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Research Article

The Effect of Safety Climate on Safety Behavior with Safety Motivation as An Intervening Variable on Contractor Workers in PT X

Darius Tandiabang[1], Syamsiar S. Russeng[1], Lalu Muhammad Saleh[1], Atjo Wahyu[1], Yahya Thamrin[1], Anwar Mallongi[2]

ABSTRACT

Safety climate in the workplace and safety behaviour of workers need attention to be able to assess what factors are the causes of safe action for workers. This study aims to determine the effect of safety climate on safety behaviour with safety motivation as an intervening variable on contractor workers at PT X.
The type of research is analytical observational with a cross sectional design. Questionnaires were given to 380 respondents. The data were analyzed using path analysis to see the direct and indirect effects of safety climate on safety behaviour.
The results showed, 361 respondents (95%) with good safety climate, 367 respondents (96.9%) with good safety motivation, and 348 respondents (91%) with good safety behaviour. The path analysis showed that there was no direct influence of safety climate on safety behaviour in contractor workers at PT X (p value >0.05). However, the safety climate indirectly affects safety behaviour through safety motivation (p value = 0.001). It is recommended to workers that they need to maintain and increase their motivation so the safe work behaviour will still create.
Key words: Safety climate, Safety behaviour, Safety motivation, Contractor workers, Path analysis.

Darius Tandiabang[1], Syamsiar S. Russeng[1], Lalu Muhammad Saleh[1], Atjo Wahyu[1], Yahya Thamrin[1], Anwar Mallongi[2]

[1]Department of Occupational health and Safety, Faculty of Public Health, Hasanuddin University, INDONESIA.

[2]Department of Environmental health, Faculty of Public Health, Hasanuddin University, INDONESIA.

Correspondence

Anwar Mallongi

Department of Environmental health, Faculty of Public Health, Hasanuddin University, INDONESIA.

E-mail: anwar_envi@yahoo.com

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INTRODUCTION

Industrial competition in the era of industrialization for markets at the regional, national and international levels, is carried out by each company competitively. Industrialization is inseparable from human resources which are expected to be ready-to-use resources and able to help achieve company goals in the required fields.[1] Every industry has a mission to improve the quality of its Human Resources (HR) so that it is able to improve the quality of products produced by the company. For this reason, human resources or workers need to get protection for safety and health at work.

According to the Regulation of the Ministry of Manpower Number 5 of 2018 concerning Occupational Safety and Health of the Occupational Environment, it is written that Occupational Safety and Health (K3) is all activities to ensure and protect the safety and health of workers in the context of preventing occupational accidents and occupational diseases. Development efforts must be based on health insights in the sense that national development must pay attention to public health and is the responsibility of all parties, both government and society. Based on this, contained in article 9 paragraph 2 its implementation includes individual health efforts, public health efforts, and health-minded development.

Factors that cause work accidents are human factors and environmental factors (Suma'mur, 2009). One of the factors that cause work accidents is the lack of discipline of the workers to comply with the provisions on K3. Safe behavior needs to be created with a perception of a good safety climate for workers. Safety climate is a description of workers' perceptions of occupational safety which is assessed with several dimensions in order to create a safe safety climate.[2]

Safety climate is one of the strategies in shaping the culture of safety. According to Vinodkumar and Bhasi (2010),[3] safety climate is defined as workers' perceptions of safety policies, procedures, practices, and all occupational safety interests and priorities. The perception of workers is mainly related to safety efforts during work as a perceived picture or related to workers' perceptions of the importance of safety and how it can be determined in the company.

Company management is also the main actor in the implementation of safety rules in the workplace. The implementation of safety standards / regulations in the workplace is one aspect of creating a safety climate. The results of a study conducted by Heryati, *et al* (2019)[4] in pabrik gula Krembong Sidoarjo showed that in the past month, three accidents have occurred. The accident was due to careless work, lack of attention to safety behavior such as lack of compliance with safety procedures and not wearing Personal Protective Equipment (PPE). The observation results also showed that some workers did not comply with existing procedures, such as some workers who did not walk the prescribed path, and some workers did not use PPE completely. The results showed that 8 workers (40%) had a high safety behavior tendency and 12 workers (60%) had low safety behavior. In general, the safety behavior of workers is relatively low.[4]

The importance of awareness of the safety climate is a challenge that must always be conveyed to workers. Of course, it is not just conveyed, but is expected to be carried out properly. Research by Sukapto examined the relationship between the amount of work accident data and the safety climate.[5] Research

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by Taqwa (2017)[6] explains that to improve the safety climate can be done by implementing more intense programs in the field, for example conducting training, putting up posters through easy-to-understand words, and installing them in safe and comfortable rooms for workers.

