

The Role of Teachers in Awareness of Occupational Safety and Health (OSH) Vocational School Students

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Abstract: This study aims to determine the effect of the role of the teacher and the occupational safety and health (OSH) climate on occupational safety and health increasing awareness in the electrical installation workshop of the Vocational High School. This research is an Ex-post Facto research. The population of the research is the XII grade students of Vocational High School 1 Sedayu Special Region of Yogyakarta with a total of 366 students and a sample of 188 students. The number of trials respondents 30 students. The sampling technique uses random sampling and data is taken using a questionnaire instrument. The validity of the questionnaire instruments done by item using analysis Product Moment correlation formula and reliability testing using the Cronbach Alpha. The results showed that (1) there is a positive and significant influence between the role of the teacher in occupational safety and health increasing awareness in the electrical installation workshop of vocational high school value 43.30 percent; (2) there is a positive and significant effect between the occupational safety and health climate on increasing occupational safety and health awareness in the electrical installation workshop of vocational high school value 43.40 percent; (3) there is a positive and significant influence between the role of teacher and occupational safety and health climate on occupational safety and health increasing awareness in the electrical installation workshop of vocational high school value 50.60 percent. The application of OSH will have an impact on increasing the productivity of the workforce and the company.

Keywords: Behavior and Knowledge, Education Process, Protecting Workers, Workplace Accidents, Work Environment.

1. Introduction

Vocational High School is one of the educational institutions responsible for creating human resources that have the ability, skills, and expertise [1]. Graduates from Vocational Schools expected to be able to develop their performance when they are involved in the workforce [2]. Vocational Education itself aims to improve the ability of students to be able to develop themselves in line with the development of science, technology and art, and preparing students to enter the workforce by developing professional attitudes [3]. All competencies obtained in vocational education will highly be needed in the world of work [4]. Existing expertise programs in vocational schools highly needed in the world of work. All expertise programs in Vocational Schools are very concerned with what is

meant by Occupational Safety and Health (OSH). Occupational Safety and Health awareness is a top priority in the industrial world besides competence so that in every Vocational High School, it must prioritize education on Occupational Safety and Health [5].

Occupational Safety and Health implemented to protect workers and other people who are on the worksite. The application of OSH is also a guarantee for each source of production so that it can use safely and efficiently so that the work process can run smoothly [6]. The application of Occupational Safety and Health is following the objectives of the Minister of Public Works Regulation No. 9 of 2008 states that "Occupational Safety and Health is occupational safety and health with the understanding of protecting everyone who is in the workplace, which is

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related to the transfer of raw materials, use of construction work equipment, the production process and the environment around the workplace.

Negligence in its application will cause various losses. Various factors certainly cause work accidents. Conditions of a safe work environment must support work people. Safe environmental conditions will reduce the risk of work accidents [7]. The working environment has various factors such as physical and non-physical factors. These factors if applied, will form an occupational safety and health climate. Facts that show the lack of a bad Occupational Safety and Health climate include work accidents that can kill people [8]. This shows that the OSH climate does not support everything from the work environment to weak management commitment.

The high costs to borne due to work accidents, the workers must provide starting from the knowledge, attitudes, and behaviors about Occupational Safety and Health when undergoing education at Vocational High School [9]. The role of the school, especially the role of the teacher when doing practice, is essential for a student to remain aware of the importance of OSH. This role is in line with the teacher's task to make students know or do things in a formal way. The teacher restructures knowledge or skills if it causes students not only to learn it but to remember it and do it better.

Occupational Safety and Health awareness very much needed for workers and prospective workers. Prospective workers will get knowledge, attitudes, and behavior about OSH well in vocational education [10]. The Occupational Safety and Health climate must be very supportive of forming OSH awareness, which is supported by the role of the teacher who always gives all roles to increase the OSH awareness professionally. Occupational Safety and Health knowledge at Vocational High School conveyed before students' practice. Vocational High School attaches great importance to OSH knowledge for its students, but there are still many students who do not listen and understand. Many teachers impart knowledge OSH not by motivating and giving attention to students. Delivery of content knowledge occupational safety and health done in the workshop so that the place of practice at the same time the delivery of content knowledge OSH has done in the workshop. There are still many workshop conditions that are less comfortable, for example, lighting conditions and hot air conditions [11].

