Mindfulness-based interventions to reduce burnout and stress in physicians: a systematic review and meta-analysis

Johannes Fendel, Johannes Bürkle, Anja S. Göritz

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Mindfulness-Based Interventions to Reduce Burnout and Stress in Physicians: A Systematic Review and Meta-Analysis

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Albert-Ludwigs-Universität Freiburg

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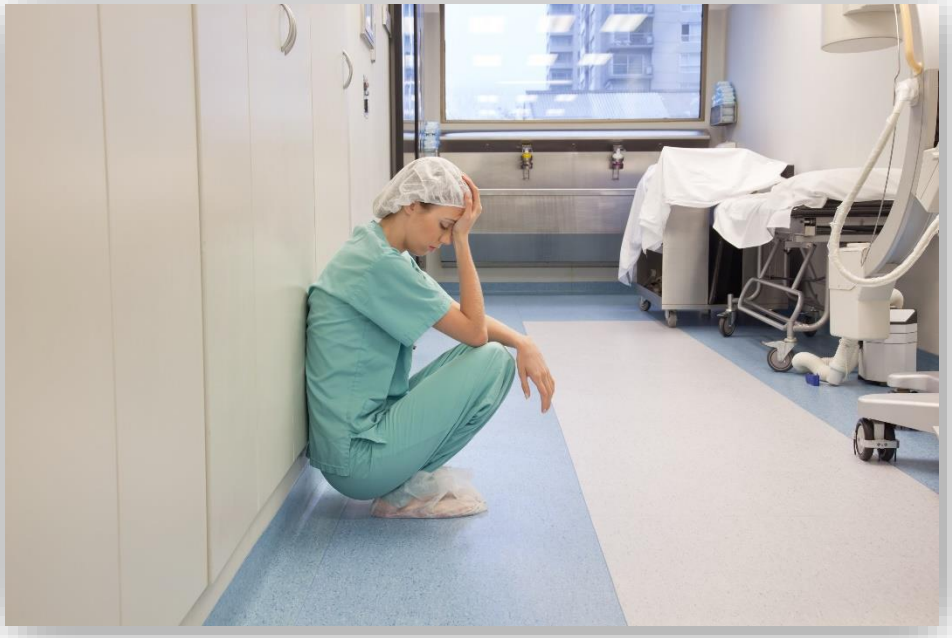
Status Quo

