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WORK RELATED MINDFULNESS-BASED INTERVENTIONS: A SCOPING LITERATURE REVIEW

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Abstract

Mindfulness is approached as a trait, a state or a practice that can be implemented, developed and that has grown from an obscure subject to a trendy topic associated with several individuals and organisational outcomes like performance, health, and well-being. This systematic literature review aims to identify and characterise empirical research on Mindfulness-Based Interventions in work-related contexts over the last five years (2016-2021), taking into account different psychological variables (e.g. stress, burnout, job performance) in different working contexts (e.g. technology, education, health) with different types of interventions in terms of modality and length. The research strategy used in this investigation is framed within the PRISMA protocol (Preferred Reporting Items for Systematic Review and Meta-Analysis). Electronic databases B-ON and EBSCO host, using the Boolean expression 'mindfulness' in the title AND 'intervention OR program OR training' in the title AND 'workplace OR organisation OR organization OR company' in the abstract, yielded 589 articles. After applying inclusion and exclusion criteria, 40 empirical papers were retained for analysis. Results show that mindfulness-based interventions in the workplace are an effective tool to improve mental health and work performance-related variables. This work reinforces the effectiveness of mindfulness interventions in improving mental health and quality of life across different populations and work contexts, irrespective of the intervention modality (online or on-site) or specific psychological variable targeted. It offers a broader perspective than previous literature reviews in this field. Future research should expand the databases used to collect data.

Keywords: mindfulness, intervention, workplace, literature review.

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Introduction

With globalisation and the accelerated change in working conditions, mental health issues have been significant motivators of absenteeism and early retirement in industrialised countries (Hassard et al., 2018). In this sense, it is clear that workers (and their mental health) are essential elements in any organisation since they are the ones who make possible the achievement of organisational goals and objectives. Therefore, their motivation is key to organisational development and success (Görün et al., 2018).

Organisations have given importance to the development and implementation of various strategies to promote mental health and prevent consequences related to the absence of it, such as stress or burnout (Hyland et al., 2015; Taylor & Millear, 2016). Strategies to improve the mental health conditions of workers are essential for ensuring their well-being and that of organisations as a whole. Mindfulness-based interventions can be conceived as part of these strategies, and theoretical research and practical applications have been increasing in recent years (Lomas et al., 2017).

Current research on this topic indicates that mindfulness-based interventions are a valuable resource for strengthening several worker conditions at the level of health and well-being (Jamieson & Tuckey, 2017). Additionally, there is increasing evidence of the effectiveness of these interventions in improving job satisfaction, health and reducing work stress (Allen et al., 2015; Irving et al., 2009).

Given the growth of interest in research about the best ways to implement Mindfulness-based interventions in different organisational contexts, this systematic literature review aims to identify and further characterise empirical research on Mindfulness-Based Interventions in work-related contexts over the last five years (2016-2021).

Mindfulness

The origin of mindfulness can be traced to about 2,500 years ago within the Buddhist tradition with the figure of Siddhartha Gautama, the Buddha, who was the initiator of this religious and philosophical tradition spread throughout the world and whose fundamental essence is the practice of mindfulness. This procedure promotes the growth of consciousness and focuses on the present (Taylor & Millear, 2016). Therefore, mindfulness was originally an activity in the religious and secular traditions of Hinduism teachings, Buddhism, yoga and non-religious meditation. Some form of

mindfulness already existed before that time and was practised by human beings of even older times. Since then, mindfulness has been studied for thousands of years as training or as part of a larger tradition (Dwidiyanti et al., 2019).

The term mindfulness was derived from the teachings of Buddhism, but it was gradually absorbed by the English language vocabulary and then expanded throughout the world (Dwidiyanti et al., 2019). Etymologically, the English term mindfulness is a translation of the word "Sati" from the Pali language, which refers to the present, and as a general psychological term, carries the meaning of attention or consciousness (Komjathy, 2018). Mindfulness can be understood in English as conscious attention, intentional attention, immediate awareness, or awareness of the moment.

Meditation, which is a practice that points to focus the mind on a single point and usually towards a single subject, can be confused with mindfulness. However, unlike it, mindfulness opens to a broader range of phenomena rather than restricting the focus to a singular object (Didonna, 2008).

According to Sun (2014), western mindfulness was seen as a trait or tendency worth cultivating. Its methods emphasise open awareness or observation of phenomena without discrimination, and its descriptions in early Buddhist scriptures, the non-conceptual, non-judgemental and non-elaborative features of attention became influential ideas in the development of western mindfulness.

Kabat-Zinn (2006) states that the ability to be fully aware of the present moment is inherent in the human being. The contribution of the Buddhist tradition has been, in part, to emphasise simple and effective ways of cultivating and refining this ability and making it transversal to all aspects of life.

The most common definition of mindfulness is that of the "state", implying consciousness that emerges by deliberately paying attention to the present moment without judgment (Kabat-Zinn, 2006). Similarly, mindfulness was defined as a process that involves self-regulation of care, in a way maintained in immediate experience, accompanied by an attitude of kindness and acceptance (Bishop et al., 2004).

In addition, mindfulness can be understood as a relatively stable ability, more commonly referred to as a trait of mindfulness (Allen & Kiburz, 2012). As the processes involved in the mindfulness trait are understood, we tend to speak more specifically of specific characteristics such as observation, acceptance, and tendency to act with awareness or non-reaction (Hervas et al., 2016). Finally, it is common to refer

to a directed meditative activity as "mindfulness practices", so speaking of mindfulness as a practice would make sense. Mindfulness practice involves activating and maintaining a state and a process of mindfulness without other simultaneous tasks (Hervas et al., 2016).

In this work, we assume that the concept of mindfulness is bound to attempt to improve or increase its exercise, and an intervention generates this improvement. The concept of intervention is understood, in this context, as intentional action, simple or complex, to manage or prevent a situation or improve a particular condition, even if there is no problem (Beehr, 2019).

Mindfulness-based Interventions in Health Contexts

The intervention models developed in mindfulness practice have been increasing their impact in recent decades due to the variability and interest of the scientific community in their effectiveness in different environments. Consisting of Buddhist practice and clinical psychology notions, Jon Kabat-Zinn developed a version adapted to the Western context, initially as an intervention for patients with chronic pain. The Mindfulness-Based Stress Reduction Program (MBSR) goal is for the individual who practices it to develop mindfulness through an understandable, experiential and meeting-based format, usually composed of 8 group sessions that take place two hours a week for eight weeks (Kabat-Zinn, 2006).

In this intervention, moment-to-moment awareness and characteristic attitudes of mindfulness, such as acceptance, beginner attitude or openness, are worked through different exercises adapted from the Buddhist tradition, such as body scanning meditation, sitting, eating or walking, as well as conscious communication. (Kabat-Zinn, 2006).

Over time, Segal et al. (2012) adapted to this program and called it Mindfulness-based Cognitive Therapy (MBCT), applying it early for depression. This program covers more components focused on decentralisation, which consists of achieving a disidentification of one's thoughts and emotions. It seeks that the individual begins his process of accepting the moment distancing himself from the thoughts that occur in an instant, causing the individual to explore the changes in psychological events instead of changing the frequency of events (Fjorback et al., 2011). In addition to the two types of intervention mentioned above, there has been a significant development of brief

interventions based on mindfulness, which tend to consist of 3 to 4 sessions of 10 to 15 minutes in length, which despite the having high experimental control, its effect has been small and transient (Creswell, 2017).

Different professionals and scientists have brought mindfulness techniques closer to western culture, and this gave birth to the interest and enthusiasm of a large part of the scientific community, especially that related to health. In contemporary psychology, mindfulness has been adopted to increase awareness and respond skillfully to mental processes that contribute to emotional distress and maladaptive behaviour (Bishop et al., 2004).

Mindfulness-based intervention programs have been a tool to significantly reduce pain, stress, anxiety and other symptoms, especially in clinical contexts. Its application has been studied in areas as diverse as psychotherapy, education, and neurosciences. One of the most recent areas of application is in the field of work and organisations (Hyland et al., 2015).

Mindfulness-based Interventions in the Organisational Context

When considering the health, well-being and safety of workers, it is necessary to propose interventions aimed at changes that align with the organisation's goals and those of the workers. To intervene in an organisation is to enter into its system of daily relationships where people, groups and the organisation collaborate to contribute to the institution's development and its collaborators (Salanova et al., 2013).

Intervention in organisations seeks to help the administration strengthen human relationships and skills that support employees in developing their tasks with greater effectiveness and efficiency. The effectiveness of interventions is related to their foundations, in particular to the psychological principles on which they act, which seek an improvement in the well-being and productivity of employees within organisations (Proudfoot et al., 2009).

Adaptations usually characterise mindfulness-based interventions in the workplace to pre-existent models of mindfulness training that answer to a specific need that is addressed (e.g. reduce stress) with specific resources (money, time) in specific contexts (e.g. health) that will most certainly outline and define the nature and characteristics of the interventions. As stated in Jayawardene et al. (2017), most

interventions use simplified Mindfulness-Based Stress Reduction protocols, which have been described above.

In this context, it was found that mindfulness-based interventions contribute to the effective resolution of problems typical of organisations, such as stress, burnout, adaptability, relationships between workers, creativity, conflict management, leadership, work engagement and productivity (Dobie et al., 2016; King & Haar, 2017; Shiba et al., 2015).

Hyland et al. (2015) state that from the beginning, mindfulness interventions were closely linked to stress reduction programs in the field of work and organisations. This makes sense in the organisational context because stress has been persistently linked to health problems such as cardiovascular diseases, strokes, respiratory infections, autoimmune disorders and depression (McEwen, 1998). For workers, stress could be problematic because it will affect their mental and overall health, which will impact the organisation.

As for its effectiveness, Creswell (2017) states that Mindfulness-based Interventions help reduce stress symptoms, increase involvement, facilitate organisational change, reduce burnout and improve the development of workers (Goilean et al., 2020). Some Mindfulness-based interventions, like Cohen-Katz et al. (2005), have focused on work-related stress and enhancing work efficiency. It has also been suggested that mindfulness training could benefit work performance (Hyland et al., 2015; Lomas et al., 2017).

There are various means by which mindfulness can generate beneficial effects for workers and promote better performance in different roles and work environments. In this sense, in Good et al. (2016), attention is essential for this achievement since attention can influence other aspects of human functioning such as physiology, behaviour, emotion, and cognition. When mindfulness is incorporated into the work, workers may be able to maintain attention without processing or elaboration, which is the basis of the benefits in well-being and overall health (Brown & Ryan, 2003). More recent studies, such as Lomas et al. (2018), have also found that mindfulness can enhance different elements related to the well-being of workers, such as emotional regulation, positive well-being, health, and empathy.

Purpose and relevance

The Sustainable Development 2030 Agenda, with its origins in the Millennium Development Goals and the United Nations Global Compact, aims to guide human development until 2030 with 17 sustainable development goals. The utility of mindfulness-based interventions is included in the third objective: to ensure healthy lives and promote well-being (United Nations, 2000). Mindfulness-based interventions can subscribe to that goal when appropriately implemented in various contexts, including the workplace.

