Supplementary Online Content

Panagioti M, Panagopoulou E, Bower P, et al. Controlled interventions to reduce burnout in physicians: a systematic review and meta-analysis. *JAMA Intern Med*. Published online December 5, 2016. doi:10.1001/jamainternmed.2016.7674

This supplementary material has been provided by the authors to give readers additional information about their work.

eTable 1. Completed PRISMA checklist

Section/topic	#	Checklist item	Reported on page #
TITLE			
Title	1	Identify the report as a systematic review, meta-analysis, or both.	1
ABSTRACT			
Structured summary	2	Provide a structured summary including, as applicable: background; objectives; data sources; study eligibility criteria, participants, and interventions; study appraisal and synthesis methods; results; limitations; conclusions and implications of key findings; systematic review registration number.	3
INTRODUCTION			
Rationale	3	Describe the rationale for the review in the context of what is already known.	8
Objectives	4	Provide an explicit statement of questions being addressed with reference to participants, interventions, comparisons, outcomes, and study design (PICOS).	8
METHODS			
Protocol and registration	5	Indicate if a review protocol exists, if and where it can be accessed (e.g., Web address), and, if available, provide registration information including registration number.	8
Eligibility criteria	6	Specify study characteristics (e.g., PICOS, length of follow-up) and report characteristics (e.g., years considered, language, publication status) used as criteria for eligibility, giving rationale.	9
Information sources	7	Describe all information sources (e.g., databases with dates of coverage, contact with study authors to identify additional studies) in the search and date last searched.	10
Search	8	Present full electronic search strategy for at least one database, including any limits used, such that it could be repeated.	10, Supplement
Study selection	9	State the process for selecting studies (i.e., screening, eligibility, included in systematic review, and, if applicable, included in the	10

		meta-analysis).	
Data collection process	1 0	Describe method of data extraction from reports (e.g., piloted forms, independently, in duplicate) and any processes for obtaining and confirming data from investigators.	10
Data items	1 1	List and define all variables for which data were sought (e.g., PICOS, funding sources) and any assumptions and simplifications made.	10
Risk of bias in individual studies	1 2	Describe methods used for assessing risk of bias of individual studies (including specification of whether this was done at the study or outcome level), and how this information is to be used in any data synthesis.	11
Summary measures	1 3	State the principal summary measures (e.g., risk ratio, difference in means).	11-12
Synthesis of results	1 4	Describe the methods of handling data and combining results of studies, if done, including measures of consistency (e.g., I^2) for each meta-analysis.	11-12
Risk of bias across studies	1 5	Specify any assessment of risk of bias that may affect the cumulative evidence (e.g., publication bias, selective reporting within studies).	12
Additional analyses	1 6	Describe methods of additional analyses (e.g., sensitivity or subgroup analyses, meta-regression), if done, indicating which were pre-specified.	12
RESULTS			
Study selection	1 7	Give numbers of studies screened, assessed for eligibility, and included in the review, with reasons for exclusions at each stage, ideally with a flow diagram.	13
Study characterist ics	1 8	For each study, present characteristics for which data were extracted (e.g., study size, PICOS, follow-up period) and provide the citations.	13-14
Risk of bias within studies	1 9	Present data on risk of bias of each study and, if available, any outcome level assessment (see item 12).	14

Results of individual studies	2 0	For all outcomes considered (benefits or harms), present, for each study: (a) simple summary data for each intervention group (b) effect estimates and confidence intervals, ideally with a forest plot.	14-16, fig 2-4
Synthesis of results	2 1	Present results of each meta-analysis done, including confidence intervals and measures of consistency.	14-16, fig 2-14
Risk of bias across studies	2 2	Present results of any assessment of risk of bias across studies (see Item 15).	14
Additional analysis	2 3	Give results of additional analyses, if done (e.g., sensitivity or subgroup analyses, meta-regression [see Item 16]).	15-16
DISCUSSION			
Summary of evidence	2 4	Summarize the main findings including the strength of evidence for each main outcome; consider their relevance to key groups (e.g., healthcare providers, users, and policy makers).	16
Limitations	2 5	Discuss limitations at study and outcome level (e.g., risk of bias), and at review-level (e.g., incomplete retrieval of identified research, reporting bias).	16-17
Conclusions	2 6	Provide a general interpretation of the results in the context of other evidence, and implications for future research.	18-20
FUNDING			
Funding	2 7	Describe sources of funding for the systematic review and other support (e.g., supply of data); role of funders for the systematic review.	20

From: Moher D, Liberati A, Tetzlaff J, Altman DG, The PRISMA Group (2009). Preferred Reporting Items for Systematic Reviews and Meta-Analyses: The PRISMA Statement. PLoS Med 6(7): e1000097. doi:10.1371/journal.pmed1000097

For more information, visit: **www.prisma-statement.org**.

eMethods 1. Systematic review protocol

Healthcare interventions for burnout in physicians: A systematic review and meta-analysis.

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Background

Burnout is highly prevalent in physicians.[1] Nearly half of practicing physicians in the United States experience burnout at some point in their career [2] although there are substantial differences by specialty; physicians at the front line of care report the highest rates of burnout.[3] Burnout can be described as a three-dimensional syndrome consisting of emotional exhaustion, depersonalisation, and a diminished sense of personal accomplishment, which is primarily driven by workplace stressors.[4-6] Higher scores of burnout are also associated with increased severity of depression symptoms, anxiety and psychological distress.[7-9]

Burnout has serious negative consequences for physicians, the healthcare system and for patient outcomes and safety. Burnout in physicians has been linked with lower work satisfaction, disrupted personal relationships, substance misuse, depression, and suicide.[8,10] Within health care organisations, burnout is related to

reduced productivity, high job turnover and early retirement.[11] [12] Importantly

burnout can result in an increase in medical errors, reduced quality of patient care

and lower patient satisfaction.[13-16] It is not surprising that wellness of physicians

is increasingly proposed to be incorporated as a healthcare quality indicator. [17]

In this review, we will first assess the effectiveness of healthcare interventions in

reducing total burnout and its three components. Secondly, we will determine

what types of interventions (person-directed, organisation directed) are the most

effective. Thirdly, we will examine whether there are any differences in the

treatment effect between groups of physicians (primary care physicians,

physicians in secondary/intensive care; physicians with extensive work

experience, trainee/recently graduated physicians).