Workload

Working hours

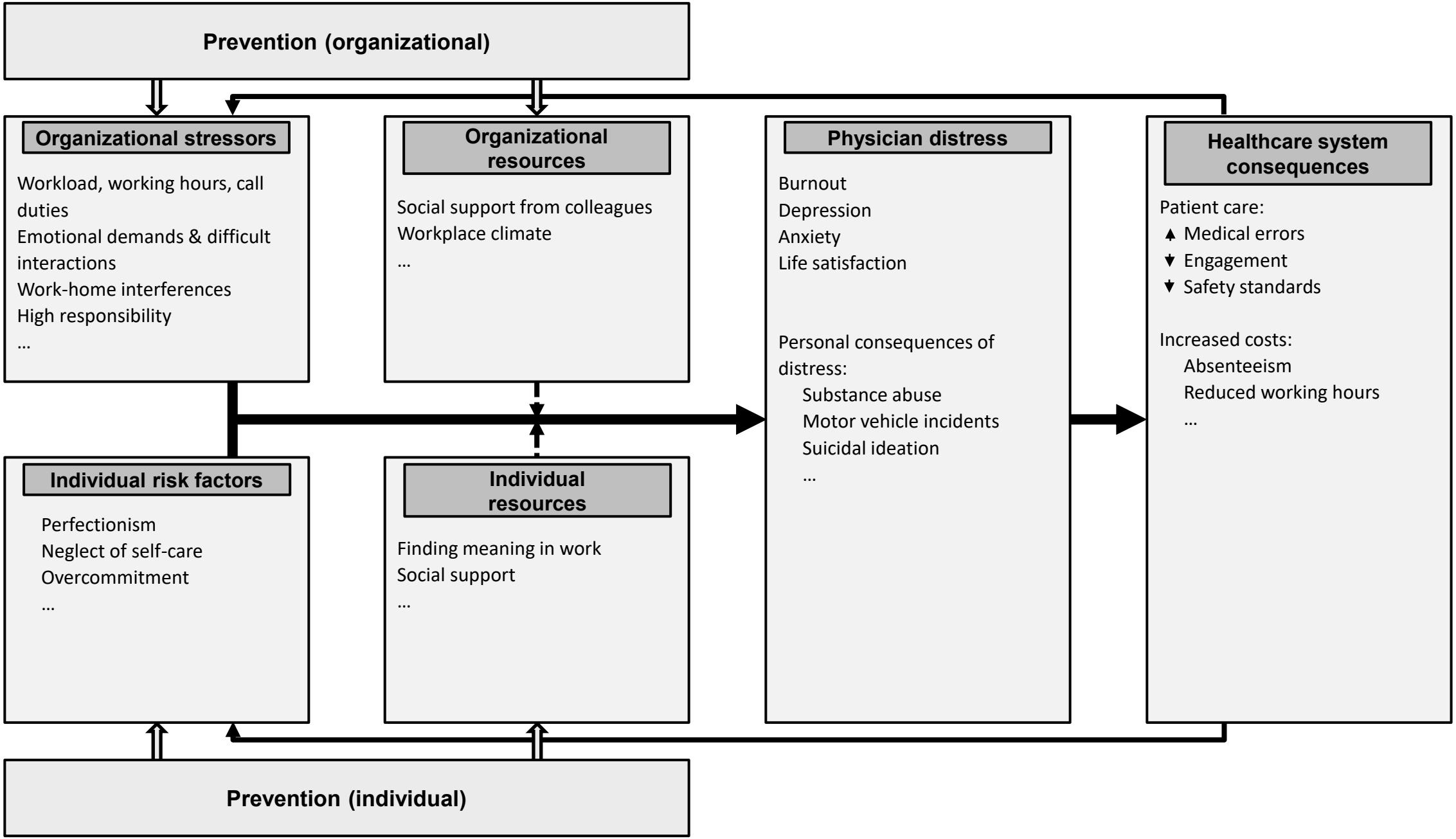
Economical pressure

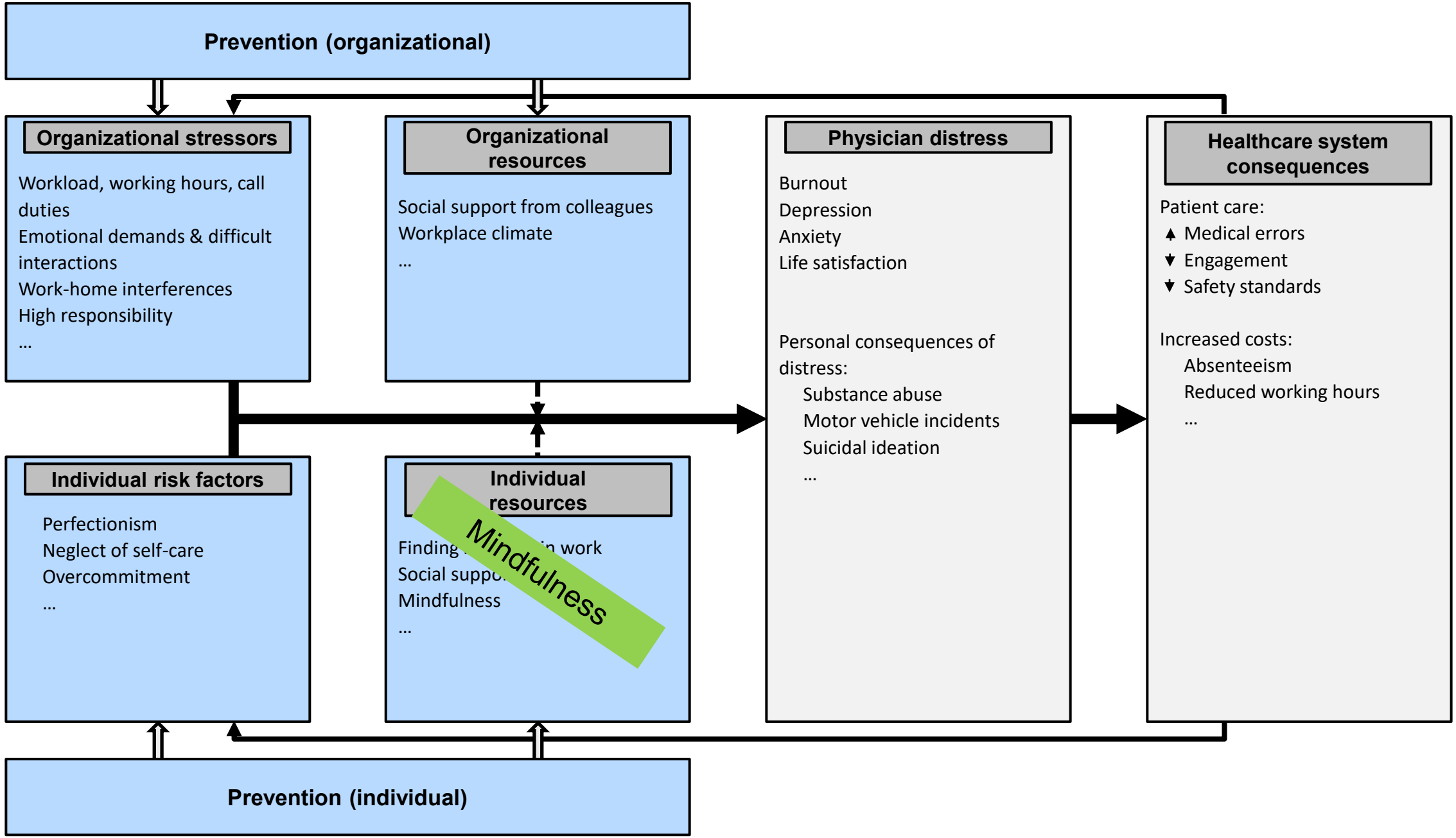


Responsibility/
Autonomy

Errors

Documentation


Prevention (organizational)
Organizational stressors
Workload, working hours, call duties
Emotional demands & difficult interactions
Work-home interferences
High responsibility
…
Organizational resources
Social support from colleagues
Workplace climate
…
Physician distress
Burnout
Depression
Anxiety
Life satisfaction
Personal consequences of distress:
Substance abuse
Motor vehicle incidents
Suicidal ideation
…
Healthcare system consequences
Patient care:
Medical errors
Engagement
Safety standards
Increased costs:
Absenteeism
Reduced working hours
…
Individual risk factors
Perfectionism
Neglect of self-care
Overcommitment
…
Individual resources
Finding meaning in work
Social support
…
Prevention (individual)


Prevention (organizational)
Organizational stressors
Workload, working hours, call duties
Emotional demands & difficult interactions
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Absenteeism
Reduced working hours
…
Individual risk factors
Perfectionism
Neglect of self-care
Overcommitment
…
Individual resources
Mindfulness
…
Mindfulness
Prevention (individual)

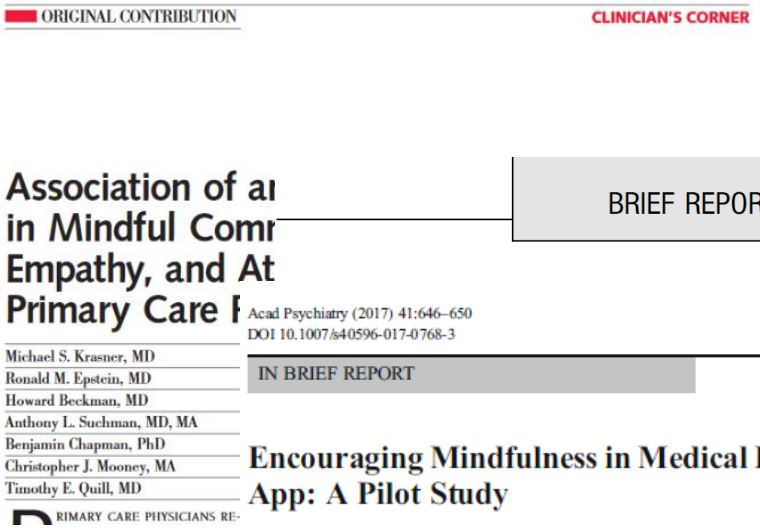
Mindfulness

Mindfulness: 1) present moment awareness, 2) accepting, without judgement

formal

informal

MBIs for physicians


ORIGINAL CONTRIBUTION

CLINICIAN'S CORNER

Association of a
in Mindful Comm
Empathy, and At
Primary Care P

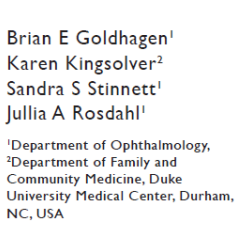
Michael S. Krasner, MD
Ronald M. Epstein, MD
Howard Beckman, MD
Anthony L. Suchman, MD, MA
Benjamin Chapman, PhD
Christopher J. Mooney, MA
Timothy E. Quill, MD

PRIMARY CARE PHYSICIANS RE-


Advances in Medical Edu

Open Access Full Text Article

Stress and burn
mindfulness-ba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Karen Kingsolver[2]
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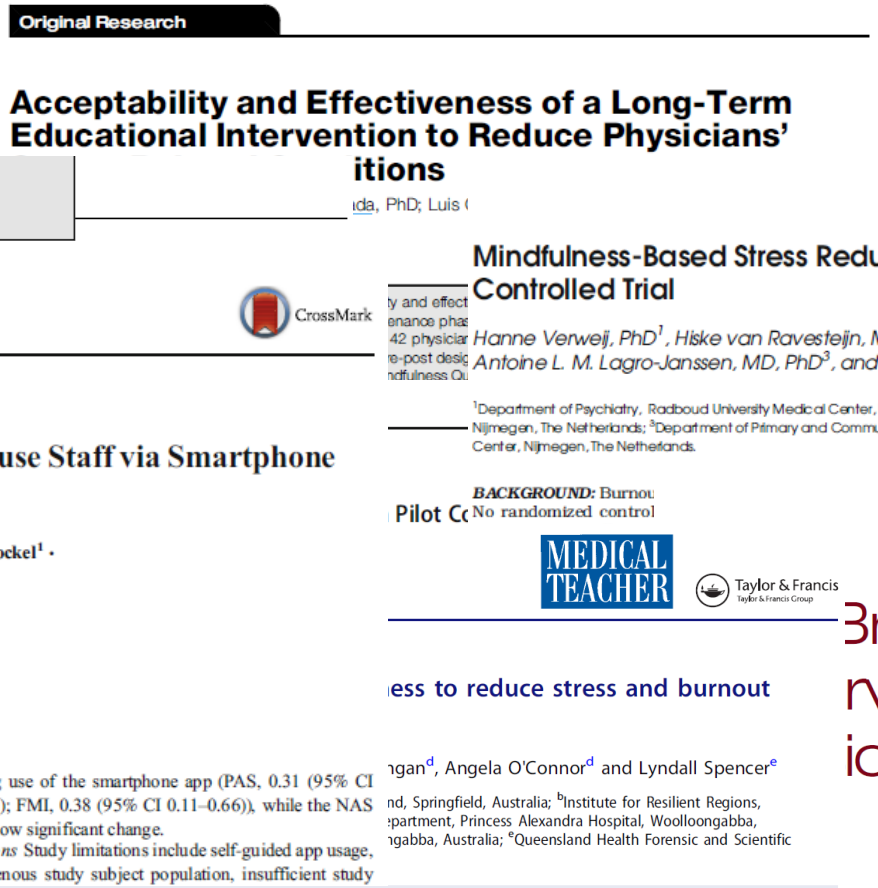
Original Research

