



BMJ Open Effect of interventions for the well-being, satisfaction and flourishing of general practitioners – a systematic review

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ABSTRACT

Objectives Clinician well-being has been recognised as an important pillar of healthcare. However, research mainly addresses mitigating the negative aspects of stress or burnout, rather than enabling positive aspects. With the added strain of a pandemic, identifying how best to maintain and support the well-being, satisfaction and flourishing of general practitioners (GPs) is now more important than ever.

Design Systematic review.

Data sources We searched MEDLINE, PsycINFO, Embase, CINAHL and Scopus from 2000 to 2020.

Study selection Intervention studies with more than 50% GPs in the sample evaluating self-reported well-being, satisfaction and related positive outcomes were included. The Cochrane Risk of Bias 2 tool was applied.

Results We retrieved 14 792 records, 94 studies underwent full-text review. We included 19 studies in total. Six randomised controlled trials, three non-randomised, controlled trials, eight non-controlled studies of individual or organisational interventions with a total of 1141 participants. There were two quasi-experimental articles evaluating health system policy change. Quantitative and qualitative positive outcomes were extracted and analysed. Individual mindfulness interventions were the most common (k=9) with medium to large within-group (0.37–1.05) and between-group (0.5–1.5) effect sizes for mindfulness outcomes, and small-to-medium effect sizes for other positive outcomes including resilience, compassion and empathy. Studies assessing other intervention foci or other positive outcomes (including well-being, satisfaction) were of limited size and quality. **Conclusions** There is remarkably little evidence on how to improve GPs well-being beyond using mindfulness interventions, particularly for interventions addressing organisational or system factors. This was further undermined by inconsistent reporting, and overall high risk of bias. We need to conduct research in this space with the same rigour with which we approach clinical intervention studies in patients.

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INTRODUCTION

Mental ill-health, burnout and stress among healthcare practitioners are a huge concern

Strengths and limitations of this study

- While burnout has been a general focus of research, interventions to improve the well-being of general practitioners (primary care physicians) appear sparse.
- The strength of this study is the extensive and systematic approach taken to evaluate interventions aimed at improving well-being, satisfaction, flourishing and other positive outcomes in general practitioners.
- The systematic review was registered on PROSPERO a priori before commencing the data selection and extraction process.
- English only articles were included.
- The limitation of this systematic review is the dependency on the number of retrieved and included publications, and their quality of methodology and reporting.

internationally with impacts on individual doctors and their families, patient care and the sustainability of the healthcare system.¹ The well-being of clinicians has been recognised as crucial, and has been added to the more commonly shared health system goals of: improved care for individuals, better population health and reduced healthcare costs.^{2–5} Despite this stated aim, few studies have evaluated interventions to improve well-being, satisfaction and flourishing in general practitioners (GPs),^{6–12} typically taking a more traditional, problem-focussed approach, such as investigating causes and reduction of burnout and stress.

Medical doctors who provide primary care to patients are the backbone of healthcare provision. In Australia, the UK and Europe, typically the term ‘general practitioner’ (GP) is used, whereas North American articles generally refer to ‘primary care physicians’ or ‘family doctors’. Terms are used interchangeably.

Satisfaction and well-being in GPs are known to be associated with several factors.

In the USA, primary care physicians are less satisfied with their job than specialists.^{13 14} A 10-year decline in job satisfaction for British GPs has been reported,¹⁵ and a Norwegian longitudinal study reported dwindling GP satisfaction over 7 years.¹⁶ In primary care, job satisfaction correlates with practice resources, an ordered atmosphere, a practice culture that enables communication and ease of providing quality care,^{13 17 18} and is inversely related to isolation and low sense of community.^{19 20}

For well-being, Murray *et al*²¹ conducted a cross-sectional study exclusively exploring positive mental health and psychological resources (well-being, resilience, self-efficacy and hope) of GPs. GPs positive mental health was comparable to the general population and older and female GPs fared best, suggesting interventions for younger and male GPs may be most useful.

Systematic reviews and interventions aimed at improving satisfaction and well-being in GPs appear sparse. A European collaboration conducted a systematic review and qualitative study looking at positive determinants of satisfaction in GPs. They identified general work-related factors (ie, workload, responsibility, recognition and income) and GP specific factors (ie, competence, intellectual stimulus and work-life balance).^{22 23} However, there does not appear to be a systematic review looking at interventions to improve satisfaction exclusively in GPs.

A systematic review of interventions to improve the psychological well-being of GPs identified only four articles; two cognitive-behavioural, one mindfulness-based intervention and one self-help information approach.²⁴ They applied a dual model of languishing/flourishing and the presence of mental illness/absence of mental illness matrix.^{25–28}

Overall, little seems known about which interventions are efficacious in promoting GPs well-being and satisfaction. In contrast to more extensive research on burnout, distress and mental ill-health with a view to treat, avoid or mitigate negative outcomes, we explicitly aimed to apply a positive lens and focus on interventions that enhance GPs' satisfaction and well-being, or promote environments and individual behaviours that may better enable well-being. We purposely included interventions on any level; directed at the individual (ie, training, workshops), the organisation (ie, work-flow improvements in the practice) and on a systemic level (ie, policy change). It is useful to bear in mind that GPs are typically high functioning individuals and are not a priori a clinical population, which is why we believe a positive framework is most preproperate.

Currently, reports indicate that COVID-19 places enormous additional strain on health professionals which impacts their physical, mental and social well-being.^{29 30} GPs as the first port of call may be particularly affected, while playing a crucial role in supporting population health.^{31–33} Efforts must be made to understand how GPs remain well, and if necessary, put measures in place to assist this.

Objectives

We systematically reviewed studies exploring the effect of any type of intervention on the well-being, satisfaction and well-being of GPs. We broaden and expand on the existing literature, deliberately including any type of intervention, and a range of positive outcomes, and explore if there have been more recent intervention studies conducted in this field.

METHODS

Data sources and search strategy

We followed Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines,³⁴ and consulted a specialist librarian (JKH). MEDLINE, PsycINFO, Embase, CINAHL and Scopus were searched on 13 January 2020.

PICO (Population, Intervention, Comparison, Outcome) search terms included GPs and synonyms; interventions and implementations directed at the individual, the level of the organisation or practice and the healthcare system; outcomes included well-being, satisfaction, flourishing, synonyms and antonyms (*search strategy, online supplemental file 1*). Titles, abstracts, text, key terms and subject headings were searched for English publications. Eligible articles and related systematic reviews were hand-searched for further relevant references, and authors were asked to supply full-text articles where relevant conference abstracts only were available.

Study selection and data extraction

Due to the large number of records, sample screening of 1% of titles (n=107) was performed and discussed by two reviewers (DN and AS) together, and excellent agreement was reached. DN screened all titles. DN and AS independently and separately examined all abstracts and full-text records for inclusion using Covidence.³⁵ Initial inter-rater reliability showed a proportionate agreement of 0.94 with Cohen's Kappa of 0.68 for abstracts. For full-text screening, there was a proportionate agreement of 0.84 with Cohen's Kappa 0.56, whereby both reviewers agreed to include 15/94 full-text articles and exclude 64/94 articles. Initial disagreements on 15 articles were resolved through joint discussion, or third reviewer adjudication (NG).

Studies with more than 50% GPs (family doctors, primary care physicians) working in a practice setting or medical centre, reporting on well-being, satisfaction, flourishing, mindfulness, resilience, empathy, engagement, balance, empowerment, compassion, work-related morale and control measures were included. We excluded studies exclusively reporting on burnout, distress, or mental ill-health.

Data including author, year, type of study, participants, intervention, preoutcome and postoutcome measures, and quantitative and qualitative results were extracted (*table 1*).