Methods

The reporting of the review will be prepared and reporting according to the Preferred

Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) statement.[18]

Eligibility criteria

- Population: Physicians of any specialty working in primary, secondary or

  intensive care setting. Studies based on a mix of physicians and other

  healthcare professionals will included in the review if the physicians

  comprised at least 70% of the sample.

- Intervention: Any type of workplace interventions designed to reduce work

  stress and performance of physicians. These interventions could be either

person-directed (such as cognitive behavioural therapies, mindfulness stress reduction techniques, educational programmes for improving communication skills) or organization directed (interventions reducing workload or improving team-work and organisation of the healthcare system).

- Comparison: Any type of control (e.g. waiting list or no intervention)

- Outcome: The outcome was overall burnout and its three core components (emotional exhaustion, depersonalisation and professional accomplishment). We will focus on burnout outcomes based on validated measures such as the Maslach Burnout Inventory (BMI)[4].

- Study design: Quantitative intervention designs described in the Cochrane handbook including RCTs, nRCTs, CBA and ITS.

- Context: Any healthcare setting including primary care and secondary care. Written in English and published in a peer-reviewed journal.

Exclusion criteria:

- Interventions focused on improving overall well-being, work satisfaction, and also general work stress without explicitly focusing on burnout.

- Non-English language papers and grey literature

Search strategy and data sources

Five electronic bibliographic databases will be searched: MEDLINE, EMBASE, CINAHL, Cochrane Register of Controlled Trials and PsycINFO. The search strategy will include combinations of three key blocks of terms (burnout; healthcare professionals;

interventions) using a combination of medical subject headings (MESH terms) and text-words. Searches will be supplemented by hand searches of the reference lists of eligible studies and systematic reviews.

Study selection

The results of the searches in each database will be exported in Endnote and duplicates will be removed. Study selection will be completed in two stages. First, the titles and abstracts of the identified studies will be screened and subsequently the full-texts of relevant studies will be accessed and further screened against the eligibility criteria. The title/abstract screening will be undertaken by the first author whereas two independent reviewers were involved in full-text screening.

Data extraction

An Excel data extraction form will be devised and piloted in five randomly selected studies. Quantitative data for meta-analysis will be extracted on a separate extraction sheet. The following descriptive information will be extracted from the eligible studies:

- Study: research design, method of recruitment and content of control
- Participants: sample size, age, gender, setting/specialty, years of work experience
- Intervention: content of the intervention, delivery format (group or individual) intensity, follow-up time points
- Outcomes: total Burnout scores or scores in burnout components including emotional exhaustion, depersonalization and professional accomplishment.

Risk of bias assessment

The critical appraisal of the studies which included a control group will be performed using the EPOC risk of bias tool.[19] EPOC will be used because it is appropriate for use across all different types of intervention designs described in the Cochrane handbook including RCTs, nRCTs, Controlled before-after studies and ITS studies. The EPOC risk of bias tool contains nine standardised criteria is scored on a 3-point scale, corresponding to: low risk, unclear risk, and high risk.

Data analysis

The results will be synthesized using meta-analysis. Meta-analysis using Cohen's d (or Hedges g if the sample sizes are small) will be used to pool the results.[20] Effect sizes and associated confidence intervals (CI) for the burnout outcomes of all the studies will be calculated in Comprehensive Meta-Analysis (CMA). [21] The pooled effect sizes and the forest plots will be constructed using the metan command in STATA 14.[22]

The main meta-analysis will examine the effectiveness of the identified interventions in improving burnout outcomes (three components of burnout).

Three pre-specified subgroup analyses [23] will be carried out:

i. *Type of interventions* – we will test the effectiveness of different types of interventions.

ii. *Professional groups of physicians* – we will test the effects of interventions separately in physicians based in primary care and physicians in secondary care

iii. *Working experience of physicians*- we will examine the differential treatment effects across studies recruited physicians with extensive working experience and studies recruited trainees or physicians with limited experience

Moreover, sensitivity analyses will be performed to examine whether the improvements sustained when only studies with low risk of bias scores were retained in the analyses.

All analyses will be conducted using a random effects model to account for heterogeneity. Heterogeneity was assessed using the I^2 statistic. Conventionally, I^2 values of 25%, 50%, and 75% indicate low, moderate, and high heterogeneity.[24] Funnel plots will be inspected to assess small sample bias (which is an indicator of publication bias) and the Egger's test of small-study effects will be performed to quantify observations in the funnel plots. [25] Funnel plots will be constructed using the metafunnel command,[26] and the Egger test will be computed using the metabias command.[27]

eMethods 2. Search strategy Medline

	#		Count	
	1	((psychological load* or strain* or burden* or stress* or distress* or depress* or anxiet*) adj1 (work* or job* or occupation*)).tw.	6436	
	2	Stress, Psychological/ or Burnout, Professional/ or Occupational Diseases/ or burnout.mp.	180173	
	3	psychological workload.tw.	32	
	4	Physicians/	76630	
	5	physician*.mp.	442641	
	6	doctor*.tw.	92615	
	7	General Practitioners/ or general practitioner*.mp.	39713	
	8	Pragmatic Clinical Trial/ or Clinical Trial/ or Randomized Controlled Trial/ or trial.mp. or Controlled Clinical Trial/	930710	
	9	intervention.tw.	367691	
	10	((evaluation or prevent*) adj1 program*).tw.	21853	

11	1 or 2 or 3	181890	
12	4 or 5 or 6 or 7	523353	
13	8 or 9 or 10	1228364	
14	11 and 12 and 13	753	

