



# Effects of internet-based, psychosocial, and early medical interventions on professional burnout in health care workers: Systematic literature review and meta-analysis

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## ABSTRACT

**Background:** The prevalence of professional burnout increased among healthcare workers during the coronavirus 2019 (COVID-19) pandemic, with negative effects on their mental health. Consequently, research interest in methods to decrease the prevalence of burnout and reduce the effects of burnout on healthcare workers has increased. **Objective:** This study was designed to evaluate the effects of Internet-based, psychosocial, and early medical interventions on professional burnout among healthcare workers.

**Methodology:** This systematic review and meta-analysis involved 8004 articles identified from four databases: Cochrane, Web of Science, PubMed/Medline, and clinical trials.

**Results:** Four articles were included in the systematic review, of which two could be meta-analyzed. The pooled effect of the group of interventions compared to control conditions was not statistically significant.

**Discussion:** Evaluating therapeutic effectiveness requires more clinical trials that allow its evaluation. Although we did not find improvements in the three intervention categories, the methodological heterogeneity in each intervention and the need for a standardized intervention guide for managing and decreasing professional burnout, subject to the evaluation of its impact, are highlighted.

## 1. Introduction

The International Classification of Diseases (ICD-11-QD-85 Burnout) indicates that chronic stress is characterized by the presence of lack of energy, negative feelings about work, and low professional efficacy. According to Maslach and Leiter (2016), professional burnout syndrome is defined as the response expressed in the workplace, stemming from chronic emotional and interpersonal stressors, including emotional exhaustion, depersonalization, and a lack of personal accomplishment. During the coronavirus 2019 (COVID-19) pandemic, healthcare workers increased reporting of fear, anxiety, depression (Guan et al., 2020; Invitto et al., 2021), and professional burnout (Bonnín et al., 2019; Hofmann, 2021; Kuehn, 2018; Teoh et al., 2020). Professional burnout is

a psychological syndrome in response to chronic occupational stress and interpersonal stressors, with adverse long-term health outcomes and work disability (Embriaco et al., 2007). Indeed, before the COVID-19 pandemic, the prevalence of professional burnout was 51 % (95 % CI: 45.0 %–57.0 %) among healthcare workers in different medical specialties in Europe, Asia, and America; however, during the first and second waves of the pandemic, the prevalence showed a significant increase ranging from 26 % to 76 %, varying according to the number of patients directly cared for by the professional (Navinés et al., 2021). Given the diversity of interventions related to reducing professional burnout, three broad groups of interventions were considered around which we can encompass most interventions focused on professional burnout: internet-based interventions, psychosocial interventions, and

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**Table 1**  
Synthesis of the studies included in the review.

Author, year, country	Design	Sample, age (range or median)	Duration of intervention	Characteristics of the intervention and duration per session	Test result for burnout
Berger, 2011, Israel	RCT	80 (nurses) 40–56 years	12 weeks	6 h per week Psychoeducation	Secondary traumatization was used. Improved post-intervention burnout score.
Barret, 2021, Ireland	RCT	N = 42 (health personnel); age range, 22–60 years; average age, 37.12 years; 88 % female	2 weeks	Acceptance and Commitment Therapy Web Page Cognitive Behavioral Therapy Web Page	Improvement of the Maslach Burnout Inventory (MBI) total score No differences in the type of intervention.
Loewental, 2021, USA	RCT	N = 42 (medical residents) Intervention group = 26 Control group = 16 Mean age = 29 years	6 weeks	RISE Program (Resilience, Integration, Self-Awareness and Engagement), one 60-min session per week. The instructor was a psychologist and a certified yoga instructor (E-RYT 500). The sessions contained a combination of didactic and experiential materials.	MBI Physicians' Professional Fulfillment Index. No improvement in job burnout was observed.
Smoktunowicz, 2019, Poland	RCT	N = 1240 (311 under experimental condition and 309 under control condition), distributed as follows: 448 physicians, 308 nurses, 93 dentists, 75 physiotherapists, 65 midwives, 62 paramedics, and 191 other medical professionals. Mean age: 36.21 ± 10.18; age range: 20–66 years.	6 weeks for the intervention group and 3 weeks for the control group	Med-Stress is a self-guided online intervention. Performance of at least one exercise from each module, lasting 1.5 h per week. Each exercise or activity was released once a week per person.	Measurements were performed on the web at baseline (time 1), immediately after the intervention (time 2), and at 6-month follow-up (time 3). There were no differences between the study conditions for burnout and depression at either time 2 or 3. There was a high dropout in the study (1023/1240, 82.50 % at posttest). Job burnout was measured using the Oldenburg Inventory.

