

MINDFULNESS AND WORKPLACE SAFETY. A SHORT LITERATURE REVIEW

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ABSTRACT

Background: Workplace accidents have repercussions that go beyond workers' health and productivity, and also compromise professional satisfaction and relationships. Among the potential causes of occupational accidents, workers' decreased presence may be due to a reduced capacity to remain present in each moment, namely during labour tasks. **Objectives:** To identify the current evidence on the association between mindfulness and workplace safety indicators, safety performance behaviours and safety outcomes, in different work contexts. **Methodology:** The short review was conducted according to PRISMA guidelines in Scopus, Web of Science, Inspec, and ScienceDirect to identify empirical studies analysing the relationship between mindfulness and occupational safety. **Results:** A total of 13 articles were included; most studies were performed in the USA and China. The large majority of studies addressed the health sector, followed by construction. All the analysed articles show a positive relationship between mindfulness and at least one safety indicator. High mindfulness traits are associated with improvements in at least one safety indicator across several high-risk occupational contexts. **Conclusions:** The review demonstrates that mindfulness positively influences safety performance behaviours and safety outcomes across diverse occupational contexts. Specifically, collective and leadership mindfulness emerge as critical factors that facilitate the early detection of operational problems.

Keywords: Attention, Collective mindfulness, Safety outcomes, Safety performance behaviours, Safety compliance.

1. INTRODUCTION

Workplace accidents have an impact on several areas of workers' lives. Their consequences go beyond the individual health, also compromising job satisfaction and family and social relationships, and affect the company's economic and social spheres. Work accidents arise from a set of pre-existing occupational risks (Areosa, 2012). The persistence of workplace accidents and incidents underscores the need not only to investigate their underlying causes but also to explore new approaches to reduce or even eliminate occupational risks.

The word "mindfulness" has emerged as the most widespread translation of the Pali word 'sati' into English. There are a variety of proposed translations for 'sati', including 'awareness', 'attention', 'retention' and even 'discernment'. As there is no consensus on a single equivalent word, "mindfulness" can be defined as "the awareness that arises from paying attention, on purpose, in the present moment and without judgment" (Kabat-Zinn, 1979). Certain meditative traditions define "mindfulness" as the precise moment of 'noticing' when the mind has become distracted. Within this framework, mindfulness is the pivotal stage of a broader cognitive cycle: it begins with sustained focus on an object, followed by the inevitable mind-wandering, and culminates in the 'mindful moment'—the conscious realisation that the focus has shifted

(Goleman, *et al.*, 2018). The sequence is completed by returning attention to the initial point of focus. By adopting mindfulness practices, it is possible to learn how to direct and sustain attention, regulate their emotions, and develop greater self-awareness.

Collectively, it is possible to increase self-cognitive and emotional regulation, with clear benefits for oneself, for the activities one undertakes, and for those with whom one interacts (Tang *et al.*, 2015).

The relation between mindfulness and workplace safety has been approached (Huber *et al.*, 2015). Previous studies have sought to synthesise the available evidence on workplace safety and mindfulness. An integrative review by Shahbaz *et al.* (2022) addresses the topic, focusing on integrating mindfulness as an effective facilitator of Management Control Systems (MCS) to improve sustainability outcomes, specifically Occupational Health and Safety (OHS). The main results of this review highlight a lack of research on the links between mindfulness, MCS and sustainability, especially from an OHS perspective. Furthermore, an integration framework is proposed that demonstrates how mindfulness-based interventions (MBIs) can be applied in an organisational context, positioning them as central facilitators of MCS, generating improvements in OHS at three levels: primary - prevention of accidents and injuries; secondary - reduction of the impact of physical and psychological problems, such as stress and emotional exhaustion; tertiary – support for recovery after work accidents and high-pressure situations. Finally, the review highlights the practical implications: organisational leaders can adopt mindfulness practices as a management tool that enhances safety culture, strengthens organisational resilience, and reduces risks, costs, and legal liabilities.

