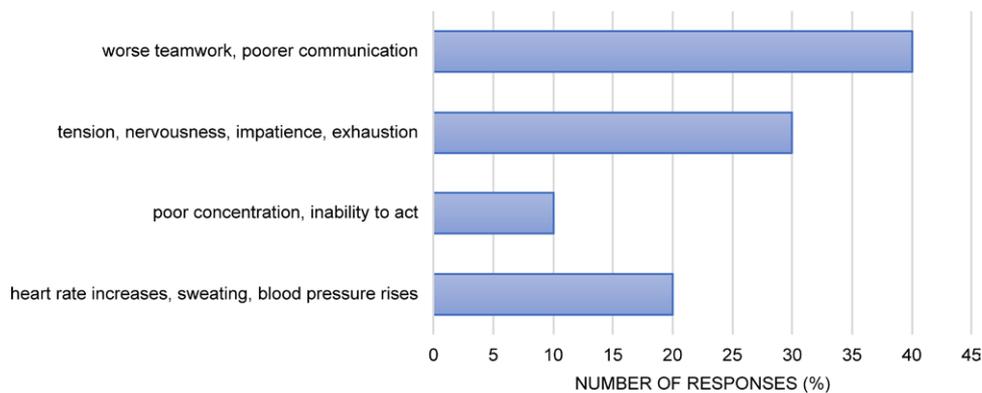
Figure 6. Reactions of emergency physicians to stress.

irrelevant stimuli in a high-stress situation, but instead having meaningful alternatives at hand. Although emergency medicine inherently involves complex and novel situations, many acute situations can be anticipated and the response to such situations can be trained. Stress management training, which is integrated into simulation training, contributes to the preparation of employees in emergency medicine. The online course "Stress Management for the Trauma Service Provider" offered by the international Critical Incident Stress Foundation is an excellent example for such a simulation training.

3.8. Develop strategies to increase mindfulness and awareness

According to the American Psychological Association,[27] mindfulness is: "…a moment-to- moment awareness of 1's experience without judgment. In this sense, mindfulness is a state and not a trait. While it might be promoted by certain practices or activities, such as meditation, it is not equivalent to or synonymous with them."

Regular and sustained mindfulness practice (e.g., practicing moment-to-moment awareness, self-compassion) has been shown to improve attentional control, increase awareness of internal and external experiences and reduce automatic reactivity in emotional, physiological and behavioral domains.[28–30] Furthermore, Gu et al showed in their review, that people who practiced mindfulness were less likely to react with negative thoughts or unhelpful emotional reactions in time of stress.[31] Consequently, a regular mindfulness practice might be especially beneficial for emergency workers. Salahuddin and Waheed developed a practice-related course for residents in emergency medicine to increase their mindfulness.[32] The course is composed of strategies to enhance mindfulness-based stress reduction, incorporate mindfulness-based interventions, and increase resilience as a combination of physical and psychological exercises and practices.

3.9. Foster resilience and increase self-efficacy

Resilience is the term used to describe psychological hardiness: That is, the ability to cope with crises and use them as an occasion for development by drawing on personal and socially mediated resources. According to the American Psychological Association everyone can learn to strengthen his or her resilience and cope better with crisis. Among other things, the APA recommends promoting positive self-perception through regular self- reflection and thus strengthening self-efficacy. Instead of focusing on what has gone wrong and beating oneself up, it

is advised to focus on individual strengths and aspects which went well. Especially in the emergency room, the situation is characterized by a high degree of complexity and time pressure, with little time for self-reflection. Accordingly, the focus is more on optimization when something does not work, but successes are accepted as a given and not considered further. However, to strengthen self-efficacy and reducing stress in the long run, it is advisable to analyze successful situations (ideally in a team) and to work out success factors. One strategy to do so is to write down positive attributes and how they helped to successfully manage a previous stressful situation. Realizing that a particular situation has been successfully handled in the past strengthens self-confidence of the individual and the team. Thus, focusing on successes helps to build self and collective- efficacy and eventually increases optimism.[10]

3.10. Reduce ambiguity and increase clear communication: Pre-briefing and debriefing

In a high-stress situation, immediate action is required. Accordingly, it is important that the individual has clarity about his role and tasks. Lack of clarity results in uncertainty for the individual, a heightened situational ambiguity and thus an increase in perceived stress and a reduction in team performance. Zimmer et al showed in their study, that communication in emergency medicine is often deficient and that uniform training should be developed and made available to healthcare workers in this field.[33] One way to improve communication is by ensuring a shared mental model. This means that the team has a common understanding of its scope and the roles of its team members. The crucial tool to build up a shared mental model is pre-briefing. A team pre-brief sets up expectations for a shift, allows people to ask questions and clarify roles, and addresses any likely challenges that the team might experience that day.[34] In this course also expected stressors can be addressed. Visualizing individual concerns and identifying potential stressors can help in preparing for stressful situations. In a sense of "knowing the enemy," stressors may be prevented or eliminated before they can even become a stressor. Debriefing after a case or a shift is also important for building shared mental models and improving performance. A meta-analysis by Tannenbaum found that teams that engage in debriefs outperform other teams by 25%, on average.[35]

