

Factors Related To Compliance Use Of Personal Protective Equipment (PPE) For Workers At The Indarung V Factory Pt Semen Padang West Sumatra

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Abstract

Workers can reduce the likelihood of workplace injury or illness through the use of PPE, or personal protective equipment. Workers' knowledge, attitudes, motivation, supervision, and level of comfort are some of the variables that are expected to be identified in this study as factors that influence their compliance with PPE usage requirements. Through the use of a cross-sectional design, this study approach combines quantitative research with analytical observational research. The research was conducted from November 2023 to December 2023 at PT Semen Padang. 139 workers from the Indarung V factory of PT Semen Padang became the research population. The number of individuals sampled was 58 people referring to the Lemeshow formula. Sampling was carried out by simple randomization. To obtain variable data, surveys and direct interviews were used. Secondary and primary data are used by data providers. Research indicates a correlation between knowledge, attitude, motivation, and supervision ($p=0.000$, $p=0.000$, and $p=0.000$ respectively). At the same time, there was no correlation between workers' comfort levels ($p=0.164$) and their compliance with PPE usage regulations. Knowledge, attitude, motivation, and supervision were determined to be four interrelated factors, whereas comfort was determined to be one irrelevant factor.

Keywords: Attitude; Compliance; Knowledge; Personal Protective Equipment (PPE); Workers

Introduction

The Occupational Safety and Health component which aims to avoid work-related illnesses and accidents is an important part of industrial growth and progress (Azizah et al., 2021). By implementing high safety standards, companies can reduce the risk of injuries and illnesses that negatively impact productivity. In addition, employee satisfaction levels increase in a safe and healthy work environment.

A big problem in Indonesia is the increasing number of work accidents, especially in the industrial sector. Nearly 2.3 million workers suffer from work-related illnesses or accidents every year, with 99,000 of them occurring in Indonesia alone, as reported by the International Labor Organization (ILO). Referring to (Indrayani & Sukmawati, 2019), almost 70% of accidents result in death or long-term disability.

There were 147,000 incidents or 40,273 cases per day reported by the Employment Social Security Administration (BPJS) related to work accidents in 2018. Of them, 4,678 (3.18%) experienced disabilities, and 2,575 (1.75%) died. Referring to (Ministry of Manpower, 2017), there were 96 work accidents and 410

days of job loss in West Sumatra in 2017. There were 23,313 work accidents in the area in 2018, referring to the BPJS Employment annual report.

PT Semen Padang produces around 8.9 million tons of cement every year. Despite this, work accidents still occur frequently, especially in the production industry. In 2020–2022, there were 9 serious cases in the work accident category, 10 cases in the first aid category, and 1 light case in the work relations accident category. In this category, there were 8 serious cases, 3 cases of first aid *and 0* mild cases.

Work accidents can be caused by humans, equipment and the environment. Therefore, work safety is very important for workers and companies. The use of Personal Protective Equipment (PPE) that complies with safety protocols is one of the actions taken (Fridalni & Rahmayanti, 2020). PPE is not the only method to prevent work accidents, however, it is a last resort to avoid danger. Due to their unpredictable and undesirable characteristics, workplace accidents can affect everyone working and result in property damage or process disruption.

Initial survey results indicated that several workers at PT Semen Padang's Indarung V factory did not wear Personal Protective Equipment (PPE) such as head protectors (*safety helmets*), even though the company provided various types of PPE. One informant said that the reason they did not wear PPE such as head protection (*safety helmets*) was because they felt uncomfortable wearing them, especially because of the heat caused by *the safety helmets*.

Methods

Through the use of cross-sectional methodology, this study measures and analyzes the results of observations. The main aim of this study is to catalog all factors that influence the frequency of use of PPE. From November to December 2023, PT Semen Padang is the location for this study. The sample population for this study consisted of all 139 workers at the Indarung V PT Semen Padang factory. We used the hypothesis testing formula for various proportions from lemeshow to select the sample. There were 58 samples in this study. Simple random sampling does not identify population positions.

