

# Review Article: Individual Safety and Health at the Workplace

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**Abstract-** Accidents and human errors at the workplace are usually deal with safety being emphasized. However, as physical and engineering approach are usually use to prevent workplace incidents and accidents that may results in physical injuries or harms, there are scarcity on what is known regarding a worker's mental health and well-being in relation with their job. Objectives: To relate health-related theories at the interpersonal level with individual behavioural health change at the workplace; and to study the relation between physical and psychosocial factors towards individual health and safety behavior. Methodology: A descriptive study, theoretical analysis. Results and discussion: Safety and health are two terms that are closely related to each other in terms of the effects of each domain on one another. As safety is mainly concern with physical hazards at the workplace, psychological hazards may effect on workers mental health and well-being that its consequences may be have adverse effects on the people and the individual himself. Conclusion: Although safety aspects are mainly emphasized in most workplaces, however, the health-related concerns that ensue from implementing those safety rules, where workers' individual health attributes that may have an impact on workplace safety should also be taken into concern.

**Index Terms-** Occupational, Behaviour, Work-Related, Injuries, Accidents

## I. INTRODUCTION

According to World Health Organization Western Pacific Region<sup>[1]</sup>, a healthy workplace is defined as one in which employees and managers work together to exercise a continuous

improvement process to ensure and promote the safety, health and well-being of every employees and the sustainability of the workplace in view of several aspects, appropriate to recognized needs such as: safety and health conditions in the physical work environment; safety, health and well-being conditions in the psychosocial work setting that consist of organization of work and workplace culture; personal health resources in the workplace; and approaches of engaging in the community to enhance the health of employees, their families and other people in the community. Even though organisations implemented and followed the laws, regulations, and guidelines, workers intentional or unintentional conducts at work may still affects their health negatively. It is important to maximise the prevention of avoidable occupational accidents and injuries, and in the same time reducing time loss injuries resulting from occupational-related accidents and injuries over whose occurrence the workplace had limited control.

## Occupational Safety and Health

The harmful nature of occupational health hazards may cause health issues that only arise after a prolonged period of contact with the harmful exposure and harm. As such it is difficult to associate health effects to the workplace and measure the efficiency of risk controls methods in the prevention of ill health. Safety hazards are mostly tangible as compare to health hazards that are intangible, such as toxic particles floating freely in the air. Thus, there is a difficulty in distinguishing cause to which occupational health safety often outweigh occupational health because organizations' care responsibility becomes vague and difficult to implement (Lunt, 2013)<sup>[2]</sup>. Occupational accidents are avoidable if both employers and employees have due concerns regarding safety issues or practicing good safety behaviour (Makin & Sutherland, 1994)<sup>[3]</sup>. In a risk control effort,

risk elimination or designing out should be prioritized as to alternatives measures that involve management or individual protective measures. Although appropriate and tight controls, human fallibility will still takes place in which workers may intentionally or unintentionally risk their or fellow workers health. Nonetheless, organization's culture or administration systems may cause behavioural safety programs or interventions to overlook latent unsafe behaviours (Lunt, 2013) <sup>[2]</sup>.

Physical health encompasses a spectrum of conditions, from having a diagnosed illness at one extreme, from a condition in which the individual without specific disease yet is not at their ideal health status, across optimum health and well-being at the other end. While traumatic injuries are usually directly noticeable to both the victim and witnesses, this is contrary in the case of work-related diseases and cumulative injuries such as noise-induced hearing loss and various musculoskeletal disorders. Normally it may take years for a disease to come to be apparent in an employee, and then the association to workplace exposure may be uncertain or not identified at all. Hence, occupational diseases and cumulative injuries have been extremely under reported and frequently under identified in relation to their statistics. WHO estimates that 1.7 million people succumbed to occupational diseases yearly and the there are 160 million prevalent cases of occupational disease. These comprise both communicable and non-communicable diseases (NCD). WHO estimates 16% of hearing loss, 11% of asthma, 9% of lung cancer cases globally are attributable to occupational exposure, while 40% of hepatitis B and C infections in health care staffs are caused by needle-stick injuries during work <sup>[4]</sup>. WHO concludes that 200,000 people die from work-related cancers every year <sup>[5]</sup>. These diseases are not evenly dispersed, with females and other vulnerable employees suffering more than their share.