The teacher has an integral role and function that is inseparable, between the ability to educate, guide, teach, train. The role and function that exists in a teacher must show professionally because it will have an impact on students and the school. The importance of acknowledging and enhancing teachers as professionals, because when teachers view themselves as professionals or utilize opportunities to grow professionally, this may be to the benefit of the school and the organization itself [12].

Ideally, a teacher should have a lot of knowledge and skills (multi-skills competencies). The ability that is as an innovator, motivator, and facilitator. Forming competencies and improving the personal qualities of students, the teacher must have a role as a teacher, supervisor, and evaluator [13]. The role of the teacher in learning includes inspirators, demonstrators, class managers. The role of the teacher in the teaching and learning process is significant for the formation of students' attitudes, behavior and knowledge [14]. Some opinions that state the role of the teacher, the role of the teacher to raise awareness of OSH professionally must include as a teacher, inspirator, motivator, innovator, facilitator, supervisor, demonstrator, class manager, and evaluator [15].

The application of OSH in vocational high school prioritized through various education regarding OSH and the role of the teacher itself. The occupational Safety and Health climate in vocational high school is sufficiently supportive, and it has just that there are still many students who are less aware of the importance of OSH as well as the teacher's less role towards occupational Safety and Health. There are several teachers in giving attention to students when the practice does not emphasize the importance of occupational Safety and Health [11]. The occupational Safety and Health (OSH) awareness needs to be increased by either students or teachers in the working environment to avoid the dangers that occur when entering the world of work so that the prospective worker can be concerned with occupational Safety and Health to avoid workplace accidents.

2. Research Methods

This research is quantitative because in this study, many use the figures contained in the collection of data which then analyzed using statistics. This study also includes a type of correlational research with an ex post facto approach because the variables and data obtained are data from the events that had occurred before the research conducted.

2.1. Variable Population and Research Samples

The population is the whole subject used for research. The population of this research is the students of Vocational High School 1 Sedayu Special Region of Yogyakarta, Department of Electric Power Installation Engineering with a total of 366 students. The sample is several people representing to examined from a few people in the population. Representing the population under study. Determination of the number of samples using the formula:

$$S = \frac{X^2 NP(1 - P)}{d^2(N - 1) + X^2 P(1 - P)} \quad (1)$$

Information:

- S = The number of samples.
- N = Total population.
- P = The proportion of the population assumed ($P = 0.50$).
- d = Level of accuracy (value, $d = 0.05$).
- χ^2 = Chi-square table values for one-degree relative freedom, confidence level 0.95 where $dk = 1$, then the value ($\chi^2 = 3.841$).

2.2. Instrument Validity and Reliability Test

Validity is a measure that shows the levels of validity or validity of an instrument. Valid means that the instrument can use to measure what should be measured [16]. The results of the study to be valid if there are similarities between the data collected and the data that occurs on the object under study. The expert judgment does a validity test for expert lecturers. The next test is done by testing the validity of the instrument. Test the instrument by analyzing the test items, namely by correlating the scores of each item with the total score. Testing the validity of the content using SPSS For Windows statistical software. If r -count > 0.300 then the instrument is declared valid and can be used in research data collection. Reliability refers to an understanding that an instrument is reliable and good enough to use as a data collection tool [17]. Reliability testing in this study used the Alpha Cronbach method using SPSS software for Windows. A variable to be reliable if it gives an Alpha Cronbach value > 0.70 . The instrument reliability test results of all variables have a Cronbach alpha value > 0.70 so that it can to be reliable and have a high level of interpretation. These instruments qualify as research data collection tools.

2.3. Research Variables and Paradigms

The research variable is anything in the form of whatever is determined by the researcher as an object to which conclusions can be drawn [18]. This study has two independent variables, namely the role of the teacher (X_1) and climate OSH (X_2), while the dependent variable is the OSH increase awareness (Y). The paradigm of the relationship between the independent variables (X_1 and X_2) and the dependent variable (Y) can see in Figure 1.