RCT, randomized clinical trial.

early medical interventions.

Internet-based interventions conducted with healthcare personnel represent a strategy to provide online social support with the purpose of addressing work-related stress. For example, they create spaces for nurses to share their emotions (Iddrisu et al., 2023; Smoktunowicz et al., 2019). They have shown effectiveness in treating depression and can be integrated into primary care (Cuijpers and Riper, 2015).

Psychosocial interventions encompass a wide range of professionals, both medical and non-medical, focused on psychological and social intervention. Their effectiveness is therefore related to a specific health goal, considering patient needs and the role of social determinants in the health outcomes to be addressed (Warth et al., 2020).

Early medical interventions involve actions to minimize susceptibility to a health problem or focus on treating the disease at an early stage. They have been studied in various contexts and issues and have been effective in reducing symptoms in mental health (Sokratous et al., 2023; Moloi et al., 2023).

Studies on professional burnout among healthcare personnel have focused on determining its symptoms, frequency, occurrence, and impact on the quality of life of the workers (Gianfermi and Buchholz, 2011; Kristensen, 2000; Ochoa and Blanch, 2016; Stewart, 2020). Recently, different interventions for preventing professional burnout based on the mind–body relationship have been identified: yoga, mindfulness, breathing regulation, relaxation, and cognitive theory, with important results on the psychological health of the participants.

However, during this review, no systematic reviews have evaluated the therapeutic effectiveness of the different interventions on professional burnout among healthcare personnel. Therefore, this study was designed to evaluate the effects of Internet-based, psychosocial, and early medical interventions on professional burnout among healthcare workers.

## 2. Methodology

### 2.1. Protocol and registry

This research followed the Preferred Reporting Items for Systematic Reviews and Meta-Analysis statement checklist (Moher et al., 2009) and

was registered at the International Prospective Register of Systematic Reviews (PROSPERO, CRD42021282316).

### 2.2. Eligibility criteria and study selection

To be eligible, studies should meet the following criteria (PICOS criteria): P: Population (relevant characteristics); I: Intervention (types of intervention); C: Comparator (group receiving another intervention or not); O: Outcome (health outcome of interest); S: Study (type of methodological design): (P) studies that had healthcare personnel exclusively with professional burnout without medical and/or psychological comorbidities as participants; (I) those that considered the following three types of interventions: a) Internet-based interventions (the use of the Internet to facilitate the dissemination of health-related information and connect patients with support), b) psychosocial interventions (psychological and social interventions provided by psychologists, psychiatrists, social workers, counselors/therapists, primary care physicians, non-psychiatric physicians, nurses, physical and occupational therapists, religious leaders, and automated providers [e.g., interventions provided via the Internet/audio/video]), c) early medical interventions (actions taken to reduce susceptibility or exposure to health problems and to detect and treat diseases at early stages). In this case, early medical intervention in individuals diagnosed with professional burnout occurs through interventions conducted at the onset of the condition and through its early detection; (C) those comparing different interventions with the control group; (O) those with the following outcomes: professional burnout measured using questionnaires (additional outcomes: anxiety, depression, and stress, measured using questionnaires [e.g., DAS] because they are the typical outcome measures in health professionals in terms of mental health); and (S) randomized controlled trials (RCTs) and non-RCTs.

Information sources and search strategy.

We conducted an electronic search of the MEDLINE/PubMed, Cochrane Central Register of Controlled Trials, [ClinicalTrials.gov](https://www.clinicaltrials.gov), and Web of Science databases until August 29, 2023.

