A Systematic Review of Interventions to Reduce Burnout Among Human Service Workers

by

Alysse Littleberry

BS, University of Pittsburgh, 2015

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This thesis was presented

by

Alysse Littleberry

It was defended on

April 20, 2020

and approved by

Patricia I. Documét, MD, DrPH, Associate Professor, Behavioral and Community Health Sciences, Graduate School of Public Health, University of Pittsburgh

Helen Cahalane, PhD, ACSW, LCSW, Clinical Associate Professor, School of Social Work, University of Pittsburgh

Thesis Advisor: Richard Garland, MSW, Assistant Professor, Behavioral and Community Health Sciences, Graduate School of Public Health, University of Pittsburgh

Richard Garland, MSW

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Alysse Littleberry, MPH

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Abstract

Background: Burnout among human service professionals is a significant public health problem. While systematic reviews on this topic have been conducted, there remains a need for a critical synthesis of intervention studies to prevent or treat burnout in this population that include recent literature and an evaluation of study quality.

Objectives of review: This review aims to answer the following questions: 1) What is the state and quality of evidence that exists regarding burnout interventions for human service workers? 2) What are the best supported interventions to prevent or reduce burnout among human service workers at the individual and organizational levels based on current evidence? 3) What are the gaps in evidence in the existing literature on burnout interventions for human service workers?

Data sources: The data sources for this review include publications in PubMed, PsychInfo, and Medline.

Eligibility Criteria: Studies were eligible if they were English-language and published in a peer-reviewed journal.

Participants: The population of interest were human service workers. For the purposes of this review, nursing personnel, physicians, students and trainees were excluded.

Interventions: Studies were included if a primary or secondary outcome of the intervention was to prevent or reduce burnout or a dimension of burnout and if there were quantitative pre and post intervention measures of burnout.

Study appraisal and synthesis methods: Study characteristics were synthesized into tables and a narrative format and methodologies were evaluated using the EPHPP Quality Assessment Tool.

Results: The final set of publications included 108 interventions at the individual level, 28 at the organizational level, and 6 with components at both levels. Few included publications had moderate or higher risk of bias ratings.

Limitations: The primary limitations of this review were that it was carried about by a single person and may have missed potentially relevant studies.

Conclusions and implications of key findings: There is a need for further, more robust research on interventions at all three levels. Mindfulness-based interventions show promise at reducing burnout at the individual level, but still need further research on diverse samples and with greater follow-up.

Systematic review registration number: The review was not registered.

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Preface

Burnout is an increasingly popular research topic, and I imagine that this is for reasons personal to many researchers, and I am no exception. Burnout is a condition I have seen in myself and in many of my colleagues throughout my work, internships and studies. My passion to understand, prevent, and treat this condition in individuals and in organizations extends beyond the work of this thesis. I plan for this thesis to act as a springboard as I continue efforts in this area throughout my career.

My thesis, and my education, would not have been possible without support. I would like to thank my family and friends for allowing me to neglect them for the last three years while I have pursued my degrees. I would like to especially thank my mother and my husband for going above and beyond in their support for my education and this thesis process. I would like to thank my dedicated teachers and committee members who have also supported my efforts. The support I have received has been instrumental. Thank you!

1.0 Introduction

Burnout, defined as a condition due to work-related stress that is characterized by emotional exhaustion, depersonalization, or reduced sense of accomplishment, is a significant public health program. Burnout can lead to poor health outcomes for providers, such as heart disease, poor outcomes for patients, such as medical errors, and poor outcomes for businesses, such as increased costs due to turnover. Many professionals in the human services sector are at risk for burnout. Numerous interventions exist to prevent or treat burnout in this population. While researchers have conducted systematic reviews in the past on interventions to prevent or treat burnout, these reviews have only targeted specific populations such as nursing personnel or physicians, specific intervention types such as physical activity-based interventions, did not include recent publications, or did not evaluate quality of included publications. To address these gaps, the focus of this review is to synthesize and evaluate the quality of published interventions to prevent or treat burnout among human service workers. The following review will establish that while the number of intervention studies on the topic of burnout has increased substantially in the last decade, the need remains for more robust examinations of existing interventions that include organizational, individual, and multilevel components. This is largely due to limited number of publications at the multi-level and poor risk of bias ratings of many studies at the organizational and individual level. While mindfulness-based interventions show promise for reducing burnout at the individual level, the need remains for further robust research with more diverse samples and with longer follow-up after the intervention.

1.1 What is Burnout?

Staff burn-out was first described in publication by psychoanalyst Herbert J. Freudenberger in 1974.[1] Freudenberger described the condition as a set of symptoms due to excessive work demands. Freudenberger identified that the burnout experience included exhaustion and looked similar to depression.[1] In 1981, Christina Maslach clarified the definition of burnout and published what is now one of the mostly widely used instruments to measure burnout, the Maslach Burnout Inventory (MBI).[2]

Currently, burnout is defined as a condition due to work-related stress characterized by dimensions of emotional exhaustion, depersonalization (or cynicism), and reduced sense of accomplishment (or lack of professional efficacy).[3,4] Exhaustion is defined as "the feeling of being emotionally drained and physically overextended; energy is lacking and mood is low" (page 29).[4] Cynicism, or depersonalization, is defined as "a distant and callous attitude toward one's job" in which "the individual is de-motivated and withdraws from his/her work" (page 29).[4] Lack professional efficacy involves "feelings of inadequacy and incompetence associated with loss of self-confidence" (page 29).[4] While a widely recognized condition, there is no DSM-5 diagnostic code for burnout[5] and no clinical criteria for identifying it.[3,6]

1.2 Distinguishing Burnout from Depression and Anxiety

Researchers who study burnout have identified a lack of clarity between burnout and anxiety, and burnout and depression, particularly when considering the burnout dimension of emotional exhaustion.[4,6,7] In addition, prior studies have identified that burnout and depression can

both act as a precursor to the other,[4] which contributes to some confusion about the relationship between these constructs. Several researchers have sought to clarify the relationships between burnout, depression, and anxiety. In a systematic review and meta-analysis, Koutsimani and colleagues found a significant association between burnout and depression (r = 0.520) and between burnout and anxiety (r = .460).[6] Their results indicate that while relationships exist between these constructs, they are still distinct, at least in published literature.[6] In a systematic review, Bianchi and colleagues found that factor analysis studies tend to identify burnout and depression as distinct factors, although this may be due to reasons other than the factors being distinct concepts.[4] Bianchi and colleagues identified that the factoring studies often used scales with different time frames and response options in their analysis which could affect the results.[4] The results of these and other studies indicate that the relationship between burnout and depression in part depends on how they are conceived and measured.[7] This limitation points to the need for further research to examine the relationship between burnout and depression.

Finally, Bakusic and colleagues conducted a systematic review to examine the relationship between depression and burnout or work/psychosocial stress on DNA methylation.[7] Published literature frequently focused on GR encoding in NR3C1, an HPA-axis related gene. While some literature appears to support a distinction between depression and work stress in GR encoding or cortisol activity, such as increased GR expression associated with job stress and reduced activation among those with major depressive disorder, Bakusic and colleagues report that more research is needed on the relationship between GR encoding, depression, and burnout.[7] In addition, publications frequently examined depression, burnout and SLC6A4, a serotonin transporter gene. Both depression and burnout were associated with SLC6A4 hypermethylation. Interestingly, while carriers of the short allele in the 5-HTTLPR promotor region exhibit more depressive symptoms

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in the literature than those with the long allele; the relationship between SL6A4 hypermethylation and burnout remained regardless of 5HTTLPR allele genotype suggesting the greater importance of environmental factors in the burnout pathway relative to depression.[7] The importance of environment in the burnout pathway points to the potential of environmental modification as a target for intervention to prevent or reduce burnout in workers.

1.3 Why Does Burnout Matter? Public Health Significance

Burnout can lead to adverse health outcomes for care providers and patients as well as increased costs for businesses. In a review of prospective studies, Salvagioni and colleagues found that burnout was consistently associated with adverse health outcomes for workers such as coronary heart disease, gastrointestinal issues, fatigue, and pain.[8] Worker burnout is associated with adverse outcomes for patients such as medical errors, poor patient care,[9,10] and decreased patient satisfaction.[10] The Triple Aim is a framework designed to improve population health through a focus on improving health, improving patient experiences and reducing costs. While this framework has been increasingly adapted in care practices, burnout in staff limits the ability to provide adequate care. The relationship between staff burnout and poorer quality care for patients has led to some calling for a Quadruple Aim, in which improving work life of care providers becomes an additional main objective for health care organizations.[11] Finally, burnout hurts businesses. Burnout leads to lower work productivity[9,12-14] and increased turnover,[15,16] absenteeism, and poor job performance;[16] all of which can in turn increase costs for employers.[15,17] Burnout has a reinforcing relationship with work pressure, in which burnout can lead to poorer performance and therefore greater job demands, and then more burnout in response to

corresponding increases in work pressure.[16] This cyclical pattern within burnout points to the need for intervention in order to stop or reverse this reinforcing loop and improve outcomes for staff, patients, and businesses.

1.4 Who is at Risk for Burnout?

Definitionally, Burnout is found frequently in "caring and social professions" such as in social workers, health care providers, and teachers.[3] The prevalence of burnout varies by profession and measure used. Prior studies report that 0-80.5% of physicians,[18] 15-31% of primary care nurses,[19] 17.3% of palliative care professionals,[20] 26% of dental staff,[21] 27% of palliative social workers,[20] 6%-47% of intensive care unit professionals,[22] 50% of anesthesiologists,[23] 55% of psychotherapists,[24] and 55% of emergency medicine physicians,[23] may be experiencing burnout.

Several individual factors have been found to be associated with development of burnout, such as adolescent socioeconomic status, personality traits, self-efficacy, optimism and self-esteem.[16] One of the most consistent individual factors associated with burnout is age. Younger age is a predictor of burnout in psychotherapists, dentists, anesthesiologists, and intensive care unit professionals.[21-24] In addition, less work experience was a predictor of burnout in psychotherapists and intensive care unit professionals.[22,24] Overinvolvement in client problems, female gender, and greater domestic responsibilities, are associated with greater risk of burnout in psychotherapists.[24] Personality traits such as neuroticism, rigid thinking style, excessive conscientiousness, perfectionism are associated with greater burnout in psychotherapists.[24]

In addition to demographic factors, situational factors or work characteristics have been found to be associated with development of burnout such as job demands or workload,[16,23,25] lack

of job resources,[16,25] stressful events,[16] role ambiguity,[16] interpersonal demands,[25] and job insecurity.[25] In addition, working night shifts, number of working hours, and often dealing with death are all associated with increased burnout in intensive care unit professionals,[22] while supervision and job support are protective against development of burnout in anesthesiologists.[23] In their review on work environment and burnout, Aronsson and colleagues identify the importance of job control, job demands, and workplace social support as precedents to burnout, consistent with the demand-control-support model,[26] in which job stress occurs when psychological demands of job exceed available resources for tasks in the absence of psychosocial support.[27,28] The identification of these as precedents to burnout points to potential targets of an intervention.

1.5 Existing Interventions

Interventions at the individual and organizational level exist to prevent or reduce burnout. Examples of potential interventions at the individual level include skill building in the areas of coping with stress, relaxation, delegation of responsibility, along with increasing hobbies, upholding social support, reducing false expectations, and targeting spirituality.[3] Interventions at the organizational level may include such actions as optimization of job demands and resources, improved supervision of employees, job crafting, supporting employees in engagement of recovery activities,[16] creating a healthy work environment, increasing recognition of performance, training managers, suitability tests, programs for people in specific risk groups, and occupational monitoring such as through check-ins.[3]

2.0 Background

2.1 Existing Literature

Some of the existing interventions to address burnout among human service workers have been synthesized into reviews in the past. Frequently, these reviews focus on physicians,[9,18,29-33] nurses,[29,34-38] healthcare professionals,[39-44] and emergency staff or other shift workers.[45,46] Other reviews of interventions have addressed burnout in surgeons,[47] ICU professionals,[48] and dementia care staff.[49] In addition to published literature, registered review protocols of systematic reviews on burnout interventions also tend to focus on physicians[50-52] or health care workers.[53,54]

Previous systematic reviews of interventions for burnout often focus on specific types of interventions. Most frequently, they focus on mindfulness-based interventions[42,55-59] or on organizational factors such as policies or care models.[35,36,38,41,45,46,60,61] There have also been reviews of burnout interventions that focused on other interventions including yoga,[39] web-based and mobile applications,[43] physical activity,[62] and psychosocial interventions.[30] Registered systematic review protocols of burnout interventions also tend to focus on specific intervention types including return-to-work interventions,[63] multifactorial rehabilitation programs,[64] Acceptance and Commitment Therapy based interventions,[54] mindfulness-based interventions,[50] and coping strategies.[51]

In reviewing previous literature, the author was able to find two systematic reviews of burnout interventions that did not focus on a specific population or intervention.[65,66] While each of these studies has strengths, there are limitations to each. Korczak, Wastian, and Schneider (2012) reviewed individual therapies for burnout in a search across thirty-one databases.[66] The

authors did evaluate study quality, but they did not include prevention interventions or non-therapeutic interventions to treat burnout and had a relatively small range of publication dates included in their review (2006 to 2011). Awa, Plaumann, and Walter (2010) reviewed intervention studies published in three databases and divided published studies into person-directed, organization-directed, or a combination of both.[65] While the authors included interventions at multiple socioecological levels, they did not evaluate quality of study methodology and did not review any articles published prior to 1995 or after 2007. Even though interest in preventing and treating burnout has increased over the years, the need remains for a critical review of both therapeutic and non-therapeutic interventions at multiple socioecological levels, that includes an evaluation of study methods, and includes more recent publications.

2.2 The Purpose of this Review

The purpose of this systematic review is to critically synthesize the literature on interventions to prevent or treat burnout among human service workers. To guide this synthesis, this review aims to answer the following questions: 1) What is the state and quality of evidence that exists regarding burnout interventions for human service workers? 2) What are the best supported interventions to prevent or reduce burnout among human service workers at the individual and organizational levels based on current evidence? 3) What are the gaps in evidence in the existing literature on burnout interventions for human service workers?

This review should conclude in one or more of the following: 1) recommendations for evidence supported interventions at the individual and organizational level to prevent or treat burnout in human service workers, 2) recommendations for more rigorous effectiveness studies of

existing interventions, 3) recommendations for effectiveness studies in unstudied populations, or

4) recommendations to develop interventions for burnout. Ultimately, this review and subsequent

recommendations will help further our understanding of burnout and its prevention and treatment

in human service workers.

3.0 Methods

This systematic review is based on the Preferred Reporting Items for Systematic Reviews and Meta-Analysis (PRISMA) methodology.[67]

3.1 Protocol Registration

There are no other protocols in PROSPERO looking at burnout interventions for a general human services population as of January 14, 2020. The review methods were submitted to PROSPERO on February 1, 2020, but were not published or assigned a registration number by the time of the defense.

3.2 Search Strategy

In January 2020, the author searched PubMed, PsychInfo, and Medline for English peer-reviewed articles and abstracts that had interventions that targeted burnout and were published prior to 2020.

In each database, the author filtered for English and used the key concepts: *intervention, prevention, treatment, and burnout*. Search terms in each database included MeSH terms for burnout in the article title or abstract with intervention, treatment, or prevention in the title or abstract. Searches by database are listed in Table 1.

Table 1 Search Terms Used in Literature Search

Database	Search terms
PubMed	(Burnout, Professional[mesh:noexp] OR Burnout, Psychological[mesh:noexp] OR burnout[tiab]) AND (intervention[tiab] OR prevention[tiab] OR treatment[tiab]) AND English[la]
PsychInfo	ab(burnout) AND (ab(intervention) OR ab(prevention) OR ab(treatment))
MEDLINE	AB burnout AND (AB intervention OR AB treatment OR AB prevention)

The author uploaded potentially relevant citations into a reference management software that automatically excluded duplicates. After the initial search, the author reviewed the abstracts for inclusion and exclusion criteria. The author then obtained full-articles of remaining studies and reviewed full-texts for inclusion and exclusion criteria. The author initially planned to hand-search the references of each selected study for potentially missed articles. However, due to the unexpectedly large volume of full articles that met inclusion criteria from the database search, the author made a post-hoc decision not to conduct the hand search of references. After the final selection of articles, the author then reviewed the included articles and categorized the interventions as A) prevention, treatment, or both; and B) occurring at the organizational level, individual level, or both in a spreadsheet.

3.3 Definitions

For this review, burnout was defined as a condition due to work-related stress characterized by dimensions of emotional exhaustion, depersonalization (or cynicism), and reduced sense of accomplishment (or lack of professional efficacy).

For the purposes of this review, human service workers were defined as individuals who work directly with patients, clients, or consumers to help service recipients meet their needs, such as physical or mental wellness or access to safe housing or regular food. Because interventions to prevent or reduce burnout have already been synthesized recently for nurse and physician populations, these groups were not included in the definition of human service workers for the purpose of this review. While students and trainees also experience burnout, and in some cases student interns or residents are in the same settings as human service workers,[68] interventions to prevent or reduce burnout may not translate well between student and worker populations due to their different settings, experiences, or roles. Therefore, students and trainees were not included in the definition of human service workers for the purpose of this review.

3.4 Inclusion and Exclusion Criteria

Articles were included only if they were peer-reviewed journal articles. The inclusion criteria were modeled after the PICO (Population, Intervention, Comparison, Outcome) framework for research questions:

- *Population* targeted was human service workers.
- *Interventions* in which reducing or preventing burnout was a planned focus. There were no restrictions on type, setting, country, or duration of the intervention. Potentially relevant articles were included if they had quantitative pre and post measures of burnout in their study. There were no restrictions on which measure was used to indicate burnout.