Sampling uses primary and secondary sources of information. Interviews and questionnaires were used to collect research data. Participants are asked to identify themselves and provide information about the variables studied, as well as observation sheets to track their progress and evaluate levels of success.

Knowledge, attitude, motivation, knowledge and comfort are independent factors in this study, while the dependent variable includes compliance with the use of PPE and is determined using univariate analysis, which is used to examine the distribution of respondent characteristics. Researchers also used bivariate analysis to look for patterns in the data regarding the correlation between compliance with PPE use and independent variables knowledge, attitude, motivation, supervision and comfort. The SPSS application used for bivariate analysis was run in the Teuku Umar University laboratory. To increase work productivity and safety, it is very important for workers to comply with the use of personal protective equipment (PPE) and

work carefully.

Results

Table 1 shows that all the people surveyed at the Indarung V factory of PT Semen Padang were male, there were 58 people (100%), and none of them were female. The majority of workers are college graduates, the majority are in the D III category (26 people, 44.8%) and S1 (12 people, 20.7%). They also fall into the 20-30 year age category, namely 16 people (27.6%), the 31-40 year age category, namely 24 people (41.4%), and the 41-50 year age category, namely 18 people (31.0%). However, there are 20 people (34.5 %) workers with high school/vocational education. Apart from that, 12 people (20.7%) of the workers at PT Semen Padang's Indarung V factory had less than five years of work experience, while 46 people (79.3%) had more than five years of work experience.

Table 1. Characteristics of Respondents

Respondent Characteristics	n	%
Gender		
Man	58	100
Woman	0	0
Age		
20-30	16	27.6
31-40	24	41.4
41-50	18	31.0
Last education		
SMA/SMK	20	34.5
D III	26	44.8
S1	12	20.7
Years of service		
< 5 years	12	20.7
≥ 5 years	46	79.3

Table 2 indicates that the majority of workers At the Indarung V Factory of PT Semen Padang, knowledge in the poor category was 53.4%, while the remaining knowledge in the good category was 46.6%. Meanwhile, respondents' unfavorable attitude was 58.6%, while respondents' good attitude was 41.4%. In terms of motivation, there were 58.6% of respondents who were low motivated, while 41.4% were highly motivated. Based on the table above, there are also 56.9% of respondents who have poor supervision, while there are 43.1% of respondents with good supervision. There were 58.6% of respondents who felt uncomfortable with PPE, while 41.4% of respondents were comfortable with PPE. Furthermore, there were 58.6% of respondents who were not compliant in using PPE, while there were 41.4% of respondents who were compliant in using PPE.

Table 2. Distribution of Levels of Knowledge, Attitudes, Motivation, Supervision, and Comfort of Workers at the Indarung V Factory of PT Semen Padang

Independent Variable	n	(%)
Knowledge		
Not good	31	53.4
Good	27	46.6
Attitude		
Not good	34	58.6
Good	24	41.4

Motivation		
Low	34	58.6
Tall	24	41.4
Supervision		
Not good	33	56.9
Good	25	43.1
comfort		
Less comfortable	34	58.6
Comfortable	24	41.4

Dependent Variable	n	(%)
Use of PPE		
Not obey	34	58.6
Obedient	24	41.4

Based on Table 3, the results indicate that workers who do not comply with using PPE and have poor knowledge are 27 respondents (87.1%) and 20 respondents (74.1%). Therefore, it was concluded that a correlation was found between the level of knowledge and results indicating that 18 workers (75.0%) were compliant and had a good attitude, and 28 workers (82.4%) were disobedient in using PPE. The p-value of the statistical test is 0.000, which does not exceed the sig level. (0.05). Thus, it can be concluded that attitude and compliance are closely related to the use of PPE.

