

Interventions to reduce burnout of physicians and nurses

An overview of systematic reviews and meta-analyses

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Abstract

Objective: Numerous systematic reviews and meta-analyses on the interventions to reduce burnout of physicians and nurses have been published nowadays. This study aimed to summarize the evidence and clarify a bundled strategy to reduce burnout of physicians and nurses.

Methods: Researches have been conducted within Cochrane Library, PubMed, Ovid, Scopus, EBSCO, and CINAHL published from inception to 2019. In addition, a manual search for relevant articles was also conducted using Google Scholar and ancestral searches through the reference lists from articles included in the final review. Two reviewers independently selected and assessed, and any disagreements were resolved through a larger team discussion. A data extraction spreadsheet was developed and initially piloted in 3 randomly selected studies. Data from each study were extracted independently using a pre-standardized data abstraction form. The the Risk of Bias in Systematic reviews and assessment of multiple systematic reviews (AMSTAR) 2 tool were used to evaluate risk of bias and quality of included articles.

Results: A total of 22 studies published from 2014 to 2019 were eligible for analysis. Previous studies have examined burnout among physicians (n=9), nurses (n=6) and healthcare providers (n=7). The MBI was used by majority of studies to assess burnout. The included studies evaluated a wide range of interventions, individual-focused (emotion regulation, self-care workshop, yoga, massage, mindfulness, meditation, stress management skills and communication skills training), structural or organizational (workload or schedule-rotation, stress management training program, group face-to-face delivery, teamwork/transitions, Balint training, debriefing sessions and a focus group) and combine interventions (snoezelen, stress management and resiliency training, stress management workshop and improving interaction with colleagues through personal training). Based on the Risk of Bias in Systematic reviews and AMSTAR 2 criteria, the risk of bias and methodological quality included studies was from moderate to high.

Conclusions: Burnout is a complicated problem and should be dealt with by using bundled strategy. The existing overview clarified evidence to reduce burnout of physicians and nurses, which provided a basis for health policy makers or clinical managers to design simple and feasible strategies to reduce the burnout of physicians and nurses, and to ensure clinical safety.

Abbreviations: AMSTAR 2 = assessment of multiple systematic reviews 2, RoB = risk of bias, ROBIS = the Risk of Bias in Systematic reviews, SRs = systematic reviews.

Keywords: burnout, meta-analyses, nurses, overview, physicians, systematic reviews

1. Introduction

Burnout refers to a prolonged response to chronic emotional and interpersonal stressors caused by work, manifested as emotional

exhaustion, depersonalization, and reduced personal accomplishment.^[1] Burnout prevalence data were extracted from 182 studies involving 109628 physicians in 45 countries, where overall prevalence ranged from 0% to 80.5%, emotional

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Xiu-jie Zhang and Ying-qian Song have the same contribution.

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Patient and Public Involvement None.

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The datasets generated during and/or analyzed during the current study are not publicly available, but are available from the corresponding author on reasonable request.

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exhaustion 0% to 86.2%, depersonalization 0% to 89.9%, and low personal accomplishment 0% to 87.1%.^[2] Among physicians in China (9302 participants from 11 studies), burnout prevalence ranged from 66.5% to 87.8%.^[3] The highest levels of burnout were reported among nurses, although all healthcare providers showed high burnout,^[4] and the prevalence has been increasing in recent years.^[5] Burned-out physicians and nurses not only suffer from more substance abuse, broken interpersonal relationships, and suicide ideation,^[6,7] they also overwhelmingly believe they deliver poorer quality care, and patients seem to be less satisfied with burned-out physicians and nurses (impacting patient outcomes, in terms of patient experiences, quality of care, and medical errors).^[8–14] Reducing burnout has been recognized as a fundamental health care policy goal across the globe, and health care organizations are encouraged to invest efforts to improve physicians' and nurses' wellness, particularly for early-career physicians and nurses.^[14–16]

Burnout among healthcare providers is in relation to their gender, marital status, work environment, interpersonal and professional conflicts, emotional distress, and low social support.^[4,17] Individual-focused, structural or organizational, or combine solutions were required.^[11,18–21] Previous studies have already carried out systematic review on the physicians' burnout.^[22] However, due to the limited database and literature, no schemes have been proposed, which can be popularized and applied in real life. Recently, COVID-19 has swept the world, which has drawn pay more attention to the mental health of human beings,^[23] especially front-line health care workers.^[24] This study aimed to discuss bundled strategy to reduce burnout of physicians and nurses, and attempted to present a protocol of intervention model.

2. Methods

The current overview for systematic reviews (SRs) and meta-analyses was performed following the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines.

2.1. Eligibility and exclusion Criteria

The inclusion criteria and exclusion were seen in Table 1.

2.2. Search Strategy and Data Sources

Databases including Cochrane Library, PubMed, Ovid, Scopus, EBSCO and CINAHL database were chosen and searched for publications from inception to December 2019 with no restriction on language, which covered a wide range of subjects including medicine, psychosociology and nursing. In addition, a manual search for relevant articles was also conducted using

Google Scholar and ancestral searches through the reference lists of articles included in the final review. The search strategy included combinations of 3 key blocks of terms (burnout; physicians and nurses; interventions) using medical subject headings (MESH terms) and text words. Consultation has been conducted between the project team and information specialists before finalizing the search strategy (see Additional file 1).

2.3. Study Selection

Search results were exported from Endnote X7 and duplicates were removed. Study selection was completed in 2 stages. Titles and abstracts of the studies were screened and subsequently full texts of the selected studies were accessed and further screened against the eligibility criteria. The title and abstract screening were undertaken by XJ. Z and YQ. S. Two reviewers independently selected and evaluated, and any disagreements were resolved through a larger team discussion.