- *Comparison* Articles were included regardless of having a comparison or control group.

- *Outcome* of burnout or at least one of the burnout dimensions (emotional exhaustion, depersonalization, or cynicism). Studies that included constructs related to burnout (e.g. work stress, job satisfaction, or intent-to-quit) but that did not explicitly identify burnout as an intended target of the intervention were not included.

Articles were excluded for the following reasons:

1. Not being a peer-reviewed journal article

2. Being a review article or commentary

3. Not targeting human service workers

4. Study sample only included physicians, nurses, trainees, or students.

5. Planned outcome of intervention did not include burnout or one of the dimensions of burnout

6. Not including quantitative pre and post measures of burnout.

7. Not being in English

3.5 Risk of Bias

Study methodologies were evaluated using the Effective Public Health Practice Project (EPHPP) Quality Assessment Tool for Quantitative Studies which has been found to be suitable for systematic reviews,[69] and has higher inter-rater reliability than another widely used tool for assessing risk of bias.[70] The EPHPP Quality Assessment tool involves rating studies using pre-

determined criteria in eight components, namely selection bias, study design, confounders, blinding, data collection methods, withdrawals and dropouts, intervention integrity, and analyses; then creating a global rating for the paper based on the component ratings. Per the EPHPP Quality Assessment Tool, articles received a strong global rating if they had no weak component ratings, a moderate global rating if they had one weak component rating, and a weak global rating if they had two or more weak component ratings. The author created a web-based survey using Qualtrics based on the EPHPP Quality Assessment tool in order to facilitate risk of bias assessment for each study. Results of the risk of bias assessment were synthesized into tables and reported in a narrative format.

3.6 Review of Selected Studies

The author then reviewed all articles that met full inclusion criteria for intervention details, duration of intervention, study design, population and setting, measure of burnout, change in burnout, and changes in additional outcomes assessed. The author created a spreadsheet prior to review of study characteristics in order to guide the extraction of information. Study and intervention characteristics were synthesized into tables and a narrative format.

4.0 Results

4.1 Search Results

In the initial search, 1930 records were identified from PubMed, 1497 from PsychInfo, and 664 from Medline. After uploading citations into an electronic reference manager, 2983 records remained after duplicates were removed. The author then screened the abstracts for eligibility and excluded 2542. The author was unable to obtain full versions of 11 articles. The remaining full articles were reviewed for inclusion and exclusion criteria with zero excluded for not being a peer-reviewed journal article; 14 excluded for being a review article or commentary; 112 excluded for not targeting human service workers; 39 excluded for only including physicians, nursing staff, trainees, or students; 47 excluded for not having interventions in which preventing or reducing burnout or one of the burnout dimensions was a planned outcome of the study; and 75 excluded for not including quantitative pre and post measures of burnout. After the review of full-texts, 143 articles remained and were included in the final sample. A flowchart of the systematic review process is in Figure 1.
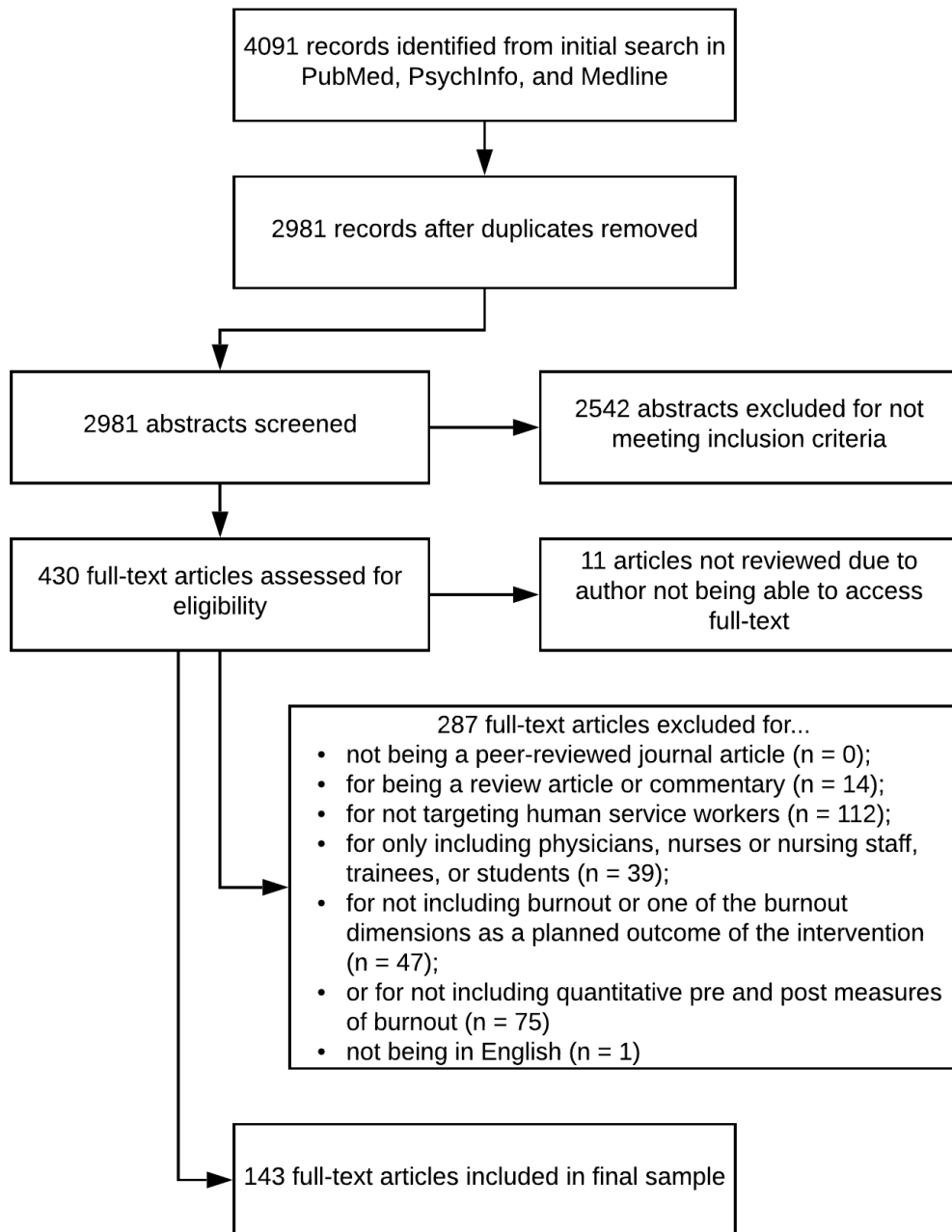
Figure 1 Flowchart of Systematic Review Process

The final sample of articles were published between 1996 and 2019. Articles were categorized by level of intervention (organizational, individual, or both) and whether the

intervention was designed to prevent burnout, treat burnout or both. There were 28 articles with interventions at the organizational level, six that had both organizational and individual level components, and 107 that included components at the individual level. Of the included articles, 11 were intended to treat burnout. This designation was determined when the authors only delivered the intervention to subjects who were identified as experiencing burnout or a related construct. All the articles with interventions designed to treat burnout occurred at the individual level. The categorization of articles by level and type of intervention are depicted in Figure 3.

Level of Intervention in Study

Target of Intervention on Burnout	Organizational	Multi-level	Individual
Treatment	0 articles	0 articles	11 articles
Prevent and Treat	0 articles	0 articles	0 articles
Prevention	28 articles	6 articles	96 articles

Figure 2 Types of Interventions Included In Review

Risk of bias component and global ratings are reported in Tables 3, 5, 6, and 8. Characteristics of each study including population characteristics and sample size, intervention characteristics, study design, follow-up period, measure of burnout, and change in burnout are reported in Tables 2, 4, and 7. Additional outcome variables are characterized in Appendix Tables 1-4. In Appendix Table 1, outcomes related to the agency or organizational as well as employee perceptions of their workplace are summarized. In Appendix Table 2, employee attitudes, cognitions, and perceptions of issues relating to work, such as self-efficacy and attitudes toward patient families, are summarized. In Appendix Table 3, employee physical health outcomes and mental health outcomes are summarized. Finally, in Appendix Table 4, outcomes for patients, families, consumers, and students are summarized. Outcomes were described as positive, negative or neutral depending on their associated direction with the intervention relative to the control or comparison group or between the baseline and follow-up period. For example, if the intervention was associated with a greater decrease in burnout compared to a group without the intervention, it would be characterized as negative regarding burnout. If an intervention had no comparison group but was associated with an increase in job satisfaction compared to baseline, it would be characterized as positive regarding job satisfaction.

4.2 Evidence Synthesis

4.2.1 Organizational Level Studies

Twenty-eight articles described 27 interventions at the organizational level, in that they attempted to create changes to the work-environment of the employee. Study characteristics of

organizational level studies are summarized in Table 2. These interventions most frequently took the form of policy, process, workflow, or communication changes to the organization, team or unit.[71-89] Several organizational interventions took the form of adding structural support or resources to reduce job demand or increase resources available to the employee.[90-96] Finally, two organizational interventions targeted management and supervision in order to improve their support to employees.[97,98] Of interventions with a known duration, the interventions ranged from a three-day workshop for supervisors[97] to over four years to implement changes to organizational intervention model.[79]

Table 2 Organizational Level Intervention Study Characteristics*

Study	Intervention (duration)	Study Design (follow-up period)	Population and sample size	Setting	Measure of Burnout	Change in Burnout
Andersen 2010	Institutional reorganization, revisions of decision making, information systems, communication and other changes with aid from a consultant to facilitate changes (all interventions occurred between baseline and first follow-up)	Cohort (3 years, 5 years)	Staff in human service organizations (n = 1868 at baseline, 1665 at final follow-up)	Organizations in the human services sector (Denmark)	CBI	Increase in burnout at first follow-up and decrease at second follow-up
Angelo 2013	Leadership stress management workshop for middle supervisors (3 days)	Cohort analytic (4 months)	Firefighters (treatment = 67 at baseline/follow-up; control = 37 at baseline/follow-up)	National Firefighters School (Portugal)	MBI-GS, EE and DP subscales	No change in DP or EE
Blumenthal 2011	Weekly group consultation with psychotherapist (1 year)	Cohort analytic (timing of follow-up not reported)	Direct care workers (Intervention = 33 at baseline, 16 at follow-up; Comparison = 32 at baseline, 16 at follow-up)	High security inpatient psychiatric hospital (UK)	MBI	Decrease in DP, no change in EE or PA
Corrigan 1997	Monthly staff meetings for quality improvement and education (8 months)	Cohort (immediately post)	MHWs (n = 35)	Psychiatric residential programs (US)	MBI	Decrease in EE, no change in PA or DP
Davidson 2017	Code Lavender kits (sensory comfort items, employee health referral information, and encouraging quotes on a card)	Cohort (3 months)	HCWs (n = 163 at baseline, 83 at follow-up)	University teaching hospital (San Diego, CA, US)	ProQol	No change in burnout
Forsgarde 2000	Ethical discussion groups (2-3 hours, once per month, 12-18 months)	Cohort analytic (12-18 months after baseline)	Medical and care staff (Treatment = 41 at baseline, 40 at follow-up;	Shelter housing, nursing homes, retirement homes,	MBI	No change in EE, DP, or PA

Table 2 Continued

			Comparison = 43 at baseline, 53 at follow-up)	and group dwellings for elderly or intellectually disabled people (Sweden)		
Ginex 2018	Animal-facilitated therapy (AFT) on the unit for patients and staff	Cohort (6 weeks)	HCWs (n = 41)	Surgical oncology unit (US)	ProQol	No change in burnout
Graham 2019	Code Lavender with Caregiver Support Team - emotional first aid and triage intervention for clinicians in healthcare environment provided by trained peers	Cohort (3 months)	HCWs (baseline = 164, code lavender alone = 83, follow-up = 75)	Academic medical center (San Diego, CA, US)	ProQol	No change in burnout
Hung 2018	Lean-based workflow redesigns in primary care practices (2 years)	Cohort (Varied by site, follow-up 5 months - 3 years after intervention)	Primary care physicians and staff (n = 970 at baseline, 860 at follow-up)	Nonprofit ambulatory care system (US)	MBI-HSS	Increase in EE, decrease in DP, no change in PA
Kazak 1996	Implementation of pediatric Leukemia intervention for procedural pain	3-arm RCT with additional comparison group (8 months, 18 months)	HCWs (n = 61 provided data at all data points)	Division of Oncology in large, urban, pediatric teaching hospital and the Pain Management Team in the hospital (US)\	MBI	Decrease in DP, no change in EE or PA
Le Blanc 2007	Team based burnout intervention program (Take Care!) using Participatory Action Research Model (6 months)	Cluster RCT (immediately post, 6 months)	Direct care oncology care providers (Treatment = 260 at baseline, 208 at 6 months; control = 404 at baseline, 96 at 6 months)	Oncology wards in general hospitals (Netherlands)	MBI-HSS EE and DP subscales (Dutch version)	Decrease in EE and DP
Leiter 2011 & 2012	Civility, Respect, and Engagement at Work (CREW) intervention involving facilitated, weekly meetings to help improve civility between coworkers (6 months)	Cohort analytic (unit based; 1 year (Leiter 2011, 2-year Lieter 2012))	HCWs (Intervention = 262 at baseline, 181 at 1-year follow-up, 196 at 2-year follow-up; Control = 911 at baseline, 726 at 1	Health authorities and hospitals (Nova Scotia and Ontario, Canada)	MBI-GS	No change in EE or PA, decrease in DP

Table 2 Continued

			year follow-up, 447 in 2 year follow-up)			
Madede 2017	Intervention 1: HR management training and supervision and support skills training for direct managers; Intervention 2: Intervention 1 with added action learning sets for supervisors at the district and facility level (2 years)	3-arm cohort analytic (2 interventions and 1 control; immediately post intervention)	Heath workers (Intervention 1 = 22 at baseline, 11 at follow-up; Intervention 2 = 22 at baseline, 20 at follow-up; Control = 48 at baseline, 18 at follow-up)	Health facilities (Niassa, Mozambique)	MBI EE subscale	Intervention 1: No change in EE; Intervention 2: No change in EE
Menon 2015	Transformation of service model into a single point of access (1 month)	Cohort (10 months)	Clinicians and administrative staff (Baseline = 49, follow-up = 50)	Crisis Resolution and Home Treatment (CRHT) teams (Leeds, England)	MBI-HSS	No change
Nocon 2019	Collaborative learning sessions and on-site coaching to implement patient-centered medical home model (over 4 years)	Cohort (immediately post intervention)	Providers and staff (N = 536 at baseline, and 589 at follow-up)	Primary care centers (US)	Single item question	Decrease in burnout for providers, no change for staff
O'Riordan 2019	Posters promoting self-care, team bonding sessions, and end of shift meetings (6 months)	Cohort (6 months)	Obstetricians (28 at baseline; excluded from analysis due to lack of interest) and midwives (69 at baseline, 5 completed both pre and post measures)	Delivery suite at Cork University Maternity Hospital (Ireland)	MBI, ProQol	Decrease in burnout (ProQol); No change in EE, DP, or PA
Ponzin 2015	Sailing team-building activity (9 days total)	Cohort (follow-up timing not reported)	HCWs (n = 20 pre and post)	Organ and tissue procurement organization (Veneto Region, Italy)	MBI-HSS (adapted for Italian workers)	Increase in PA, decrease in EE and DP
Schrijnemaekers 2003	Clinical lessons, training and supervision to shift agency model to emotion-oriented care (8 months)	Cluster RCT (3, 6, and 12-month follow-up)	Professional caregivers (treatment = 155 at baseline, 126 at 12-month follow-up; control = 145	Homes for elderly persons (Netherlands)	UBOS-C/MBI-NL	Increase in PA, no difference in EE or DP

Table 2 Continued

			at baseline, 116 at 12-month follow-up)			
Selamu 2019	Integration of new mental health service into practice (duration not reported)	Cohort (6 months)	HCWs (n = 145, 136 returned questionnaires)	Primary healthcare facilities (Rural Ethiopia)	MBI-HSS	No change
Sieja 2019	Revised team-process (Sprint) to reduce EHR burden (6 months)	Cohort (2 week)	HCWs (119/205 clinicians responded to pre survey, 107 of 205 responded to post-survey)	Clinicals in integrated health network (Colorado)	MBI EE Subscale	No change
Smith 2019	Primary Care Redesign process that improves team-based care strategies (1-2 months to create changes)	Cohort analytic with wait-list control (biannually over 42 months)	Family medicine staff (sample size not reported)	Family medicine practices (US)	Single item from the Physician Worklife Study	Decrease in burnout
Strolin-Goltzman 2009	Facilitated employee work teams to identify and solve problems related to turnover and poor outcomes for clients (duration not reported)	Cohort analytic (follow-up period not reported)	Child welfare employees (5 agencies in treatment, 12 in control, sample size of respondents not reported)	Child welfare agencies (Northeast US)	Items on a workforce retention survey adapted from EE questions on MBI	No change
Taylor 2012	Revised service delivery though changing staff behavior (4 months)	Cohort (8 months)	Mental health nurses, health care support workers and occupational therapists (n = 28, with 18 returning questionnaires at T1 and 12 returning questionnaires at T2)	In-patient unit for adults with serious mental health problems	MBI	Decrease in EE, and DP, slight increase in PA
Wolk 2019	Modules targeting team function competencies, communication and climate (duration not reported)	Cluster RCT (5 months)	School mental health teams (control = 3 teams, 13 individuals; treatment = 3 teams, 12 individuals)	Philadelphia area (US)	MBI-HSS	Increase in EE, decrease in PA, no change in DP

Table 2 Continued

Zajac 2017	Unit-based bereavement debriefs after patient deaths with 24/7 onsite support for staff (3 months)	Cohort (3-month follow-up)	136 RNs and oncology care associates	Medical and blended medical-surgical units in NCI-designated comprehensive cancer center (Midwestern US)	ProQol	No change
Zimmerman 2013	Workshop for families to increase their involvement in patient care, intervention included revised service plan component (6 months)	Cluster RCT (6 months)	Nurses and direct care staff (control = 202 staff; treatment = 195 staff); residents (control = 258; control = 230); families (control = 258, treatment = 230)	Nursing homes, residential care, and assisted living settings (North Carolina, US)	MBI	Increased PA; no change in EE or DP
Zwijsen 2015	Care program with education and assessment tools to aid staff in evaluation and treatment of challenging behavior (12 months)	Randomized cluster stepped-wedge cohort analytic (12 months, 20 months)	Care staff (n = 645)	Dementia care units (Netherlands)	UBOS-C/MBI-NL	No change

BCSQ-12 = Burnout Clinical Subtype Questionnaire (Spanish short version), CBI = Copenhagen Burnout Inventory, Cluster RCT = Cluster randomized controlled trial, CSFST = Compassion Satisfaction/Fatigue Self-Test, DP = Depersonalization or Cynicism dimensions of burnout, EE = Emotional Exhaustion dimension of burnout; HCWs = Health care workers, MBI = Maslach Burnout Inventory, MBI-D = German version of MBI, MBI-ES = MBI Educator Survey, MBI-GS = MBI General Survey, MBI-HSS = MBI Human Services Survey, MHWs = Mental health workers, OLBI = Oldenburg Burnout Inventory, PA = Personal accomplishment or professional efficacy dimension of burnout, PCWs = Personal care workers, ProQol = Professional Quality of Life Scale, SBI = Spanish Burnout Inventory, SMBQ = Shirom Melamed Burnout Questionnaire, TBI = Teachers' Burnout Inventory, TBS = Teacher Burnout Scale, UBOS-C/MBI-NL = Dutch version of the MBI-HSS, UBOS-L = Dutch version of the MBI-ES.