The search strategy used was as follows: (“internet-based intervention” [MeSH Terms] OR (“internet-based” [All Fields] AND “intervention” [All Fields]) OR “internet-based intervention” [All Fields] OR

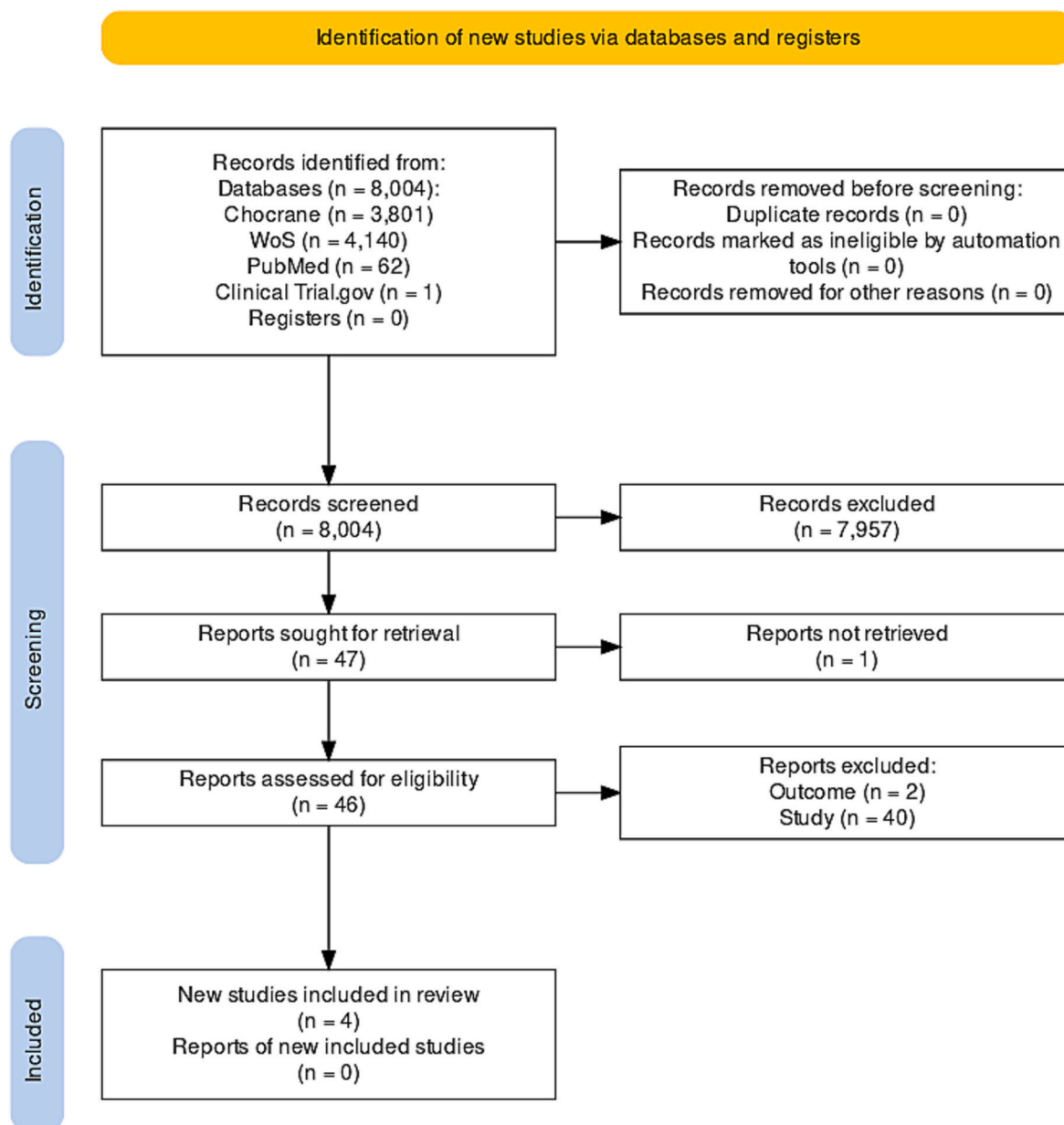


Fig. 1. Flow diagram for systematic review (Haddaway et al., 2022).