Table 1 Evidence table						
Author, date, study design	Participants (n, mean age, % male)	Intervention (n, mean age)	Control (n, mean age)	Positive outcome measure	Other outcome measure	Baseline scores
Allen <i>et al</i> ⁴¹ Panel survey linked with Quality and Outcomes Framework (QOF) data 2004/2005 (first year) and 2007/2008 (fourth year)	GPs in the UK 2004: n=1950, 47.0years, 66.2% male. 2005: n=2000, 47.9years, 63.6% male. 2008: n=1986, 48.7years, 63.3% male	Pay for performance (P4P) scheme; QOF introduced in NHS in 2004	NA	Job satisfaction (JSS WCW). Life satisfaction	P4P exposure	Mean. 2004: Life satisfaction (4.649), Overall JS (4.567), physical working conditions (4.862), choose method of working (4.636), colleagues (5.515), recognition for good work (4.224), responsibility (4.976), remuneration (4.376), opportunity to use abilities (4.787), hours of work (3.914), variety in job (5.011).
Amutio <i>et al</i> ⁴² RCT	Physicians (approx. 70% primary care) in public or private practice in Spain (n=42, 47.3years, 42.9%)	8-week MBSR programme (group course 8x2.5hours/ week, 1x8 hour retreat plus homework), 10-month maintenance period (group course 10x2.5hours/ month plus homework) (n=21)	WLC (n=21)	Mindfulness (FFMQ), relaxation (SRSI-3)	Heart rate	Mean and SD INTERVENTION (n=21) FFMQ total (3.34, 0.44), FFMQ observing (3.33, 0.60), FFMQ describing (3.58, 0.72), FFMQ act with awareness (3.16, 0.87), FFMQ non-judging (3.42, 0.64), FFMQ non-reactivity (3.17, 0.51), SRSI relaxation (2.54, 0.53), SRSI positive energy (3.09, 0.64), SRSI mindfulness (3.74, 0.89), SRSI transcendence (2.67, 0.82), CONTROL (n=21) FFMQ total (3.51, 0.25), FFMQ observing (3.02, 0.88), FFMQ describing (3.88, 0.53), FFMQ act with awareness (3.93, 0.70), FFMQ non-judging (4.19, 0.52), FFMQ non-reactivity (3.23, 0.57), SRSI relaxation (2.52, 0.5), SRSI positive energy (3.01, 0.62), SRSI mindfulness (4.29, 0.92), SRSI transcendence (2.64, 0.93).
				Time at 12 months. Mean. 2005: Life satisfaction (5.095), Overall JS (5.201), physical working conditions (5.044), choose method of working (4.892), colleagues (5.599), recognition for good work (4.726), responsibility (5.406), remuneration (5.387), opportunity to use abilities (5.147), hours of work (4.802), variety in job (5.269).		Time at 12 months. Mean. 2004: Life satisfaction (5.008), Overall JS (4.728), physical working conditions (5.129), choose method of working (4.640), colleagues (5.602), recognition for good work (4.495), responsibility (5.276), remuneration (4.849), opportunity to use abilities (5.074), hours of work (4.205), variety in job (5.276).
				Time at 8 weeks. Mean and SD INTERVENTION (n=21) FFMQ total (3.71, 0.51), FFMQ observing (3.98, 0.64), FFMQ describing (3.83, 0.62), FFMQ act with awareness (3.48, 0.65), FFMQ non-judging (3.78, 0.66), FFMQ non-reactivity (3.46, 0.63), SRSI relaxation (3.08, 0.61), SRSI positive energy (3.80, 0.82), SRSI mindfulness (4.45, 0.71), SRSI transcendence (3.27, 1.02), CONTROL (n=21) FFMQ total (3.34, 0.33), FFMQ observing (2.83, 0.98), FFMQ act with awareness (3.91, 0.61), FFMQ non-judging (4.16, 0.52), FFMQ non-reactivity (3.26, 0.67), SRSI relaxation (2.60, 0.51), SRSI positive energy (3.01, 0.6), SRSI mindfulness (4.24, 0.95), SRSI transcendence (2.40, 0.92).		Time at 12 months. Mean and SD INTERVENTION FFMQ total (3.85, 0.49), FFMQ observing (4.09, 0.62), FFMQ describing (4.01, 0.58), FFMQ act with awareness (3.55, 0.69), FFMQ non-judging (3.96, 0.66), FFMQ non-reactivity (3.58, 0.55), SRSI relaxation (3.16, 0.78), SRSI positive energy (3.99, 0.81), SRSI mindfulness (4.60, 1.01), SRSI transcendence (3.65, 1.36).
				Between 2004 and 2005 overall job satisfaction increased (also see ref. ⁵⁶), then fell from 2005 to 2008. There is a positive effect (though not statistically significant) between QOF/P4P income exposure and job satisfaction in 2005 (t-ratio 1.74), though not so in 2008 (t-ratio 0.14). The P4P exposure shows now significant effect on GPs job satisfaction. The MBSR programme (statistically) significantly improves mindfulness and relaxation measures (particularly positive energy and transcendence) at 8weeks after baseline. Sustained and even improved long-term effects at 12 months follow-up are shown.		

Continued

Table 1 Continued

Author, date, study design	Participants (n, mean age, % male)	Intervention (n, mean age)	Control (n, mean age)	Positive outcome measure	Other outcome measure	Baseline scores	Postintervention score	Follow-up score (mean, SD, n)	Results—summary
Asuero et al ¹³ RCT (2010–2012)	Primary healthcare professionals (41 physicians) in Spain, public system (n=68 total, 47 years, 8% male)	8-week MB psychoeducational programme: didactic material, mindful-ness meditation, narrative/appreciative enquiry, discussion. Group course 8x2.5 hours/week, 1x8 hour retreat plus homework (n=43 total, 23 physicians, 48.8 years)	WLC (n=25 total, 18 physicians, 46.9 years)	Mindfulness (FFMQ), empathy (JSPE), also self-report on energy, well-being and activity	Burnout (MBI), mood disturbance (POMS), intervention evaluation	Mean and SD INTERVENTION (n=43) FFMQ (129.6, 22.2), FFMQ observing (26.1, 8.6), FFMQ describing (28.2, 5.7), FFMQ act with awareness (25.3, 5.9), FFMQ non-judging (27.1, 8.0), FFMQ non-reactivity (21.9, 4.3), JSPE total (119.5, 13.1), JSPE perspective taking (54.8, 6.5), JSPE compassionate care (47.2, 5.1), JSPE standing in pts shoes (13.1, 1.8), CONTROL (n=25) FFMQ total (120.5, 14.4), FFMQ observing (24.5, 4.3), FFMQ describing (26.4, 5.2), FFMQ act with awareness (23.6, 6.8), FFMQ non-judging (26.3, 6.5), FFMQ non-reactivity (19.8, 2.9), JSPE total (120.8, 10.1), JSPE perspective taking (59.8, 7.0), JSPE compassionate care (47.4, 4.9), JSPE standing in pts shoes (13.6, 0.9)	Time at 8 weeks. Mean and SD INTERVENTION (n=43) FFMQ total (141.6, 16.5), FFMQ observing (30.4, 5.1), FFMQ describing (28.9, 5.3), FFMQ act with awareness (27.4, 4.7), FFMQ non-judging (30.6, 6.2), FFMQ non-reactivity (24.1, 3.0), JSPE total (123.0, 9.2), JSPE perspective taking (56.1, 5.3), JSPE compassionate care (49.0, 3.9), JSPE standing in pts shoes (13.5, 1.1), CONTROL (n=25) FFMQ total (121.5, 16.0), FFMQ observing (24.1, 4.5), FFMQ describing (26.5, 5.5), FFMQ act with awareness (23.0, 5.9), FFMQ non-judging (27.4, 6.8), FFMQ non-reactivity (20.2, 3.5), JSPE total (119.0, 10.7), JSPE perspective taking (59.6, 6.3), JSPE compassionate care (46.9, 4.6), JSPE standing in pts shoes (12.5, 3.0)	For mindfulness total, there is significant improvement for the intervention (moderate change). For empathy total, there is a non-significant increase from pre to post measure in the intervention group, only an increase in compassionate care was statistically significant. Overall mindfulness and empathy (compassionate care) were improved by the programme.	
Baroons et al ¹² CBA, mixed methods, 2016–2017	Primary healthcare professionals in Spain, public system (n=38)	MTP and IBST group programme plus routine programme. 9x1 hours per week (6 hours training on psychology, 3 hours on psychiatry and 1 hour social work) (n=20)	Routine mental-health support programme for primary care (n=18)	Job satisfaction (FR-JS)	Burnout (MBI), Brief Psychiatric Rating Scale (BPRS), psychopharmacology use, opinions about mental illness, administrative and healthcare indicators	Median and IQR. INTERVENTION (n=20) FR satisfaction at work (15, 13, 16.25), FR work tension (12, 11, 14), FR professional competence (5, 4, 6), FR work pressure (12, 10, 12.25), FR professional promotion (12, 9, 13), FR relationship superiors (4, 4, 6.5), FR relationship peers (6, 5.75, 7), FR extrinsic status (5.5, 4, 6), FR monotony (4.5, 4, 6), FR total (75, 72, 77.5), BPRS total (23.50, 22, 24.25), CONTROL (n=18), FR satisfaction at work (14, 10.5, 16), FR work tension (13.5, 12.25, 16.75), FR professional competence (4.5, 3, 6), FR work pressure (12, 12, 13), FR professional promotion (11, 10, 13.75), FR relationship superiors (6, 4, 6.75), FR relationship peers (5, 5, 6), FR extrinsic status (5, 5, 6), FR total (76, 73, 80.5)	Time at 10 months. Median and NA IQR. INTERVENTION (n=20) FR satisfaction at work (16, 15, 17), FR work tension (13, 11, 16), FR professional competence (5, 4.5, 6), FR work pressure (12, 10, 12.50), FR professional promotion (12, 10, 13), FR relationship superiors (4, 4, 6.5), FR relationship peers (5, 5, 6.5), FR extrinsic status (5, 5, 6.5), FR monotony (5, 4, 5), FR total (76, 73, 83), BPRS total (20.50, 19, 22), CONTROL (n=18), FR satisfaction at work (12, 9, 16), FR work tension (15, 1, 16), FR professional competence (5, 4, 6), FR work pressure (11, 11, 12), FR professional promotion (12, 11, 15), FR relationship superiors (4, 6, 8), FR relationship peers (6, 5, 7), FR extrinsic status (6, 4, 6), FR monotony (4, 3, 5), FR total (77, 75, 78)	No statistically significant changes in job satisfaction (FR). For well-being, a statistically significant decrease was seen from pre to post measure in the intervention group, as the BPRS measures negative constructs, this is interpreted as an improvement of well-being.	