Within this research, there will be a characterisation of mindfulness-based interventions' design, implementation processes, evaluation of those interventions, and explanation of both the process and outcome through existing theories and new conceptual propositions on the effect of interventions on people and organisations.

Mindfulness-based interventions are a broadly researched topic. Current research status in the field shows a lack of in-depth reviews of this kind of intervention in a Work, Organisational and Personnel Psychology context, especially one that considers different psychological variables (leadership, stress, well-being), different types of organisations (size, economic sector) and different modalities of intervention (online, face-to-face).

In past recent literature reviews and meta-analyses, the focus has been on either specific work sectors, such as healthcare (Burton et al., 2016; Scheepers, Emke & Epstein, 2018), in specific psychological outcomes, such as stress (Heckenberg et al., 2018) or specific types of interventions, such as online (Jawardene et al., 2017).

Therefore, asides from being more recent and updating the knowledge about mindfulness-based interventions in the workplace, it presents a relevant contribution for organisations who must decide about what kind of interventions they will implement to promote their workers' well-being, mental health, and overall health, regardless of the working context they are part of, the outcomes they want to achieve and the type of intervention they can carry out. In this way, with the results of this work, human resources managers or occupational health psychologists could have a broader picture and, therefore, a better decision-making process among intervention plans that would better suit their organisational needs and goals.

By taking into account different psychological variables (e.g. stress, burnout, job performance) in different working contexts (e.g. technology, education, health) with different types of interventions in terms of modality and length, and given the increase

of interest and research in Mindfulness-based Interventions over the past few years, this systematic literature review aims to identify and further characterise empirical research on Mindfulness-Based Interventions in work-related contexts on the last five years (2016-2021).

Method

The PRISMA Protocol (Preferred Reporting Items for Systematic Review and Meta-Analysis) is a guide to ensure methodological rigour in systematic reviews in the health care area (Moher et al., 2015). Moreover, since psychology can also be considered health care, it is helpful to adopt this protocol to guide our systematic literature review on mindfulness-based interventions.

The studies presented and discussed in the subsequent sections were retrieved, until February 16th, 2022, from the following academic publication databases: B-ON (Academic Search Complete, American Chemical Society, American Institute of Physics, Annual Reviews, Association for Computing Machinery, Business Source Complete, 6 Cinahl, Coimbra University Press, Current Contents, Dynamed, Elsevier, ERIC, Essential Science Indicators, Health Business Elite, IEEE, Institute of Physics, Journal Citation Reports, LISTA, Medline with full text, Nature, Psychology & Behavioral Science, Royal Society of Chemistry, Sage, Society for Industrial and Applied Mathematics, Springer, Taylor & Francis, Wiley, Zentralblatt) and EBSCO host (Communication Source, Criminal Justice Abstracts with Full Text, eBook Collection, EconLit with Full Text, Library & Information Science Source, SocINDEX with Full Text, SPORTDiscus with Full Text) which are available to the academic community of the University of Coimbra.

The Boolean expression for this research was: 'mindfulness’ in the title AND ‘intervention OR program OR training' in the title AND 'workplace OR organisation OR organization OR company' in the abstract. The intention was to avoid literature concerning other forms of interventions and non-work-related contexts. This review included studies that 1) were published as articles in academic journals and 2) reported the results of empirical studies. A citation was excluded if 1) it was a book review, 2) it was a book or chapter, or 1) no empirical data was reported.

The retrieval process was conducted systematically in three phases. The 589 abstracts were examined against the inclusion and exclusion criteria in the first phase.

Based on the abstract, 349 possible were kept for the next round. In the second phase, after reading titles and abstracts, it was decided to exclude the articles that were not focused or did not use Mindfulness-based interventions in the workplace, and 236 articles were acquired. From those, 184 were retrieved. In the final round, only empirical studies between the last five years (2016-2021) were retained, and duplicates were removed manually, reducing the number of articles to 40. The following sections are the result of the analysis of 40 articles (see Figure 1).

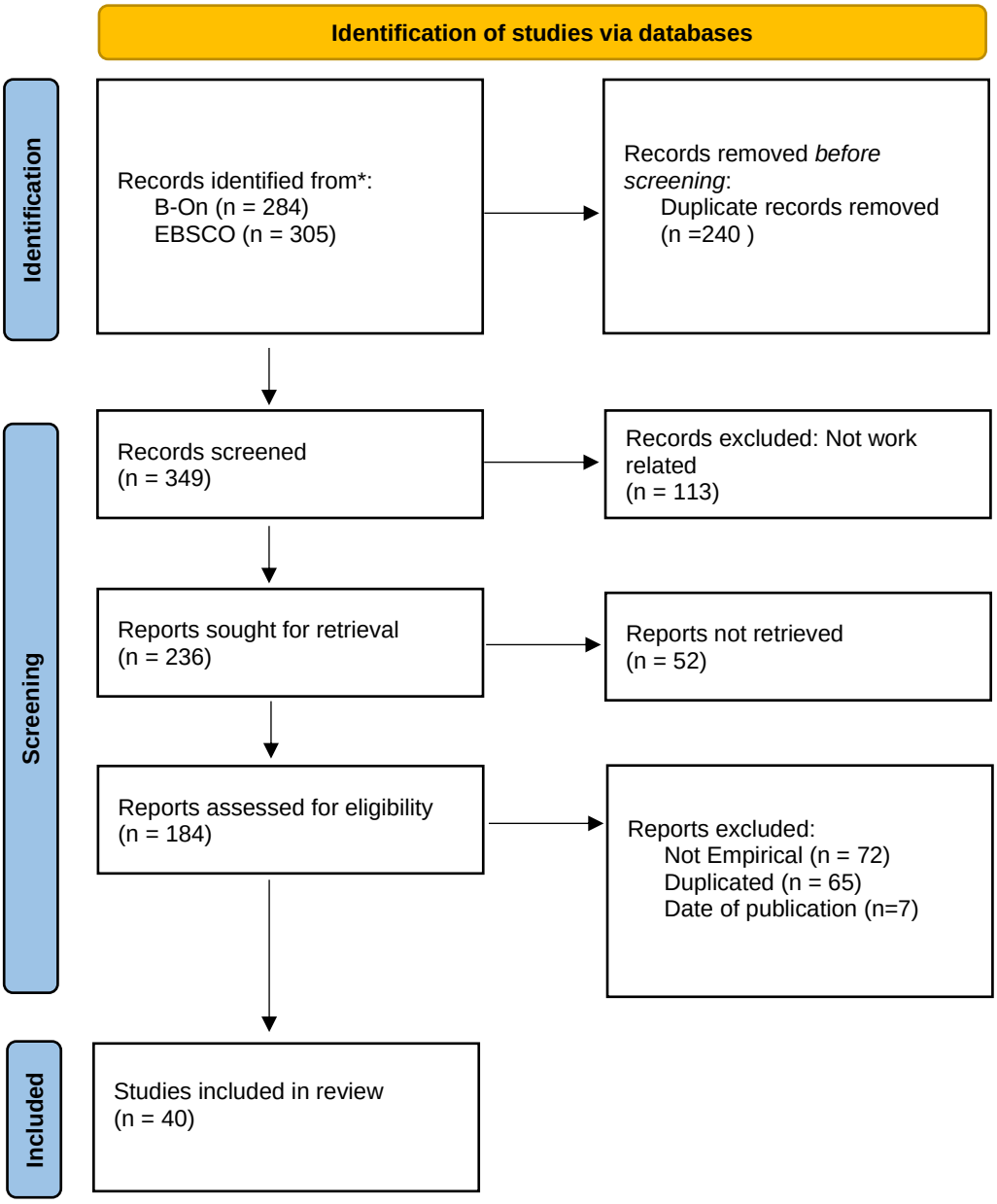

Figure 1: *Flow diagram of articles selection*

The articles will be analysed according to the following aspects, which were thought to be relevant for the aims of this systematic literature review and its potential application range: (a) the study purposes, (b) the samples (data sources) of the empirical studies, (c) the definition/operationalisation of mindfulness, (d) the variables related to or measured besides mindfulness, (e) research designs, (f) procedure description, (g) measurement times, (h) main findings, (i) applied interventions, (j) instruments or information gathering techniques, (k) main results, (l) limitations mentioned by the authors, (m) suggestions made by the authors concerning future research and (n) practical implications mentioned by the authors.

Results

Considering the studies exploring mindfulness-based interventions in work-related contexts, Table 1 shows the study purpose, the data sources description, the definition/operationalisation of mindfulness, and other variables measured.

Table 1

Study purpose, data sources description, definition/operationalization of mindfulness, and other variables measured

Authors and year of publication	Study Purpose	Sample dimension	Sample description	Definition and/or operationalization of Mindfulness	Other variables measured
Allexandre et al. (2016)	Determine the effectiveness of a mindfulness stress management program in a corporate call center	161	Workers from a call center in USA	Developing focused attention, nonjudgmental awareness, openness, curiosity, and acceptance of internal and external present experiences.	Perceived Stress, Emotional exhaustion, Professional efficacy, emotional well-being, emotional role functioning, vitality, productivity
Anderson (2020)	Explore the effects of a mindfulness-based stress reduction intervention	25	Nurses from a hospital in England	Not defined	Satisfaction with life, perceived stress, sickness and absence rates

Arredondo et al. (2017)	Assess the efficacy of an M-BIP training program in reducing stress, increasing mindfulness ability and increasing the Heart Rate Variabilty (HRV)	40	Employees from a Clinical Research Organization in Spain	A training for self-regulation of attention, non-judgmental awareness, adoption of an orientation of curiosity, openness and acceptance of one's experience in the present moment	Stress, Self-compassion, decentering, rumination, burnout, HRV
Bartlett et al. (2016)	Explore the acceptability and feasibility of a Mindfulness at Work Program (MaWP) and its efficacy for improving mindfulness and reducing stress and related health problems, and productivity problems	120	Workers from Tasmanian public sector	Dispositional state of paying attention, intentionally and without judgment, to whatever is going on in any given moment	Perceived stress, psychological distress, health-related quality of life, sleep quality, perception of stressors, social functioning, work limitations, social functioning,
Bu et al. (2019)	Assess the feasibility of a larger scale study mindfulness intervention among trainee UK hospital doctors to reduce stress.	20	Health-care workers from the Uk	The skill of learning to pay attention moment to moment, intentionally, and with curiosity and compassion	Stress, engagement
Chin et al. (2019)	Examine the potential effects of mindfulness training for improving well-being in the workplace.	60	Employees from a marketing firm in USA	Not defined	Stress, coping, affect
Crowder & Sears (2017)	Explore differences in social workers' levels of resilience and burnout after an MBSR intervention	14	Social workers in Canada	Paying attention in a particular way: on purpose, in the present moment, and non-judgmentally	Resilience, burnout, perceived stress, professional quality of life

