

Industrial Workers's Regarding Compliance with the Use of Personal Protective Equipment: A Cross-Sectional Study

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ABSTRACT

Introduction: Workplace safety remains a critical issue, and using Personal Protective Equipment (PPE) is essential to reducing occupational hazards. Industrial workers' attitudes are important in shaping safety behaviors and compliance with protective measures.

Objectives: This study aims to determine the relationship between industrial workers' attitudes and compliance with the use of personal protective equipment (PPE)

Methods: A cross-sectional observational study was conducted with 35 industrial workers selected through total sampling. Data were collected using two validated questionnaires: one assessing industrial workers' attitudes toward PPE use (10 items, Likert scale) and another evaluating PPE compliance (8 items, 0–3 scale). Based on median values, scores were categorized as positive or negative attitudes and compliant or non-compliant behavior. Data were analyzed using frequency distributions and the Chi-Square test.

Results: Most participants were male (71.4%) and aged 30–39 (42.8%). 57.1% of respondents reported positive attitudes toward PPE use, while 51.4% demonstrated compliance. Bivariate analysis showed a significant association between industrial workers' attitudes and PPE compliance ($p = 0.002$), with 75% of workers with positive attitudes adhering to PPE protocols compared to 20% with negative attitudes.

Conclusions: Positive safety attitudes were strongly linked to higher PPE compliance, emphasizing the need to integrate behavioral and organizational interventions alongside technical measures to promote workplace safety. Although the study provides valuable insights, its cross-sectional design and small sample size limit generalizability. Future studies should adopt longitudinal approaches and include diverse populations to guide targeted safety strategies.

Introduction

Ensuring occupational health and safety (OHS) in the workplace is critical to organisational sustainability, particularly in industries with high-risk environments such as construction, manufacturing, and agriculture. Personal Protective Equipment (PPE) minimises occupational hazards by serving as a protective barrier between workers and potential risks (Baye et al., 2022; Sartina & Purnamawati, 2024). However, despite strict safety regulations and the availability of PPE, many industrial workers demonstrate low compliance rates, contributing to increased injury rates, reduced productivity, and higher healthcare costs (Ghassani et al., 2023; Wahyuni et al., 2024). Non-compliance with PPE usage remains a significant challenge across various sectors. Studies indicate that although workers are aware of PPE requirements, behavioral factors such as attitudes, perceptions of risk, and workplace culture significantly influence adherence (Devila et al., 2022; Noviarmita & Prananya, 2023). Poor compliance is a



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matter of inadequate access or training and reflects deeper attitudinal and organisational issues that require targeted investigation (Boakye et al., 2022).

National and regional data indicate that compliance with using Personal Protective Equipment (PPE) in the industrial sector remains varied and relatively low. A study in Central Java among factory workers reported a compliance rate of only about 65.7% (Sutrisno et al., 2021), while research in other industrial sectors in East Java, such as a construction project in Madiun, also found low levels of PPE compliance among workers (Wahyuni et al., 2024). A similar situation was observed locally, where internal inspections in the fisheries processing industry at CV. Indojoya Pratama Muncar revealed that some workers were still inconsistent in using PPE according to operational standards. This situation is concerning, considering that the 2022 report from the Social Security Agency for Employment (BPJS Ketenagakerjaan) recorded more than 200,000 occupational accident cases in Indonesia, with a significant proportion occurring in the manufacturing and agricultural-fisheries processing sectors. This emphasizes that PPE compliance issues are national and provincial concerns and a real problem at the study site. Therefore, this research is urgently needed to provide empirical insights into the attitudes and compliance of fisheries processing industry workers toward PPE use, serving as a basis for more targeted occupational safety interventions to prevent accidents and enhance worker protection.

Industrial workers' attitudes have long been recognized as a key determinant of organizational success, as they directly shape workplace behavior and performance outcomes. Negative worker attitudes are often associated with organizational challenges such as low productivity, poor service quality, resistance to innovation, and high turnover (Robbins & Judge, 2019). In occupational safety, attitudes are particularly important because they influence how workers perceive, value, and ultimately comply with safety regulations, including the consistent use of personal protective equipment (PPE). Previous research across various industries has demonstrated that industrial workers with positive attitudes towards PPE and safety practices are more likely to adhere to compliance standards, which in turn reduces workplace risks and accidents (Devila et al., 2022; Ghassani et al., 2023; Khoshakhlagh et al., 2024; Wahyuni et al., 2024). In the Indonesian context, where occupational accident rates remain high (Social Security Agency for Employment (Ketenagakerjaan, 2022), focusing on industrial workers' attitudes provides critical insights into the psychosocial factors underlying compliance behavior. Therefore, selecting industrial workers' attitudes as the main variable of interest is theoretically justified and practically relevant, as it offers a foundation for developing targeted interventions to improve compliance with PPE usage and strengthen workplace safety culture, particularly in high-risk sectors such as fish processing industries.

