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Hindrances to Understanding and Identifying Hazards in the Workplace: A Systematic Literature Review

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ABSTRACT

Industries and various sectors of the economy continue to record workplace incidents. Understanding and identifying workplace hazards is crucial for ensuring employee safety and health. However, various hindrances can impede effective hazard recognition and risk assessment. This systematic literature review weaves recent research to identify the factors that contribute to these barriers. The central purpose of this review is to systematically examine journal articles from the past ten years that examines the difficulties encountered by both employees and organizations in identifying and comprehending workplace hazards, and to offer a thorough summary of the key issues involved. The review identified several key barriers to hazard identification, including cognitive biases, insufficient training and education, organizational culture, and inadequate communication of risks. Personal factors such as risk perception and prior experiences significantly influence hazard recognition. There is an opportunity to improve standardized procedures and tools for hazard assessment, which its insufficiency often results in underreporting of potential risks. This systematic literature review highlights the multifaceted challenges in understanding and identifying workplace hazards. It examines the findings of studies that focused on the challenges employees and management face in understanding and identifying workplace hazards. Addressing these hindrances is critical to effective workplace incident prevention. This will require better training, a stronger safety culture, improved communication, and standardized hazard assessment. Future research should evaluate the effectiveness of these strategies. The review highlights key themes, identifies gaps in occupational health and safety literature, and offers recommendations to strengthen safety protocols.

Keywords: Cognitive biases, Communication barriers, Hazard identification, Risk assessment, Safety culture, Training and education, Workplace hazards

INTRODUCTION

Effective hazard identification and recognition are fundamental for ensuring workplace safety. However, various hindrances often impede employees and organizations from accurately identifying potential dangers. Research indicates that cognitive biases, inadequate training, ineffective communication, and organizational culture significantly influence hazard recognition processes. When hazards are not recognized, the likelihood of workplace incidents increases substantially. Although decades of research

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and intervention programs have been implemented, the challenge of incomplete or inaccurate hazard recognition persists across industries. This literature review synthesizes evidence from the past decade published in peer-reviewed journals that examine the barriers workers and organizations face in understanding, perceiving, reporting, and preventing workplace hazards and suggests pathways for improvement in workplace hazard identification. Emphasis is placed on studies that use qualitative perspectives, quantitative and mixed-method data; both of which provide a nuanced understanding of how hazard recognition is hindered and what this means for incident prevention.

METHODS

Search Strategy

Three main academic databases, PubMed, Scopus, and IEEE Xplore, were combed for peer-reviewed journals from 2014–2026. Searches utilised a combination of keywords and Boolean operators to ensure comprehensive coverage of the topic. The exact strings included: "Workplace hazards" AND "Hazard recognition," "Risk assessment" AND "Barriers," "Safety culture" AND "Hazard identification," "Training" AND "Workplace safety" AND "Hazard recognition," "Cognitive biases" AND "Safety."

These three databases were selected to ensure interdisciplinary coverage: PubMed for occupational health and medical literature, Scopus for broad multidisciplinary and social-science coverage, and IEEE Xplore for engineering- and technology-oriented safety research. The ten-year search window (2014–2026) was chosen to capture contemporary hazard-recognition research, including the recent shift toward remote and hybrid work arrangements, while remaining broad enough to allow comparison with earlier foundational studies cited elsewhere in this review.

Inclusion and Exclusion Criteria

Table 1 below illustrates the process used to search relevant peer-reviewed studies published between 2014 and 2026. The studies address workplace hazard recognition hinderances, focusing on qualitative and quantitative research articles from a combination of academic databases, such as PubMed, Scopus, and IEEE Xplore, to extract articles on hazard recognition, hazard identification, workplace safety, safety culture, cognitive biases, training, etc. The search from the databases generated 1,306 articles. Non-peer reviewed literature, such as opinion pieces, conference abstracts, book papers, magazines, and research not directly related to workplace settings (e.g. laboratory or technical environments only), duplicate studies, and published literature reviews from other reviewers were excluded from the review to reduce the number of the search to 65 articles. The articles considered are published in the English language. Title and abstract screening, followed by full-text eligibility assessment against the criteria above, was conducted by a single reviewer; formal inter-rater reliability testing (e.g., Cohen's kappa) was not performed, and no standardized quality or risk-of-bias appraisal instrument