Another integrative review on the topic was published by Liu *et al.* (2023). In this review, the authors analysed and synthesised existing research on the relationship between mindfulness and workplace safety, finding that most of it focuses on critical sectors such as healthcare and construction. The authors present a theoretical model based on the *Job Demands-Resources* (JD-R) model that explains how the benefits of mindfulness help individuals respond to safety-related work demands. In the authors' theoretical model, it is proposed that mindfulness provides three basic influences on human functioning that promote safety: enhanced awareness (improves detection and responses to risks and hazards in the workplace), sustained attention (increases concentration and self-monitoring of safety behaviours in cognitively demanding situations), and acceptance attitudes (facilitate more adaptive responses to emotional loads and stress). These mechanisms address three significant work demands: risks and hazards, cognitive demands, and emotional demands. The influence of mindfulness, however, can vary according to personal factors (experience and intelligence) and contextual factors (workload and complexity). It is therefore essential to note that mindfulness intervention proposals must take into account the diversity of individuals and companies, and should not be applied without prior analysis. The review also highlights the need for greater conceptual and operational clarity on mindfulness, as well as the importance of studies that explore the "state of mindfulness." The authors also emphasise the importance of extending research to other occupations to investigate whether the mechanisms underlying the link between mindfulness and occupational safety vary across occupational contexts.

The two abovementioned integrative reviews reveal a significant increase in recent empirical studies on mindfulness applied to work and occupational safety. However, data collection and analysis did not use structured research methods, such as those applied in a systematic review. Therefore, we performed a systematic review to identify, evaluate, and synthesise

updated evidences on a possible association between mindfulness and occupational safety indicators, safety performance behaviours (SPB), and safety outcomes (SO) in different work contexts.

2. MATERIALS AND METHODS

This short literature review was conducted using the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines (Page *et al.*, 2021).

To ensure the comprehensiveness and rigour of the systematic literature review, information descriptors were defined that, when combined using boolean operators, yielded keywords related to the central concepts of the revision. A total of 10 combinations were used for the search: mindfulness AND "occupational safety"; mindfulness AND ("safety behavior" OR "safety behaviour"); mindfulness AND "safety climate"; mindfulness AND "safety compliance"; mindfulness AND "safety participation"; mindfulness AND "injuries prevention"; mindfulness AND "accident prevention"; mindfulness AND accident; mindfulness AND incident; "mindfulness-based intervention" AND safety.

The first research took place from 24 November 2023 to 15 January 2024. The following databases were selected: *Scopus*, *Web of Science* and *Inspec*. The search was updated in March 2025 using the *Scopus* and *Web of Science* databases. The *Inspec* database underwent modifications and was not fully available; herein, ScienceDirect was included as an additional database. The search was conducted in a single step, covering the period from 2019 to March 2025. During the initial screening stage, predefined filters were applied to limit the results according to the following criteria: publication date (2019–2024), document type (scientific articles), source type (journal publications), and language (English). After applying these predefined criteria, a title and abstract screening was carried out to assess the relevance of the studies to the research objective. At this stage, articles whose titles and/or abstracts were not aligned with the research objective were excluded. Subsequently, the remaining articles proceeded to the full-text assessment stage, in which the complete papers were examined to confirm their relevance and eligibility for inclusion in the study.

The selected records were extracted and organised by: authors, year of publication, study title, and article abstract. Eligibility criteria were then applied, and articles that answered affirmatively to the questions: "Is the focus of the article in the occupational field?" and "Does the article investigate if mindfulness improves workplace safety?" were selected. After the final selection of articles, all articles were read in full. The following information was extracted and recorded: country where the study was conducted, sector of activity, objectives, scope of occupational safety, population, sample, average age of the sample, average years of experience of the sample, methodology, study results, and limitations.