2.4. Data Extraction

A data extraction spreadsheet was developed and initially piloted in 3 randomly selected studies. Following data were retrieved from articles included in this review: study characteristics (eg, first author, year of publication, country, search period, and number of primary studies included), participant characteristics (eg, sample size), outcome measures (eg, MBI, JSS, PSS, ESS, BP and HR), and study methods (eg, interventions in experimental/control groups). Data from each study were extracted independently using a pre-standardized data abstraction form.

2.5. Assessment of risk of bias and quality

The Risk of Bias in Systematic reviews (ROBIS) and AMSTAR 2 scale were used to evaluate risk of bias (RoB) and methodological quality of the included systematic reviews and/or meta-analyses, which were evaluated independently by 2 authors. The ROBIS^[25] is a tool to assess RoB of SRs which comprised phase 2 (4 domains) and phase 3. Four domains in phase 2 are study eligibility criteria, identification and selection of studies, data collection and study appraisal, and synthesis and findings. The results of each domain and phase 3 were rated as high risk, low risk, or unclear risk. The AMSTAR 2^[26] includes 16 items and is not designed to generate an overall 'score'. A high score may disguise critical weaknesses in specific domains, such as an inadequate literature search or a failure to assess RoB within individual studies that were included in a systematic review. In making an overall rating of systematic review, it is important to take account of flaws in critical domains, which may greatly weaken the confidence that can be placed in a systematic review.

Table 1
Inclusion and exclusion criteria.

Study criteria	Inclusion criteria	Exclusion criteria
Study design	Systematic review or/and Meta-analysis	The systematic evaluation plan repeats the traditional review and the conference abstract
Population	Physicians or/and nurses	Medical students, nursing students, nonmedical providers or beyond hospitals
Intervention	Intervention strategies for reducing burnout	Non-relevant interventions
Comparison	Baseline/no intervention	Interventions lacking robust research evidence
Outcome	Primary outcome: burnout (evaluated by Maslach Burnout Inventory) Secondary outcome: stress, anxiety, depression, resilience and general health status	Studies that did not measure a reduction in burnout qualitatively or via self-reporting scales

2.6. Data synthesis

A quantitative analysis of the included SRs was not performed due to information from overlapping RCTs between SRs. On the other hand, literature of different design types cannot be quantitatively synthesized. Therefore, a qualitative synthesis of the included studies was conducted instead. Literature search results and data extraction results were summarized descriptively. To exclude duplicate RCTs, 2 authors reviewed all of the RCTs in each SR. A summary of efficacy outcomes was presented based on the different outcome measures, controls and interventions. A narrative synthesis was therefore generated considering the total number of SRs that reported results, the methodological quality of SRs and RCTs, and the quality of evidence for the outcomes to yield final conclusions.

2.7. Ethics

Ethics approval is not required in overview of SRs and meta-analyses.

3. Results

The search strategy yielded 841 potential studies. After removing duplications (n = 334) and eliminating 486 by a first pass through the titles and abstracts, the potentially relevant literature was screened in 2 rounds and resulted in 22 studies from 2014 to 2019 (Fig. 1).^[15,16,18–21,27–42] The included researchers are from the USA (n = 7), UK (n = 4), Australia (n = 3), China (n = 2), Italy (n = 2), Germany, Iran, Finland and Malaysia. The search period of included research was from the inception to 2019. The 38.10% included research were meta-analyzed. The measurement instruments used in the literature are shown in Table 2, and MBI is the most widely used questionnaire to evaluate burnout. Follow-up time ranged from 0 to 7 years. The detailed characteristics of the included research are presented in Table 2.

3.1. Assessment of risk of bias

The RoB of the included studies was assessed by ROBIS. Table 3 presents the results of assessment. The first domain aims to assess