3.11. Peer support, sharing and reducing the pressure by openly communicating feelings

Generally, peer support has been proven to support psychological resilience by enhancing coping skills and providing

social support.[36] Particularly, in the health care system and for emergency workers, the positive effects of peer support have been widely researched and documented. In another report, a decrease in perceived stress and an increase in mental wellbeing as positive effects of regular meetings (in which problems and concerns are exchanged with fellow physicians and possible solutions and mitigation strategies) are discussed.[37,38] Despite the positive effects, there is hardly a systematic peer support program in place. A notable exception is RISE (Resilience in Stressful Events), initiated by the Johns Hopkins University and the PSU Akut e.V. initiated by independent physicians. RISE is a confidential program for peer support that offers psychological support for healthcare workers after stressful patient-related events.[39] In Germany, PSU Akut e.V. supports ways to implement peer support structures in hospitals and health care institutions (www.psu-akut.de). It is strongly recommended to expand the peer support structures in the long term. Research by Bartone et al, Daniels et al, and Rebeiro et al has shown that the training, ongoing monitoring, and supervision are decisive for successful implementation.[40–42] Evidence-based training for peer workers is critical to delivering a structured peer support program. Peer workers should also understand the values, philosophy, and standards of peer support services and have the competencies required to be an effective peer worker.

3.12. Acute-stress relief

Focus on controllable aspects: Participants in our survey, indicated that the lack of control over an acute situation increases their stress level (Fig. 5). Emergency situations are often associated with factors that cannot be controlled, yet many factors can be controlled if appropriate measures are taken. Therefore, pressure may be reduced by distinguishing between controllable and uncontrollable factors in the situation. In doing so, the focus can be shifted to those parameters that can be controlled while uncontrollable factors are excluded from the scenario. Focusing on what is controllable increases the self-efficacy which then in turn reduces 1s' own stress-level.

Regulate breathing and practice meditation: Breathing techniques and meditation are useful tools to decrease pressure and stress. In emergency medicine, square or box breathing techniques have proven helpful in controlling respiration, inducing deep breathing and more calmly controlling the situation.[43] Mediation techniques can be employed before an acute situation to induce calm and increase concentration. Lynch et al propose that mantra meditation can increase the self-awareness of emergency medicine workers and thereby help them to control their reactions in an acute situation and reduce stress.[44] Azizoddin et al observed a significant reduction in stress-induced psychological symptoms of emergency workers during the SARS-CoV 2 pandemic after a transcendental meditation intervention.[45]

4. Discussion

The article demonstrates that most respondents have experienced stressful situations in their workplace, triggered by a combination of institutional stressors (e.g., work environment), situational stressors (e.g., complaining relatives), and individual stress intensifiers (e.g., dysfunctional thoughts like I am not well trained enough). Even though we did not directly record burnout symptoms, our data allow the cautious interpretation that the respondents are at risk of developing burnout syndrome due to high general stress levels in combination with the clinic- and job-specific factors (lack of recovery time, insufficient communication and thus lack of information, and lack of room for maneuver). This applies both to the broad target group of medical staff and a selected sample concerning a seminar on dealing with stress.

Thus, the results suggest that emergency workers are suffering from stress and that there is an urgent need to improve stress management in the clinical setting to protect their physical and mental well-being. Ultimately, this is the only way to ensure patient care in the long term.

However, most studies that address the medical profession and mental health of emergency workers focus on the treatment of mental disorders (e.g., burnout, anxiety, depression) caused by the profession.[46] Only quite recently there has been a shift in focus from treating stress-related mental diseases to preventing them.[47] In 2012, Schmitz et al assessed typical issues faced by emergency workers and identified the following aspects that may aid in preventing psychological distress: raising awareness for the necessity of emergency worker wellbeing, discovering and tackling substance abuse early on, improving personal wellbeing through exercise and nutrition, self-education to cope with work-related health risks and litigation, and learning practices to cope with sleep deprivation and changing circadian rhythms.[11] Regardless of the intervention, it should aim at the reduction of feelings of stress. Furthermore, preparatory measures and acute stress relief methods should be part of the education and training curriculum of emergency workers.

5. Conclusion

In summary, preparation to cope with high-pressure situations may support healthcare workers in successfully managing daily challenges and reducing their pressure and stress. This in turn will increase the quality of patient care, employee satisfaction and patient safety. Therefore, it is important to rethink traditional training concepts and attach importance to mental stability. Areas identified as particularly important in this context are realization and communication of pressure and stressors, personal wellbeing and mindfulness, realization of individual abilities and stressors, and preparedness for a stressful, high-pressure situation. However, the present study's findings are limited by the small sample size in Survey 1. Furthermore, a lack of available long-term data on the effects of stress-reducing methods, employee satisfaction, and turnover must be addressed. Finally, the interventions presented in this study are general stress reduction methods and were not tested for healthcare workers' specific needs.

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