Most organizational level interventions were with health care workers.[73-81,87,91-96,98] Others were with mental health care workers,[72,83-85,87,88] direct or personal care workers,[73,82,89,90,96] workers in human service organizations,[71] firefighters,[97] child welfare workers,[86] and school-based workers.[88] Interventions took place in a variety of settings. Four interventions were with oncology professionals.[75,92,94,95] Two organizational level studies were with staff that work with the elderly or those with dementia.[73,82] One was with individual who work with people with intellectual disabilities.[73] Organizational interventions took place in North America,[72,74,76,77,79,84-86,88,91-96] Europe,[71,73,75,78,80-82,87,89,90,97] and Africa.[83,98]

Most organizational interventions were studied with cohort[71,72,74,78-81,83,84,87,91-93,95] or cohort analytic designs.[73,76,77,85,86,90,97,98] Five organizational level interventions were examined with randomized controlled trial where either individuals[94] or clusters were randomized.[75,82,88,96] One organizational level intervention was examined with a randomized cluster stepped wedge trial.[89] Timing of final follow-up assessments in studies of organizational interventions ranged from immediately following the intervention[72,79,98] to five years after the baseline.[71]

Overall, 12 organizational level interventions were associated with lower levels of burnout on at least one measure or dimension,[72,75-77,79-82,85,87,90,94,96] while 12 were associated with no change.[73,78,83,84,86,89,91-93,95,97,98] In one intervention, there was an increase in burnout.[88] Two interventions were associated with mixed results. In one intervention, burnout increased at the first follow-up and then decreased at the second.[71] In another study, one dimension of burnout improved while another worsened.

Overall, three organizational level intervention studies had moderate global risk of bias ratings,[78,82,97] while the remaining had weak overall ratings (Table 3). Studies tended to score well in study design and data collection, with all studies achieving moderate or strong ratings on study

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design, and all but one study achieving moderate or strong on data collection ratings. Many interventions failed to control for potential selection bias or confounders. Ratings on withdrawals were particularly mixed across studies.

Table 3 Risk of Bias Ratings for Organizational Level Studies

Article	Selection Bias Rating	Design Rating	Confounders Rating	Blinding Rating	Data Collection Rating	Withdrawal Rating	Global Rating
Anderson 2010	Weak	Moderate	Weak	Moderate	Strong	Strong	Weak
Angelo 2013	Weak	Strong	Moderate	Moderate	Strong	Strong	Moderate
Blumenthal 2011	Weak	Moderate	Weak	Moderate	Strong	Weak	Weak
Corrigan 1997	Weak	Moderate	Weak	Moderate	Strong	Weak	Weak
Davidson 2017	Weak	Moderate	Weak	Weak	Strong	Weak	Weak
Forsgarde 2000	Weak	Moderate	Weak	Moderate	Strong	Moderate	Weak
Ginex 2018	Moderate	Moderate	Weak	Moderate	Strong	Weak	Weak
Graham 2019	Weak	Moderate	Weak	Moderate	Strong	Strong	Weak
Hung 2018	Weak	Moderate	Weak	Moderate	Strong	Moderate	Weak
Kazak 1996	Moderate	Strong	Weak	Moderate	Strong	Weak	Weak
Le Blanc 2007	Moderate	Strong	Weak	Moderate	Strong	Weak	Weak
Leiter 2011 & 2012	Weak	Moderate	Weak	Moderate	Strong	Moderate	Weak
Madede 2017	Moderate	Moderate	Weak	Moderate	Strong	Weak	Weak
Menon 2015	Strong	Moderate	Weak	Moderate	Strong	Moderate	Moderate
Nocon 2019	Moderate	Moderate	Weak	Moderate	Weak	Strong	Weak
O'Riordan 2019	Moderate	Moderate	Weak	Moderate	Strong	Weak	Weak
Ponzin 2015	Weak	Moderate	Weak	Moderate	Moderate	Strong	Weak
Schrijnemaekers 2003	Strong	Strong	Weak	Moderate	Strong	Strong	Moderate
Selamu 2019	Weak	Moderate	Weak	Moderate	Strong	Strong	Weak
Sieja 2019	Weak	Moderate	Weak	Moderate	Strong	Weak	Weak
Smith 2019	Weak	Moderate	Weak	Moderate	Strong	Weak	Weak
Strolin-Goltzman 2009	Weak	Strong	Weak	Moderate	Weak	Weak	Weak
Taylor 2012	Weak	Moderate	Weak	Moderate	Strong	Weak	Weak
Wolk 2019	Weak	Strong	Weak	Moderate	Strong	Moderate	Weak
Zajac 2017	Weak	Moderate	Weak	Weak	Strong	Weak	Weak
Zimmerman 2013	Moderate	Strong	Weak	Moderate	Strong	Weak	Weak
Zwijsen 2015	Weak	Strong	Weak	Moderate	Strong	Weak	Weak

4.2.2 Individual Level Studies

One-hundred and eight articles described 107 interventions at the individual level, with 95 interventions aiming to prevent burnout, and 11 studies aiming to treat burnout among those already experiencing it. Individual level intervention studies are summarized in Table 4. Individual intervention studies designed to treat existing burnout most frequently involved therapy or counseling, either at the group or individual level.[99-106] Other individual treatments included mindfulness meditations,[107] skills training,[108] and Qigong.[109] Individual intervention studies designed to prevent burnout most frequently involved some type of individual or group therapy sessions, often utilizing strategies from Cognitive Behavioral Therapy or Acceptance and Commitment Therapy with mindfulness, or teaching individuals to recognize and respond to symptoms of burnout.[110-163] Many of the individual prevention intervention focused on stress reduction techniques, meditation and, frequently, mindfulness-based strategies.[110,111,115-122,124-127,129-134,136,137,139-143,146,147,149-153,157,159,164-167] Individual prevention strategies also were frequently designed to improve employee skills.[134,153,164,168-195] Other individual prevention interventions included physical activity,[137,196-198] activities to encourage self-reflection,[194,199] spending time in nature away from work,[197,200,201] peer support groups,[117] using noise protection at work,[202] acupuncture,[203] reiki,[204] and music or artistic expression.[114,123,151,205,206] Of interventions which durations are known, the duration of individual interventions ranged from a single two-hour training session,[181,182] to 24 months for supervised training and implementation of a new care model.[193]

Table 4 Individual Level Intervention Study Characteristics*

Study	Prevention, Treatment, or Both	Intervention (duration)	Study Design (follow-up period)	Population and sample size	Setting	Measure of Burnout	Change in Burnout
Abos 2019	Prevention	Leisure time physical activity intervention (8 months)	RCT (1 week)	Teachers (Treatment = 58 at baseline, 22 at follow-up; Control = 48 at baseline, 35 at follow-up)	Public secondary schools (Huesca, Aragon, Spain)	BCSQ-12	No change in overload, lack of development, neglect
Aimola 2018	Prevention	Peer and self-performance review of extent staff meet quality of care standards, training of select staff in good practice in field (~12 weeks)	Cluster RCT (12-month follow-up)	Inpatient mental healthcare wards (treatment = 30 wards at baseline, 28 at follow-up; control = 45 at baseline, 39 at follow-up; staff N's not reported)	Low secure mental health inpatient (England and Wales)	MBI	DP higher at follow-up in treatment group compared to control group; no difference in PA or EE
Ancona 2014	Prevention	Yoga and mindfulness intervention for teachers (6 sessions over 3 weeks)	Cluster RCT (immediately post intervention)	Elementary and middle school teachers (Treatment = 21, Control = 22)	Baltimore city public schools serving low-income neighborhoods (MD, US)	MBI-ES EE subscale	No change in EE
Askey-Jones 2018	Prevention	Mindfulness-based cognitive therapy course (MBCT) (8 weeks)	Cohort (immediately post, and 6 months)	MHWs (N-86 Baseline, 69 at follow-up Tx, 43 completed all measures)	Mix of inpatient and secondary care (UK)	MBI	decrease in EE, DP, increase in PA
Barbosa 2015	Prevention	Person centered care-based psychoeducational intervention (8 week)	Cluster RCT (2 weeks post intervention)	PCW (Intervention = 27 at baseline, 25 at follow-up; Control = 31 at baseline, 25 at follow-up)	Long term dementia care units (Portugal)	MBI-HSS (Portuguese)	Decrease in EE, DP and PA null

Table 4 Continued

Barbosa 2016	Prevention	Person-Centered Care-Based PE Intervention (8 week)	Cluster RCT (immediately post, 2 weeks, 6 months)	PCW (Intervention = 27, 24 at follow-up; Control = 31 at baseline, 29 at follow-up)	Long term dementia care units (Portugal)	MBI-HSS (Portuguese)	Decrease in EE, DP and PA
Barr 2015	Prevention	Professional development (5-day seminar with follow-up coaching and workshops)	Cluster RCT (immediately post intervention)	Humanities teachers (Treatment = 78 at baseline, 53 at follow-up; Control = 102 at baseline; 60 at follow-up)	High schools from metropolitan areas (US)	MBI	Increase in PA, no change in EE or DP
Berg 2017	Prevention	Intervention 1: PAX Good Behavior Game; Intervention 2: Intervention 1 and Promoting Alternative Thinking Strategies Program (1 school year)	Three arm cluster RCT (Three follow-ups within 1 year)	Teachers (N = 250, 25% in intervention 1, 29% in intervention 2, and 37% in control)	Elementary schools in a large urban, east coast public school district (US)	Subset of items from MBI	Intervention 1: No change in EE, DP, or PA; Intervention 2: No change in EE, DP, or PA
Berry 2012	Prevention	Workshop to improve care skills (single 3-hour session)	Cohort (1 month)	MHWs (25 at baseline, 16 completed treatment, 13 completed follow-up)	Long term low security psychiatric ward aka LSU (UK)	MBI	Increase in EE, no change in PA or DP
Bethay 2013	Prevention	Acceptance and Commitment Training (ACT) (3 weekly 3-hour sessions)	RCT (immediately post and 3 month)	Intellectual disability staff (Intervention = 20 at baseline, 18 at follow-up; Control = 18 at baseline, 16 at follow-up)	Residential facility for individuals with intellectual disability (USA)	MBI-HSS	No change in EE, DP, or PA
Brake 2001	Treatment	Individual and group counseling sessions to aimed at restoring `the balance by obtaining insight in one's own situation and working	Cohort analytic (1 month, 1 year)	Dentists at risk of burnout measured by MBI assessment (Intervention = 19 at baseline/follow-up; Comparison = 75 at	Dentists identified through a national survey (Netherlands)	UBOS-C/MBI-NL	No change in EE, DP, or PA

Table 4 Continued

		with a personal plan of action'. (6 months)		baseline, 73 at follow-up)			
Breeman 2016	Prevention	Training and implementation of Good Behavior Game (three 2-hour trainings; 10 coaching sessions)	Cluster RCT (9 months after start of intervention)	Teachers (Intervention = 28 at baseline/follow-up; Control = 36 at baseline, 30 at follow-up)	Special education (Netherlands)	UBOS-L	No change in EE, or PC (Personal competence)
Brinkborg 2011	Prevention	ACT for stress management, Swedish Version (3-hour session every other week x 4 sessions)	RCT (Pre and 2 weeks post intervention)	Social workers (Intervention = 70 at baseline, 58 at follow-up; Control = 36 at baseline/follow-up)	Social workers employed by city of Stockholm (Sweden)	MBI	Decrease in EE, DP, and PA
Brooker 2013	Prevention	Training program for Occupational Mindfulness (8 weeks)	Cohort (immediately post completion of training program)	Management and direct care workers for a disability support provider (35 at baseline, 29 at follow-up)	Non-government provider of disability services in form of community homes (Australia)	CBI, ProQol	No change in client related, work related, or personal burnout, or burnout (ProQol)
Callender 2019	Treatment	Mindfulness-based mobile intervention providing mediations of various lengths (The Calm App) (12 weeks)	A-B single case research design with analysis of weekly journal entries (3-week assessment pre, the data collection during 12-week intervention)	Residential and outpatient substance abuse counselors (3 at baseline, 1 at follow-up)	Medium sized treatment facility (USA)	CBI	Decrease in burnout
Carmel 2014	Prevention	Training in Dialectical Behavioral Therapy (DBT; 10 days over 13 months)	Cohort (13 months)	Mental health practitioners and substance abuse counselors (n = 9	Large, urban public behavioral health system	CBI	Decrease in burnout overall

Table 4 Continued

				who completed pre and post measures)	(North Carolina, US)		
Caruso 2013	Prevention	Training in Cognitive-analytic therapy (2-hour weekly sessions for 5 weeks)	Cohort (immediately post and 1 month)	MHWs (n = 12)	Community Rehabilitation Unit which provides residential and care to psychiatric patients (Ferrara, Emilia Romagna Region, north-east Italy)	MBI	Decrease in EE, increase in PA
Chan 2011	Prevention	Self-improvement project to improve wellbeing through self-reflection and appreciation (8 weeks)	Cohort (immediately post)	School teachers (n = 63)	Chinese University of Hong Kong (Hong Kong)	MBI-ES	No change in EE, DP or PA
Cheek 2003	Prevention	Music therapy added to CBT treatment (6 weeks)	RCT (follow-up timing not reported)	Teachers (Intervention 1 = 28 at baseline; Intervention 2: 23 at baseline)	Elementary schools in mid-sized suburban schools district (Southwest, US)	MBI-ES	Decrease in DP, no change in EE or PA
Christopher 2016	Prevention	Mindfulness-based resilience training (MBRT) (8 weeks)	Cohort (4 weeks after baseline, immediately after last class)	Law enforcement officers (59 at baseline, 43 at follow-up)	Police department in medium sized city (Pacific Northwest, US)	OLBI	Decrease in burnout
Christopher 2018	Prevention	Mindfulness-based resilience training (MBRT) (8 weeks)	RCT (immediately post and three month)	Law enforcement officers (Treatment = 31 at baseline, 24 at follow-up; Control =	Urban area and surrounding metro (Pacific Northwest US)	OLBI	Decrease in burnout

Table 4 Continued

				30 at baseline, 25 at follow-up)			
Cohen 2005	Prevention	Group-intervention skills training or General hospital social work skills training (each training was 15 sessions)	Cohort analytic (1 month after completion)	Hospital social workers (n = 15 at baseline, 15 at follow-up)	Rambam Medical Center (North of Israel)	MBI	Decrease in DP, increase in PA, no change in EE
Cooley 1996	Prevention	Intervention 1: Stress-management workshop (2 months); Intervention 2: Peer-collaboration workshop (2 months)	Randomized cross over design (two interventions received in different order with wait-list group also receiving treatments after a delay) (follow-up period - different for different groups, all received follow-up immediately post interventions, some received follow-up 1 year after baseline)	Special education teachers and related service providers (Treatment first (received both interventions in different order) = 49 at baseline, 43 at follow-up; Waitlist control (also received treatment) = 33 at baseline, 33 at follow-up)	Unknown	MBI	Decrease in EE, increase in PA, no change in DP
Crowder 2017	Prevention	Mindfulness Based Stress Reduction (MBSR) (2.5-hour weekly sessions for 8 weeks with 1 full-day weekend session)	RCT (immediately post, 13 weeks, for both groups, 26 weeks for treatment group)	Social workers (Intervention = 7 at baseline, 7 at follow-up, control = 7 at baseline, 7 at follow-up)	Canada	MBI and ProQol	No change in burnout compared to control by week 13, decrease in burnout compared to baseline at week 26, no change in