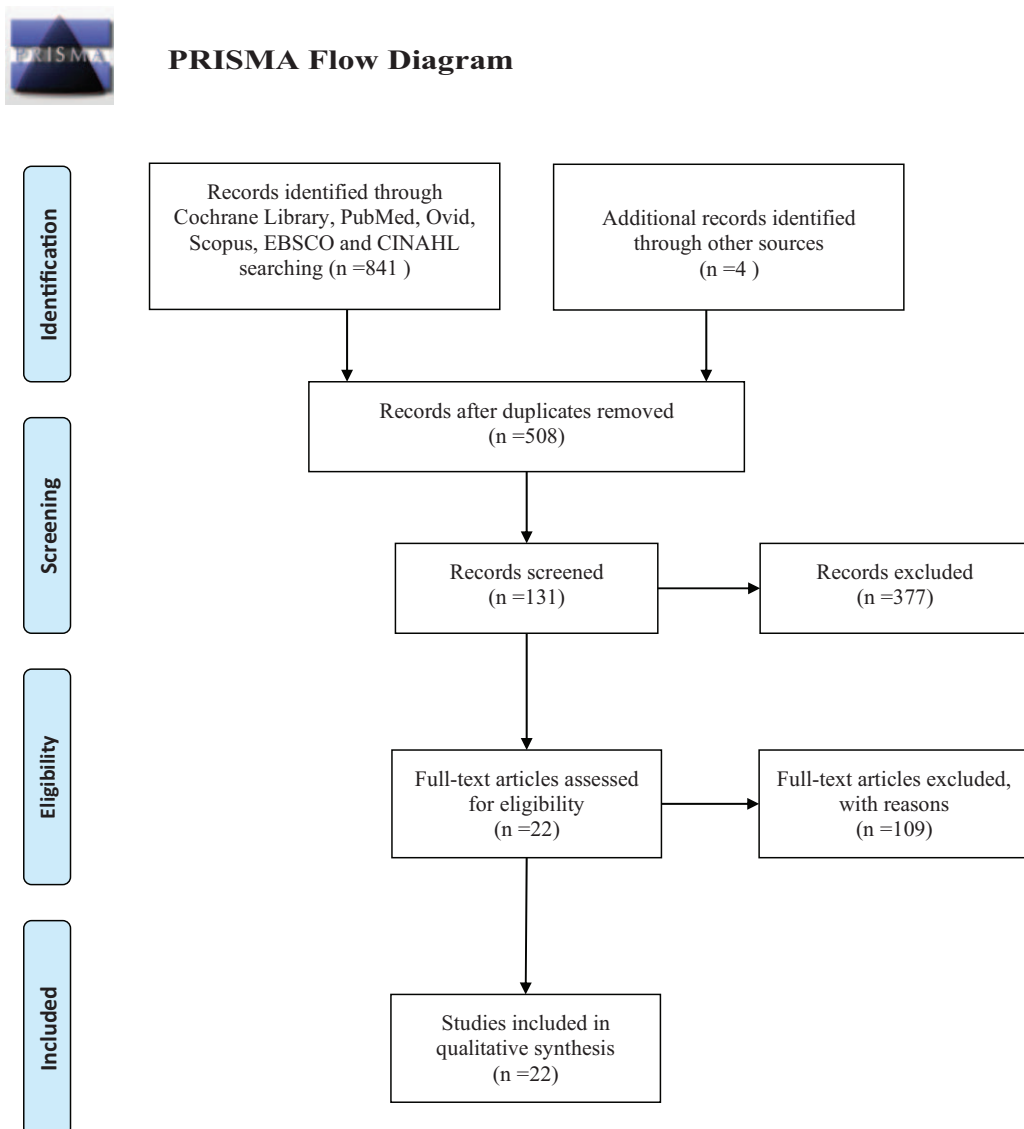


Figure 1. Flowchart of the literature selection process.

Table 2

Characteristics of the included systematic reviews/ meta-analysis on the use of interventions for reducing burnout of physicians and nurses.

Author, year	Country	Search period	Number of primary studies included	Number of participants included	Meta-analysis	Outcome measures	Person-directed intervention	Organization-directed intervention	Combined intervention	Comparison	Follow-up timepoints
Petrie et al.2019	Australia	Inception to March 26, 2018	RCT (n=7) CBA (n=1)	Physicians (n=1023)	Yes	GHO-12 (n=2) PRIME-MD (n=2) BDI (n=1) BSI (n=1) POMS (n=1) PHQ-9 (n=1) CES-D (n=1) STAI (n=1)	Online individualized intervention (10-week, about 25 h in total); Psychoeducation-web online sessions (4-week, 2 h in total); One-off mailed intervention in hardcopy (4-week);	Psychoeducation and Mindfulness sessions (8-week, 28 h in total); SMTP (5-week, 15 h in total); Group face-to-face delivery (12-week, 12 h in total); Group face-to-face delivery and cognitive behavior therapy or mindfulness (16-week, 24 h in total); 9-month curriculum of 19 fortnightly 1-h sessions (19 h in total);	NR	Baseline, post-intervention (4, 8, 12 or 16 wk), or post-intervention (3, 6, 9 or 12 mo)	
Li et al.2019	China	Inception to August 2017	RCT (n=4) CBA (n=2) QCT (n=2) NRCT (n=2)	Nurses (n=626)	Yes	VAS PSS SSS OSI CSI CSO POSS Urinary cortisol	Aromatherapy (n=4) Massage (n=4) Aromatherapy + Massage (n=2)	NR	NR	Baseline/No intervention	NR
Jackson-Koku et al.2019	UK	Inception to August 2017	CS (N=14)	Healthcare providers (n=1209)	No	MBI (n=11) OSI (n=1) QLBI (n=1) ProQOL (n=1) SCS (n=3) DASS-21 (n=3) PSS (n=3) MBI (n=2) SWLS (n=2) ProQOL (n=2) RRS (n=2) AAG-I (n=2) BDI (n=2) FTWQ (n=2)	Emotion regulation: self-regulatory or taught emotion regulation skills or interventions such as mindfulness	NR	NR	NR	
Ghawadra et al.2019	Malaysia	2002 to 2018	CBA (n=4) QCT (n=3) RCT (n=2)	Nurses (n=465)	No	SCS (n=3) DASS-21 (n=3) PSS (n=3) MBI (n=2) SWLS (n=2) ProQOL (n=2) RRS (n=2) AAG-I (n=2) BDI (n=2) FTWQ (n=2)	MBSR (n=5) T-MBSR (n=1) SDM (n=2) SRP (n=1) Mindful-Gym (n=1)	NR	NR	Baseline/No intervention	2-8 wk 0.5h/wk
DeChant et al. 2019	USA	January 2007 to October, 2018	CBA (n=24) RCT (n=10) CS (n=7) Cohort (n=5) NR (n=4)	Physicians (n=12, 286)	No	Physician/Staff/ Workplaces/ Work/clinician/Job satisfaction (n=15) PSS (n=2) ESS (n=2) JSOPE (n=1) STAI (n=1) Overall well-being (n=1)	NR	Teamwork: Employing medical assistants in an innovative model of care with new roles with a focus on career advancement, training, and enhanced compensation for the new medical assistant roles (n=17) Teamwork/Transitions: Projects to improve communication, changes in workflow, and targeted quality improvement projects (n=6); Time: Schedule design, 2003 ACGME work hour limits (n=15); Technology: EHR system (n=10); Transitions: Data-guided interventions and systematic improvement processes that included (1) leadership valuing physician well-being equal to quality of care and financial stewardship, (2) physicians identifying factors that influenced well-being, followed by plans for improvement with accountability, and (3) measuring the well-being of physicians regularly using validated instruments (n=5)	NR	NR	1 wk - 7 yr
Shnone et al.2019	Italy	Inception to September 2018	RCT (n=20)	Physicians (n=2391)	Yes	MR	2-month MBSR program (a weekly 45-min mindfulness exercise, a weekly 60-min group reflection about the weekly topic, and the mindfulness exercise); 30-h communication skills training and a 10-h SMC1 in small groups; 1.5-day/7-h intensive face-to-face workshop with role play practice, followed by monthly videoconferences incorporating role play of physician-generated scenarios; Debriefing sessions and a focus group that explored themes around work-related stressors.	Workload or schedule-rotation: continuous and interrupted (rotations every 2 weeks) for 14 months; Communication, teamwork, and quality improvement; Components from physician-directed interventions: 19 biweekly facilitated discussion groups incorporating elements of mindfulness, reflection, shared experience, and small-group learning for 9 months	NR	NR	Telephone call 1 mo

(continued)

Table 2
(continued).