("internet" [All Fields] AND "based" [All Fields] AND "intervention" [All Fields]) OR "internet-based intervention" [All Fields] OR ("psychosocial intervention" [MeSH Terms] OR ("psychosocial" [All Fields] AND "intervention" [All Fields]) OR "psychosocial intervention" [All Fields]) OR ("early medical intervention" [MeSH Terms] OR ("early" [All Fields] AND "medical" [All Fields] AND "intervention" [All Fields]) OR "early medical intervention" [All Fields]) AND ("burnout, professional" [MeSH Terms] OR ("burnout" [All Fields] AND "professional" [All Fields]) OR "professional burnout" [All Fields] OR ("burnout" [All Fields] AND "professional" [All Fields]) OR "burnout professional" [All Fields]) AND ("health personnel" [MeSH Terms] OR ("health" [All Fields] AND "personnel" [All Fields]) OR "health personnel" [All Fields]).

### 2.3. Selection process and data collection

Two researchers (DM and VC) independently searched and selected the articles included by their titles, abstracts, and full text, according to

the established criteria, subsequently agreeing on the results. Discrepancies were resolved by a third author (ABC).

Two authors independently extracted data from each study, and information on the characteristics of the study population was collected: (i) first author's last name; (ii) year of publication; (iii) country; (iv) study setting; (v) participant characteristics, sample size, and mean age; (v) intervention characteristics (type, frequency, and duration) and control group; and (vii) primary outcomes (i.e., dropouts, defined as the number of randomized participants who did not have post-intervention measurements available because of health reasons and deaths) and secondary outcomes (aforementioned additional outcomes).

When information was insufficient, the authors of the studies included were contacted.

### 2.4. Data synthesis and analysis

Studies were combined in a meta-analysis when possible, using RevMan 5.4; otherwise, a narrative synthesis was performed. Because

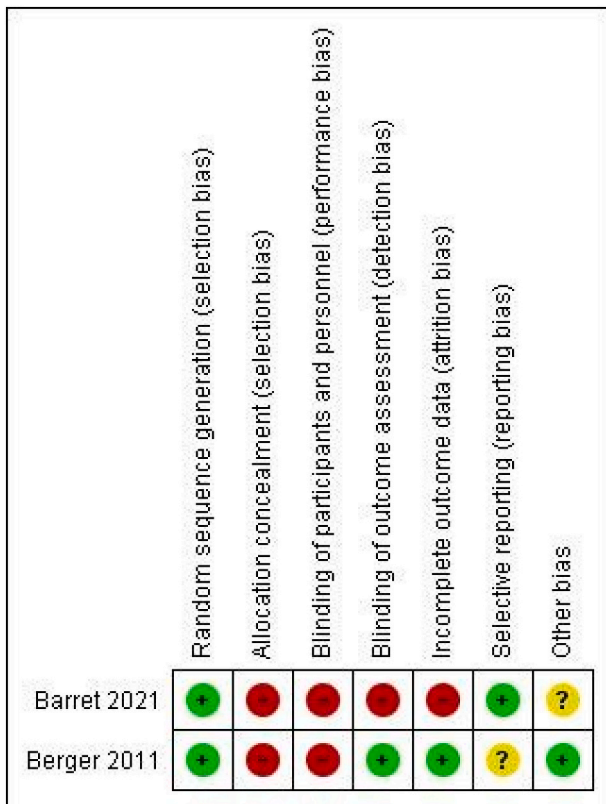


Fig. 2. Risk of bias for the studies included in the meta-analysis.

the data in the meta-analyses were continuous, we used the standardized mean difference to combine studies that measured the same outcome but used different methods.

2.5. Heterogeneity assessment

We used the I-square and chi-square tests. We considered substantial heterogeneity if the I<sup>2</sup> was >40 % or if the X<sup>2</sup> test had a p-value of <0.1.

Because in the meta-analysis, heterogeneity was found, we combined the data with a random-effects model, which was treated as the average range of possible effects on burnout and discussed the clinical implications of the effects on burnout across studies.

2.6. Reporting bias assessment

We used the recommendations of the Cochrane Handbook for Systematic Reviews for assessing bias and the quality of the evidence presented.

3. Results

Four studies were included in the systematic review. Overall, 1404 healthcare professionals participated in RCTs with Internet-based and

psychosocial interventions, which lasted between 2 and 12 weeks. No early medical interventions were found (Table 1). (See Fig. 1.)

