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Perceived Work Environment and the Occurrence of Accidents: A Study Based on Kuching Area of Sarawak

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ABSTRACT

Perceived work environment could be described as the opinions and attitudes of workers towards their work condition. Elements of perceived work environment such as physical environment, supportive work environment, and perceived work tasks may possibly be important factors that influence the occurrence of accidents. The objective of this study is to examine the relationship between perceived work environment and the occurrence of accidents within an electronic manufacturing industry in Kuching, Sarawak. A cross-sectional survey utilizing a bilingual self-report questionnaire was conducted to garner data from 50 workers. Independent t-test and Pearson moment correlation were used to assess data. The results indicated that the occurrence of accidents was not affected by age group. Although physical environment and perceived work tasks did not demonstrate significant relationships with the occurrence of accidents, supportive work environment exhibited a significant inverse relationship, thereby indicating that accidents could be lowered in the presence of higher supportive work environment. Thus, support and help from co-workers are essential determinants of safety at the workplace.

Keywords: Accidents, perceived work task, physical environment, supportive work environment, safety

INTRODUCTION

For the establishment of a safe and healthy working environment, it is essential that every employer and every employee make safety as his or her top priority. Safety management system improves the work environment and reduces the risk of accidents. Despite this, it is not uncommon for accidents to occur in the workplace due to negligence. Reports and news about accidents in the factory sector have been notably widespread. Several factors like physical environ-

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ment, supportive work environment and perceived work tasks play crucial roles in preventing workplace accidents. Physical work conditions like lighting, temperature and noise affect accident rates (Bjerkan, 2010). For example, Chandrasekar (2011) in his work reported that high temperatures caused the workers to feel stressed and exhausted, and moreover, the poor design of workplace made the space more prone to accidents. Relatedly, Tariq and Everett (2000) posited that an unsafe condition is a state wherein the physical design of the workplace, ergonomics of tools and other materials may interrupt the safety conditions at work. Within this context, Noorul, Norudin, and Zalinawati (2012) suggested that a workplace should be well-designed and well-planned. Besides, employees' perceptions towards safety also help prevent accidents. Huang et al. (2014) and Clarke (2006a) emphasized that when workers were aware of hazards, they tended to be more careful. In addition to these factors, a supportive work environment could also encourage workers to provide useful feedback about matters relating to safety at the workplace. For instance, Zohar (2002) indicated that supervisors who showed their concern personally through stimulating open communication and discussion with the employees could reduce accident rates in the workplace. All these aspects highlight the importance of perceived work environment and its influence on safety as well as the risk of accidents, either in an organization or industry.

The theoretical framework for the present study was based on 'the axioms of industrial safety', proposed by Heinrich et al. (1980). Aimed at preventing unsafe acts or unsafe conditions, this theory provided the foundation for accident prevention measures. The first axiom which deals with accident causation states that ''the occurrence of an injury invariably results from a complicated sequence of factors, the last one of which being the accident itself" (Heinrich, Peterson & Roos, 1980, p154). This theory is also known as the 'domino theory', since the accident sequence is likened to a block of dominoes knocking each other down in a row. Heinrich et al. (1980) posited five metaphorical dominoes labeled with accident causes. They are Social Environment and Ancestry, Fault of Person, Unsafe Act or Mechanical or Physical Hazard (unsafe condition), Accident, and Injury. According to the authors, accidents could be avoided by removing one of the dominoes, normally the middle one or Unsafe Act.

In Malaysia, safety within the work environment of the manufacturing sector, compared to other sectors, has been ranked uppermost for occupational accidents.. This could be a cause for concern and it leads to critical issues for both employees and the organization. However, due to the potential for the development of the manufacturing sector, people were willing to take the risk to work within this industry. In 2015, the continually increasing growth of the manufacturing sector contributed nearly 25% towards the GDP, wherein more than 60% of the products had been exported overseas (Trading economics, 2015). Correspondingly, the manufacturing

industry in Kuching had contributed almost 27.4% towards the Sarawak economy with a total labor force of 11.2%, and these contributions were expected to grow remarkably (Oxford business group, 2016b). The approved investments in the manufacturing sector had risen from RM4.7 billion to RM8.3 billion, with an increase of 75% in 2013 (Oxford business group, 2016b). The electronics and electrical (E&E) component of the manufacturing sector remained as the backbone of the export market (Oxford business group, 2016a). Over the years, the E&E segment expanded significantly in the market, mainly due to the advancement in technology. This sector has played an important role as a key contributor towards the Sarawak economy.