Dobie et al. (2016)	Investigate the impact of MBSR training amongst practicing mental health professionals	9	Healthcare workers from Australia	Not defined	Depression, anxiety
Fabbro et al. (2020)	Explore the effects of Mindfulness Meditation on self-reported personality traits and perceived stress and burnout.	39	Teachers from school in Italy	Individual's awareness of and attention to one's here-and-now mental and somatosensory experience	Personality, stress, burnout
Fadzil et al. (2021)	Explore the effectiveness of a mindfulness-based intervention in reducing perceived stress, anxiety and depression	35	Nurses in Malaysia	Emphasises present-moment awareness, in which a person purposefully pays attention to the present-moment experience in a nonjudgemental way	Depression, anxiety, stress
Fazia et al. (2021)	Test the effect of an MBI by measuring aspects of psychological wellbeing related to mindfulness and workplace functioning	42	Service workers from Italy	Interventions that are effective in reducing mental health symptoms and in increasing mental wellbeing	Well-being, anxiety, positive affect, stress, self-compassion, interoceptive awareness
Gracia et al. (2019)	Evaluate the effect of a mindfulness training program on the levels of burnout, mindfulness, empathy and self-compassion	32	Healthcare professionals from Spain	Capacity allowing humans to focus attention on the experience of the present moment with openness, curiosity,acceptance and kindness	Burnout, empathy, self-compassion
Heckenberg et al. (2019)	Assess the efficacy of an online mindfulness-based program on aspects of psychological and physiological measures of stress and ill-health.	22	Direct-care workers from Australia	An intervention that involves purposefully paying attention to present-moment mental states, processes and experiences without judgement	Work engagement, perceived stress, effort reward imbalance, self-efficacy and optimism, resilience, active participation, adherence

Hugh-Jones et al. (2017)	Elicit and analyse accounts from past participants of a workplace mindfulness intervention	21	Workers of a higher education institution in the UK	Metacognitive monitoring of present moment experience without judgement	Stress
Hunter at al. (2017)	To ascertain how midwives attending a mindfulness course impacted on their professional practice	9	Midwives from a maternity trust in the UK	Promotes non-judgemental acceptance and curiosity regarding one's own and others' thoughts and emotions	Stress, work relationships
Jay et al. (2016)	Evaluate the effect of a multifaceted intervention strategy on neurocognitive performance	112	Laboratory technicians from Denmark	Not defined	Neurocognitive function, physical function
Kang et al. (2021)	Evaluate whether a regular, short and guided group mindfulness practice improves attention and teamwork.	21	Health professionals from Australia	Body scan, mindful breathing, movement and sensory awareness	Attention, teamwork, communication
Kersemaekers et al. (2018)	Examine the feasibility and effectiveness of a Workplace Mindfulness Training (WMT) in terms of burnout, psychological well-being, organizational and team climate, and performance.	425	Workers from different USA companies	State of paying attention in the present moment, on purpose and in an accepting and kind way	Burnout, perceived stress, psychological well-being, organizational climate, team climate, personal performance
Klatt et al. (2017)	Examine the effectiveness of the Danish translation of MIM and its ability to reduce stress while enhancing quality of sleep and work engagement	57	Workers from a bank in Demark	Not defined	Stress, sleep quality, perceived experience at work

Krick et at. (2021)	Evaluate the growth curve of HRV in the course of an MBI	140	Workers from public services in Germany	An important personal resource	Heart rate variability, stress related vulnerability, self-care, personality, perceived social norm
Lange & Rowold (2019)	Evaluate a mindfulness based leader intervention.	58 teams composed of 58 leaders and 270 subordinates	Workers of organizations in Germany	A trait, varying between individuals naturally; a state, varying between situations within individuals and; a skill, trainable for every individual.	Leadership behavior, irritation
Lilly et al. (2019)	Evaluate the efficacy of an online mindfulness training in reducing stress in EMDs.	323	Emergency Medical Dispatchers in Canada and USA	Awareness that arises through paying attention, on purpose, in the present moment, non-judgementally	Stress
Manigault et al. (2021)	Examine the effects of two types of mindfulness practice on measures of stress and coping.	60	Workers from a marketing company in USA	Not defined	Stress, coping
Michel et al. (2021)	Evaluate the effects of a mindfulness-based intervention on motivation-related constructs, sleep quality, and fatigue	169	Workers from Germany	Promotes openness to experience through the cultivation of a state of non-judgemental awareness	Positive affect, work engagement, hope, fatigue, sleep quality
Montero-Marin et al. (2020)	Explore the feasibility, acceptability, and effects of a Workplace-adapted mindfulness-based programme for the logistics sector (WA-MBP-LS)	68	Workers of a logistic company in Spain	Intervention that trains the mind to adopt nonjudgemental, present-focused awareness	Stress, mental well-being, job satisfaction

Nadler et al. (2020)	Assess the effectiveness of an online mindfulness-based training program	102	Workers from the USA	Observation of moment-to-moment experiences in a nonjudgmental, non-reactive, curious manner, along with acting with awareness and intention	Stress, resilience, positive and negative affect, emotional intelligence, workplace competency
O'Mahony et al. (2016)	Asses the outcomes of participation in a group-based mindfulness training	13	Workers in pediatric and neonatal ICUs in USA	A means to stay present and engaged in moment	Experiential avoidance, cognitive fusion, burnout, depressive symptoms, PTSD symptoms
Orellana-Rios et al. (2017)	Explore the feasibility and effectiveness of a mindfulness and compassion oriented training	28	Healthcare workers from Germany	Awareness of the present moment with width of the mind in which one attempts to observe without interfering	Burnout, stress, anxiety, depression, somatization, emotional regulation, work situation, program impact
Pan et al. (2019)	Evaluate a mindfulness-based intervention for nurses providing care for people living with HIV.	19	Nurses from China	Helps people bring their thoughts, feelings, and body sensations to existing moment experiences	Stress, burnout, anxiety, depression
Pang & Ruch (2019)	Test the effectiveness of two mindfulness interventions on psychological well-being and work-related outcomes	63	Workers from various job branches in Switzerland	To pay attention in a particular way – on purpose, to the present moment, nonjudgmentally	Job satisfaction, task performance, stress
Rich et al. (2021)	Evaluate the impact on stress and work-related outcomes of an app-delivered mindfulness-based program	101	Workers of a University in England	Not defined	Perceived stress, Work-life balance, job engagement, organizational citizenship behavior, Curiosity, Intention to quit

Rupprecht at al. (2019)	Better understand the impact of a second-generation WMT on leader capabilities	13	Workers of organizations in Germany	Paying attention in a particular way: on purpose, in the present moment, and non-judgmentally	Leadership
Slutsky et al. (2019)	Compare the effects of 6-week mindfulness training program with that of a half-day mindfulness training on employee well-being outcomes.	60	Employees from a marketing firm in USA	Not defined	Attentional control, fatigue, job satisfaction, job productivity, work–life conflict, life–work conflict
Steinberg et al. (2017)	Evaluate the feasibility of a workplace intervention for increasing resilience to stress.	32	Health-care workers in USA	Being in the present without judgment.	Burnout, stress
Verdes-Montenegro-Atalaya et al. (2021)	Compare the effectiveness of an abbreviated 4-week MBRS training program in relation to a standard 8-week one on perceived stress	112	Medical interns in Spain	Ability to pay attention on purpose in the present moment, without judgment, to the development of one's own experiences	Stress, adherence to training programs
Verger et al. (2021)	Study how the duration and type of mindfulness practice may enhance employees' well-being.	72	Workers from France	Ability to pay attention, on pur-pose, to the present moment, without judgement	Well-being
Vonderlin et al. (2021)	Evaluate the effects of a mindfulness and skill based intervention	861	Workers from German companies	Nonjudgmental awareness of thoughts, feelings, and sensations	Mental Distress, Health-promoting leadership
Wampole & Bressi (2020)	Examine a MBI effect on reducing burnout	5	Nurses of a psychiatric unit in USA	Practice of directing thoughts and emotions to the here and now and observing in a non-judgmental manner.	Burnout

Weng et al. (2021)	Examine the effect of a brief-MT intervention on smoking cessation	213	Workers in China	Awareness to detach observation and focus on immediate cravings with openness, tolerance and acceptance	Smoking behavior, nicotine dependence
Xu et al. (2021)	Explore ED staff's experience and perspectives of practicing mindfulness using a smartphone app.	24	Emergency Department staff in Australia	Attention training by increasing awareness of the present moment and leaving any fixation on thoughts of the past and future behind	Stress, App use patterns, perceived benefits, perceived barriers

The specificities of each study are mirrored in each's study purpose. However, they can be grouped into more general categories, namely the ones that (1) investigate the impact/efficiency of one or more mindfulness-based interventions in terms of the relation with other variables (all of them), (2) evaluate the acceptability/feasibility of newly developed mindfulness-based interventions in specific contexts (5 of the total, e.g., Steinberg et al., 2017).

Studies present diverse samples. Sample dimension, here understood as the individuals evaluated by others or themselves, ranges from n = 5 (Wampole & Bressi, 2020) to n = 861 (Vonderlin et al., 2021), being the most frequent dimension in the order of the tens (23 of the total, e.g., Pan et al., 2019). Half of the studies have less than 50 participants (e.g., Heckenberg et al., 2019), and the other half have more (e.g. Weng et al., 2021).

Professional fields of the companies for which the participants worked could be grouped into (1) healthcare (18 of the total, e.g., Kang et al., 2021), (2) non-specified sector (9 of the total, e.g., Pang & Ruch, 2019), (3) education (3 of the total, e.g., Hugh-Jones et al., 2017), (4) marketing (3 of the total, e.g., Manigault et al., 2021), (5) public sector (2 of the total, e.g., Krick et al.,2021), (6) social work (Crowder & Sears, 2017), (7) services (Fazia et al., 2021), (8) bank (Klatt et al., 2017), (9) logistics (Montero-Marin et al., 2020).

The samples were retrieved in the majority from Europe (17 of the total), especially from Germany (6 of the total, e.g., Orellana-Rios et al., 2017); and from

America (13 of the total), especially from the USA (11 of the total, e.g., O'Mahony et al., 2016). Samples were also collected from the UK (5 of the total, e.g., Hunter et al., 2017); from Asian countries such as China (2 of the total, e.g., Pan et al., 2019) and Malaysia (Fadzil et al., 2021); and from Australia (5 of the total, e.g., Dobie et al., 2016). Every continent is represented, except Africa.

The mindfulness definitions presented by the authors were addressed mainly in terms of how it is understood (as explained at the beginning of this paper). Mindfulness was most commonly understood as a practice (14 of the total, e.g., Michel et al., 2021), an ability or trait (9 of the total, e.g., Lange & Rowold, 2019), a state (8 of the total, e.g., Kersemaekers et al., 2018), a training/intervention (5 of the total, e.g., Montero-Marin et al., 2020). Among the various definitions found, attention (13 of the total, e.g., Pang & Ruch, 2019) and awareness (8 of the total, e.g., Arredondo et al., 2017) were the most repeated when referring to mindfulness. The term was not defined in 8 of the total (e.g. Chin et al., 2019).