eMethods 3. List of excluded studies

Uncontrolled studies

1.   Barbosa P, Raymond G, Zlotnick C, Wilk J, Toomey R, 3rd, Mitchell J, 3rd. Mindfulness-based stress reduction training is associated with greater empathy and reduced anxiety for graduate healthcare students. *Education for Health.* 2013;26(1):9-14.
2.   Beckman HB, Wendland M, Mooney C, et al. The impact of a program in mindful communication on primary care physicians. *Academic Medicine.* 2012;87(6):815-819.
3.   Beckman TJ, Reed DA, Shanafelt TD, West CP. Impact of resident well-being and empathy on assessments of faculty physicians. *Journal of General Internal Medicine.* 2010;25(1):52-56.
4.   Dunn PM, Arnetz BB, Christensen JF, Homer L. Meeting the imperative to improve physician well-being: assessment of an innovative program. *Journal of General Internal Medicine.* 2007;22(11):1544-1552.
5.   Fortney L, Luchterhand C, Zakletskaia L, Zgierska A, Rakel D. Abbreviated mindfulness intervention for job satisfaction, quality of life, and compassion in primary care clinicians: a pilot study. *Annals of Family Medicine.* 2013;11(5):412-420.
6.   Goodman MJ, Schorling JB. A mindfulness course decreases burnout and improves well-being among healthcare providers. *International Journal of Psychiatry in Medicine.* 2012;43(2):119-128.
7.   Isaksson-Ro KE, Gude T, Tyssen R, Aasland OG. Counselling for burnout in Norwegian doctors: one year cohort study. *Bmj.* 2008;337:a2004.
8.   Krasner MS, Epstein RM, Beckman H, et al. Association of an educational program in mindful communication with burnout, empathy, and attitudes among primary care physicians. *JAMA.* 2009;302(12):1284-1293.
9.   Clayton JM, Butow PN, Waters A, et al. Evaluation of a novel individualised communication-skills training intervention to improve doctors' confidence and skills in end-of-life communication. *Palliative Medicine.* 2013;27(3):236-243.

Intervention studies with mixed samples of healthcare professionals

1.   Oman D, Hedberg J, Thoresen CE. Passage meditation reduces perceived stress in health professionals: a randomized, controlled trial. *Journal of Consulting & Clinical Psychology.* 2006;74(4):714-719.
2.   Moody K, Kramer D, Santizo RO, et al. Helping the helpers: mindfulness training for burnout in pediatric oncology--a pilot program. *Journal of Pediatric Oncology Nursing.* 2013;30(5):275-284.
3.   Rowe MM. Four-year longitudinal study of behavioral changes in coping with stress. *American Journal of Health Behavior.* 2006;30(6):602-612.
4.   Diaz-Rodriguez L, Arroyo-Morales M, Fernandez-de-las-Penas C, Garcia-Lafuente F, Garcia-Royo C, Tomas-Rojas I. Immediate effects of reiki on heart rate variability, cortisol levels, and body temperature in health care professionals with burnout. *Biological Research for Nursing.* 2011;13(4):376-382.

5. Le Blanc PM, Hox JJ, Schaufeli WB, Taris TW, Peeters MCW. Take care! The evaluation of a team-based burnout intervention program for oncology care providers. *Journal of Applied Psychology.* 2007;92(1):213-227.
6. Peterson U, Bergstrom G, Samuelsson M, Asberg M, Nygren A. Reflecting peer-support groups in the prevention of stress and burnout: randomized controlled trial. *Journal of Advanced Nursing.* 2008;63(5):506-516.
7. Sands SA, Stanley P, Charon R. Pediatric narrative oncology: interprofessional training to promote empathy, build teams, and prevent burnout. *The Journal of Supportive Oncology.* 2008;6(7):307-312.

eTable 2. Burnout measure and main findings of included studies

Study	Burnout tool	Main findings
Ali et al.[28] 2011	Burnout measure derived by the National Study of the Changing Workforce Survey[29]	Physicians assigned in the interrupted staffing schedule (rotations every 2 weeks) (mean=12.35 SD=4.54) had lower burnout scores compared to physicians assigned in the continuous staffing schedule (mean=15.40 SD=4.46; p=0.007).
Amutio et al.[30] 2015	MBI (all 3 subscales)	Physicians in the mindfulness-based stress reduction program had marginally lower levels of emotional exhaustion at post-intervention compared to controls (p=0.05) but no differences were found in the depersonalization (p=0.13) and personal accomplishment (p=0.32) domains between the intervention and the control group.
Asuero et al.[31] 2014	MBI (all 3 subscales)	Physicians in the contemplation-meditation exercises had lower levels of emotional exhaustion at post-intervention compared to controls (mean=19.5 SD=11.0 vs mean=26.7 SD13.6) but no differences were found in the depersonalization and personal accomplishment domains between the intervention and the control group.
Bragard et al.[32] 2010	MBI (all 3 subscales)	Physicians in the intervention group (communication skills training) did not differ at levels of emotion exhaustion (p=0.12) and personal accomplishment (p=0.14) but had significantly improved scores on depersonalization (p=0.04) compared to the control group.
Butow et al.[33] 2008	MBI (all 3 subscales)	Physicians in the intervention group (1.5-day intensive face to face workshop with three to six participants incorporating presentation of principles, a DVD modelling ideal behavior and role-play practice) did not differ at emotion exhaustion (p=0.61), depersonalization (p=0.30) and personal accomplishment (p=0.32) compared to control group.
Butow et al.[34] 2015	MBI (all 3 subscales)	Physicians who received the intervention (A 7-h interactive face to- face workshop training with a follow-up telephone call 1 month later) had