Author, year	Country	Search period	Number of primary studies included	Number of participants included	Meta-analysis	Outcome measures	Person-directed intervention	Organization-directed intervention	Combined intervention	Comparison	Follow-up timepoints
Cocchiara et al.2019	Italy	Inception to February 2017	CBA (n=7) CS (n=4)	NR	No	MBI HPLP DASS-21 SCS SF12 FMI PSQI OMWS CD-RISC	<p>Person-directed intervention: coping mechanisms, and potential strategies to improve junior medical officer well-being; Daily workshop for a total of 12 wk. Interactive teaching intervention aiming to impart the knowledge, attitudes, and skills needed for adapting to the task of a physician in a busy community clinic;</p> <p>Brief self-care workshops;</p> <p>45-min stress reduction intervention in which one reflects (1) on the background and troublesome of the stressful situation and on (2) how 1 handled the situation</p> <p>Yoga (8-wk); Yoga sessions twice a wk (50/60 min per session); Yoga program and meditation: 8-wk yoga program associated with a day-to-day work of 20 min of meditative awareness; 8-week YBSM;</p>	NR	Cognitive Behavioral Stress Management	NR	NR
Anankhesal et al.2019	Iran	January 2000 to June 2017	RCT (n=12) CBA (n=6)	Physicians (n=1571) Nurses (n=4484)	No	NR	<p>Person-directed intervention: Communication skills training; Eight-point program: a meditation-based intervention; Thankful events; Electronic-mental health care approach: Consultation with an occupational physician; 8-wk Yoga; Professional identity development program; Psychosocial training intervention; Coping skills training a support group; Mindfulness training</p> <p>Organization-directed intervention: Improved communication: changes in work-flow, and targeted quality improvement projects; Team-based, incentivized exercise program;</p>	Improved communication: changes in work-flow, and targeted quality improvement projects; Team-based, incentivized exercise program;	Cognitive, somatic, dynamic, emotive and hands-on (Yoga, meditation, relaxation, touch therapy, energy healing)	NR	4 or 6 mo
Fibbins et al.2018	Australia	Inception to November 2017	RCT (n=3) CBA (n=2)	Nurses (n=346)	No	BMI (n=2) WC (n=2) BP (n=2) HR at rest (n=2) HbA1c P-glucose Insulin Lipids	<p>Person-directed intervention: Group discussions; Study circles: information groups on diet/healthy lifestyle; Guided low-intensity yoga Classes; Lifestyle and physical health information sessions; Educational programs</p> <p>Organization-directed intervention: Stress management workshop; Mindfulness; Brain wave; Rational emotive therapy</p>	NR	NR	NR	10 wk to 1 yr
Dreison et al.2018	USA	Inception to January 27, 2015	CBA (n=14) RCT (n=13)	Healthcare providers (n=1894)	Yes	MBI (n=26) CBI (n=1)	<p>Person-directed intervention: Stress management workshop; Mindfulness; Brain wave; Rational emotive therapy</p> <p>Organization-directed intervention: Job training and education; Coworker support groups; Clinical supervisor; Job redesign and restructuring; Team communication</p>	Job training and education; Coworker support groups; Clinical supervisor; Job redesign and restructuring; Team communication	Stress management workshop; Workshop - ongoing; Workgroups and organizational consultation	NR	NR
Brendia et al. 2018	USA	Inception to September, 2015	RCT (n=4) NRCT (n=9)	Physician (n=5557)	No	NR	<p>Person-directed intervention: Team-based intervention Organizational leadership program</p> <p>Organization-directed intervention: Art therapy and CBT Counseling intervention Mindful communication Stress management and communication training Communication skills training Respiratory One Method Incentivized exercise program Changes in physicians' professional effort Supervision of professional skills in work challenges; Development of work condition and training</p>	Art therapy and CBT Counseling intervention Mindful communication Stress management and communication training Communication skills training Respiratory One Method Incentivized exercise program Changes in physicians' professional effort Supervision of professional skills in work challenges; Development of work condition and training	NR	NR	NR
Johanna et al.2017	Finland	2009 to March 2015	RCT (n=3) CBA (n=3) ITS (n=2)	NR	No	NR	<p>Person-directed intervention: Methods for stress management and resilience-building; Methods for behavioral and mental change;</p> <p>Organization-directed intervention: Improving interaction with colleagues through personal training; Development of stress management and working methods</p>	Improving interaction with colleagues through personal training; Development of stress management and working methods	NR	NR	Baseline, post-intervention (4, 6, 9,12 or 24 mo)
	UK			Yes	NR						

(continued)

Table 2
(Continued).

