

Review Article

Effects of mindfulness and meditation techniques on mental health of Emergency Department healthcare workers: a systematic review

Efeitos de técnicas de mindfulness e meditação na saúde mental de profissionais de saúde no Departamento de Emergência: uma revisão sistemática

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Correa ES, Rocha RM, Villari CA, Alencar JCG, Souza HP. Effects of mindfulness and meditation techniques on mental health of Emergency Department healthcare workers: a systematic review / *Efeitos de técnicas de mindfulness e meditação na saúde mental de profissionais de saúde no Departamento de Emergência: uma revisão sistemática*. Rev Med (São Paulo). 2023 Jan-Feb;102(1):e-199975.

ABSTRACT: *Background:* Working in the Emergency Department (ED) is linked to mental health effects, such as stress and burnout. Meditation and mindfulness are seen as ways of reducing the frequency and intensity of these issues. *Objectives:* To evaluate if meditation and mindfulness reduce the frequency of negative mental health outcomes among ED Healthcare Workers. *Methods:* We included studies in English which analyzed interventions using meditation or mindfulness and ED staff's mental health outcomes. *PubMed*, *SciELO* and *LILACS* were used as databases. *Results:* 8 studies were included. Meditation techniques and outcomes evaluated were heterogeneous. Interventions were associated with reduced burnout, emotional exhaustion, or increased job satisfaction. *Discussion:* This study indicates that meditation and mindfulness decrease frequency and intensity of negative mental health outcomes among professionals in the ED. This review has limitations: some studies have methodological problems and limitations such as small sample size; measurements of outcomes were heterogeneous, and results are not always concordant. Studies with higher sample sizes and stricter methodology are needed for us to achieve conclusions about the effectiveness of these interventions.

Keywords: Burnout; Hospital emergency service; Meditation; Mindfulness.

RESUMO: *Contexto:* Profissionais de saúde que atuam no Departamento de Emergência (DE) estão sob risco de estresse e burnout. Meditação e *mindfulness* são alternativas propostas para redução da frequência e intensidade desses desfechos. *Objetivos:* Avaliar se meditação e *mindfulness* reduzem a frequência de desfechos negativos de saúde mental em profissionais no DE. *Métodos:* Foram analisados artigos em Inglês que estudaram intervenções utilizando técnicas de meditação e desfechos em saúde mental de profissionais do DE. *PubMed*, *SciELO* e *LILACS* foram utilizadas como bases de dados. *Resultados:* Foram incluídos 8 estudos, que avaliaram diferentes técnicas de meditação e desfechos heterogêneos. A intervenção foi associada a redução de burnout, exaustão emocional ou aumento na satisfação no trabalho. *Discussão:* Achados indicam que meditação e *mindfulness* reduzem desfechos negativos de saúde mental. Alguns estudos têm problemas e limitações, como pequeno tamanho amostral. Além disso, as medidas dos desfechos foram heterogêneas, e seus resultados não são de todo concordantes. Ensaios clínicos com maior número de participantes são necessários para tirar conclusões com relação à efetividade dessas intervenções.

Palavras-chave: Burnout; Serviço hospitalar de emergência; Meditação; Mindfulness

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INTRODUCTION

Working in an Emergency Department is associated with high levels of stress^{1,2}. Multiple organizational factors such as overcrowding, excessive workload, staff shortages, fear of making mistakes, exposure to traumatic events, and budgetary constraints may lead to occupational stress³. Burnout is the most common chronic work-related stress exposure, and it has been reported that the prevalence of burnout is around 40% among Emergency Physicians⁴.

In face of this scenario, when looking for accessible interventions that may adapt to the routine of ED Healthcare Workers, meditation and mindfulness techniques seem to be an adequate option. Mindfulness practices are centered on the attempt to develop a mental state in which conscience is totally turned to the present⁵ and, as shown by many studies^{5,6}, they show great potential as an intervention to mental health problems.

Despite existing systematic reviews about stress reduction interventions⁷, the review did not study effectiveness of interventions by professional specialty, which makes it difficult to generalize these findings to all ED Healthcare Workers, including Emergency Physicians. Therefore, the goal of this systematic review is to determine the effectiveness of interventions based on meditation or mindfulness techniques to reduce mental health problems, mainly occupational stress and burnout, specifically for staff working in the ED environment.