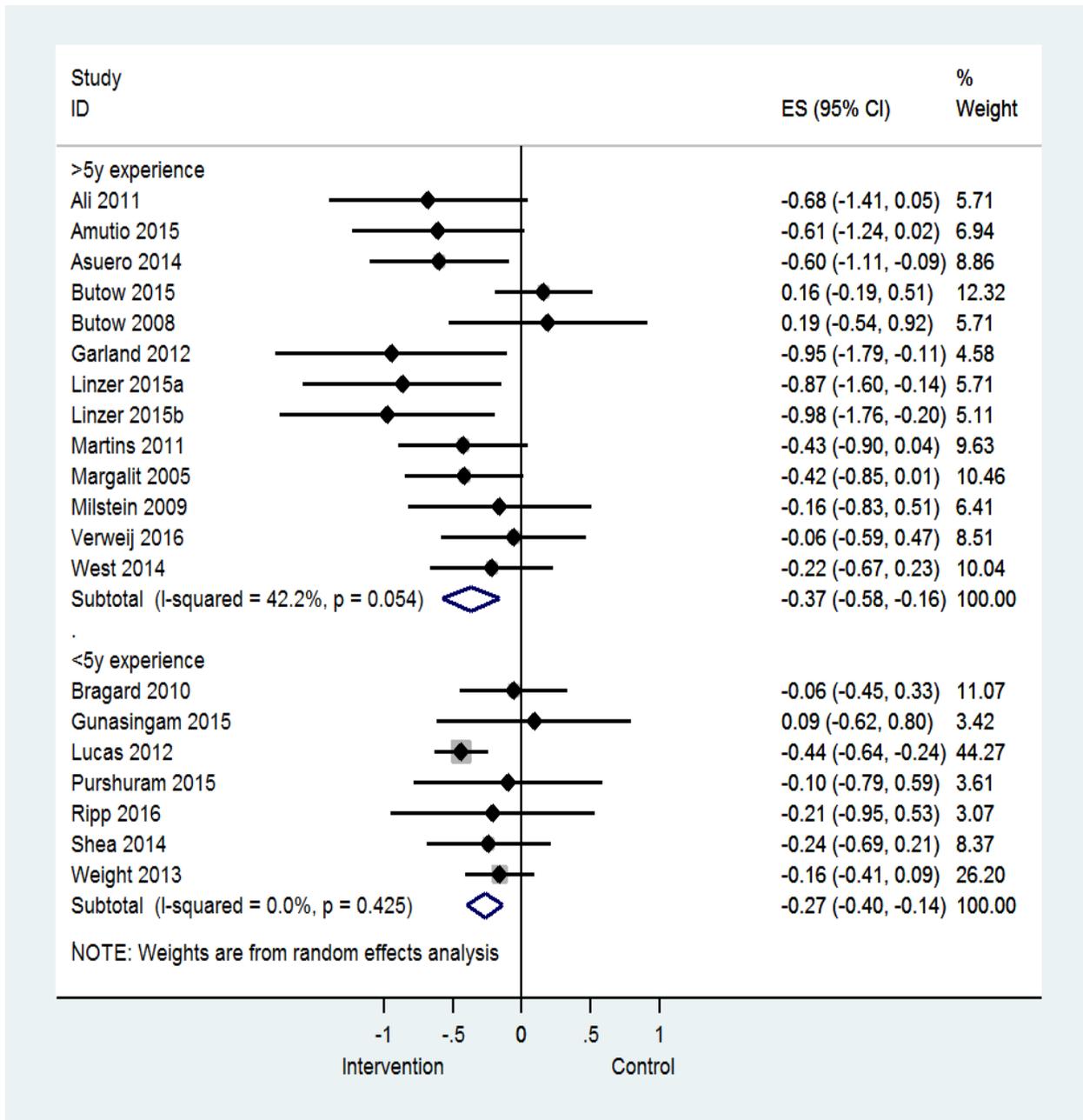|		significantly lower levels of personal accomplishment (p=0.03) but did not differ on the levels of emotion exhaustion (p=0.38) and depersonalization (p=0.68) compared to control group.
Garland et al.[35] 2012	MBI (emotional exhaustion subscale)	Intensivists in the shift work staffing group in which there was 24/7 intensivist presence had significantly lower levels of emotional exhaustion (MD=-6.9, p<0.05) compared to intensivists in standard staffing.
Gunasingam et al.[36] 2015	MBI (all 3 subscales)	Physicians in the interventions (3 1-hour debriefing sessions and a focus group) did not differ at emotion exhaustion (p=0.87), depersonalization (p=0.91) and personal accomplishment (p=0.33) compared to control group.
Linzer et al.[37] 2015	MBI (emotional exhaustion subscale)	Burnout was more likely to improve with communication and changes in workflow interventions (Odds Ratio of improvement in burnout 5.9, p=0.02), and with targeted quality improvement projects than in controls (OR 4.8, p=0.02).
Lucas et al.[38] 2012	MBI (emotional exhaustion subscale)	Physicians assigned to random sequences of 2- week shift rotations had lower emotional exhaustion scores (19% vs 37%; adjusted OR, 0.45; 95% CI, 0.31 to 0.64) compared to standard (4-week) shift.
Margalit et al.[39] 2005	MBI (emotional exhaustion subscale)	At post intervention, physicians in the Interactive teaching intervention did not differ significantly at levels of emotional exhaustion compared to physicians in the didactive teaching (p=0.43).
Martins et al.[40] 2011	MBI (all 3 subscales)	Physicians who received the brief intervention consisting of two 2.5 hours self-care workshops did not differ significantly at the levels of emotion exhaustion, depersonalization and personal accomplishment compared to physicians in the control group (p=0.22).
Milstein et al.[41] 2009	MBI (all 3 subscales)	Physicians who received the brief intervention (45-minute stress reduction intervention) did not differ significantly at the levels of emotion exhaustion, depersonalization and personal accomplishment compared to physicians in the control group.

Parshuram et al.[42] 2015	MBI (all 3 subscales)	Residents of intensive care units who were randomly assigned to in-house overnight schedules of 12 hours did not differ significantly at the levels of emotion exhaustion (p=0.9), depersonalization (p=0.7) and personal accomplishment (p=0.2) compared to physicians in the control group (24 hours schedules).
Ripp et al.[43] 2014	MBI (emotional exhaustion & depersonalization)	Physicians who participated in the intervention group (18 one-hour bimonthly practicing physician groups who met regularly with trained discussion group leader) had lower levels of depersonalization (p=0.04) but not on emotional exhaustion (p=0.73) compared to the control group at post-intervention.
Shea et al.[44] 2014	MBI (all 3 subscales)	Interns in the intervention group (a 5-hour period of protected time in which interns were expected to sleep did not differ significantly at the levels of emotion exhaustion (p=0.65), depersonalization (p=0.86) and personal accomplishment (p=0.59) compared to physicians in the control group.
Verweij et al.[45] 2016	MBI (all 3 subscales)	Physicians who received the mindfulness intervention had significantly lower levels of depersonalization (MD=-0.28, p=0.04) but did not differ significantly at the levels of emotion exhaustion (p=0.41), and personal accomplishment (p=0.11) compared to physicians in the control group.
Weight et al.[46] 2013	Two single item measures adopted by MBI (emotional exhaustion, depersonalization)	Physicians who the exercise intervention programs did not differ significantly at the levels of emotional exhaustion (p=0.21) and depersonalization (p=0.13)compared to physicians in the control group at post-intervention.
West et al.[47] 2014	MBI (all 3 subscales)	Physicians in the intervention group which involved facilitated physician discussion groups and protected time (1 hour of paid time every other week) did not differ significantly at the levels of emotion exhaustion (p=0.54), but they had significantly lower levels of depersonalization (p=0.004) personal accomplishment (p=0.04) compared to physicians in the control group.