Table 4 Continued

						EE, DP, or PA in either comparison
Domitrovich 2016	Prevention	Intervention 1: PAX Good Behavior Game; Intervention 2: Intervention 1 and Promoting Alternative Thinking Strategies Program (1 school year)	Cluster 3-arm RCT (4 assessments, final at end of school year)	Teachers (n = 350; 25% in intervention 1, 29% in intervention 2, 37% in control)	Elementary schools (PA, US)	MBI	Intervention 1: No change in EE, DP, or PA; Intervention 2: Increase in PA, no change in EE or DP
Ducar 2019	Prevention	Mindfulness for healthcare providers course (8 weeks)	Single group interrupted time series (2 weeks before, immediately before, 4 weeks into intervention, 8 weeks into intervention, 1 month after, 3 months after, 6 months after)	Emergency medical technicians (n = 15 at baseline, 10 at final follow-up)	Rural volunteer EMS rescue squad (US)	ProQol	Decrease in burnout
Duchemin 2015	Prevention	Mindfulness-based intervention (8 weeks)	RCT (1-week post intervention)	HCWs (Intervention = 16 at baseline, 16 at follow-up; control = 16 at baseline, 16 at follow-up)	Surgical intensive care unit of a large academic medical center (US)	MBI and ProQol	No change in EE, DP or PA; ProQol burnout change not reported in results
Duijts 2008	Treatment	Preventative coaching program (7 to 9 1-hour sessions over 6 months)	RCT (6 and 12 months)	Employees at risk of sickness related work absence (Treatment = 76 at baseline, 57 at final follow-up; Controls = 75 at baseline, 61 at final follow-up)	Healthcare and education sector (Southeastern part of Netherlands)	UBOS-A	Decrease in EE, no change in PA or DP

Table 4 Continued

Dunne 2019	Prevention	Attention-based training program (4 sessions over 7 weeks)	RCT (1 week, 2 months)	Emergency multidisciplinary team members (Treatment = 22 at baseline, 17 at follow-up; Control = 25 at baseline, 25 at follow-up)	Large urban hospital (Ireland)	MBI-HSS	Decrease in EE, no change in PA or DP
D'Urso 2019	Prevention	Stress management intervention including monthly reflective practice groups, team away days, staff drop-in sessions and teaching on managing difficult conversations (9 months)	Cohort (0-1 month post)	HCWs (n = 160 on unit, ns for measures not reported)	Level 3 neonatal intensive care unit (London)	ProQol	No change in burnout
Dutton 2017	Prevention	Holistic Healing Arts Retreat (4 day)	Cohort (2 weeks, 3-months, 6 months)	Female counselors, advocates and lawyers who deliver services to survivors of child abuse, domestic violence, and sexual assault (n = 18 at baseline, 14 at 6-month follow-up)	Community organizations (Southern CA, US)	ProQol	Decrease in burnout
Ebert 2014	Treatment	Internet-based problem-solving training	RCT (6 weeks, 3 months, 6 months)	Teachers with depressive symptoms (Treatment = 75 at baseline, 61 at follow-up; Control = 75 at baseline; 66 at follow-up)	National sample (Germany)	MBI-D (MBI for human services)	Decrease in EE and DP, no change in PA

Table 4 Continued

Elder 2014	Prevention	Transcendental meditation course (2 lectures, individual interview, and review after 3 days)	RCT (4 months)	Teachers and support staff (Treatment = 20 at baseline, 17 at follow-up, controls = 20 at baseline, 19 at follow-up)	Residential therapeutic school for students with severe behavioral problems (US)	MBI-ES	Decrease in EE, increase in PA, no change in DP
Ellen Braun 2019	Prevention	Mindfulness for Interdisciplinary Health-care Professionals (MIHP) intervention (8-week course)	Cohort (immediately post and 6 months-1.5 years post)	HCWs (n = 18 completed all measures)	Setting not reported	MBI-HSS	Decrease in DP and EE, no change in PA
Eriksson 2018	Prevention	Web-based mindful self-compassion program (6 weeks)	RCT (7 weeks from baseline)	Psychologists (Intervention = 52 at baseline, 40 at follow-up; Control = 49 at baseline, 41 at follow-up)	Online (Sweden)	SMBQ	Decrease in burnout
Flook 2013	Prevention	Modified Mindfulness-based Stress Reduction (MBSR) (2.5 hours per week for 8 weeks plus 1-day immersion)	RCT (1-3 weeks post intervention)	Public elementary school teachers (Treatment = 10; Control = 8)	Medium sized Midwestern city (US)	MBI-ES	Decrease in EE, increase in PA, no change in DP
Forbat 2019	Prevention	Training in staff-patient conflict management (4 days)	Cohort (4 months)	HCWs (Baseline = 55, follow-up = 31)	A pediatric oncology department day-patient and 23-bed inpatient ward (Perth, Australia)	ProQol	Decrease in burnout
Fukuda 2018	Prevention	Education program to train staff in coping with behavioral and psychological symptoms	Cluster RCT (1 month after baseline)	Care staff (Intervention = 214 at baseline, 185 at follow-up; Control =	Residential aged care facilities (Japan)	MBI (Japanese version)	No change in EE, DP, or PA

Table 4 Continued

		of dementia (2-hour training)		186 at baseline, 172 at follow-up)			
Gentry 2004	Prevention	Certified Compassion Fatigue Specialist Training (CCFST; 17-20 hours over 2 days)	Cohort (immediately after training)	MHPs (n = 83)	Florida, US	CSFST	Decrease in burnout
Goodman 2012	Prevention	Mindfulness-based stress reduction (MBSR) course (8 weeks plus 7-hour retreat)	Cohort (immediately after training)	HCWs (73 completed pre and post)	University medical center (Charlottesville, VA, US)	MBI	Decrease in EE, DP, increase in PA
Gorter 2001	Treatment	Career counseling program	Cohort analytic (2 comparison groups; 1 month)	Dentists with burnout (Treatment = 19 at baseline, 17 at follow-up; Both comparison groups = 75 at baseline and follow-up)	National population (Netherlands)	UBOS-C/MBI-NL	Decrease in EE, increase in PA, no change in DP
Grafestatter 2017	Prevention	Intervention 1: Spend 1 week in village 1024m above sea level with daily hike; Intervention 2: Intervention 1 with daily 1-hour trips to waterfall; all groups (including control) received Cholera vaccination	Three arm RCT (immediately post, 10 days, and 60 days)	People working in care professions (Intervention 1 = 32 at baseline; Intervention 2 = 33 at baseline; Control = 26 at baseline)	Carinthia, Austria	MBI-D (German)	Intervention 1: No change in DP, EE, or PA; Intervention 2: decrease in depersonalization; no change in EE or PA
Gridley 2016	Prevention	Life Story Work training for staff (LSW; 2-hour training)	Cohort (1, 2 and 6 months after start of intervention);	Staff in dementia care homes (n = 26 at baseline, 15 at final follow-up)	Dementia care homes (England)	CBI	No change in work-related burnout, personal burnout, or client-related burnout
Grupe 2019	Prevention	Mindfulness Based Stress Reduction (MBSR; 8 weeks)	Cohort (up to 3 weeks after the class; 5 months)	Police officers (baseline = 30, follow-up = 28)	Police Department (Madison, WI, US)	OLBI	Decrease in exhaustion, no change in disengagement

Table 4 Continued

Harris 2016	Prevention	Community Approach to Learning Mindfully (CALM) program to promote socio-emotional competence, stress management, and wellbeing (4 days a week for 16 weeks)	Cluster RCT (second half of school year)	Teachers (Intervention = 34 at baseline/follow-up; Control = 30 at baseline, 29 at follow-up)	Middle schools (US)	MBI-ES	No change in EE, DP, or PA
Hastings 2018	Prevention	Who's Challenging Who? training (half a day)	Cluster RCT (6 weeks, 12 weeks)	Care staff and managers (Intervention = 118 at baseline, 57 at follow-up; control = 118 at baseline, 75 at follow-up)	Community-based residential settings for adults with intellectual disabilities (UK)	MBI	Increase in PA, No change in EE or DP
Hayes 2019	Prevention	The Incredible Years Teacher Classroom Management (TCM) course (1-day workshop)	Cluster RCT (2 months post training)	Teachers (Intervention = 40 at baseline, 37 at follow-up; Control = 40 at baseline, 37 at follow-up)	Schools (Southwest England)	MBI-GS	No change in EE, DP, or PA
Jacobs 2016	Prevention	Brief psychologically informed physiotherapy training (1 day)	Cohort (immediately post)	Physiotherapists (25 completed pre and post assessments)	Outpatient musculoskeletal department (UK)	Items from the MBI	No change in burnout
Jacobs 2017	Prevention	Mindfulness-based skills training (6 weeks)	Cohort (immediately post and 4 weeks)	Paraprofessionals (26 completed all pre and post measures)	Paraprofessional early intervention/prevention program (Chicago area, US)	MBI	Decrease in EE, no change in DP or PA

Table 4 Continued

Jennings 2013	Prevention	Cultivating Awareness and Resilience in Education (CARE for Teachers) mindfulness-based professional development program (5 full day sessions over 4 weeks, with 1-day booster after 1 month)	RCT (timeline of post assessments not reported)	Teachers (N = 53; n's by group not reported)	Urban and suburban public schools in a small metropolitan area (Northeast US)	MBI-ES	Increase in PA, no change in EE or DP
Jensen 2006	Prevention	Intervention 1: Transfer technique education to reduce risk of lower back pain and injuries; Intervention 2: Stress management intervention to prevent burnout (6 month)	3-arm Cluster RCT (2 years)	HCWs (Intervention 1 = 65 at baseline, 53 at follow-up; Intervention 2: 68 at baseline, 49 at follow-up' Control = 77 at baseline, 61 at follow-up)	Eldercare wards (Denmark)	MBI	Intervention 1: No change in DP, EE, or PA; Intervention 2: No change in DP, EE or PA
Jeon 2012	Prevention	Intervention 1: Training and support in person centered care, Intervention 2: training and support in dementia care mapping (4 months)	3-arm Cluster RCT (immediately post, 4 months)	HCWs (Intervention 1 = 56, Intervention 2 = 45, Control = 23)	residential aged care sites (Sydney metropolitan area)	MBI-HSS	Intervention 1: No change in EE, DP, or PA; Intervention 2: Decrease in EE, no change in PA or DP
Johnson 2013	Prevention	Capacitar trauma healing and transformation workshop (8 days over 4 months)	Cohort analytic (1 week)	HIV/Aids coordinator teachers (Intervention = 27; Control = 27)	Primary and secondary schools (Metro South, South Africa)	CBI	Decrease in work burnout; no change in client burnout
Johnson 2017	Prevention	Intervention 1: TRE workshops, which focus on tremoring exercises; Intervention 2: TP workshops which focus on education about stress	4-arm Cohort analytic (1 week)	Teachers (Intervention 1 = 17; Intervention 2 = 16; Intervention 3 = 10; Control = 20)	High risk-schools (Cape Flats, Western Cape, South Africa)	CBI	Decrease in personal burnout, decrease in work burnout, decrease in learner burnout

Table 4 Continued

		and burnout combined with emotional processing exercises; Intervention 3: TA workshops which presented main TA education models which are based on social psychology (Each intervention occurred via 10 1.5 hour weekly sessions)*Interventions combined in analysis					
Kang 2011	Prevention	Sabbatical program (1 month)	Cohort analytic (3 weeks, 3 months)	Helping professionals (treatment = 8, comparison = 8)	Nonprofit service organizations (South Korea)	MBI-HSS (Korean version)	Decrease in EE and DP, no change in PA
Kaplan 2017	Prevention	Mindfulness-Based Resilience Training (MBRT; 8 weeks))	Cohort (Immediately post)	Law enforcement and firefighters (N = 69)	Suburban community (Pacific Northwest, US)	OLBI	Decrease in burnout
Karjalainen 2019	Prevention	Training in evidence-based strategies to improve classroom communication (5 weeks of 1.5 hours per week of training)	Cohort analytic with wait-list control (immediately post, 5 weeks, 3 months)	Grade 3-6 teachers (Immediate intervention = 13 at baseline, 13 at final follow-up; Delayed start intervention = 12 at baseline, 11 at final follow-up)	Public mainstream schools (Southern Sweden)	CBI	Decrease in student-related burnout; no change in work-related or personal-related burnout
Kinser 2016	Prevention	Mindfulness and mindful-movement course (1x week for 8 weeks)	Cohort (immediately post)	HCWs and trainees (n = 27 completed pre and post)	Recruitment source not reported (Virginia, US)	MBI-HSS	Decrease in EE and DP, no change in PA
Klein 2018	Prevention	Resiliency education program (three 90-minute sessions, 2 weeks apart)	Cohort (1 week, 6 months)	HCWs (n = 18 at baseline, 8 at 6-month follow-up)	Inpatient palliative care department and	ProQol	No change in burnout

Table 4 Continued

				neonatal advanced practice providers at a large Midwestern academic medical center (US)		
Koch 2016	Prevention	Molded hearing protectors for noise exposure and stress (involved 2 visits to an audiologist)	Cohort analytic (12 months)	Childcare workers (Intervention = 45 at baseline, 33 at follow-up; comparison = 154 at baseline, 61 at follow-up)	Multi-site institution for children and adolescents (Germany)	CBI personal burnout subscale (German version)	No change in burnout
Kuske 2009	Prevention	Intervention 1: Training program for staff to improve staff-resident interactions; Intervention 2: Relaxation training for staff (3 months)	Three arm cluster RCT (immediately post, 6 months)	Dementia care staff (Intervention 1 = 38 at follow-up, Intervention 2 = 30 at follow-up; Control = 28 at follow-up; baseline n's by group not reported for staff) and residents (Intervention 1 = 89 at baseline, 68 at follow-up; Intervention 2 = 90 at baseline, 68 at follow-up; Control = 94 at baseline, 74 at follow-up)	Nursing homes (Leipzig, Germany)	MBI-D	No change in EE, DP or PA

Table 4 Continued

Leary 2018		Online mindfulness Mantram Repetition Program (6 50-minute classes over 3 months)	Cohort (immediately post, and 3 months)	VA Staff (n = 39 who completed all data points)	VA (Nationwide, US)	MBI-GS	Decrease in EE, no change in PA or DP
Livingston 2019	Prevention	Managing Agitation and Raising Quality of Life intervention for care of people with dementia (6 session training procedure)	Cluster RCT (8 months)	Care home staff (Treatment = 243 at baseline, 175 at follow-up; Control = 249 at baseline, 179 at follow-up)	Care homes for people with dementia (England)	MBI	No change in EE, DP, or PA
Luberto 2017	Prevention	Mindfulness based cognitive therapy (4 week)	Cohort (immediately post)	Hospital employees (67 completed intervention, 26 completed both pre and post measure of burnout)	Large academic medical center (Midwest, US)	Single item measure of burnout	Decrease in burnout
Lusilla-Palacios 2015	Prevention	Training in Motivational Interviewing (9 months)	Cohort (1-5 months after training)	HCWs (n = 45)	Spinal cord injury rehabilitation team (Spain)	MBI	No change in EE, DP or PA
Marlow 2015	Prevention	Incredible Years Teacher Classroom Management course (6 sessions)	Cohort (immediately)	Teachers (n = 40 at baseline, 34 at follow-up)	State-funded primary schools (Southwest England)	MBI	No change in EE, DP, or PA
Mistretta 2018	Prevention	Intervention 1: Mindfulness-Based Resilience Training program (6 weeks); Intervention 2: Smartphone delivered resiliency-based intervention (6 weeks)	Three arm RCT (immediately post and 3 months)	HCWs (Intervention1 = 22 at baseline, Intervention 2 = 23 at baseline, control = 15 at baseline; 74% across groups completed measures at all time points, differences by group not reported)	Major tertiary health care institution (Arizona, US)	MBI-HSS	Intervention 1: Decrease in EE, no change in DP or PA; Intervention 2: No change in EE, DP, or PA

Table 4 Continued

Moody 2013	Prevention	Mindfulness-based course (MBC; 8 weekly sessions)	RCT (immediately post intervention)	Pediatric oncology staff (treatment = 23 at baseline, 22 at follow-up, control = 24 at baseline and follow-up)	Urban academic pediatric hematology/onc ology programs (NYC, US and Petach Tikva, Israel)	MBI	No change in EE, DP or PA
Muir 2019	Prevention	Emergency Resiliency Initiative: mindfulness and compassion training program (3 months)	Cohort (immediately after completion of program)	RNs and patient care technicians (n = 35 at baseline, and 26 at follow-up)	Level 1 trauma care center emergency department (US)	MBI-HSS for medical personnel	Increase in PA, decrease in EE, no change in DP
Muse 2016	Treatment	Intensive outpatient therapy (1 week)	Cohort analytic (immediately post)	Clergy with depression and burnout (Treatment = 23, Control = 121 with 23 as matched pair)	Pastoral Institute's ''Clergy in Kairos'' program (GA, US)	MBI	Decrease in EE and DP, no change in PA
Noullet 2018	Prevention	Pastoral crisis intervention training (3 day)	Cohort (1 year)	Clergy (n = 73 at baseline, 39 at follow-up)	Trainings and conferences (US)	ProQol	Decrease in burnout
Nwabuko 2019	Treatment	Rational-emotive adult education intervention (2 2-hour sessions per week for 16 weeks)	RCT (Immediately post, 3 months)	Teachers with burnout (Treatment = 43; Control = 43)	Primary schools (Southeast Nigeria)	TBI	Decrease in burnout
Oman 2006	Prevention	Passage meditation (8 weekly, 2-hour training sessions)	RCT (post intervention, 8 weeks, and 19 weeks)	HCWs (Intervention = 30 at baseline, 27 at follow-up; control = 31 at baseline, 31 at follow-up)	Large hospital (Colorado, US)	MBI	No change in EE, DP or PA
Orellana-Rios 2017	Prevention	Meditation and mindfulness program with *Tong-len* (10 weeks)	Cohort (post intervention)	Palliative care team members (N = 28)	Faith-based community hospital (Germany)	MBI-HSS	Decrease in EE, increase in PA, no change in DP