Acceptability and Effectiveness of a Long-Term Educational Intervention to Reduce Physicians'
itions

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BRIEF REPORT

Acad Psychiatry (2017) 41:646–650
DOI 10.1007/s40596-017-0768-3

CrossMark

IN BRIEF REPORT

Encouraging Mindfulness in Medical House Staff via Smartphone App: A Pilot Study

Louise Wen[1] · Timothy E. Sweeney[1] · Lindsay Welton[1] · Mickey Trockel[1] · Laurence Katznelson[1]

Received: 3 March 2017 / Accepted: 27 June 2017 / Published online: 9 August 2017
© Academic Psychiatry 2017

Abstract
Background Stress and burnout are increasingly recognized as urgent issues among resident physicians, especially given the concerning implications of burnout on physician well-being and patient care outcomes.

increasing use of the smartphone app (PAS, 0.31 (95% CI 0.03–0.57); FMI, 0.38 (95% CI 0.11–0.66)), while the NAS did not show significant change.
Conclusions Study limitations include self-guided app usage, a homogenous study subject population, insufficient study

Background and objective: Stress and burnout impact resident phy study tests the hypothesis that a mindfulness-based resilience interventi and burnout in residents.
Methods: Resident physicians from the Departments of Family M Anesthesia at Duke University, Durham, NC, USA, participated in two of mindfulness-based resilience activities, which introduced mindful- practical exercises for nurturing resilience. Anonymous surveys were pleted by 47 residents) and after the intervention (both completed by 3 survey was distributed 1 month later (seven residents completed all th

Pilot C

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42 physician
e-post desig
ndfulness Qu

BACKGROUND: Burnou
No randomized control

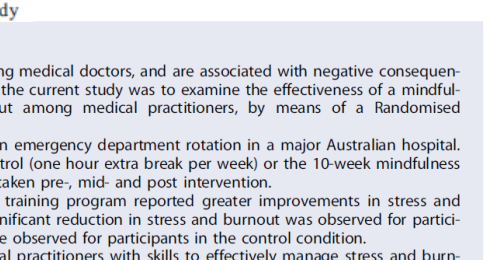
MEDICAL TEACHER

Taylor & Francis
Taylor & Francis Group

ess to reduce stress and burnout

ngan[d], Angela O'Connor[d] and Lyndall Spencer[e]

nd, Springfield, Australia; [b]Institute for Resilient Regions, partment, Princess Alexandra Hospital, Woolloongabba, ngabba, Australia; [e]Queensland Health Forensic and Scientific


ABSTRACT
Introduction: Stress and burnout are highly prevalent among medical doctors, and are associated with negative consequences for doctors, patients, and organizations. The purpose of the current study was to examine the effectiveness of a mindfulness training intervention in reducing stress and burnout among medical practitioners, by means of a Randomised Controlled Trial design.
Methods: Participants were 44 intern doctors completing an emergency department rotation in a major Australian hospital. Participants were randomly assigned to either an active control (one hour extra break per week) or the 10-week mindfulness training intervention. Measures of stress and burnout were taken pre-, mid- and post intervention.
Results: Participants undergoing the 10-week mindfulness training program reported greater improvements in stress and burnout relative to participants in the control condition. Significant reduction in stress and burnout was observed for participants in the mindfulness condition. No such reductions were observed for participants in the control condition.
Conclusions: Mindfulness interventions may provide medical practitioners with skills to effectively manage stress and burn-


Research

Hanne Verweij, Ruth C Waumans, Danique Smeijers, Peter LBJ Lucassen, A Rogier T Donders, Henriëtte E van der Horst and Anne EM Speckens

CrossMark

uction for GPs:
in Dutch primary care

Mindfulness-Based Stress Reduction for Residents: A Randomized Controlled Trial

Hanne Verweij, PhD[1], Hiske van Ravesteijn, MD, PhD[1], Madelon L. M. van Hooff, PhD[2], Antoine L. M. Lagro-Janssen, MD, PhD[3], and Anne E. M. Speckens, MD, PhD[1]

[1]Department of Psychiatry, Radboud University Medical Center, Nijmegen, The Netherlands; [2]Behavioural Science Institute, Radboud University, Nijmegen, The Netherlands; [3]Department of Primary and Community Care, Unit Gender and Womens' Health, Radboud University Medical Center, Nijmegen, The Netherlands.

in the 1970s as an 8-week, group-based programme called mindfulness-based stress reduction (MBSR). MBSR was initially offered to patients with both chronic and somatic illnesses, such as chronic pain[13,14] and psoriasis,[15] and psychological

David A. Schroeder, MD, FACC, Elizabeth Stephens, MD, FACP, Dharmakaya Colgan, MS, Matthew Hunsinger, PhD, Dan Rubin, PsyD, and Michael S. Christopher, PhD

Brief Mindfulness-Based
rvention for Primary Care
icians: A Pilot Randomized
Controlled Trial

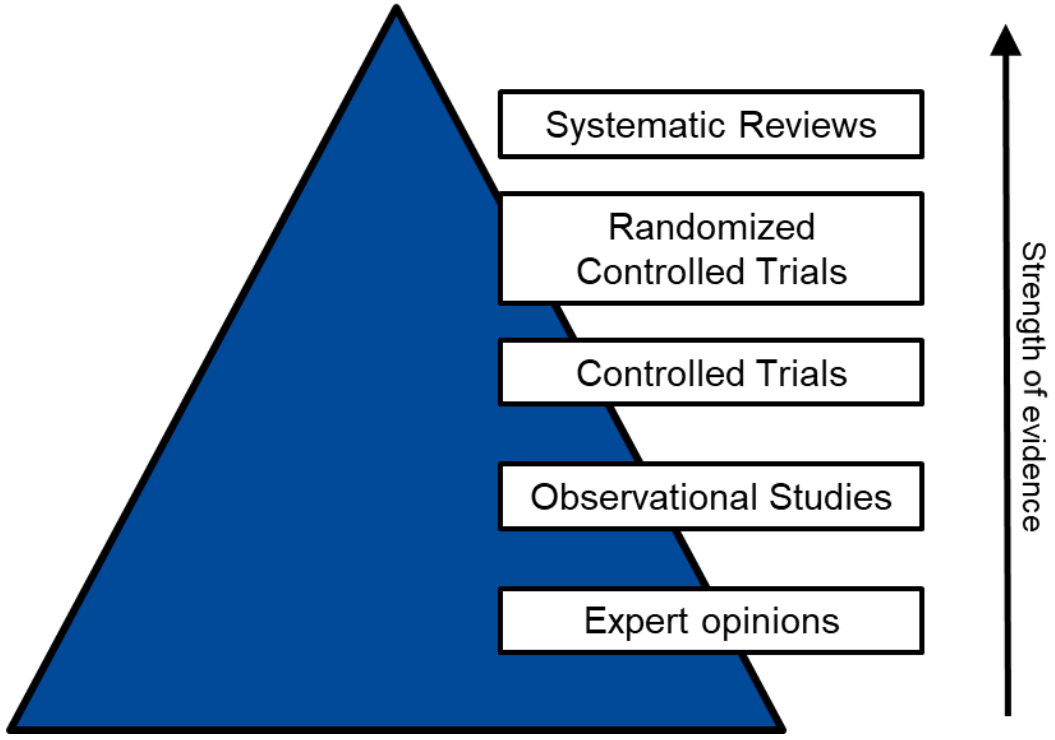
e physicians burnout, hed quality care, and bis randomized nary aim

Although the MMC had no impact on patient-reported DCC or ODR, among the entire sample at baseline, DCC and ODR were significantly correlated with several physician outcomes, including resilience and personal achievement.