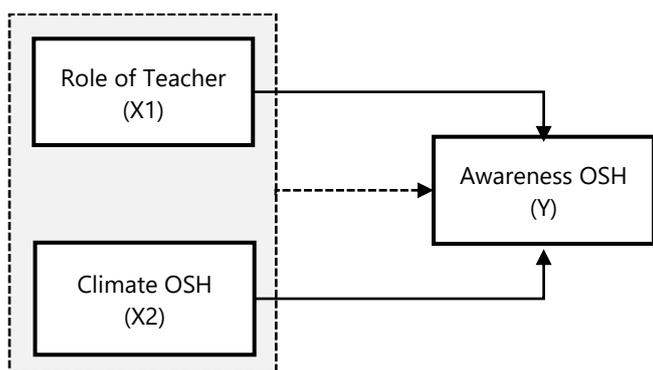


Figure 1. Connectivity Between Research Variables

2.4. Data Analysis Technique

- Descriptive Analysis
Descriptive analysis is useful for knowing the state of the data based on each variable. Analysis of the data will obtain mean, median, mode, standard deviation, maximum value, minimum value, and spread level which then presented in the form of tables and histogram images [19]. Description of this research data using SPSS software for Windows.
- Normality test
Data normality test performed to find out whether the data of each variable in this study is usually distributed or not as a requirement for testing hypotheses. The normality test carried out using the Kolmogorov Smirnov test (one sample test) with a significance level of 0.05. Normality testing uses SPSS software for Windows software. Research variables stated as generally distributed if the significance value is more excellent than 5 percent (0.05), whereas if the significance is less than 5 percent (0.05), the research variable not normally distributed [20].
- Linearity Test
The linearity test performed to determine the relationship between the independent variables with the dependent variable has a linear relationship or not. Linearity test using SPSS software For Windows through deviation from linearity. The results of the calculation if the significance is more than 5 percent then the relationship between the independent variable and the linear dependent variable [21].
- Multicollinearity Test
A multicollinearity test used to test whether the regression model found a correlation between independent variables. The multicollinearity test is done by looking at the value of TOL (Tolerance) and VIF (Variance Inflation Factor). If the value of $\alpha = 0.05$ then the limit of $VIF = 10$. The test results show $VIF < 10$ and $TOL > 0.10$ then there is no multicollinearity. Proper research is that if no multicollinearity is there is no correlation between independent variables [20].
- Simple Linear Regression Analysis
Simple linear regression based on the functional or causal relationship of an independent variable with a dependent variable. This analysis is to determine the effect the role of the teacher (X_1) to OSH increase awareness (Y) and the influence of climate OSH (X_2) to OSH increase awareness (Y).
- Multiple Linear Regression Analysis
Multiple Linear Regression is a linear regression model involving more than one independent variable or predictor [22]. The analysis technique in this study uses multiple linear regression. Multiple linear regression analysis uses to determine the effect the role of the teacher (X_1) and OSH climate (X_2) to OSH increase awareness (Y).

3. Results and Discussions

3.1. Description of Research Results

Teacher role variable data obtained from questionnaires with 25 questions and the number of respondents 188 students. The results of the descriptive analysis attached using SPSS program show an average price (mean) = 77.81, median = 78, mode = 78, standard deviation = 7.58, minimum score = 43, the highest score = 98, the level of spread of OSH Climate (variance) = 57.457, the range (range) = 55, and the total score is 14.629. Based on the categorization calculation, a frequency distribution table for the category of teacher role tendencies can make in Figure 2.