The safety indicators analysed were grouped into two main categories: Safety Performance and Safety Outcomes. This division aligns with how the specialised safety literature has been classifying them (Christian *et al.*, 2009). These indicators were used to organise the analysed results of the selected articles from the short review.

The Safety Performance Behaviours indicator comprises two main dimensions. The first, Safety Compliance, refers to the behaviours that workers are formally required to adopt in accordance with the organisation's safety standards, rules, and procedures. The second dimension, Safety Participation, encompasses voluntary behaviours which, although not directly contributing to immediate individual safety, promote the development and maintenance of a safety culture in the broader organisational context. This type of behaviour

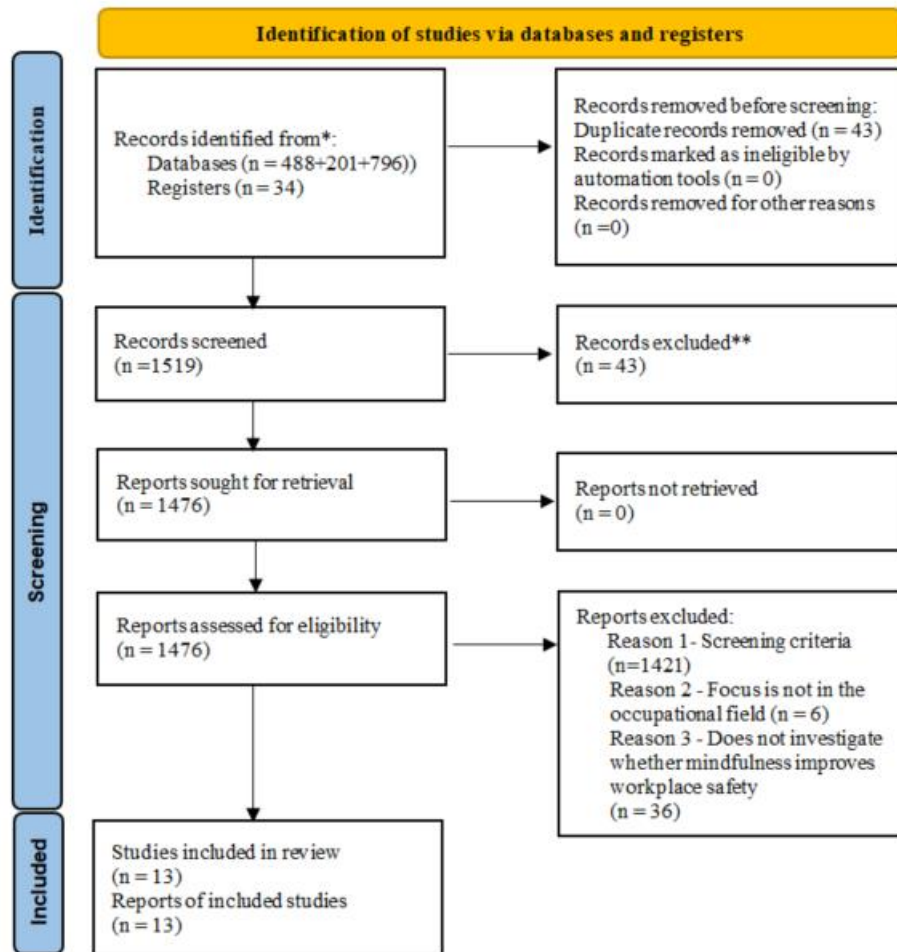
includes, for example, communicating risks, supporting colleagues, exercising labour rights and responsibilities, and taking the initiative to identify and implement safety-related improvements. The Safety Outcomes indicator refers to tangible and adverse safety events, namely accidents, injuries, and fatalities.

The research was updated in March 2025 in the Scopus and Web of Science databases. The Inspec database underwent changes and, at the time of the research update, was only available via a journal portal, so it was not possible to update the research or replicate previously carried out research in that database. We therefore included a new database, ScienceDirect, and again maintained the PRISMA research methodology and eligibility criteria. The reference period for the research was applied in one go, i.e., the research was carried out in this database from 2019 to March 2025.

