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Improving workplace safety through safety awareness training at PT Barata Indonesia

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Abstract

Workplace safety remains a crucial concern in Indonesia's industrial sector. According to BPJS Ketenagakerjaan, more than 315,000 occupational accidents were recorded in 2023, with 73% occurring in the manufacturing and construction sectors. This alarming number highlights the need for psychological and behavioral interventions rather than technical compliance alone. This study aims to examine how Safety Awareness Training at PT Barata Indonesia can improve employees' cognitive, emotional, and behavioral awareness toward safe practices. Using a pre–post test design involving 400 participants, the training program focused on risk perception, motivation, and safety-related self-efficacy. Results showed a significant improvement in participants' knowledge and engagement, with a 30% increase in post-test scores. Findings emphasize the role of psychological mechanisms such as motivation, reinforcement, and observational learning in developing a safety-oriented mindset. This study contributes to understanding how structured psychological interventions can create long-term behavioral change in workplace safety.

Keywords: Safety Awareness, Workplace Safety, Employee Training.

Abstrak

Keselamatan kerja tetap menjadi perhatian utama di sektor industri Indonesia. Menurut BPJS Ketenagakerjaan, lebih dari 315.000 kecelakaan kerja tercatat pada tahun 2023, dengan 73% terjadi di sektor manufaktur dan konstruksi. Angka yang mengkhawatirkan ini menyoroti kebutuhan akan intervensi psikologis dan perilaku, bukan hanya kepatuhan teknis semata. Penelitian ini bertujuan untuk menganalisis bagaimana Pelatihan Kesadaran Keselamatan di PT Barata Indonesia dapat meningkatkan kesadaran kognitif, emosional, dan perilaku karyawan terhadap praktik keselamatan. Menggunakan pendekatan pre–post test yang melibatkan 400 peserta, program pelatihan ini berfokus pada persepsi risiko, motivasi, dan kepercayaan diri terkait keselamatan. Hasil menunjukkan peningkatan signifikan dalam pengetahuan dan keterlibatan peserta, dengan peningkatan skor pasca-tes sebesar 30%. Temuan ini menekankan peran mekanisme psikologis seperti motivasi, penguatan, dan pembelajaran observasional dalam mengembangkan pola pikir yang berorientasi pada keselamatan. Studi ini berkontribusi pada pemahaman bagaimana intervensi psikologis yang terstruktur dapat menciptakan perubahan perilaku jangka panjang dalam keselamatan kerja.

Kata kunci: Kesadaran Keselamatan, Keselamatan Kerja, Pelatihan Karyawan.

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1. Introduction

Workplace safety has become one of the most pressing challenges for organizations worldwide, especially in developing countries such as Indonesia. The rapid growth of manufacturing and construction industries has increased the complexity of work environments and consequently the risk of occupational accidents. Data from BPJS Ketenagakerjaan (2023) reported more than 315,579 recorded workplace accidents, with a significant portion resulting in temporary or permanent disabilities (Melansir.com, 2024). The International Labour Organization (ILO, 2023) also reported that more than 2.8 million workers die annually due to occupational accidents and diseases globally. These statistics underscore the urgent need for safety interventions that address not only technical but also psychological and behavioral dimensions of employee safety.

At PT Barata Indonesia, a state-owned enterprise engaged in manufacturing and heavy engineering, management has long recognized safety as a strategic priority. However, incident reports and near-miss cases indicate that human factors—such as lack of attention, complacency, and underestimation of risks—remain dominant contributors to unsafe acts (Aurellia, 2022; Ristantya et al. 2022; Mayandari & Inayah, 2023; Bramistra, 2024). Traditional safety briefings and posters have shown limited effectiveness in changing deep-seated attitudes and behaviors. Therefore, psychological-based interventions that emphasize awareness, motivation, and safety culture are essential to ensure sustainable change.

From a psychological perspective, safety is not merely compliance with regulations but a form of cognitive and emotional engagement. Employees must not only know what is safe but also believe and feel that safety is personally meaningful. The Theory of Planned Behavior (Ajzen, 1991) provides a valuable framework for understanding how attitudes, subjective norms, and perceived behavioral control influence intentions to perform safe behavior. Similarly, Bandura's Social Learning Theory (1977) emphasizes the importance of learning through observation, imitation, and reinforcement, which are key components in safety training. These theories highlight that safety performance depends on individual psychological readiness as much as it depends on external supervision.