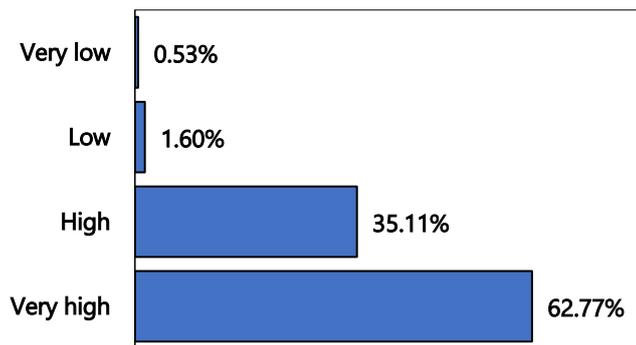


Figure 2. Frequency Distribution the Role of Teacher Category.

Based on Figure 2, it can seem that from a sample of 188 students in the electric power installation workshop of Vocational High School there were 118 students (62.76 percent) who had a very high for the role of teacher, 66 students (35.11 percent) have a high for the role of teacher, three students (1.60 percent) have a low for the role of teacher, and one student (0.53 percent) have a very low for the role of teacher. Based on these explanations, it can conclude that students majoring in electrical power installation engineering at vocational high school have a for the role of teacher to be very high.

The occupational safety and health (OSH) climate variable data obtained from a questionnaire with 24 questions and the number of respondents 188 students. The results of the descriptive analysis attached using SPSS Program show the average value (mean) = 76.35, median value = 76, mode = 76, standard deviation = 6.854, minimum score = 59, highest score = 94, the level of spread of Occupational Safety and Health Climate (variance) = 46.976, range = 35, and the total score is 14,353. Based on the categorization calculation, a frequency distribution table for the category of OSH climate trends can make in Figure 3.

Based on Figure 3, it can seem that from a sample of 188 students in the electrical power engineering installation workshop of vocational high school, and there were 138 students (73.40 percent) who had very high OSH climate trends, 49 students (26.06 percent) had a higher

category OSH climate tendency, one student (0.532 percent) have a lower category OSH climate tendency, and no student who has a very low tendency OSH climate. Based on these explanations, it can conclude that students majoring in electrical power installation engineering at vocational high school have very high OSH climate trends.

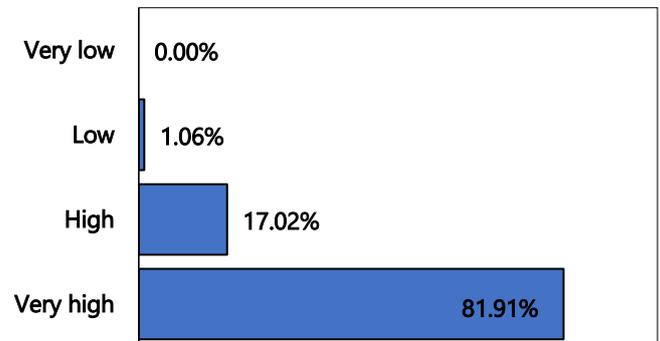


Figure 3. Frequency Distribution Category OSH Climate.

The occupational safety and health awareness-raising variable data obtained from a questionnaire with 20 questions and the number of respondents 188 students. The results of the descriptive analysis attached using SPSS 19 show the mean = 66.19, median value = 67, mode = 67, standard deviation = 6.223, minimum score = 48, highest score = 79, variance = 38.730, range = 31, and the total score is 12.433. Based on the categorization calculation, a frequency distribution table can make in the category of trends in increasing OSH awareness in Figure 4.

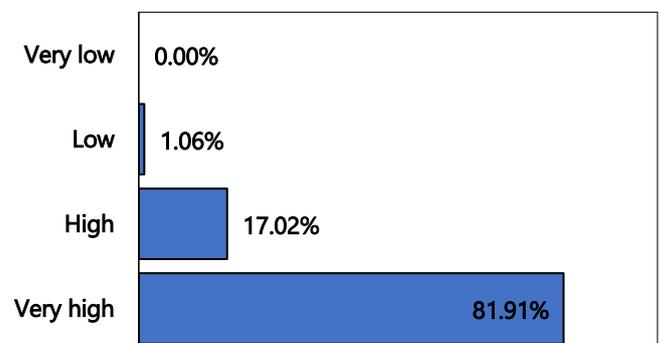


Figure 4. Frequency Distribution Category OSH Increasing Awareness.