eFigure 1. Study ratings in the critical appraisals tool
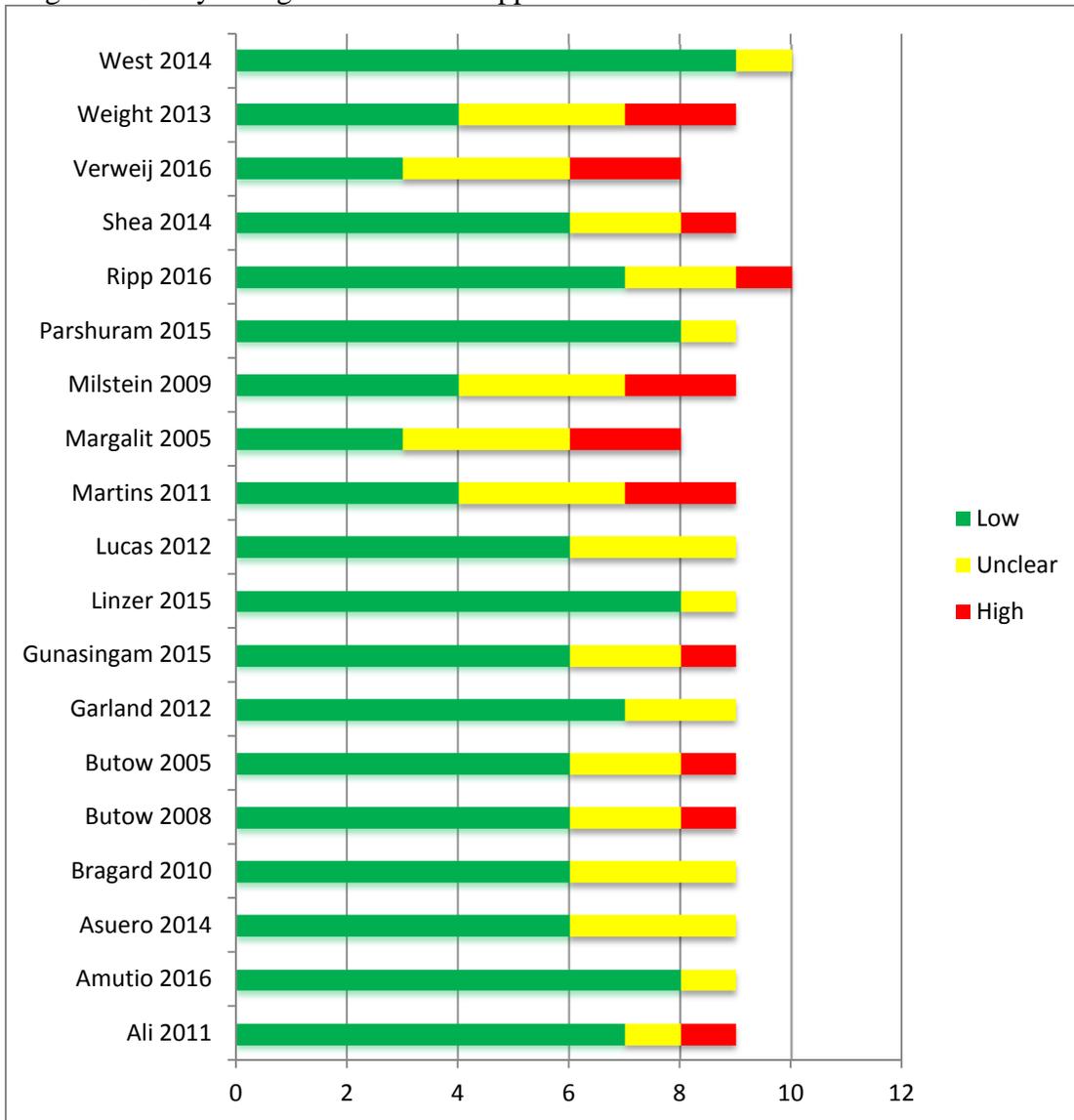
Ratings of studies included in the review in the 9 EPOC risk of bias criteria.

eFigure 2. Forest plot of the effects of interventions on burnout scores in physicians with low and extensive working experience

Study ID	ES (95% CI)	% Weight
>5y experience		
Ali 2011	-0.68 (-1.41, 0.05)	5.71
Amutio 2015	-0.61 (-1.24, 0.02)	6.94
Asuero 2014	-0.60 (-1.11, -0.09)	8.86
Butow 2015	0.16 (-0.19, 0.51)	12.32
Butow 2008	0.19 (-0.54, 0.92)	5.71
Garland 2012	-0.95 (-1.79, -0.11)	4.58
Linzer 2015a	-0.87 (-1.60, -0.14)	5.71
Linzer 2015b	-0.98 (-1.76, -0.20)	5.11
Martins 2011	-0.43 (-0.90, 0.04)	9.63
Margalit 2005	-0.42 (-0.85, 0.01)	10.46
Milstein 2009	-0.16 (-0.83, 0.51)	6.41
Verweij 2016	-0.06 (-0.59, 0.47)	8.51
West 2014	-0.22 (-0.67, 0.23)	10.04
Subtotal (I-squared = 42.2%, p = 0.054)	-0.37 (-0.58, -0.16)	100.00
.		
<5y experience		
Bragard 2010	-0.06 (-0.45, 0.33)	11.07
Gunasingam 2015	0.09 (-0.62, 0.80)	3.42
Lucas 2012	-0.44 (-0.64, -0.24)	44.27
Purshuram 2015	-0.10 (-0.79, 0.59)	3.61
Ripp 2016	-0.21 (-0.95, 0.53)	3.07
Shea 2014	-0.24 (-0.69, 0.21)	8.37
Weight 2013	-0.16 (-0.41, 0.09)	26.20
Subtotal (I-squared = 0.0%, p = 0.425)	-0.27 (-0.40, -0.14)	100.00

NOTE: Weights are from random effects analysis

Intervention   Control

Subgroup analysis of individual study and pooled effects of interventions on burnout scores in physicians with low and extensive working experience. Random effects model used. 95% CI = 95% confidence intervals; ES = Standardized mean difference (SMD).