patients.[4,5] Furthermore, burnout is linked to lower productivity, early retirement, and higher rates of turnover, which have profound financial impacts,[6,7] replacement costs are approximately $250 000 per physician.[8] Therefore, there

Research question

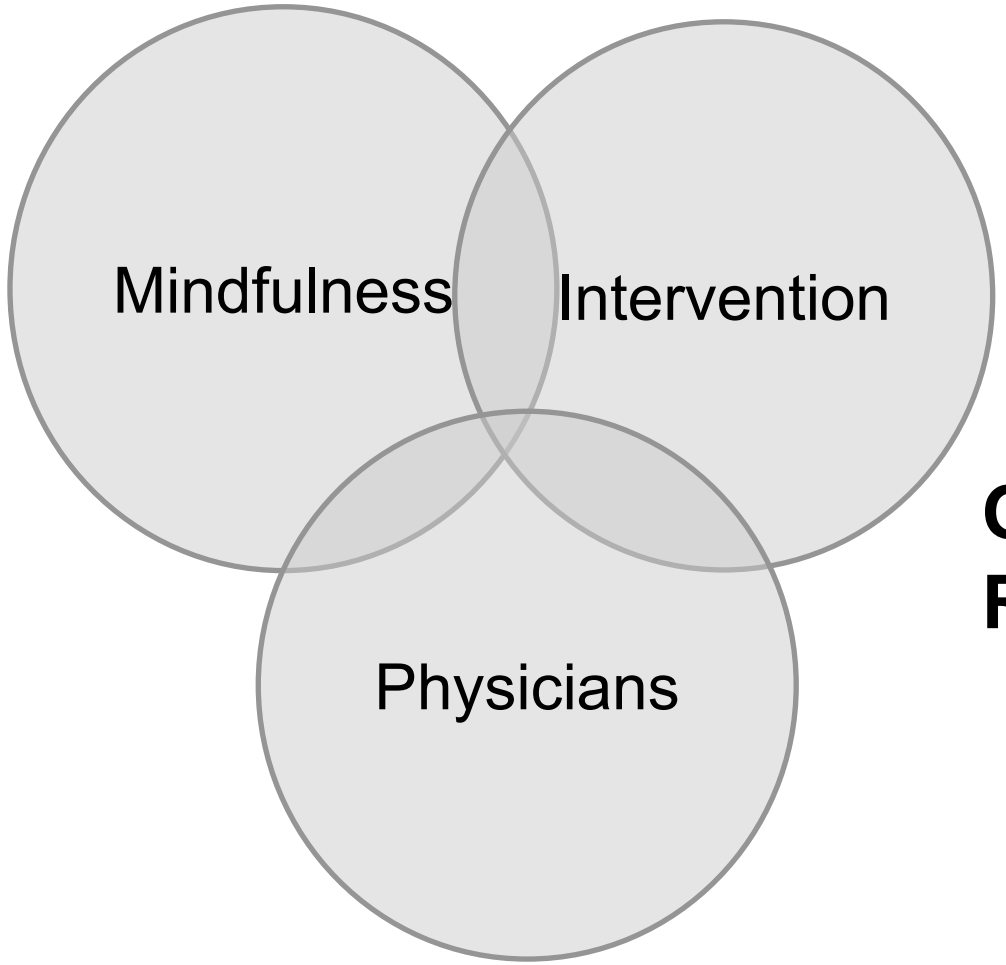
How effective are **mindfulness-based interventions** in reducing **burnout and stress** among **physicians**?



Research question

Population:	Physicians
Intervention:	Interventions explicitly based on mindfulness
Comparator:	- Intervention-control difference (between-group) - Pre-post (within-group)
Outcome:	Burnout & Stress
Study Design:	RCTs; NRTs & NCBAs

Search Strategy



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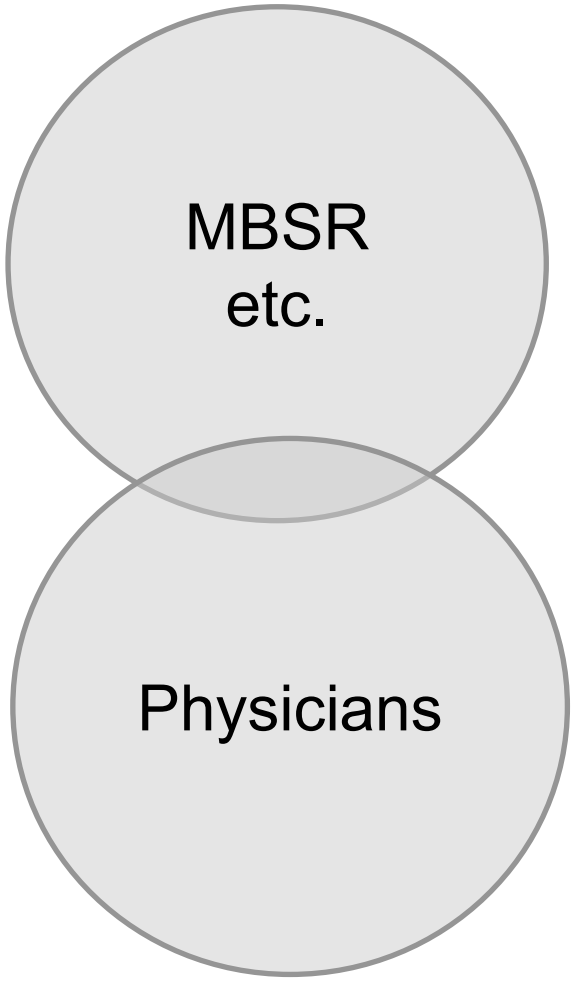

((Mindfulness **AND** Intervention**) OR** MBSR**) AND** Physicians

Search Strategy - Web of science Core Collection

	Searches
#1	TS=(mindfulness OR mindfulness-based OR mindful)
#2	TS=(intervention* OR training* OR program* OR RCT OR “randomized control trial” OR “randomized controlled trial” OR course* OR curricul* OR trial* OR session*)
#3	#1 AND #2
#4	TS=(MBSR OR “mindfulness-based stress reduction” OR MBCT OR “mindfulness-based cognitive therapy” OR MBST OR “mind-body skill training”)
#5	#3 OR #4
#6	TS=(physician* OR doctor* OR practitioner* OR clinician* OR "medic* intern*” OR resident OR residents OR residency OR “post-graduate year” OR PGY OR PGY-1 OR PGY-2 OR PGY-3 OR “foundation year” OR F1 OR FY1 OR F2 OR FY2 OR SpR OR “house officer*” OR PRHO OR SHO OR anesthesiologist* OR cardiologist* OR dermatologist* OR endocrinologist* OR gastroenterologist* OR “general practitioner*” OR GPs OR gynecologist* OR hematologist* OR hepatologist* OR immunologist* OR internist* OR nephrologist* OR neurologist* OR obstetrician* OR oncologist* OR ophthalmologist* OR otorhinolaryngologist* OR pathologist* OR pediatric* OR podiatrist* OR psychiatrist* OR pulmonologist* OR radiologist* OR respirologist* OR rheumatologist* OR surgeon* OR urologist*)
#7	#5 AND #6

Notes: TS: topic (Title, Abstract, Authors Keywords, Keywords Plus®)

Implemented in:

Medline
Embase
PsycINFO
PSYNDEX
CINAHL
CENTRAL
Web of Science

Research question

Table 1 Inclusion and exclusion criteria

Criterion	Inclusion	Exclusion
Population	Practicing physicians and resident physicians	Medical students, healthcare providers other than physicians, mixed samples
Intervention	Interventions explicitly based on mindfulness	Interventions without explicit focus on mindfulness
Comparator	Randomised controlled trials, non-randomised trials, non-controlled before-after studies	Case-control studies, systematic reviews, meta-analyses, clinical case studies, qualitative studies, editors' letters
Outcome	Burnout or stress measured using validated self-report questionnaires, pre and post intervention	Self-report questionnaires without validation
Language	All languages	None
Publication date	All dates	None

Data Extraction

Study:

- authors - publication date
- country - experimental design
- content of control (waitlist etc.)