Despite the significance of the manufacturing sector in the Malaysian economy, statistics provided by the Department of Occupational Safety and Health (DOSH, 2010a, 2010b, 2010c, 2011, 2012b, 2013, 2014, 2015) indicated that occupational accidents within this sector had the highest number of cases compared to other sectors, with more than 1,440 reported casualties. The occupational accident statistics are shown in Table 1.

It is also evident from Figure 1 (Department of Occupational Safety and Health [DOSH], 2015) that the construction sector had higher death cases compared to other sectors. However, the highest number of non-permanent disability (NPD) and permanent disability (PD) cases occurred within the manufacturing industry. In comparison to the other occupational sectors, the marked difference in the number of NPD and PD cases is quite alarming and a cause for concern.Therefore, the current research is focused on different aspects of safety within the electronic components manufacturing industry in Kuching, Sarawak.

OCCUPATIONAL ACCIDENTS

According to Barling, Loughlin, and Kelloway (2002), less than 1% of research conducted by companies on occupational safety matters was available, and this condition had remained the same for more than twenty years.Most of the studies have largely centred on the safety climate (Vinodkumar & Bhasi, 2009; Clarke, 2006b; Siu, Phillips & Leung, 2004; Smith & Dejoy, 2014; Hon, Hinze,& Chan, 2014), which is assumed to be of greater significance for the work environment. In Malaysia, very few known researches have specifically focused on the perception of workers towards workplace accidents, which also could be considered as an important segment of the safety climate. Therefore, the main objective of the present study is to identify the relationship between perceived work environment and the occurrence of accidents in the electronic manufacturing industry.

METHOD

Table 1: Occupational accident statistics by manufacturing sector from 2010 to December 2015

	2010	2011	2012	2013	2014	Dec 2015
Death	59	45	40	58	45	46
Non-Permanent disability	1,493	1,471	1,535	1,469	1,510	1,906
Permanent Disability	162	133	147	128	112	89
Total	1,714	1,649	1,722	1,655	1,667	2,041

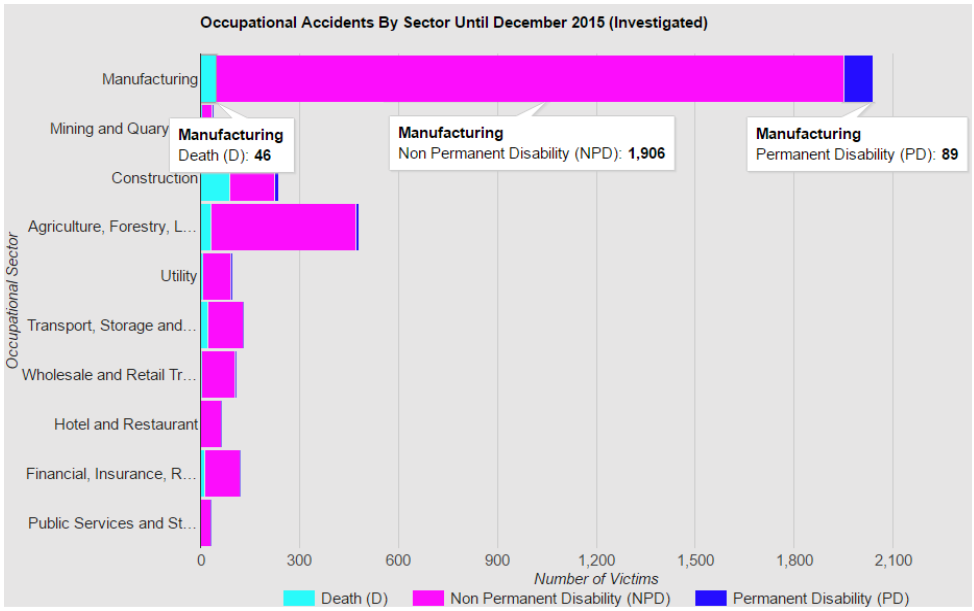

Figure 1: Occupational accidents by sector until December 2015

A quantitative study utilizing a cross-sectional non-probability sampling research design with a convenience sampling technique was used to evaluate data from 50 male respondents of an electronic component manufacturing industry in Kuching, Sarawak. Primary data was gathered through a self-administered questionnaire. In order to facilitate ease of understanding, both English and Bahasa Malaysia versions of the questionnaire were provided to the respondents. Workers were informed about the purpose of the study and assured about the anonymity of their responses. Permission was obtained from relevant authorities prior to collection of data.