Continued

Table 1 Continued

Author, date, study design	Participants (n, mean age, % male)	Intervention (n, mean age)	Control (n, mean age)	Positive outcome measure	Other outcome measure	Baseline scores	Postintervention score	Follow-up score (mean, SD, n)	Results—summary
Contratto <i>et al</i> ⁴⁵ NCBA, mixed methods	General medicine physicians in the USA, working part-time (n=7)	1 clerical staff was hired in a GP practice to enter orders (n=7)	NA	Personal-professional balance, physician satisfaction defined as QoL	Burnout (MBI), physician productivity, EMR documentation, Quality interviews	QoL: 14% bad, 14% neutral, 71% good, Balance: 14% dissatisfied, 43% neutral, 43% good.	Time at 4 months: QoL: 0% bad, 0% neutral, 100% good, Balance: 0% dissatisfied, 29% neutral, 71% good.		QoL, personal balance, burnout improved. Productivity increased (work relative value unit) per session increased. Reports of feeling more supported, focussed on pt care, less stress, less fatigue.
Dunn <i>et al</i> ² NCBA, 2000–2005	Primary care in urban USA (n=32, 25 internists, 6 family medicine) NP	Organisational intervention programme to improve physician well-being (quality improvement project, participant data-guided intervention) (n=22–32 range over the intervention period)	NA	Physician satisfaction (ACP/ASIM)	Burnout (MBI), Quality Work Competence (QWC)	2001: 55% of physicians were somewhat or very satisfied with their practice.	Time at 24 months, 2003: 84% were somewhat or very satisfied with their practice.	Time at 24 months, 2005: 74% were somewhat or very satisfied with their practice.	Intervention ongoing from 2000 onward. Emotional and work-related exhaustion decreased significantly over the study period. QWC measures of organisational health significantly improved initially and remained acceptable and stable during the rest of the study. Satisfaction fluctuated throughout.
Dyrbye <i>et al</i> ⁴⁶ RCT, 2017–2018	Physicians in USA (67 generalists, 21 subspecialists) (n=88, 45.5% male)	6 coaching sessions (3.5 hours) facilitated by a professional coach over 5 months (n=44)	WLC (n=44)	Resilience (CD-RISC), Global Job Satisfaction-12 (subscales of PJSS), work engagement (UWES), empowerment at work scale	Burnout (MBI)	Means and SD INTERVENTION (n=44), resilience (31.0, 6.3), job satisfaction (43.4, 10.7), UWES vigour (3.9, 1.0), UWES dedication (4.5, 1.1), UWES absorption (4.2, 1.0), empowerment at work (58.2, 55.5, 11.9). CONTROL (n=44), resilience (30.6, 5.7), job satisfaction (42.8, 10.6), UWES vigour (4.0, 1.2), UWES dedication (4.6, 1.0), UWES absorption (4.1, 1.1), empowerment at work (57.3, 14.0).	Time at 5 months. Means. INTERVENTION (n=44), resilience (32.3), job satisfaction (44.4), UWES vigour (4.1), UWES dedication (4.6), UWES absorption (4.1), empowerment at work (58.2), CONTROL (n=44), resilience (31.2), job satisfaction (43.2), UWES vigour (4.2), UWES dedication (4.7), UWES absorption (4.2), empowerment at work (60.3).		Statistically significant improvement for resilience from pre to post intervention, no change in job satisfaction. Burnout, emotional exhaustion decreased. QoL improved. No statistically significant differences in depersonalisation, engagement or meaning in work.
Fortney <i>et al</i> ⁴⁹ NCBA	Family medicine practitioners in the USA (n=30, 87% family medicine physicians)	Shortened MBSR course, 18 hours total, 14 hours weekend, 2x2 hour plus homework (n=30)	NA	Compassion (SCBC), resilience (RS-14)	Burnout (MBI), Depression and Anxiety (DASS), Perceived Stress scale (PSS)	Mean score and CI: n=30. Resilience RS-14 (79.9, CI: 75.2 to 84.6), compassion SCBC (27.6, CI: 25.9 to 29.3).	Time at 4 weeks. Mean score and CI: n=28. Resilience RS-14 (82, CI: 77.1 to 86.8), Compassion SCBC (27.4, CI: 25.6 to 29.1).	Time at 9 months. Mean score and CI at 9 months, n=23. Resilience RS-14 (81.4, CI: 76.2 to 86.6), compassion SCBC (28.3, CI: 26.5 to 30.1).	No significant improvement in compassion and resilience over time. Participants had improvements compared with baseline at all follow-up time points for burnout, depression, anxiety and perceived stress.

