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Psychosocial Stressors in Relation to Unsafe Acts

Muhammad Umair Javaid[1]*, Ahmad Shahrul Nizam Isha[2], Zulkipli Ghazali[3], Naseebullah Langove[4]

[1]Department of Management & Humanities, Universiti Teknologi Petronas, Bandar Seri Iskandar, 32610 Tronoh, Perak, Malaysia, [2]Department of Management & Humanities, Universiti Teknologi Petronas, Bandar Seri Iskandar, 32610 Tronoh, Perak, Malaysia, [3]Department of Management & Humanities, Universiti Teknologi Petronas, Bandar Seri Iskandar, 32610 Tronoh, Perak, Malaysia, [4]Department of Management & Humanities, Universiti Teknologi Petronas, Bandar Seri Iskandar, 32610 Tronoh, Perak, Malaysia. *Email: umairjav@yahoo.com

ABSTRACT

The psychosocial stressor has become a prevailing phenomenon around the globe and is the major factor contributing towards the poor health and unsafe acts (leads to accidents) of the workers. These stressors at plant turnaround maintenance process are the most neglected context in petrochemical industries of Malaysia. The use of biomarkers in this study will be helpful to look into the actual health status of the workers due to psychosocial and work-related risks. The result of previous studies are contradicting and does not give a clear picture, therefore this study will particularly look into the relationship of demographic characteristics and working hours on psychosocial stress and their impact on unsafe acts. There are so many reasons that lead to accidents, but understanding the underlying reasons of these unsafe acts from the psychosocial perspective is very crucial.

Keywords: Accidents, Psychosocial Stressors, Petrochemical Industry, Unsafe Act
JEL Classification: M3

1. INTRODUCTION

Around the globe occupational accident is considered as one of the most important problem in the workplace environment influenced by job stress and unsafe acts having significant impact on workers' health and life (Fam et al., 2010). The numbers of these occupational accidents at the workplace jumped to 120 million with 210,000 (annually) are fatal accidents that include over 500 workers who do not come home daily because they were killed due to such accidents as reported by international labour office. Only in Europion countries around 5,500 people lose their life each day with nearly 75,000 disability cases of the workers (who no longer able to work) are reported by European Agency of Safety and Health at Work (EU-OSHA).

Psychosocial risks and work-related stress factors are being increasingly acknowledged as major public health and safety concerns in industrialized countries (Leka and Cox, 2008). However, due to the technological advancement and the era of globalization these risks are not restricted to such countries. Due to such advancements the physical and chemical hazards in the working environment have been controlled to some extent, but still, there is an out spurt psychosocial stressors which has not so far been seriously taken care of (Rishi, 2002). There has been alarming distress related to causes of safety, health and its consequences because of psychosocial risks mainly in industrialized countries and recently the trend has shifted towards developing countries (Kortum, 2007). The working conditions over the past decade has been rapidly changed with the growth and development of industrial sector, it has become more significant to bring to light the psychosocial stressors together with the physical aspects of work (Hockertin, 2006).

A poor work climate would lower employees' compliance to safety rules and procedures as well their participation in organizational safety activities, resulting in higher rates of workplace accidents (Tay, 2014). In a study conducted by Mirza and Bashir (2015) over eight different industrial sectors found that if there are no safety policies in an organization then the accidents at large scale cannot be easily controlled

and prevented. In general, academics have empirically shown that unsafe employee behaviors, unsafe work conditions and hazardous practices are positively related to occupational problems and illnesses at the workplace (Christian et al., 2009). It has been found that physical conditions of the workplace with ergonomics and pace of the work are the most important stress factors which causes the unsafe act of the workers (Fam et al., 2010). Besides these occupational risks, there is a lack of awareness of psychosocial risks coupled with limited resources to deal with them that mainly arise due to the imbalances of job demands and control faced by the workers. Hence, the literature exhibits that human factors in particular psychosocial risks have a significant impact in relation to unsafe acts (leads to accidents) at workplace which are still largely neglected and misunderstood in the scenario of developing countries (WHO, 2007a).