Population:

- sample size (TG/ CG) - Mean age - sex proportion (%) - dropout
- career stage (resident/ practicing physician) - specialist field […]

Intervention:

- delivery format (online/ offline/ mixed)
- duration of an average single session - total number of sessions
- exposure (time under professional & personal guidance)
- home practice - group size
- theoretical background (MBSR/ adapted MBSR/ other MBIs),

Primary and secondary outcomes:

- means & SDs for burnout, stress and mindfulness (pre/ post/ follow-up)

Preregistration & Study protocol

Open access Protocol

BMJ Open

Mindfulness-based interventions to reduce burnout and stress in physicians: a study protocol for a systematic review and meta-analysis

Johannes Caspar Fendel ,[1] Johannes Julian Bürkle,[1,2] Anja Simone Göritz[1]

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► Prepublication history and additional material for this paper are available online. To view these files, please visit the journal online (http://dx.doi.org/10.1136/bmjopen-2019-032295).

JCF and JJB contributed equally.

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Mr Johannes Caspar Fendel; johannes.fendel@psychologie.uni-freiburg.de

ABSTRACT

Introduction Physicians often suffer from burnout and stress, not only affecting themselves, but also their patients and the healthcare system in general. An increasing number of studies suggest that mindfulness-based interventions improve physicians' well-being as well as the quality of care they deliver. However, the evidence is scattered, and a systematic review and meta-analysis are lacking. To the best of our knowledge, this systematic review and meta-analysis will be the first to assess the effectiveness of mindfulness-based interventions in reducing burnout and stress among physicians. Further, it aims to uncover potential moderators of intervention effectiveness.

Methods and analysis MEDLINE, Embase, PsycINFO, PSYINDEX, Web of Science, CINAHL and the Cochrane Central Register of Controlled Trials will be screened without language or publication date restrictions. In addition, backward and forward citation searches of included studies and relevant reviews will be conducted. Studies examining the effect of interventions for physicians explicitly based on mindfulness will be included. Primary outcomes will be pre-post changes in burnout and stress if assessed with validated measures. Two reviewers independently search, select and extract data, and rate the methodological quality of the studies. Both controlled and uncontrolled studies will be included. Randomised controlled trails will be meta-analysed separately using between-group effect. In addition, non-randomised trials including non-controlled before-after studies will be meta-analysed using within-group effect. Potential moderators and sources of between-study heterogeneity will be tested using meta-regression and subgroup analyses. Futhermore, a narrative synthesis will be pursued. The Grading of Recommendations Assessment, Development and Evaluation system will be used to assess the quality of the cumulated evidence.

Ethics and dissemination Ethical approval is not required. Results will be published in a peer-reviewed journal and presented at international conferences.

PROSPERO registration number CRD42019133077.

Strengths and limitations of this study

- We conduct the first systematic review and meta-analysis on the effectiveness of mindfulness-based interventions in reducing burnout and stress among physicians, using a fine-meshed yet comprehensive literature search.
- We follow the Preferred Reporting Items for Systematic Review and Meta-analysis Protocols guidelines.
- Limitations of the quality of evidence will be assessed using the Grading of Recommendations Assessment, Development and Evaluation system.
- We consider all relevant evidence by separately providing effect estimates for randomised controlled trails and non-randomised trials including non-controlled before-after studies.
- The diversity of intervention formats and designs of included studies might lead to considerable heterogeneity among studies.

INTRODUCTION

Rationale

Medicine is a rewarding and at the same time highly demanding and stressful profession. Physicians are exposed to human suffering, need to take on tremendous responsibility and face expectations of faultless performance. They need to deal with excessive workloads and long working hours and often struggle to balance professional and personal life.[1] Among the stages of a physician's career, medical residency is a particularly demanding period. At the beginning of their career, resident physicians often experience role transition and relocation, resulting in fewer available support systems and feelings of isolation.[2] A lack of supervisory support, restricted autonomy and the frequent confrontation with unfamiliar and difficult job demands have deleterious impact on resident physicians' well-being.[3 4] Consequently, in comparison to the general population and other healthcare professions, physicians and especially resident physicians have higher prevalences of burnout and stress.[5–7]

Burnout is a work-related syndrome characterised by emotional exhaustion, often

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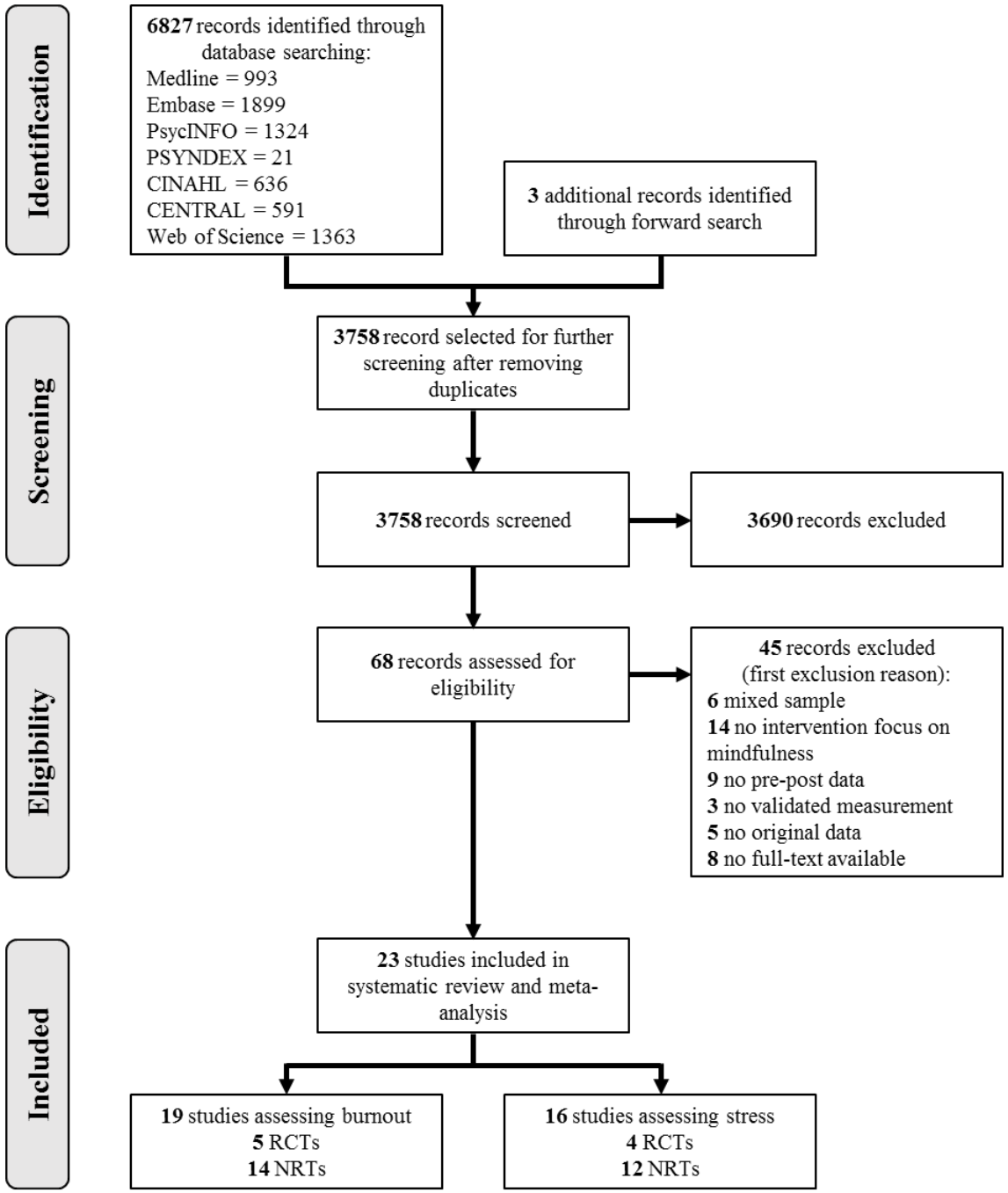
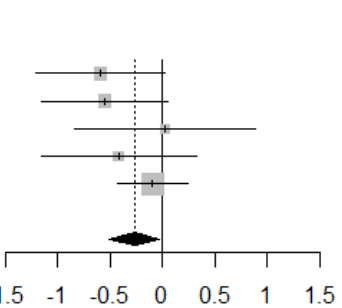
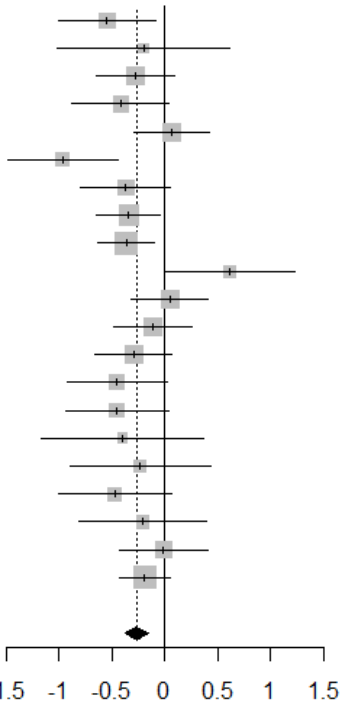