The bilingual self-report questionnaire consisted of three sections. Demographic profiles of respondents were incorporated in Section A. Section B contained the instrument to measure perceived work environment, and had three main elements which included the physical environment, supportive work environment and perceived work tasks. Re-

spondents were required to encircle the appropriate score based on a scale ranging from 1 (strongly disagree) to 4 (strongly agree). The 15 questions on perceived work environment were adapted and modified from a scale developed by Bjerkan (2010). Cronbach's Alpha for the scale was found to be 0.77. Section C consisted of an instrument to measure the occurrence of accidents, and comprised of three questions which were adapted and modified from Hon, Hinze, and Chan (2014). Respondents were required to encircle the appropriate score based on a scale ranging from 1 (never) to 4 (over five times). Independent t-test and Pearson moment correlation were used to evaluate the data, which were analyzed through SPSS (Statistical Program for the Social Sciences) software, version 22. All tests were two-tailed and significance level was set at $p < 0.05$, unless stated otherwise.

RESULTS

Demographic profile

The majority (76%) of the respondents were in the age group of 18 to 35 years, whilst 24% were above 35 years. Almost 98% of the workers were educated up to SPM level, whereas only 2% had acquired their PMR qualification. Nearly 14% respondents had up to 10 years of work experience, 74% indicated 10 to 20 years of experience, and 12% had gained more than 20 years of work experience.

Age and occurrence of accidents

Independent samples *t* test was conducted to identify any mean differences between the lower age group (between 18 to 35 years) and higher age group (above 35 years). Results indicated that significant differences in mean were not found between the low age group (M=1.30, SD=0.38) and high age group (M=1.28, SD=0.55), $t(48) = 0.048$, $p > 0.05$. An insignificant *t* denoted that age did not influence the occurrence of accidents.

Relationship between physical environment and occurrence of accidents

Pearson's correlation between physical environment and occurrence of accidents showed a weak insignificant relation of $r = 0.19$, $p > 0.05$.

Relationship between supportive work environment and occurrence of accidents

Pearson's correlation between supportive work environment and the occurrence of accidents portrayed an inverse weak but significant relation of $r=-0.33$, $p < 0.05$.

Relationship between perceived work task and occurrence of accidents

Pearson's correlation between perceived work tasks and the occurrence of accidents showed an inverse weak and insignificant relation of $r=-0.12$, $p > 0.05$.

DISCUSSION

Work environment could be described as the inter-relation within the organizational members and between the organi-

zational members with their workplace (Osibanjo, Gberevbie, Adeniji & Oludayo, 2015). Within this context, perceived work environment could be portrayed as the opinions and thoughts of the employees towards their work conditions, interactions with organizational members, climate and culture (Klein, Conn, Smith,& Sorra, 2001). In this scenario of work environment, one of the elements that influences work accidents is working conditions (Kanten, 2013). For instance, in their study Martins et al. (2015) found that inappropriate design, chemical materials as well as psychosocial aspects of work environment could be dangerous to the employees and might also lead to their deaths. In the factory setting, Dhillon (2014) reported that noise, poor lighting, temperature, and other factors had caused errors in the maintenance system. Furthermore, Noorul, Norudin, and Zalinawati (2012) elucidated that poor design and layout of the workplace might have exposed the workers to hazardous situations, and might be factors leading to injuries and accidents. In addition to this, the perception of the employees towards safety could also indirectly predict the result of the injuries (Huang et al., 2014; Clarke, 2006a). Basok, Coetsee, and Cullinane (2013) reported that workers gradually ignored safety rules due to work pressure and achieving goals of increasing the quantity of products in order to reach target production.

As postulated by the Domino Theory, which provided the theoretical basis for this study, accidents can be avoided if the preceding domino blocks could be prevented from falling down. In corroboration with this theory, appropriate attention must be provided by the management towards the design layout as well as workplace settings, especially in juxtaposition with the safety of employees. In the present study, the work environment is considered as the first domino block, wherein accidents can be reduced by establishing a safe work environment. Within the context of work environment, the workplace is a setting where employees spend one-third of their time daily. Hence, a safe workplace will ensure the welfare and security of the workforce, thereby enabling the employees to perform their tasks without any harm. Consequently, this aspect may well reduce the occurrence of accidents.