Work related stress is a burning issue in the Asia Pacific and psychosocial stressors at work need to be study in relation to both the psychological and physical health of the workers (Dollard et al., 2014). A deprived work climate would lower employees' acquiescence to safety rules and procedures as well their participation in organizational safety activities that results in workplace accidents (Tay, 2014). Research on psychosocial stressors, work stress and safety climate in eastern countries such as Malaysia in general and specifically to the manufacturing industries of Malaysia is lacking (Azma et al., 2013). Moreover to the best of authors' knowledge there is no study on the effect of psychosocial risk factors which causes the unsafe acts on plant turnaround maintenance workers in the petrochemical industries.

Organizations in developed countries like America are more focused on safety production in comparison to the developing countries like Malaysia, China and India where the production and profitability is the main concern (Azma et al., 2013). In recent years, social security organization (SOCSO) Malaysia has been paying progressively more amounts of financial compensation to individual sufferers and the families of workplace fatalities. In 2003, it paid out a total sum of RM305 million, followed by a sum of RM889 million in 2006 and a far-fetched RM1.55 billion in 2011. The problem Malaysia is facing that the number of industrial accidents are keep on increasing. In 2009 total number of cases reported 55,186 which jumped to 63,557 in 2013 as shown in the Graph 1. Of these, 56.48% were industrial accidents with an increase of 1.71% from 35,296 cases in 2012 to 35,898 cases in 2013 (SOCSO, 2013).

The lack of awareness towards plant turnaround maintenance is highly notable in comparison to its nourishment in the manufacturing sectors of the fast-expanding Malaysian economy over the past three decades which results the potential man power loses. During the plant turnaround maintenance, on one hand large number of working force is required to carry out the maintenance activities in a short period of time and on the other hand maintenance man hours are also required as per the availability of opportunities and the amount of work required to complete the task. The plant turnaround maintenance process consists of diverse yet interconnected activities at different levels of the plant. Due to different complexities the physical environment and ergonomics increase the chances of unsafe acts, potential accidents with conflicts, errors, disturbance and confusion that are greater compared to normal maintenance working environment. Furthermore, the increase in societial demands to meet the target in the process of executing the turnaround maintenance activities such as conflicting goals and objectives have been placed between different facets (Ghazali et al., 2014).

Thus, this paper proposes to investigate the impact of the antecedents of psychosocial stressors on unsafe act (leads to accidents) in the petrochemical industries of Malaysia with an aim to fill the research gap in literature as understanding the root cause of any problem is the first step towards prevention.

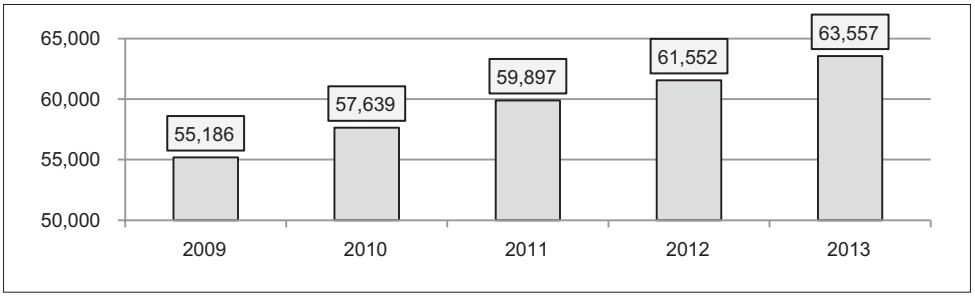
1.1. Research Objectives

1. To investigate the relationship between working hours (exceed than the normal limit) of workers with the psychosocial stress and unsafe acts in the plant turnaround maintenance of Petrochemical Industries of Malaysia.
2. To investigate the relationship between demographic characteristics (age and experience) of workers with the psychosocial stress and unsafe acts in the plant turnaround maintenance of Petrochemical Industries of Malaysia.

2. LITERATURE REVIEW

The proposed framework draws heavily on one theory; job demand control model (DCM) which has been widely studied in the job stress field. DCM pays attention to human factors in work place environment and conceptualizes the work place environment as purely one of human erection (Karasek, 1998). Specifically, in relation to the proposed framework where the antecedents' of psychosocial stress in terms of high job demands like long working hours and demographic characteristics (in

Graph 1: Number of accidents reported during 2009-2013



terms of age and experience) bounds exceeds over the workers low control like in terms of social support and rewards. This is the worst context of workers in terms of health and the unsafe acts which causes the accidents over the work place (Jonge et al., 2000).