Based on Figure 4, it can see that from a sample of 188 students in the electrical power installation engineering workshop of vocational high school there were 154 students (81.92 percent) had a very high OSH increasing awareness category, 32 students (17.02 percent) had a high OSH increasing awareness category, two students (1.06 percent) had a low OSH increasing awareness category, and no student who has a very low OSH increasing awareness category. Based on this explanation, it can conclude that students majoring in electrical power installation engineering at the vocational high school tend to increase very high OSH awareness.

3.2. Prerequisite Test Analysis

Normality testing conducted to determine the research variables generally distributed as a prerequisite for hypothesis testing. The normality test carried out using Kolmogorov-Smirnov (K-S). Data stated to generally distributed if the significance or Asymptotic Sig. is higher than 5 percent or 0.05 [23]. Normality Test Results can be seen in Table 1.

Table 1. Summary of Normality Test Results

Variable	Asymp. Sig.	Results
Role of Teacher (X1)	0.850	Normal
OSH Climate (X2)	0.729	Normal
OSH Awareness (Y)	0.350	Normal

Table 2. Summary of Linearity Test Results

Independent Variable	F	Sig.	Results
The Role of Teacher (X1)	1.366	0.101	Linear
OSH Climate (X2)	0.856	0.693	Linier

Multicollinearity test aims to test whether the regression model found a correlation between independent variables. Whether multicollinearity occurs in the regression model is done by looking at the value of TOL (Tolerance) and VIF (Variance Inflation Factor), if $\alpha = 0.05$ then the VIF limit = 10. If $VIF < 10$ and $TOL > 0.10$, multicollinearity does not occur. Proper research is that if

Table 4. Regression Analysis Test Results

		Standard Coefficient	R	R ²	t-count	t-table	Results
Role of Teacher (X1)	→ OSH awareness (Y)	0.540	0.658	0,433	6.815	1.65	Significant
OSH Climate (X2)	→ OSH awareness (Y)	0.598	0.659	0.434	5.341	1.65	Significant
Role of teacher & OSH Climate (X1 & X2)	→ OSH awareness (Y)	0,351 0,314	0.711	0.506	94.81	2.99	Significant

Based on Table 4, the magnitude of the constants (a) = 24,156 and the regression coefficient (b) = 0.540 are known. The regression line equation can be expressed in equation $Y = 24.156 + 0.540 X1$. The equation shows that the regression coefficient value is positive at 0.540, which means that if the role of the teacher (X1) increases by one unit, the value of OSH increasing awareness (Y) will increase by 0.540 units. The magnitude of the constants (a) = 20,499 and the value of the regression coefficient (b) = 0.598. The regression line equation can be expressed in equation $Y = 20.499 + 0.598 X2$. The equation shows that the regression coefficient value is positive at 0.598 which means that if the OSH climate (X2) increases by one unit, the value of OSH increasing awareness (Y) will increase by 0.598 units.

Regression Test (X1 and X2 to Y) on Table 4, it is known that the magnitude of the constants (a) = 14,977, the value of the regression coefficient (b) = 0.351, the regression coefficient (c) = 0.314, then the double

there is no multicollinearity, that is, there is no correlation between independent variables [20]. Multicollinearity Test Results are shown in Table 3.

Table 3. Summary of Multicollinearity Test Results

Variable	VIF	Tolerance
Role of Teacher (X1)	2,035	0,491
OSH Climate (X2)	2,035	0,491

Based on Table 3 of the two variables, the VIF value is 2.035 and tolerance is 0.491, so it can conclude that the regression model does not have multicollinearity.