In the context of PT Barata Indonesia, these psychological theories are integrated into the Safety Awareness Training program. The training uses simulations, group discussions, and reflective exercises to enhance safety motivation and perception of risk. By combining cognitive (knowledge-based), emotional (motivation-based), and behavioral (practice-based) elements, the program aims to develop a comprehensive understanding of safety. The design reflects the company's commitment to building a proactive safety culture, where employees take ownership of their safety responsibilities rather than relying solely on enforcement.

The present study was conducted as part of an internship project that sought to evaluate the effectiveness of this training program. It focuses on assessing how safety awareness training influences employees' safety cognition, motivation, and behavior.

By applying psychological theories in a real industrial context, this research aims to contribute both practically and theoretically to the field of occupational safety psychology, offering insights for other organizations that seek to improve safety performance through behavioral and psychological interventions.

2. Literature Review

Importance of Workplace Safety Training

Psychological approaches to workplace safety emphasize that human behavior is influenced by cognitive, emotional, and social mechanisms. Two dominant frameworks—Theory of Planned Behavior (TPB) and Social Learning Theory (SLT)—provide the foundation for understanding how safety-related attitudes and behaviors develop.

According to Ajzen (1991), TPB suggests that behavior is determined by intention, which is influenced by attitudes toward the behavior, subjective norms, and perceived behavioral control. Within the context of workplace safety, this means that employees who perceive safety as valuable, socially encouraged, and within their control are more likely to engage in safe behaviors. For example, when PT Barata Indonesia's management consistently communicates the importance of safety and empowers workers to act safely without fear of penalty, employees' perceived behavioral control and positive safety attitudes increase.

Bandura's Social Learning Theory (1977) complements this by emphasizing that individuals learn from observing others' actions and the consequences that follow. In the training program at PT Barata Indonesia, this theory is applied through role-playing and peer modeling activities, where workers observe how their peers respond to risky situations and how positive behavior is rewarded. This process fosters vicarious learning—employees internalize safe behaviors not just through instruction but through social reinforcement.

Several researchers have shown that safety training programs can significantly reduce unsafe acts when they integrate psychological principles. Clarke (2020) found that safety behavior improves when organizations strengthen employees' safety motivation and perception of control. Christian et al. (2020) identified that psychological ownership mediates the relationship between safety climate and performance. Choudhry (2022) also emphasized that behavior-based safety is more effective when combined with self-reflection and emotional engagement.

3. Research Method

The internship took place in the HR Division of PT Barata Indonesia during September 2025. This placement provided the author with the opportunity to be directly involved in a training program that involved approximately 400 employees. The employees were divided into several batches to facilitate the training process. Each batch consisted of 40–50 participants to ensure effective interaction and engagement. The Safety Awareness Training program consists of several systematic stages, namely:

1. Pre-test: Conducted before the training to assess participants' initial understanding of basic workplace safety concepts, potential hazards in the workplace, and risk mitigation steps. This assessment helps identify knowledge gaps that the training will address.
2. Presentation of Material: The material is delivered by instructors from the OHS team and special staff from management. Topics include the importance of safety, hazard identification, the use of personal protective equipment (PPE), and employees' responsibilities in supporting the safety culture. Multimedia presentations and interactive discussions are employed to enhance engagement.

Figure 1. Safety awareness material presentation

3. Simulation: Using a simulator, participants are given hands-on experiences regarding how potential hazards can occur in the workplace and how to address them. This experience provides a realistic understanding of workplace risks that cannot be grasped through theory alone. Real-life scenarios are simulated to demonstrate the consequences of unsafe practices.

Figure 2. The simulation site

4. Post-test: Conducted after the entire training session to evaluate the increase in participants' knowledge and awareness regarding workplace safety. This helps measure the effectiveness of the training and identifies areas that may require further emphasis in future sessions.

Data was collected through direct observation, documentation, and evaluation of pre-test and post-test results. The author also conducted interviews with participants

to gather feedback on the effectiveness of the training. Open-ended questions allowed participants to express their thoughts and suggestions for improvement.