Continued

Table 1 Continued

Author, date, study design	Participants (n, mean age, % male)	Intervention (n, mean age)	Control (n, mean age)	Positive outcome measure	Other outcome measure	Baseline scores	Postintervention score	Follow-up score (mean, SD, n)	Results—summary
Gardiner <i>et al</i> ⁴⁷ CBA	GPs in metropolitan Australia (n=110)	Cognitive behavioural stress management course, 1×3 hours, 15 hours over 5 weeks (n=85)	Control group had other developmental courses (n=25)	Work-related morale measure (WRM-7), quality of work life (QoWL-6)	Work-related distress measure (WRD-7), general psychological distress (GHQ-12), coping styles.	Means and SD total measure without submeasures given. INTERVENTION (n=86), work-related morale total 31.83 (6.75), QoWL total 25.32 (6.64), CONTROL (n=24), Work-related morale total 31.42 (6.19), QoWL total 23.16 (5.86), (6.36).	Time at 4 weeks. Means and SD INTERVENTION (n=77), Work-related morale total 34.62 (6.11), QoWL total 28.24 (6.35), CONTROL (n=19), Work-related morale total 32.21 (6.73), QoWL total 24.32 (6.36).	Time at 12 weeks. Means and SD INTERVENTION (n=62), work-related morale total 35.70 (6.01).	Overall, the intervention group showed higher scores postintervention than the control group (positive trend). However, no statistically significant change seen for work-related morale or QoWL for the intervention group. Only physiological distress significantly lower for intervention group. When looking at those GPs that scored low for morale, there was a 56% reduction preintervention to postintervention, compared with a 29% reduction in the control group.
Krasner <i>et al</i> ⁴⁸ NCBA	Primary care physicians in the USA (n=70, 54% male)	CME programme: didactic material, mindfulness meditation, narrative/appreciative enquiry, discussion, 28 hours total. 1×7 hours per week, 10-month maintenance phase (2.5 hours/month) (n=70)	NA	Mindfulness (BAER), empathy (JSPE)	Burnout (MBI), mood (POMS), Big 5 personality factors, physician belief (PBS)	Mean and CI. BAER mindfulness total (45.2, 95% CI: 43.3 to 47.1, n=60), BAER mindfulness observe (25.6, 95% CI: 24.4 to 26.8, n=60), BAER mindfulness non-react (19.7, CI: 95% 18.7 to 20.7, n=60), JSPE total (116.2, 95% CI: 114.2 to 118.9, n=60), JSPE compassionate care (48.6, 95% CI: 47.5 to 49.7, n=60), JSPE perspective taking (57.1, 95% CI: 55.6 to 58.6, n=60), JSPE standing in pts shoes (10.8, 95% CI: 10.4 to 11.5, n=60).	Time at 8 weeks. Mean and CI. BAER mindfulness total (52.9, 95% CI: 51 to 54.8, n=59), BAER mindfulness observe (30.6, 95% CI: 29.4 to 31.8, n=59), BAER mindfulness non-react (22.9, 95% CI: 21.8 to 23.9, n=59), JSPE total (120.6, 95% CI: 118.2 to 123.0, n=59), JSPE compassionate care (49.8, 95% CI: 48.7 to 50.9, n=59), JSPE perspective taking (59.1, 95% CI: 57.6 to 60.6, n=59), JSPE standing in pts shoes (11.7, 95% CI: 11.1 to 12.2, n=59).	Time at 12 months. Mean and CI. BAER mindfulness total (55, 95% CI: 53.0 to 56.9, n=56), BAER mindfulness observe (31.1, 95% CI: 29.8 to 32.3, n=56), BAER mindfulness non-react (23.9, 95% CI: 22.9 to 24.9, n=56), JSPE total (121.4, 95% CI: 119.0 to 123.8, n=56), JSPE compassionate care (50.4, 95% CI: 49.3 to 51.5, n=56), JSPE perspective taking (59.7, 95% CI: 58.2 to 61.2, n=56), JSPE standing in pts shoes (11.4, 95% CI: 10.9 to 11.9, n=56).	Baseline scores and follow-up scores at 15 months are not reported for the purpose of this SR. Over time, all measures for mindfulness, burnout, physician belief, mood and personality improved, the largest effect size was observed for mindfulness at 15 months.
Linzer <i>et al</i> ⁴⁹ RCT	Primary care clinicians in the USA (n=166, >80% physicians, 47.3 years, 48% male)	Interventions to improve communication; workflow, quality improvement (QI) n=83	WLC n=83	Work Control, Satisfaction (survey tools adapted from the Physician Work Life study (PWS) and the MEMO study	Stress, burnout, chaos, intent to leave, varia	Number given in %. INTERVENTION (n=83) high work control (score >2) 96%, high satisfaction (>3) 38.5%. CONTROL (n=83) high work control 13.2%, high satisfaction (>3) 51.8%.	Time at 12–18 months. Number given in %. INTERVENTION (n=67) high work control (score >2) 4.6%, high satisfaction (>3) 40.0%. CONTROL (n=72) high work control 11.4%, high satisfaction (>3) 45.7%.	Satisfaction improved with workflow interventions, targeted QI projects, communication.	
Margalit <i>et al</i> ⁵⁰ RCT	GPs in Israel (n=44)	CPD teaching programmes (n=22 for interactive programme)	CPD teaching programme (n=22 didactic method)	Attitude to patient care, self-esteem	Knowledge, intention, attitude, burnout	Mean, SD self-esteem (72.1, 14.5), attitude to patient care (34.5, 12.2) (n=44)	Time at 6 months. Mean, SD self-esteem (76.5, 12.9), attitude to patient care (36.5, 19.9) (n=44)	NA	Significant improvement on self-esteem postintervention. The interactive teaching approach improved self-esteem more than the didactic teaching did. No improvement on attitude to patient care.

Continued

Table 1 Continued

Author, date, study design	Participants (n, mean age, % male)	Intervention (n, mean age)	Control (n, mean age)	Positive outcome measure	Other outcome measure	Baseline scores	Postintervention score	Follow-up score (mean, SD, n)	Results—summary
Montero-Marín <i>et al</i> ⁵¹ NCBA	GPs in Spain (n=290, 49 years, 22.5% males)	Brief blended web-based mindfulness intervention, 1 x 4 hour face to face, 8 online sessions (2 weekly sessions over 4 weeks) (n=58)	NA	Positive affect (PANAS), awareness (MAAS), resilience (CD-RISC)	Negative affect (PANAS), burnout subtypes (BCSQ)	Mean, SD 1 session/week (n=28): PANAS-pos (32.19, 6.72), MAAS (64, 12.07), CD-RISC (68.96, 8.96), 2 sessions/week (n=30): PANAS-pos (32.03, 6.38), MAAS (61.77, 13.41), CD-RISC (38.80, 8.58).	Time at 4 weeks. Mean, SD 1 session/week (n=28): PANAS-pos (33.44, 5.42), MAAS (66.67, 10.88), CD-RISC (40.19, 5.17), 2 sessions/week (n=30): PANAS-pos (35.00, 4.91), MAAS (66.37, 11.03), CD-RISC (41.28, 4.32).	Benefits in PANAS-pos and MAAS for two or more weekly meditation session. No benefits for 1 weekly practice. While face-to-face attendance was good, very high attrition rate for online component.	
Pozdnyakova <i>et al</i> ⁶² NCBA, 2007	Academic general internal medicine clinic (n=6 faculty, n=325 patients)	Clinic sessions with and without a scribe	NA	Physician workplace satisfaction	Burnout, time spent on EHR documentation, patient satisfaction with doctor-patient relationship, attitudes towards scribes	n=6. Number of responses 'agree' or 'strongly agree'. Satisfied with clinic workflow 6/6 (100%). Calm atmosphere in work area 0/6 (0%). Satisfied with quality of patient interactions 5/6 (83%). Satisfied with quality of communication with patient 4/6 (67%).	Time at 3 months. n=6. Number of responses 'agree' or 'strongly agree'. Satisfied with clinic workflow 6/6 (100%). Calm atmosphere in work area 2/6 (33%). Satisfied with quality of patient interactions 6/6 (100%). Satisfied with quality of communication with patient 5/6 (83%).	Of six physicians, 100% were satisfied with clinic workflow postpilot (vs 33% prepilot), and 83% were satisfied with EHR use postpilot (vs 17% prepilot). Physician burnout was low at baseline and did not change postpilot. Mean time spent on postclinic EHR documentation decreased from 1.65 to 0.76 hour per clinic session (p=0.02).	
Rees <i>et al</i> ⁶³ NCBA, mixed methods	Rural medical practitioners in Australia (57% GPs) (n=13 total, n=4 qual. research, n=7 quant. research, 40 years, 76.9% male)	MSCR, Mindful Self-Care and Resiliency programme (7 hour face-to-face session) and 3x1 hour video-conference (follow-up sessions)	NA	Well-being (WHO-5), positive affect (PANAS)	Burnout measure (short version 10-item), psychological strain (GHQ-12)	n=7. Mean. Well-being (61.1). Positive affect not reported.	Time at 4 weeks. n=7. Mean. Well-being (71.4). Positive affect not reported.	For the WHO-5 well-being scale, there was no change pre-post for one doctor, deterioration for two doctors with no reliable change, improvement for four doctors with no reliable change.	
Schroeder <i>et al</i> ⁶⁴ RCT, 2014–2015	Primary care physicians in the USA (n=33, 42.76 years, 27% male)	Mindful Medicine Curriculum=modified version of MBSR, 1 x 13 hour and 2 x 2 hour (n=16)	WLC (n=17)	Mindful Attention Awareness (MAAS), Resilience (BRS), Compassion (SCBC)	Stress (PSS), burnout (MBI), Meditation Practice (MPCQ)	Mean, SD INTERVENTION (n=16) MAAS (3.42, 0.96), BRS (21.62, 4.45), SCBCS (26.31, 4.51), CONTROL (n=17) MAAS (3.32, 0.76), BRS (18.70, 5.13), SCBCS (27.00, 4.97).	Time at 4 weeks. Mean, SD INTERVENTION (n=15) MAAS (3.62, 0.89), BRS (22.33, 4.74), SCBCS (27.66, 3.22), CONTROL (n=14) MAAS (3.08, 0.76), BRS (19.42, 4.21), SCBCS (26.07, 4.73).	Participants in the MMC group reported significant improvements over time for MAAS (also PSS and MBI), whereas in the control group, there were no improvements. There was no significant improvement for resilience or compassion.	
Van Wietmarschen <i>et al</i> ⁶⁵ NCBA, mixed methods, 2015–2016	Primary care physicians in the Netherlands (n=54, 87% GPs, 40 years, 22% male)	Adapted MBSR programme, weekly group sessions for 8 weeks, 26 hours total	NA	Self-Compassion (SCS), Self-reflection (GRAS)	Cohen Perceived Stress Scale (PSS)	Mean, SD SCS (2.9, 0.7, n=50), GRAS (87.6, 7.7, n=44).	Time at 8 weeks. Mean, SD SCS (3.4, 0.6, n=50), GRAS (90.9, 6.7, n=44).	Significant improvement of self-compassion and self-reflection. Six months after PSS and SCS were still improved. PSS significantly reduced. Qual: awareness, acceptance, peacefulness and openness improved through intervention.	