Furthermore, this study is not limited to identifying the problem but also seeks to provide practical solutions that can be implemented in the workplace. Recommended interventions include strengthening safety training programs tailored to workers' needs, promoting consistent safety leadership by supervisors, and fostering a positive safety culture through peer support and reward systems for compliance. These approaches are expected to shift workers' attitudes towards greater awareness and responsibility, thereby enhancing the consistent use of PPE, reducing occupational accidents, and improving overall organisational sustainability. This study aims to determine the relationship between industrial workers' attitudes and compliance with the use of personal protective equipment (PPE)

Methods

This study observational design with a cross-sectional approach to examine the relationship between industrial workers' attitudes and their compliance with using Personal Protective Equipment (PPE). A total of 35 workers at CV. Indojoya Pratama Muncar were selected as the



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study sample using a total sampling technique. Data were collected through questionnaires measuring both employees' attitudes toward PPE use and their level of compliance.

The instrument used to assess employee attitudes was the PPE Attitude Questionnaire, which comprised 10 items scored on a five-point Likert scale ranging from 1 (strongly disagree) to 5 (strongly agree), yielding a minimum total score of 10 and a maximum of 50. Attitude scores were classified into two categories: positive (scores \geq mean or median) and negative (scores $<$ mean or median). The second instrument, the PPE Compliance Questionnaire, consisted of 8 items to measure adherence to PPE usage protocols. Responses were scored on a scale of 0 to 3, with total scores ranging from 0 to 24. Compliance levels were categorised as compliant (scores \geq mean or median) and non-compliant (scores $<$ mean or median). Data analysis included univariate statistics using frequency distributions, and bivariate analysis was conducted using the Chi-Square test.

Results

Table 1. Characteristics of Respondents (n = 35)

Characteristics	Frequency (n)	Percentage (%)
Age		
20–29 years	10	28.6
30–39 years	15	42.8
≥ 40 years	10	28.6
Gender		
Male	25	71.4
Female	10	28.6
Employee Attitudes		
Positive	20	57.1
Negative	15	42.9
Compliance with PPE Use		
Compliant	18	51.4
Non-compliant	17	48.6

Based on the frequency distribution in Table 1, most respondents were in the 30–39-year age group, totaling 15 participants (42.8%). Regarding gender, the majority were male, comprising 25 respondents (71.4%), while females accounted for 10 respondents (28.6%). Regarding employee attitudes toward PPE usage, 20 participants (57.1%) demonstrated a positive attitude, whereas 15 (42.9%) exhibited a negative attitude. Regarding PPE compliance, 18 respondents (51.4%) were ca

tegorized as compliant with company PPE standards, while 17 respondents (48.6%) were classified as non-compliant.

Table 2. Employee Attitudes and Compliance with PPE Use at CV. Indojoya Pratama Muncar (n=35)

Employee Attitudes	Compliance with PPE Use						P-value
	Compliance		Non-Compliance		Total		
	n	%	n	%	n	%	
Positive	15	42.9	5	14.3	20	57.1	0.002



Employee Attitudes	Compliance with PPE Use						P-value
	Compliance		Non-Compliance		Total		
	n	%	n	%	n	%	
Negative	3	8.6	12	34.3	15	42.9	
Total	18	51.4	17	48.6	35	100	

Based on Table 2, workers with a positive attitude were more likely to comply with PPE usage (75%) than those with a negative attitude, most of whom were non-compliant (80%). This indicates that a more positive attitude toward occupational safety is associated with higher levels of PPE compliance. The Chi-Square test produced a p-value of 0.002 (< 0.05), signifying a statistically significant association between employee attitudes and compliance with PPE use at CV. Indojoya Pratama Muncar.

Discussion

Employee Attitudes

The results of this study indicate that the majority of industrial workers at CV. Indojoya Pratama Muncar demonstrated positive attitudes toward using Personal Protective Equipment (PPE), accounting for 57.1% of participants. This suggests that more than half of the workforce knows workplace safety and recognizes the importance of PPE. However, 42.9% of workers expressed negative attitudes, highlighting the need for targeted interventions to cultivate a stronger safety culture within the organization.

From a theoretical perspective, attitudes are a key determinant of behavior, as outlined in Ajzen's Theory of Planned Behavior (1991), which posits that individual beliefs and perceptions significantly influence intentions and subsequent actions. Previous research by Latif et al (2023) and (Noviarmi & Prananya, 2023), supports this view, emphasizing that positive attitudes strongly correlate with consistent PPE use across various industries. These findings reinforce the need to foster positive attitudes through safety education, communication strategies, and cultural initiatives to improve adherence to workplace safety protocols (Harvey et al., 2001).

This study suggests that organizations should prioritize initiatives to strengthen positive industrial workers' attitudes, such as regular safety training, clear risk communication, and visible managerial commitment to occupational health and safety (OHS). Encouraging industrial workers to participate in decision-making processes related to safety could further enhance their sense of ownership and accountability. Nevertheless, this study's cross-sectional design and relatively small sample size limit the generalizability of the findings, underscoring the need for further research with larger and more diverse populations.

