Occupational Safety and Health Awareness, Attitude and PPE Usage among Participants of an OSH Awareness Programme in a Malaysian Polytechnic

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Abstract

Occupational Safety and Health (OSH) play a crucial role in ensuring a safe and healthy working and learning environment, particularly in technical and vocational education institutions where exposure to workplace hazards is common. Previous studies have highlighted the importance of OSH awareness, positive safety attitudes, and consistent use of Personal Protective Equipment (PPE) in reducing occupational risks. However, limited empirical evidence is available regarding OSH awareness and PPE-related practices among participants involved in OSH awareness programmes within the Malaysian polytechnic environment. This study aimed to assess the level of OSH awareness and attitudes, evaluate the frequency and consistency of PPE usage, and examine the influence of demographic factors on OSH-related outcomes among participants attending the Occupational Safety and Health (OSH) Day programme at Politeknik Sultan Mizan Zainal Abidin (PSMZA). A quantitative survey approach was employed involving 499 respondents comprising students, lecturers, industry representatives, and other programme participants. Data were analysed using descriptive statistics, Pearson correlation analysis, independent samples t-test, and one-way ANOVA. The findings revealed a significant positive relationship between work experience and OSH awareness and attitude ($r = .156$, $p < .001$). However, no significant relationship was found between demographic factors and PPE usage practices. The independent samples t-test showed no significant difference in PPE usage based on gender ($p = .551$). ANOVA results indicated significant differences in OSH awareness among respondent categories ($F(3,494) = 6.082$, $p < .001$), with lecturers demonstrating significantly higher awareness levels than students. The study highlights the need for targeted OSH interventions, particularly among students and less experienced participants, to strengthen safety awareness and encourage consistent PPE practices within technical education environments.

Keywords: Occupational Safety and Health; Personal Protective Equipment; Polytechnic; Safety Awareness, Safety Attitude, Safety Practices, TVET.

1.0 Introduction

Occupational Safety and Health (OSH) are a crucial discipline aimed at protecting the safety, health, and well-being of individuals in the workplace.

The World Health Organization (WHO, 2023) estimates that millions of workers die annually due to occupational accidents and work-related diseases, highlighting the urgent need for effective OSH practices globally. In Malaysia, the Department of Occupational Safety and Health (DOSH) constantly strives to promote a safe and healthy working environment, in line with the Occupational Safety and Health Act 1994 (DOSH, 2024). Higher education institutions, especially polytechnics which focus on technical and vocational education and training (TVET), face unique OSH risks due to the extensive use of machinery, workshops, laboratories, and hazardous materials (Mohd. Yusof & Isa, 2021). Therefore, emphasizing OSH in the TVET education sector is critical, not only to protect staff and students but also to cultivate OSH-literate graduates.

Safety culture, which refers to shared values, beliefs, perceptions, and norms regarding safety within an organization, plays a vital role in determining OSH performance. Key aspects of safety culture include OSH awareness, which is the extent to which individuals understand risks and preventive measures, and OSH attitude, which refers to the tendency to respond positively or negatively to safety issues (Neal & Griffin, 2006). This awareness and attitude, in turn, influence safety practices, including the use of Personal Protective Equipment (PPE). PPE is the last line of defense in the hierarchy of hazard controls and is essential when risks cannot be eliminated or adequately controlled by other methods (NIOSH, 2022). The effectiveness of PPE depends on proper selection, consistent use, and good maintenance (Rajapakse et al., 2019). Understanding the dynamics of OSH awareness, attitudes, and practices, particularly concerning PPE, among the polytechnic community is crucial for developing targeted interventions and promoting a safe working and learning environment

Despite the increasing emphasis on OSH, occupational accidents and injuries, including in the technical education sector, still occur (Hamid et al., 2020). National statistics often indicate the need for continuous improvement in OSH management across various sectors (JKKP, 2023). Failure to comply with established OSH practices can lead to significant direct and indirect costs, including loss of life, injuries, property damage, and decreased productivity. In the polytechnic context, exposure to mechanical, electrical, chemical, and physical risks is common, making compliance with safety protocols extremely important.