METHODS

Registration and ethical approval

Our study is based on published data; thus, ethical approval is not required.

Search strategy

This systematic review was performed according to the Preferred Reporting Items for Systematic Reviews and Meta-Analyses statement (PRISMA)⁸.

We searched, in March 2021, the *PubMed*, *LILACS* and *SciELO* databases for articles published from January 1990 until February 2021.

The search strategy included the search terms (“Meditation”) OR (“Mindfulness”) AND (“Emergency medicine”) OR (“Emergency department”) OR (“Emergency physician”) OR (“Emergency Service “).

The inclusion criteria were: studies published in scientific journals with full text available in English; studies whose subjects were members of the health team or students taking health courses and working in the ED; studies which involved interventions and quantitative analysis of outcomes; studies that had the frequency or intensity of mental health problems as an analyzed outcome. Studies with mixed (quantitative and qualitative) analysis of

outcomes were also included.

Exclusion criteria were: studies with a setting that was not the Emergency Department; studies which had an exclusively qualitative analysis; and studies that weren’t published in a scientific paper.

In the first phase, all the articles found were included in the Rayyan® platform⁹, and three independent reviewers (ESC, RMR, CAR) categorized the articles into “Yes”, “No” or “Perhaps” from the reading the title and the abstract. Articles that received a unanimous “Yes” were read in full for inclusion evaluation. Nonunanimous articles were evaluated by a fourth reviewer (JCGA) who gave an opinion on the inclusion of the article.

In the second phase, all articles that received a unanimous “Yes” or were approved by the fourth reviewer were read in full by the three reviewers (ESC, RMR, CAR) independently. Any conflicts in the decision to include/exclude were evaluated by the fourth reviewer.

RESULTS

Initially, 144 articles were selected after searching the databases. Using Rayyan® software⁹, 50 duplicates were identified and excluded, so 94 articles remained for the first phase of the analysis.

Ten articles were selected after reading the title and abstract, and the articles were then read in full by the reviewers. Two studies were excluded in the second phase: one because it was a qualitative study, and one because it addressed students who were not working in the ED.

The eight selected articles constitute this systematic review (Figure 1).