Author, year	Country	Search period	Number of primary studies included	Number of participants included	Meta-analysis	Outcome measures	Person-directed intervention	Organization-directed intervention	Combined intervention	Comparison	Follow-up timepoints
Panagioti et al. 2017		Inception to May, 2016	RCT (n=17) CAB (n=2)	Physicians (n=1706)	No		MBSR; Workshop (interactive teaching intervention); Self-care workshops coordinated by mental health professionals; Stress reduction intervention; Bimonthly groups; 8 weekly sessions each lasting 2.5 h, and a 1-d silent retreat between the sixth and seventh session focused on mindfulness; Interactive, face-to-face workshop training; Communication and SMST; Contemplation-meditation exercises such as mindfulness meditation	Workload or schedule; Communication, teamwork, and quality improvement; Debriefing sessions and a focus group that explored themes around work-related stressors, coping mechanisms, and potential strategies to improve junior medical officer well-being	19 biweekly facilitated discussion groups incorporating elements of mindfulness, reflection, shared experience, and small-group learning for 9 months; Self-directed and team-based incentivized exercise program including self-reported exercise and gym attendance; Educational sessions and on-the-unit guided meditation; SMART educational session or standard nursing orientation session; Educational session and brief mindfulness meditative exercise	Waiting list/No intervention/ Continuous schedule/4-wk rotations	Postintervention/ 18 mo
Gilmartin et al. 2017	USA	Inception to January 2017	RCT (n=7) CAB (n=7)	Healthcare providers (n=833)	No	MBI PSS STAI SAS MAAS GADS BRS SRDI SCL-90 CDRS	SMART program: five-minute daily guided practice, three-x-a day home practice; Guided mindfulness meditation sessions; MBSR-based: introduction to Mindfulness and Mindfulness in Daily Life modules with pre-recorded meditation audio; Brief MBSR-based; Buddhist Anapanasati breathing meditation or nonmeditating activities (eg, reading, chatting, napping); Vipassana meditation or biofeedback or control; Free, mindfulness meditation smart phone application; Audio compact disc guided mindfulness practice or wait-list control	NR	NR	NR	4, 8, 10 or 16 wk
Clough et al. 2017	Australia	Inception to January 2016	RCT (n=10) CAB (n=8) OCT (n=5)	Physicians (n=1107)	No	MBI (n=15) STAI (n=4) PSS (n=4) GHQ-12 (n=1) SSI (n=1) Job satisfaction (n=1)	Balint group sessions: 9x1.5 h (held monthly) or over 1-yr intervention period (each of 1-h duration); Mental practice sessions: 5x30 min, each undertaken before performing a surgical procedure on a VR simulator; Individual or group-based counselling program: Communication and SMST program: 40-h, delivered in small groups (n=7) over 8 wk; 4 debriefing sessions held over 8 wk, each of 1-h duration, led by experienced senior health professionals; Educational intervention: consisting of 7 sessions, each of 60-min duration, focusing on CBT skills such as cognitive restructuring and relaxation; Mindfulness, awareness, and communication training intervention: with 8-wk intensive period (27 h total) and 10-mo maintenance period (2.5-h session each month); Biofeedback intervention delivered over 28 d, with 1 workshop (30 min), twice weekly meetings for intervention group, and practice 3 times per day for 5 min each; Instruction (45 min) in use of BATHE psychotherapeutic tool, focusing on awareness and self-empathy (3 times per week for next 3 mo); Relaxation/meditation training using Respiratory One Method: 4 workshops, held weekly of 1-h duration; Mindfulness intervention delivered via 3 live sessions (60 min each), 8 online training videos (5-7 min each), and weekly teleconference coaching calls (1 h each) delivered over 8 wk; 90-min SMART program and training in a paced	Stress management workshops (3x3h duration), held weekly focusing on identification of triggers and development of stress management techniques, or 4-h duration emphasizing personal management, relationship, outlook, and stamina skills; Workshops: didactic or interactive (role play, Balint groups, individual teaching) instruction in biopsychosocial approach to patient care (once per week for 4-6h over 12-wk period); 4 sessions (once a wk, or 1-h duration) focusing on understanding burnout and developing coping skills to manage burnout (burnout group) or focusing on interactions with patients (Balint group); 6-wk SFTP based on cognitive behavioural principles, with sessions held weekly for 2-h duration; Guided group discussions (1-h duration, held fortnightly over 9 months, 19 sessions in total) focusing on mindfulness, reflection, and shared experiences; SMI: relaxation, coping, and mental rehearsal strategies, duration not provided; 3 educational seminars, held fortnightly, each of 3-h duration, focusing on relaxation training, social support, managing self-expectations, and practice management	Doctors chose 1 of 2 interventions: a single day (6-7h) individual counselling session or 5-d, group-based counselling program aimed at motivating reflection on the doctors' situation and personal needs	NR	Baseline, post-intervention (1, 2, 3 or 6 mo)

(continued)

Table 2
(continued).