Continued

Table 1 Continued

Author, date, study design	Participants (n, mean age, % male)	Intervention (n, mean age)	Control (n, mean age)	Positive outcome measure	Other outcome measure	Baseline scores	Postintervention score	Follow-up score (mean, SD, n)	Results—summary
Verweij <i>et al</i> ⁴⁰ CBA, mixed methods	General practitioner trainers in the Netherlands (n=50, 54.9years, 66% male)	MBSR training 8x2.5 hours, 1x8hour retreat (n=30)	WLC (n=20)	Empathy (JSPE-20), Mindfulness (FFMQ-39)	Work engagement, Burnout (UBOS-C)	Mean, SE INTERVENTION (n=43) JSPE (117.4, 1.53), FFMQ total (136.21, 2.23), FFMQ observing (26.36, 0.69), FFMQ describing (28.26, 0.9), FFMQ acting with awareness (27.12, 0.71), FFMQ non-judging (31.16, 0.81), FFMQ non-reacting (23.34, 0.57), CONTROL (n=20) JSPE (116.18, 1.92), FFMQ total (135.48, 2.65), FFMQ observing (25.85, 0.82), FFMQ describing (28.33, 0.9), FFMQ acting with awareness (28.09), FFMQ non-judging (30.49, 0.98), FFMQ non-reacting (23.12, 0.7).	Time at 8 weeks. Mean, SE INTERVENTION (n=43) JSPE (119.35, 1.49), FFMQ total (143.08, 2.19), FFMQ observing (28.4, 0.68), FFMQ describing (29.77, 0.71), FFMQ acting with awareness (28.1, 0.69), FFMQ non-judging (32.36, 0.79), FFMQ non-reacting (24.47, 0.56, 0.57), CONTROL (n=20) JSPE (117.93, 1.98), FFMQ total (135.45, 2.67), FFMQ observing (26.33, 0.83), FFMQ describing (28.2, 0.91), FFMQ acting with awareness (27.41, .91), FFMQ non-judging (30.32, 0.99), FFMQ non-reacting (23.49, 0.7).	Mindfulness skills increased significantly in the MBSR group. Empathy remained the same. The qualitative data indicated that the MBSR course increased their well-being and compassion towards themselves and others, including their patients.	
Whalley <i>et al</i> ⁴⁶ Panel survey, 2004, 2005	GPs in the UK. 2004: n=2105, mean age 46.9years, 66% male. 2005: n=1349, mean age 48.6years, 65% male.	New introduction of pay for performance system happened in 2004 (after the 2004 survey)	NA	JSS WCW	Job pressure, job design and time pressures	Mean, SD. 2004: JSS total (4.58, 1.39, n=2081)	Time at 1 year. Mean, SD. 2005: JSS total (5.17, 1.28, n=1345)	Statistically significant improvement in job satisfaction. Job pressure and work hours significantly declined. Most GPs reported increased their income (88%), but decreased their professional autonomy (71%), and increased their administrative (94%) and clinical (86%) workloads.	

ACP, College of Physicians; ASIM, American Society of Internal Medicine; BCSO, Burnout Clinical Subtype Questionnaire; BPRS, Brief Psychiatric Rating Scale; BRS, Brief Resilience Scale; CBA, controlled before and after trial; CD-RISC, Connor-Savidson Resilience Scale; CME, Continuing Medical Education; CPD, Continuing Professional Development; DASS, Depression and Anxiety Scale; EHR, electronic health record; EMR, Electronic Medical Record; FFMQ, Five Facet Mindfulness Questionnaire; FR-US, Front Range Job Satisfaction Questionnaire; GHQ, General Health Questionnaire; GPs, general practitioners; GHAS, Groningen Reflection Ability Scale; IBST, Integrated Brief Systemic Therapy; JS, job satisfaction; JSPE, Jefferson Scale of Physician Empathy; JSS, Job Satisfaction Scale; MAAS, Mindful Attention Awareness Scale; MBI, Maslach Burnout Inventory; MPQ, Meditation Practice Questionnaire; MTP, multimodal training programme; NA, not applicable; NCBA, non-controlled before and after trial; NHS, National Health Service; NP, nurse practitioner; PANAS, Positive And Negative Affect Scale; PBS, Physician Belief Scale; PJSS, Physician Job Satisfaction Scale (3 dimensions JS, career satisfaction, and specialty satisfaction), 12-item global job satisfaction subscale used; POMS, profile of mood states; P4P, pay for performance; PFS, Perceived Stress Scale; p/pis, patients; QoL, quality of life; RCT, randomised controlled trial; SCBCS, Santa Clara Brief Compassion Scale (an abbreviation of the Sprecher and Fehr's compassionate love scale); SCS, Self Compassion Scale (Neff); SRS1, Smith Relaxation States Inventory; UBOS-C, Utrecht Burnout Scale for Contractual Occupations (this is the validated Dutch version of the Maslach Burnout Inventory); UWES, Utrecht Work Engagement Score; WCW, Warr Cook Wali; WLC, Wait List Control group.

Data synthesis and analysis

We calculated within-group and between-group absolute change and effect sizes (Hedges' *g*) (see tables 2 and 3, online supplemental files 1 and 2).³⁶ We compared mean outcome scores and SDs at baseline with postintervention scores. Where several postintervention measures were reported, the primary outcome point nominated by the authors was selected. We utilised SD*, which takes different sample sizes into account (formulae in online supplemental file 2). For within-group, we calculated the pooled SD* based on preintervention and postintervention SDs, for between-group analysis, the effect size was calculated based on the pooled SD* of control and intervention groups at baseline³⁷ (online supplemental file 2).

Positive effect sizes indicated an effect for the intervention. Effect sizes of 0.2, 0.5 and 0.8 were considered small, moderate and large, respectively.³⁸

Risk of bias

Two reviewers (AS and DN) independently applied the Cochrane RoB2³⁹ to randomised controlled trials (RCTs). Total RoB2 scores showed 100% agreement. Any discrepancies of subscores were discussed, and consensus was achieved. The other studies were assessed by DN.

Patient and public involvement

No patients are involved.

RESULTS

The database searches rendered 14 792 records in total. After removing duplicates, studies conducted before the year 2000, and adding 12 studies through hand search—which included contacting authors for full text papers of relevant conference abstracts—10 759 studies were screened. We eliminated 9682 records by title, and 983 by abstract, leaving 94 studies for full-text assessment.