(e.g., the Mixed Methods Appraisal Tool) was applied to the included studies beyond peer-review status and topical relevance to the search strategy. These methodological constraints, and their implications for the findings reported below, are discussed further in the Limitations section.

Table 1: Process of selecting eligible articles for inclusion in the systematic review.

Stage	Description	Records (n)
Identification	Records identified through database searching: PubMed (n = 641); IEEE Xplore (n = 517); Scopus (n = 148)	1,306
	Records removed before screening: conference abstracts/ papers (n = 316); book chapters (n = 43); review papers (n = 32); duplicates (n = 15); records not directly related to the focus topic (n = 685)	*1,091*
Screening	Records screened by title and abstract	215
	Records excluded after title and abstract screening	*150*
Eligibility	Full-text articles assessed for eligibility	65
	Full-text articles excluded, with reasons	*42*
Included	Studies included in the qualitative synthesis	23

Note. Values in italics represent records excluded or removed at each stage. Final inclusion (n = 23) reflects studies retained after full-text eligibility assessment.

STUDY THEMES AND FINDINGS

The systematic search yielded 65 articles, out of which 23 met the inclusion and exclusion criteria stated above. The systematic analysis of these articles identified several recurring hindrances in workplace hazard recognition. Below are some of the findings from this review:

1. Employees often exhibit cognitive biases such as overconfidence, which can lead to negligence in recognizing risks (Pin-Chao et al., 2021).
2. A significant number of studies highlighted a lack of thorough training programs as a barrier to effective hazard recognition (Ding et al., 2024; Peng et al., 2024).
3. The culture within an organization immensely impacts how hazards are reported and recognized, with a strong correlation found between poor safety culture and underreporting (Smith et al., 2018).
4. Inefficient communication channels or communication barriers impede the timely sharing of information related to hazards (Abolfazi et al., 2025).
5. Many organizations lack standardised practices and procedures for identifying and reporting hazards, which compounds the recognition issues (Gregory et al., 2025).

These five recurring themes provide the organizing structure for the Results section that follows, linking the synthesis process described above directly to the findings reported below.

RESULTS

The findings below are organized around the five recurring themes identified during the synthesis of the 23 included studies (see Study Themes and Findings above), followed by two integrative findings on intervention effectiveness and remaining evidence gaps.

Cognitive Biases and Risk Perception

The literature indicates that cognitive biases are pivotal barriers to hazard recognition. Research by Jamil et al. (2020) highlights that employees often display overconfidence in their ability to recognize risks, leading to accidents and safety breaches.

Training and Education Gaps

Insufficient training significantly contributes to hazard misidentification, as noted by Peng et al., (2024), who conducted a study demonstrating that comprehensive training correlates positively with hazard awareness.

Organizational Culture

Bhavana et al., (2019) argued that employees often express a disconnect between management intentions and day-to-day practices, leading to complacency and negligence. According to Smith et al., 2018, organizational culture also plays a critical role. Studies show that workplaces that lack a strong safety culture are less likely to encourage hazard reporting, leading to inadequate awareness and protection measures (Smith et al., 2018).

Communication Barriers

Poor communication within organizations leads to the inefficacy of hazard reporting systems, resulting in unrecognized dangers (Walker et al., 2025).

Standardization of Procedures and Tools

Finally, the lack of standardized procedures for hazard identification and the lack of engagement in safety protocols hinder employees from consistently recognizing and reporting hazards, as indicated by Gregory et al., (2025). The research collectively emphasizes the necessity for organizations to review their training programs, communication strategies, and cultural attitudes towards safety in order to enhance hazard recognition.