3.3. Hypothesis Test

The hypothesis is a provisional conjecture of the problem formulation, so the hypothesis must empirically be tested for truth. Hypothesis testing in this study uses simple regression analysis for the first hypothesis (X1–Y), the second hypothesis (X2–Y), and the third hypothesis uses multiple regression analysis which is to test the variables (X1 and X2–Y). The analysis used to determine the correlation coefficient both individually and jointly between the independent variables (the role of teacher, OSH climate) to the dependent variable (OSH increasing awareness). Based on the calculation results, the simple linear regression X1 to Y obtained as shown in Table 4.

regression line equation can be expressed in the equation $Y = 14.977 + 0.351 X1 + 0.314 X2$. The equation shows that the value the role of teacher coefficient (X1) has a positive value of 0.351, which means that if the role of teacher increases by one unit, then the value of OSH increasing awareness will increase by 0.351 assuming the climate value of OSH (X2) fixed. The OSH climate regression coefficient value (X2) has a positive value of 0.314, which means that if the OSH climate increases by one unit, the value of increasing the OSH increasing awareness (Y) by 0.314 units assuming the role of teacher value (X1) remains.

The results of testing the first hypothesis indicate that there is a positive and significant influence between the role of the teacher in OSH increasing awareness in the electrical power engineering installation workshop of the vocational high school. Regression equation of simple linear regression analysis $Y = 24.156 + 0.540 X1$, correlation (R) of 0.658 and coefficient of determination (R²) of 0.433. This means that if the role of teacher variable

increases or increases one, then the variable of OSH increasing awareness in the electrical power engineering installation workshop of vocational high school will also increase the value of 0.540.

Based on the alternative hypothesis (H_a), it states that there is a positive and significant influence between the role of the teacher in OSH increasing awareness in the electrical power engineering installation workshop of vocational high school. Evidenced by comparing the price of t-arithmetic and t-table at a significance level of 5 percent with $N = 188$ obtained t-count prices higher than t-table ($6.815 > 1.65$) or sig ($0.00 < 0.05$), it can be concluded that the role of teacher has a positive influence and significant towards OSH increasing awareness in electrical power engineering installation workshop in vocational high school, with contributions given 43.30 percent and the remaining 56.70 percent due to other factors not examined by the authors.

The results of testing the first hypothesis indicate that there is a positive and significant effect between the OSH climate on OSH increasing awareness in the electrical power engineering installation workshop of vocational high school. Regression equation of simple linear regression analysis $Y = 20.499 + 0.598 X_2$, correlation (R) of 0.659 and coefficient of determination (R^2) of 0.434. This means that if the OSH climate variable increases or experiences an increase of one, then the variable OSH increasing awareness in the electrical power engineering installation workshop vocational high school will also increase or will increase by 0.598.

Based on the alternative hypothesis (H_a), it states that there is a positive and significant influence between the OSH climate on increasing OSH awareness in the electrical power engineering installation workshop of the vocational high school. This condition proven by comparing the price of t-count and t-table at a significance level of 5 percent with $N = 188$, the value of t-count is greater than t-table ($5.341 > 1.65$) or sig ($0.00 < 0.05$), it can be concluded that the OSH climate has an influence positive and significant impact on increasing OSH awareness in electrical installation engineering workshops vocational high school, with contributions given 43.40 percent and the remaining 56.60 percent due to other factors not examined by the authors

The results of testing the third hypothesis indicate that there is a positive and significant effect between the participation of the role of teacher and the OSH climate on OSH increasing awareness in the electrical power engineering installation workshop of the vocational high school. Regression equation of multiple linear regression analysis $Y = 14.977 + 0.314X_1 + 0.351 (X_2)$, the correlation coefficient (R) of 0.711 and the coefficient of determination (R^2) of 0.506. This means that if the role of the teacher (X_1) has a positive value of 0.314, which means if the role of teacher increases by one unit, the value of the role of a teacher (X_1) will increase by 0.351 unit assuming a fixed

OSH climate (X_2). OSH climate regression coefficient value (X_2) increases by one unit, then the value of increased OSH increasing awareness 0.351 assuming the role of the teacher (X_1) remains.

