Knowledge, attitude and practice on occupational safety and health among workers in petrochemical companies

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Abstract: Petroleum, petrochemical or oil and gas industry is one of the important industrial sectors in Malaysia. The safety in the workplace is one of the vital issues that need to be taken seriously. Every worker should know about the occupational safety and health organization to protect them from any accidents and injuries. The purpose of this study was to determine the level of knowledge, attitude and practice on occupational safety and health among workers in petrochemical companies at Teluk Kalung Industrial Area, Kemaman, Terengganu. A cross-sectional study was conducted among the workers in petrochemical companies. A convenience sampling method was used to collect the data. Descriptive statistics was used to describe the levels of knowledge, attitude and practice (KAP) among the workers. Chi-square test were used to test the association between level of knowledge with level of attitude, level of knowledge with level of practice and level of attitude with level of practice. From the study, it found that there was significant association between level of knowledge with level of attitude (p=0.002), no significant association between knowledge level and practice level (p=0.386) and was no significant difference between the level of attitude and the level of practice (p=0.117). Therefore, this study found that the knowledge level can significantly affect the attitude level of the workers. Training on occupational safety and health should be held to improve their knowledge and attitude. It is recommended for other researcher to extend this study to other places with same industrial sector as there were few studies of knowledge, attitude and practice on occupational safety and health in petrochemical companies conducted.

1. Introduction
Petrochemical industrial sector is one of the main economic sources in Malaysia. The industrial workers have to abide the standard of procedure to avoid any accidents happened in the workplace. A lot of cases have been reported in the newspaper and media regarding the accident happen in the industrial sector. Some cases may cause fatal or permanent disablement to the worker. According to Ministry of Human Resources (2008), Malaysia has been in mid-
table ranking with a fatal accident frequency rate of occurrence of about 13 workplace deaths per 100,000 workers [7].

The safety in the workplace is one of the vital issues that need to be taken seriously. The accidents that occur in the workplace can cause multiple serious effects to the organization. When accidents happen, the employee should know where to report the case to ensure that immediate action could be taken by the employer. Further inspection of the cases should be done to identify the factors and causes of the accidents and future accidents can be prevented. Accidental injury remains an important cause of morbidity and mortality in certain industries.

The awareness of safety and health should be inculcated into each worker to ensure that their work is effective and efficient, thus prevent accidents from occurring in the workplace. The practice of safety also should be emphasized by the employer and provide safety measures and proper attire (personal protective equipment) in the workplace to the workers. A good employer will make sure that the workplace is safe for the employee to do their job and carry out their daily routine. The company also plays an important role to make sure all the safety equipment and precautions has been installed in each work site. The effective approaches and remedial actions should be taken to prevent and minimize the reoccurrence of accidents in the future.

Many workplace incidents in petrochemical companies had been reported through newspaper and media. Most reported cases involved male employees than female employees because the number of female are low than male [2]. Besides that, there are also lack of study on level of knowledge, attitude and practice in companies. Mainly, previous researchers focused on issues that happen in companies such as non-fatal occupational injuries [10], epidemiology of accidents [5], and impact of occupational safety and health education on workplace study. Thus, this research would like to focus more on knowledge, attitude and practice in occupational safety and health among petrochemical workers. Thus, we can know the level of their understanding of safety and health in companies and their practice during working hours. Hence, the study determined the level of knowledge, attitude and practice on occupational safety and health among workers of petrochemical companies at Teluk Kalung Industrial Area, Kemaman, Terengganu.

2. Materials and methods
2.1 Sample collection.
This study was held at petrochemical companies at Teluk Kalong Industrial Area, Kemaman, Terengganu. The technique that used to select the respondents was convenience sampling. The type of study use was cross-sectional study. The respondents were among the workers that working in the factories. Using Rao soft calculator of sample size, about 152 respondents was chose from 250 populations of workers. This was the minimum sample size that needed in this research project.

2.2 Study design.
This study was a quantitative study. It was carried out by distributing questionnaires to the participants. Dependent variables for this study are knowledge, attitude and practice (KAP) on occupational safety and health (OSH). Independent variable for this study was respondents’ age, designation, race, and working experience.

2.3 Data analysis and statistical comparison.
The data was analysed using Statistical Package for the Social Sciences (SPSS) version 20 software. The answer was sorted out into the level of knowledge, attitude and practice of the subjects. The level of knowledge, attitude and practice on occupational safety and health
among petrochemical industrial’s workers were analysed by using frequency and Chi-square. The relationship between these variables was analysed by using Chi-square.

3. Result and discussion
Out of 152 distributed questionnaires, a total of 140 workers responded the questionnaire with 92.1% response rate. Table 1 clearly illustrates that 95.7% of the respondents had high knowledge on occupational safety and health, 2.9% had moderate knowledge and only 1.4% had low knowledge. The level of knowledge in this study shows that majority of the workers had high level of knowledge (95.7%). This result was higher than the studies conducted in Ethiopia (20.2%). Most of the workers in the petrochemical industries know the potential risk to health and safety and know the precautions that need to be implemented to protect them from risk and danger that may occur in working places. The operational workers always read the safety information and anticipate in safety campaign than non-operational workers [6]. A study in China showed a positive correlation found between service year and knowledge score \((p=0.01)\) and no statistical significance correlation found between knowledge score with age \((p=0.11)\) [8].