The variables related to mindfulness differed depending on each study's purpose. Mindfulness was mainly related to stress (26 of the total, e.g., Fabbro et al., 2020), burnout (10 of the total, e.g., Kersemaekers et al., 2018) and anxiety (5 of the total, e.g., Orellana-Rios et al., 2017), depression (5 of the total, e.g., Fadzil et al., 2021), and well-being (5 of the total). Among other commonly measured variables are life quality (4 of the total, e.g., Fazia et al., 2021), sleep quality (4 of the total, e.g., Klatt et al., 2017), job satisfaction (4 of the total, e.g., Crowder & Sears, 2017) and work engagement (4 of the total, e.g., Bu et al., 2019).

Table 2 synthetizes research designs, procedure descriptions and measurement times.

Table 2

Research design, procedure description and measurement times

Authors and year of publication	Research design	Procedure description	Measurement times
Allexandre et al. (2016)	Longitudinal, descriptive, correlational	Data was collected using surveys	Pre, during and post-intervention
Anderson (2020)	Longitudinal, descriptive, correlational	Data was collected using surveys	Pre and post-intervention

Arredondo et al. (2017)	Longitudinal, descriptive, correlational	Data was collected with surveys and heart rate sensors	Pre, during and post-intervention
Bartlett et al. (2016)	Longitudinal, descriptive, correlational	Data was collected using surveys	Pre and post-intervention
Bu et al. (2019)	Longitudinal, analytical, experimental	Data was collected with surveys	Pre and post-intervention
Chin et al. (2019)	Longitudinal, analytical, experimental	Data was collected with surveys	Pre and post-intervention
Crowder & Sears (2017)	Longitudinal, mixed-methods, exploratory	Data was collected using surveys and semi-structured interviews	Pre and post-intervention
Dobie et al. (2016)	Longitudinal, analytical, experimental	Data was collected with surveys	Pre and post-intervention
Fabbro et al. (2020)	Longitudinal, analitical, experimental	Data was collected with surveys	Pre and post-intervention
Fadzil et al. (2021)	Longitudinal, analytical, experimental	Data was collected with surveys	Pre and post-intervention
Fazia et al. (2021)	Longitudinal, analytical, experimental	Data was collected with surveys	Pre and post-intervention
Gracia et al. (2019)	Longitudinal, descriptive, correlational	Data was collected using surveys	Pre and post-intervention
Heckenberg et al. (2019)	Longitudinal, descriptive, correlational	Data was collected using surveys and saliva samples	Pre, during and post-intervention
Hugh-Jones et al. (2017)	Longitudinal, descriptive, exploratory	Data was collected with semi-structured interviews	Pre and post-intervention
Hunter at al. (2017)	Longitudinal, descriptive, exploratory	Data was collected using semi-structured interviews	During intervention

Jay et al. (2016)	Longitudinal, analytical, experimental	Data was collected with surveys and physical measures	Pre and post-intervention
Kang et al. (2021)	Longitudinal, mixed methods, descriptive, correlational	Data was collected with surveys and a focus group	Pre and post-intervention
Kersemaekers et al. (2018)	Longitudinal, descriptive, correlational	Data was collected using surveys	Pre, during and post-intervention
Klatt et al. (2017)	Longitudinal, analytical, experimental	Data was collected with surveys	Pre and post-intervention
Krick et at. (2021)	Longitudinal, descriptive, correlational	Data was collected with surveys and heart rate sensors	Pre, during and post-intervention
Lange & Rowold (2019)	Longitudinal, analytical, experimental	Data was collected with surveys	Pre and post-intervention
Lilly et al. (2019)	Longitudinal, descriptive, correlational	Data was collected with surveys	Pre and post-intervention
Manigault et al. (2021)	Longitudinal, analytical, experimental	Data was collected with surveys	Pre and post-intervention
Michel et al. (2021)	Longitudinal, analytical, experimental	Data was collected with surveys	Pre and post-intervention
Montero-Marin et al. (2020)	Longitudinal, mixed-methods, exploratory	Data was collected with surveys and in-depth interviews	Pre and post-intervention
Nadler et al. (2020)	Longitudinal, analytical, experimental	Data was collected with surveys	Pre and post-intervention
O'Mahony et al. (2016)	Longitudinal, descriptive, correlational	Data was collected using surveys	Pre, during and post-intervention
Orellana-Rios et al. (2017)	Longitudinal, mixed methods, analytical, experimental	Data was collected with surveys, saliva samples and semi-structured interviews	Pre and post-intervention

Pan et al. (2019)	Longitudinal, mixed-methods, exploratory	Data was collected with surveys and in-depth interviews	Pre and post-intervention
Pang & Ruch (2019)	Longitudinal, analytical, experimental	Data was collected with surveys	Pre and post-intervention
Rich et al. (2021)	Longitudinal, descriptive, correlational	Data was collected using surveys	Pre and post-intervention
Rupprecht at al. (2019)	Longitudinal, descriptive, exploratory	Data was collected with semi-structured interviews	Pre and post-intervention
Slutsky et al. (2019)	Longitudinal, analytical, experimental	Data was collected with surveys	Pre and post-intervention
Steinberg et al. (2017)	Longitudinal, analytical, experimental	Data was collected with surveys	Pre and post-intervention
Verdes-Montenegro-Atalaya et al. (2021)	Longitudinal, analytical, experimental	Data was collected with surveys	Pre and post-intervention
Verger et al. (2021)	Longitudinal, mixed-methods, exploratory	Data was collected with surveys	Pre and post-intervention
Vonderlin et al. (2021)	Longitudinal, analytical, experimental	Data was collected with surveys	Pre and post-intervention
Wampole & Bressi (2020)	Longitudinal, mixed-methods, exploratory	Data was collected with surveys	Pre and post-intervention
Weng et al. (2021)	Longitudinal, descriptive, exploratory	Data was collected using surveys and semi-structured interviews	Pre, during and post-intervention
Xu et al. (2021)	Longitudinal, descriptive, correlational	Data was collected with semi-structured interviews	Post-intervention

The research designs of the studies were homogeneous. All the studies were longitudinal, and most used experimental designs (19 of the total, e.g., Lange & Rowold, 2019). Some studies were correlational (12 of the total, e.g., Kersemaekers et

al., 2018) and exploratories (9 of the total, e.g., Weng et al., 2021). Mixed methods were also used in 7 of the total (e.g., Montero-Marin et al., 2020).

Data was gathered through quantitative and qualitative methods. These methods included surveys (36 of the total, e.g., Anderson, 2020), semi-structured interviews (8 of the total, e.g., Hugh-Jones et al., 2017), physiological measures (5 of the total, e.g., Heckenberg et al., 2019), in-depth interviews (2 of the total, e.g., Montero-Marin et al., 2020) and focus group (Kang et al., 2021). It must be noted that in terms of waves,

In terms of the measurement times, most studies (31 of the total, e.g., Fazia et al., 2021) gathered the data before and after the intervention. Data were also collected before, after and during the intervention in 7 of the total (e.g. Arredondo et al., 2017); only after the intervention (Xu et al., 2021); and only during the intervention (Hunter et al., 2017).

In Table 3, interventions and instruments/information gathering techniques are presented.

Table 3

Interventions and instruments/information gathering techniques

Authors and year of publication	Intervention	Instruments/Information Gathering Techniques
Allexandre et al. (2016)	One group received the WSM program is an 8-week online, interactive, educational program based on mindfulness meditation. One group received WSM and weekly group meeting. Another group received the WSM, the group meeting and expert clinical support	Perceived Stress Scale, Maslach Burnout Inventory, Mindfulness Attention Awareness Scale, RAND Corporation's Medical Outcomes Study Short Form-36
Anderson (2020)	8-week Mindfulness Based Stress Reduction (MBSR). The course commenced with a 2-hour group face-to-face training session, followed by 6 weeks of online mindfulness training.	Satisfaction with life scale, Perceived stress scale, Mindful attention awareness scale
Arredondo et al. (2017)	M-PBI: 8 weeks training, 8 sessions 2.5 hours each. And daily practice of 12-16min.	Perceived Stress Scale (PSS-14), Five Facet Mindfulness Questionnaire (FFMQ), Self-Compassion Scale (SCS), Experiences Questionnaire-Decentering (EQ-D), Maslach Burnout Inventory-General Survey (MBI-GS), Polar H7

Bartlett et al. (2016)	Mindfulness at Work Program (MaWP) Total class time amounted to 7.5 h, spread across 5 weeks, and in line with other mindfulness programs, a range of formal and informal homework exercises were assigned.	Observable Mindful Behavior, Mindful Attention and Awareness Scale, Perceived Stress, Kessler-10 scale, Assessment of Quality of Life, Jenkins' Sleep Scale, Household Income Labour Dynamics in Australia, Social Functioning Questionnaire
Bu et al. (2019)	This 6-week course was an adaptation of the 'Mindfulness in the Workplace' course that usually runs over 8 weeks. Participants were provided six 2-h mindfulness sessions.	Self-developed questionnaires
Chin et al. (2019)	One half-day live mindfulness workshop after which participants were randomized to one of two conditions: low dose (6 weeks of a waiting period) or high dose (6 weeks of daily mindfulness practice). During the 6-week training period, participants in the high-dose group were expected to complete one 25-min guided mindfulness meditation audio recording each day for 5 days per week.	Perceived Stress Scale
Crowder & Sears (2017)	This MBSR was composed by one 2.5-hour group session each week for a total of 8 weekly sessions and attended 1 full-day weekend session between weeks 5 and 6.	Perceived Stress Scale, Self-compassion Scale, Experiences Questionnaire, Maslach Burnout Inventory, Professional Quality of Life
Dobie et al. (2016)	Eight weeks of daily 15-minute MBSR training interspersed with three 30-minute education sessions	The Depression Anxiety Stress Scale, The Kentucky Inventory of Mindfulness Skills
Fabbro et al. (2020)	Mindfulness Oriented Meditation program is inspired by MBSR. 8 weekly sessions, daily meditation experience and no retreat experience.	Five Facet Mindfulness Questionnaire, Big Five Inventory, Teachers Stress Inventory, Maslach Burnout Inventory
Fadzil et al. (2021)	MINDFULGym comprised a 1-day brief mindfulness-based intervention workshop and 1 h group practice session each month for 3 months together with daily follow-up via WhatsApp group.	The Depression, Anxiety and Stress Scale 21, Perceived Stress Scale 10