Each line represents one study in the meta-analysis, plotted according to the SMD

(roughly the difference between the average score of participants in the intervention

group, and the average score of participants in the control group).

eFigure 3. Forest plot of the effects of interventions on burnout scores in primary care
and secondary care physicians

Study ID	ES (95% CI)	% Weight
Secondary care		
Ali 2011	-0.68 (-1.41, 0.05)	4.40
Amutio 2015	-0.61 (-1.24, 0.02)	5.54
Bragard 2010	-0.06 (-0.45, 0.33)	10.42
Butow 2015	0.16 (-0.19, 0.51)	11.68
Butow 2008	0.19 (-0.54, 0.92)	4.40
Garland 2012	-0.95 (-1.79, -0.11)	3.42
Gunasingam 2015	0.09 (-0.62, 0.80)	4.60
Lucas 2012	-0.44 (-0.64, -0.24)	18.09
Martins 2011	-0.43 (-0.90, 0.04)	8.35
Purshuram 2015	-0.10 (-0.79, 0.59)	4.81
Shea 2014	-0.24 (-0.69, 0.21)	8.82
Weight 2013	-0.16 (-0.41, 0.09)	15.47
Subtotal (I-squared = 40.5%, p = 0.071)	-0.24 (-0.41, -0.07)	100.00
.		
Primary care		
Asuero 2014	-0.60 (-1.11, -0.09)	15.20
Linzer 2015a	-0.87 (-1.60, -0.14)	7.67
Linzer 2015b	-0.98 (-1.76, -0.20)	6.59
Margalit 2005	-0.42 (-0.85, 0.01)	20.87
Milstein 2009	-0.16 (-0.83, 0.51)	9.05
Ripp 2016	-0.21 (-0.95, 0.53)	7.28
Verweij 2016	-0.06 (-0.59, 0.47)	14.14
West 2014	-0.22 (-0.67, 0.23)	19.19
Subtotal (I-squared = 3.5%, p = 0.403)	-0.39 (-0.59, -0.19)	100.00

NOTE: Weights are from random effects analysis

Intervention — Control

Subgroup analysis of individual study and pooled effects of interventions on burnout

scores in primary care and secondary care physicians. Random effects model used. 95%

CI = 95% confidence intervals; ES = Standardized mean difference (SMD). Each line

represents one study in the meta-analysis, plotted according to the SMD (roughly the

difference between the average score of participants in the intervention group, and the

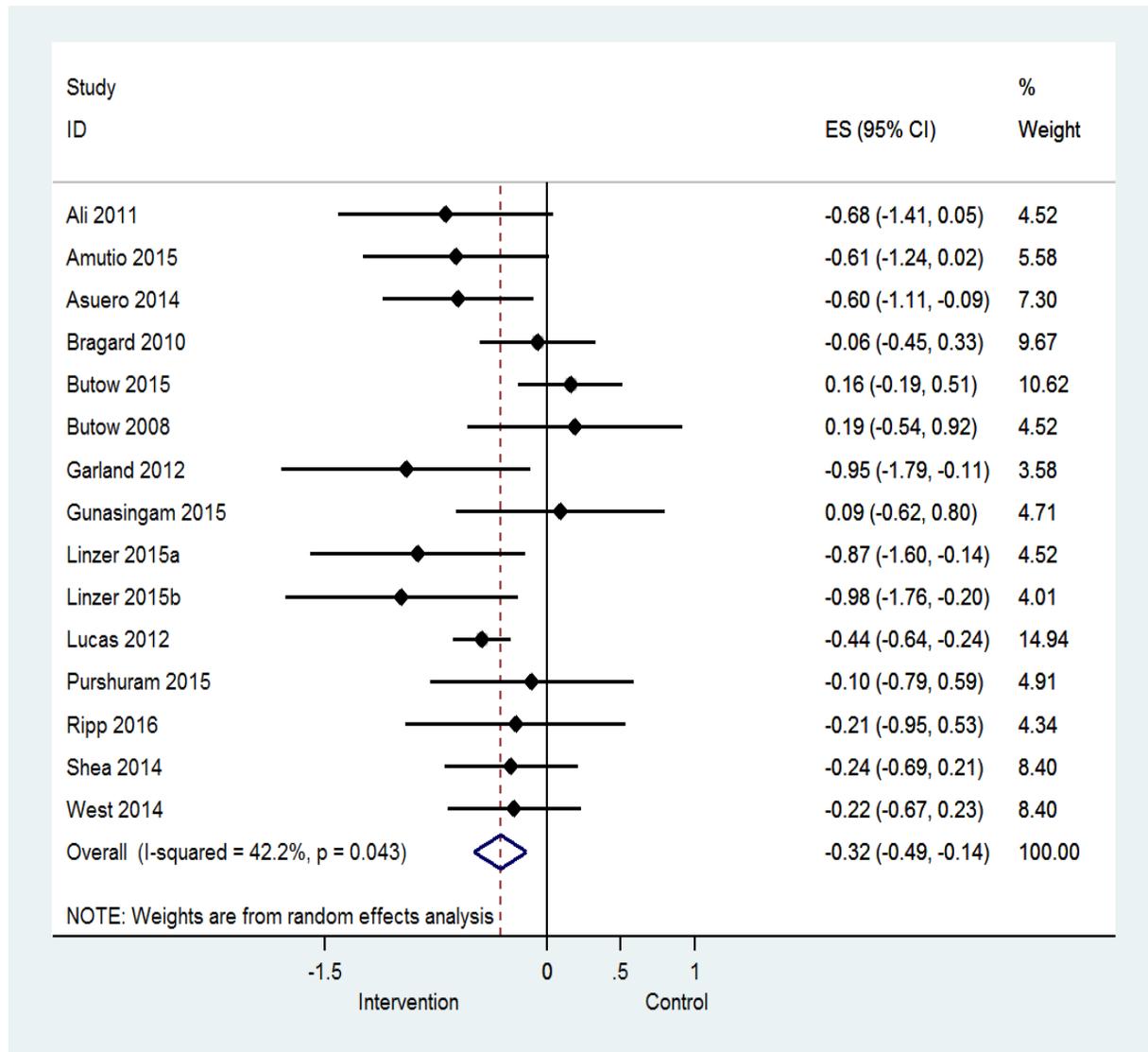*average score of participants in the control group).*

eFigure 4. Forest plot of the effects of interventions on burnout scores across studies with low risk of bias ratings