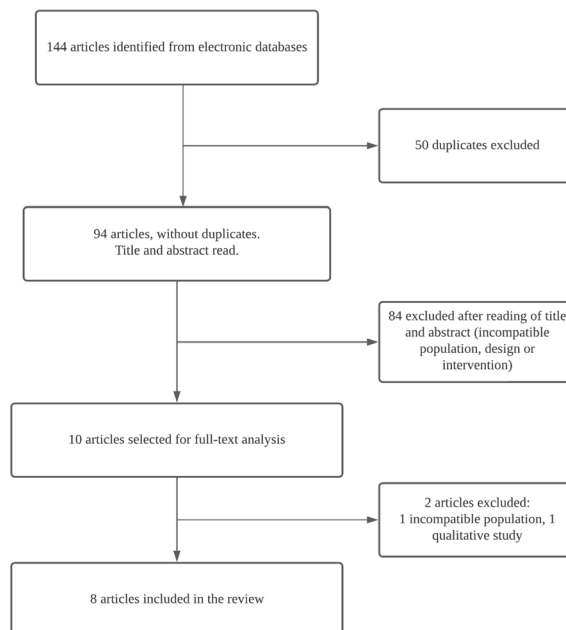


Figure 1: Diagram of study selection

Table 1 - Included Studies

Author	Journal	Year	Country	Study design	N	Population
Braganza et al. (2018) ¹²	Emerg Med Australas	2018	Australia	Descriptive evaluation of the "mixed method"	66	Doctors, nurses and health workers associated with the emergency department
Lambert et al. (2020) ¹³	Am J Emerg Med	2020	United States	Prospective randomized controlled trial	39	Emergency doctors and nurses
Chung et al. (2018) ¹⁰	West J Emerg Med	2018	United States	Experimental, (clinical trial, before/after)	20	Intern doctors in the emergency department
Dunne et al. (2019) ¹⁷	J Integr Med	2019	Ireland	Randomized controlled clinical trial (control waiting list)	47	Multidisciplinary team in the emergency department
Ireland et al. (2017) ¹⁶	Med Teach	2017	Australia	Randomized controlled clinical trial	44	Intern doctors in the emergency department
Blanco Donoso et al. (2017) ¹⁴	Int J Psychol Psychol Ther	2017	Spain	Randomized controlled clinical trial (waiting list control)	50	Nursing team of medical ICU, surgical ICU or emergency room
Muir KJ; Keim-Malpass J (2019) ¹¹	J Holist Nurs	2019	United States	Study with mixed methods pre/post intervention with 3 data collection points: Before the intervention, at its completion and 1 to 3 months after its completion	35	Nurses and patient care technicians (PCTs)
Saban et al. (2021) ¹⁵	J. Emerg. Nurs.	2021	Israel	Two phases (pre-post intervention); without control group	48	Emergency Nurses

Table 2 - Results

Author	Objective of study	Intervention	Measures evaluated	Results
Braganza et al. (2018) ¹²	Describe a program developed to address stress at the Emergency Department, report the feasibility and sustainability of the program and its impact on staff.	Subjects started participation with a day-long mindfulness workshop. The following activities were daily 4-minute pauses at the time of medical handovers, and weekly 30-minute mindfulness sessions, during 12 months.	Kessler Psychological Distress Scale, Maslach Burnout Inventory-Human Service Survey	The mean Kessler Psychological Distress Scale score decreased significantly. There were no significant changes in the mean scores reflected by the Maslach Burnout Inventory-Human Service Survey.
Lambert et al. (2020) ¹³	Evaluate the efficacy of a phone-based meditation application in reducing stress, burnout, anxiety and depression in Emergency Medicine nurses and physicians after 3 months of weekly use.	Subjects downloaded an application with twelve guided meditation activities from 3.5 to 21 minutes, and were instructed to use the application weekly, for 90 days.	Perceived Stress Scale, Beck Depression Inventory, Beck Anxiety Inventory, Maslach Burnout Inventory-Human Service Survey	Decrease in the Perceived Stress Scale and Beck Depression Inventory and increase in the Personal Accomplishment aspect of Maslach Burnout Inventory compared to the control group
Chung et al. (2018) ¹⁰	Not mentioned in article	Subjects engaged in weekly lessons about the meditation theme, and had individual meditation assignments and filled a journal about the lessons and the experience, during 4 weeks.	Approval and learning by the students	Approval and successful learning by students. No burnout or stress was measured.
Dunne et al. (2019) ¹⁷	Apply an Attention-based Training (ABT) program to reduce burnout among multidisciplinary team.	Subjects participated in four sessions of Attention-based Training (ABT) during 7 weeks. The practice target consisted in repetition of a non-English mantra, during 20 minutes, twice a day.	Adherence, Maslach Burnout Inventory, Stress Scores. Biological evaluation: TNF-alpha, minutes of sleep, average daily heart rate and blood pressure, RR interval variability, salivary cortisol, adverse effects	Reduction of part of the measures evaluating burnout, stress, anxiety and other associated markers, especially in adherents.