Table 2. Distribution of Levels of Knowledge, Attitudes, Motivation, Supervision, and Comfort of Workers at the Indarung V Factory of PT Semen Padang

Independent Variable	Compliance with PPE Use				Total		p-value
	Not obey		Obedient		n	%	
	n	%	n	%			
Knowledge							
Not good	27	87.1	4	12.9	31	100	0.000
Good	7	25.9	20	74.1	27	100	
Attitude							
Not good	28	82.4	6	17.6	34	100	0.000
Good	6	25.0	18	75.0	24	100	
Motivation							
Low	29	85.3	5	14.7	34	100	0.000
Tall	24	20.8	19	79.2	24	100	
Supervision							
Not good	32	97.0	1	3.0	33	100	0,000
Good	2	8.0	23	92.0	25	100	
Comfort							
Comfortable	23	67.6	11	32.4	34	100	0.164
Less comfortable	11	45.8	13	54.2	24	100	

Significant at $p < 0.05$

The results indicated that 18 workers (75.0%) were compliant and had a good attitude, and 28 workers (82.4%) were disobedient in using PPE. The p-value of the statistical test is 0.000, which does not exceed the sig level. (0.05). Thus, it can be concluded that attitude and compliance are closely related to the use of PPE. Based on Table 3, there were 29 (85.3%) workers who were disobedient in using PPE and had low motivation, while 19 (79.2%) workers were compliant and had high motivation. The p-value of the statistical test is 0.000, far below the sig level. (0.05). Therefore, it can be concluded that there is a significant relationship between motivation and compliance with using PPE. Furthermore, it was seen that 32 workers (97.0%) were

disobedient in using PPE and there was poor supervision, while 23 workers (92.0%) were compliant in using PPE and there was good supervision. The p-value of the statistical test is 0.000, which does not exceed the sig level. (0.05). As a result, it can be concluded that there is a significant correlation between the level of supervision and compliance with the use of PPE.

Based on Table 3, it can be seen that 23 (67.6%) workers did not comply with using PPE and were not comfortable, while 13 (54.2%) workers complied with using PPE and felt comfortable. The results of statistical testing indicate a p-value of 0.164, which exceeds the sig level. (0.05). Therefore, it can be concluded that no significant correlation was found between the level of comfort and the fulfillment of PPE use.

Discussion

Workers' compliance in wearing PPE and being careful at work is very important to support work productivity and safety, especially considering the productive age defined by *World Health Organization* (WHO) as those involved in the workforce aged between 15 years and 64 years. On the other hand, non-laborers are those who are considered unable or unwilling to work even though they have the desire to work. In the age range of 15-64 years, an individual has the ability to be effective and efficient in carrying out work and daily activities. Good physical health is also a crucial factor in supporting work productivity and safety. Referring to Law of the Republic of Indonesia Number 13 of 2003 concerning Employment, the minimum age for workers in the dangerous or risky category is 18 years.

Workers with a higher level of education will be better able to understand company systems and adapt to applicable standard operating procedures (SOP), therefore education is a major factor in the workplace. This indicates that there is a strong correlation between the level of education and action. Furthermore, workers with a higher level of education tend to be more familiar with the company's systems and able to adapt to its standard operating procedures. There is a clear relationship between educational attainment and behavior, as seen above (Heryawan & Heryana, 2019).

Furthermore, habitual factors influence workers' behavior, workers who have worked for a long time tend to consider themselves accustomed to carrying out their duties, so they often neglect and ignore the use of PPE which should be considered important to protect themselves (Fridalni & Rahmayanti, 2020). This can result in an increased risk of work accidents and injuries in the workplace. Therefore, it is important to continue to improve and train workers regarding the importance of consistent use of PPE.

Period of work experience indicates how well a person works in a particular company or department. Law of the Republic of Indonesia Number 13 of 2003 concerning Employment determines the number of working hours or total time spent working. Length of service is the number of years that a person has worked for a particular company, group, or organization so that they can perform their job is called length of service. In general, working time can be divided into three categories: a. first job: less than five years, b. second job: six to ten years, and c. Long service period >10 years.

An accident at work is an undesirable and often unexpected event, which can cause losses such as loss of time, damage to assets, property, or even loss of life, occurring during industrial or related activities. Therefore, it is very important for workers to always maintain their personal safety, one of which is by consistently wearing PPE, so that various unwanted risks can be minimized (Wulandari, 2017) .