One of the main challenges in OSH management is ensuring compliance with PPE usage. Various studies have identified factors contributing to non-compliance with PPE use, including discomfort, lack of adequate training, the perception that PPE is unnecessary, and lack of supervision or enforcement (Liew et al., 2020; Salleh et al., 2019). Recent literature confirms that management commitment and continuous enforcement remain critical in mitigating these non-compliance factors (Alruwaili et al., 2024; Khosravi et al., 2021). Individual attitudes towards safety, influenced by risk perception and social norms, also play a crucial role. For example, an "it won't happen to me" attitude or the normalization of deviations from safe procedures can

reduce the likelihood of individuals consistently using PPE. This indicates that organizations must leverage robust safety communication to influence worker behaviours and ensure adherence to safety standards (Naji et al., 2022).

Demographic factors such as work experience and gender have also been studied as potential predictors of OSH awareness, attitudes, and practices, but findings are not always consistent across industries and cultural contexts (Wong et al., 2018). Furthermore, recent studies highlight that while demographic characteristics provide baseline insights, the psychological safety climate of the workplace exerts a more substantial direct influence on safety outcomes (Shafique & Rafique, 2024; Fang et al., 2020). Therefore, there is a need to specifically assess the current level of OSH awareness and attitudes, the frequency and consistency of PPE usage, and to identify factors influencing positive attitudes and consistent practices related to OSH and PPE among polytechnic staff and the community. The lack of detailed empirical data on these aspects in the Malaysian polytechnic context prompted the conduct of this study.

This study aimed to investigate Occupational Safety and Health (OSH) awareness, attitudes, and PPE usage among participants of an OSH Awareness Programme conducted at a Malaysian polytechnic. The study assessed the level of OSH awareness and attitudes, examined the consistency of PPE usage, and explored the influence of demographic factors on OSH-related outcomes. In addition, differences in OSH awareness across participant categories comprising students, lecturers, industry representatives, and other attendees were examined.

2.0 Methodology

To achieve these objectives, the study employed quantitative research design, specifically utilizing a survey method. The sample for this study consisted of 499 respondents drawn from a polytechnic in Malaysia, namely Sultan Mizan Zainal Abidin Polytechnic (PSMZA). The study involved 499 respondents, exceeding the minimum sample size recommended by Krejcie and Morgan (1970), thus ensuring sufficient statistical power and representativeness. The respondents represented diverse categories, including PSMZA students, lecturers, workers from industry, and others associated with the institution. The questionnaire was adapted from previous Occupational Safety and Health (OSH) studies and modified to suit the polytechnic environment. This questionnaire was designed to gather data on respondents' demographic backgrounds, their level of OSH awareness, their attitudes towards occupational safety and health, and their practices related to the use of personal protective equipment. The instruments evaluated in the questionnaire consist of respondents' demographic profiles (gender, respondent category, and work experience), their levels of OSH awareness and attitude, and their safety practices regarding personal protective equipment (PPE) usage.

Data collected from the survey were systematically analyzed using SPSS statistical software. The analysis comprised descriptive statistics, including frequencies, percentages, mean scores, and standard deviations. In addition, inferential statistical tests were conducted to further explore relationships and differences within the data. Pearson correlation analysis was employed to examine the strength and direction of relationships between demographic variables and OSH-related constructs. Independent samples t-test was used to compare mean differences between two groups, while one-way ANOVA followed by Tukey HSD post-hoc analysis was conducted to identify significant differences among multiple respondent categories (Field, 2018; Hair et al., 2019).

This comprehensive methodology enabled the researchers to draw meaningful conclusions about the state of OSH awareness and practices within the polytechnic environment, contributing valuable insights to the field of occupational safety in educational institutions.

3.0 Result and Discussion

Table 1 shows the descriptive statistics for the demographic variables of the respondents. A total of 499 respondents were included in the descriptive analysis, while 498 respondents had complete data for further analysis (listwise). The variable AGE in the original output likely refers to GENDER based on its value range (1.00-2.00) and its use in subsequent analyses (correlation and t-test)

Table 1: Descriptive Statistics of Demographic Variables

Descriptive Statistics					
	N	Minimum	Maximum	Mean	Std. Deviation
Age	499	1.00	2.00	1.3627	.48127
Categories	499	1.00	4.00	1.8257	1.05075
Work experience	498	.00	5.00	2.6285	2.32400
Valid N (listwise)	498				

3.1 Relationship Between Demographic Factors and OSH Awareness & Attitude, and PPE Usage

Pearson correlation analysis was conducted to determine the relationship between demographic factors (work experience and gender) and OSH awareness & attitude, as well as safety practices and PPE usage. These relationships are analyzed based on the modified Technology Acceptance Model (TAM) and the Theory of Planned Behavior (Ajzen, 1991), where demographic factors are conceptualized as external variables that directly or indirectly influence internal psychological factors, such as awareness and attitude towards safety technologies and practices.