Table 4 Continued

Pandya 2019	Prevention	Meditation app (M-App)	RCT (1 year)	Chaplains (Intervention = 48 at baseline, 45 at follow-up; Control = 48 at baseline, 40 at follow-up)	Hospices for older adults (Mumbai, Bangkok, Pretoria, and Nairobi)	MBI-HSS	Decrease in EE, DP, and increased PA
Passalacqua 2012	Prevention	VIPS Communication skills training for patient-centered dementia care (Four 1-hour workshops over 4 weeks)	Cohort (6 weeks)	Professional caregivers (n = 26)	For-profit long-term care facility with specialty in memory issues (Southwest US)	MBI EE and DP subscales	Decrease in DP, no change in EE
Perseius 2007	Prevention	Use of Dialectical behavioral therapy with patients with Borderline Personality Disorder (6 months of training, 18 months of practice)	Cohort (6, 12, and 18 months post training)	Psychiatric professionals (baseline = 22, 18-month follow-up = 18)	Adult and child psychiatry clinics in Uppsala County (Sweden)	MBI-GS (Swedish version)	No change in EE, DP, or PA
Peterson 2008	Treatment	Reflecting peer-support groups (weekly for 10 sessions)	RCT (immediately post, 7 months, and 12 months)	HCWs with burnout (treatment = 64 at baseline, 47 at 12 months; control = 87 at baseline, 63 at 12 months)	Several geographic regions (Sweden)	OLBI (Swedish version)	Decrease in exhaustion, no change in disengagement
Pfaff 2017	Prevention	Compassion fatigue resiliency program (6 weeks)	Cohort (follow-up period not reported)	Interprofessional staff (HCWs) (27 completed programs, 12 completed both pre and post-intervention surveys)	Regional cancer center (Canada)	ProQol	No change
Potash 2014	Prevention	Intervention 1: Art therapy-based supervision (6-week, 18-hour) compared to Intervention 2: Standard skills-based	Cohort analytic (post was 6 weeks for art therapy, and 3 days for comparison)	End-of-life care workers (art therapy = 69 at baseline, 56 completed follow-up questionnaires;	Various settings, training through Hospice Care	MBI-GS	Intervention 1: decrease in EE, no change in DP or PA; Intervention 2:

Table 4 Continued

							Decrease in DP, no change in PA or EE
		supervision (3-day, 18-hour)		comparison = 63 at baseline, 57 completed follow-up questionnaires)	society (Hong Kong)		
Powell 2016	Prevention	Resilience and Coping for the Healthcare Community psychoeducation program	Cohort (immediately post workshop, and 3 weeks)	Community health workers (baseline = 69; follow-up = 45)	Federally qualified health centers in areas affected by Hurricane Sandy (US)	ProQol	No change in burnout
Raab 2015	Prevention	Mindfulness Based Stress Reduction education (Weekly for 8 weeks)	Cohort (immediately post)	Female mental health professionals (n = 22)	Large urban mental health center (Canada)	MBI-HSS	No change in PA, EE, or DP
Ranta 2008	Prevention	Multidimensional intervention with relaxation, self and mood management, and rehearsal (3 one-hour sessions) or relaxation only (control)	RCT (immediately post intervention)	Police personnel (treatment = 10, control = 10)	Police stations	MBI	Decrease in EE and DP, no change in PA
Reilly 2014	Prevention	Auricular acupuncture (5 sessions over 16 weeks)	Cohort (immediate after last session)	HCWs (76 at baseline, 37 completed intervention and follow-up)	Inpatient surgical burn/trauma intensive care and step-down units at an urban medical center (Northeast, US)	ProQol	Decrease in burnout
Reyes 2019	Prevention	"Helping the Helper" program based on Functional Analytic Psychotherapy (through 6 weekly online sessions)	Interrupted time series (data points at 5, 3, and 1 weeks before and 1, 4, and 7 weeks post)	MHWs (n = 6)	Borderline Personality Disorder Clinic (Mexico)	MBI (Mexican Version)	Decrease in EE and DP; increase in PA

Table 4 Continued

Riley 2017	Prevention	Study 1: Yoga-Based Stress Management (YBSM; 8 weeks); Study 2: Cognitive Behavioral Stress Management and YBSM (8 weeks each)	Study 1: Cohort (1 week); Study 2: RCT (post intervention, 2 months, 6 months)	MHWs (Study 1: n = 44 at baseline, 37 completed follow-ups; Study 2: YBSM = 19 at baseline; CBSM = 19 at baseline. Follow-up by group not reported for study 2)	Study 1: Multisite mental health center (Massachusetts); Study 2: Psychiatry department in a large hospital (New England)	Study 1: Not measured; Study 2: ProQol	Study 1: N/A; Study 2: Decrease in burnout for both intervention
Rollins 2016	Prevention	Intervention 1: BREATHE: Relapse prevention-based group workshop with mindfulness, cognitive restructuring, boundary setting, and social support (1 day); Intervention 2: Person-centered treatment planning (1 day)	Cluster Randomized comparative effectiveness trial (6 weeks, 6 months)	Behavioral health providers (Intervention 1 = 76 at baseline, 63 completed all assessments; Intervention 2 = 69 at baseline, 43 completed all assessments)	US Department of Veterans Affairs facilities and social service agencies (Midwestern US)	MBI	Intervention 1: Decrease in EE, and DP, no change in PA Intervention 2: No change
Rosada 2015	Prevention	Reiki (weekly, 30-minute sessions for 6 weeks)	Randomized crossover with placebo and washout period (immediately post)	Community mental health clinicians (n = 45)	Community mental health agencies (New England)	MBI-HSS	Decrease in EE; no difference in DP or PA
Saganha 2012	Treatment	"White Ball" Qigong exercises (2 weeks)	RCT (3 weeks)	Physical therapists with burnout (treatment = 8, control = 8)	Private hospitals (Portugal)	MBI	Decrease in EE and DP; No change in PA
Sahlin 2014	Prevention	Nature based stress management course (12 weeks)	Cohort (course end, 3 months, 6 months, 12 months)	HCWs (baseline = 38, 12-month follow-up = 32)	Botanical garden, course offered through large public health care	SMBQ	Decrease in burnout

Table 4 Continued

					organization (Sweden)		
Sallon 2017	Prevention		Cohort analytic (weeks following intervention completion)	Hospital staff (treatment = 118 at baseline, 82 at follow-up; controls = 97 at baseline, 67 at follow-up)	Tertiary care center (Jerusalem)	MBI	Decrease in EE, no change in DP or PA
Salyers 2011	Prevention	BREATHE: Relapse prevention-based group workshop with mindfulness, cognitive restructuring, boundary setting, and social support (1 day)	Cohort (6 weeks)	Behavioral health care employees (baseline = 79, follow-up = 74)	Public agency providing comprehensive substance abuse and mental health services (Midwest US)	MBI	Decrease in EE and DP; No change in PA
Salyers 2019	Prevention	Intervention 1: BREATHE - Relapse prevention based group workshop with mindfulness, cognitive restructuring, boundary setting, and social support; Intervention 2: Motivational interviewing training (both trainings 8-8.5 hours total)	Randomized comparative effectiveness (3, 6, and 12 months)	Direct care professionals (Intervention 1 baseline = 89, 12-month follow-up = 59; Intervention 2 baseline = 103; 12 month follow-up = 66)	Community mental health centers (Midwest US)	MBI	Intervention 1: no change; Intervention 2: no change
Scarlet 2017	Prevention	Compassion cultivation training to prevent burnout (8 week)	Cohort (midway, immediately post, and 1 month)	HCWs (n = 62)	CE offered in a Hospital (San Diego)	CBI	No change
Schoeps 2019	Prevention	Training to reduce work-related stress and enhance wellbeing through emotional ability and skills (7 2-hour training sessions over 3 months)	RCT (Immediately post, 6 months)	Teachers (Intervention = 135; Control = 205)	Private and public schools (Valencia, Spain)	SBI	Decrease in indolence, exhaustion and guilt; no change in excitement

Table 4 Continued

Scott 2015	Prevention	Educational and networking in-person meetings with capacity building remote support for individuals (duration varies)	Cohort (5 follow-up periods within 18 months)	Pastors (baseline = 51; completers = 34)	Rural (US)	Scale developed for use with pastors	Decrease
Sexton 2019	Prevention	Three Good Things intervention (15 days)	Cohort (1, 6, and 12 months)	HCWs (baseline = 228, 1 month = 127, 6-month follow-up = 119, 12 month follow-up = 121)	Online (US)	MBI EE Subscale	Decrease in EE
Siu 2014	Prevention	Study 1: Intensive positive psychology stress-management training program (2 days); Study 2: Added recovery strategy component to training (2.5 days)	Study 1: Cohort (7-10 days); Study 2: Cohort analytic (follow-up period not reported)	Study 1: HCWs (1034 attended trainings, 817 completed both pre and posttest); Study 2: Teachers (Treatment = 50, control = 48)	Study 1: Public hospitals; Study 2: Primary and Secondary Schools (Hong Kong)	MBI-HSS	Study 1: Decrease in DP, EE, increase in PA; Study 2: No change
Slade 2018	Prevention	Educational and supportive resources to prevent PTSD in midwives (single workshop)	Cohort (6 months)	Midwives (baseline = 176, follow-up = 91)	Hospital (northwest England)	MBI-HSS	Decrease in DP, Increase in PA, no change in EE
Suyi 2017	Prevention	Sessions to increase mindfulness (six two-hour sessions over six weeks)	Cohort (immediately post, and 3 month)	Mental health professionals (n = 37)	Institute of Mental Health (Singapore)	OLBI	No change
Tonarelli 2018	Prevention	Expressive writing session (1 session)	RCT (follow-up within 1-3 days)	Professionals that work in palliative care (nurses, health care assistants and a psychologist; treatment = 15; control = 11)	Palliative Care operating units and Hospice and Local Health Services (Italy)	MBI	No change

Table 4 Continued

Ugwoke 2018	Treatment	Rational-emotive adult education intervention (12 weeks)	RCT (2 follow-up assessments, timing not reported)	Special education teachers with burnout (Intervention = 28 at baseline/follow-up; Control = 26 at baseline/follow-up)	Schools for students with special needs (Southeast Nigeria)	TBS	Decrease in physical fatigue, EE, and cognitive weariness
Unterbrink 2012; Unterbrink 2014	Prevention	Manualized group to reduce stress and increase social support between teachers (10 90-minute sessions over 10 months)	RCT (follow-up timing not reported)	Teachers (Intervention = 166 at baseline, 92 at follow-up; Control = 146 at baseline; 117 at follow-up)	Grammar schools and Secondary modern schools (Southwest Germany)	MBI (German version)	Decrease in EE, increase in PA, no change in DP or involvement (ITT no change)
Visser 2008	Prevention	Dementia behavior education training program with or without peer-support (8 weeks)	3-arm cluster RCT (3 months, 6 months)	Care staff (education only = 10 at baseline, 6 at follow-up; education and peer support = 17 at baseline; control = 25) and residents (education only = 21; education and peer support = 23; control = 32)	Aged care facilities (Australia)	MBI third edition	No change
Wegner 2011	Treatment	Inpatient individual and group therapy for burnout (average duration was 7 weeks)	Cohort (first exam post treatment)	Teachers with emotional exhaustion (n = 200 at baseline, 150 at follow-up)	Rural treatment center (Germany)	MBI (German version)	Decrease in EE, increase in PA, no change in DP
Weingardt 2009	Prevention	online CBT modules and group supervision (2 months)	Randomized trial with high dose and low dose groups (timing of follow-up not reported)	Substance abuse counselors (high fidelity group = 73; low fidelity group = 74)	Online procedures (Northwest US)	MBI-HSS	Increase in PA; no change in EE or DP

Table 4 Continued

Zolnierczyk-Zreda 2005	Prevention	Stress management workshop (2 day, 6 hours per day)	RCT (1 month)	Teachers (Intervention = 29, Control = 29)	Setting not specified (Poland)	MBI (Koniarek adaptation)	Decrease in EE, no change in DP or PA

*BCSQ-12 = Burnout Clinical Subtype Questionnaire (Spanish short version), CBI = Copenhagen Burnout Inventory, Cluster RCT = Cluster randomized controlled trial, CSFST = Compassion Satisfaction/Fatigue Self-Test, DP = Depersonalization or Cynicism dimensions of burnout, EE = Emotional Exhaustion dimension of burnout; HCWs = Health care workers, MBI = Maslach Burnout Inventory, MBI-D = German version of MBI, MBI-ES = MBI Educator Survey, MBI-GS = MBI General Survey, MBI-HSS = MBI Human Services Survey, MHWs = Mental health workers, OLBI = Oldenburg Burnout Inventory, PA = Personal accomplishment or professional efficacy dimension of burnout, PCWs = Personal care workers, ProQol = Professional Quality of Life Scale, SBI = Spanish Burnout Inventory, SMBQ = Shirom Melamed Burnout Questionnaire, TBI = Teachers' Burnout Inventory, TBS = Teacher Burnout Scale, UBOS-C/MBI-NL = Dutch version of the MBI-HSS, UBOS-L = Dutch version of the MBI-ES.

Most individual interventions targeted teachers,[100,108,110,114,124,171,172,175,179,196,199-103,106,127,131,133,135,155,157,160,161,163,184,187,190] mental and behavioral health care workers,[107,111,126,128,146,148-150,152,153,159,162,168,173,176,177,193,204] health care workers,[100,104,109,119-122,125,129,132,134,137-145,154,156-158,165,166,180,185,189,201,203,205-207] or personal care staff.[113,164,169,170,174,181-183,188,192,195] Ten individual level studies were with people who work with the elderly or those who have dementia.[164,167,169,170,181,182,188,192,195,207] Seven individual level intervention studies were with people who work with those who have intellectual disabilities.[105,113,117,124,174,175,183] Other interventions targeted police,[115,116,130,136,147] religious leaders,[102,167,191,194] social workers,[112,118,178] dentists,[99,101] firefighters,[136] special education teachers,[105,117] EMTs,[119] HIV/AIDS educators,[186] people that work to help victims of interpersonal violence,[123] childcare workers,[202] and helping professionals in general.[197,200] Five individual studies were among professionals who work in palliative or hospice care,[138,143,167,205,206] and two were will oncology professionals.[141,180] Individual interventions took place in Europe,[99,111,168-170,173,196-100,101,104,106,108,109,112,121,122,126,134,143,155,158,160,161,163,164,175,177,182-185,187-190,193,197,201,202,206] North America,[102,107,110,114-116,118-120,123,124,127-133,136-142,144-146,148-150,152-154,165,166,171,172,174,176,179,191,192,203,204-156,162,194] Asia,[147,157,159,167,181,199,200,205] Africa,[103,105,135,167,186] Australia,[113,180,195,207] and the Middle East.[141,151,208]

Most individual level treatment studies were randomized controlled trials.[100,103-105,108,109] Other individual level treatment study designs were cohort,[106] cohort analytic,[99,101,102] and an AB single case study.[107] Of the individual level prevention interventions, most designs were cohort studies,[111,113,115,122,123,125,128-130,132,136-139,142-146,149,152,154,156-159,165,173,176,177,180,182,185,189-194,199,201,203] randomized controlled trials,[112,114,116,118,120,121,124,126,127,133,140,141,147,149,155,166,167,174,196,197,206-160,161,163] cluster randomized controlled trials,[110,131,134,164,168-172,175,179,181,183,184,188,195,207] or cohort

analytic studies.[135,151,157,178,186,187,200,202,205] Other study designs included randomized crossover,[117,204] interrupted time series,[148,209] randomized cluster comparative effectiveness,[150,153] and randomized trial with high dose and low dose groups.[162] Final follow-up measures of individual level interventions occurred as early as immediately after the intervention[110,113,115,128,136,137,139,141-143,146,171,179,185,190,199,203] to two years after the intervention.[134]

All but one individual level treatment interventions were associated with reductions in burnout. The remaining individual treatment intervention was not associated in any change in burnout.[99] Of the individual level prevention studies, 32 were not associated with any change in burnout,[110,113,120,122,131,134,138,141,144-146,153,154,159,164,166,172,174,175,181,182,184,185,188-190,193,195,196,199,202,206] one was associated with an increase in burnout,[168] and two had mixed results where one dimension of burnout worsened and one dimension improved.[112,170] The remaining individual prevention studies were associated with decreases in at least one dimension of burnout.

Of the individual level treatment studies, two studies had a moderate global risk of bias rating,[100,104] while the remaining studies had weak global risk of bias ratings (Table 5). Of the individual level prevention studies, one study had a strong global risk of bias rating,[168] 13 had a moderate global risk of bias rating,[113,132,134,139,140,142,143,148,165,169,188,189,202] and the remaining studies had a weak global risk of bias rating (Table 6). Like the organizational level studies, individual level studies tended to have better ratings in the areas of design and data collection method, poorer ratings in controlling for selection and confounders, and mixed ratings in the area of withdrawals.