Identification
Screening
Eligibility
Included
6827 records identified through database searching:
Medline = 993
Embase = 1899
PsycINFO = 1324
PSYNDEX = 21
CINAHL = 636
CENTRAL = 591
Web of Science = 1363
3 additional records identified through forward search
3758 record selected for further screening after removing duplicates
3758 records screened
3690 records excluded
68 records assessed for eligibility
45 records excluded (first exclusion reason):
6 mixed sample
14 no intervention focus on mindfulness
9 no pre-post data
3 no validated measurement
5 no original data
8 no full-text available
23 studies included in systematic review and meta-analysis
19 studies assessing burnout
5 RCTs
14 NRTs
16 studies assessing stress
4 RCTs
12 NRTs

Characteristics

- **Studies:**
  - 6 RCTs, 19 NRTs (16 NCBA, 3 CBA)
  - n = 925 (714 MBI, 211 control)
  - samples: 7-148 (Median = 31)
  - age = 38 (10.1), female = 63%
  - mixed specialities
- **Interventions:**
  - 18 face to face, 5 mixed, 2 online
  - 2 days to three months; Median = 16,8h
  - 4 MBSR, 10 adapted MBSR, 6 self-developed, 2 MBST, 2 Headspace, 1 adapted MBCT

Burnout (meta-analyses)





MBIs can be **effective in reducing** physician's **burnout**

Stress (meta-analyses)

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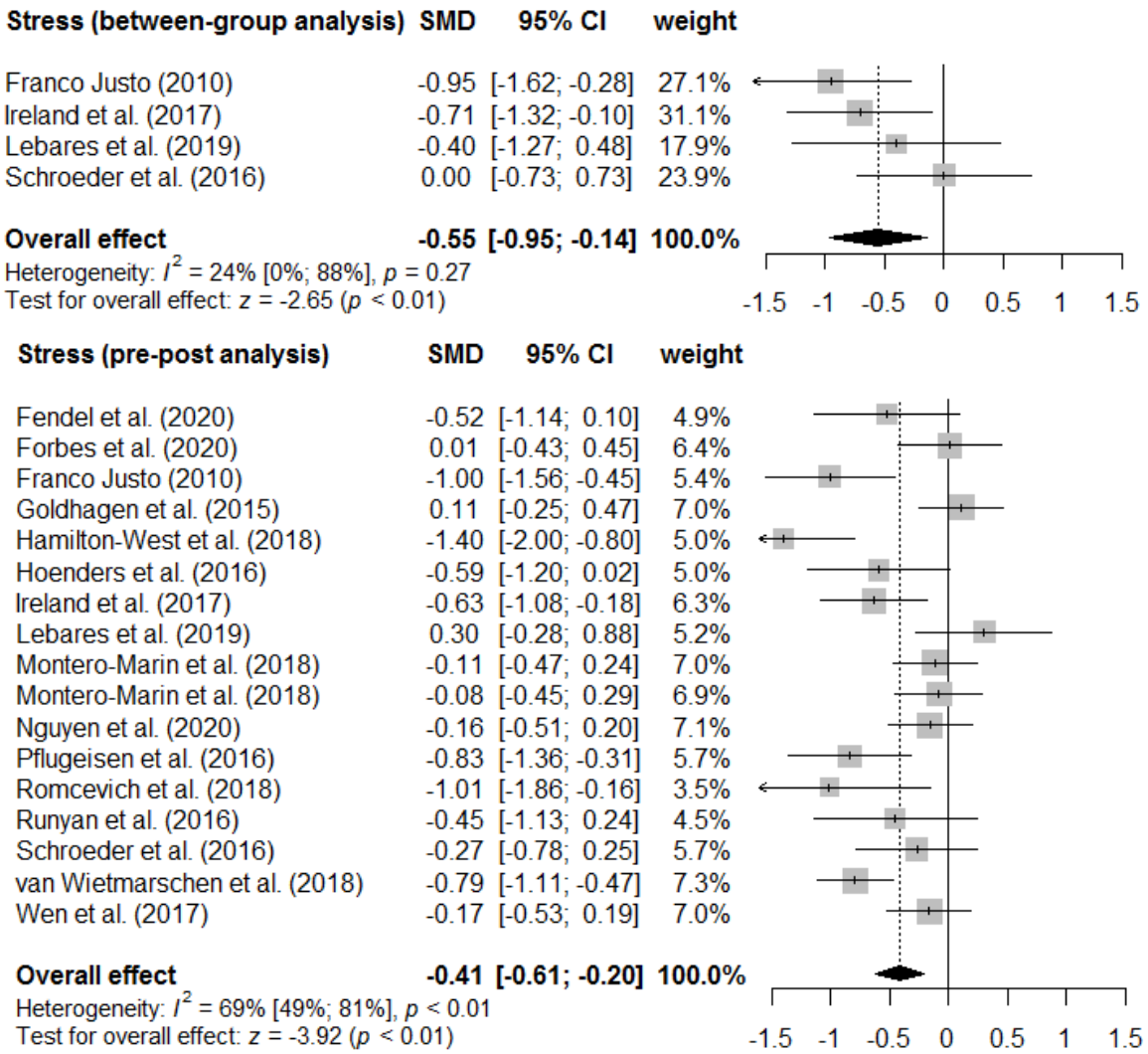


MBIs can be **effective in reducing** physician's **stress**

Burnout (subgroup analyses)