From several theories that have been presented, researchers have an initial assumption that the safety climate is related to the behavior of workers in the workplace. Safety climate is the perception of workers towards the state of work safety in the work environment of workers. Safety climate was formed because of the efforts of companies for the safety of their workers. The company designs the work environment in such a way that workers feel comfortable and safe while working. This environment then gets judgement from the workers so that a good safety climate and a bad safety climate from the workers appear. This safety climate is not the only determining factor and does not directly affect the behavior of workers in the workplace. However, the safety climate is one of the factors that affect the behavior of workers while working. Based on the assumptions above, the author has an assumption that the safety climate of workers is related to the occurrence of safety/unsafe behavior of workers while working. Safety behaviors include: wearing PPE when working, operating machines according to their speed, working in a comfortable position, and also reminding colleagues when making mistakes. Meanwhile, unsafe behavior includes: not using PPE.

PT X is one of the largest Nickel production industries in Eastern Indonesia and even in Indonesia. PT X has 8,000 contractor workers spread across various units. Managing these resources is a challenge for companies to stay productive in a healthy and safe state while working. The implementation of SMK3 at PT X has received many awards both nationally and internationally. K3 training has also been provided to all workers before entering the work site. However, the incidence data still fluctuates from year to year.

The case of incidents specifically caused by unsafe acts is still a challenge for PT X. Safety climate in the workplace and safety behavior of workers are important to know so that it can be known exactly what factors are the causes of safe action in workers who are still a problem in the workplace. In this study, there may be a correlation between safety climate, safety motivation, and safety behavior on the basis that when workers are motivated to comply with occupational safety procedures and contribute to creating a safe work environment, they will have a positive perception of the safety climate.

The most common definition of safety motivation is an individual's willingness to exert effort in enforcing safety behaviors.[7] Based on the use of this definition, the safety motivation of workers has been defined purely in terms of the level of effort that individuals want to make to perform work safely.

According to Syaaf (2007),[8] safety behavior is a behavior that is directly related to safety, for example wearing safety glasses, signing a risk assessment form before work or discussing safety issues. Previously in 1980, Heinrich[9] had explained about safety behavior which is the act or actions of a person or several workers that reduce the possibility of accidents to workers.

There are three challenges in an effort to improve safety culture in the work environment, namely how to change dynamic and contextual worker behavior, how to change difficult worker attitudes, and how the safety culture itself has been real as a role model.[10]

The definition above can be concluded that safety behavior is a work behavior that is relevant to safety, which can be conceptualized in the same way as other work behaviors that shape work behavior. The output of negative occupational safety behavior is referred to as safety outcomes, in the form of injuries or careless behavior that almost injures oneself, material damage or harms others

A contractor is defined as a person or entity that accepts work and organizes work according to predetermined costs based on drawings of plans and regulations as well as established conditions.[11] Based on Presidential Decree 80 of 2003, a contractor is defined as a contractor service provider, namely a party that provides services for handling building or construction work or other physical forms whose technical planning and specifications are determined by the user of the goods/services and the process and implementation are supervised by the user of the goods/services.

The area of the contractor's business field is actually very wide, and each contractor has a business focus and specialization in their respective fields, for example: a) building contractors providing construction services, b) contractors in the field of labor procurement services, and c) contractors in the defense and military fields, and others.

Definition of safety climate

Safety climate defined by Cooper (2000)[12] is a psychological aspect of safety culture that explains the values, attitudes and perceptions of individuals and groups towards the implementation of safety programs within the company. Then according to Winarsunu (2008),[13] safety climate is a perception of workers on management's attitude towards occupational safety and a perception of the extent of the contribution of occupational safety in the production process in general and Guldenmund (2010)[14] explains safety climate as a perception of workers to safety policies, procedures, practices, and all occupational safety interests and priorities.

