
Analysis Of The Relationship Between Personal Protective Equipment (Ppe) Compliance And Workplace Accident Risk: A Literature Review

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Abstract

Workplace accidents remain a major occupational safety issue across various industries, and low compliance with Personal Protective Equipment (PPE) use continues to increase injury risk. This literature review aimed to analyze the relationship between PPE compliance and workplace accident risk. The study used a qualitative literature review approach by reviewing five quantitative empirical studies published between 2022 and 2025. The findings consistently showed that proper and consistent PPE use was associated with lower workplace accident and injury risk. Knowledge, attitude, and safe work behavior were also identified as important factors influencing PPE compliance. Several studies further showed that incomplete PPE availability, weak supervision, and poor enforcement of safety procedures reduced compliance and increased accident risk. In conclusion, PPE compliance is an important protective factor in improving workplace safety. Therefore, workplace accident prevention should focus not only on PPE provision, but also on strengthening worker education, supervision, and safety culture.

Keywords: *Personal Protective Equipment, Workplace Accident, Workplace Incident.*

INTRODUCTION

Workplace accidents remain a major global issue, affecting workers across many industries and causing injury, disability, and death. Although safety regulations and preventive measures have developed over time, occupational accidents still occur at a high rate. This shows that workplace safety improvement and stronger prevention strategies are still urgently needed (Malta et al., 2024).

Estimates from the International Labour Organization (ILO) indicate that workplace hazards continue to pose a serious global concern. Each year, more than 2.3 million people lose their lives due to occupational accidents or work-related diseases, which is equivalent to over 6,000 deaths every day. In addition, worldwide statistics report approximately 340 million cases of occupational injuries and around 160 million cases of work-related illnesses annually (ILO, 2024). In Indonesia, occupational safety remains a significant issue. Data recorded between January and December 2024 show that a total of 462,241 workplace accident cases occurred. Of these cases, 91.65% involved wage-earning employees, 7.43% were experienced by non-wage workers, and the remaining 0.92% were associated with workers in the construction services sector (Ketenagakerjaan, 2024).

One important strategy to reduce workplace risk is the use of Personal Protective Equipment (PPE). As the last line of defense, PPE helps protect workers when other hazard controls are not enough. Common examples include helmets, gloves, goggles, and safety shoes (Santos et al., 2025).

However, PPE use in practice is often inconsistent. Many workers do not use PPE regularly or correctly because of limited equipment, discomfort, lack of training, and weak safety culture. Poor supervision and weak enforcement of safety rules can make compliance even lower, especially in small and medium-sized enterprises (Santos et al., 2025). (Khoshakhlagh et al., 2024).

The relationship between PPE compliance and workplace accidents is influenced by many factors, such as worker knowledge, attitudes, behavior, and workplace safety culture. Many accidents happen because PPE is not used or is used incorrectly, making non-compliance an important risk factor (Khoshakhlagh et al., 2024).

On the other hand, proper and consistent PPE use can reduce injury risk and improve workplace safety. Still, its effectiveness may vary depending on industry type, worker behavior, and differences in safety practices across settings (Santos et al., 2025). (Malta et al., 2024).

Based on these conditions, it is important to better understand how PPE compliance is related to workplace accident risk. Therefore, this literature review aims to analyze and summarize findings from previous studies on this topic. The results are expected to provide clearer insight into the role of PPE compliance in improving workplace safety and reducing occupational accidents.

RESEARCH METHODS

This study employs a qualitative method with a literature review approach to analyze the relationship between Personal Protective Equipment (PPE) compliance and the risk of workplace accidents, as well as its role in occupational safety and health (OSH) performance. The data used in this study are secondary data obtained from various literature sources, including national and international scientific journals, organizational reports, and relevant publications related to the research topic.

The data collection process was carried out by searching for articles published between 2022 and 2025 through academic databases such as Google Scholar and ScienceDirect. The search strategy used keywords: "personal protective equipment" AND "compliance" AND "workplace accidents" AND "occupational safety". The selected articles were quantitative empirical studies that examine the influence or relationship between PPE compliance and workplace accident risk and are available in full-text form. The selection of articles was conducted in stages, including title evaluation, abstract review, and full-text reading of the articles.

Articles that met the criteria were then analyzed descriptively by comparing and examining findings from various studies to obtain comprehensive conclusions. The analysis aims to identify patterns and relationships between PPE compliance and workplace accident risk, as well as to highlight the importance of PPE adherence in improving occupational safety outcomes across industries.