Comparison	Moderator	Subgroup	k	SMD	95% CI	p	I^2 (%)	Q
Between-group		All	5	-0.26	[-0.50; -0.03]	.03	0	3.54
	Career stage	Practicing physicians	2	-0.52	[-0.90; -0.04]	.03	0	0.12
		Resident physicians	3	-0.18	[-0.45; 0.10]	.21	0	1.94
		Difference				.22		
	Intervention type	Adapted MBSR	3	-0.38	[-0.79; 0.03]	.07	0	1.15
		MBSR	2	-0.27	[-0.74; 0.20]	.26	48	1.92
		Difference				.73		
	Intervention format	Offline	5	-0.26	[-0.50; -0.03]	.03	0	3.54
	Type control	Active	2	-0.35	[-0.89; 0.18]	.20	12	1.14
		Waitlist	3	-0.25	[-0.55; 0.05]	.10	9	2.19
		Difference				.74		
Pre-post		All	21	-0.26	[-0.37; -0.15]	< .001	29	28.19
	Career stage	Mixed	4	-0.51	[-0.78; -0.23]	< .001	31	4.37
		Practicing physicians	7	-0.25	[-0.41; -0.09]	.02	22	7.67
		Resident physicians	10	-0.17	[-0.33; -0.02]	.03	15	10.62
		Difference				.12		
	Intervention type	Adapted MBSR	8	-0.17	[-0.37; 0.02]	.08	38	11.30
		Adapted MBCT	1	-0.96	[-1.48; -0.45]	< .001	-	-
		MBSR	3	-0.22	[-0.47; 0.02]	.07	31	2.92
		MBST	2	-0.31	[-0.64; 0.01]	.06	0	0.06
		Mindfulness App	1	-0.21	[-0.81; 0.39]	.49	-	-
		Other forms	6	-0.29	[-0.46; -0.13]	< .001	6	5.31
		Difference				.15		
	Intervention format	Mixed	5	-0.19	[-0.37; 0.00]	.046	0	3.64
		Offline	15	-0.28	[-0.42; -0.14]	< .001	41	23.83
		Online	1	-0.21	[-0.81; 0.39]	.49	-	-
		Difference				.72		
	Study design	CBA	3	-0.27	[-0.49; -0.05]	.02	3	2.06
		NCBA	13	-0.27	[-0.41; -0.13]	< .001	24	15.74
		RCT	5	-0.23	[-0.53; 0.08]	.14	61	10.30
		Difference				.97		

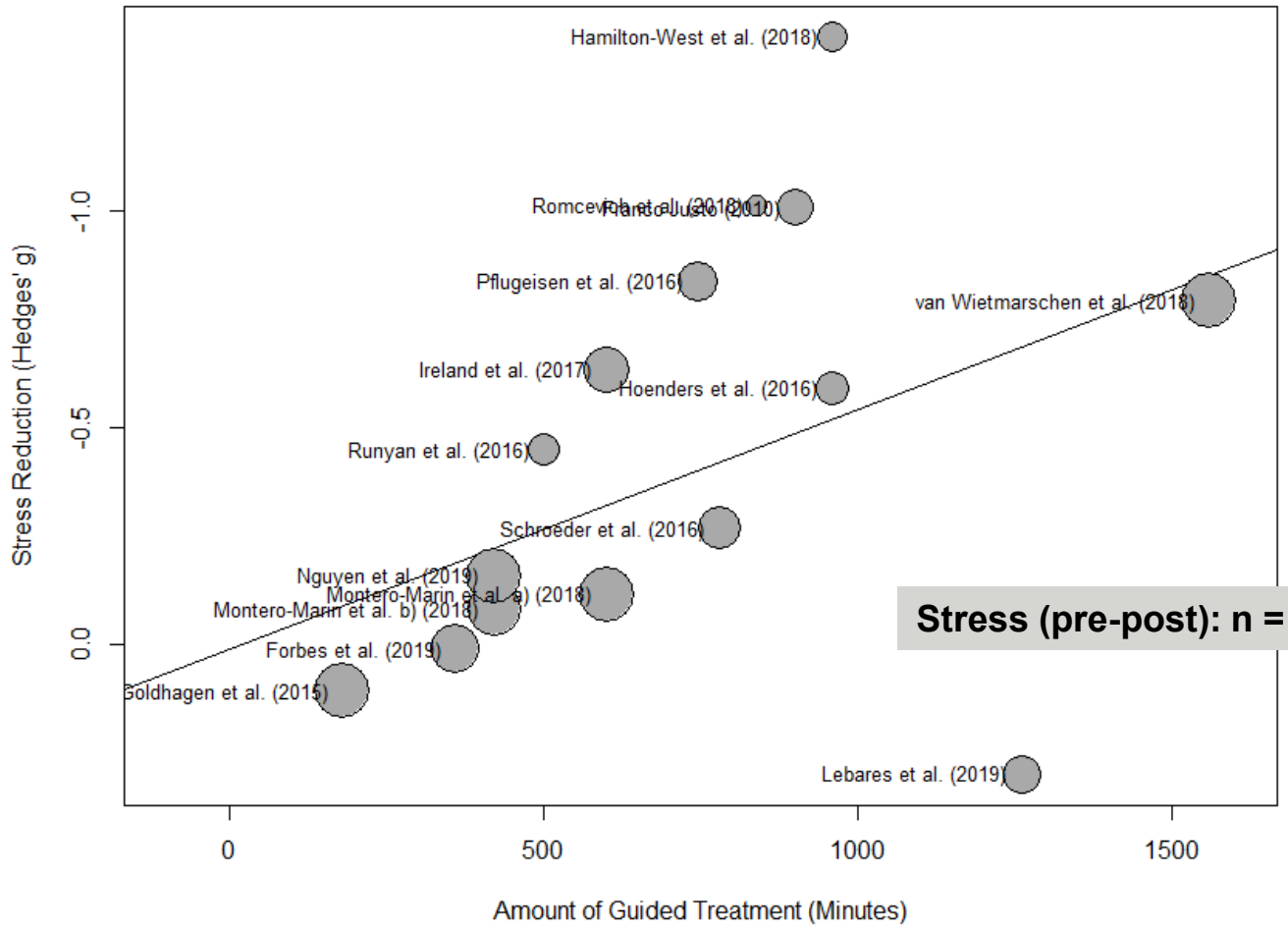
Burnout reduction was **independent of moderators**

Stress (subgroup analyses)

Comparison	Moderator	Subgroup	k	SMD	95% CI	p	I^2 (%)	Q
Between-group		All	4	-0.55	[-0.95; -0.14]	.01	24	3.94
	Career stage	Practicing physicians	2	-0.49	[-1.42; 0.45]	.31	72	3.55
		Resident physicians	2	-0.60	[-1.10; -0.10]	.02	0	0.32
		Difference				.83		
	Intervention type	Adapted MBSR	4	-0.55	[-0.95; -0.14]	.01	24	3.94
	Intervention format	Offline	4	-0.55	[-0.95; -0.14]	.01	24	3.94
	Type control	Active	2	-0.60	[-1.10; -0.10]	.02	0	0.32
		Waitlist	2	-0.49	[-1.42; 0.45]	.31	72	3.55
		Difference				.83		
Pre-post		All	17	-0.41	[-0.61; -0.20]	< .001	69	52.01
	Career stage	Mixed	3	-0.77	[-1.49; -0.04]	.04	85	13.47
		Practicing physicians	5	-0.44	[-0.80; -0.07]	.02	75	15.74
		Resident physicians	9	-0.26	[-0.51; -0.02]	.04	52	16.76
		Difference				.38		
	Intervention type	Adapted MBSR	8	-0.39	[-0.68; -0.11]	< .01	69	22.58
		Adapted MBCT	1	-1.40	[-2.00; -0.80]	< .001	-	-
		MBSR	1	-0.59	[-1.20; 0.02]	.06	-	-
		MBST	2	-0.49	[-1.31; 0.32]	.24	70	3.28
		Mindfulness App	1	-0.17	[-0.53; 0.19]	.37	-	-
		Other forms	4	-0.25	[-0.69; 0.18]	.26	69	9.81
		Difference				.02		
	Intervention format	Mixed	5	-0.33	[-0.64; -0.02]	.03	58	9.46
		Offline	11	-0.46	[-0.76; -0.17]	< .01	74	39.08
		Online	1	-0.17	[-0.53; 0.19]	.37	-	-
		Difference				.45		
	Study design	CBA	1	0.01	[-0.43; 0.45]	.96	-	-
		NCBA	12	-0.44	[-0.69; -0.20]	< .001	71	37.5
		RCT	4	-0.41	[-0.92; 0.10]	.11	74	11.4
		Difference				.20		