Fazia et al. (2021)	The Integral Meditation program was composed by 12 classes given once a week, with a duration of 1hour each.	Clinical Outcomes in Routine Evaluation-Outcomes Measure, State Trait Anxiety Inventory form X1, Five Facet Mindfulness Questionnaire, Positive Affect Negative Affect Scale, Perceived Stress Scale, Self-compassion scale, Multidimensional Assessment of Interoceptive Awareness, Warwick-Edinburgh Mental Wellbeing Scale
Gracia et al. (2019)	A clinical session/workshop was held on the practice of mindfulness and its usefulness. The possibility of following an 8-week training program with specifically designed short guided practices supported by a virtual community based on a WhatsApp group was offered. A weekly proposal in audio and text format and daily reminders with stimulating messages of practice were sent.	Maslach Burnout Inventory, Five Facets of Mindfulness Questionnaire, Jefferson Empathy Scale, Self-Compassion Scale
Heckenberg et al. (2019)	8-week Mindfulness-Based Stress Reduction program delivered online. Participants were provided with a printed manual detailing the instructions for participation in the program. The program consisted of weekly reading and videos as well as 30 min sessions of formal mindfulness meditation six days per week.	ERI questionnaire, Perceived stress scale, Freiberg Mindfulness Inventory - Short Form, Job Demands-Resources Questionnaire, 6-item Brief Resilience Scale,
Hugh-Jones et al. (2017)	MBMBSR-Mindfulness at Work was a workplace adaptation of MBSR. Adaptations from the standard programme were as follows: shorter sessions (2 rather than 2.5 hours); exclusion of the full practice day; and inclusion, in sessions 4 and 5, of the workable ranges model of stress regulation	Self-developed questionnaires
Hunter at al. (2017)	An eight-week Mindfulness course, adapted from Mindfulness-based Cognitive Therapy. This programme consists of eight 60-90 minute group sessions designed to introduce different formal and informal Mindfulness practices	Interpretive Phenomenological Analysis

Jay et al. (2016)	Multifactorial 10-week intervention to the PCMT group consisting of joint mobility exercises focusing on precise motor control. Brief 20minutes sessions 4 times per week.	CNS Vital Signs
Kang et al. (2021)	10-minute program comprising mindfulness exercises and techniques was delivered daily to a multidisciplinary general medicine team based in a tertiary hospital for four weeks.	Toronto Mindfulness Scale (TMS), Subscales of the Surveys on Patient Safety Culture
Kersemaekers et al. (2018)	The WMT program named “WorkingMind". Required participation in 2 day-long training days plus eight 2.5 h-long sessions. The WMT took place in a group setting with 12–25 participants per group. participants were asked to practice mindfulness for at least 10 minutes daily.	The Burnout Measure, The Perceived Stress Questionnaire, The Freiburg Mindfulness Inventory, The Mindfulness Attention Awareness Scale, The WHO-Five well-being scale, Landau Organization and Team Climate Inventory
Klatt et al. (2017)	Mindfulness in Motion (MIM) is an 8 week intervention that encompasses 1 hour group and individual sessions. Additionally, each participant received an MP3 player with brief prerecorded guided individual practice sessions translated from English to Danish and a form to record the daily home practice.	The Perceived Stress Scale, Pittsburgh Sleep Quality Index, Utrecht Work Engagement Scale-9
Krick et at. (2021)	This MBSR encompassed 6 weekly sessions, each with a duration of 2 hr.	Health action process approach, Health-Oriented Leadership scale, NEO Five-Factor Inventory,
Lange & Rowold (2019)	A seven-hour training called Mindful Leadership, consisted of three components: First, a one-day group training session, second, one-on-one coachings (Follow-up 1) and third, a group closing-session (Follow-up 2).	Fragebogen zur Integrativen Führung (FIF), Five Facet Mindfulness Questionnaire, Irritation Scale
Lilly et al. (2019)	Comprised seven modules, each completed on a weekly basis. Two emails were sent each week: one introducing the weekly theme and one providing practice reminders. Completion times for each module ranged from 20 to 30 min and expectations for outside practice were 5–10 min daily	The Calgary Symptoms of Stress Inventory, The Mindful Attention Awareness Scale

Manigault et al. (2021)	High-Dose mindfulness training was composed of a 6 weeks training. Participants were prompted to complete 5 guided audio practice sessions each week (except for the first week where only 2 sessions could be completed).	Self-developed questionnaires
Michel et al. (2021)	Online intervention consisting of three modules practised daily over three consecutive weeks.	Cognitive and Affective Mindfulness Scale-Revised, Positive and Negative Affect Schedule Scale, Utrecht Work Engagement Scale, State hope scale
Montero-Marin et al. (2020)	The WA-MBP-LS is an adaptation of the MBSR programme and encompasses six weekly 90-min sessions. No full-day retreat was offered, but it included the possibility of 15-min, audio-recorded daily practices.	Perceived Stress Scale, Warwick-Edinburgh MentalWellbeing Scale, Job Satisfaction Scale, Five Facet Mindfulness Questionnaire
Nadler et al. (2020)	Online Workplace-Based Mindfulness Training. Content consisted of short videos (6–12 min long), brief guided meditation practices (3–20 min long with an average length of 10 min), and suggestions for how to integrate mindfulness into daily activities at work. Participants were asked to watch the weekly video and practice the guided meditations 6 out of 7 days a week	Five Factor Mindfulness Questionnaire – Short Form, Perceived Stress Scale, Positive Affect Negative Affect Schedule, Positive Affect Negative Affect Schedule, Multidimensional Emotional Intelligence Assessment – Workplace, Workplace Competency Assessment
O'Mahony et al. (2016)	9 sessions, once a week, 2 hours long excepting the first and last session which were half-day sessions. Each session included (1) group discussion to foster cohesion and social support; (2) didactics to educate on topics of psychological flexibility, palliative care, and trauma; and (3) experiential mindfulness and communication exercises.	The Acceptance and Action Questionnaire Version II., Cognitive Fusion Questionnaire, Beck Depression Inventory, Maslach Burnout Inventory, The PTSD Symptom Checklist
Orellana-Rios et al. (2017)	The intervention is a 10-week group program consisting of an initial 2 h session and nine weekly practice days. On practice days, the staff members were offered the opportunity to participate in brief meditations sessions and one-to-one sessions for a period of 4 h per shift.	Maslach Burnout Inventory, Perceived Stress Questionnaire, Hospital Anxiety and Depression Scale, The Symptom Checklist-90-R, Somatization Scale, Emotion Regulation Skills Questionnaire, Goal attainment scaling

Pan et al. (2019)	Mindful Living With Stress (MLWS) intervention consisted of six weekly 2 hr small group sessions and daily life meditation.	The Perceived Stress Scale, Maslach Burnout Inventory, Five Facets Mindfulness Questionnaire, State-Trait Anxiety Inventory, and the Beck Depression Inventory
Pang & Ruch (2019)	Groups gathered once a week in a classroom for eight consecutive weeks and received the training in a group setting led by qualified trainers with each session lasting 2 hr. The MBSP group received a training built on Nhat Hanh's and Kabat-Zinn's work on mindfulness. The MBSR group received a 2-hr version of the standard MBSR curriculum.	WHO-Five Well-Being Index, Perceived Stress Scale-10, Applicability of Character Strengths Rating Scales, Job Satisfaction Questionnaire, Task Performance Questionnaire
Rich et al. (2021)	Headspace was the mindfulness-based self-help training application (app) used for this study. Headspace consists of 30 foundation sessions of 10 minutes each which are available for individuals to use at their convenience. All sessions are repeatable. Headspace uses audio, video, animations and exercises which incorporate opportunities for breath awareness, body scans, focus, and motivation and intentions.	Five-Facet Mindfulness Questionnaire - Short Form, Perceived Stress Scale 10, Job Engagement Scale, subscale of the OCB, Curiosity and Exploration Inventory-II
Rupprecht at al. (2019)	This WMT program named "WorkingMind" has a longer duration requiring participation in two day-long training days in addition to eight 2.5-hour-long sessions and is comprised of content and exercises relevant to leaders and workplace	Self-developed questionnaires
Slutsky et al. (2019)	One half-day live mindfulness workshop after which participants were randomized to one of two conditions: low dose (6 weeks of a waiting period) or high dose (6 weeks of daily mindfulness practice). During the 6-week training period, participants in the high-dose group were expected to complete one 25-min guided mindfulness meditation audio recording each day for 5 days per week.	Attentional Control Scale, Job Satisfaction Scale, Work–Life Conflict Scale, Life–Work Conflict Scale

Steinberg et al. (2017)	The mindfulness-based intervention included meditation, mild yoga movement, and music and was conducted in a group format 1 hour a week for 8 weeks in a surgical intensive care unit during work hours.	Maslach Burnout Inventory, Professional Quality of Life, Utrecht Work Engagement Scale
Verdes-Montenegro-Atalaya et al. (2021)	In GE1, participants received an abbreviated training program whose format was 4 weekly sessions of 2.5 h duration, having to practice for 15 min a day at home. In GE2, the format of the standard training program was 8 weekly sessions of 2.5 h duration together with 30 min daily practice at home.	Perceived Stress Questionnaire, Five Facet Mindfulness Questionnaire
Verger et al. (2021)	Standard 8-week MBSR program. The participants took part in between 2 and 8 in-classsessions of the MBSR program.	Five Facets Mindfulness Questionnaire, Warwick-EdinburghMental Well-being Scale
Vonderlin et al. (2021)	Consisted of three full-day courses (8 hr each) and two 3-hr booster sessions. Mindfulness training was delivered according to the mindfulness concept developed in dialectical behavior therapy. All modules were delivered at intervals of 4 weeks.	Hospital Anxiety and Depression Scale, Heath oriented Leadership questionnaire
Wampole & Bressi (2020)	12 weekly hour-long psychoeducational sessions based on curriculum from Marsha Linehan's Dialectical Behavior Therapy's (DBT) module on Core Mindfulness.	Maslach Burnout Inventory
Weng et al. (2021)	The brief-MT workshop with 2 sessions was held within 2 weeks. Each session lasted for 2 hours with 8–20 participants. Mindfulness meditation was operationalized through training of attention regulation, body awareness and emotion regulation.	Fagerstrom Test for Nicotine Dependence, Self-developed questionnaires
Xu et al. (2021)	Practice mindfulness daily for 4 weeks, using a mindfulness app (Headspace Mindfulness App) for 10 min at a convenient time. The app was designed to provide basic mindfulness training techniques including breathing, imagination and body scan exercises focusing on different bodily sensations.	Qualitative description

The studies used a wide variety of interventions. Given the organisations' different needs and the studies' goals, the interventions will be categorised in nature (self-developed or pre-existent), length and modality (online, face-to-face or mixed).

The nature of the interventions consisted mainly of self-developed (33 of the total, e.g., Chin et al., 2019) that were designed to fulfil the specific needs and time availability of the group/participants/workplace in which they were carried out. These interventions were mostly based upon the standard MBSR training, which was used in 7 of the total (e.g. Anderson, 2020).

In terms of length, the interventions varied between 2 and 12-week long, with a duration of between 4 and 40 hours of training. Most of them were among 12-20 hours and 6-8 weeks long. Modality-wise, on-site intervention accounted for most of the training (30 of the total, e.g., Hugh-Jones et al., 2017), followed by online (7 of the total, e.g., Rich et al., 2021) and mixed (3 of the total, e.g., Anderson, 2020). Most of the interventions were wave 2 (30 of the total e.g. Weng et al., 2021) and others were wave 4 (10 of the total e.g. Steinberg et al., 2017).