RESULTS AND DISCUSSION

Table 1. Summary of Previous Research

No.	Author	Year	Title	Method	Result
1	Hairil Akbar, Eko Budi Santoso, Andi Asliana Sainal, A. Suyatni Musrah, Matius Paundanan, Eko Maulana Syaputra, Masni	2022	The Relationship between Personal Protective Equipment (PPE) Use Behavior and Work Accidents among Farmers in Kotamobagu City	An analytic survey with a cross-sectional design involving 60 farmers. Data were collected through interviews and secondary data, analyzed using descriptive statistics and the chi-square test.	Knowledge (p=0.001; OR=6.397), attitude (p=0.035; OR=4.059), and action (p=0.001; OR=7.909) were significantly associated with workplace accidents. The better the behavior, the lower the risk of accidents.

2	Nailul Hikmi	2022	The Relationship Between The Use of Personal Protective Equipment and Work Accidents in Workers Production at PT. Kunango Jantan	Quantitative research with a cross-sectional approach, using simple random sampling and univariate and bivariate analysis (Chi-Square)	As many as 56.9% of workers had accidents, and 44.8% did not use complete PPE. There is a significant relationship between the use of PPE and work accidents (p=0.0001)
3	Kenvin Rusli, Vitrilina Hutabarat, Peny Ariani	2024	Analysis Of The Relationship Between The Use Of Personal Protective Equipment, Knowledge And Workplace Accidents	Analytical observational design with a cross-sectional approach. Sample of 68 out of 99 employees	69.1% used PPE. Workers without PPE had a 1,807-fold higher risk of accidents, and low knowledge increased the risk 1,931-fold.
4	Adi Saputra, Stanita Nataya	2024	The Correlation Between Adherence to Personal Protective Equipment and Incidents Involving Construction Workers	Analytical quantitative study with cross-sectional design, sample of 70 construction workers	68.7% experienced accidents. Only 28.6% had complete PPE. There is a significant relationship between PPE compliance and accident incidence.
5	Venny Yusiana, Muchlisinalahuddin, Martanto, Fandel Maluw, Daisy Debora Grace Pangemanan	2025	The Relationship Between Personal Protective Equipment Use and Reduction in Workplace Injuries	Quantitative with pre-test and post-test design. Sample of 110 out of 150 employees	There was a significant decrease in work injuries (2.27 to 1.50; p=0.000). The use of PPE has been proven to be effective in reducing work accidents.

Discussion

Across all five studies are aligned to support the main argument of this literature review that PPE compliance is closely related to workplace accident risk. PPE functions as an immediate protective barrier against workplace hazards, but its effectiveness depends on whether workers actually use it correctly, consistently, and in accordance with job risk. Previous studies show that PPE compliance should not be understood only as equipment availability. It must also be understood as a behavioral issue shaped by knowledge, attitude, and daily work practices. Akbar et al. 2022

demonstrated that knowledge, attitude, and action were all significant predictors of workplace accidents. Similarly, Rusli et al. 2024 showed that knowledge remained a dominant factor in accident occurrence.

Another pattern is that incomplete or inconsistent PPE use is still common in many workplaces. Hikmi 2022, showed that many workers did not use PPE completely, and this was significantly linked to workplace accidents. Saputra et al. 2024 also found that most construction workers had incomplete PPE availability. This suggests that accident prevention is not only about worker behaviour, but also about company support through proper PPE provision, supervision, and safety enforcement.

Yusiana et al. 2025 strengthens the argument but stronger evidence by using measured conditions before and after PPE implementation. The significant reduction in injury scores from pre-test to post test suggests PPE use is not only correlated to actual injury reduction when implemented properly. This makes that study valuable by supporting the direction of effect suggested by the cross-sectional studies.

In summary, the reviewed evidence indicates that PPE compliance has a significant protective relationship with workplace safety outcomes. Workers with better PPE compliance, stronger safety knowledge, and safer work behavior tend to experience fewer workplace accidents and less severe injuries. Therefore, efforts to reduce workplace accidents should not focus only on providing PPE, but also on improving worker knowledge, strengthening supervision, ensuring equipment completeness, and building a stronger culture of safety compliance.

CONCLUSION

Taken together, the five reviewed studies show a consistent pattern: better PPE use, stronger compliance, and better safety-related knowledge are associated with lower workplace accident risk. The evidence is especially consistent in showing that workers who do not use PPE, use it incompletely, or lack adequate safety knowledge are more vulnerable to accidents and injuries.

There is a clear relationship between PPE compliance and workplace accident risk. Workers who use PPE properly and consistently are less likely to experience workplace accidents and injuries. The findings also show that knowledge, attitude, and safe work behavior play an important role in supporting PPE compliance. In addition, organizational factors such as PPE availability, supervision, and enforcement of safety procedures are essential in preventing accidents. Although most of the studies used cross-sectional designs and were limited to Indonesian workplace settings, the overall evidence consistently indicates that PPE compliance is an important protective factor in improving workplace safety and reducing accident risk.

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