Esteblished MBIs showed **higher effectiveness** in **reducing stress**

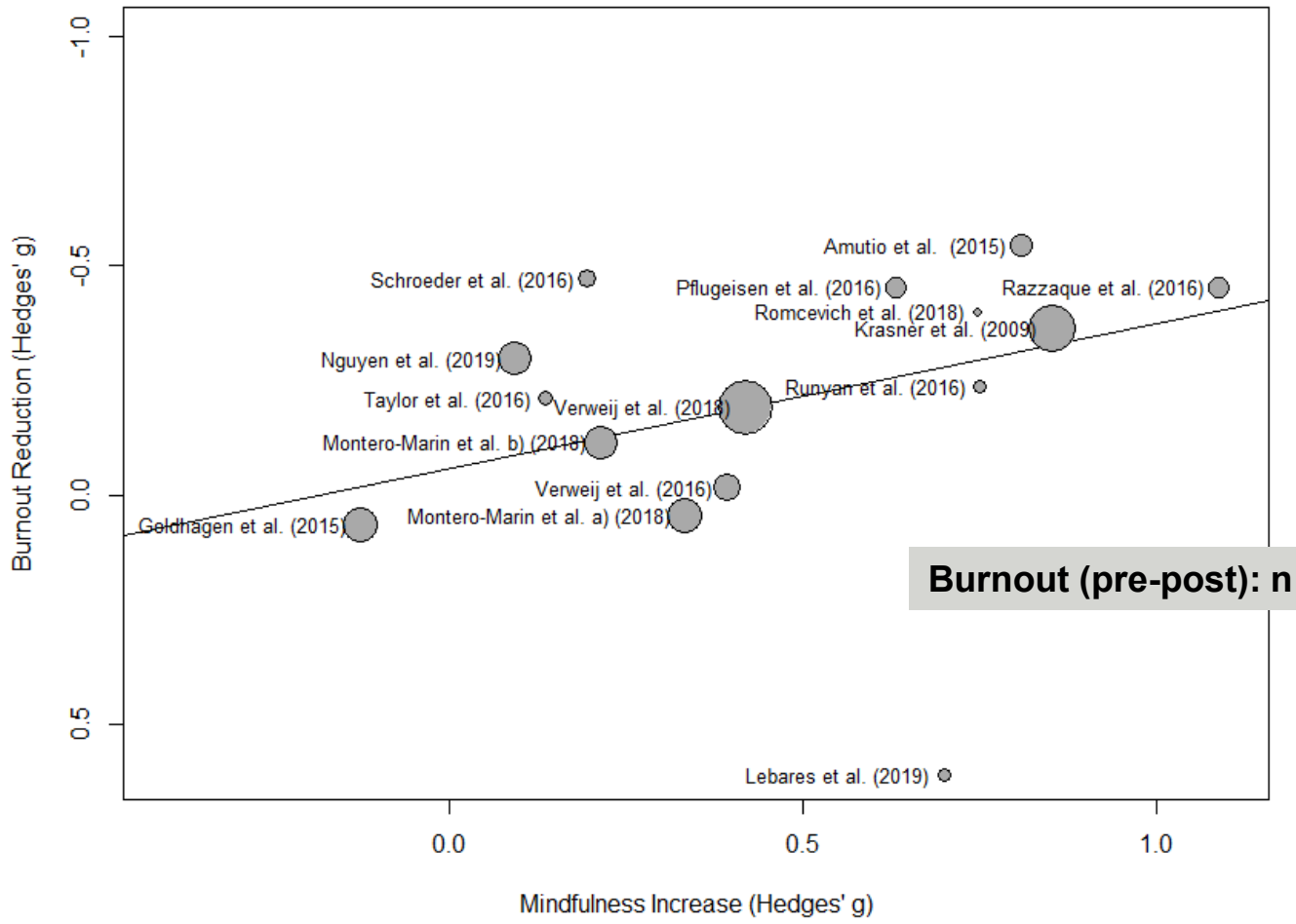
Stress (meta-regression)



Hours of guided treatment was **associated with stress reduction**

Stress (pre-post): n = 16, b = -0.03, SE = 0.01, p = 0.04

Burnout (meta-regression)



Burnout (pre-post): n = 17, b = -0.31, SE = 0.17, p = 0.07

Sensitivity analyses (follow-up)

Outcome	Comparison	k	SMD	95% CI	p	I^2 (%)	Q
Burnout	Between	5	-0.26	[-0.50; -0.03]	.03	0	3.54
	Between (fu)	2	-0.58	[-1.70; 0.53]	.30	71	3.46
	Pre-post	21	-0.26	[-0.37; -0.15]	< .001	29	28.19
	Pre-fu	9	-0.46	[-0.80; -0.11]	.01	71	28.01
Stress	Between	4	-0.55	[-0.95; -0.14]	.01	24	3.94
	Between (fu)	3	-0.78	[-1.43; -0.12]	.02	53	4.21
	Pre-post	17	-0.41	[-0.61; -0.20]	< .001	69	52.01
	Pre-fu	9	-0.56	[-1.02; -0.10]	.02	80	40.56

Reductions were **maintained over** the **follow-up** period

In a nutshell

MBIS ARE **EFFECTIVE IN REDUCING** PHYSICIAN'S **BURNOUT & STRESS**

INTERVENTION EFFECT WAS **INDEPENDENT OF** VARIOUS **MODERATORS**

REDUCTIONS WERE **MAINTAINED OVER** THE **FOLLOW-UP** PERIOD

ESTEBLISHED MBIS SHOWED **HIGHER EFFECTIVENESS** IN REDUCING STRESS

Between-group (RCT):

- Stress: (n = 4; g = **-0.55**; 95% CI [-0.95; -0.14]; p = < 0.01; I^2 = 24%)
- Burnout: (n = 5; g = **-0.26**; 95% CI [-0.50; -0.03]; p = 0.03; I^2 = 0%)

Pre-Post (all):

- Stress: (n = 17; g = **-0.41**; 95% CI [-0.61; -0.20]; p < 0.01; I^2 = 69%)
- Burnout: (n = 21; g = **-0.26**; 95% CI [-0.37; -0.15]; p < 0.01; I^2 = 29%)

Meta-regression:

- Mindfulness → Burnout reduction (pre-post): n = 17, b = -0.31, SE = 0.17, p = 0.07
- Guidance → Stress reduction (pre-post): n = 16, b = -0.03, SE = 0.01, p = 0.04
- Guidance → Mindfulness increase (pre-post): n = 16, b = 0.004, SE = 0.0001, p = < 0.01)

Strenghts & Limitations

- Methods:
  - ✓ All designs (limitation?)
  - ✓ Preregistration and publication
  - ✓ Methodological objectivity
  - ✓ Sensitive literature search
- Results:
  - ✓ Significant burnout and stress reduction
  - ✓ Significant moderators
  - ✓ Low/ moderate heterogeneity
  - ✓ Robust results (sensitivity analyses)
  - ✓ Low/ moderate signs for publication bias

- Methods:
  - – All designs (strength?)
- Results:
  - – Only six RCTs
  - – Rarely follow-up data

Related Publications

Fendel, J. C., Bürkle, J. J., & Göritz, A. S. (2021). Mindfulness-based interventions to reduce burnout and stress in physicians: a systematic review and meta-analysis. *Academic Medicine*, *96*(5), 751-764. https://doi.org/10.1097/acm.0000000000003936

Fendel, J. C., Bürkle, J. J., & Göritz, A. S. (2019). Mindfulness-based interventions to reduce burnout and stress in physicians: a study protocol for a systematic review and meta-analysis. *BMJ open*, *9*(11), e032295. http://dx.doi.org/10.1136/bmjopen-2019-032295

Thank you for your attention!

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Picture sources

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