Author, year	Country	Search period	Number of primary studies included	Number of participants included	Meta-analysis	Outcome measures	Person-directed intervention	Organization-directed intervention	Combined intervention	Comparison	Follow-up timepoints
Brand et al., 2017	UK	October 2013 to September 2016	CAB (n=6) RCT (n=4) Cohort (n=1)	NR	No	GHQ-12 DASS-21 KIMS HPLP Job satisfaction	breathing meditation, or with 2 follow-up phone calls and optional 30-min booster session; MBSR: 15-min of group daily guided experiential practice, 3 30-min education sessions during weeks 2, 4, and 6 designed to increase participants' understanding of the core components; Mindfulness-based approaches; Stress management training; Small group curricula	Workplace nutrition and physical activity promotion: a total of 12 weeks; Collaborative Care Model program: promotion of culture of caring and safety; Workplace wellness champion program; Duty hour requirements; Locally developed modifications to clinical work processes	NR	NR	Baseline, post-intervention 3-mo
West et al., 2016	USA	Inception to Jan 15, 2016	CS (n=37) RCT (n=15)	Physicians (n=3630)	Yes	NR	Mindfulness-based approaches; Stress management training; Small group curricula	Workplace wellness champion program; Duty hour requirements; Locally developed modifications to clinical work processes	NR	NR	NR
Lukun et al., 2016	USA	Inception to March 2014	RCT (n=8)	NR	No	MBI	MBSR program: 4 weekly 30-min group meetings and encouragement to practice 10 min of mindfulness exercises 5 days/week, meditative practices body scan, sitting meditation, mindful movements (gentle stretches, yoga), and loving-kindness meditation	NR	NR	NR	Baseline, post-intervention (1, 2 or 3 mo)
Lee et al., 2016	China	Inception to 2014	RCT (n=5) OCT (n=2)	Nurses (n=1521)	Yes	MBI	CBT; Mindfulness-based programs; Stress management;	Team-based support group	NR	NR	Baseline, immediately and post-intervention (0.5, 1, 2, 2.5 or 4 yr)
Busreddy et al., 2016	USA	Inception to 2015	Cohort (n=13) RCT (n=6)	Physicians (n=2030)	Yes	MBI	Self-care workshops; Meditation intervention; Communication and SMTP; BATH stress therapy training; Incentivized exercise program; Protected sleep period; Support group structure	Duty h restrictions; Balint training	NR	NR	NR
Westermann et al., 2014	Germany	Inception to January 2012	RCT (n=10) OCT (n=5) CBA (n=1)	Nurses (n=2033)	No	MBI (n=14) GHQ-12 (n=2)	Communication training; MBSR; Training program: managing behavioural symptoms of dementia and peer support; Time slips: a creative expression program in dementia care; Ergonomic and psychosocial training; Educational course to increase staff skills in dealing with abuse of the elderly	Systematic Pain; Exercise and activity program for clients; Group discussion; Supervision meetings	Stoebelen: Cooperative communication program for staff and families on dementia units; Emotion-oriented care for cognitively impaired elderly persons and	NR	4 wk to 18 mo
Stewart et al., 2014	UK	Inception to May 2012	OCT (n=2) RCT (n=2) Qualitative (n=2)	NR	No	NR	A 20-d training course in psychosocial intervention; Clinical supervision	NR	NR	NR	NR

CBA = controlled before-after study, CS = cross sectional, ITS = interrupted time series, NR = no reported, NRCT = no randomised control trial, OCT = Quasi control trial, RCT = randomised control trial, SR = systematic review, AAQ-II = acceptance and action questionnaire - II, BDI = beck depression inventory, BRS = brief resilience scale, BSS = brief symptoms inventory, BSS = the brief serenity scale, CBI = Copenhagen burnout inventory, CDRS = Connor-Davidson Resiliency Scale, CES = caring efficacy scale, CES-D = center for epidemiologic studies depression scale, CFST = the compassion fatigue self-test, CSQ = Cooper Job stress questionnaire, DASS-21 = depression, anxiety, and stress scale 21, ESS = epworth sleepiness scale, FACT-Sp = functional assessment of chronic illness therapy-spiritual well-being scale, FFMO = five facets of mindfulness questionnaire, FM = Freiburg mindfulness inventory, GADS = generalized anxiety disorder scale, GHQ = general health questionnaire, GHQ-12 = general health questionnaire, HPLP = health promoting lifestyles promotion, US = intrinsic job satisfaction, J-SOPE = the jefferson scale of physician empathy, KIMS = Kentucky inventory of mindfulness skills, LEC = the life events checklist, MAAS = mindfulness attention awareness scale, MBI = Maslach Burnout inventory, NR = No Reported, OLB = Oldenberg burnout inventory, OSI = occupational stress instrument, PQ-C = post-traumatic stress disorder Checklist - Civilian, PHQ-9 = patient health questionnaire, POMS = profile of mood states questionnaire, POSS = perceived occupational stress scale, PRIME-MD = primary care evaluation of mental disorders (9-item) depression screener questionnaire, ProdQOL = professional quality of life scale, PSDI = Pittsburgh Quality Index, RRS = ruminative responses scale-short form, PHQ-9 = patient health questionnaire, PSS = perceived stress scale, QMWS = questionnaire on medical worker's stress, SAS = Smith Anxiety Scale, SQ - 90 = symptom checklist 90 subscale, SCS = self-compassion scale, SF-12 = SF-12/2 Health Survey, SHS = subjective happiness inventory, SMART = stress management and resiliency program, SOC = sense of coherence, SRDI = Smith relaxation dispositions inventory, SSI = stress systems instrument, SSS = stress symptom scale, STAI = State-Trait Anxiety Inventory, SWLS = satisfaction with life scale, SRDI = smith relaxation dispositions inventory, TDM = traditionally delivered mindfulness, WAS = visual analog scale, WC = waist circumference, WHOQOL-BREF = World Health Organization Quality of Life-BREF, WSS = work stress scale, CBT = cognitive-behavior therapy, HER = electronic health record, MBSR = mindfulness-based stress reduction, SDM = smartphone delivered mindfulness, SMART = stress management and resiliency training, SMST = stress management skills training, SMTP = stress management training programme, SRP = stress reduction programme, t-MBSR = telephonic mindfulness-based stress reduction, YBSM = yoga-based stress management.

Table 3
Risk of bias of included systematic reviews/ meta-analysis.