Table 5 Risk of Bias Ratings for Individual Level Treatment Studies

Article	Selection Bias Rating	Design Rating	Confounders Rating	Blinding Rating	Data Collection Rating	Withdrawal Rating	Global Rating
Brake 2001	Weak	Moderate	Weak	Moderate	Strong	Strong	Weak
Callender 2019	Moderate	Moderate	Weak	Moderate	Strong	Weak	Weak
Duijts 2008	Moderate	Strong	Weak	Moderate	Strong	Moderate	Moderate
Ebert 2014	Weak	Strong	Weak	Moderate	Strong	Strong	Weak
Gorter 2001	Weak	Moderate	Weak	Moderate	Strong	Strong	Weak
Muse 2016	Weak	Moderate	Weak	Moderate	Strong	Strong	Weak
Nwabuko 2019	Weak	Strong	Weak	Moderate	Strong	Weak	Weak
Peterson 2008	Weak	Strong	Moderate	Moderate	Strong	Moderate	Moderate
Saganha 2012	Weak	Strong	Weak	Moderate	Strong	Strong	Weak
Ugwoke 2018	Weak	Strong	Weak	Moderate	Strong	Strong	Weak
Wegner 2011	Moderate	Moderate	Weak	Weak	Moderate	Strong	Weak

Table 6 Risk of Bias Ratings for Individual level Prevention Studies

Article	Selection Bias Rating	Design Rating	Confounders Rating	Blinding Rating	Data Collection Rating	Withdrawal Rating	Global Rating
Abos 2019	Weak	Strong	Moderate	Moderate	Moderate	Weak	Weak
Aimola 2018	Moderate	Strong	Moderate	Moderate	Strong	Strong	Strong
Ancona 2014	Weak	Strong	Weak	Weak	Strong	Strong	Weak
Askey-Jones 2018	Weak	Moderate	Weak	Weak	Strong	Strong	Weak
Barbosa 2015	Moderate	Strong	Weak	Moderate	Strong	Strong	Moderate
Barbosa 2016	Weak	Strong	Weak	Moderate	Strong	Strong	Weak
Barr 2015	Weak	Strong	Weak	Moderate	Strong	Moderate	Weak
Berg 2017	Weak	Strong	Weak	Moderate	Weak	Weak	Weak
Berry 2012	Moderate	Moderate	Weak	Moderate	Strong	Weak	Weak
Bethay 2013	Weak	Strong	Weak	Moderate	Strong	Strong	Weak
Breeman 2016	Weak	Strong	Weak	Moderate	Strong	Strong	Weak
Brinkborg 2011	Weak	Strong	Weak	Moderate	Strong	Strong	Weak

Table 6 Continued

Brooker 2013	Moderate	Moderate	Weak	Moderate	Strong	Strong	Moderate
Carmel 2014	Weak	Moderate	Weak	Moderate	Strong	Weak	Weak
Caruso 2013	Weak	Moderate	Weak	Moderate	Strong	Strong	Weak
Chan 2011	Weak	Moderate	Weak	Moderate	Strong	Weak	Weak
Cheek 2003	Weak	Strong	Weak	Moderate	Strong	Weak	Weak
Christopher 2016	Weak	Moderate	Weak	Moderate	Strong	Moderate	Weak
Christopher 2018	Weak	Strong	Weak	Moderate	Strong	Moderate	Weak
Christopher 2018	Weak	Strong	Weak	Moderate	Strong	Moderate	Weak
Cohen 2005	Weak	Moderate	Weak	Moderate	Strong	Strong	Weak
Cooley 1996	Weak	Strong	Weak	Moderate	Strong	Strong	Weak
Crowder 2017	Weak	Strong	Weak	Moderate	Strong	Strong	Weak
Domitrovich 2016	Weak	Strong	Weak	Moderate	Strong	Weak	Weak
Ducar 2019	Weak	Moderate	Weak	Moderate	Strong	Moderate	Weak
Duchemin 2015	Weak	Strong	Weak	Moderate	Strong	Strong	Weak
Dunne 2019	Weak	Strong	Weak	Moderate	Strong	Weak	Weak
D'Urso 2019	Weak	Moderate	Weak	Moderate	Strong	Weak	Weak
Dutton 2017	Weak	Moderate	Weak	Moderate	Strong	Moderate	Weak
Elder 2014	Weak	Strong	Weak	Moderate	Strong	Strong	Weak
Ellen Braun 2019	Weak	Moderate	Weak	Moderate	Strong	Strong	Weak
Eriksson 2018	Weak	Strong	Weak	Moderate	Weak	Strong	Weak
Flook 2013	Weak	Strong	Weak	Moderate	Strong	Weak	Weak
Forbat 2019	Weak	Moderate	Weak	Moderate	Strong	Weak	Weak
Fukuda 2018	Weak	Strong	Weak	Moderate	Weak	Strong	Weak
Gentry 2004	Weak	Moderate	Weak	Moderate	Weak	Weak	Weak
Goodman 2012	Weak	Moderate	Weak	Moderate	Strong	Weak	Weak
Grafestatter 2017	Weak	Strong	Weak	Moderate	Weak	Weak	Weak
Gridley 2016	Weak	Moderate	Weak	Moderate	Strong	Weak	Weak
Grupe 2019	Weak	Moderate	Weak	Moderate	Strong	Strong	Weak
Harris 2016	Weak	Strong	Weak	Moderate	Strong	Strong	Weak
Hastings 2018	Weak	Strong	Weak	Moderate	Strong	Weak	Weak
Hayes 2019	Weak	Strong	Weak	Weak	Strong	Strong	Weak
Jacobs 2016	Moderate	Moderate	Weak	Moderate	Weak	Strong	Weak
Jacobs 2017	Moderate	Moderate	Weak	Moderate	Strong	Strong	Moderate
Jennings 2013	Weak	Strong	Weak	Moderate	Strong	Weak	Weak

Table 6 Continued

Jensen 2006	Moderate	Strong	Weak	Moderate	Strong	Moderate	Moderate
Jeon 2012	Weak	Strong	Weak	Moderate	Strong	Moderate	Weak
Johnson 2013	Weak	Moderate	Weak	Moderate	Strong	Strong	Weak
Johnson 2017	Weak	Moderate	Weak	Moderate	Strong	Strong	Weak
Jones 2009		Moderate	Weak	Moderate	Strong	Moderate	Weak
Kang 2011	Weak	Moderate	Weak	Moderate	Weak	Strong	Weak
Kaplan 2017	Weak	Moderate	Weak	Moderate	Strong	Weak	Weak
Karjalainen 2019	Weak	Moderate	Weak	Moderate	Strong	Strong	Weak
Kinser 2016	Weak	Moderate	Weak	Moderate	Strong	Moderate	Weak
Klein 2018	Weak	Moderate	Weak	Moderate	Strong	Strong	Weak
Koch 2016	Moderate	Moderate	Moderate	Moderate	Strong	Weak	Moderate
Kuske 2009	Moderate	Strong	Weak	Weak	Strong	Moderate	Weak
Leary 2018	Moderate	Moderate	Weak	Moderate	Strong	Moderate	Moderate
Livingston 2019	Moderate	Strong	Weak	Moderate	Strong	Moderate	Moderate
Luberto 2017	Moderate	Moderate	Weak	Moderate	Strong	Strong	Moderate
Lusilla-Palacios 2015	Moderate	Moderate	Weak	Moderate	Strong	Moderate	Moderate
Marlow 2015	Weak	Moderate	Weak	Moderate	Strong	Strong	Weak
Mistretta 2018	Moderate	Strong	Weak	Moderate	Strong	Moderate	Moderate
Moody 2013	Weak	Strong	Moderate	Weak	Strong	Strong	Weak
Muir 2019	Moderate	Moderate	Weak	Moderate	Strong	Moderate	Moderate
Noullet 2018	Weak	Moderate	Weak	Moderate	Strong	Weak	Weak
Oman 2006	Weak	Strong	Weak	Weak	Strong	Strong	Weak
Orellana-Rios 2019	Strong	Moderate	Weak	Moderate	Strong	Strong	Moderate
Pandya 2019	Weak	Strong	Weak	Moderate	Strong	Strong	Weak
Passalacqua 2012	Weak	Moderate	Weak	Moderate	Strong	Strong	Weak
Perseius 2007	Weak	Moderate	Weak	Moderate	Strong	Strong	Weak
Pfaff 2017	Weak	Moderate	Weak	Moderate	Strong	Weak	Weak
Potash 2014	Weak	Moderate	Weak	Moderate	Strong	Weak	Weak
Powell 2016	Weak	Moderate	Weak	Moderate	Strong	Moderate	Weak
Raab 2015	Weak	Moderate	Weak	Moderate	Strong	Weak	Weak
Ranta 2008	Weak	Strong	Weak	Moderate	Strong	Strong	Weak
Reilly 2014	Weak	Moderate	Weak	Moderate	Strong	Weak	Weak
Reyes 2019	Moderate	Moderate	Weak	Moderate	Strong	Strong	Moderate

Table 6 Continued

Riley 2017 Study 1	Weak	Moderate	Weak	Moderate	Strong	Strong	Weak
Riley 2017 Study 2	Weak	Strong	Weak	Moderate	Strong	Weak	Weak
Rollins 2016	Weak	Strong	Weak	Moderate	Strong	Moderate	Weak
Rosada 2015	Weak	Strong	Weak	Moderate	Strong	Strong	Weak
Sahlin 2014	Weak	Moderate	Weak	Moderate	Strong	Strong	Weak
Sallon 2017	Weak	Moderate	Weak	Moderate	Strong	Strong	Weak
Salyers 2011	Weak	Moderate	Weak	Moderate	Strong	Strong	Weak
Salyers 2019	Weak	Strong	Weak	Moderate	Strong	Moderate	Weak
Scarlet 2017	Weak	Moderate	Weak	Moderate	Strong	Weak	Weak
Schoeps 2019	Weak	Strong	Weak	Moderate	Strong	Weak	Weak
Scott 2015	Weak	Moderate	Weak	Moderate	Weak	Moderate	Weak
Sexton 2019	Weak	Moderate	Weak	Moderate	Strong	Weak	Weak
Siu 2014 Study 1	Weak	Moderate	Weak	Weak	Strong	Moderate	Weak
Siu 2014 Study 2	Weak	Moderate	Weak	Moderate	Strong	Strong	Weak
Slade 2018	Weak	Moderate	Weak	Moderate	Strong	Moderate	Weak
Suyi 2017	Weak	Moderate	Weak	Moderate	Strong	Strong	Weak
Tonarelli 2018	Weak	Strong	Weak	Moderate	Strong	Strong	Weak
Unterbrink 2012 & Unterbrink 2014	Weak	Strong	Weak	Moderate	Strong	Moderate	Weak
Visser 2008	Weak	Strong	Weak	Moderate	Strong	Weak	Weak
Weingardt 2009	Weak	Strong	Weak	Moderate	Strong	Moderate	Weak
Zolnierczyk-Zreda 2005	Weak	Strong	Weak	Moderate	Weak	Strong	Weak

4.2.3 Multilevel Studies

There were six articles describing six interventions that had both individual and organizational components, all of which were prevention studies (Table 7). These interventions involved helping individuals learn how to personally cope with stress or burnout,[210-213] skills trainings for workers,[210,212,214,215] organizational changes to work process or workflow,[210,214,215] trainings for supervisors,[211,213] strategies to improve communication or team-functioning,[211,213] and changes to the physical work environment.[212] One of these interventions had a participatory component, in which feedback from employees informed the interventions used.[210] Of interventions with reported duration, duration of interventions ranged from five weeks[213] to six months.[211]

Table 7 Multilevel Intervention Study Characteristics*

Study	Intervention (duration)	Study Design (follow-up period)	Population and sample size	Setting	Measure of Burnout	Change in Burnout
Innstrand 2004	Staff met to discuss ideas to reduce burnout and stress and implemented changes at the individual (e.g. regular physical activity and seminars) and organizational level (e.g. scheduling changes and improvements to new employee routines; 2 months)	Cohort analytic (10 months)	Staff that work with people who have intellectual disabilities (treatment = 43 at baseline, 36 at follow-up; Control = 22 at baseline, 11 at follow-up)	Community residential care (Norway)	MBI-GS	Decrease in EE, no change in DP or PA
Jones 2008	Training in evidence-based psychological interventions designed to enhance practitioners' ability to foster engagement and develop collaborative therapeutic relationships with people with serious mental illness with changes to inpatient environment (12 weeks)	Cohort with repeated measures (one month before training, immediately before training, immediately after training)	Acute inpatient mental health team (n = 18 at baseline, 12 completed all assessments)	Adult acute inpatient team in Mental Health and Learning Disability Trust (South of England)	MBI	No change in EE, DP, or PA
Jones 2009	Training in evidence-based interventions for psychosis (15 weeks) with unit changes to support implementation of skills from training	Cohort with repeated measures (3 months prior to training, immediately before training, immediately after training, 18 months after training)	Inpatient workers (n = 72 at baseline, 49 at follow-up)	Three wards in a single mental health unit at a district general hospital (outer London)	MBI	Increase in DP, no change in PA or EE
Scarnera 2009	Series of six monthly 3-5-hour workshops to manage interpersonal relationships, leadership training for managers, and trainings for	Cohort (6 months, 18 months)	Mental health workers (n=25)	Public and private services (Italy)	Italian MBI	Decrease in DP; no change in PA or EE

Table 7 Continued

	employees to manage negative emotions (6 months)				
Sottimano 2018	Intervention 1: Counseling, supported working groups, and revisions to school layout and furniture to support physical needs of teachers and students; Intervention 2: Counseling, supported working groups, and programs to improve posture, movement, and use of voice (duration of intervention periods not reported)	3-arm cluster RCT (follow-up timing not reported)	Preschool teachers (Intervention 1 = 88 at baseline, 69 at follow-up; Intervention 2 = 88 at baseline, 65 at follow-up; Control = 230 at baseline, 190 at follow-up)	Large municipality preschools (Italy)	SBI	Intervention 1: Increase in enthusiasm, decrease in exhaustion and indolence, no change in guilt; Intervention 2: Increase in enthusiasm and indolence, decrease in exhaustion, no change in guilt
van Dierendonck 1998	Series of group meetings designed to reduce feelings of burnout with training for supervisors to handle burnt out staff (5 week)	3-arm cohort analytic (2 comparison groups; 6 months, 12 months)	Direct care professionals who work with people with mental disabilities (treatment = 36, same agency (internal) control = 39, external control = 74)	Direct care organizations (Netherlands)	UBOS-C/MBI-NL	Decrease in EE, no change to PA or DP

BCSQ-12 = Burnout Clinical Subtype Questionnaire (Spanish short version), CBI = Copenhagen Burnout Inventory, Cluster RCT = Cluster randomized controlled trial, CSFST = Compassion Satisfaction/Fatigue Self-Test, DP = Depersonalization or Cynicism dimensions of burnout, EE = Emotional Exhaustion dimension of burnout; HCWs = Health care workers, MBI = Maslach Burnout Inventory, MBI-D = German version of MBI, MBI-ES = MBI Educator Survey, MBI-GS = MBI General Survey, MBI-HSS = MBI Human Services Survey, MHWs = Mental health workers, OLBI = Oldenburg Burnout Inventory, PA = Personal accomplishment or professional efficacy dimension of burnout, PCWs = Personal care workers, ProQol = Professional Quality of Life Scale, SBI = Spanish Burnout Inventory, SMBQ = Shirom Melamed Burnout Questionnaire, TBI = Teachers' Burnout Inventory, TBS = Teacher Burnout Scale, UBOS-C/MBI-NL = Dutch version of the MBI-HSS, UBOS-L = Dutch version of the MBI-ES.

Multi-level interventions targeted intellectual disability support staff,[210,213] mental health care workers,[211,214] health care workers,[215] and teachers.[212] All multilevel interventions occurred in European countries. Multilevel interventions were studied with cohort studies,[211,214,215] cohort analytic study designs,[210,213] and a cluster randomized controlled trial.[212] Final collection of measures in studies examining multi-level intervention occurred as early as immediately following the intervention[214] or as late as 18 months after the intervention.[211,215]

Of the multi-level intervention studies, three were associated with a decrease in at least one dimension of burnout,[210,211,213] one was not associated with any change in burnout,[214] one was associated with an increase in burnout,[215] and one had mixed results in which one dimension of burnout increased while others decreased.[212]

Of the multi-level intervention studies, one of the studies had a global risk of bias rating of moderate (Table 8).[212] The remaining studies all had weak risk of bias ratings. All multilevel studies scored weak on selection bias and moderate on blinding. All but one study had a weak rating for confounders and a strong rating for data collection methods. Like organizational and individual level studies, ratings for withdrawals were mixed.

Table 8 Risk of Bias Ratings for Multi-level Studies

Article	Selection Bias Rating	Design Rating	Confounders Rating	Blinding Rating	Data Collection Rating	Withdrawal Rating	Global Rating
Innstrand 2004	Weak	Moderate	Weak	Moderate	Strong	Weak	Weak
Jones 2008	Weak	Moderate	Weak	Moderate	Strong	Moderate	Weak
Jones 2009	Weak	Moderate	Weak	Moderate	Strong	Moderate	Weak
Scarnera 2009	Weak	Moderate	Weak	Moderate	Moderate	Weak	Weak
Sottimano 2018	Weak	Strong	Moderate	Moderate	Strong	Strong	Moderate
van Dierendonck 1998	Weak	Strong	Weak	Moderate	Strong	Weak	Weak

4.2.4 Additional Outcomes

Like burnout, most studies reported outcomes that were either null or in the desired direction. A few studies reported outcomes in the opposite direction of what was desired. Studies frequently assessed work satisfaction, with 10 out of 34 associated with increased levels of work satisfaction (Appendix Table 1). Studies also frequently assessed employee depression, anxiety, and stress, with 14 out of 25 interventions associated with a decrease in depressive symptoms, eight out of 19 interventions associated with a decrease in anxiety, and 28 interventions out of 46 interventions associated with a decline in stress (Appendix Table 3).