Sensitivity analysis of individual study and pooled effects of interventions on burnout scores across studies which fulfilled at least 6 of the 9 EPOC criteria. Random effects model used. 95% CI=95% confidence intervals; ES=Standardized mean difference (SMD). Each line represents one study in the meta-analysis, plott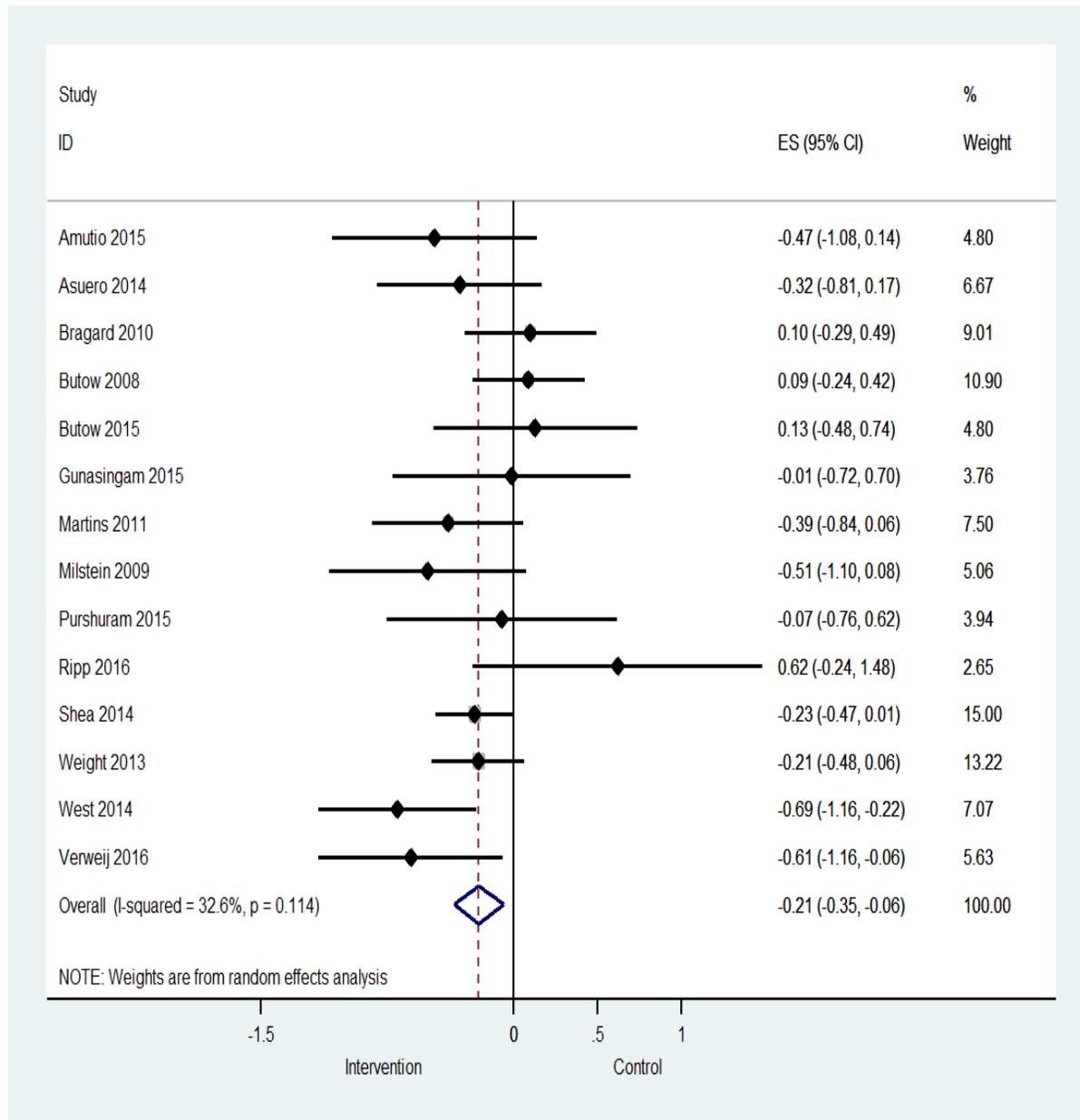ed according to the SMD (roughly the difference between the average score of participants in the intervention group, and the average score of participants in the control group).

eFigure 5. Forest plot of the effects of interventions on depersonalization domain of

Maslach Burnout Inventory

Study ID	ES (95% CI)	% Weight
Amutio 2015	-0.47 (-1.08, 0.14)	4.80
Asuero 2014	-0.32 (-0.81, 0.17)	6.67
Bragard 2010	0.10 (-0.29, 0.49)	9.01
Butow 2008	0.09 (-0.24, 0.42)	10.90
Butow 2015	0.13 (-0.48, 0.74)	4.80
Gunasingam 2015	-0.01 (-0.72, 0.70)	3.76
Martins 2011	-0.39 (-0.84, 0.06)	7.50
Milstein 2009	-0.51 (-1.10, 0.08)	5.06
Purshuram 2015	-0.07 (-0.76, 0.62)	3.94
Ripp 2016	0.62 (-0.24, 1.48)	2.65
Shea 2014	-0.23 (-0.47, 0.01)	15.00
Weight 2013	-0.21 (-0.48, 0.06)	13.22
West 2014	-0.69 (-1.16, -0.22)	7.07
Verweij 2016	-0.61 (-1.16, -0.06)	5.63
Overall (I-squared = 32.6%, p = 0.114)	-0.21 (-0.35, -0.06)	100.00

NOTE: Weights are from random effects analysis

Sensitivity analysis of individual study and pooled effects of interventions on

depersonalization scores across studies which used the MBI tool. Random effects model

used. 95% CI = 95% confidence intervals; ES = Standardized mean difference (SMD).

Each line represents one study in the meta-analysis, plotted according to the SMD

(roughly the difference between the average score of participants in the intervention