Study characteristics and design

We included 19 studies in the systematic review^{2 10 40–56} (tables 1 and 2, and PRISMA-Flowchart figure 1). Six RCTs, three non-RCTs (controlled before and after trial, CBA), eight non-controlled interventions (non-controlled before and after trial, NCBA) and two reports from a longitudinal cohort during which a health policy change was introduced, which we considered as 'naturalistic' interventions.^{41 56} Five studies included a qualitative component. Only one RCT⁵⁰ and two CBAs^{44 47} utilised active controls. Five RCTs and one CBA⁴⁰ had a waitlist control arm. Publications from the USA (8/19, 42%), Europe (8/19, 42%), Australia (2/19) and Israel (1/19) were included (table 1).

Participants

The total population enrolled was 1141 for the 17 intervention studies (average participants per study 67.1, range 6–290). The two studies reporting on the same panel survey population^{41 56} included approximately 2000 participants each year. Mean age overall ranged from 40

to 54.9 years, and sex from 8%–76.9% male participants (table 1). Attrition for intervention groups varied from 0% to 20%, for controls from 0% to 24%. One outlier had a total attrition rate of 80%.⁵¹ Eight studies reported follow-up measures, timepoints ranged from 3 to 48 months postbaseline (mean 14.6 months).

Intervention type

We found considerable variation in intervention type, length and dose-intensity. Three groups were distinguished based on the focus of the intervention: individual/personal (13/19, 68% of studies, n=930), organisational (4/19, 21%, n=211) and naturalistic interventions on a systemic level (policy change in the UK) (2/19, 11%).

Individual mindfulness-based interventions were most common (9/13, 69%), followed by educational training or experiential workshops (3/13, 23%) with one coaching intervention.⁴⁶ Two organisational interventions trialled the addition of clerical support or scribes, and two explored an organisational improvement programme. Two studies from the UK examined the effects of the introduction of a pay for performance scheme^{41 56} (table 2).

Outcomes and their measures

The definitions of outcomes and measurement tools varied considerably. Only one study clearly stated one a priori primary outcome,⁵¹ with most using a battery of self-reported outcome measures (online supplemental file 4). These included a range of 12 validated tools (BAER, BRS, CD-RISC-10, FFMQ, GRAS, JSPE, JSS-WCW, MAAS, PANAS, SCS, UWES and WHO-5)^{57–75} as well as 13 measures where no validation information was obtainable. A range of job satisfaction measures were applied in eight studies, mindfulness in six, resilience in four, compassion and empathy tools were each used thrice, the positive and negative affect scale was used twice. The WHO-5 well-being index was used once (online supplemental file 4). Not one study evaluated flourishing. Negative outcome measures were often concurrently reported. Sixteen studies employed the Maslach Burnout Inventory or other stress-related measures. As the a priori aim of the study was to explore effects of interventions on well-being, satisfaction and other positive outcomes, we did not extract and report results for negative outcome measures, nor examine possible inter-relationships between positive and negative outcome measures.

Intervention effects

The between-group change for controlled studies and within-group change for intervention arms are presented in tables 2 and 3, online supplemental file 3).

(a) Individual focussed interventions

(1) Mindfulness (k=9)

Six mindfulness interventions (3 RCTs, 1 CBA and 2 NCBA) evaluated mindfulness outcomes (FFMQ, MAAS

Table 2 Overview of included studies

Intervention level	Intervention type	Study ID (author, date)	Study design	Outcome measures	Within-group effect sizes (experiment)	Between-group effect sizes (exp. vs control group)
Intervention targeted at the individual	Mindfulness	Amutio <i>et al</i> ¹²	RCT	FFMQ	0.78	1.5
		Asuero <i>et al</i> ⁴³	RCT	FFMQ, JSPE	0.64, 0.31	0.57, 0.44
		Schroeder <i>et al</i> ⁵⁴	RCT	MAAS, BRS, SCBC	0.63, 0.51, 0.35	0.88, 0.61, 0.73
		Verweij <i>et al</i> ¹⁰	CBA	FFMQ, JSPE	0.47, 0.20	0.5, 0.02
		Fortney <i>et al</i> ¹⁰	NCBA	SCBC, RS-14	-0.04, 0.17	-
		Montero-Marín <i>et al</i> ⁵¹	NCBA	PANAS, MAAS, CD-RISC	0.52, 0.37, 0.37	-
		Rees <i>et al</i> ⁵³	NCBA	PANAS, WHO-5	- , 0.52	-
		Van Wietmarschen <i>et al</i> ⁵⁵	NCBA	SCS, GRAS	0.77, 0.46	-
		Krasner <i>et al</i> ⁴⁸	NCBA	FFMQ-2 (BAER), JSPE	1.05, 0.44	-
		Barcons <i>et al</i> ¹²	CBA	FR-JS	-	-
Intervention at organisational level	Educational training/experiential workshop	Gardiner <i>et al</i> ⁴⁷	CBA	WRM-7, QoWL-6	0.43, 0.45	0.3, 0.27
		Margalit <i>et al</i> ⁵⁰	RCT	Self-esteem	-	-
		Dyrbye <i>et al</i> ⁴⁶	RCT	CD-RISC, PJSS	0.24, 0.10	0.13, 0.06
		Contratto <i>et al</i> ⁴⁵	NCBA	Professional balance, physician satisfaction (QoL)	-	-
		Pozdnyakova <i>et al</i> ⁵²	NCBA	Physician workplace satisfaction	-	-
Intervention at systemic level/policy	Organisational improvement programme/Quality assurance	Dunn <i>et al</i> ²	NCBA	Physician satisfaction	-	-
		Linzer <i>et al</i> ⁴⁹	RCT	Work control, satisfaction	-	-
		Allen <i>et al</i> ⁴¹	NCBA (naturalistic)	Job satisfaction (JSS WCV), Life satisfaction	-	-
		Whalley <i>et al</i> ⁵⁶	NCBA (naturalistic)	JSS WCV	0.44	-

BRS, brief resilience scale; CBA, controlled before and after trial; CD-RISC, Connor-Davidson Resilience Scale; FFMQ, five facet mindfulness questionnaire; FR-JS, Font Roja Job Satisfaction Questionnaire; GRAS, Groningen reflection ability scale; JSPE, Jefferson Scale of Physician Empathy; JSS WCV, Warr Cook Wall Job satisfaction Scale; MAAS, Mindful Attention Awareness Scale; NCBA, non-controlled before and after trial; PANAS, positive and negative affect scale; PJSS, Physician Job Satisfaction Scale (3 dimensions JS, career satisfaction and specialty satisfaction), 12-item Global Job Satisfaction subscale used; QoWL-6, Quality of Work Life; RCT, randomised controlled trial; RS-14, resilience; SCBC, Santa Clara Brief Compassion Scale (an abbreviation of the Sprecher and Fehr's Compassionate Love Scale); SCS, Self Compassion Scale (Neff); SRSI, Smith Relaxation States Inventory; WHO-5, Wellbeing Index; WRM, Work-Related Morale Measure.

Table 3 Overview of within-group and between-group effect sizes (ES) for several positive outcomes of mindfulness interventions

	Outcome	Mindfulness	Resilience	Compassion	Empathy
Mindfulness interventions (k=9)	Within-group ES (k=9)	0.37–1.05	0.17–0.51	–0.04–0.77	0.2–0.44
	Between-group ES (k=4)	0.5–1.5	Only one study 0.61	Only one study 0.73	0.02–0.44

There were nine studies that trialled mindfulness interventions (k=9). These studies utilised a range of different outcome measures and included tools for assessing mindfulness, resilience, compassion and empathy. Within-group effect sizes (ES) are shown, comparing before and after measures for the intervention.

and BAER) and reported moderate to high between-group effect sizes (k=4) ranging from 0.5 to 0.88 for mindfulness with an outlier at 1.5 (42). Within-group ES (k=6) showed moderate effect sizes (range 0.47–0.78) with one study outlier at 0.37 and one at 1.05 (tables 2 and 3).