Compliance with PPE Use

The findings also reveal that 51.4% of industrial workers reported consistent compliance with PPE use, while 48.6% failed to adhere to company safety standards. This near-equal distribution suggests a significant gap between workers' awareness of the importance of PPE and its consistent implementation in daily routines. Similar studies have observed comparable challenges, where knowledge and access to PPE do not always guarantee adherence, indicating the need for behavioral and organizational interventions (Malwi et al., 2024; Wahyuni et al., 2024). These results highlight that despite increased availability of PPE and ongoing safety campaigns, barriers such as discomfort, perceived inconvenience, and lack of reinforcement remain key obstacles to full compliance (Devila et al., 2022).

Existing literature indicates that internal and external factors, including industrial workers knowledge, attitudes toward safety, availability of equipment, supervisory practices, and



organizational safety culture, shape PPE compliance (Khoshakhlagh et al., 2024; Wahyuni et al., 2023). Research by Erika et al (2024) emphasized that management commitment, consistent training, and organizational policies are pivotal in promoting compliance. Similarly, Sartina & Purnamawati, 2024 demonstrated that environments with strong enforcement and visible leadership support foster higher adherence rates. This suggests compliance initiatives should target individual behavior and integrate organizational strategies to create a safety-oriented workplace environment (Latif et al., 2023).

This study advocates for a comprehensive, multi-level approach to improving PPE compliance. Adequate provision of protective equipment must be accompanied by systematic safety training, behavioral reinforcement, and the implementation of reward and penalty mechanisms. Previous studies have highlighted that programs combining safety communication with participatory safety planning can enhance industrial workers' engagement and accountability (Vika et al., 2024; Wahyuni et al., 2024). Integrating these measures with periodic evaluations and safety audits is essential to reducing workplace hazards and promoting a sustainable safety culture.

Employee Attitudes and Compliance with PPE Use

Bivariate analysis revealed a significant association between industrial workers' attitudes and PPE compliance, with a p-value of 0.002. Among those with positive attitudes, 75% consistently complied with PPE use, whereas 80% of industrial workers with negative attitudes were non-compliant. These findings demonstrate the pivotal role of psychological and behavioral factors in occupational safety management. Studies on industrial safety have consistently highlighted that industrial workers' safety perceptions and attitudes strongly predict compliance, often more so than technical knowledge or physical resources (Devila et al., 2022; Khoshakhlagh et al., 2024). This reinforces the argument that addressing workers' behavioral determinants is equally critical as providing adequate safety tools (Carra et al., 2024; Dyreborg et al., 2022; Saleem & Malik, 2022).

This observation aligns with studies by Wahyuni et al (2024) and Sartina & Purnamawati (2024), which reported that positive industrial workers' attitudes strongly influence adherence to occupational health and safety procedures. Behavioral change theories, such as the Health Belief Model and Theory of Planned Behavior, emphasize that strong risk perception, perceived benefits, and a sense of control are crucial motivators for safe practices (Erika et al., 2024; Ghassani et al., 2023). Organizational safety climate research also suggests that when management visibly prioritizes safety, industrial workers develop a stronger sense of responsibility, improving PPE adherence (Puspitarini & Martiana, 2024; Vika et al., 2024).

In light of these findings, employers are encouraged to implement behavior-based interventions to shape safety perceptions and foster positive attitudes through safety campaigns, leadership engagement, and collaborative workplace cultures. Effective strategies may include participatory training programs, peer-led safety initiatives, and incentive systems that reward safe behaviors (Malwi et al., 2024). However, this study's reliance on a cross-sectional design, its small sample size, and the potential for self-reporting bias limit the extent to which these findings can be generalized. Future research should adopt longitudinal and mixed-method designs to capture changes over time and provide deeper insights into the interplay between employee attitudes, organizational culture, and PPE compliance (Wahyuni et al., 2023). Based on the researcher's perspective, prioritizing interventions that simultaneously address individual attitudes and organizational culture will yield the most sustainable improvements in PPE compliance within high-risk industries such as fish processing.



Conclusion

This study shows a significant relationship between employee attitudes and adherence to Personal Protective Equipment (PPE) use, with positive attitudes linked to higher compliance and negative attitudes related to lower compliance. The findings highlight the importance of integrating behavioral and organizational strategies with technical measures to strengthen safety culture and reduce workplace risks. However, its cross-sectional design, small sample, and self-reported data limit generalizability, suggesting the need for future research with longitudinal and mixed-method approaches on larger, more diverse populations to guide effective safety practices.

Ethics approval and consent to participate

Ethical approval for this study was obtained per institutional and national research guidelines. Before participation, all participants were informed about the study's purpose, procedures, and rights, and written informed consent was obtained. Participant confidentiality and anonymity were strictly maintained throughout the research process.

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