The risk of bias (Fig. 2) due to the interventions was not possible by blinding the participants and staff. Due to heterogeneity (I<sup>2</sup> = 90 %), a random-effects model was used in which it was found that the pooled treatment effect was not statistically significant from zero in reducing burnout; however, this high heterogeneity implies that the scope of interpretation of the results should be limited (Fig. 3).

4. Discussion

The meta-analysis suggests that there is no evidence on the effectiveness of interventions to reduce professional burnout. Although only two articles could be included in the meta-analysis, note that there are different forms of intervention on professional burnout among healthcare workers. Barret and Stewart (2021) addressed the methods Acceptance and Commitment Therapy (ACT) and Cognitive Behavioral Therapy (CBT) (Barrett and Stewart, 2021); Berger et al. (2011) developed their method (Berger and Gelkopf, 2011); Smoktunowicz et al. (2019) applied the “Med-Stress” intervention (Smoktunowicz et al., 2019; Ewelina Smoktunowicz et al., 2021); and Loewenthal et al. (2021) implemented the RISE program (Loewenthal et al., 2021).

Interventions were either “Internet-based” (ACT–CBT and Med-Stress) or “face-to-face” (RISE program and the one developed by Berger et al. [2011]). While the pandemic promoted the development of virtual encounters, Barret et al. highlighted that studies using web-based tools may have higher attrition (Barrett et al., 2021) and therefore recommended that interventions may have a human interaction factor, including email interaction (Smoktunowicz et al., 2019). Therefore, from the systematic review conducted, the authors suggest that human interaction favors participation, without this meaning the absence of the use of virtual tools; in fact, Loewenthal et al. (2021) agree that participation in interventions using virtuality is favored because of the limited availability of health personnel.

Although nurses, resident physicians, social workers, and radiation therapists participated, no differences in the set of studies were found when the interventions had differences between groups of professionals. This may be because the professionals' perceptions of professional burnout in the hospital contexts tend to be similar to those of other professionals (Gulsen and Ozmen, 2020), in terms of the life management that each clinical decision involves, which ranks the medical profession as one of the professions with the highest levels of stress (Loewenthal et al., 2021).

Regarding the effectiveness of internet-based interventions, in the last two years, several studies have used it as a tool to treat various mental health conditions to cope with the COVID-19 pandemic, showing advantages in improving symptoms such as anxiety, depression, or general pandemic-related concerns in various types of patients (Duan et al., 2022; Dumarkaite et al., 2023; Heckendorf et al., 2022). Similarly, significant contributions of this intervention were found concerning nurses, also during the COVID-19 pandemic period, demonstrating that internet-based interventions can be effective in psychological detachment, relaxation, stress reduction, and depression (D'Onofrio et al., 2022). Within the systematic review, Loewenthal et al., (2021) recognizes the need to implement these interventions by identifying a gap in

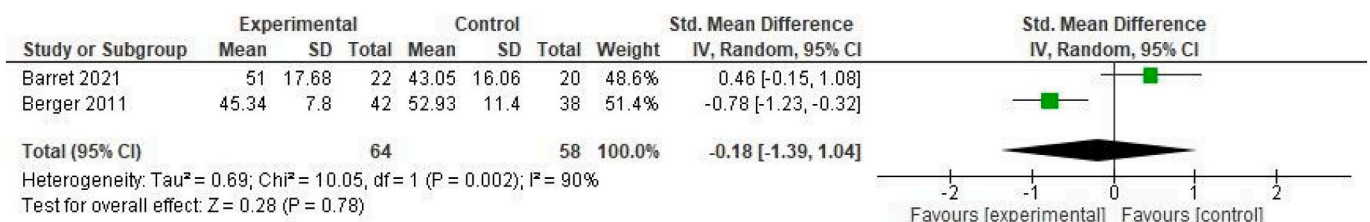


Fig. 3. Meta-analysis with a random-effects model.



the availability of healthcare personnel.

Also, some studies explore mobile phone-based learning and primary care. For example, one study aimed to investigate how to teach tactile attention using mobile technologies (Anand et al., 2021). In the same line of inquiry, tensions between primary care and the learning of digital tools through the phone to provide clinical information in specific Indian contexts were also explored (Jensen et al., 2023; Anand et al., 2021; Muke et al., 2019; Muke et al., 2020; Sharma et al., 2021).