2.1. Work Hours (Day/Night)

During 1990, many changes have taken place in the international legislation related to working hours. The objective was to limit working hours as long and mismanage working hours are hazardous to health (Harrington, 2001). Currently there are no working hour standards issued by OSHA (Lerman and Eskin, 2012). There are various reasons for which the demand of shift works is still on its peak. The first reason is the society's needs for emergency services, secondly the technical need for maintain the continuous processes and finally the economic need (Harrington, 2001). Long working hours and shift works are the work stressors that vary significantly both in quality and quantity. Long working hours means less sleep which is one of the causes of errors and accidents in workplace. Long hours also create a problem of work-life balance which becomes a potential source of stress and ultimately the cause of accidents (Wagstaff and Lie, 2011). Fatigue is related with the extended working hours, night and rotating shifts which leads to workplace accidents (Lerman and Eskin, 2012). The recent review exhibited that during afternoon shifts the risk of occupational injury increased by 18.3% and in night by 30.4% in comparison to morning shifts (Folkard and Tucker, 2003). According to the National Longitudinal Survey of Youth compared to day shifts, employees of evening and night shifts had a high risk of injury at 43% and 30% respectively (Wagstaff and Lie, 2011). The study revealed that (i) it was not only the night shifts where the accidents take place (ii) increase in number of accidents were not due to long working hours on shift (Kantermann et al., 2013). Study revealed that both long hours and shift work affect the accidents while night shifts carries a more risk of accidents (Wagstaff and Lie, 2011).

Hence, due to the inconclusive findings the authors hypothesized the relationship between working hours with psychosocial stress and workers unsafe act in relation to the DCM:

H1: Psychosocial demand stressor - Working hours (long/shift work) have positive relationship with psychosocial stress and unsafe act.

2.2. Demographic Characteristics (Age and Experience)

The assessed studies give no clear indications of age effects on work times scheduling on accident risk (Wagstaff and Lie, 2011) as contradicting reasoning is found in different research. One claims that older workers have higher rates of accidents because of their age and other says that they have fewer rates because of the experience. Same contradicting findings revealed that young workers have higher risks of accidents because of their attitudes whereas few authors found that because of their less experience they have not exposed to hazardous work (Root, 1981). One of the study has found an insignificant relationship of age and experience with unsafe acts (Monazzam and Soltanzadeh, 2009). Another study found that there was a significant relationship between age and workplace accidents (Malakouti et al., 2013). In a study the authors found a strong inverse relationship between job tenure and claim rates beyond any possible perplexing due to gender, age, industry and occupation (Breslin and Smith, 2006). Risk of accidents are associated with the attribute of experience (Chau et al., 2002).

Hence, due to the inconclusive findings this paper proposes further hypothesized the relationship of working hours with psychosocial stress and workers unsafe act in relation to the DCM:

H2: Psychosocial demand stressor - Age and experience have positive relationship with psychosocial stress and unsafe act.

2.3. Psychosocial Stress

According to Australian psychological society stress is defined as a feeling of being overloaded, tense and worried and it is the individual's demand and pressure to take on the ability to cope out with it (Blaug, Kenyon, 2007). Psychosocial stress arises when there are certain perceived risks which needs resources that are either unavailable or in the depleting stage. Work related stress and psychosocial risks both are being experienced and witnessed by employees simultaneously (Leka and Jain, 2010) with a negative effect on employee health and safety along with business outcomes in a large number of European workplaces (EU-OSHA, 2014). According to health, safety and environment UK, work-related stress is defined as a unsafe reaction that people have because of excessive pressures and demands put on them at work (HSE, 2013). In addition, stressful working conditions can significantly contribute in workplace injuries and illnesses because of employee's ability to work safely (WHO, 2007b). Study in the developing countries shows that the physical and psychosocial risks have an impact on the low back symptoms of the workers with permanent and night shift workers increased the odds (Widanarko et al., 2014) which forced workers to concentrate on work for longer period of time. Another study in the multi-country INTERHEART-52 countries shows that psychosocial stressors are associated with increased risk of acute myocardial infarction (Rosengren et al., 2004). The idea of using biomarkers is to detect diseases at a very early stage (Reuters, 2010) within the workers who have to perform plant turnaround maintenance process. A biomarker as "any substance, structure, or process that can be measured in the body or its products and influence or predict the incidence of outcome or disease" (WHO, 2001). A study conducted in US which shows that psychological stress can contribute to health disparities in population with recurring stress of everyday life. In developing countries, there is a growing concern about job stress and risks associated with them in terms of organizational problems such as absenteeism, turnover below the average job performances, accidents, unsafe acts and drug abuse. Taap Manshor et al. (2003) found that different working conditions help to generate stress among workers and such conditions ultimately are the leading causes of accidents and errors at the workplace. In recent past, another study conducted on accidents at port sites in Malaysia where authors have studied upon individual and job related factors as the two common dimensions of unsafe acts (leads to accidents). The authors found that amongst many factors, psychosocial stress and fatigue are the important factors

