

FACTORS INFLUENCING THE USE OF PERSONAL PROTECTIVE EQUIPMENT IN WELDING WORKSHOP WORKERS**Putri Adelya^{1*}, Kursiah Warti Ningsih¹****¹** Public Health Study Program, Faculty of Health and Informatics, Institut Kesehatan Payung Negeri, Pekanbaru, Indonesia.Email : putriadelya327@gmail.com**Abstract**

Occupational safety and health (K3) is an important aspect in protecting workers from potential dangers in the workplace, one of which is through the use of Personal Protective Equipment (PPE). Welding workshop workers are classified as having a high risk of accidents due to exposure to heat, sparks, ultraviolet rays, and harmful gases. This study aims to find out the factors that affect the use of PPE in workers at the Jalan Jendal welding workshop. This type of research is quantitative with a cross sectional design involving 30 respondents as a sample using the total sampling technique. Data were collected through observation sheets and analyzed using the Chi-Square test with a significance level of 0.05. The results showed that most of the respondents were young (86.7%), had higher education (80%), and an income above the UMR (80%). Incomplete use of PPE was found in 90% of respondents. The results of bivariate analysis showed that there was no significant relationship between age ($p=0.474$) and education ($p=0.543$) with PPE use. However, there was a significant relationship between income and PPE use ($p=0.033$). Workers with incomes below the UMR have a smaller chance of using PPE completely than workers with incomes above the UMR. In conclusion, economic factors play an important role in compliance with the use of PPE in welding workshop workers, so it is recommended to provide free PPE as well as increased supervision and education of K3 to improve work safety.

Keywords: Personal Protective Equipment; Income; Occupational Safety; Welding Workshops; Employee

INTRODUCTION

Occupational safety and health (K3) is an important aspect in maintaining the welfare of workers from the risk of accidents and occupational diseases. One form of application of K3 is the use of Personal Protective Equipment (PPE) which functions as a body protector from workplace hazards such as heat, sparks, ultraviolet rays, and toxic fumes that are often found in welding workshops. Welding work is included in the high-risk category because it involves exposure to extreme heat and hazardous materials that can cause burns, respiratory distress, and vision damage.

Based on data from the International Labour Organization (ILO), every 15 seconds one worker in the world dies due to a work accident, and about 337 million work accidents occur every year. This shows that the implementation of K3, especially in terms of the use of PPE, is still not optimal in various work sectors. In Indonesia, welding workshop workers are generally included in the informal sector that have not fully received supervision and protection related to K3. Research in North Sumatra shows that 65.5% of welding workshop workers do not use PPE completely and more than half have experienced a work accident.

Several studies showed different results regarding the influence of demographic variables on PPE use. Study [1] stated that there was no significant relationship between knowledge, work experience, and motivation with the use of PPE. Instead, research [2] and [3] showed a significant relationship between the use of PPE and the incidence of work

accidents. This difference shows that there is still a research gap regarding the most dominant factors in influencing PPE use behavior.

Based on this background, this study was conducted to determine the factors that affect the use of Personal Protective Equipment in welding workshop workers on Jalan Jendral Pekanbaru, focusing on three main factors, namely age, education, and income. The results of this study are expected to provide input for workshops and related institutions to increase awareness and compliance of workers on the implementation of K3 in the informal sector.

RESEARCH METHODS

This study uses a quantitative approach with a cross sectional design, which is a study conducted to determine the relationship between independent variables and dependent variables at one observation time. This research was carried out at the Jalan Jendal Welding Workshop, Pekanbaru City, in October 2025. The purpose of this study is to analyze factors that affect the use of Personal Protective Equipment (PPE) in welding workshop workers, including age, education, and income factors.

The population in this study is all welding workshop workers who are at the research site with a total of 30 people. Because the population is relatively small, the researcher uses a total sampling technique, where the entire population is used as a research sample. Thus, the number of samples in this study is equal to the number of population, namely 30 respondents. The research data was obtained through observation sheets that were used to directly record the behavior of PPE use by workers, as well as collect information about respondents' characteristics such as age, education, and income. Primary data is collected directly from the results of field observations, while secondary data is obtained through literature studies from various sources such as journals, scientific articles, and official documents relevant to the research topic.

Each variable in this study has a clear operational definition. The independent variables consist of age, education, and income, while the dependent variable is the use of personal protective equipment. The age of the respondents was categorized into young and old, education was differentiated between low and high levels, while income was classified based on the Regional Minimum Wage (UMR) of Pekanbaru City in 2025 of IDR 3,675,937.97 per month [4]. The use of PPE is categorized as complete if workers use all personal protective equipment according to standards, and incomplete if they only use part of personal protective equipment while working.

The data that has been collected is then processed through several stages, namely editing, coding, and cleaning the data so that the analysis results are accurate. Data analysis was carried out univariate to describe the frequency distribution of each variable and bivariate to determine the relationship between independent variables and dependent variables using the Chi-Square test with a significance level of 0.05. If the p-value < 0.05, it is stated that there is a significant relationship between the two variables, while if the p-value > 0.05, it means that the relationship is not significant.

RESEARCH RESULTS

The results of the study showed that the analyzed factors, namely age, education, and income, had different influences on the use of Personal Protective Equipment (PPE) in workers of the Jalan Jendal welding workshop. Of the three variables, only the income factor showed a significant relationship with PPE use, while age and education were not meaningfully related.