Several studies assessed compassion satisfaction and compassion fatigue, frequently referred to as secondary traumatic stress. Both constructs are often assessed with the ProQol, a measure frequently used to measure burnout. Seven out of 20 interventions were associated with an increase in compassion satisfaction (Appendix Table 3), and six out of 17 interventions were associated with a decline in compassion fatigue (Appendix Table 1). Additional outcomes are summarized in Appendix Tables 1-4.

5.0 Discussion

Workers in the human services sector are at risk of developing burnout. Despite this known risk, there are no interventions either at the individual level or organizational level that have strong evidence base to support their use with this population to the author's knowledge. This lack of evidence indicates the need to synthesize the existing literature and identify directions for future research.

One hundred and forty-three studies met inclusion criteria for this review, and 108 of the included studies described interventions at the individual level. Individual level interventions most frequently involved a form of individual or group therapy or relaxation or mindfulness training. Twenty-eight articles examined interventions that were designed to change the work-environment of employees in order to prevent burnout. Most frequently, these interventions targeted workflow, work processes, policies, or communication. Six articles examined interventions that had both individual and organizational components. The multilevel interventions frequently included components to teach individuals strategies to cope with stress or burnout, skills trainings for workers, strategies to improve team functioning, and trainings for supervisors.

Most study designs were cohort studies, cohort analytic studies, or randomized controlled trials, or cluster randomized controlled trials. Out of all the included studies, only one had a strong global risk of bias rating and only 19 had a moderate global risk of bias rating. Studies tended to have moderate or strong component ratings in the domain of design and data collection methods. Studies performed well in study design as the EPHPP Quality Assessment tool indicates strong ratings for randomized controlled trials and controlled clinical trials, and moderate for cohort analytic studies, case control study, cohort studies, and interrupted time series. All studies had one

of the study designs that indicated a strong or moderate rating. Further, studies performed well in data collection methods, as most studies used tools with demonstrated validity and reliability.

While most studies had moderate or strong ratings in the domains of design and data collection methods, many studies were weaker in controlling for selection bias or confounders. Based on the EPHPP Quality Assessment tool, studies could only be rated strong on the selection bias component if the study sample was randomly selected from a comprehensive list and if there was 80% or greater participation in the study. Studies were rated as weak in selection bias if participants were self-referred, there was less than 60% participation, or if selection methods and participation levels were not described. Two studies in the sample were rated strong in selection bias.[78,82] Many studies relied on self-referral from the population of interest. Studies were rated strong on the confounders component if there were no differences between groups prior to the intervention or if the study design or analysis controlled for most of the potential confounders, such as through matching. Studies were rated weak on confounders if control of confounders was not described, or if there appeared to be uncontrolled differences between groups prior to the intervention. No studies achieved a strong rating in the area of confounders and many studies did not report on potential differences between groups.

Ratings were particularly mixed across studies in the component of withdrawals. The withdrawal rating was based on the percent of participants at follow-up, with studies obtaining a strong rating if follow-up was 80% or greater, a moderate rating if follow-up was between 60-79% and a weak rating if follow-up was less than 60% or not reported. The percent of participation at follow-up varied substantially between studies, which is the reason for the variation in ratings on this component.

These findings are consistent with previous reviews which found that, while there appears to be a number of promising interventions to prevent or treat burnout, the evidence is limited by small sample sizes, high rates of withdrawals, and short durations of interventions.[65] The lack of robust evidence for interventions in this study may be partly accounted for by the large number of pilot studies. Eighteen of the included interventions self-identified as pilot studies in the title of the publication.[88,115,120,122,127,132,138,141,142,144-146,152,156,174,191,202,211]

Previous reviews on this topic had 17[66] and 25[65] studies included in their final selection. This is in great contrast to the 143 studies that were included in the final sample of this review. Part of this difference is due to the increasing awareness of burnout and the need for interventions for it that has occurred in the last decade. This increasing awareness is evident in the fact that over 100 of the studies included in this review were published after 2011, with approximately 60 published in the last three years alone.

Authors of one of the preceding reviews categorized identified studies into organizational level interventions, individual level, or mixed.[65] In the previous review, only two of the included publications were at the organizational level, indicating an important gap in the literature on this topic. In the current review, 28 of the included studies were characterized as targeting the organizational level. While this is a substantial increase from two, all but three of the studies had weak global risk of bias ratings, indicating a need for future studies of organizational level interventions with more robust methodology. Of the organizational level interventions with moderate risk of bias, only one was associated with a change in burnout. This intervention involved lessons, training, and supervision to shift a residential care home for elderly persons to an emotion-oriented care model and was associated with an increase in personal accomplishment, but not with changes in emotional exhaustion or depersonalization.[82] The other two organizational level

65

interventions that rated moderately on the global risk of bias involved a leadership and stress management workshop for firefighter supervisors,[97] and a transformation of Crisis Resolution Home team to a single point of service.[78] Neither of the second two interventions were associated with any change in burnout.

The potential importance of researcher organizational level interventions is highlighted by the findings of a recent systematic review of interventions that target burnout in physicians. The researchers of this review found that organizational level interventions significantly outperformed individual level interventions in reducing burnout.[32]

In the preceding review that categorized intervention levels, the reviewers identified six interventions that had both organizational level and individual level components.[65] The reviewers found that individual level interventions tended to produce desired results, but only in the short term (less than six months) while interventions that combined individual level and organizational level components had more lasting effects.[65] Despite the potential of interventions that combine individual and organizational level components, only six of the included studies in this review were multilevel. Further, only one of the included multi-level studies had a global risk of bias rating of moderate, while the remaining were identified as weak. The lack of included studies in this category indicate a gap in the literature of interventions that target individuals and their workplaces to reduce burnout.

The emphasis on individual level interventions in the literature stands in contrast to calls to shift focus from individual level to social and ecological level determinants of health. The World Health Organization (WHO) called for shift in focus to social determinants in the 1986 Ottawa Charter.[216] In the United States, the Centers for Disease Control and Prevention called for Public Health 3.0, which also emphasizes the need for public health strategies that target social

determinants.[217] The WHO has further identified the relationship between working conditions and health, including high job demand, low control, and effort-reward imbalance.[218] Recognition of the importance of these factors is consistent with both the demand-control support model of burnout[27,28] and the job demands-resources model of burnout,[219] in which burnout occurs under conditions of excess job demand without adequate support.

Conceptually, the root cause of burnout is not individual, so while treating the individual may help alleviate symptoms of stress or burnout, it does not address the causes, which are organizational. Despite the awareness of social determinants of health and the role of organizational factors in burnout, most interventions continue to target individuals. This emphasis on individuals may be evident of organizations shifting responsibility from themselves to their employees, and may demonstrate a lack of accountability among organizations for unhealthy work environments. For example, an organization with a high rate of burnout among employees, may hold a mindfulness training workshop, rather than change policies or management practices that are contributing to the high rate of burnout. Given the power imbalance between organizations and their employees, this poses an ethical problem of social justice in which agencies are not always adequately supporting their employees.

While organizational level interventions may be ideal, individual level interventions are still important in preventing or treating burnout. Of the 61 individual studies associated with reductions in burnout, 10 had moderate global risk of bias ratings. Of these 10 interventions, one was a skills training for staff, in which staff in a long-term dementia care unit learned person-centered care strategies for their work. This intervention was associated with a decrease in emotional exhaustion, with no changes in depersonalization or personal efficacy.[169] One involved online functional analytic psychotherapy and was associated with decreases in emotional

exhaustion and depersonalization with increases in personal efficacy.[148] Another involved preventative coaching for workers[100] and another involved reflecting peer-support groups,[104] both of which were associated with reductions in exhaustion. The other six individual level prevention interventions involved a mindfulness skills or meditation component, either for relaxation training only or in conjunction with other types of therapy. One was associated with reductions in burnout as a dimension of the Professional Quality of Life Scale.[139] Three of these were associated with decreases in emotional exhaustion with no changes in personal efficacy or depersonalization.[132,140,165] Two were associated with decreases in emotional exhaustion and increases in personal efficacy with no change in depersonalization.[142,143]

In past systematic reviews of interventions to treat or prevent burnout at the individual level, authors have noted a lack of consistency in intervention intensities and duration which limit comparability between studies.[66] The authors found that of the 17 studies included in their review, that most had relatively high evidence levels and that Cognitive Behavioral Therapy and the roots of Rhodiola were the most promising interventions in their review, while other interventions examined had results that were too inconsistent to draw any conclusions.[66] The findings in this review are consistent with that of past reviews, in that the bulk of interventions included at the individual level used a variety of methods that made them difficult to compare and draw larger conclusions.[66]

While the author cannot draw conclusions about the bulk of the intervention studies, it does appear the mindfulness-based interventions demonstrate some promise. Mindfulness-based interventions have been increasing in popularity in recent years. Twenty-seven of the interventions included in this review had mindfulness components,[107,110,111,115,116,118-120,125,127,129,130,132,136,137,139-143,146,150-153,159,165] the earliest of which was published in 2011.[152] Of these interventions, 21 were

associated with a decrease in burnout or dimension of burnout.[107,111,115,116,118,119,125,127,129,130,132,136,137,139,140,142,143,150-152,165] Of the included mindfulness based intervention studies, six had moderate global risk of bias ratings and all of those with moderate ratings were associated with reductions in burnout.[132,139,140,142,143,165] The results of this review regarding mindfulness are consistent with other systematic reviews. Past systematic reviews on mindfulness-based interventions for burnout include mindfulness in healthcare professionals,[42,58] workplace mindfulness randomized controlled trials,[55] mindfulness based stress reduction and mindfulness based cognitive therapy,[57] and mindfulness in general for burnout.[59] Several prior reviews have identified that mindfulness-based interventions may be promising for reducing burnout in certain groups,[57-59,220] but that there is poor methodological quality in many of these publications and a need for higher quality studies.[42,55,58] While the mindfulness-based interventions identified in this study show promise, there is a need for further research. Of the mindfulness-based interventions in this study that had moderate global risk of bias ratings, interventions ranged from four weeks[139] to 10 weeks in duration[143] with follow-up occurring up to three months after the intervention.[140,165] All of the interventions were with various types of health care workers, so their effectiveness with groups like police officers, firefighters or clergy is unknown. Further, all but one[143] of the interventions took place in the United States. Because of these limitations, there is a need for robust research on mindfulness based interventions for burnout with a greater variety of professionals, in a greater variety of settings, and that include follow-up after a longer period of time in order to examine if the effect of the intervention last over time.

5.1 Limitations to This Review

There are several limitations to this review. First, the review was conducted by a single person rather than two or more independent reviewers. This may introduce bias into the study selection and synthesis process. Second, a limitation of this review is the potential for incomplete retrieval of identified research. While the author initially planned to hand-search the references of included articles, due to the high number of included articles from the initial search, this was not feasible. This review is limited in that it only includes publications in the three databases searched and may be missing important and relevant articles on the topic. In addition, because the review was limited to studies published in English, additional relevant publications may have been missed. Further interventions may have been missed as the author did not search for any related grey literature.

With the author did conduct risk of bias assessments of individual studies, the reviewer did not assess for risk of bias across studies, limiting the possibility of identifying systematic bias such as publication bias or selective reporting.

Because of how population criteria were defined, this review systematically underrepresented the presence of individual treatment studies in the literature. Several publications that studied interventions at the individual level to treat existing burnout were with samples who could no longer work due to the severity of their symptoms. Even if these interventions were effective with human service workers, they were typically not included as most of these studies did not identify what profession the workers were on leave from. This likely skews the selection of interventions in this review to those used with more mild cases of burnout.

As identified by several other reviewers, there is no clinical diagnostic criteria for burnout and one of the most used tools for assessing burnout, the MBI, has not been validated for clinical purposes. This limits the interpretation of any results of this review for clinical use.

5.2 Conclusions

In conclusion, while the number of intervention studies on the topic of burnout has increased substantially in the last decade, the need remains for more robust examinations of existing interventions. The author is currently unable to provide recommendations for evidenced-based interventions for human service workers that occur at the organizational level, due to lack of robust evidence. The author is also unable to provide recommendations for evidence-based interventions that include both organizational and individual level components due to the lack of literature identified. To address these limitations, the author recommends future research on both organizational level and mixed level interventions with robust methodology in order to fill this gap in the literature.

At the individual level, it appears that mindfulness-based interventions show promise for reducing burnout in human service workers, based on the results of six of the included studies. The mindfulness-based intervention studies had limited follow-up periods after the studies, only included healthcare personnel, and all but one were based in the United States. The author recommends continued good-quality research on mindfulness-based interventions with more diverse samples and with longer follow-up. The author further recommends more robust research on other forms of individual level interventions.

6.0 Funding

Appendix Additional Outcomes Tables

Appendix Table 1 Organizational Outcomes and Perceptions of Workplace Characteristics

Outcome Category	Outcome	+ (Positive)	0 (Null)	- (Negative)
Perception and Satisfaction with work	Work satisfaction	117,196; 157 (Study 1); 74,76,82,89,158,210	91,113,143,166,169,170,189; 150 (Intervention 1 & 2); 152; 153 (Intervention 1 & 2); 154; 157 (Study 2); 73,93,206,214 98 (Interventions 1 & 2); 81,83,86	79,215
	Work-life balance	156	150 (Interventions 1 & 2)	
	Anticipation of client/consumer success (hope for patients)	192; 150 (Intervention 1); 152	150 (Intervention 2)	
	Professional quality of life		145	
	Development opportunities at work	104		
	Work enjoyment	143		
	Work enforcement		143	
	Organizational commitment	117	200	
	Self-rated lifting behavior		134 (Interventions 1 & 2)	
	Positive contributes to work		183	

Appendix Table 1 Continued

	Positive work motivation	183		
	Relatedness satisfaction at work	196		
	Quality of professional support subjects have received	171		
	Psychological and social health of workplace		187	
	behavioral work control	163		
	cognitive work control		163	
	Job satisfaction (intrinsic)		113,169,170	
	Job satisfaction (extrinsic)		169,170	
	Work-related support		112	
	Percent of "accepting" staff-patient interactions (relative to tolerating, rejecting, or unknown)	90		
	Satisfaction with EHR	84		
	Positive Perception of work situation		82	
	Ownership (sense that employee work contributes to organization's goals)		74	
	Perceived barriers to behavior therapy: institutional constraints			72
	Morale		79	
	Personal motivation at work	74		
	Physical Safety (assaults)	168		
	Emotional Safety	168		
Job demands	Overload and role conflict demand			163
	Quantitative demands at work			104
	Perceived exertion (physical)		134 (Interventions 1 &2)	
	Perceived exertion (mental)		134 (Interventions 1 &2)	
	Psychological and safety work demands			163
	Work-related demands		112	
	Professional demands (chronic)		97	

	Professional demands (acute)		97	
Effort/reward balance	Perception of Organizational Equity (balance between investment put in and received from work effort)	213		
	Effort reward imbalance: Effort		160	
	Effort reward imbalance: Reward		160	
	Effort reward imbalance: Appreciation		160	
	Effort reward imbalance: Job safety		160	
	Effort reward imbalance: Status		160	
	Effort reward imbalance ratio		160	
Work engagement	Work engagement: vigor	196		
	Work engagement: absorption	196		
	Work engagement: dedication		196	
	Work engagement: vigor		97; 98 (Interventions 1 & 2)	
	Work engagement: dedication		97; 98 (Interventions 1 & 2)	
	work engagement: absorption		98 (Interventions 1 & 2)	
	Participation at work	104		
Ward atmosphere and quality	Ward quality - relationships		173	
	Ward quality - personal development		173	
	Ward quality - system maintenance		173	
	Ward atmosphere: involvement	90		
	Ward atmosphere: support		90	
	Ward atmosphere: Spontaneity		90	
	Ward atmosphere: autonomy		90	
	Ward atmosphere: practical orientation		90	
	Ward atmosphere: personal problems orientation		90	

Appendix Table 1 Continued

	Ward atmosphere: anger and aggression		90	
	Ward atmosphere: Order and organization		90	
	Ward atmosphere: Program clarity		90	
	Ward atmosphere: Staff control		90	
Social support at work	Combi work-family		100	
	Attitudes related to teamwork constructs		88	
	perceptions of group-level team skills		88	
	Collegial support network size		72	
	Satisfaction with collegial support network	72		
	Perceived barriers to behavior therapy: collegial support	72		
	Supervisor social support		97	
	Colleague/coworker social support	97; 212 (Interventions 1 & 2)		
	Perception of management trust in worker ability (vertical trust)	212 (Interventions 1 & 2)		
	Support from superiors/managers		163, 207 (Interventions 1 & 2)	
	Work satisfaction with colleagues	206		
	Support at work	104		
	Perceptions of workplace civility within organization	76		
	Experienced incivility			76
	Instigated incivility		76	
	Respect from supervisors and colleagues	76		
	Trust in management	76		
	Feeling cared for	93	91	
	Treatment team cohesion: attraction to group task		177	
	Treatment team cohesion: attraction to group-social			177
	Treatment team cohesion: group integration-task		177	
	Treatment team cohesion: group integration-social			177