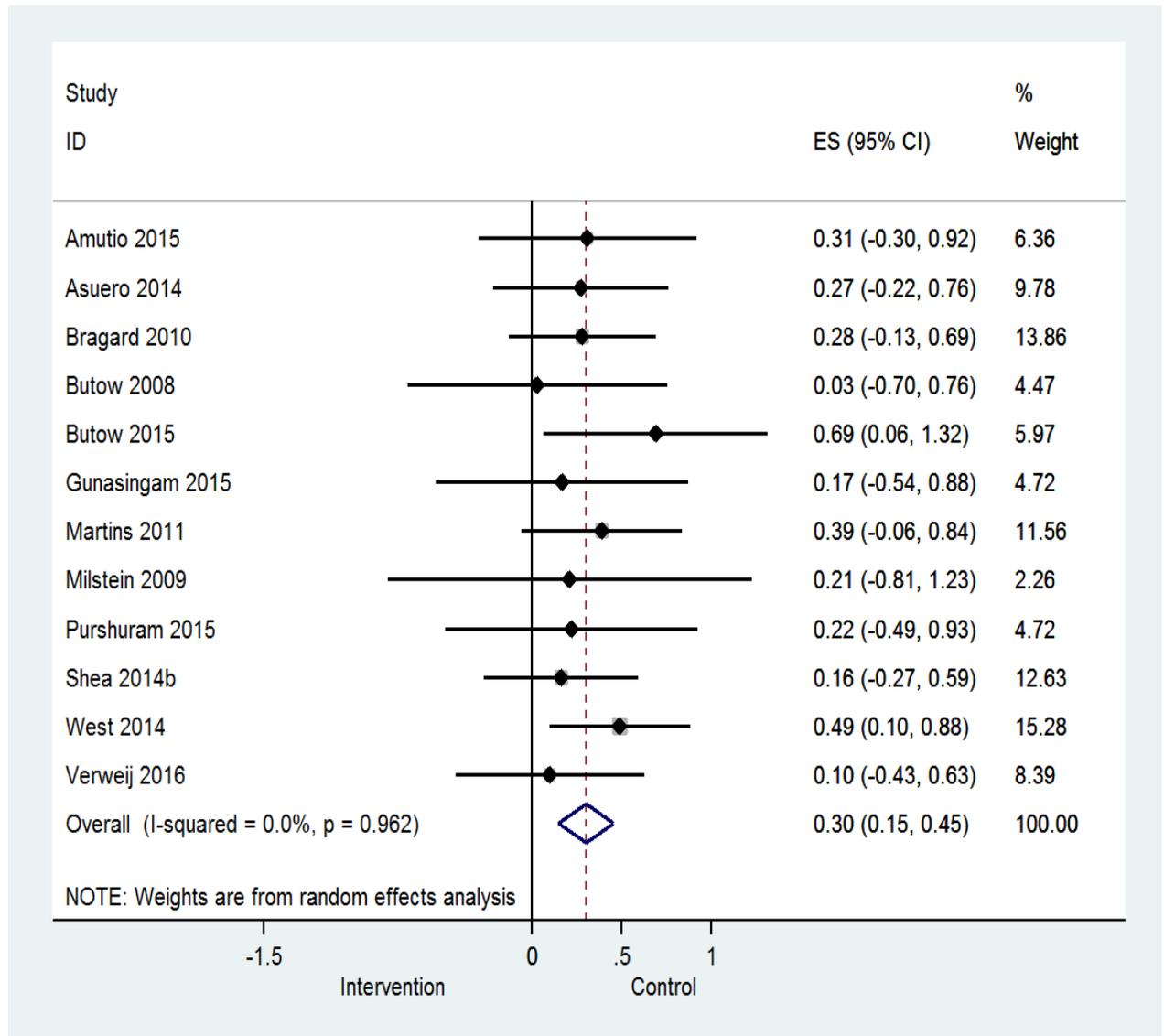*group, and the average score of participants in the control group).*

eFigure 6. Forest plot of the effects of interventions on personal accomplishment domain of Maslach Burnout Inventory

Study ID	ES (95% CI)	% Weight
Amutio 2015	0.31 (-0.30, 0.92)	6.36
Asuero 2014	0.27 (-0.22, 0.76)	9.78
Bragard 2010	0.28 (-0.13, 0.69)	13.86
Butow 2008	0.03 (-0.70, 0.76)	4.47
Butow 2015	0.69 (0.06, 1.32)	5.97
Gunasingam 2015	0.17 (-0.54, 0.88)	4.72
Martins 2011	0.39 (-0.06, 0.84)	11.56
Milstein 2009	0.21 (-0.81, 1.23)	2.26
Purshuram 2015	0.22 (-0.49, 0.93)	4.72
Shea 2014b	0.16 (-0.27, 0.59)	12.63
West 2014	0.49 (0.10, 0.88)	15.28
Verweij 2016	0.10 (-0.43, 0.63)	8.39
Overall (I-squared = 0.0%, p = 0.962)	0.30 (0.15, 0.45)	100.00

NOTE: Weights are from random effects analysis

Sensitivity analysis of individual study and pooled effects of interventions on burnout scores across studies which fulfilled at least 6 of the 9 EPOC criteria. Random effects model used. 95% CI = 95% confidence intervals; ES = Standardized mean difference (SMD). Each line represents one study in the meta-analysis, plotted according to the

SMD (roughly the difference between the average score of participants in the

intervention group, and the average score of participants in the control group).

eTable 3. Results of subgroup analyses on depersonalization and personal accomplishment domains of MBI (statistically significant effects are highlighted)

Analyses	N	Depersonalisation	Personal accomplishment
Subgroup analysis 1: Types of interventions			
Organization-directed interventions	4	SMD=**-0.34**, 95% CI=-0.66 to -0.02, I^2=41%, 95%CI =0 to 55	SMD=**0.33**, 95% CI=0.18 to 0.59, I^2=0%, 95%CI =0 to 50
Physician-directed interventions	10	SMD=-0.16, 95% CI=-0.36 to 0.01, I^2=31.1%, 95%CI =0 to 73	SMD=**0.28**, 95% CI=0.10 to 0.47, I^2=0%, 95%CI =0 to 55
Subgroup analysis 2: Levels of work experience			
Experienced physicians (>5 years at work)	8	SMD=**-0.30**, 95% CI=-0.49 to -0.11, I^2=35%, P=0.14	SMD=**0.35**, 95% CI=0.15 to 0.54, I^2=0%, 95%CI =0 to 65
Inexperienced physicians (<5 years at work)	6	SMD=-0.05, 95% CI=-0.28	SMD=0.22, 95% CI=-0.04 to 0.47, I^2=0%,

		to 0.18, I^2=19%, 95%CI =0 to 60	95%CI =0 to 70
Subgroup analysis 3: Healthcare setting			
Primary care physicians	5	SMD=**-0.40**, 95% CI=-0.74 to -0.05, I^2=47%, 95%CI =0 to 75	SMD=**0.34**, 95% CI=0.10 to 0.58, I^2=0%, 95%CI =0 to 65
Secondary care physicians	9	SMD=**-0.14**, 95% CI=-0.27 to -0.01, I^2=0%, 95%CI =0 to 60	SMD=**-0.27**, 95% CI=0.06 to 0.48, I^2=0%, 95%CI =0 to 60

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