Table 1. Level of knowledge on occupational safety and health (n=140).

| Variables       | Category | Frequency | Percentage (%) |
|-----------------|----------|-----------|----------------|
| Level of Knowledge | High     | 134       | 95.7           |
|                 | Moderate | 4         | 2.9            |
|                 | Low      | 2         | 1.4            |

From Table 2, it states that majority of the workers had positive attitude on OSH (70.0%), 38 (27.1%) of them had neutral attitude and 4 (2.9%) had negative attitude. The result of this study showed that most of the workers had positive attitude (70.0%), followed by neutral attitude (27.1%) and negative attitude (2.9%). Another study also shows the same result where that most respondents (80 %) had positive attitude due to high knowledge and as a result of fear to get occupational diseases [1]. A different study that being held in Iran also showed the same result where majority of the workers had positive attitude (75.7%), followed by moderate attitude (23.8%) and low attitude (0.5%) [9].

Table 2. Level of attitude on occupational safety and health (n=140).

| Variables | Category | Frequency | Percentage (%) |
|-----------|----------|-----------|----------------|
| Level of Attitude | Positive | 98        | 70.0           |
|            | Neutral  | 38        | 27.1           |
|            | Negative | 4         | 2.9            |

Table 3 below shows that majority of the workers had fair practices (50.0%) in their working places. 48.6% (n=68) had good practices and only 1.4 % (n=2) had poor practices in their working places. From this study, it showed that half of the respondents had fair practice (50%) and the rest had good (48.6%) and poor (1.4%) practice. A different study showed that 13.9% of respondents were found with poor practice, while 46.8% and 39.3% had fair and good practices.
practice respectively. The reasons for not following the safety measures were because of financial, non-availability of devices and safety devices not provided by the manufacturers [3].

**Table 3.** Level of practice on occupational safety and health (n=140).

| Variables | Category | Frequency | Percentage (%) |
|-----------|----------|-----------|----------------|
| Level of Practice | Good     | 68        | 48.6           |
|            | Fair     | 70        | 50.0           |
|            | Poor     | 2         | 1.4            |

From Table 4, it depicts that there were significant association between level of knowledge with level of attitude ($p=0.002$). Majority of the workers had positive attitude when they had high knowledge on occupational safety and health (n=95) and 36 of them had neutral attitude even though they had high knowledge. This study found that there was significant association between level of knowledge with level of attitude ($p=0.002$). However, another study showed that there was no statistically significant relation between knowledge with attitude [9]. In other study, workers are knowledgeable about the benefit of safety measures and the adverse effect when working in the companies, but their perception of long term and chronic effects on their health was inadequate [3].

**Table 4.** Association between level of knowledge with level of attitude among workers.

| Variable       | Category | Level of Attitude | $\chi^2$ | $p$ value |
|----------------|----------|-------------------|----------|-----------|
| Level of Knowledge | Low      | 1 0 1            | 17.5     | 0.002     |
|                 | Moderate | 1 2 2            |          |           |
|                 | High     | 3 36 95          |          |           |

Table 5 shows that there were no significant association between level of knowledge with level of practice ($p=0.39$). There were 67 workers had high knowledge with good practice, followed by 65 of them had high knowledge with fair practice and none of them had poor practice with low and moderate knowledge. In this study, there was no significant association between knowledge level and practice level ($p=0.386$) among workers of petrochemical companies. From this result, even though the workers did not get high knowledge on occupational safety and health, but they need to have good practice based on their management procedure and rules and regulations. However, another study found that workers’ safety knowledge was related to their safety priority that influence their safety practices [4].
Table 5. Association between level of knowledge with level of practice among workers.

| Variable Category | Level of Practice | $\chi^2$ | $p$ value |
|-------------------|-------------------|----------|-----------|
| Level of Knowledge| Low               | 0        | 1         | 1         | 4.15 | 0.39 |
|                   | Moderate          | 0        | 4         | 0         |      |      |
|                   | High              | 2        | 65        | 67        |      |      |

From Table 6, it clearly illustrates that the level of attitude was not significantly associated with the level of practice ($p=0.18$). There were 54 workers had positive attitude with good practice and none of them had negative attitude with poor practice. From this study, it found that there was no significant difference between the level of attitude and the level of practice ($p=0.117$) among industrial’s workers. A negative or positive attitude of workers will not affect their practice as they need to follow the guidelines in the factory site. In other side a study found that there was a positive correlation between attitudes with safe behaviors ($p=0.000$) [9]. This different of finding may be due to empowerment of rules and regulations in the working place.

Table 6. Association between level of attitude with level of practice among workers.

| Variable Category | Level of Practice | $\chi^2$ | $p$ value |
|-------------------|-------------------|----------|-----------|
| Level of Attitude  | Negative          | 0        | 2         | 2         | 6.31 | 0.18 |
|                   | Neutral           | 1        | 25        | 12        |      |      |
|                   | Positive          | 1        | 43        | 54        |      |      |

Conclusion
In conclusion, the petrochemical companies in this study appear to uphold the occupational safety and health measure as mandated by OSHA. Majority of the workers had high knowledge, positive attitude and fair practice that help in reducing the hazards in the workplace. This study found there is a relation between the knowledge level and the attitude level toward health and safety. Since there were few studies of knowledge, attitude and practice on occupational safety and health in petrochemical companies conducted, therefore, truthful findings and new discoveries remain untouched. It is recommended for other researcher to extend this study to other places with the similar industrial sector.
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