It concluded that the definition of safety climate relates to shared perceptions relating to the priority of policies, procedures, safety practices, and the extent to which safety compliance or improved behavior is supported and valued in the work environment.

Definition of safety motivation

The most common definition of safety motivation is an individual's willingness to exert effort in enforcing safety behaviors.[7] Based on the use of this definition, the safety motivation of the worker is defined purely in terms of the level of effort that the individual wants to make to perform the work safely.

Safety motivation largely focuses on understanding how the overall effort put in and the motivational force to work safely impacts safety outcomes.

Definition of safety behaviour

According to Syaaf (2007),[8] safety behavior is a behavior that is directly related to safety, for example wearing safety glasses, signing a risk assessment form before work or discussing safety issues. Previously in 1980, Heinrich had explained about safety behavior which is the act or actions of a person or several workers that reduce the possibility of accidents to workers. As for the definition according to Zin, *et al* (2012),[15] safety behavior is a behavior that supports safety practices and activities at work, where both of these things must be accepted by workers as work requirements to avoid accidents at work.

The definition above can be concluded that safety behavior is a work behavior that is relevant to safety, which can be conceptualized in the same way as other work behaviors that shape work behavior. The output of negative occupational safety behavior is referred to as safety outcomes, in the form of injuries or careless behavior that almost injures oneself, material damage or harms others.

Contractor definition

A contractor is defined as a person or entity that accepts work and organizes work according to predetermined costs based on drawings of plans and regulations as well as established conditions.[11]

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METHOD

This research is an observational research of analytical ict using the research design cross sectional study. The sample totaled 380 contractor workers. This study uses a path analysis model as a data analysis method.

Data collection was carried out in June–July 2022 by observing the sample work area. While workers are resting, researchers provide questionnaires to collect data relating to dependent, independent, and intervening variables.

RESULTS

The collected data is then processed and analyzed using SPSS and AMOS (path analysis) programs.

Univariate analysis

Dis used to analyze each variable descriptively. This analysis aims to find out the characteristics of each variable.

Characteristics of respondents: Table 1 di above shows the characteristics of the study sample. Based on the results obtained, most of the respondents' ages were 20-35 years, which was 63.2% while the least age was <20 years, which was 1.3%. Based on the gender of the study sample, most of the respondents were men, namely 85.5% and had met the use of PPE by 98.7%.

Based on univariate test results in Table 2 above, obtained from 380 respondents of contractor workers at PT X, most of the respondents chose good on the safety climate as much as 9 5.0% as well as on safety motivation most respondents chose good as much as 9 6.6% and for safety behaviour most respondents chose good as much as 9 1, 6%.

Table 3 above shows the average working period and length of work of respondents of the research sample in a day, where the average working period was obtained as much as 6.17 years with the least working period being one year and the longest is 38 years while judging from the average length of work in a day, it is obtained as much as 9.08 hours with the minimum length of work in a day is 6 hours and the longest is 12 hours.

Bivariate analysis

Table 4 and table 5 is the result of cross-tabulation between the variables studied, then analysis is carried out between independent variables, dependent variables, and intervening variables.

Based on the results of cross-tabulation in table 4. above shows that of the 380 respondents of contractor workers at PT X, most of them showed good safety climate, safety motivation, and safety behavior. A good safety climate with good safety behavior of 94.2% as well as safety motivation shows good safety motivation with good safety behavior of 93.7%. A good safety climate with a safety behavior of less than 5.8% as well as a safety motivation shows a good safety motivation with a safety behavior of less than 6.3%. Meanwhile, less safety climate with less safety behavior was found at 57.9% and also less safety motivation with less safety behavior found at 69.2%.

Multivariate analysis

Path analysis: Figure 1 above shows the effect of safety climate on safety behavior with safety motivation as an intervening variable. Based on the results of the analysis obtained, that indirectly safety climate affects safety behavior through safety motivation (p = 0.001). Safety motivation obtained a greater positive factor (0.48) so that it can be interpreted that safety motivation has a positive factor in creating safety behavior in PT X.

Table 5 above describes the direct, indirect, and total influences of the research variables. Based on the results of the analysis of the direct

Table 1: Univariate analysis results based on respondent characteristics in contractor workers at PT X.