Implications for Hazard Elimination and Incident Prevention

Identifying and addressing barriers in hazard recognition has direct implications for workplace incident prevention. Review evidence suggests that safety interventions grounded in hazard elimination (engineering controls) may be more effective than those relying solely on training or behavior modification (Dan Wang et al., 2026); this pattern is drawn from a small

number of the included studies rather than a quantitative comparison across the full review, so it is reported here as an observed trend rather than a firmly established effect. Behavior-based approaches remain essential components of comprehensive safety programs; their effectiveness can improve when informed by deeper insights into worker perceptions and organizational barriers.

Evidence Gaps and Emerging Research Directions

The existing research reflects that while significant progress has been made in understanding hazards and associated risks, gaps remain; particularly in the development of validated tools that are widely applicable, and in bridging the divide between hazard recognition theory and practice. Some of the studies on hazard recognition and risk perception research point to emerging trends and research hotspots that may inform future work, including cross-industry comparisons and deeper psychological analysis models (Tom et al., 2025; Thepaksorn et al., 2025).

DISCUSSION

Multiple studies highlight that workers fail to recognize many workplace hazards, even after training, resulting in missed opportunities for prevention. For example, one large-scale investigation involving construction workers found that workers recognized less than half of the safety hazards presented in controlled tasks, particularly under-recognizing hazards related to pressure, chemical, and radiation exposures compared to more obvious hazards such as electrical or gravity risks (Jamil et al., 2020). This study illustrates that workers' hazard perception varies widely across hazard types, revealing core cognitive and environmental barriers to full hazard recognition (Jamil et al., 2020).

Intentional failure to report or recognize hazards can also stem from organizational culture and psychological factors, such as perceiving risk as "part of the job," or low concern about health consequences (Abdolhamid et al., 2022). Identified barriers included time constraints, workplace conditions, and habits that inhibit proactive safety behavior; factors that quantitative data alone may not capture adequately but are revealed through qualitative interviews and mixed-methods analysis (Abdolhamid et al., 2022).

Organizational culture significantly affects hazard recognition and reporting. A systematic review of safety management barriers revealed that both individual-level and barrier-management issues undermine hazard identification systems. Studies in this domain emphasize the complex socio-technical system within organizations, where insufficient training, lack of commitment, poor communication, and inadequate barrier implementation strategies contribute to risk-related incidents (Michael et al., 2019).

Safety culture issues, such as poor attitudes toward safety and a lack of employee engagement, emerge as consistent themes across diverse studies. Workers who do not feel involved in safety processes or empowered to report hazards often underestimate the significance of hazard recognition

(Chuangang et al., 2024). A related mixed-method study in educational settings found that organizational leadership, knowledge gaps, and enforcement challenge all compromised hazard awareness and compliance levels (Abdolhamid et al., 2022). This highlights that barriers are not only individual but embedded within workplace structures and norms.

Mixed-methods research has provided particularly rich insights into the complexity of hazard recognition barriers. For example, an ergonomic study exploring pen-and-paper observational methods used by occupational health specialists combined surveys and interviews to uncover educational, individual, and organizational factors that influence effective hazard assessment (Abdolhamid et al., 2022). Quantitative data revealed limited knowledge and limited usage of risk assessment methods, while qualitative interviews described why this knowledge gap existed, including insufficient training and organizational support. These dual perspectives underscore that quantitative trends must be interpreted alongside worker experiences.

Another mixed-methods investigation exploring occupational reporting cultures found internal and external organizational factors that influenced incident reporting processes, such as the lack of clear procedures, poor supervision, and cultural reluctance to report near-misses (Abolfazi et al., 2025). This integrative study shows how administrative and psychosocial barriers intersect to hinder hazard identification and learning from past incidents.