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continuation

Table 2 - Results

Author	Objective of study	Intervention	Measures evaluated	Results
Ireland et al. (2017) ¹⁶	Evaluate the efficacy of a mindfulness training intervention in reducing stress and burnout in medical practitioners	Subjects engaged in one-hour training workshops with theoretical contents and mindfulness exercises, during 10 weeks.	Demographic and control (previous experience and interest), Copenhagen Burnout Inventory, Perceived Stress Scale	Significant reduction in stress levels, marginally significant reduction in burnout levels in the experimental group compared to the control group.
Blanco Donoso et al. (2017) ¹⁴	Evaluate the efficacy of a brief intervention in reducing emotional exhaustion and increasing psychological flexibility, attention and wellbeing in professionals working in a high-stress area.	Subjects participated in two weekly 3-hour sessions of ABT and mindfulness, and a third one after three months. Subjects received material and were encouraged to practice specific meditation exercises at home.	Psychological flexibility, mindfulness, emotional well-being, emotional exhaustion, subjective vitality, purpose in life.	Intergroup: significant differences in vitality, vital purpose, mindfulness. Intragroup: In the intervention group: significant differences in psychological flexibility, vital purpose and "negative affect"; in the expected group, and significant change in negative affect, psychological flexibility and vitality.
Muir KJ; Keim-Malpass J (2019) ¹¹	Assess feasibility of Emergency Resiliency Initiative (ERI), investigate changes in burnout before and after the intervention, and understand views on drivers to burnout	Subjects engaged in 3 sessions of mindfulness during 3 months to the study members. In addition, they were encouraged to practice at least 2 weekly mindfulness sessions in their homes for 5 minutes.	Maslach Burnout Inventory-Human Service Survey	Increase in personal accomplishment scores (p = 0.01) and decrease in emotional exhaustion scores (p = 0.03) for nurses and patient care technicians and combined.
Saban et al. (2021) ¹⁵	Examine effect of Mindfulness-based Timeout Intervention (MBTI) on emergency nurses' state of mindfulness and its relation to patient satisfaction	Subjects engaged in a mindfulness-based time-out intervention (MBTI) every 4 hours.	Consumer Emergency Care Satisfaction Scale- patient satisfaction; State Mindfulness Scale	The nurses' state of mindfulness was better after the intervention (P < 0.001); Patient satisfaction was better after the intervention (P < 0.001)

DISCUSSION

In this systematic review of the literature, we analyzed 8 articles that reported clinical trials involving meditation and mindfulness techniques which objective to reduce mental health problems in ED Healthcare Workers. Mental health problems were mainly burnout and stress, but also depression and anxiety, and some studies analyzed general markers of mental health and well-being. Several programs and methods were used. In all studies, there were positive findings regarding the effects of meditation on mental health in at least one of the variables analyzed.

The positive findings in the studies are sustained by measures of mental health. For example, in the study that conducted a year-long mindfulness program with all ED Health Workers¹², the Kessler Psychological Distress Scale, which measures distress in the anxiety-depression spectrum, was lower after the intervention.

Regarding the study that evaluated mindfulness and burnout using Maslach Burnout Inventory-Human in ED nurses¹¹. Personal accomplishment had an increase after the intervention (p=0,01) and the results regarding emotional exhaustion had a decrease (p=0,03).

The phone-based meditation intervention¹³ also has good outcomes: the Beck Depression Inventory, which evaluates the presence and severity of depressive symptoms, and the Perceived Stress Scale decreased. The

Maslach Burnout Inventory was also used, and the personal accomplishment aspect results were increased compared to the control group without meditation. It was found, therefore, that meditation interventions with different techniques, durations and objectives have had outcomes related to the decrease of distress measurements.

The analysis made it possible to compare the results of the studies, thus reinforcing the idea that meditation and *mindfulness* techniques have great potential to reduce the frequency and intensity of mental health problems related to working in the ED. Furthermore, this review sheds light over the need of studies with bigger sample sizes and stricter methodologies regarding the practice of meditation and its impact on stress, burnout and other mental health problems among professionals working in the ED. However, it is important to point out that there were limitations in the studies that comprise this review.

The study sample was small and heterogeneous, i.e., there are studies focusing on medical students¹⁰, nursing technicians¹¹, nurses^{11,12,13,14,15} and emergency physicians^{12,13,16}. Such heterogeneity may make it difficult to draw precise conclusions from this systematic review regarding the effectiveness of the intervention in each of these professional categories. This is because different ED professionals are subject to different routines and pressures, which may lead to the need to develop more specific interventions that better adapt to the role exercised

by the individual, so as to achieve maximum results. It is important to note that some of the studies analyzed were used as pilots, to evaluate the effectiveness of specific interventions in the ED. Considering that, it is possible that some interventions analyzed were in process of construction and adaptation; within this context, small samples of subjects and heterogenous methodology can be partially explained by the experimental character of a number of studies.

Another important point is that in most studies^{10-15,17}, there was a considerable rate of abandonment or lack of response to a questionnaire by the participants, which added to the fact that the initial populations were generally small; this makes it difficult to perform analysis and make profound conclusions about the outcome of the proposed interventions.

In addition, in some of the studies¹⁰⁻¹³, the intervention was proposed for the target population of the ED, and the analyses were based on data from individuals who accepted or actively sought to participate in the study. Thus, participation of individuals who had some affinity or propensity to perform meditation may have biased results and compromised the external validity of these studies.