Studies frequently utilised resilience, compassion and empathy measures with overall low-to moderate effect sizes. One RCT and two NCBA's measured resilience (BRS,

RS-14 and CD-RISC), whereby between-group ES (k=1) was moderate at 0.61, while within-group (k=3) effect sizes were low to moderate (range 0.17–0.51). Compassion measures (SCBC and SCS) were reported in three studies (1 RCT and 2 NCBA's). Between-group ES (k=1) was 0.73, while within-group ES (k=3) varied considerably (–0.04 to 0.77). Three studies reported on empathy (JSPE) (1 RCT, 1 CBA and 1 NCBA) with very low 0.02,

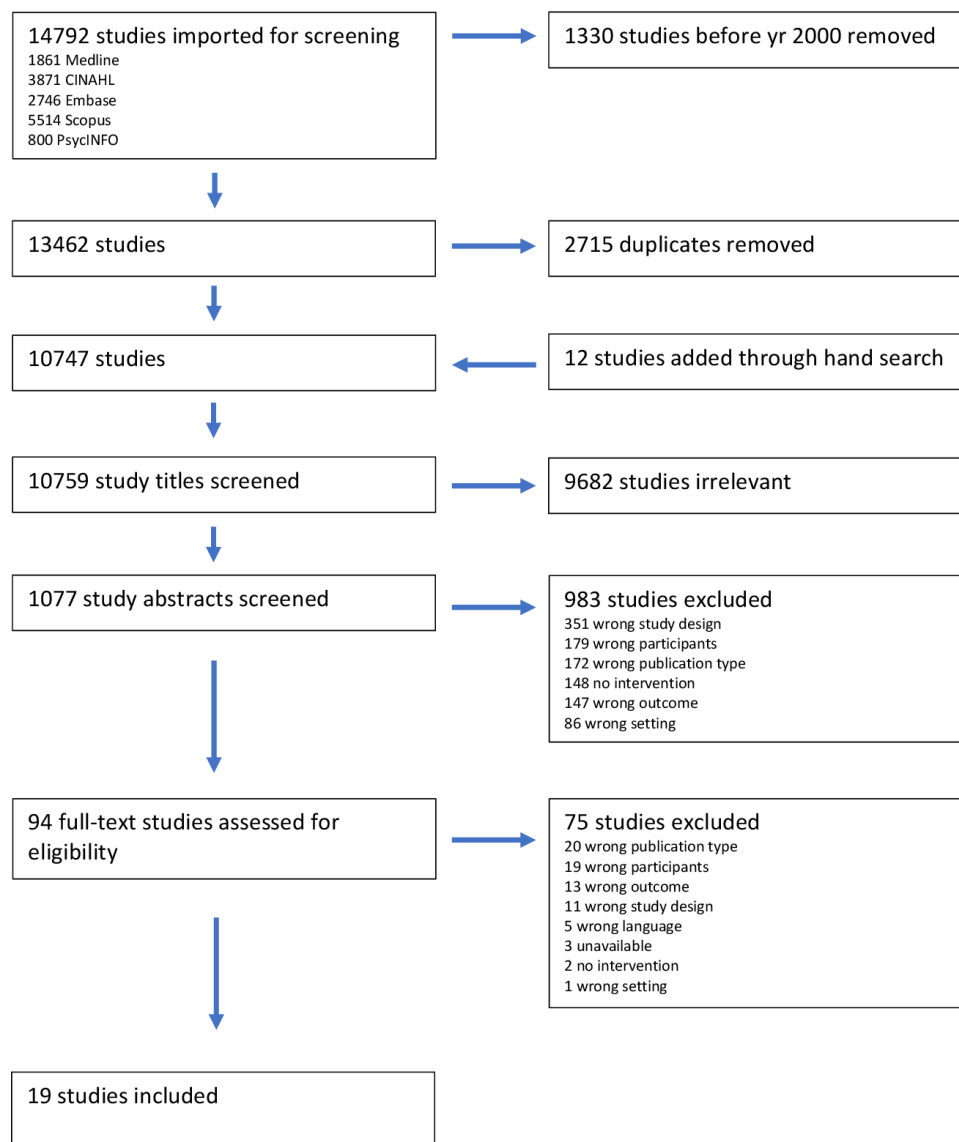


Figure 1 Prisma diagram. PRISMA, Preferred Reporting Items for Systematic Reviews and Meta-Analyses.

respectively moderate between-group 0.44 ES ($k=2$), and within-group ES ranging from 0.2 to 0.44 ($k=3$) (tables 2 and 3).

Two mindfulness studies (NCBAs) measured positive affect (PANAS), only one reported a within-group ES (0.52). One NCBA reported a within-group ES (0.52) for well-being (WHO-5), another NCBA reported an ES of 0.46 for self-reflection.

These effect sizes are generally supported by the results reported in the individual studies (table 1). Several interventions included repeated measures at later time-points, that is, during maintenance phase,⁴⁸ showing an ongoing impact of mindfulness practice. Qualitative results suggested increased well-being and compassion towards self and others,⁴⁰ respectively, improved awareness, acceptance, peacefulness and openness⁵⁵ after the intervention.

(ii) Training, workshops and coaching ($k=4$)

For training, workshops and coaching interventions, we were only able to obtain data to calculate the ES of one RCT⁴⁶ and one CBA.⁴⁷ Low between-group effect sizes for work-related morale (0.3), quality of work-life (0.27) and low ES for both measures within-group (0.43 and 0.45, respectively) were found for Gardiner's CBA.⁴⁷ Very low effect sizes for job satisfaction and resilience both for between-group (0.06, 0.13) and within-group (0.13, 0.24) change were observed in Dyrbye's RCT.⁴⁶

These results are reflected in the individual study results (table 1). Barcons⁴⁴ did not detect any significant between-group differences for overall job satisfaction, while Margalit⁵⁰ demonstrated significant improvement in self-esteem between-groups.

(b) Organisational interventions ($k=4$)

One RCT and three NCBAs trialled organisational interventions. Means and SD were not provided; therefore, we were not able to calculate effect sizes. Linzer *et al*⁴⁹ (RCT, $n=166$) demonstrated that workflow interventions, communication and overall quality improvements benefited satisfaction in the intervention group. While Dunn *et al*² (NCBA, $n=32$) showed that quality improvement projects in the workplace showed significant improvement in quality work competence ratings but fluctuating satisfaction levels. Two smaller uncontrolled trials ($n=13$ in total) investigated the addition of clerical staff to the practice. Pozdnyakova *et al*⁵² showed that the addition of clerical staff led to an improvement in satisfaction with the clinic workflow from 2/6 to all 6 GPs in a single practice but did not report on any other measures of well-being. Similarly, Contratto *et al*⁴⁵ reported improved quality of life and professional balance for seven general medicine physicians in a mixed-methods approach.

(c) Systemic interventions ($k=2$)

The introduction of a new contract with pay for performance scheme showed a significant improvement in job satisfaction⁵⁶ with an effect size of 0.44 between 2004 and 2005. Allen *et al*⁴¹ used the same data and included a 2008 survey to look at satisfaction as a function of the exposure

of GPs to the pay per performance scheme. While job satisfaction declined again in 2008, the exposure to the scheme did not affect satisfaction.

Risk of bias

The types of intervention and study settings precluded blinding for randomised controlled studies (no allocation concealment for waitlist control groups), and the outcome measures were participant reported throughout, and as such all studies were rated as high risk of bias by the Cochrane RoB2.

DISCUSSION

Strengths, limitations, and interpretation of evidence

We identified 19 studies, half of which were published in the last 4 years, demonstrating an increased interest in the improvement of well-being and satisfaction of GPs. In comparison, a systematic review from 2016 looking at interventions to reduce burnout in physicians included fifteen RCTs and 37 cohort studies with 20 studies conducted before 2010,⁷⁶ suggesting that burnout has been a research focus for longer. Or this may possibly indicate that the focus is more generally shifting from a disease and 'dis-abled' to an 'en-abled' approach when trying to design interventions for healthcare professionals.

The considerable heterogeneity in the definition and measurement of constructs, study design, participant numbers, intervention types, intervention dose (ranging from 6 to 53 hours), follow-up periods, quality and reporting precluded a meta-analysis. It is challenging to draw robust conclusions regarding the (comparative) effectiveness of the different types of interventions reviewed.