Taken together, the studies reviewed here are predominantly qualitative, cross-sectional, or mixed-methods in design rather than controlled experimental or longitudinal studies. As such, the barriers and relationships described above are best interpreted as consistently reported associations across the included literature rather than as established causal mechanisms, and any claims about the relative effectiveness of specific interventions should be read with this evidentiary limit in mind.

RECOMMENDATION FOR FUTURE RESEARCH

Future research should explore conducting studies involving variables over an extended period (longitudinal studies) to assess the long-term impacts of training programs on hazard recognition and how organizational cultures evolve over-time. This can provide insights into the sustained effect of interventions and training.

There is a need for experimental or cause-and-effect studies (Intervention studies) that explore specific interventions aimed at overcoming the identified barriers to hazard recognition (e.g., targeted training programs, improved communication practices). This will help determine the effectiveness of various strategies in fostering better hazard identification.

Research could focus on comparing hazard recognition barriers across different industries (e.g., construction, healthcare, manufacturing) to identify sector-specific challenges and solutions. Such comparisons could yield valuable insights into unique cultural or operational factors affecting safety.

Future research could investigate the role of technology (e.g., mobile apps, AI-driven tools) in enhancing hazard recognition. Research can assess how digital tools can support training efforts, improve communication, and standardize hazard reporting processes.

Future studies should include qualitative research that emphasizes employee experiences and perceptions regarding hazard recognition. Understanding the psychological and social dynamics surrounding safety can inform more effective training and cultural initiatives.

Explore barriers to hazard recognition in diverse work environments, especially in remote or hybrid settings. The transition to flexible work arrangements due to recent global events presents a new landscape for understanding safety challenges.

LIMITATION OF THIS REVIEW

Screening and eligibility assessment were conducted by a single reviewer without independent second-reviewer verification or a formal inter-rater reliability check. Although explicit, pre-defined inclusion and exclusion criteria were applied (Table 1), this single-reviewer process introduces the possibility of reviewer-driven subjectivity at the title/abstract and full-text screening stages.

In addition, inclusion in the qualitative synthesis was based on peer-review status and topical relevance rather than on a standardized methodological quality or risk-of-bias appraisal instrument (e.g., the Mixed Methods Appraisal Tool or a CASP checklist); the methodological rigor of individual studies was therefore not formally weighted when identifying themes. Consequently, this review should be read as a structured narrative synthesis of reported findings rather than a critically appraised systematic review in the strictest sense, and claims about the relative effectiveness of specific interventions (e.g., engineering controls versus behavior-based training) are presented as patterns observed across the included literature rather than as established causal effects.

While the review focused on peer-reviewed articles from reputable databases, it did not encompass all relevant literature, such as grey literature or reports from safety organizations that could provide additional insights.

With a focus on articles published within the last ten years, the review may overlook relevant historical developments in workplace safety practices that continue to influence current challenges and solutions.

The review may be influenced by selective reporting bias because of the preponderance of studies with significant findings in the search than those with few findings. This could affect the understanding of the actual barriers.

Cultural and regulatory differences can affect the ways in which hazards are recognized and communicated, indicating that results may not be universally applicable. Additionally, differing definitions of key concepts like “hazard” and “safe practices” across studies may result in inconsistent outcomes, complicating direct comparisons.

CONCLUSION

This systematic literature review indicates that hindrances to understanding and identifying workplace hazards are multifaceted, involving individual cognitive limitations, organizational culture and structural barriers, and tool or process deficiencies. It highlights numerous barriers to understanding and identifying workplace hazards. Addressing these hindrances is critical to effective workplace incident prevention. It will require strategies that include improving training initiatives, fostering a supportive safety culture, enhancing communication frameworks, and implementing standardized procedures for hazard assessment. Because this synthesis reflects a narrative review of 23 studies screened by a single reviewer without a standardized quality-appraisal instrument, these conclusions should be treated as evidence-informed patterns rather than definitive causal claims. Future research should prioritize intervention studies that assess the effectiveness of these strategies in improving workplace safety.

CONFLICT OF INTEREST

None declared.

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