Relationship between Knowledge and Compliance with PPE Use

chi-square test produces a p value of 0.000 in statistical analysis. Workers' compliance with PPE is related to their level of knowledge, because the majority of human information is obtained through the senses of sight and hearing. Individual behavior is determined by this information (Aidelwees & Candra, 2021) . These results indicate a significant relationship between knowledge and worker compliance with PPE. Thus, efforts to increase knowledge through training and education can help workers use PPE more accurately.

The research results indicate that 27 respondents (87.1%) of workers who are not compliant in wearing PPE have poor insight. Only 7 respondents (25.9%) had good insight. It can be concluded that knowledge regarding PPE is very important for workers' compliance with wearing PPE. In line with research Aini & Suwandi (2023) , this study found that there is a relationship between knowledge and compliance with the use of PPE .

Referring to (Edigan et al., 2019) The more knowledge a worker has, the more behavior based on that knowledge will be demonstrated. This behavior will signal the importance of implementing PPE to maintain safety and health in the workplace, and in vice versa

Because they are used to their jobs, workers often think that the activities they do at work are less harmful to them. Some workers may not be aware of the risks because they only know the basics about PPE. Thus, they may not understand the importance of PPE, its requirements, benefits, and possible consequences if PPE is not worn. Knowledge, in theory, is the result of curiosity through sensory processes, especially regarding objects seen by the eyes and ears. Open behavior is influenced by knowledge. Understanding, application, analysis, synthesis and evaluation are several levels of a person's theory of knowledge, and there is a relationship between knowledge and compliance with the use of PPE (Notoatmodjo, in Sylvia Handayani et al., 2023) .

In addition, this study is in line with Green's theory which argues that knowledge is an important factor in encouraging people to act. Actions without knowledge tend to be inconsistent and short-lived. A person has a great possibility of avoiding undesirable events when they behave positively based on knowledge (Saraswati, 2021) . The more knowledge a person has, the more positive the resulting behavior will be. This is possible because employees' knowledge determines their actions; for example, workers who are knowledgeable tend to be more alert than those who are not. Referring to (Azizah et al., 2021) , Knowledgeable personnel can influence attitudes and behavior to ensure the use of PPE.

The results of the research indicate that there is a correlation between the knowledge variable and the level of compliance with the use of PPE. Based on Krianto's research, a p value of 0.051 (OR = 1.729) was

obtained. If referring to research (Yenni, 2018) found a correlation between the knowledge variable and the level of compliance with the use of Personal Protective Equipment (PPE) with a value of p of 0.031, so the previous hypothesis was accepted. The research results indicate that there is a very significant relationship between the level of knowledge of industrial workers and the use of PPE with a p value of 0.02 ($OR = 1.93$). Thus, respondents who have a high level of expertise are 1.93 times more likely to meet the research criteria. (Alfarisi et al., 2018) reported that researchers found a correlation between worker awareness and compliance with the use of PPE ($OR = 4.540$, $p = 0.027$). The Relationship Between Mentality and Compliance with Using PPE.

Relationship between Attitude and Compliance with PPE Use

A person's point of view determines the emotional effects of certain stimuli, which are ultimately influenced by various other circumstances. Workers' compliance with PPE is influenced by habitual attitudes, referring to research findings ($p = 0.000$). Referring to the data, of the total number of workers who adhere to wearing PPE, 18 (75% of the total) have a positive attitude, while only 6 (17.6%) have a negative attitude.

Our findings are consistent with those of (Pulungan, 2021) and previous researchers who found a statistically significant correlation between APD attitudes and behavior; A lower p value indicates a stronger relationship. Therefore, it can be concluded that the possibility of a person showing compliant behavior regarding the use of PPE is directly proportional to the level of their positive attitude towards PPE.

Workers who do not comply with wearing PPE feel uncomfortable or uncomfortable and feel more comfortable if they do not wear PPE. The company itself is responsible for supervision, training on the use of PPE and application of regulations according to Standard Operating Procedures (SOP) when working. This situation causes bad attitudes and non-compliance with existing rules. In line with theory, there is a relationship between workers' attitudes and behavior regarding the use of personal protective equipment (PPE). Notoatmodjo in (Syylvia Handayani et al., 2023), states that individual attitudes can be interpreted as reactions to external factors. Personal views and feelings, including but not limited to: agree or disagree, happy or sad, etc.