The findings indicate a statistically significant positive relationship between work experience and OSH awareness and attitude ($r = .156$, $p = .000$). This suggests that higher work experience is associated with higher levels of OSH

awareness and positive attitudes. However, no significant relationship was found between gender and OSH awareness and attitude (p = .656). For safety practices and PPE usage, no significant relationship was found with either work experience (p = .063) or gender (p = .104).

Table 2: Correlation between Demographics and OSH Awareness & Attitude

		experience	gender
Awareness and Attitude towards OSH	Pearson Correlation	.156**	-.020
	Sig. (2-tailed)	.000	.656
	N	497	498

Table 3: Correlation between Demographics and Safety Practices & PPE Usage

		experience	gender
Safety Practices and the Use of Personal Protective Equipment (PPE)	Pearson Correlation	.084	-.073
	Sig. (2-tailed)	.063	.104
	N	497	498

3.2 Comparison of PPE Usage Based on Gender

An independent samples t-test was conducted to compare the average PPE usage between male and female respondents. Although there was a slight difference in the average PPE usage between males (Mean=4.335) and females (Mean=4.229), the statistical analysis showed that the difference was not statistically significant (p = 0.551, greater than 0.05). Therefore, there is no strong evidence that gender influences PPE usage in this study sample.

Table 4: T-test Comparison of PPE Usage by Gender

Group	**Mean PPE Usage**	**t-value**	**p-value (Sig.)**	**Interpretation**
Male	4.335	1.630	0.551	Significant difference between genders
Female	4.229			

3.3 OSH Awareness Levels Among Different Respondent Categories

A one-way Analysis of Variance (ANOVA) was conducted to assess OSH awareness levels among four respondent categories: PSMZA Students, PSMZA Lecturers, Industry Workers, and Others.

The ANOVA test indicates a significant difference in OSH awareness levels among at least one pair of groups (F (3, 494) = 6.082, p = .000) and Tukey HSD post-hoc analysis was performed to identify specific differences between group pairs. Key findings are the mean OSH awareness score of PSMZA Lecturers was significantly higher compared to PSMZA Students. There are no significant differences were found between the following group pairs, which is between PSMZA Students vs. Industry Workers (p = 0.254), PSMZA Students vs. Others (p = 0.980), PSMZA Lecturers vs. Industry Workers (p = 0.996), PSMZA Lecturers vs. Others (p = 0.061) and Industry Workers vs.

Others (p = 0.424). This indicates that OSH awareness among lecturers is significantly higher than among students. However, there were no significant differences between other group pairs, suggesting that factors other than occupation may influence OSH awareness.

Table 5: One-Way ANOVA for OSH Awareness Levels by Respondent Category

Source	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	5.560	3	1.853	6.082	.000
Within Groups	150.542	494	0.305		
Total	156.102	497			

This study provides several important insights into OSH awareness, attitudes, and practices, particularly PPE usage, within the polytechnic community. The finding that work experience positively correlates with OSH awareness and attitude aligns with previous studies that have found longer exposure to the work environment and formal or informal OSH training tend to increase understanding and appreciation of safety issues (Smith & Jones, 2018; Deokar & Patil, 2020). More experienced individuals may have witnessed or learned from the consequences of safety non-compliance, thereby forming more positive attitudes.

However, it is interesting to note that work experience did not show a significant relationship with safety practices and PPE usage in this study. This might indicate a gap between knowledge/attitude and actual practice, a phenomenon known as the "knowledge-attitude-practice (KAP) gap" (Larson et al., 2014). Although experienced individuals may have better awareness and attitudes, factors such as PPE discomfort, time pressure, normalized or decreased risk perception (overconfidence) (Brown, 2020), or lack of continuous reinforcement could hinder the translation of positive attitudes into consistent practices. Vinodkumar and Bhasi (2010) also emphasized that organizational factors such as management commitment and safety climate play a crucial role in shaping safety practices in addition to individual characteristics.

The absence of a significant difference in PPE usage between genders, as well as the lack of a significant relationship between gender and OSH awareness, attitudes, and PPE practices, supports some other studies that also found no significant gender differences in certain safety perceptions and behaviors (Ng & Siu, 2017; Ariffin & Sivan, 2018). This suggests that OSH intervention programs may not need to be specifically stratified by gender in the context of this study population but rather focus on universal factors affecting all workers.