Regarding mindfulness measures, even though not all the studies measured it directly but in terms of the intervention relationship with other variables of interest, the ones that measured it directly used surveys. Of these surveys, the most used was the Five Facet Mindfulness Questionnaire (11 of the total, e.g., Verger et al., 2021), followed by the Mindful Attention Awareness Scale (4 of the total, e.g., Anderson, 2020), Freiburg Mindfulness Questionnaire (2 of the total, e.g., Kersemaekers et al., 2018), Cognitive and Affective Mindfulness Scale (Michel et al., 2021), Toronto Mindfulness Scale (Kang et al., 2021) and Kentucky Inventory of Mindfulness Skills (Dobie et al., 2016).

Table 4 presents the main findings of the articles under review.

Table 4

Main findings

Authors and year of publication	Main Findings
Allexandre et al. (2016)	All active groups demonstrated significant reductions in perceived stress and increases in emotional and psychological well-being compared with control. Group support improved participation, engagement, and outcomes.

Anderson (2020)	Demonstrated that satisfaction with life, perceived stress, and mindful attention awareness scores were all significantly improved in a cohort of critical care nurses immediately following an 8-week mindfulness-based stress reduction programme. Longevity of positive effects was also demonstrated.
Arredondo et al. (2017)	Support the efficacy of this brief practice mindfulness program in reducing stress in a workplace. Moreover, it has also been effective in increasing mindfulness ability, HRV, self-compassion, and decentering as well as decreasing burnout syndrome.
Bartlett et al. (2016)	High degree of acceptability. Compared with the control, the primary outcome of mindfulness improved for MaWP participants, as did perceived stress, psychological distress, health-related quality of life, and social functioning.
Bu et al. (2019)	This mindfulness course is promising but further modifications are required before this intervention programme may be trialed and implemented in the UK.
Chin et al. (2019)	High-dose mindfulness training reduced both perceived and momentary stress, and buffered employees against worsened affect and decreased coping efficacy compared to low-dose mindfulness training.
Crowder & Sears (2017)	The mindfulness-based intervention significantly decreased the treatment group's perceived stress. Intervention participants reported positive changes in attitudes, perspectives, behaviours, and energy in relation to their workplace relationships with peers and supervisors.
Dobie et al. (2016)	A brief MBSR programme for mental health professionals was associated with perceived reductions in psychological distress.
Fabbro et al. (2020)	Psychological dimensions such as perceived occupational stress and burnout, dispositional mindfulness, and certain personality traits were positively altered by an 8-week MM program among teachers of students at various educational levels.
Fadzil et al. (2021)	A brief mindfulness-based intervention was effective in reducing perceived stress and anxiety among nurses.
Fazia et al. (2021)	Demonstrated to bring beneficial effects in mindfulness, in perceived stress, self-compassion, interoception and psychological wellbeing, and overall was effective in increasing the positive aspects of wellbeing and in reducing stress.
Gracia et al. (2019)	Showed a decrease in emotional exhaustion and an increase in self-compassion. These being factors that can produce well-being and exert a positive impact upon burnout in this vulnerable group.
Heckenberg et al. (2019)	Online mindfulness-based programs induce short-term improvements in fatigue and anxiety in employees. Additionally, we also report a decrease in overcommitment and increases in optimism and mucosal immunity.

Hugh-Jones et al. (2017)	Enhanced attentional capacity was found to be important in stress reducing, but resonance, self-care, detection of stress markers, perceiving choice, recovering self-agency and upward spiraling may be central mechanisms that lead to positive outcomes too.
Hunter at al. (2017)	Focusing on the present moment enabled participants better to identify the boundary between self and other. This led to an increased sense of control and a reconnection with and reframing of relationships with colleagues and the women in their care.
Jay et al. (2016)	A 10-week physical-cognitive-mindfulness training intervention did not improve maximal strength or RFD of chronically painful muscles. Neither did neurocognitive performance change over the intervention period.
Kang et al. (2021)	A brief mindfulness program, that is not time and resource intensive, is feasible in an acute hospital environment and improves individual attention and team cohesion.
Kersemaekers et al. (2018)	Compared to the pre-intervention period, the intervention period was associated with greater reductions in burnout and perceived stress, improvements in mindfulness, well-being, and increases in team and organizational climate and personal performance.
Klatt et al. (2017)	Supports the cross-cultural effectiveness of MIM for reducing stress while enhancing quality of sleep and work engagement in bank employees.
Krick et at. (2021)	Continuous increase of HRV during the intervention and that development of HRV varies considerably among participants. Those who show the strongest HRV increase are those with the highest self-care, the lowest vulnerability, the highest conscientiousness, and the most favorable social context.
Lange & Rowold (2019)	Such training has the potential to enhance leaders' trait mindfulness, reduce their levels of irritation and develop their leadership sustainability in terms of transformational and destructive leadership behaviors.
Lilly et al. (2019)	A 7-week MBI presented online significantly reduced reported levels of stress among emergency medical dispatchers when compared with a control group. Reductions in stress were observed from pretreatment to post-treatment, as well as from pretreatment to a 3-month follow-up.
Manigault et al. (2021)	For both audio-guided mindfulness practice and daily life mindfulness practice, more frequent practice was associated with diminished increases in self-reported stress ratings, stressor frequency, and stressor intensity, as well as diminished decreases in successful coping.
Michel et al. (2021)	The intervention is effective in increasing work engagement, hope and sleep quality as well as in reducing fatigue.
Montero-Marin et al. (2020)	The WA-MBP-LS could be feasible when applied to for-profit, private sector logistics companies. It seemed to be acceptable in this professional context and its application was related to reductions in perceived stress and improvements in mental well-being and job satisfaction.

Nadler et al. (2020)	Demonstrate the effectiveness of an online-based mindfulness training program for enhancing well-being, self-perceptions of emotional intelligence, and workplace performance.
O'Mahony et al. (2016)	Provide evidence that a multimodal training to enhance resilience among pediatric palliative care professionals may be beneficial for reducing mental health symptoms in this population. Participants who engaged in the 8-week program demonstrated significant reductions in both depressive and PTSD symptoms.
Orellana-Rios et al. (2017)	The training may be a feasible, effective and practical way of reducing caregiver-distress and enhancing the resources of palliative care teams.
Pan et al. (2019)	Supports the acceptability and potential benefits of the mindfulness based intervention in helping nurses caring for people living with human immunodeficiency virus to manage stress and emotions, and improve their acceptance of others and attention.
Pang & Ruch (2019)	Both of the interventions showed effects on job satisfaction. The task performance only increased when character strengths have been fused into the mindfulness training. Some effects of the mindfulness interventions do not vanish even when regarding longer time periods (up to 6 months after the intervention).
Rich et al. (2021)	Analysis showed significant increases in several aspects of mindfulness and a significant reduction in perceived stress but no significant effects for work-related outcomes.
Rupprecht at al. (2019)	Exhibited impact on three self-leadership capacities: mindful task management, self-care and self-reflection and two leadership capacities: relating to others and adapting to change. Participants' recounts additionally suggested effects may expand to the level of the team and the organization.
Slutsky et al. (2019)	Small doses of mindfulness training may be sufficient to foster increased perceptions of job productivity.
Steinberg et al. (2017)	The intervention was well received and got a good retention rate. Work satisfaction increased significantly in the intervention group with no change in the control group. Participants rated recognizing their stress response as a main benefit of the intervention.
Verdes-Montenegro-Atalaya et al. (2021)	Compared with an abbreviated program and no intervention, a standard 8-week MBSR training program produced significant improvements in PSQ total score aimed at Primary Care professionals.
Verger et al. (2021)	Participants reported a preferential use of brief, informal practices. Those who preferentially used informal practices showed the same increase in well-being as those who reported preferentially using formal practices. The number of days of practice did not moderate the effect of the intervention on well-being.
Vonderlin et al. (2021)	These findings indicate how HoL can be effectively trained to increase supervisors' health oriented selfcare- and staff-care and reduce their mental distress.

Wampole & Bressi (2020)	The intervention may be of benefit to psychiatric nurses for challenging negative thoughts about the patient group and to manage stress inducing interpersonal dynamics.
Weng et al. (2021)	A brief mindfulness-based intervention for smoking cessation on Chinese women in the workplace showed feasibility but no significant intervention effect on abstinence.
Xu et al. (2021)	Participants reported that mindfulness practice had numerous benefits including better stress and anxiety management, as well as improved general well-being

The main findings of the studies demonstrate a certain homogeneity in terms of the effectiveness of the interventions that were carried out. Taking into account the total number of studies, all of them reported positive outcomes in terms of their purposes.

These purposes were mainly showing the relationship between mindfulness and different variables that were mainly associated with mental health (e.g. stress, burnout, well-being, life quality, anxiety, depression, sleep quality) and work performance (e.g. burnout, life quality, job satisfaction, work engagement, leadership).

While others were evaluating the acceptance/feasibility of these interventions to be able to carry them out in a wide set of contexts, even those in which time or resources are limited (e.g. ICU, psychiatric units, emergency settings, call centers). The results also showed support for different ways in which mindfulness-based interventions can be applied with different lengths (e.g. 2 weeks, 4 weeks, 6 weeks, 8 weeks, 12 weeks).

The outcomes supported that these types of interventions were effective even with different modalities (e.g. online, on-site and mixed) and with a wide range of different directly physical health-related outcomes (e.g. sleep quality, burnout, nicotine dependence, fatigue, heart rate variability). Table 5 presents limitations, suggestions for future studies and practical implications mentioned by the authors.

Table 5

Limitations, suggestions for future studies and practical implications

Authors and year of publication	Limitations	Suggestions for future studies	Practical implications

Allexandre et al. (2016)	Population was mainly female and caucasian. Interaction bewteen the research and clinical staff. Small sample size and selective attrition.	Evaluate the efficacy of WSM programs. Better track stress reduction practices. Collect psychological and physical health outcomes, systematic measures of productivity, health care costs, and absenteeism.	Group practice of mindfulness techniques, with minimal external support, significantly improved program participation and benefits, suggesting the intervention may be cost-effective and easily scalable.
Anderson (2020)	No exclusion criteria. Response bias of the self-report questionnaires.	Evaluate the effects of an MBSR training programme with a larger sample size, more stringent recruitment methods, and a control group to further determine psychometric effects following an MBSR intervention.	Mindfulness training is a feasible and accepted intervention that critical care nurses may benefit from in terms of quality of life, perceived stress, and mindfulness awareness.
Arredondo et al. (2017)	Sample size, voluntary participants, not representative sample ofr the company's employees	Larger samples and examine the impact of such interventions on costs, long-term productivity, health outcomes, and assess the mechanisms of action of these mindfulness interventions.	An 8-weeks mindfulness brief practices program is an effective and time-efficient tool to help employees to quickly reduce stress and improve their well-being.
Bartlett et al. (2016)	Sample size, type of control, location and inflexible work schedules	Establish validity, reliability, and scalability of methods of assessing observable changes following mindfulness training.	The intervention appears to have potential merit as a workplace intervention for public sector employees across a range of outcomes.
Bu et al. (2019)	Non-validated measures of stress and wellbeing, sample size, lack of control group	Investigate alternative methods of delivering mindfulness such as brief ward-based sessions or short practices integrated into teaching sessions	Further development and testing are required prior to trialling the intervention programme in a larger-scale study such as a randomised controlled trial.
Chin et al. (2019)	Sample size, self-report assessments	Consider the importance of developing more objective and accurate means of tracking the nature and extent of participant home practice. Compare the efficacy and feasibility of the mindfulness training program used in this study to that of other programs such as 8-week MBSR.	Provide well-controlled evidence that mindfulness training programs can reduce momentary stress at work, suggesting that more intensive mindfulness training doses may be necessary for improving workplace wellbeing outcomes.