Work-related stress	Job tension			151
			113; 118 (compared to control at 26 weeks); 80,91,93,95,119,138, 144,145,180	123,128,191,203; 149 (Study 2 Interventions 1 & 2)
	Work stress		120,130,189	147
	Clinical Stress			144
	Frequency of stressful events		165	
	Subjective noise exposure		202	
	Operational stress		116	
	Job demands		89	
	Job content (work factors)		83	
	Impact of client behavioral disturbances on their workload and stress		207 (Interventions 1 & 2)	
	Organizational stress			115,116
	Operational stress			115
Time Urgency	Time urgency		131	
	Time urgency: speech patterns		133	
	Time urgency: eating behavior		133	
	Time urgency: competitiveness		133	
	Time urgency: task related hurry		133	
	Time urgency: general hurry			133
Turnover and absenteeism	Turnover intention		150 (Interventions 1 & 2); 153 (Interventions 1 & 2); 213	
	Absenteeism/sick days		108,122 150 (Interventions 1 & 2); 82	76,106,201,213

	If worker had taken off work due to a trauma exposure		158	
	If worker had made short- or long-term changes to work practice due to a trauma exposure		158	
	If worker had considered leaving profession due to a trauma exposure			158
	Considering leaving position		152,158	
	Turnover - likely to leave	153 (Intervention 2)	150(Interventions 1 & 2); 152 153 (Intervention 1)	
	Stress related illnesses		122	
	Organizational/agency commitment	76,86		
	actual turnover			86
	intent to leave		76	86
	Seriously considering leaving organization		98 (Interventions 1 & 2)	
	Actively seeking other employment		98 (Interventions 1 & 2)	
Work Quality	Professional excellence	194		
	Quality of care: Person centered care	153 (Intervention 2)	153 (Intervention 1)	
	Quality of care: discordant care		153 (Interventions 1 & 2)	
	Quality of care-total	153 (Intervention 2)	153 (Intervention 1)	
	Percent of time doing socioemotional care for patients		192	
	Staff-patient relationship		173	
	work-ability		212 (Interventions 1 & 2)	
	Staff positive behavior		188	
	Staff abusive behavior		188	

Appendix Table 1 Continued

	Productivity	151		
	Silencing response (communication problem of directing conversation away from distressing things)		144	
	Quality of communication with patients	192		
Organizational outcomes	Quality of Environment (QELS)		168	
	Incidents of challenging behavior, damage or injury		168	87
	Patient access to care	85		
	Clinical Quality Metrics	85		
	Adequate Staffing	85		
	Quality of organizational climate	148		
	Organizational Performance	81		
	Quality of interactions between care staff and residents		207 (Interventions 1 & 2)	
	Teamwork	74		
	Participation in decision making/collective problem solving	74		
	Workplace stress (perception of workplace environment as stressful)	74		
	Sense of coherence		73	
	Severity of conflicts			180
	Time spent on conflicts			180
	Incidence of conflicts			180
	Departmental function/impact (desired impact of intervention of factors like budget, and time demand)	94		

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Appendix Table 2 Attitudes and Cognitions of Employee Toward Work-Related Issues

Outcome Category	Outcome	+ (Positive)	0 (Null)	- (Negative)
Skills and efficacy	General self-efficacy	108,133		
	Work specific self-efficacy	108		
	Verbal communication behavior		170	
	Nonverbal communication behavior		170	
	Provider knowledge of interventions from training		214	
	Sense of competence with dementia		188	
	Socioemotional learning self-efficacy	172 (Intervention 2)	172 (Intervention 1)	
	Behavior management self-efficacy	172 (Intervention 2)	172 (Intervention 1)	
	CBT knowledge	162		
	CBT self-efficacy	162		
	Self-assessed work ability	201		
	Ability to care for others	203		
	Knowledge and competence in dealing adequately with challenges of dementia	164		
Teaching efficacy	Personal teaching efficacy	171,187		
	Teacher self-efficacy: learner centered	171		
	Teacher self-efficacy: community centered	171		
	Teacher self-efficacy: Knowledge centered	171		
	Teacher self-efficacy: historical understanding	171		
	Teacher self-efficacy: tolerance and psycho-social development	171		
	Teacher self-efficacy: Deliberation	171		
	Teacher self-efficacy: civic literacy	171		
	Teacher efficacy in student engagement	133,175	131,184,190	
	Teacher self-efficacy: classroom management	131	133,175,184,190	
	Teacher socioemotional learning efficacy	179 (Intervention 2)	179 (Intervention 1)	

	Teacher behavioral management efficacy	179 (Intervention 2)	179 (Intervention 1)	
	Emotional support to students (observer reported)	127		
	Classroom organization (observer reported)	127		
	Instructional support (Observer reported)		127	
	Teaching efficacy: instructional practices/strategies	133	131,184,190	
	Teaching efficacy: relational trust		131	
Perceptions towards interventions used	Positive perception of intervention technique for clients/patients	94		
	Perception of effectiveness of psychological and pharmacologic interventions for pain		94	
	Satisfaction with intervention	84		
	Evidence-based practice attitudes		88	
	Perceived barriers to behavior therapy: philosophical opposition			72
Attitudes toward caregiving role	attitudes/perceptions of caregiving role	195	221	
attitudes toward patient families	attitudes towards families	221		
	perception of family involvement	221		
Attitudes about death	Fear of death	205 (Intervention 2)		205 (Intervention 1)
	Death avoidance	205 (Intervention 2)		205 (Intervention 1)
	Neutral acceptance		205 (Intervention 1)	205 (Intervention 2)
	Approach acceptance	205 (Intervention 1)	205 (Intervention 2)	
	Escape acceptance	205 (Intervention 1)	205 (Intervention 2)	
Attitudes about aging and dementia	Positive attitudes about aging		192	
	Positive attitudes about dementia	182	192	
	Personhood in dementia	182		
Attitudes about pain	Health care provider pain and impairment relationship (higher scores are worse)			185
	Biomedical orientation to treating pain			185

Appendix Table 2 Continued

	Biopsychosocial orientation to treating pain	185		
Attitudes about people with intellectual disabilities	Empathy for people with intellectual disabilities		183	
	Similarities (Community Living Attitudes Scale)		183	
	Empowerment attitudes (Community Living Attitudes Scale)	183		

Appendix Table 3 Employee Mental Health, Social Health, Resilience, and Coping Skills Outcomes

Outcome Category	Outcome	+ (Positive)	0 (Null)	- (Negative)
Depression, Anxiety and negative emotions	Psychoticism		197 (Interventions 1 & 2)	
	Depressive reaction			100
	Expressing emotions		100	
	Positive symptoms distress		197 (Interventions 1 & 2)	
	Hostility		197 (Interventions 1 & 2)	
	Psychological wellbeing	130		
	Aggression			197 (Interventions 1 & 2)
	Obsessive-compulsive			197 (Interventions 1 & 2)
	Paranoid ideation		197 (Intervention 1)	197 (Intervention 2)
	Mental health	108,112,115,129,166; 149 (Study 2 Intervention 1&2)		
	Depressive Symptoms		104,113,116,125,130,133,137,141,143,22 [1]; 140 (Intervention 2)	83,102,108,123,124,155,156,200; 197 (Interventions 1 & 2); 140 (Intervention 1); 149 (Study 1 & Study 2 Interventions 1 & 2)
	Loneliness			194
	Negative affect/emotion	113	131,133,184,190	130,151
	Psychological detachment		157 (Study 2)	
	Anxiety	113	116,125,186; 197 (Interventions 1 & 2); 140 (Interventions 1 & 2); 104; 149 (Study 2 Interventions 1 & 2)	121,130,137,143,155,200, 203; 149 (Study 1)
	Feeling sad		140 (Interventions 1 & 2)	
	Feeling nervous		140 (Interventions 1 & 2)	
	Troubled conscience about stressful events			165

	Rumination		137	
	Fatigue		130	
	Phobic anxiety			197 (Interventions 1 & 2)
	Anxious mood		100	
	Fatigue		100	115
	Suicidal ideation		116	
	Anger		116	115
	Aggression		116	
	Worry			108
	Psychological/emotional distress	215	214; 197 (Intervention 1)	100,105,127; 197 (Intervention 2)
	Presence of depression or anxiety		81	
	Stress	81,113,215	[120,125,131,169,170,222]; 214 (Interventions 1 & 2); 212 (Intervention 1); 140 (Intervention 2); [80,141,155,206,221]	110,112,115; 118 (compared to control; at 26 weeks) 108,119-121,123,124,126; 197 (Interventions 1 & 2); [132,137,139,187,210,223]; 140 (Intervention 1); 143,145,166; 149 (Study 1 & Study 2 Interventions 1&2) 151,159; 212(Intervention 2)
	Symptoms of PTSD		158	123,130
	Physical & psychological symptoms of stress		157 (Study 2)	151,201; 157 (Study 1)
Positive emotions	Positive Emotions/Affect	113,131,151; 157 (Study 1)	130,133,184; 157 (Study 2); 190	
	Subjective happiness	156	192	
	Feeling calm	140 (Intervention 1)	140 (Intervention 2)	
	Feeling cheerful	140 (Intervention 1)	140 (Intervention 2)	

Appendix Table 3 Continued

	Well-being	200		
	Hope		123	
	Comforting cognitions		100	
Knowledge and coping self-efficacy in trauma, stress, and burnout	Confidence in knowledge of how to identify and manage personal or colleague responses to traumatic perinatal events	158		
	Coping self-efficacy		145	
	Knowledge about stress	145		
Coping skills and emotional functioning	Coping strategies (avoidance)			206
	Coping skill: Relaxation	149 (Study 1 & Study 2 Intervention 1&2)		
	Coping Skill: Awareness	143; 149 (Study 1 & Study 2 Intervention 1&2)	149 (Study 1)	
	Coping Skill: Assertion		149 (Study 1)	
	Coping confidence/self-efficacy	149 (Study 1 & Study 2 Intervention 1&2)	123	
	Emotion regulation	149 (Study 1)	143	
	Emotion regulation/coping: clarity		143	
	Emotional regulation/coping: sensations		143	
	Emotional regulation/coping: understanding		143	
	Emotional regulation/coping: acceptance		143	
	Emotional regulation/coping:	143		
	Emotional regulation/coping: self-support		143	
	Emotional regulation/coping: Readiness to confront		143	
	Adherence to meditation practices	166		

	Acceptance of ones own thoughts and feelings		185	
	Acceptance and action			123
	Psychological flexibility	116	112	
	Difficulties in emotion regulation			115
	Intrapersonal competence/mindfulness		179 (Interventions 1 & 2)	
	Interpersonal competence/mindfulness		179 (Interventions 1 & 2)	
	Emotional regulation: reappraisal	133	131,133	
	Emotion regulation: suppression		131,133	
	Emotion regulation: distress tolerance	131		
Mindfulness	Mindfulness	111,115,119,126,133; 149 (Study 1); 154,159		
	Informal mindfulness practices	130		
	Mindful attention awareness scale		123	
	Mindfulness: Observing	113,131,133; 205 (Intervention 1)	123,125,127; 205 (Intervention 2)	
	Mindfulness: Describing:	127	113,123,125,131,133; 205 (Intervention 1 & 2)	
	Mindfulness: Acting with awareness	115,125,136	113,116,123,127,131,133; 205 (Intervention 2)	205 (Intervention 1)
	Mindfulness: Non-judging of inner experiences	115,123,125,136	113,116,127,131,133; 205 (Intervention 2)	205 (Intervention 1)
	Mindfulness: Non-reactivity to inner experiences	115,116,125,133,136	113,123,127,131; 205 (Intervention 1 & 2)	
Compassion and Empathy	Self-Compassion	118 (at 26 weeks); 126,127; 140 (Intervention 2); 146; 149 (Study 1); 154,159	113,116; 118 (compared to controls); 123; 140 (Intervention 1)	
	Compassion	159	113	
	Compassion Satisfaction	118 (at 26 weeks); 119,128; 149 (Study 2 Interventions 1&2); 95,194	113; 118 (compared to control); 80,91-	

			93,123,138,144,145,180,191,203	
	Fear of compassion			154
	Empathy	192	123,189	
	Compassion for others		140 (Interventions 1 & 2)	
	Self-coldness			126
	Self-Compassion: Self-kindness		113,123	
	Self-Compassion: Self-judgement	123	113	
	Self-Compassion: Common humanity		113,123	
	Self-Compassion: Isolation	123	113	
	Self-Compassion: Mindfulness		113,123	
	Self-Compassion: Over-identified	123	113	
Resilience	Resilience	115,136,167,191	116	
	Decentering	118 (at 26 weeks)	118 (compared to control)	
Self-esteem	Self-esteem	123,155,215	112,214	
	Appearance self-esteem		123	
	Performance self-esteem		123	
	Body Esteem - Sexual Attractiveness		123	
	Body Esteem - weight concern		123	
	Body Esteem - Physical condition	123		
	Social self-esteem		123	
Spiritual health	Daily spiritual experience		194	
	closeness to God		194	
Interpersonal health	Social dysfunction			200
	Frequency of going out		200	
	Interpersonal sensitivity		197 (Intervention 1)	197 (Intervention 2)
	Peer support	208		
	Family functioning		115	
	interpersonal conflict		221	

	Interpersonal conflict		154	
	Quality of social relationships	145		
	Enjoyment of relationships	140 (Intervention 1)	140 (Intervention 2)	
	Social Support		[222] (Interventions 1 & 2)	
	Social participation		130	
	Trust		123	
Other	Recovery Experience	157 (Study 2)		
	Mastery Experiences	157 (Study 2)		
	Vitality		166	
	Acting in accordance with personal values	140 (Intervention 2)	140 (Intervention1)	
	Emotional intelligence	115		
	Sustained attention	127		
	Errors of commission in emotional processing			127

Appendix Table 4 Patient, Client, Family and Student Outcomes

Category	Outcome	+ (Positive)	0 (Null)	- (Negative)
Client/Patient/Consumer: Mental health	Hope		153 (Interventions 1 & 2)	
	Patient Activation Measure - Mental Health	153 (Intervention 1)	153 (Intervention 2)	
	Mental Health Functioning		153 (Interventions 1 & 2)	
	Depression		153 (Intervention 2)	153 (Intervention 1)
	Anxiety		153 (Intervention 2)	153 (Intervention 1)
	Fatigue		92	
	Stress		92	
	Hopefulness		92	
	Happiness		92	
	Energy		92	
	Anxiety		92	
	Depression		92	
	Mental wellbeing		168	
	Depressive symptoms		221	
	Activity involvement and enjoyment		221	
	Neuropsychiatric symptoms		188	
	Psychotropic medication prescriptions		188	
Client/Patient/Consumer: Physical health	Physical Health Functioning		153 (Interventions 1 & 2)	
	Pain		92	
Client/Patient/Consumer: Health behaviors and attitudes	Medication Adherence	153 (Intervention 1)	153 (Intervention 2)	
	Positive Medication Attitudes	153 (Intervention 1)	153 (Intervention 2)	
Client/Patient/Consumer: satisfaction and quality of care	Satisfaction		95,168	
	Autonomy Support - Health Care Climate Questionnaire		153 (Interventions 1 & 2)	

Appendix Table 4 Continued

	Working Alliance Inventory		153 (Interventions 1 & 2)	
	Client Satisfaction	153 (Intervention 1)	153 (Intervention 2)	
	Quality of Care - total		153 (Intervention 2)	153 (Intervention 1)
	Quality of Care - Person centered care subscale		153 (Interventions 1 & 2)	
	Quality of Care - Negative Interactions Subscale		153 (Interventions 1 & 2)	
	Quality of Care - Inattentive Care Subscale		153 (Interventions 1 & 2)	
	Staff use of physical restraints		164	
	Staff use of sedative drugs		164	
	Staff use of restrictive practices		183	
Client/Patient/Consumer: aggression and challenging behaviors	Incidents of challenging behaviors		183	
	Aggressive behavior		183	
	Agitated Behavior		188,195	
Client/Patient/Consumer: quality of life	Quality of Life		182	
	Dementia Quality of Life (rated by proxy)		182	
	Dementia Quality of Life (rated by person with dementia)	182		
	Overall sense of well-being		92	
	Quality of Life	221	195	
	Dementia specific quality of life		188	
	health related quality of life		188	
Client/Patient/Consumer: independence and relationship with caregivers	Quality of relationship of people with dementia and their family caregivers		182	
	Severity and burden to caregiver of dementia related symptoms			181
	Patient independence (Care Dependency Scale)		181	

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Appendix Table 4 Continued

Client/Patient/Consumer: engagement	Patient engagement with services: availability	177		
	patient engagement with services: collaboration		177	
	patient engagement with services: help seeking		177	
	patient engagement with services: treatment adherence		177	
	Service use (direct/indirect costs of health and social care)		188	
Client/Patient/Consumer: safety	Physical Safety (assaults)		168	
	Emotional Safety		168	
Patient/client's family outcomes	Positive experience with caregiving of people with dementia			182
	involvement in care		221	
	depressive symptoms		221	
	perception of care		221	
	interpersonal conflict		221	
	perception of caregiving role (guilt and conflict)	221		
	caregiving burden			221
Student outcomes	Racism tolerance		171	
	Political tolerance	171		
	deliberation convictions (tolerance)		171	
	Civic self-efficacy	171		
	Deliberation practice (civic participation)		171	
	Civic discourse (civic participation)		171	
	Open climate: teachers overall	171		
	open climate: students overall		171	
	Engagement with civic matters	171		

	Historic understanding	171		
	Social and ethical competency: response rating on relationship questionnaire		171	
	Social and ethical competency: best choice on relationship questionnaire		171	
	Social and ethical competency: Justification (choices in social context)		171	
	Social and ethical competency: Strategy (choices in social context)		171	
	Emotional and behavioral problems			175
	Teacher-child closeness		175	
	Child social preference		175	

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