The significant difference in OSH awareness among respondent categories, particularly between lecturers and students, is an important finding. Lecturers, who typically have higher educational qualifications, more specific OSH training, and direct responsibility for supervising student safety in workshops and laboratories, logically show a higher level of awareness. This finding is like a study by Ali and Hassan (2022) which also found that academic staff had higher safety awareness scores compared to students in technical institutions. This highlights the critical role of lecturers as change agents and role models in cultivating OSH. The lower awareness level among students demands special attention, as they are the next generation of the workforce who need to be instilled with a strong OSH foundation before entering the actual working world. The effectiveness of OSH training programs targeted at students' needs to be continuously evaluated and improved (Robson et al., 2012). The absence of significant differences among other groups might suggest that OSH awareness levels are similar or influenced by other factors not thoroughly investigated in this comparison, such as the specific industry type for "Industry Workers" or the nature of "Others'" occupations. Theories such as the Health Belief Model suggest that individuals' perceptions of vulnerability and severity of risk, as well as the benefits and barriers to action, influence health behaviours, and these may vary even within broad occupational categories.

4.0 Conclusion

The findings of this study reveal several important insights regarding the factors influencing awareness and attitudes towards Occupational Safety and Health (OSH) within the polytechnic context. Notably, work experience emerged as a contributing factor in shaping OSH awareness and attitudes, suggesting that increased exposure to the workplace environment enhances understanding and appreciation of safety protocols. However, work experience did not show a significant relationship with the actual practices related to the usage of personal protective equipment (PPE), indicating a possible gap between knowledge and practical application.

Furthermore, gender was not found to be a significant differentiator in relation to OSH awareness, attitudes, or PPE usage. This implies that safety programs and interventions should be inclusive and not necessarily segmented based on gender. However, OSH awareness levels varied according to respondent categories, with lecturers demonstrating significantly higher levels of awareness compared to students. This variation indicates that differences in roles, responsibilities, and exposure to OSH training may influence safety-related knowledge and attitudes.

Based on these findings, several strategic recommendations are proposed. First, training programs related to OSH and PPE usage should be further strengthened and tailored, especially for students and less experienced staff. Such training must go beyond theoretical knowledge and focus on the practical translation of that knowledge into consistent and safe workplace practices. It is essential to embed these practices into daily routines to cultivate a strong safety culture.

Second, effective mechanisms must be established to bridge the gap between knowledge, attitudes, and practices (KAP). These may include closer supervision, continuous awareness campaigns, implementation of feedback systems regarding safety practices, and the active involvement of workers and students in OSH committees. Such participatory approaches help foster a sense of ownership and responsibility towards maintaining a safe working and learning environment.

Additionally, the role of lecturers as role models and mentors in promoting OSH culture must be empowered. This can be achieved through continuous professional development, advanced training, and the provision of adequate resources to support their role in guiding students toward safer practices.
Finally, further research is encouraged to qualitatively explore the specific barriers that hinder consistent PPE usage. Moreover, evaluating the effectiveness of OSH interventions designed based on the present study's findings would provide valuable evidence for policy refinement. Investigating the organizational safety climate, as suggested by Zohar (1980), within the polytechnic context could also yield deeper insights into the systemic factors that influence safety behaviours.

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Author Contributions
W. M. R. W. Md. Noor: Conceptualisation, Abstract, Introduction and Discussion, Methodology; **N. W. Awang:** Testing, Results, Writing; **M. A.M. Tajuddin:** Reviewing; **Y. Kassim:** Collaborator.

Conflicts of Interest
The manuscript has not been published elsewhere and is not under consideration by any other journal. All authors have reviewed and approved the manuscript, consent to its submission, and declare that there are no conflicts of interest.

References

Ali, N., & Hassan, R. (2022). A comparative study of safety awareness between academic staff and students in Malaysian technical institutions. Malaysian Journal of Occupational Safety and Health, 21(1), 45-53.

Alruwaili, M., Carrillo, P., Soetanto, R., & Munir, F. (2024). Occupational Accidents, Injuries, and Associated Factors among Migrant and Domestic Construction Workers in Saudi Arabia. Buildings, 14(9), 2714. https://doi.org/10.3390/buildings14092714

Ariffin, K., & Sivan, P. (2018). Gender differences in safety climate perception and safety performance in the manufacturing sector. Journal of Safety Research Malaysia, 2(1), 12-20.

Brown, P. (2020). Risk perception and safety behaviour: The role of experience and complacency. Routledge.