These results are in line with attribution theory, which says that people know their attitudes by drawing conclusions from their behavior and the way they see situations. That is, if someone changes their behavior, they are likely to assume that their attitudes have changed as well. Therefore, it is very important that individuals' perceptions of their behavior shape their attitudes (Akbar & H, 2020).

The findings of this study corroborate the findings of other research (Edigan et al., 2019). In 2017, workers at PT Surya Agrolika Reksa in Sei Basau indicated a significant relationship ($P 0.000$) between work attitudes and the use of personal protective equipment (PPE). There was a 9.5-fold increase in the likelihood that respondents with an unfavorable view would not wear PPE compared to those with a good attitude ($OR 9.524$, $CI95\%$; 3.051-29.728).

The Relationship between Motivation and Compliance with PPE Use

The results of statistical analysis using the chi square test produced a p-value of 0.000. So it can be concluded that there is a relationship between the level of worker motivation and their level of compliance with PPE. Motivation is a factor that encourages individuals, both internally and externally, to carry out certain work activities, including the use of PPE.

The results of the research indicate that the majority of workers who comply with the use of PPE have a high level of work motivation, namely 19 respondents (79.2%), and only 14 respondents (14.7%) have a low level of work motivation. This situation indicates, in L. Green's theory, that the element of strengthening motivation has a significant impact on a person's behavior. Compliance and motivation are correlated, so that a person's level of compliance with the use of personal protective equipment in the workplace is positively correlated.

There is a strong correlation between intrinsic motivation and the use of APD, referring to previous research (Kasim et al., 2017) . Compliance with personal protective equipment (PPE) is polite behavior. Both studies also found a correlation between these two variables (Rahmawati & Febriyanto, 2020) . Workers who are not inspired to do their best often neglect safety protocols such as the use of PPE, while those who recognize the importance of their work and the risks involved are more likely to comply.

At Tamiyang Layang Hospital, researchers (Saparini et al., 2023) found a correlation between intrinsic motivation and compliance with the use of PPE, with a value of $p\ 0.000 < 0.05$. This study is in line with previous research conducted at Tamiyang Layang Regional Hospital by (Nurdiani & Krianto.Tri, 2019) which also found a positive and statistically significant correlation between nurses' motivation and compliance with the use of handsooon duffles as a form of personal protective equipment.

The Relationship between Supervision and Compliance with PPE Use

Workers tend to wear PPE if the situation at hand is uncontrolled. The purpose of supervision is to keep things on track by monitoring progress and making adjustments when necessary (Sukma Ika Noviarmi & Hamengku Prananya, 2023) . The research results indicate that one of the factors that determines the level of worker compliance with PPE is the monitoring variable ($p=0.000$). There were 23 people (92%) who stated that they complied with PPE because they had good supervision from superiors and K3. Meanwhile, only 3% of respondents stated that they did not have good supervision.

Lack of supervision over the use of personal protective equipment (PPE) by supervisors and K3 workers is one of the causes. The majority of workers do not wear PPE because there are no consequences or punishments for using PPE. As a result, workers will be more careful and more focused when working because they are afraid of being watched by supervisors. High levels of control can help workers wear PPE. On the other hand, workers say that low supervision makes workers feel that no one is watching them, which makes them more careless and tend to ignore dangers (Sukma Ika Noviarmi & Hamengku Prananya, 2023) . Workers who feel that they do not have sufficient supervision will act as they please and pay less attention to their

performance. In addition, workers who feel that they do not have sufficient supervision can cause them to disobey the use of Personal Protective Equipment.

Previous research conducted by Noviarmita & Prananya (2023) indicated that there was a correlation between characteristics that increase supervision and compliance with the use of personal protective equipment (PPE), with a p value of $0.000 < 0.05$. Likewise other research (Utami, 2019) This indicates that unannounced controls can provide better results. The aim of monitoring worker activities is to measure implementation in the field and compare it with existing standards. In this way, the importance of occupational safety and health for themselves, their co-workers and the workplace as a whole will likely be better understood and adhered to.