Author, year	Phase 2				Phase 3
	1. Study eligibility criteria	2. Identification and selection of studies	3. Data collection and study appraisal	4. Synthesis and findings	5. Risk of bias in the review
Petrie et al.,2019					
Li et al.,2019					
Jackson-Koku et al.,2019					
Ghawadra et al.,2019					
DeChant et al., 2019					
Simone et al.,2019					
Cocchiara et al.,2019					
Aryankhesal et al.,2019					
Fibbins et al.,2018					
Dreison et al.,2018					
Brenda et al., 2018					
Johanna et al.,2017					
Panagiotti et al.,2017					
Gilmartin et al.,2017					
Clough et al.,2017					
Brand et al.,2017					
West et al.,2016					
Luken et al.,2016					
Lee et al.,2016					
Busireddy et al.,2016					
Westermann et al.,2014					
Stewart et al.,2014					

= low risk; = high risk = unclear risk

whether primary study eligibility criteria were prespecified, clear, and appropriate to the review question.^[25] 12 out of 22 studies were rated low risk and 3 were unclear risk. The second domain aims to assess whether any primary studies that would have met the inclusion criteria were not included in the review. 8 out of 22 studies were rated low risk. The third domain aims to assess whether bias may have been introduced through the data collection or risk of bias assessment processes. 17 studies were of low risk while 5 studies were graded as high risk. The fourth domain aimed to assess whether the data was combined from the included primary studies. Only 8 studies rated low risk of bias. The final phase considers whether the systematic review as a whole is at risk of bias, 14 studies were rated high risk and 8 were low.

3.2. Assessment of quality

The quality of included studies was assessed by AMSTAR 2 (Table 4), which is not designed to generate an overall 'score' to avoid disguising critical weaknesses in specific domains, such as

an inadequate literature search or are a failure to assess risk of bias with individual studies that were included in an overview.^[26] 12 of the 16 items were reported over 60% of compliance, which were as followed: the research questions and inclusion criteria for the review include the components of PICO (item 1); explain their selection of the study designs for inclusion in the review (item 3); use a comprehensive literature search strategy (item 4); perform study selection in duplicate (item 5); perform data extraction in duplicate (item 6); provide a list of excluded studies and justify the exclusions (item 7); describe the included studies in adequate detail (item 8); use a satisfactory technique for assessing the RoS in individual studies that were included in the review (item 9); account for RoB in individual studies when interpreting/discussing the results of the review (item 13); provide a satisfactory explanation for, and discussion of, any heterogeneity observed in the results of the review (item 14); carry out an adequate investigation of publication bias (small study bias) and discuss its likely impact on the results of the review (item 15) and report any potential sources of conflict of interest, including any

Table 4
Quality assessment (AMSTAR 2) of included systematic reviews/ meta-analysis.

AMSTAR 2 criteria*	Petrie et al, 2019	Li et al, 2019	Jackson-Koku et al, 2019	Ghawadra et al, 2019	DeChant et al, 2019	Simone et al, 2019	Cocchiara et al, 2019	Arvanthhesal et al, 2019	Fibbins et al, 2018	Dreison et al, 2018	Brenda et al, 2018	Johanna et al, 2017	Panagiotti et al, 2017	Gilmartin et al, 2017	Clough et al, 2017	Brand et al, 2017	West et al, 2016	Luken et al, 2016	Lee et al, 2016	Bushreddy et al, 2016	Westermann et al, 2014	Stewart et al, 2014	
1. Did the research questions and inclusion criteria for the review include the components of PICO?	Y	Y	N	Y	Y	Y	N	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	N	Y	Y	Y	Y	
2. Did the report of the review contain an explicit statement that the review methods were established prior to conduct of the review and did the report justify any significant deviations from the protocol?	Y	N	N	Y	N	N	N	N	Y	N	N	N	Y	Y	Y	N	N	N	N	N	N	N	N
3. Did the review authors explain their selection of the study designs for inclusion in the review?	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
4. Did the review authors use a comprehensive literature search strategy?	Y	Y	PY	Y	Y	PY	N	Y	Y	Y	PY	Y	Y	Y	Y	Y	Y	PY	Y	Y	Y	Y	Y
5. Did the review authors perform study selection in duplicate?	Y	Y	N	Y	N	Y	Y	Y	Y	Y	Y	Y	Y	N	Y	Y	Y	N	Y	Y	Y	Y	N
6. Did the review authors perform data extraction in duplicate?	N	Y	N	Y	N	Y	Y	Y	Y	Y	Y	Y	Y	N	N	Y	Y	N	Y	Y	N	N	N
7. Did the review authors provide a list of excluded studies and justify the exclusions?	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
8. Did the review authors describe the included studies in adequate detail?	Y	PY	Y	Y	Y	Y	Y	Y	Y	PY	PY	PY	Y	Y	Y	Y	Y	PY	Y	Y	Y	Y	Y
9. Did the review authors use a satisfactory technique for assessing the RoS in individual studies that were included in the review?	PY	PY	PY	PY	PY	PY	Y	N	N	PY	N	N	Y	Y	Y	Y	Y	N	N	Y	PY	PY	PY
10. Did the review authors report on the sources of funding for the studies included in the review?	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N
11. If meta-analysis was justified did the review authors use appropriate methods for statistical	Y	Y	NMC	NMC	NMC	Y	NMC	NMC	NMC	Y	NMC	NMC	Y	NMC	NMC	NMC	Y	NMC	Y	Y	NMC	NMC	NMC

(continued)

Table 4
(Continued).

	Petrie et al, 2019	Li et al, 2019	Jackson-Koku et al, 2019	Ghawadra et al, 2019	DeChant et al, 2019	Simone et al, 2019	Cocchiara et al, 2019	Aryankhesal et al, 2019	Fibbins et al, 2018	Dreison et al, 2018	Brenda et al, 2018	Johanna et al, 2017	Panagioti et al, 2017	Gilmartin et al, 2017	Clough et al, 2017	Brand et al, 2017	West et al, 2016	Luken et al, 2016	Lee et al, 2016	Busireddy et al, 2016	Westermann et al, 2014	Stewart et al, 2014
AMSTAR 2 criteria*																						
combination of results?																						
12. If meta-analysis was performed did the review authors assess the potential impact of RoB in individual studies on the results of the meta-analysis or other evidence synthesis?	Y	Y	Y	Y	Y	Y	Y	Y	N	Y	N	N	Y	Y	Y	Y	N	Y	Y	Y	Y	Y
13. Did the review authors account for RoB in individual studies when interpreting/discussing the results of the review?	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
14. Did the review authors provide a satisfactory explanation for, and discussion of, any heterogeneity observed in the results of the review?	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
15. If they performed quantitative synthesis did the review authors carry out an adequate investigation of publication bias (small study bias) and discuss its likely impact on the results of the review?	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
16. Did the review authors report any potential sources of conflict of interest, including any funding they received for conducting the review?	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y