Another factor that should be considered is that several studies did not perform randomization and control group formation^{10,11,12}. This lack of randomization, associated with the possibility of selection bias and small sample groups, may limit the analysis of the results.

Among the potential problems seen in the intervention, there is, first, an inconsistency in the type of intervention: some studies used the mindfulness technique^{10-12,15,16}, others used other types of meditation^{13,14,16}, some used face-to-face techniques¹⁰⁻¹⁶, and others used remote¹³ or mixed techniques¹⁷. Thus, it was not possible to analyze the results of only one type of intervention because the methodology of the studies differed in multiple aspects.

The evaluation of the outcomes was very heterogeneous in the studies analyzed in this systematic review. One of the most common measures evaluated was burnout, which was evaluated in two different ways: some articles^{12,13,17} used the Maslach Burnout Inventory-Human Services Survey (MBI-HSS)¹⁸, and another¹¹ used the Copenhagen Burnout Inventory (CBI)¹⁹. In the other studies¹⁴, burnout was not evaluated in favor of emotional exhaustion, one of the components of the syndrome. Another outcome analyzed in the included articles was stress, measured by the Perceived Stress Scale (PSS)^{11,14,18} and the Kessler Psychological Distress Scale (K-10)^{12,21}, i.e., also heterogeneously. In some of the studies, other measures and scores associated with mental health outcomes were also employed. One study¹⁴ evaluated biological markers of stress and found some statistically significant changes, but in this review, there are no other

studies that have performed this type of analysis.

For studies that evaluated similar measures, the results were not consistent. Braganza et al.¹² found no reduction in MBI with meditation techniques. On the other hand, Lambert et al.¹³ demonstrated increased personal accomplishment with the intervention, and Muir et al.⁹ also demonstrated an increase in personal accomplishment, in addition to a decrease in emotional exhaustion. Regarding the PSS analysis, performed by two of the studies^{13,16}, there is more agreement: significant reductions in the measurement were observed in both.

The inconsistency in the type of intervention and results obtained can be partially explained by the subject of the studies - meditation techniques. Although meditation practices have been used in religious and cultural traditions for centuries, the use of techniques like mindfulness to promote mental health within medical contexts are relatively recent, dating from the 1970s^{22,23}. For this reason, the development of a pattern for the use of meditation in the reduction of psychological harm is still a field in development. Meditation practices being diverse technically and philosophically, along with the findings of its effectiveness on the medical field being recent, may be part of the reason why a heterogeneity in the interventions was found. Thus, the heterogeneity in the results obtained also may be a reflection of the lack of a pattern in the application of the meditation techniques.

This systematic review suggests that there are positive effects of meditation on the reduction of stress, burnout and other mental health problems in health professionals in the ED, but there is a clear need for more randomized, controlled studies with a larger sample size. The presence of these studies is essential to confirm the positive effects of meditation and mindfulness among professionals in the emergency department.

CONCLUSION

Mindfulness and meditation techniques are a promising approach to dealing with very prevalent mental health issues among ED health professionals. Current studies regarding its effectiveness are lacking in quantity and quality, with heterogeneous designs and methods of evaluation and small sample sizes. They suggest positive effects of meditation and mindfulness, but we do not have enough information to be certain of that, nor to specifically determine how big the effects are regarding different mental health conditions. Furthermore, it is important to recognize that EDs are heterogeneous, and so are the functions of the various professionals who work in them; therefore, it is likely that different types of interventions work better for certain settings or groups.

Further studies, with larger sample sizes, well-

accepted methods of evaluation of outcomes and well-defined and explained interventions are very much needed to clarify these results and help us achieve clearer

conclusions. Mindfulness and meditation techniques may be valuable therapeutic resources for the mental health of ED professionals, but we need more knowledge so as to apply them well.

Author's contributions: Inclusion and Exclusion criteria were established by ESC, RMR, CAV, JCGA and HPS; ESC, RMR and CAV conducted database research and initial article selection; JCGA decided on the inclusion or exclusion when there were disagreements; ESC, RMR, CAV and JCGA wrote the manuscript and HPS reviewed it.

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Received: 2022, July 11

Accepted: 2022, December 19