Figure 3. The safety awareness simulation

4. Results and Discussion

4.1. Results

The results indicate a substantial increase (≈30%) in safety awareness across all three dimensions. The highest improvement occurred in safety motivation, suggesting that participants not only learned new information but also developed stronger personal responsibility toward safety.

Dimension	Pre-test mean	Post-test mean	Improvement (%)
Safety knowledge	61.2	79.4	+29.7%
Safety motivation	59.8	78.0	+30.5%
Safety behavior	60.3	77.1	+27.9%
Overall average	60.4	78.2	+29.4%

The analysis results indicate a significant improvement across all dimensions after the safety training program. The average score for safety knowledge increased from 61.2 in the pre-test to 79.4 in the post-test, reflecting an improvement of 29.7%. The safety motivation dimension also showed a marked increase from 59.8 to 78.0, with a 30.5% improvement—the highest among the three dimensions. Meanwhile, safety behavior rose from 60.3 to 77.1, representing an improvement of 27.9%. Overall, the total average score increased from 60.4 to 78.2, indicating an overall improvement of 29.4%. These findings demonstrate that the implemented training program effectively enhanced participants' safety knowledge, motivation, and behavior.

4.2. Discussion

Data from the pre-test and post-test provide a clear picture of the training's effectiveness. The average scores of participants increased after attending the training, with several participants showing significant improvements. For instance, participant Jefry Eka Prayogo improved his score from 50 in the pre-test to 80 in the post-test. Furthermore, qualitative feedback revealed that participants felt more confident in identifying hazards and using PPE. Many reported that the simulation exercises were particularly impactful, as they provided a safe space to practice responses to potential

emergencies. Despite the training running smoothly, several challenges affected its effectiveness, including:

1. Limitations of the Simulator: Some training sessions encountered technical difficulties with the simulator, which could diminish participants' hands-on experience. To address this, alternative training methods were implemented, such as group discussions and role-playing exercises.
2. Differences in Participants' Understanding: Employees with more work experience tended to grasp the material more easily compared to newer employees. This disparity was addressed by providing additional support and resources for less experienced employees.
3. Time Constraints: Some batches faced time limitations in delivering the material, resulting in not all topics being covered in depth. To mitigate this, the training schedule was adjusted to allow for more comprehensive coverage of essential topics.

Alternative Measures for Technical Issues: The technical team from OHS was always on standby to support the training. If the simulator encountered issues, instructors utilized alternative approaches such as real case studies and manual demonstrations.

1. Interactive Discussions: Material was presented using interactive methods, such as group discussions and Q&A sessions, to enhance participants' understanding. Encouraging questions and discussions fostered a collaborative learning environment.
2. Flexible Training Schedule: Some batches were organized into two parts to ensure that material was delivered without sacrificing depth of understanding. This allowed for more thorough exploration of complex topics.
3. Ice Breaking Activities: Ice breaking activities were conducted to enhance participants' focus and create a more engaging training atmosphere. These activities helped build rapport among participants, making them more comfortable in sharing their experiences.

The positive outcomes of the Safety Awareness Training program suggest that ongoing training initiatives should be a priority for PT Barata Indonesia. Continuous education in safety practices not only reinforces the knowledge gained during initial training but also adapts to new risks and challenges in the workplace. Establishing a culture of safety requires consistent commitment from all levels of the organization. Management should actively participate in safety initiatives and demonstrate their commitment to employee well-being. This involvement can enhance employee morale and encourage a proactive approach to safety.

5. Conclusion

The Safety Awareness Training at PT Barata Indonesia has a significant psychological impact on employees’ understanding, motivation, and practice of workplace safety. The program effectively improved workers’ cognitive comprehension, emotional engagement, and behavioral consistency, leading to a 30% overall increase in safety

awareness scores. These findings confirm that safety training is most effective when it integrates psychological principles—specifically motivation, reinforcement, and observational learning—alongside technical content.

Practical suggestions for PT Barata Indonesia include incorporating behavior-based safety programs, conducting psychological safety audits, encouraging management participation, integrating safety awareness modules into continuous learning, and collaborating with psychology experts. Ultimately, workplace safety should be viewed as a shared psychological culture, not only an administrative requirement.

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