that contribute to accidents (Mansor et al., 2011). Hence, findings show that psychosocial risks/stress has a relation with health outcomes therefore `authors have hypothesized the relationship between psychosocial stress and workers unsafe act in relation to the DCM:

H3: Psychosocial Stress has positive relationship with unsafe act.

3. UNSAFE ACTS

In general, accidents through inherent nature are unforeseen events that may cause physical and emotional damage and industrial accident in particular is an unintended and unpredicted event that causes injury (Figure 1). Broadly speaking, industrial accidents can be distributed in to two groups' i.e., unsafe conditions and unsafe behavior. It is in actual the second condition which shows that despite of good physical working conditions human factors are important factors in work accidents (Issever et al., 2008). Unsafe conditions include the physical and ergonomics of the workplace. For instance atmospheric temperature, poor lightning, unbearable noise, lack of machine protection, inappropriate working distances (Harrell, 1995). Unsafe acts may result from not having a proper training, limited know how about personal and machine protection, not much experienced, having sickness that leads to accidents, lack in concentration, lumbering and uncomfortable, having drug dependence and smoking (Greiner et al., 1998). Above all it's the psychosocial stressors that are the main cause of unsafe acts of the workers. Heinrich's (1931) domino theory is the widely discussed accident causation model so far. Heinrich emphasized that any injury (5th domino) is certainly triggered by an accident (4th domino) and that the accident in turn is triggered by unsafe acts and/or unsafe conditions (3rd domino) that are headed by fault of person (2nd domino) and ancestry and social environment (1st domino). Psychosocial stressors mainly resides in the social environment and from here these factors start effecting the highs and lows of human behaviors and attitudes which causes the unsafe acts and ultimately ended up on the workers injury.

Even if the unsafe conditions i.e. the physical factors are removed from the workplace still the psychosocial stressors are there. It is not possible to limit the industrial accidents unless psychosocial stressors have been controlled properly (Issever et al., 2008). Several unsafe acts have been identified by researchers which has been highlighted and break down into 19 unsafe acts by (Aksorn and Hadikusumo, 2007) (Table 1).

Thus, on the basis of literature review the researcher will going to investigate the proposed conceptual framework (Figure 2).

4. METHODOLOGY

Mixed methods techniques will be used for the data collection. Interviews will be conducted from workers who work during the plant turnaround maintenance process which includes but not limited to production and operation, health and safety, shift supervisors, health doctor/nurses or any medical officer available on the site in order to obtain their comments and suggestions related