Characteristics of Respondents	Frequency (n)	Percent (%)
Age		
<20	5	1,3
20-35	240	6 3.2
36-45	96	2 5.3
>45	39	10.3
Gender		
Man	325	8 5.5
Woman	55	1 4.5
PPE		
Yes	375	98.7
Not	5	1.3

Source: Primary data for 2022

Table 2: Results analysis univariate based on variable yang diteliti P there is pwork kontractor in PT X.

Characteristics of Respondents	Frequency (n)	Percent (%)
Safety climate		
Good	361	95.0
Less	19	5,0
Safety motivation		
Good	367	9 6.6
Less	13	3,4
Safety behavior		
Good	348	91.6
Less	19	8,4

Source: Primary data for 2022

Table 3: Univariate analysis results seen based on the average working period and length of work in workers at PT X.

Characteristics of Respondents	Mean ± SD	Min	Max
Period of Service (Years)	6.17±6,839	1	38
Length of Work (Hours)	9.08±1,604	6	12

Source: Primary data for 2022

Table 4: Relation safety climate, safety motivation with safety behavior on contractor workers in PT X.

Variable	Safety behavior				Total	
	Good		Less			
	n	%	n	%	n	%
Safety climate						
Good	340	9 4.2	21	5.8	361	100
Less	8	42,1	11	57,9	19	100
Safety motivation						
Good	344	93.7	23	6,3	367	100
Less	4	30,8	9	69,2	13	100

Source: Primary data for 2022

Table 5: Direct, indirect, and total research variables on contractor workers at PT X in 2022.

Independent Variables	Dependent Variables	Direct Influence	Indirect Influence	Total Influence
Safety climate	Safety motivation	0,280	0,001	0,280
Safety climate	Safety behavior	0,081	0,056	0,157
Safety motivation	Safety behavior	0,230	0,001	0,230

Source: Path analysis

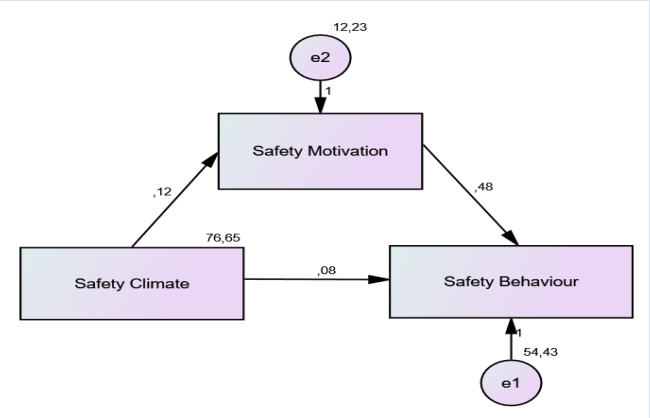

Figure 1: Effect of safety climate on safety behavior with safety motivation sa intervening variable

influence of safety climate variables on safety behavior, a value of p>0.05 was obtained, it can be interpreted that there is no direct influence between safety climate and safety behavior. Meanwhile, based on the indirect influence obtained by the value of p<0.05, it can be interpreted that there is an indirect influence between the safety climate on safety behavior through safety motivation.

DISCUSSION

Relationship of respondent characteristics with research variables on contractor workers at PT X

Based on the results obtained, most of the respondents' ages were 20-35 t ahun, which was 63.2% while the least age was <20 tahun, which was 1.3%. Dalam research conducted by Xia, *et al* (2020)[16] on construction workers obtained the most age was 30-39 years old, which was 32.8% and 40-49 years, namely 38.9% where most were men as much as 92.0%.

Based on gender, from the results of the study obtained, most of the respondents were men as much as 85.5% and had met the use of PPE by 98.7% with a service period of 6 years, of which the fastest service period was one year and the longest was 38 years. When viewed from the average length of work in a day, the figure of 9.08 hours is obtained with the minimum length of work is 6 hours and the longest is 12 j am. This result is not much different from the results of research by Xia, *et al* (2017)[17] where most of the age of construction workers who have a high risk are 20-29 years old as much as 33.3% and 30-39 years old as much as 29.17% where 93.3% are men with a working period of 6-10 years. The results of a similar study conducted by Smith and Dyal (2020)[18] where most workers have experience for 4-9 years with more age comparisons of men than women. Workers who are older, married or have families to support have a perception of the safety climate than workers who are younger, single, and no family to support.[19] Research conducted by Fang and Louisa (2006)[19] says that the higher the social responsibility, the higher the level of violations will decrease and workers tend to work more carefully and have a better perception of the safety climate.