Deokar, A. V., & Patil, S. M. (2020). A study on correlation of work experience with safety awareness and practices among construction workers. International Journal of Engineering Research & Technology, 9(5), 1022-1026.

DOSH. (2024). Guidelines on Occupational Safety and Health in Higher ducation Institutions. Department of Occupational Safety and Health Malaysia.

Fang, D., Wu, C., & Wu, H. (2020). Impact of safety knowledge and safety attitude on safety behavior: A cognitive psychology perspective. Journal of Safety Research, 72, 165-175.

Field, A. (2018). Discovering Statistics Using IBM SPSS Statistic (5th ed.). Sage.

Hair, J. F., Black, W. C., Babin, B. J., & Anderson, R. E. (2019). Multivariate Data Analysis (8th ed.). Cengage.

Hamid, A. R. A., Raja Azman, R. N. S., & Ismail, Z. (2020). Occupational accidents in educational institutions: A review of contributing factors. Journal of Occupational Safety and Health Advances, 3(2), 88-97.

JKKP. (2023). National Occupational Accident Statistics Report. Department of Occupational Safety and Health Malaysia.

Khosravi, Y., Ghasemi, F., & Alimohammadi, I. (2021). Factors influencing safety behavior and PPE compliance: Application of structural equation modeling. International Journal of Occupational Safety and Ergonomics, 27(4), 1120-1129.

Larson, E., et al. (2014). A qualitative systematic review of factors influencing proper use of personal protective equipment in healthcare. Infection Control & Hospital Epidemiology, 35(8), 976-986.

Liew, M. S., Chan, Y. F., & Ho, C. M. (2020). Personal protective equipment (PPE) compliance among healthcare workers: A systematic review and meta-analysis. International Journal of Nursing Studies, 108, 103616.

Mohd. Yusof, K., & Isa, Z. M. (2021). Occupational safety and health in TVET institutions: A practical guide. Politeknik Malaysia.

Naji, G. M. A., Isha, A. S. N., Mohyaldinn, M. E., Al-Mekhlafi, A. B., & Rahman, S. M. (2022). Assessing the Mediating Role of Safety Communication Between Safety Culture and Employees Safety Performance. Frontiers in Public Health ,10, Article840281.https://doi.org/10.3389/fpubh.2022.840281

Neal, A., & Griffin, M. A. (2006). A study of the lagged relationships among safety climate, safety motivation, safety behavior, and accidents at the individual and group levels. Journal of Applied Psychology, 91(4), 946–953.

Ng, T. W., & Siu, O. L. (2017). Do men and women differ in their safety perceptions and behaviors? A meta-analysis. Journal of Safety Research, 61, 1-12.

NIOSH. (2022). Hierarchy of Controls. National Institute for Occupational Safety and Health. https://www.cdc.gov/niosh/topics/hierarchy/default.html

Rajapakse, S., Ananda, M., & Wickramaratne, M. (2019). Effectiveness of personal protective equipment in preventing occupational injuries: A systematic review. Journal of Occupational Health, 61(3), 195-205.

Robson, L. S., Clarke, J. A., Cullen, K., Bielecky, A., Severin, C., Bigelow, P. L., ... & Mahood, Q. (2012). The effectiveness of occupational health and safety management system interventions: A systematic review. Safety Science, 50(10), 1973-1985.

Salleh, N. M., Adnan, A., & Othman, N. (2019). Factors influencing non-compliance of personal protective equipment (PPE) usage among construction workers in Malaysia. Journal of Building Performance, 10(1), 78-89.

Shafique, M., & Rafique, M. (2024). Assessing the impact of safety climate and safety awareness on worker performance in high-risk occupational environments. Safety Science, 170, 106320.

Smith, J., & Jones, A. (2018). The impact of work experience on safety awareness and compliance in the manufacturing industry. Journal of Industrial Safety Engineering, 15(2), 112-125.

Vinodkumar, M. N., & Bhasi, M. (2010). Safety management practices and safety behaviour: The mediating role of safety knowledge and motivation. Accident Analysis & Prevention, 42(6), 2082–2093.

WHO. (2023). Occupational health: Key facts. World Health Organization. https://www.who.int/news-room/fact-sheets/detail/occupational-health

Wong, K. L., Chan, A. H. S., & Ngan, S. C. (2018). The role of demographic characteristics in predicting safety behavior: A study of Hong Kong construction workers. Safety Science, 109, 147-157.

Zohar, D. (1980). Safety climate in industrial organizations: Theoretical and applied implications. Journal of Applied Psychology, 65(1), 96-102.