This is in line with previous research (Edigan et al., 2019) which found a POR relationship of 4,167 between worker behavior related to compliance with required PPE and factors of perception of supervision and supervision efforts. Based on research results, the risk of non-compliance with the criteria for using PPE is 4.167 times higher in individuals who do not carry out outreach or exaggerate compared to those who are monitored or carry out outreach. This is reinforced by (Bachtiyar Lobis et al., 2020) who found a statistically significant correlation ($p = 0.0125$) between supervision factors and compliance with PPE.

There is an information imbalance between stimulus and reaction, or the parties interested in the information, referring to signal theory, which is based on the premise that each party obtains unique information. Workers should wear personal protective equipment (PPE) more carefully in line with SOPs if the presence of unambiguous controls will influence their behavior.

The Relationship between Comfort and Compliance with PPE Use

It must be recognized that job satisfaction is an important component in the success of a person and an organization. Those who are successful in their work feel comfortable that they can complete tasks in line with or exceed their own and the organization's expectations. When talking about work support features, comfort is something that is really taken into consideration. The results of statistical analysis using the chi square test indicate a p-value of 0.164. This situation indicates that there is no relationship between comfort in wearing PPE and compliance.

The research results indicate that the majority of workers who adhere to the use of PPE enjoy using PPE very well, namely 13 respondents (54.2%). On the other hand, only 11 respondents (32.4%) were workers who adhered to wearing PPE but enjoyed wearing PPE with a little more comfort. This situation contradicts the theory explained by Sanders in (Winarsunu, 2008), which states that the comfort of PPE felt by workers can influence their behavior. Every type of PPE, including work clothing and equipment, must be designed and constructed in a manner that is safe, appropriate, and comfortable. Choosing the right PPE will make users feel comfortable and safe.

Companies must also consider the quality of PPE and ensure that the PPE is suitable and harmonious to the worker's body if PPE must be worn simultaneously. If PPE does not fit or is comfortable, workers may

be reluctant to wear it, which in turn may reduce the level of protection required. Discomfort is often the reason workers are reluctant to wear PPE.

The statistical test results indicate a p value of 0.450 (>0.05), which indicates there is no relationship between comfort and compliance with PPE use. These results are in line with previous research (Andrian Sutrisno et al., 2021). The statistical test results indicate a p value of 0.383, which means that H_0 is accepted referring to other research (Ekawati et al., 2017). This proves that the comfort level of PPE does not really affect how often PPE is actually worn.

Conclusion

Workers at PT Semen Padang's Indarung V factory were proven to be less compliant with the use of PPE when considering the following factors: knowledge, attitude, motivation, supervision and comfort. At the Indarung V Factory of PT Semen Padang, there is a significant correlation between worker knowledge and compliance with the use of PPE. This is because actions based on knowledge tend to pay more attention to safety at work through full use of PPE. Workers' attitudes greatly influence workers' awareness of the use of PPE. A positive employee attitude can have a huge impact on the company. At the Indarung V Factory of PT Semen Padang, there is a strong correlation between worker motivation and PPE compliance. High motivation fosters awareness and discipline among workers to adhere to safety regulations, including the proper use of PPE. At the Indarung V Factory of PT Semen Padang, strict PPE supervision boosts compliance, enhancing discipline and reducing work accidents by motivating workers to follow safety procedures. At the Indarung V Factory of PT Semen Padang, PPE compliance is driven by safety awareness and adherence to rules, not comfort. Workers use PPE despite discomfort, understanding the risks of non-compliance.

Researchers hope that workers will increase their awareness and self-awareness regarding the use of PPE both at work and in the work environment because this matter is related to the personal safety and health of workers. Apart from that, researchers hope that PT Semen Padang's Indarung V Factory will increase supervision of workers' behavior while working to ensure safety and productivity in the workplace. This can be achieved by enacting laws that require the use of PPE, frequently supervise and punish workers who violate the rules. Since workplace accidents can cause major losses, these steps are important for the well-being of both companies and workers. Future researchers are expected to improve this study by increasing the number of samples and examining other variables that have not been studied related to suitability for PPE.

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