Based on the alternative hypothesis (H_a), it states that there is a positive and significant influence, the role of teachers and OSH climate, and OSH increasing awareness in electrical engineering installation workshops of vocational high school. It is proven by comparing the price of F-arithmetic and F-table at a significance level of 5 percent, $N = 188$. Based on the F test results obtained F-arithmetic of 94.813. When compared with F-table of 2.99, the F-arithmetic is higher than F-table ($94.813 > 2.99$) or sig ($0.00 < 0.05$) so that the role of teacher and OSH climate has a positive and significant effect on OSH increasing awareness in the electrical power engineering installation workshop vocational high school with a contribution of 50.60 percent and the remaining 49.40 percent due to other factors not examined by the author. Based on the results of the analysis, it can conclude that there is a better tendency for the role of the teacher and the OSH climate, the better it will be in OSH increasing awareness in the electrical power engineering installation workshop of the vocational high school. Conversely, the lower the role of the teacher and the OSH climate, the lower the OSH increasing awareness in the electrical power engineering installation workshop.

Climate is the average weather conditions over one year covering a large area. The climate in a narrow sense is usually defined as the average weather, or more rigorously, as the statistical description in terms of the mean and variability of relevant quantities over a period ranging from months to thousands or millions. Understanding climate, in general, emphasizes more on aspects of weather conditions. Climate is associated with the conditions of the work environment, and the climate will emphasize aspects according to individual perceptions that exist in the work environment [24]. Occupational Safety and Health (OSH) is vital in the work environment. Safety climate as individual perceptions of policies, procedures, and practices relating to safety in the workplace.

Safety climate as employee perception, attitudes and beliefs about risk and safety. Workers' perceptions about safety and health are fundamental so that every worker is always careful in working [25]. Safety is a protection for every worker to avoid the dangers that result in work accidents, while health is a physical condition that is free from disease. Occupational safety and health climate can mean a state with guarantees against good health and safety of workers, work equipment and working environment that will improve labor efficiency over a wide area in a long time [26]. Awareness is the ability of individuals to contact their surroundings and himself through his senses and impose restrictions on the environment as well as to itself through attention — defined self-awareness as a process of getting in touch

with your feelings and behaviors. Self-awareness is the process that nurses use to recognize their feelings, beliefs and attitudes [27].

Based on several opinions, awareness can be interpreted as the ability of individuals to recognize relationships with the environment through feelings, beliefs, attitudes, and behaviors. Occupational Safety and Health (OSH) is not only a guideline but must be believed and applied in daily life, especially by workers through the knowledge that has obtained. Occupational safety and health acquired knowledge to give birth to a recognition of the OSH causing attitudes toward an appreciation of OSH. Behavior-based on knowledge will last longer than behavior that not based on knowledge. Knowledge is the result of knowing that occurs through a sensory process, especially the eyes and ears of objects [3]. Occupational safety and health awareness are inseparable from the attitude of workers because unfavorable attitudes when doing work can also endanger themselves and others [28].

Occupational safety and health climate have an excellent contribution to making the culture of OSH through attitudes and behavior [29]. Every worker who has an OSH culture will see from his behavior at work. Occupational safety and health climate shaping the attitudes and behaviors needed OSH value of labor and management. Safety climate refers to the attitude towards safety in the organization which then believed to form a culture of safety. The occupational safety and health climate in Vocational Schools and the better role of teachers will certainly avoid hazards that result in workplace accidents. This condition must also be supported by students who must actively participate in improving and maintaining the work environment. The learning process carried out practical vocational activities, the increased awareness of OSH will rely more on the role of a teacher who is supported by a healthy climate in vocational occupational safety and health.

4. Conclusions

Occupational health and safety are an effort and effort to create protection and security from the risk of accidents and physical, mental and emotional hazards to workers, companies, communities and the environment. So, work health and safety are not only related to the physical problems of workers, but also mental, psychological and emotional. Occupational safety and health must follow by everyone involved in a job or activity that can cause an occupational accident. Companies in Indonesia have also implemented occupational safety and health because it is imperative the role of occupational safety and health in companies that for the protection of workers and to prevent or reduce the occurrence of employee injury after all workers are vital company assets. Occupational safety and health are also useful as increasing the degree of health and safety of workers in companies, with the existence of an occupational safety

and health system in the company, will minimize the budgetary costs due to work accidents.

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