Mindfulness interventions provided the most comprehensive and robust data with moderate to large effect sizes on mindfulness outcomes, and low-to-moderate effect sizes on compassion, resilience and empathy. Our results are supported by two reviews looking at the effects of mindfulness-based interventions on well-being,^{77 78} in healthcare professionals more generally. Lomas *et al*⁷⁷ conducted a systematic review and meta-analysis and assessed 41 studies with approximately 2100 participants. They found a wide range of self-reported outcomes (with both positive and negative measures of well-being). Reported within-group effect sizes for mindfulness, positive well-being (or life satisfaction) and compassion hovered around a moderate 0.5 mark, ES for empathy was 0.31; while for RCTs, the between-group ES for mindfulness, life satisfaction, and compassion were around 0.3.

Scheepers *et al*⁷⁸ contributed a narrative review of 23 studies looking at mindfulness-based interventions for well-being in doctors of all ages and specialities. Review authors noted some caveats; considerable variation in type and dose-intensity of practice, sparse long-term outcome data and methodological limitations. They cautioned that mindfulness practice involves time and dedication, which is not always feasible for busy healthcare professionals.

In summary, the conclusions they drew are tentatively positive.

In contrast to Lomas *et al*⁷⁷ our ES for mindfulness is higher between-group than within-group, which is somewhat unusual. This may be explained by one study⁴² whose positive outcome appeared determined by the decline in mindfulness over time in their control group, rather than the intervention being effective.

We identified four studies evaluating coaching and experiential workshops for GPs, which showed low effect sizes for satisfaction measures and moderate ES for work-related morale and quality of work life. There does not appear to be much literature on coaching for healthcare professionals. One quasi-experimental study by Gardiner *et al*⁷⁹ looked at ‘cognitive behavioural coaching’ in rural Australian GPs and demonstrated a significant within-group reduction in distress levels for the coachees. Resilience training for a range of different physicians who had completed training was investigated in a recent systematic review. Four RCTs and five observational studies were included. The authors flag heterogeneous study design and use of outcome measures, as well as quality issues with weak evidence for the interventions, while indicating potential for improvement of resilience.⁸⁰

We found four small-scale organisational interventions that suggested improved (job) satisfaction, as did one large-scale health policy intervention of performance-related pay in the UK. For burnout, a paucity of interventions trials delivered at organisational and systemic levels has been previously reported,^{81 82} the authors suggest to actively design such trials. Similarly, Dyrbye *et al*⁴⁶ concluded that while useful, an individual intervention such as coaching is no replacement for organisational improvement. Shanafelt and colleagues have collated their vast research into burnout and put forward nine organisational strategies to address burnout and physician well-being through leadership.⁸³ Despite calls for action, these avenues have not been adequately addressed or reported to date, at least not for GPs, and warrant further exploration. Considering the time it takes to gather and report data, it is understandable that organisations might feel pressure to implement programmes based on preliminary data.

Commendably, Dutch researchers recently investigated the effects of a mindful leadership course in hospital-based medical specialists.^{84 85} Both a qualitative interview and a preself-evaluation and postself-evaluation suggested an overall benefit of the intervention with improved mindfulness, life satisfaction and leadership, reduced burnout and positive change in attitudes and behaviours towards self and others. Not all participants benefited equally, suggesting a need to provide a range of interventions to meet defend participants’ needs. Future investigation will need to explore what the impact on individuals’ leadership style and on their teams is.

Limitations

We included English publications only, although purposely extending our search globally. We excluded studies before the year 2000, because well-being literature in medicine is a more recent development, and general practice is now likely quite different than two decades ago. Self-reported outcome measures are typically subject to bias, particularly considering studies included GPs from different settings and cultures, potentially introducing cultural bias, rendering comparisons challenging.

Suggestions for future research

Based on our findings, we provide some suggestions which may be useful for future research into well-being and satisfaction for GPs. Stronger collaboration among researchers in this space may also lead to improved results.

(a) Selection of outcomes & outcome measures

The reduction in burnout and stress is often equated with an improvement in well-being or satisfaction. We argue that the improvement of negative outcomes does not necessarily indicate a presence of satisfaction or well-being. This aligns with the dual continuum model of mental health/mental ill-health and flourishing/languishing.^{25–28} Good mental health is not automatically linked to flourishing, nor is mental ill-health an indicator of languishing. Other authors have made similar statements.^{10 24 42 77} We did not find a single study about flourishing in GPs.

Clearly defining the constructs ‘well-being’ and ‘satisfaction’, while utilising validated well-being and satisfaction measures, will enhance clarity, consistency and comparability of study design and reporting. We suggest drawing on existing frameworks, models and definitions in the psychological literature (for different types of well-being, satisfaction or flourishing).^{27 86–88} To measure well-being, we suggest the Warwick Edinburgh Mental Well-being Scale (WEMWBS) and for Job satisfaction the Warr-Cook-Wall scale (WCW-JS), both of which have been validated in medical populations.^{89 90} Brady *et al*, who conducted a systematic review looking at the definition and measurement of ‘physician wellness’, similarly stated that there needs to be consensus and clarity of definition, if we want to improve the quality and comparability of research in this space.⁹¹ While this would improve the next phase of studies, the urgency in calls for actions may need to be balanced against the calls for consistency among studies.

(b) Organisational and systemic interventions

With the dearth of research in this space, and the relatively small effects for individual interventions, we believe it is worthwhile to explore system and organisational interventions (ie, mindful leadership training describe above) in the context of well-being.

Considering what is known about burnout (drivers being organisational culture, workplace conditions, lack of control and autonomy), it is not surprising that individual interventions are not as effective as desired.^{49 81 92–94}



Hence, more combined approaches targeting both individuals and organisations have been proposed.

A 2017 British meta-analysis contrasted different types of interventions for burnout on the individual doctor and on the systemic level, whereby systemic interventions appear more effective.⁹⁵ Similarly, groups in the USA state that the approach must be combined and include organisational interventions,^{1 96 97} mostly focusing on time management, rostering, workflow management, staffing and use of information technology solutions. Overall, there is a scarcity of organisational interventions aimed at reducing burnout,⁹⁸ and conclusions from the two meta-analyses of interventions to reduce burnout should be considered provisional.

In summary, we endorse an intensified effort to explore organisational interventions to improve well-being and satisfaction, and believe a focus on leadership and improving the culture at work is a good place to start.

(c) Physical interventions

We did not find any physical interventions (ie, exercise and nutrition) geared towards improving GPs' well-being. Sparse research on exercise or diet interventions for doctors exists. A Pakistani cross-sectional survey revealed that 76% of nearly 1200 doctors, nurses and dentists did not exercise at all, and only one participant ate according to U.S. department of agriculture (USDA) dietary guidelines.⁹⁹ While a US cross-sectional survey of 303 physicians found that less than 25% knew the American Heart Association (AHA) dietary recommendations, while around half knew and followed their physical activity guidelines.¹⁰⁰ Two systematic reviews looked at exercise and burnout in the general population, one was inconclusive,¹⁰¹ the other stated that physical activity effectively reduces burnout.¹⁰² Both identified methodological issues and no long-term follow-up. Seeing the paucity of data, this might provide an avenue for further investigation.

(d) Quality and risk of bias

Areas for risk of bias are inherent in this type of research. However, measures can be taken to reduce bias for example by using active controls in randomised studies as suggested by other review authors,⁷⁸ by consistently publishing study protocols a priori, and controlling for participant attributes, such as prior engagement in mindfulness practice. Ideally, the same rigorous approach should be applied to intervention studies for clinicians, as to clinical interventions studies for patients.

CONCLUSION

Despite increasing interest in the improvement of well-being and satisfaction, there is remarkably little evidence beyond mindfulness interventions aimed at individual GPs. Few studies utilise validated measures of well-being and satisfaction, and favour burnout tools. Studies looking into organisational and systemic interventions

remain sparse, and conclusions about their effectiveness may be premature.

Considering the COVID-19 pandemic and the added strain to primary care, programmes to support and research GP well-being should be prioritised by policy-makers and governments worldwide.

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