To expand on the research already carried out, the snowballing technique, based on a chain of references, was used. Thus, a preliminary analysis of the bibliographies presented in the selected articles was conducted after applying the eligibility criteria, identifying other articles that fit the topic under study.

As part of the research process using the PRISMA methodology, summarised in Figure 1, 1,519 records were identified, of which 31 were from other research sources selected using the snowball technique, and 3 articles resulted from the 2025 research update. The duplicated articles were removed, 43. During the screening phase, 1,421 records were excluded because they did not meet the established inclusion criteria. The full texts were then analysed according to the eligibility criteria, with 42 being excluded. At the end of the process, 13 articles met *all* the inclusion criteria and were included in the brief review.

The 13 studies included show some concentration in terms of instruments, countries, and sectors of activity. Regarding measurement instruments, there is a clear predominance of the MAAS (Mindful Attention Awareness Scale), used in 10 studies, while the FMI (Freiburg Mindfulness Inventory) appears in 2 studies and the FFMQ (Five Facet Mindfulness Questionnaire) in 1 study. In terms of geographical distribution, the studies are mainly concentrated in the United States ($n = 5$) and China ($n = 5$), with the remainder conducted in Canada ($n = 1$), England ($n = 1$), and the Netherlands ($n = 1$). In terms of sectors of activity, the most prominent are construction ($n = 3$) and hospital health professionals ($n = 3$), followed by nursing assistants ($n = 2$) and airline pilots ($n = 2$), as well as more specific sectors such as oil industry operations ($n = 1$), nuclear power plant operators ($n = 1$), and rail transport operators ($n = 1$). These patterns show a predominance of studies conducted in operational contexts and in high-occupational-risk settings. One reviewer conducted data extraction and initial analysis. Two additional researchers subsequently verified the extracted information to ensure accuracy and consistency. Any discrepancies were discussed among the three researchers until a consensus was reached.



*Consider, if feasible to do so, reporting the number of records identified from each database or register searched (rather than the total number across all databases/registers).

**If automation tools were used, indicate how many records were excluded by a human and how many were excluded by automation tools.

Figure 1: PRISMA flow diagram adapted from Page et al. (2021)

3. RESULTS

The results of the screening and analysis of the studies is presented below. Most studies were performed in the USA (n=5) and China (n=5). The remaining studies were performed in Canada, the UK, and the Netherlands (all with n=1).

3.1 MINDFULNESS AND SAFETY PERFORMANCE BEHAVIOURS (SPB)

Of the selected articles, six demonstrated a positive impact on SPB in both the Safety Compliance (SC) and Safety Participation (SP). Zhang *et al.* (2013) analysed the influence of mindfulness on the task complexity and safety performance of nuclear power plant operators. They showed that mindfulness interacts with task complexity, significantly influencing both task and safety performance, especially in highly complex activities. Subsequently, the same authors investigated the relationship between dispositional mindfulness (i.e., the trait of mindfulness) and workplace safety among nuclear power plant control room operators (Zhang

et al., 2014). The results indicate that dispositional mindfulness contributes positively to compliance with safety standards and safe behaviour among workers.

Prudenzi *et al.* (2022) studied healthcare professionals to evaluate the role of mindfulness in well-being, burnout, and safety in practice, and to analyse whether values and self-compassion explain additional variability beyond mindfulness skills. The results suggest that mindfulness processes may be associated with perceptions of practice safety.

The research by Choi *et al.* (2022) was conducted through a randomised controlled trial (mindfulness training – namely the Mindfulness-Based Stress Reduction (MBSR) program vs active control group vs waiting list

control group) in a hospital setting. This study investigated the relationship between error concealment and occupational safety, examining how mindfulness may influence those behaviours. Qualitative analysis confirmed that participants in the MBSR programme experienced significant changes in how they handled their own errors.