Elements of perceived work environment such as the physical environment, supportive work environment and perceived work tasks may possibly be important factors that influence the occurrence of accidents.Hence, the main aim of the current study is to appraise the relationship between perceived work environment and the occurrence of accidents in a manufacturing industry.

Age group

The present study has found that there were no significant differences in the occurrence of accidents between the lower age group and the higher age group. Hence, the probability of an accident would be the same for both age groups. This finding is in contrast to Laberge and Ledoux (2011) who reported that older workers had less possibility

of getting injured at work when compared to younger workers because of their added working experience. Older workers might have a propensity for tacit knowledge which could be attributable to an extensive period of work familiarity. Young workers, who had difficulties learning the job, were likely to be at risk of accidents (Breslin & Pole, 2009). According to Breslin et al. (2007), unskilled young people who held manual jobs had a stronger connection to a high number of occupational injury cases.

Physical environment

Although no relationship was found between physical environment and the occurrence of accidents in the current study, several other researchers have found links between them. In their study, Min et al. (2013) identified that the risks due to physical environment were the vibrations from tools and machines generating loud noise which made the workers feel uncomfortable. A similar study conducted by Osibanjo, Gberevbia, Adeniji, and Oludayo (2015), conveyed that proper lighting system could reduce the number of mistakes as well as issues of quality control. Lighting which was either too dim or too bright or even an improper choice of coloured lighting system sometimes could possibly indicate that the workers were operating under unfavorable conditions. These conditions might lead to errors while manufacturing products or lead to the occurrence of accidents at the workplace.

Supportive work environment

According to Ling, Norslah, and Mohammed (2013), job resources such as support and help from immediate superiors and co-workers could motivate workers in a workplace. A supportive work environment would enable the workers to share their feelings or problems, and hence facilitate in getting useful feedback and response from them. In the present study, a significant but weak negative relationship was found between supportive work environment and the occurrence of accidents. This finding is similar to Liu et al. (2015), who also reported a relationship between co-workers support and occupational safety climate ($r = 0.88$).A slightly differing view provided by Tucker, Turner, Hershcovis, Chmiel, and Stride (2008), described that employees' interest in safety matters had a relatively stronger effect when supported by co-workers in comparison to supervisor support since they were closer to their colleagues rather than to the supervisor or the management team.

Perceived work task

Perceived work tasks could be described as the outlook of the employees towards the tasks assigned, such as speed of the task, work pressure, work demand, routine work and other such work tasks. If workers perceived themselves to be capable of managing their work tasks, then the likelihood of accidents at workplace would be less. Moreover, a willingness to follow safety rules may possibly result in the reduction of occupational accidents. According to Bronkhorst (2015), workers with autonomy would work

comfortably at their own work pace, were committed and would comply with the company rules. On the other hand, workers who were forced to increase production and disregarded safety rules might increase the probability of accidents (Basok, Coetsee, & Cullinane, 2013). Supporting this viewpoint, Bender, Green, and Heywood (2012) reported that workplace hazards could be intensified by accelerated work speed. Explaining further, Sorock et al. (2001) stated that accidents might also happen easily when workers were performing an unusual or a new task. In other words, the occurrence of accidents could be an outcome of the direct and/or indirect effect of perceived work tasks. However, in contrast to all these findings, no relationship was found between perceived work tasks and the occurrence of accidents in the current study.

LIMITATION OF THE STUDY

The quantitative methodology in this study utilized a non-probability convenience sampling technique, since many workers refused to be interviewed. Employing other sampling methods would have resulted in a smaller sample size. Convenience sampling thus ensured maximum number of respondents, although this did limit the generalizability of the findings.

SUGGESTIONS

A safe and healthy work environment should be the priority for any organization or industry. If the employers as well as employees are equally responsible for the welfare and safety of each other, it would result in the reduction of occupational accidents thereby leading to an optimum job performance at work. Hence, it could be suggested that employers within an organization or industry should strive to provide safety measures to ensure the welfare of employees through requisite guidelines which may be prepared by policy makers within their areas of expertise.

CONCLUSION

Engaging in any kind of work or employment provides ample benefits to an individual. However, a wide range of workplace hazards poses a challenge to the safety, health and welfare of the employees concerned. As an important segment of the safety climate, perceived work environment and its relationship with occupational accidents is of equal significance. One of the major findings of the present study is the implication of a supportive work environment for workplace accidents. The results of this study indicated that the occurrence of accidents could be lower in the presence of a higher supportive work environment. Hence, it could be concluded that support and help from co-workers are essential determinants of safety at the workplace.

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