Crowder & Sears (2017)	Size and representativity of the sample. Measures relying on self-reporting tools.	Repeating this study with a larger representative sample over a longer time period with the goal of providing an effective intervention aimed at protecting and strengthening personal and professional wellbeing among social workers.	MBSR appears to be a promising approach in reducing stress in social workers and strengthening resilience through increasing self-compassion and the ability to decentre, and by reducing perceived stress, compassion fatigue, and risk of burnout.
Dobie et al. (2016)	Sample size, no control group	Replication with a larger population, longitudinal evaluation of the brief MBSR approach	A brief MBSR programme can be incorporated into the full-time workloads of practicing mental health professionals, potentially addressing a significant unmet workplace need.
Fabbro et al. (2020)	Sample size, gender bias	Move away from an exclusive reliance on self-report measures to a broader array of objective outcome measures. Utilize a follow-up session to allow analyses of any long-term stability of the psychological changes assessed in the present short-term research.	The practice of mindfulness may positively impact critical dimensions of teachers' personality traits, such as neuroticism and conscientiousness, which were found to be critically relevant in relation to work management and job performance.
Fadzil et al. (2021)	Lack of randomisation and control group, self-report scales, sampling	Measure the impact of the duration of mindfulness-based intervention home practice on stress levels, as well as on other psychological domains. Use clinician-rated questionnaires to evaluate stress, anxiety and depression.	A brief mindfulness-based intervention for hospital staff nurses can yield meaningful outcomes, especially in terms of preventing stress and enhancing well-being among healthcare workers.
Fazia et al. (2021)	Sample size, voluntary sampling	Collect follow-up measures that allow to discuss the long-term effects and the stability over times of the observed changes related to interventions.	MBI can promote wellbeing through different domains and those kinds of interventions can bring benefits even in working populations that are not highly exposed to stress or anxiety.
Gracia et al. (2019)	Lack of control group.	Future randomized controlled studies with larger sample sizes are needed	Demonstrated psychological and cognitive effects that may afford wellbeing and have an impact upon burnout by reducing emotional exhaustion and incrementing self-compassion.

Heckenberg et al. (2019)	Sample size, inclusion of psychological constructs that partly overlap.	Replicating the findings in a larger sample that allows for control of this effect is desirable	Support for the use of online MBSR programs for employees as we observed both short term improved affect and potentially, more enduring changes in coping
Hugh-Jones et al. (2017)	Subjective model and probably incomplete	Use this model to examine possible mediators and moderators	Understanding mechanisms of change may help support participant engagement and trust in work-based mindfulness programmes, and enhance participants' ability to apply mindfulness in their work life.
Hunter at al. (2017)	Self-selecting participants. Influence of the principal investigator.	Not mentioned	Mindfulness may provide an effective way to address the high levels of stress, role dissatisfaction and workplace bullying found in Midwifery, by improving both the working environment and patient care.
Jay et al. (2016)	Inability to blind participants to the treatments	Not mentioned	Further exploration of neurocognitive impairment and musculoskeletal pain is warranted
Kang et al. (2021)	Lack of a control group and selection bias. Response rate for the survey was low in some weeks leading to large standard errors. Applicability to other healthcare settings is uncertain.	Confirm these results in other settings and potentially measure patient outcomes (adverse events, length of stay and readmission rates) and staff outcomes	Is possible to improve staff wellbeing as well as patient and organisational outcomes through mindfulness-based interventions.
Kersemaekers et al. (2018)	Absence of randomized control group, incompleteness of data, organizational restraints.	Aim at collecting more complete data and more control data. Preferably, more rigorous designs should be employed, such as Randomized Controlled Trials (RCTs) or designs that are adaptable to the needs of the workplace	Interventions which enhance workplace well-being and performance are not only valuable for an employee's well-being and reduction of chronic stress and mental health issues, but would also have considerable positive benefits for organizations and the society as whole.

Klatt et al. (2017)	Sample size, post-intervention dropout	Extend to a larger population of workers in a variety of countries and occupational settings, delve deeper into reasons for drop out, and explore if results correlate to healthcare utilization costs or health status	Demonstrates the feasibility of the cross-cultural translation of MIM as an effective MBI that can be generalizable to populations outside the American worksite.
Krick et at. (2021)	Self-selection bias, no control group.	Use a waitlist control group and an active control group to investigate the relative trajectory of MBI compared to those who receive no intervention and other comparable interventions.	Learning more about differential effects of workplace health promotion programs and individual variation in benefitting helps organizations and practitioners to streamline and adapt MBIs to the needs of specific groups to optimize the intervention effectiveness
Lange & Rowold (2019)	Sample size, further exploration of mediators/moderators, self-assessment	Investigate in larger sample sizes. Look into mediating and moderating effects. Use objective indicators for stress like cortisol or heart-rate variability.	Expand the effects of mindfulness-based interventions and integrate those to the organizational context. Practitioners should be incentivized to invest in mindfulness-based programs in order to develop employees holistically.
Lilly et al. (2019)	Although enrolled call centres initially indicated willingness to allow participants time during work hours to complete the intervention, many participants were not provided this opportunity.	Incorporation of a different mindfulness measure such as the Five Facet Mindfulness Questionnaire	Online MBIs are a promising direction for clinical prevention and intervention, as this approach offers affordability, convenience and greater geographical reach. Since they can significantly reduce stress in an emergency responding population, that similar samples may benefit in the future from such tailored interventions.
Manigault et al. (2021)	Measures reliant on self-report, no way of knowing if participants who progressed through a full audio lesson actually listened to the full recording.	Use measures of mindfulness practice based on time. Also, examining the dose–response relationship between mindfulness training adherence and trial outcomes in more varied populations is warranted to evaluate generalizability.	Much of the mindfulness meditation RCT literature to date has not measured or reported guided or daily life practices, and this work suggests that measuring both may be important for understanding the stress buffering effects of mindfulness meditation training.

Michel et al. (2021)	No tracking of exercises completion, sample size	Include a tracking system in intervention research and measure participants' preferences for different intervention activities.	Mindfulness and positive activities could be used to increase work engagement and hope. In addition, the intervention shows short-term improvements in sleep quality and fatigue.
Montero-Marin et al. (2020)	No randomized participants enrolment, self-report questionnaires	Use these results and that explanatory framework to better understand how to effectively implement an MBP in workplace contexts.	Serve as a template for more complex and powerful future designs to test other intervention formats, intensities, outcomes; considering the necessary adaptations to suit different professions in order to gain flexibility when applying the programme.
Nadler et al. (2020)	Self-reported measures, follow-up results not collected, high atrittion rate	Seek a larger sample of both participants and colleague/other raters and efforts should continue to be made to utilize multiple modes of assessing the benefits of mindfulness at work.	Support for the benefits of online mindfulness interventions in workplace settings, even for those participants who already have prior experience with mindfulness.
O'Mahony et al. (2016)	Lack of a control group, so causality cannot be inferred. All data are self-reported. Potential for selection bias.	Offering a hybrid program with face-to-face sessions, web meetings, and online audiovisual supports may increase access for busy providers and overcome barriers presented by long commutes. Objective measures of stress and work performance outcomes should be assessed	Mindfulness-based programs may help providers recognize and address symptoms of depression and PTSD.
Orellana-Rios et al. (2017)	Short intervention, lack of control group, sample size	Consider a longer training duration and adding guided, larger practice spans, outside working hours in order to assure in depth practice.	A more targeted implementation of mindfulness and compassion-oriented practices in clinical settings, that can be beneficial for both practitioners and their patients.

Pan et al. (2019)	Sample size, one-group design	Scheduled supervisory program for nurses during the first weeks after the completion of the MLWS intervention should be tested. Potential personal events before and after the completion of this type of program	Enhance understanding about strategies that may be successful in implementing a mindfulness intervention with nurses caring for PLWH within a busy and stressful work environment in China
Pang & Ruch (2019)	Sample size, randomization was constrained due to availability, measures used were rather focused on the task	Add a new condition to further distinguish between the effects. Use a more objective measure of performance or look at the other aspects of performance at work. Explore other mediators.	Mindfulness interventions are useful resources for facilitating employees' well-being and performance. Mindfulness alone seems to function better when regarding psychological well-being at work, but the combination of character strengths and mindfulness seems to influence the participants on a motivational level and thus bolsters task performance.
Rich et al. (2021)	The measures used are all self-reported and therefore susceptible to the biases inherent in such outcomes. The study was evaluating a commercially available MBP which may have resulted in socially desirable responses.4	Address the limitation of self-reported outcomes, explore variability in response to the Headspace app to identify which participants benefit most from its use, more research is needed on the mechanisms by which different types of MBP affect the facets of mindfulness and how these in turn affect stress and different work outcomes.	The offer of the Headspace app in the Higher Education sector may result in reduced perceived stress. If improvements in work-related outcomes are also to be seen, then users need to be encouraged to complete a minimum level of practice.
Rupprecht at al. (2019)	Sample size, results presented might be skewed toward an overly enthusiastic view of the potential of mindfulness for leadership.	Compare different training types and a control condition to assess the specific effects of training components on leader capabilities.	WMT may be a promising tool for self-directed leadership development and outline avenues for future research.
Slutsky et al. (2019)	Sample size, self-report assessments	Include a nonactive control group to provide confidence that the intervention did have an impact versus changes that may occur due to time.	Underscores the salutary effects of implementing mindfulness training into the workplace.

Steinberg et al. (2017)	Sample size, administration support in workplace interventions	Larger sample size and longer period of follow-up	Workplace group interventions aimed at decreasing the negative effects of stress can be applied within hospital intensive care units.
Verdes-Montenegro-Atalaya et al. (2021)	Sample size lower than initially calculated. No monitorization of the practice after the intervention	Expand the exhaustive investigation of abbreviated programs that improve the psychological discomfort of these professionals, and analyze their cost-effectiveness so that the SNS can include these programs in its policies, with a guarantee of adherence and long-term profitability.	New studies about abbreviated training programs are needed to provide effective treatments which improve well-being of these professionals.
Verger et al. (2021)	Sample size, no formalized randomization	Continue to analyse how mindfulness-based programs tailored to the preferred type of practices can improve adherence, practice time, and positive outcomes at work.	Brief and informal mindfulness practices appear to be a promising means of increasing well-being in everyday life
Vonderlin et al. (2021)	Bias due to confounding variables, high drop-out rates	Explore additional moderator variables, linkages to established work stress models, and improvements of these interventions to increase their effectiveness for employees.	Health oriented Leadership interventions may be a useful methodology for organizations to enhance their supervisors' explicit engagement in their employees' mental health
Wampole & Bressi (2020)	Limited participation, high rare of drop out.	Incorporating the intervention into a normal workday.	The intervention has the potential to promote better emotional regulation in the workplace and beyond. Social worker education on mindfulness techniques may represent a resource for improving the emotional wellness and effective patient care.