Also in the healthcare context, Dierynck *et al.* (2017) analysed healthcare professionals at a hospital to evaluate the concepts of individual and collective mindfulness as cognitive antecedents of occupational safety. The study shows that mindfulness reduces occupational safety failures, specifically non-compliance with internal safety regulations, by decreasing the use of alternative solutions. Furthermore, mindfulness prevents motivational burnout caused by concern about the extra time needed to follow rules. The study suggests that "collective mindfulness" provides the work team with a cognitive infrastructure that facilitates problem detection and safe adaptation of work processes.

Another study investigated the impact of mindfulness on the safety performance of construction workers (Liang *et al.*, 2022). Workers with higher mindfulness traits performed better in safety issues, with psychological safety contract having a stronger mediating effect than coping behaviours. The study showed that mindfulness is more directly linked to reducing errors and violations, whereas safety participation is indirectly influenced.

3.2. MINDFULNESS AND SAFETY OUTCOMES

Ji *et al.* (2018) analysed the influence of the mindfulness trait in airline pilots, specifically on the involvement in incidents. The results revealed a positive relationship between mindfulness and risk perception. It is suggested that pilots with high levels of the mindfulness trait can better discern flight risks and assess them more accurately, leading to fewer incidents.

O'Brien *et al.* (2019) examined the links between mindfulness, professional training, and workplace injuries among nursing assistants in nursing homes. Higher levels of mindfulness (both trait and training) were associated with lower rates of injuries and musculoskeletal symptoms. Furthermore, mindfulness was identified as a unique and significant predictor of injury reduction.

The study by Solomon *et al.* (2024) measured participants' mindfulness trait and found that higher mindfulness scores were significantly associated with greater accuracy in detecting safety-relevant changes among construction workers. More specifically, workers with higher mindfulness correctly identified safety-relevant changes better than those with lower scores.

3.3 MINDFULNESS, SAFETY PERFORMANCE BEHAVIOURS AND SAFETY OUTCOMES

Valley *et al.* (2017) studied healthcare professionals at a hospital and used a randomised controlled trial with a waiting-list control, in which an MBSR intervention was delivered to assess its impact on the safety and health of professionals. The results of this study revealed that the mindfulness-based intervention reduced cognitive failures and errors in the workplace and increased safety-compliant behaviours, with effects lasting 6 months after the intervention, suggesting that mindfulness training can potentially reduce workplace accidents among healthcare professionals.

Kao *et al.* (2019) assessed the relationship between mindfulness traits and workplace injuries in the oil industry. It was shown that mindfulness as a trait was negatively associated with work-related injuries and positively associated with safety compliance and safety participation. The study by Liu *et al.* (2024), conducted with employees of high-speed train operating companies, analysed the effects of leaders' mindfulness on employees' safety behaviours. The results confirm that mindfulness positively influences both compliance with safety standards and participation in safety practices.

The study by Solomon *et al.* (2021), conducted with construction workers, confirms that personality traits (conscientiousness, neuroticism, and agreeableness) and cultural dimensions (uncertainty avoidance, individualism, and collectivism) influence mindfulness levels.

4. DISCUSSION

In this systematic review we address the association between mindfulness and work safety. In general, the studies show a positive association between mindfulness traits and work safety, analysed from several perspectives. Higher ability to be present, as analysed by several mindfulness questionnaires, decreases the probability of accidents. This result supports the findings of two integrative reviews (Liu *et al.*, 2023; Shahbaz *et al.*, 2022) and is entirely in line with the conceptual framework of mindfulness, which emphasises increasing awareness in each moment. Despite the existence of those integrative reviews, our study uses the PRISMA guidelines for a structured analysis of the studies. The results show that mindfulness may be useful in several work contexts, namely health and construction. Several studies examined health environments, including hospitals (Choi *et al.*, 2022; Dierynck *et al.*, 2017; O'Brien *et al.*, 2019; Valley *et al.*, 2017). Health professionals are under considerable risks, namely due to long shifts and technical and emotional demands. Mindfulness is also a tool for self-emotional regulation. It should be highlighted that the study by Prudenzi *et al.* (2022) indicated that mindfulness practices grounded in self-compassion may be relevant beyond mindfulness skills. The value of self-compassion needs to be evaluated also in other work contexts.