Table 1. The Relationship between Age and the Use of Personal Protective Equipment (PPE) in Welding Workshop Workers

		Use of PPE	Sum	Total	<i>P Value</i>	OR 95% CI
		Incomplete	Complete			
		n %	n %	%		
Age	Seedling	23 (88,5)	3 (11,5)	100	0,474	0,885
	Your	4 (100)	0 0			
Total		27 (90)	3 (10)			

Based on the table above, as many as 23 respondents (88.5%) were young and did not use PPE completely, while all elderly respondents (100%) also did not use PPE completely. The results of the Chi-Square test showed a value of $p = 0.474 (>0.05)$, so there was no significant relationship between age and the use of PPE in the workers of the Jalan Jendal welding workshop.

Table 2. The Relationship between Education and the Use of Personal Protective Equipment (PPE) in Welding Workshop Workers

		Use of PPE	Sum	Total	<i>P Value</i>	OR 95% CI
		Incomplete	Complete			
		n %	n %	%		
Education	Low	5 (83,3)	1 (16,7)	100	0,543	0,455
	Tall	22 (91,7)	2 (8,3)			
Total		27 (90)	3 (10)			

The results of the analysis showed that most of the respondents with higher education (91.7%) did not use PPE completely. The value of $p = 0.543 (>0.05)$ indicates that there is no significant relationship between the level of education and the use of PPE in welding workshop workers.

Table 3. The Relationship between Income and the Use of Personal Protective Equipment (PPE) in Welding Workshop Workers

		Use of PPE	Sum	Total	<i>P Value</i>	OR 95% CI
		Incomplete	Complete			
		n %	n %	%		
Income	< UMR	4 (66,7)	2 (33,3)	100	0,033	0,087
	> UMR	23 (95,8)	1 (4,2)			
Total		27 (90)	3 (10)			

Based on the table above, workers with incomes below UMR mostly do not use PPE in full (66.7%), while in the income group above the UMR, 95.8% of respondents also do not use PPE completely. The results of the Chi-Square test showed $p = 0.033$ (<0.05), which means that there was a significant relationship between income and PPE use in Jalan Jendal welding workshop workers. An Odds Ratio (OR) value of 0.087 indicates that workers with incomes below the UMR have a 0.087 times smaller chance of using PPE in full than workers with incomes above the UMR.

DISCUSSION

The results of the study showed that the analyzed factors, namely age, education, and income, had a different influence on the use of Personal Protective Equipment (PPE) in workers of the Jalan Jendal welding workshop. Of the three variables, only the income factor showed a significant relationship with PPE use, while age and education were not meaningfully related.

The Relationship between Age and the Use of Personal Protective Equipment (PPE) in Welding Workshop Workers

Based on the results of the Chi Square test, there was no significant relationship between age and PPE use ($p=0.474$). These findings suggest that workers' age does not directly affect the level of compliance in using personal protective equipment. The results of this study are in line with the research [1] which also states that age is not related to the behavior of using PPE in welding workshop workers in Makassar City.

This phenomenon can be explained by the fact that age is not the only factor that determines work safety behavior. Older workers are not necessarily more compliant with safety rules due to work habits, excessive confidence in experience, and low supervision. In contrast, younger workers may have higher awareness due to getting new information about K3 through media or training. Thus, compliance with the use of PPE is more influenced by aspects of knowledge, attitudes, and work culture than age factors alone.

The Relationship between Education and the Use of Personal Protective Equipment (PPE) in Welding Workshop Workers

The results of the study also showed that there was no significant relationship between education level and PPE use ($p=0.543$). This means that the level of formal education does not directly determine the behavior of workers in using personal protective equipment. These findings are in line with research [5], which shows that education does not have a significant relationship with PPE compliance, while knowledge and availability of protective equipment have a greater influence.

Formal education does provide a basis for general knowledge, but it is not always directly related to awareness of occupational safety. Many weld shop workers acquire skills and work habits from hands-on experience in the field, rather than from academic education. Therefore, practical and continuous K3 training is more influential in shaping safe behavior than formal education levels.

The Relationship between Income and PPE Use

In contrast to the previous two variables, the results showed that there was a significant relationship between income and PPE use ($p=0.033$). This indicates that workers with higher incomes tend to be more compliant in using personal protective equipment than workers with lower incomes. An Odds Ratio (OR) value of 0.087 indicates that workers with

incomes below the UMR have a lower chance of using PPE fully than those with incomes above the UMR. These findings are supported by research [6] which explains that economic factors play an important role in compliance with the use of PPE. Low-income workers tend to ignore the use of PPE for economic reasons, inconvenience, or lack of availability of tools. In contrast, workers with higher incomes tend to have better access to PPE and are more aware of the importance of occupational safety.

The results of this study confirm that efforts to improve occupational safety are not enough only through socialization or training, but also need to be balanced with economic support, such as the provision of free PPE and strict supervision from workshop managers. The intervention is expected to improve the safe behavior of workers and reduce the number of work accidents in the welding workshop environment.

CONCLUSION

This study shows that of the three factors analyzed, namely age, education, and income, only the income factor has a significant relationship with the use of Personal Protective Equipment (PPE) in Jalan Jendal welding workshop workers. Age and education did not show a meaningful relationship with PPE use adherence.

These results indicate that economic aspects are an important factor influencing work safety behavior. Workers with higher incomes tend to be more compliant in using PPE because they have the ability to purchase safety equipment as well as a better awareness of occupational risks. Therefore, an active role is needed from workshop owners and related agencies to provide free or subsidized PPE, as well as to carry out continuous supervision and education of K3. This step is expected to improve work safety and reduce the risk of accidents for welding workshop workers, especially in the informal sector.

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