On the other hand, another study, such as that of Schaeuffele et al. (2022), identified difficulties in implementing internet-based intervention, as they experienced dropouts and post-treatment evaluation abandonment, which is considered a significant finding in the implementation and recognition of the effectiveness of this intervention. In this regard, Barret et al. highlighted that studies using web-based tools may have a higher attrition rate (Barrett and Stewart, 2021), and therefore recommended that interventions incorporate a human interaction factor, including email interaction (Smoktunowicz et al., 2019). Therefore, based on the systematic review conducted, the authors suggest that human interaction promotes participation, without implying the absence of the use of virtual tools.

This review showed that psychoeducation is a tool for reducing professional burnout, when focused on two key aspects: the recognition of compassion satisfaction and the improvement of professional skills. We believe that the interpretation of professional burnout is related to one's perception of the mastery of professional skills, where an increase in the perception of professional skills means a decrease in the perception of professional burnout. Additionally, compassion satisfaction contributes to increasing one's perception of professional skills by reaffirming by patients and peers, recognizing the dedication with which care is exercised, and making the professional skills associated with health maintenance explicit (Berger and Gelkopf, 2011).

This emphasis on resources, such as self-efficacy or perceived social support, is relevant to the medical profession (Ewelina Smoktunowicz et al., 2021); however, this perceived social support favors the health of medical personnel when it comes from patients or peers, but when it is assumed to be a work-related compromise, the health of medical personnel deteriorates (Smoktunowicz et al., 2019). We believe that work commitment or the perception that professional work is performed for work-related reasons is insufficient to manage professional burnout generated by professional practice, whereas, when the reasons are dedication and recognition of this dedication to caring, burnout levels decrease (Wang et al., 2022, 2023).

The psychoeducational intervention was the only intervention that improved burnout scores after the intervention, and this intervention was conducted with nurses. We believe it was effective because the focus of psychoeducation is on behavior change, symptom recognition, and continuous learning about the illness being experienced when applied in clinical settings. For example, it has been shown to be effective in a wide range of health issues such as bipolar disorder (Rouget and Aubry, 2007), eating disorders (Kurnik Mesarić et al., 2023), or cancer (Phiri et al., 2023).

We believe that the group of nurses showed a greater effectiveness of the psychoeducational intervention because this form of intervention originated in the field of psychiatric nursing as a response to managing schizophrenia. For this reason, the group of nurses may be more inclined to engage in this form of intervention. Furthermore, burnout is a mental health issue in the workplace, which favors the application of psychoeducation to reduce symptoms of professional burnout due to the contextual similarity between using psychoeducation for mental health intervention and using it for managing mental health in the workplace (Matsuda and Kohno, 2021).

Given the stress inherent to the practice of medicine, it seems important to us to highlight that the promotion of training spaces in resilience skills improved the levels of stress and professional burnout (Loewenthal et al., 2021). One of the possible explanations related to this improvement is that psychological resilience describes the capacity

of the health professional to quickly recover from the different conditions occurring in clinical practice and instead of generating burnout, the professional generates a response to the situation, due to the speed with which a person with higher levels of resilience can manage the situation (Panter-Brick et al., 2020).

In this mind–body relationship, therapies focused on restructuring beliefs about professional performance, such as ACT and online CBT, improved perceived stress, burnout, and mental health scores (Barrett and Stewart, 2021). As part of the effectiveness of the interventions, it is recommended that they should be evaluated not only once the process is completed but also with follow-up measures because the latter allows the measurement of the sustainability of the program developed over time (Barrett and Stewart, 2021; Berger and Gelkopf, 2011).

#### 4.1. Limitations

Among the limitations of this study, we found difficulties in accessing quantitative data in two of the selected studies. However, we considered including databases that index clinical trials as strength to be an adequate source of evidence to answer the question of therapeutic effectiveness.

Therefore, when combining the effects of the interventions, we did not find evidence of their therapeutic effectiveness in reducing professional burnout; however, future studies may use Internet-based interventions with a human component to combine the best of both scenarios and evaluate their therapeutic effects in reducing professional burnout among healthcare workers.

A limitation of this study was that it did not include studies published in languages other than English.

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#### Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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