Almost all studies were based on mindfulness questionnaires (FFMQ, FMI, and MASS), which are validated methods for self-evaluation of the ability to be present, but the studies were observational. One study was a randomised controlled trial evaluating the effects of a mindfulness-based intervention (Valley *et al.*, 2017). Although it could be argued that self-assessment without an intervention may not be sufficient to establish a causal relationship, the existence of randomised controlled trials will be important for determining the causal relationship between high mindfulness trait and increased work safety.

Besides indicating a positive relationship between mindfulness and safety behaviours across different occupational contexts, the analysed studies also discuss practical implications.

Suggestions of mindfulness testing, problem-focused coping training, and the cultivation of positive psychological contracts to improve workplace safety. The psychological contract refers to a set of beliefs held by the worker regarding their obligations to the organisation and the organisation's obligations to them (Castanheira & Caetano, 1999). The research reinforces the relevance of the relationship between mindfulness and workplace safety. Human errors, together with organisational and systemic factors, are among the main contributors to workplace accidents across industries (Dabkowski *et al.*, 2025). In this context, leaders who are attentive to the present moment can enhance employees' awareness of their surroundings, strengthen their ability to cope with stress, and promote greater organisational cohesion.

The study by Dierynck *et al.* (2017) proposes an important concept: the "collective mindfulness" construct, defined as the ability of a team to develop a rich awareness of discriminatory details within and across internal and external processes and to regulate team behaviours. Although mindfulness is an individual practice, it should be noted that awareness improves emotional self-regulation and is also a tool to improve human relations and human connections (Kabat-Zinn, 2014). Thus, leadership mindfulness is a determining factor in promoting safe behaviours and reducing risks in the workplace. In practical terms, it is recommended that organisations integrate mindfulness into their management processes, particularly in the recruitment, training, and performance evaluation of managers, with a particular focus on high-safety areas. Integrating mindfulness training into educational programmes could mitigate injury risks. In line with these perspectives, safety managers may want to incorporate mindfulness training to improve workers' hazard identification and change detection abilities, thereby reducing the frequency of construction injuries.

The study by Solomon *et al.* (2021) suggests that safety managers can use these factors to identify workers at greater risk and facilitate mindfulness training. Thus, promoting mindfulness can be an effective strategy for improving performance, reducing unsafe behaviour, and preventing workplace accidents. Therefore, having a low mindfulness trait could be used to help workers in their workplace, namely by offering participation in structured mindfulness-based programs.

5. CONCLUSIONS

This review synthesised current evidence on the relationship between mindfulness and workplace safety indicators, considering both safety performance behaviours (safety compliance and safety participation) and safety outcomes (accidents, injuries, and incidents). This study represents an effort to apply structured methods, such as the PRISMA guidelines, which is a clear contribution to current knowledge. This study should continue by analysing the risk of bias in the studies and determining the feasibility of performing a meta-analysis of the data. The evidence suggests that mindfulness may be particularly relevant in cognitively and emotionally demanding settings, such as health work. Importantly, the reviewed literature indicates that safety benefits extend beyond individual mindfulness. Collective mindfulness appears to provide teams with a shared capacity to notice critical details and adapt work processes safely. In contrast, leaders' mindfulness is linked to stronger safety compliance and participation through improved situational awareness, stress coping, cohesion, and safety culture. The research on mindfulness in workplaces remains methodologically heterogeneous and calls for further studies using robust longitudinal and intervention designs, clearer operationalisation of mindfulness (including state, collective, and leadership components), and the inclusion of objective safety metrics.

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