Personal characteristics can affect a person's perception of the safety climate and therefore affect a person's safety behavior. Based on Hinze (1997)[20] the personal characteristics in question include general information such as age, gender, level of education, and other personal information. Fang and Louisa (2006)[19] tested the age difference against safety behaviour with data from 374 workers in China who worked on 27 construction projects in Hongkong. The intercorrelation between worker age and safety behaviour has been tested and found that older workers have a more positive attitude towards safety.

Cooper, *et al* (2004)[21] indicate that the safety climate is a perceived picture or related to workers' perceptions of the importance of safety and how it can be established within the organization. Therefore, safety climate is related to perceptions of occupational safety policies, procedures, and practices. This is in accordance with the definition of safety climate according to Neal[22] namely workers' perceptions of policies, procedures, and practices related to occupational safety. Safety climate as an illustration of workers about the state of the occupational health and safety climate which is an indicator of the culture of occupational safety in an organization.[22]

Direct effect of research variables on contractor workers in PT X

Based on the results of the analysis of the direct influence of safety climate variables on safety behavior, a value of p>0.05 was obtained, it can be interpreted that there is no direct influence between safety climate and safety behavior. Although the relationship that occurs is not significant, it turns out that there are several subfactors of safety climate factors that can affect safety behavior. A good safety climate is the result of controlling safety behavior carried out.[23] The types of constituentsare divided into several variations, namely construction in general, building construction, civil construction, EPC (electricity and steel) construction, where these types of work have their own working climate so that direct influence cannot occur. Indirect influence obtained p<0.05 value, so it can be interpreted that there is an indirect influence between safety climate and safety behavior through safety motivation.

Different results in the research of Listyaningsih and Haryanto (2021)[1] related to the construction sector in general, found that the safety climate is related to safety behavior. Lyu, *et al* (2018)[24] report in cross-sectional research on civil and infrastructure projects that the safety climate has a positive and significant relationship with safety behavior. At this observation safety behavior is differentiated into safety participation and safety compliance. Similarly, research conducted by Pane and Dharmastiti (2019)[25] shows that there is a significant influence between the 7 dimensions of safety climate on the safety behaviour of construction workers. The seven dimensions consist of priority variables and management's commitment to safety; empowerment of occupational safety management; fairness of occupational safety management; workers' commitment to occupational safety; priority of worker safety and non-tolerance of risk of harm; learning, communication, and innovation; trust in the effectiveness of occupational safety systems; has a significant effect on the safety behavior of workers by 69.8%. This indicates a strong correlation between variables.

A study conducted on 230 workers on building projects around East Java showed that there was a significant influence between the safety climate and safety behavior (p = 0.000).[26] Penelitian Tanjung and Andi (2020) of 100 workers in a building project in Surabaya mentioned that the safety climate with safety behavior has a relationship but is not

significant (p>0.05), although some subfactors of safety climate factors are significantly related to safety behavior. The safety climate is limited by a specific dimension of safety culture, so the safety climate moderate's supervisory enforcement compliance relationships only under the cultural dimension. The influence of the general organizational climate on safety performance is mediated by the safety climate, while the safety climate has an effect on safety performance partly mediated by knowledge and motivation. The organizational climate is related to the level of worker satisfaction so that it affects performance and workers to stay in a company.[27]

In the precast construction industry, a study was conducted on 84 workers and showed that the safety climate factor simultaneously had a significant effect on safety behavior (p= 0.000).[25] In addition, there are studies that look at the correlation between the safety climate and safety behavior in the EPC construction sector, including steel construction and electricity construction. Research conducted on 154 steel construction workers proved that there is a meaningful impact between the safety climate and safety behavior (p<0.001).[28] In the PLN Pusmanpro PST Central Java I project; a study was conducted on 120 workers showing that there is a strong positive relationship between the safety climate and safety behavior (p = 0.000).[29]

Indirect effect of research variables on contractor working PT X

Based on the results of the analysis obtained, that indirectly safety climate affects safety behavior through safety motivation (p = 0.001). In safety motivation, a greater positive factor was obtained (0.48) so that it can be interpreted that safety motivation has a positive factor in creating safety behavior in PT X. The results of this study are supported by the research of Neal and Griffin (2002)[30] who examined the organizational climate, especially the safety climate. In his research, it was found that motivation is able to predict compliance and participation, in other words, safety motivation creates safety behavior. Another research that supports the hypothesis of this study is a study conducted by Christian, *et al* (2009)[31] who in their research stated that the variable safety motivation has a direct effect on safety behavior.