N = no, MMC = no meta-analysis conducted, PY = partial Yes, RoB = risk of bias, Y = yes.

funding they received for conducting the review (item 16). 4 items with compliance lower than 40% were the main reporting limitations to be blamed: contain an explicit statement that the review methods were established prior to conduct of the review and did the report justify any significant deviations from the protocol (item 2, 27.27%); report on the sources of funding for the studies included in the review (item 10, 0.00%); use appropriate methods for statistical combination of results (item 11, 36.36%); and assess the potential impact of RoB in individual studies on the results of the meta-analysis or other evidence synthesis (item 12, 36.36%). As a whole, the methodological quality and quality of included studies was from moderate to high.

3.3. Interventions of reducing burnout of physicians and nurses

Previous studies have reported on the content, intensity, form, evaluation, and timepoint of follow-up of interventions to reduce the burnout of physician and nurses (Table 2). There were three types of interventions: individual-focused, structural or organizational, and combine interventions. Emotion regulation was an important psychological variable, which associated with burnout. The self-regulatory or emotion regulation skills such as mindfulness was used to reduce the doctors’ burnout.^[28] Individual-focused interventions included self-care workshops,^[19,31,40] stress management skills^[31,37,39,42] and communication skills training.^[19,20,42] Other interventions such as yoga,^[16,32,33] massage,^[15] mindfulness^[16,18,20,31,37,39,42] and meditation^[16,19,35,40] have been reported. Structural or organizational interventions included workload or schedule-rotation,^[19,31] stress management training program,^[27] group face-to-face delivery,^[19,27,31] teamwork/transitions,^[30,42] Balint training,^[20,40] debriefing sessions and a focus

group.^[19,20,31] Team-based primary care redesign, “Primary Care 2.0”, with the goal of addressing the Quadruple Aim of health care (ie, the Triple Aim plus reducing workforce burnout) with the following components:

- (1) an expanded “care coordinator” role for medical assistants including scribing, population health management, and between-visit care management,
- (2) health coaching and motivational interviewing,
- (3) “lean” quality improvement to support a Learning Health System,
- (4) telehealth,
- (5) protected physician time for care coordination, and
- (6) an onsite extended interdisciplinary care team (ie, mental health, pharmacy, physical therapy).^[30]

Combine individual-focused and structural or organizational interventions included Snoezelen,^[21] stress management and resiliency training,^[34] stress management workshops^[18,20] and improving interaction with colleagues through personal training.^[34] Training and follow-up were conducted by face-to-face,^[27,31] phone,^[20,31,35] e-mail,^[27] video^[20,31] or online,^[18,20] and the timepoint of follow-up ranged from 0 to 7 years (Table 2).

4. Discussion

4.1. Summary of main findings

The purpose of this study was to summarize the evidence and clarify a bundled strategy to reduce burnout of physicians and nurses. According to ROBIS, 12 research were in low risk in domain 1, 8 in domain 2, 17 in domain 3, and 8 in phase 3. By using AMSTAR 2 to assess the methodological quality and



Figure 2. The path of bundle strategy to reduce burnout of physicians and nurses.

quality of included research, most of those were considered as relatively good quality.

4.2. Implication for future study

Burnout of physicians and nurses has become a global public health problem. This overview analyzed the contents of 22 papers with results that physician-directed interventions are associated with small reductions in symptoms of common mental health disorders among physicians. Organizational interventions that ignore individual factors cannot really reducing burnout of physicians and nurses. Therefore, based on theories and studies, when physicians and nurses face stressors caused by work, they will make different coping strategies.^[43] Coping refers to the “cognitive and behavioral efforts to manage specific external and/or internal demands that are appraised as taxing or exceeding the resources of the person”.^[44]

Emotional intelligence theory suggests that emotion regulation skills facilitate the maintenance of appropriate emotions, reducing or adapting undesirable emotions in oneself and others.^[28] Physicians and nurses constantly alternate between exhaustion and happiness, Resilience is the bridge from burnout to wellness.^[45,46] Based on previous theories and studies, physicians and nurses experience a dynamic change between burnout and wellness. If positive intervention strategies can be adopted to enhance resilience, the incidence of burnout of physicians and nurses is greatly reduced and the wellness improved (Fig. 2).

4.3. Strength and limitations

This research included studies in different settings, which brought to light the range of interventions, which could provide the direction for further research. The current overview clarified evidence to reduce burnout of physicians and nurses, which provide a basis for health policy makers or clinical managers to design simple and feasible strategies to reduce the burnout of physicians and nurses, and to ensure clinical safety. Considering partial databases selected and gray literature not included, the results are used only as an overview of the field.

5. Conclusion

This overview has included 22 systematic reviews and meta-analyses to summarize the relevant studies of interventions to reduce the burnout of physicians and nurses and form an evidence resource, which provides reliable evidence support for further intervention. It is an urgent need to implement and evaluate the long-term effect of bundle strategy.

Author contributions

XJZ, YQS and TYS designed, performed and analyzed the research. XJZ, YQS, TYS and TTJ advised on article inclusion and exclusion. XJZ and ND designed the Tables. XJZ, YQS and TTJ wrote the manuscript. XJZ, YQS, TTJ, ND and TYS read and revised the manuscript. All authors read and approved the final manuscript.

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