Weng et al. (2021)	Intervention fidelity, formal assessment tools on mindfulness, assessment of potential mediators or moderators	Future trials on brief interventions should balance the busy schedule of participants by increasing the frequency and length of the brief-MT sessions to overcome difficulties in learning and daily practice.	This brief-MT intervention, which only had 2 sessions, might be too brief as it was much shorter and less intensive than the standard MT intervention.
Xu et al. (2021)	It only explored the user's immediate experience after a short exposure to the intervention. The majority of the participants were self-selected for the interviews which could create selection bias and decrease the validity of the findings.	A better understanding of the self-directed stress management intervention is essential for its future implementation in a larger scale workforce. To successfully implement this type of intervention, it is essential to consider both barriers and enablers when planning future mindfulness initiatives.	Practicing mindfulness with a smartphone app is a useful strategy to promote ED staff wellness and manage stress. Healthcare organisations should consider the implementation of a mindfulness app for staff.

The limitations signalled by the authors are diverse. Twenty-one studies (e.g. Dobie et al., 2016) reported limitations related to the sample size and sample representative. Thirteen studies (e.g. Hunter et al., 2017) mentioned limitations in regards to selection difficulties or biases. Twelve studies (e.g. Anderson, 2020) signalled an issue with the use of self-reported measures. Nine studies (e.g. Orellana-Rios et al., 2017) reported the absence of a control group as an issue with the validity of the results. Five studies (e.g. Klatt et al., 2017) mentioned the drop-out rates as a significant limitation.

Concerning suggestions for future studies, it was proposed to (1) work with larger samples (12 of the total, e.g., Lange & Rowold, 2019), and (2) use more objective indicators to measure the effectiveness of the interventions (12 of the total, e.g., Kersemaekers et al., 2018), (3) keep track of the long terms effects of the interventions (7 of the total, e.g., Fazia et al. 2021), (4) look into possible mediators/moderators (6 of the total, e.g., Vonderlin et al., 2021), and use more rigorous designs that include control groups (6 of the total, e.g. Slutsky et al., 2019).

In terms of the practical implications, the great majority of the studies (36 of the total, e.g., Verger et al., 2021) uplifted the effectiveness of mindfulness-based interventions in work-related contexts as well as in personal/social domains and the

need to replicate the interventions in different contexts to keep learning about the mechanisms through which it is effective and the variables it relates.

Discussion

This systematic review of the literature constitutes a relevant contribution to organisations where there are people who work in a paid or unpaid manner. The present work is a synthetic document that aims to be an element of help in the decision-making process of organisations or their leaders, to carry out training or interventions based on mindfulness.

The interest in the care and study of mental health has had a growth and expansion in people's lives and society as a whole. Hence the increase in research that aims to understand more and more holistically the effect certain types of interventions have on the improvement of different variables related to mental health. Mental health is an issue that concerns and affects all human beings and is related to how it is lived, related and worked. Hence the interest in the care of it on the part of organisations that, while pretending to take care of their workers, also want to ensure the performance of their functions and their relationship with growth and profitability.

In this context, mindfulness has gained significant strength (Jayawardene et al., 2017) as an intervening tool that seems to have success and positive effects on improving specific mental health indicators and work performance (Scheepers et al., 2018). However, it does not negate the need to continue increasing understanding of mindfulness-based interventions and their role in work contexts, the variables related to it and the mechanisms through which it acts.

The vast majority of the interventions reported in the articles included in this review had positive effects or changes associated with improving certain variables that are directly related to mental health and work performance. As stated in the introduction of this work, mindfulness does not have a consensus in its definition and can be understood as a practice (Hervas et al., 2016), a state (Kabat-Zinn, 2006) or a trait (Allen & Kiburz, 2012).

In the interventions reviewed, the conceptualisation of the term mindfulness did not seem to have a particularly significant weight in how the intervention was approached. When working through interventions, it is usually approached holistically

as (1) a practice that can be performed, (2) a state that can be achieved and (3) a trait that can be developed over time.

From the main theoretical model that is based on the planning and implementation of mindfulness-based interventions, developed by Kabat-Zinn (2006), called the Mindfulness-Based Stress Reduction Program, we work mainly on cultivating acceptance, abandonment of premature judgments, compassion, gratitude, the ability to see the world with a beginner's mind, and detachment. Due to their characteristics, the interventions applied aimed to work, to a greater or lesser extent, these principles relatively transversal to the understanding of mindfulness as a tool to improve mental health. With these skills, it becomes possible to develop a greater awareness of mental, emotional and behavioural patterns to improve quality of life and physical and psychological well-being (attention, stress, burnout, anxiety).

The number of studies available emphasises the growth of interest in the study of mindfulness. At the same time, it points out the deficiencies and difficulties of the studies carried out so far and the need to improve the methodological tools and the rigour with which they are carried out, especially in the field of interventions. Additionally, it was evident that many authors were more concerned with the evaluation of change in the variables of interest than in the description, nature and implementation of the interventions. For this reason, it would be relevant for future research to be more comprehensive in describing interventions to facilitate their replication.

The samples used included a very variable number of participants and depended on the organisation in which the intervention was carried out, being that most oscillated between the order of tens. The authors highlighted problems related to workers' time and availability in terms of participation in the intervention and the drop-out rate.

Additionally, although most of the interventions were carried out in occupational health contexts, it is evident that they are also helpful and relevant in different work contexts and that the effects are equally beneficial. Regarding the geographical location of the participants, there was variety in terms of countries and continents, and the results seemed to point in the same direction.

In the interventions reviewed, the research design par excellence was experimental since it allows a broader picture of the changes that can occur as a result of an intervention. Almost all were longitudinal because they allowed precisely to

evaluate the change through a period and not in a single moment. However, some studies pointed to the lack of control groups as a problem and a difficulty to address.

Although most of the instruments used to measure the efficacy and effects of the interventions were validated questionnaires and interviews, which have been validated in the past as data collection techniques, they have the limitation of being self-reporting techniques and, therefore, can be subject to questioning. For future studies, it is suggested to use more objective measures, which do not depend on self-report.

The interventions that were proposed and implemented were shown to be effective for the objectives set out in each specific research, whether related to stress reduction (e.g. Lilly et al., 2019), reduction of burnout (e.g. Arredondo et al., 2017) or increase in well-being (e.g. Verger et al., 2021). A large part of the variables that were positively related to the interventions directly or indirectly affect the mental health of workers and their work performance. Thus, they are directly related to the Sustainable Development Goals included in the 2030 agenda, especially ensuring healthy lives and promoting well-being (United Nations, 2000).

The results of this work reinforce the trend and interest that has been placed in mindfulness interventions, especially in terms of their effectiveness in improving the quality of life and mental health of people. Thus, in congruence with what has been found in other reviews (e.g. Bartlett et al., 2019), the usefulness of mindfulness-based interventions to work on different variables of psychological life, such as work-life through organisational interventions, regardless of the type of organisation in which they are carried out, or the modality (e.g. online) that is used, is confirmed.

The main contribution of this work and the way it differentiates from the rest is that it doesn’t focus on just one population (e.g. health-care), just one modality of intervention (e.g. online) or just one psychological variable (e.g. stress). It intends to provide a broader perspective on how these interventions can be effective in different populations or work contexts. Almost without differentiation of the sample that it’s being applied in, as well as no differentiation on the way it’s delivered (either online or on-site). It also pretends to show its effect and relationship with different variables, which is an uncommon thing to do in past literature reviews on this topic.

It must be noticed that mindfulness-based interventions merely put responsibility on people, but it's critical to recognize that workplace stress is a systemic issue. Organisations should engage actively to lessen stressors in the workplace in addition to

using mindfulness as a strategy for stress management. Organisations can foster a more enduring and encouraging work environment for their employees by putting strategies into place that address the underlying causes of stress, such as an excessive workload, a lack of support networks, or an undesirable organizational culture. This mindset change from personal accountability to corporate accountability can result in more thorough and effective treatments that genuinely support employee well-being.

Additionally, it's crucial to go beyond a strictly descriptive approach when talking about mindfulness-based interventions and examine how mindfulness itself is always growing. Beyond its basic conception as a practice, state, or trait, mindfulness has undergone tremendous evolution and change over time. Understanding the subtleties and many viewpoints on mindfulness can give important insights into how it might be used in various work settings. We can better grasp the larger implications and future directions of mindfulness-based interventions by examining emerging trends, such as the application of mindfulness in leadership development or its interaction with other well-being practices.

Limitations

This systematic review of the literature has some limitations. Publication bias was not considered, leading to more unpublished studies with results that differ from those presented in this research. This work excluded all articles not present in the selected databases, which although understandable, may have also decreased the number of interventions analysed. In this way, future research can expand databases.

This work encourages additional investigation and study in the area. Future research can offer light on the potential of mindfulness interventions to address not only individual well-being but also the larger systemic elements that fuel job-related stress and support sustainable work environments by adopting a more thorough and contextualized approach. Additionally, it would be advised to include an analysis of the models behind the interventions.

Practical Implications

This research systematises mindfulness-based interventions in the organisational context, making it a job that contributes to human resource management practices in

any organisation. Human resources professionals and managers can find in this work an action guide that can allow them to choose or recreate practices that have empirical evidence of their effectiveness in different variables, different areas of application and different contexts.

Likewise, the results presented could be helpful to even workers and human beings in general since mindfulness is not an exercise that is limited only to the organisational context, nor does it necessarily depend on an organisation to be implemented in people. However, there are different ways to access it and, thus, also access the potential benefits that it has been evidenced to have. However, this work calls for the promotion of intervention techniques that have scientific support and have been empirically tested.

Overall, it is expected that the systematic presentation of mindfulness-based interventions will help to improve the mental health of professionals who are part of the organisational contexts and the organisations themselves.

Conclusion

This paper identified and characterised empirical research on mindfulness-based interventions in work contexts in the last five years (2016-2021), taking into account different psychological variables in different work contexts and with different types of intervention in terms of modality and duration.

Despite the number of empirical studies eligible for this review, there is a clear need for more research that considers the limitations of previous studies, in methodological terms, to increasingly better understand the mechanisms by which mindfulness-based interventions act, and there may be greater standardisation in how they are carried out in organisational contexts.

The results of this research confirmed and were consistent with the evidence in the previous literature on the effectiveness and applicability of mindfulness-based interventions in organisational contexts. However, future research should adopt the suggestions about possible publication biases and the databases used. Likewise, it is expected that this work will be helpful for human resource managers when making decisions about the interventions to be implemented to improve the mental health of their employees.

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