Ins tudi Chen and Chen (2014)[32] who conducted research on pilot subjects also obtained similar results. Safety motivation is positively related to safety performance. Individuals who have a desire to maintain safety at work will practice and promote occupational safety procedures in the concept of workplace safety. Safety motivation is a proximal factor that directly affects safety behavior (Neal and Griffin, 2002).[30] The higher the safety climate owned by workers, the better the safety behaviour carried out by workers, on the contrary, if the lower the safety climate, the safety behavior will also be less to implement. The results of this study prove that the hypothesis that tercan have a significant effect on the safety of behaviour in workers is acceptable. With the acceptance of this hypothesis, the safety climate can have an effect on the safety behavior on workers through safety motivation. The intention of motivation and perception in viewing and carrying out high safety behaviors at work will make workers come up with behaviors that prioritize work safety and avoid work accidents. Safety motivation directly affects the level of safety performance shown by workers.[31] Research conducted by Liu, *et al* (2015)[33] is related to the relationship between the four dimensions of safety climate, the three dimensions of safety behaviour and work injuries among manufacturing workers in China. The results of this study show that safety climate predicts safety behavior, and that safety behavior mediates the relationship between safety climate and occupational injury. Increased safety climate and safety behavior in the workplace can reduce the number of work accidents in the workplace.

The study broadens understanding of the role of safety supervision supervisors and leadership in protecting and improving worker safety. Most previous studies have underscored the positive effects of safety-oriented surveillance in preventing unsafe behavior and promoting safety behavior.[34] Iklim safety including supervisors and co-workers make a good contribution if there are adverse impacts in job demands (work conflicts, domestic conflicts, and work insecurity) which will also have an impact on safety behavior.[35]

If safety behavior can be created, another aspect that is no less important is how to increase safety behavior in workers, one of which is through safety awareness. In a study conducted by Wang *et al* (2018)[36] it was found that safety awareness for construction workers has a positive influence on safety behaviour. Safety awareness is a priority in efforts to reduce unsafe behavior among construction workers, which means that increasing individual safety awareness can reduce unsafe behavior and contribute to safety management in construction. So that in this study safety motivation and have a very important role in creating safety behavior in the work environment.[37,38]

The role of safety motivation as a mediator between the safety climate and the needs of safety behavior is supported by the company's management by providing safety training. The company's management can provide training related to occupational safety which is carried out at least once in six months. Probst and Brubaker (2001)[39] found that survival motivation had an effect on safety adherence for about six months.

Neal and Griffin (2006)[7] explain that if workers have the perception that organizations care about a good for workers, then they will be motivated to do everything that can benefit the organization. In this study, workers who had a positive safety climate and high safety motivation showed good safety behavior. A positive climate will support workers to comply with relevant regulations on workplace safety. Moreover, workers who have high safety motivation will tend to carry out occupational safety behaviors to avoid work accidents.

CONCLUSION

Based on the results of the study and analysis of the variables studied on the effect of safety climate on safety behavior with safety motivation as an intervening variable, the following conclusions can be drawn:

There is no direct influence of safety climate on safety behavior in contractor workers at PT X.

There is an indirect influence of safety climate on safety behavior with safety motivation as an intervening variable in contractor workers at PT X.

RECOMMENDATIONS

For contractor workers at PT X to always maintain and increase motivation for work safety so as to create good safety behavior in the workplace which in turn can prevent work accidents that harm oneself and the company.

For PT X to always maintain and strive for the emergence of motivation for work safety from the Contractor workers in its auspices in addition to creating a climate of work safety which of course should also be good.

Improvement of research instruments, analytical techniques, and approaches taken by researchers to research subjects is expected to be carried out better by subsequent researchers, so that the results are obtained can also be maximized.

More research on safety awareness needs to be done to measure the extent of worker awareness in implementing safe workplace behaviors.

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