Figure 1: Heinrich's Domino: The process of accident

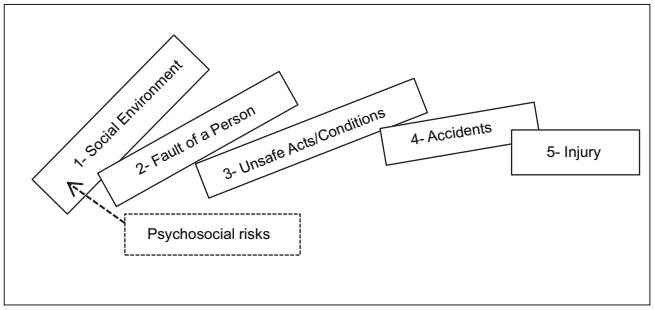


Figure 2: Proposed conceptual framework

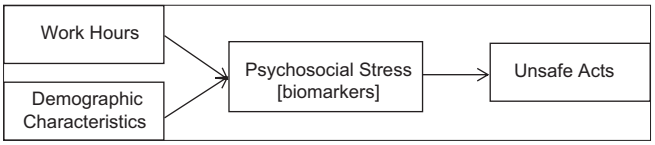


Table 1: Unsafe acts that cause accidents

1	Working without any rights on the job
2	Failure to intimate at first to secure members from danger
3	Work pace is too high that crosses the speed limit as defined
4	Improper handling of objects
5	Object and materials are not placed at safe place
6	Tools and machinery are not properly used
7	Use equipment's that are not in proper shape, design and working condition
8	Inappropriate behaviors at the workplace
9	Show resistance to wear PPE
10	Keeping away safety equipment's from the workplace
11	Do smoking where hazardous equipment's are placed
12	Mishandling of nails and a like materials at workplace
13	Dropping objects without taking care of the surroundings
14	Working under the effect of drugs
15	Tasks are not well defined that creates ambiguity
16	Poor body language and postures while performing different tasks
17	Maintaining and cleaning equipment which is under operation
18	Lack of concentration while performing tasks
19	Working in a physical environment which is substandard

PPE: Personal protective equipment

to 19 unsafe acts as mentioned above. Finally, the selected unsafe acts will be added in the final questionnaire which will be self-administrated by the authors. During the self-administration process of questionnaire each respondent will be individually interviewed in order to determine the frequency at which worker committed the earlier mentioned unsafe acts. Whereas psychosocial stress will be measured in terms of biomarkers, anxiety and burnout scales. Blood pressure will be used as a biomarker for measuring the systolic and diastolic pressure for both the arms as per the protocols mentioned my American Heart Association (Pickering et al., 2005). In quantitative method, the survey questionnaire will be distributed by using simple random sampling technique on the workers. G*Power 3.1 software will be used to estimate the sample size by conducting A priori analysis by using 80% power. The effects of demographic characteristics, working hours and biomarkers will be explored through structural equation model by using SmartPLS 3.0 as the research objectives are predictive rather than confirmation of structural relationships (Hair et al., 2011).

5. DISCUSSION AND CONCLUSION

We are living in the era of globalization and technological advancements where the world has captivated itself with modern equipment. All these developments have increased the efficiency and effectiveness of the plants around the world but all have failed to control the rates of accidents that are growing at substantial rates. In fact the lack of training, improper management, long working hours and many other factors have significantly affecting the mental health of workers which is the area of major concerned. Recently, in one of the proposed study on psychosocial risks in relation to health and well-being the authors have predicted that higher job demands (quantitative demands, emotional demands and long working hours) in relation to limited job resources (quality of leadership, social support from colleagues and supervisors) have a very significant effect on the workers' health and wellbeing in Malaysian petrochemical industries (Javaid et al., 2015). In a study conducted by Parker et al. (1992) distinguishes between violation and error producing factors. According to him violation producing factors are influenced by attitudes, beliefs and group norms whereas error producing factors are due to high workload, inadequate knowledge, ability or experience, poor interface design, inadequate supervision, change stressful environment and mental state (fatigue, preoccupation, distraction, anxiety, etc.). The proposed study will look into the root causes of psychosocial stressor that causes unsafe acts (leading to accidents). Organizations with a low psychosocial problem or inappropriate behavior may be prevalent because employees infer that psychological well-being is not a priority in the organization. Employees develop expectancies regarding consequences for unsafe acts via observations of the other employee's including senior management behaviors (Isha, 2012).

The proposed study will provide an empirical insight into inclusive relationship of psychosocial stressor with unsafe acts (leading to accidents). The study will be helpful to fill the knowledge gap in the existing literature in terms of psychosocial risks and work related stress particularly in developing countries. The results of the study have the lasting effects and will help the government, regulators, policy makers, board of directors in devising a proper human resource management system specifically during the plant turnaround maintenance time in petrochemical industries of Malaysia. This will work as mechanism to reduce the stressor with effective policies and proper working hour's schedule.

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