## II OBJECTIVES

1. To relate health-related theories at the interpersonal level with individual behavioural health change at the workplace.
2. To study the relation between physical and psychosocial factors towards individual safety and health behavior.

## III METHODOLOGY

A descriptive study, theoretical analysis

## IV FINDINGS AND DISCUSSION

1. To relate health-related theories at the interpersonal level with individual behavioural health change at the workplace.

Positive changes in health behaviour can be achieved by understanding the reason that prompt or influence a person to act as they do. For this purpose, theories and models of health behaviour have been established with the aim of getting a systematic view of events or situations by identifying associations between variables so that explanation and prediction about events or situations that occurs can be studied. In addition, the methods to influence or change behaviour can be more effective when intervention strategies are developed based on the identified information (Glanz & Maddok, 2002) <sup>[6]</sup>. Theories can be applied in the planning, implementation, and evaluation phases of interventions on addition of leading investigations why people are not practicing a health-related behaviour or following given medical advises. Thus, change models are introduced to guide an individual towards positive health behaviour. Theories relating to health behaviour often similar each other in one way or another and no particular theories or models dominated studies or practice in the field. Health behaviour is a complex and multifaceted term to be explained by only one theory or model (Glanz & Maddock, 2002) <sup>[6]</sup>. Nevertheless, these explanations for behaviour and models for change have some mutual notions and common themes that emphasised on diverse factors that comprised of factors at the individual, interpersonal, and community level. These theories have been tested in earlier studies and have helped in understanding or predicting health behaviours. Some models that were based on several theories have helped to provide an understanding on a specific problem in a particular setting or context.

### 1.1 Social Learning/ Social Cognitive Theory

Social learning/ social cognitive theory was established on the belief that behaviour was determined by expectations and benefits about environmental cues. How events are interconnected, consequences of an individual's actions like how outcomes and competency to achieve is influenced by the behaviour and the behaviour needed to influence outcomes such as self-efficacy as suggested by Bandura (1977) <sup>[7]</sup> are included in six concepts in Social Learning/ Social Cognitive Theory, which are: **Reciprocal Determinism**, where the interaction between an individual and environment bring about behaviour changes that are bi-directional. The people who are involved will have to make adjustments to the situation if needed. **Behavioural Capability** involves knowledge and skills to influence behaviour. Information and training about actions are offered to change behaviour. In **Expectations**, beliefs about conceivable results of action. Information about possible consequences of actions is included in recommendations. **Self-Efficacy** is the ability to act and persevere in action. Strengths are pointed out, persuasion and supports are used while changing behaviour in small steps. **Observational Learning** is having beliefs that centres on studying others like one own self or have evident physical results. Others' experiences are pointed out and identity role models physical changes to follow. **Reinforcement**, is where feedbacks to an individual's behaviour that increase or reduce the probability of relapse. Incentives, rewards, praise are given and

self-reward are encouraged to decrease the chance of negative responses that discourage positive changes.

### 1.2 Theory of Reasoned Action

Theory of Reasoned Action (TRA) developed by Fishbein and Ajzen (1977) <sup>[8]</sup> proposed that an individual's behaviour is determined by his intention to perform behaviour and it is a reflection of his attitude toward the behaviour and his subjective norms. Intention is the direct antecedent of behaviour and the cognitive perspective of an individual's willingness to carry out a particular behaviour. An individual intention is determined by three things: the person's attitudes toward the specific behaviour or recommended actions, the person's subjective norms which involve the sense of social pressure towards taking actions, and his perceived behavioural control or confidence in controlling his behaviour.

Theory of Reasoned Action (TRA) explained voluntary or decision making behaviour and that social behaviour are encouraged by a person's attitude in carrying out behaviour. An individual's beliefs about the consequences of his or her behaviour and an appraisal of the value of those actions will influence the behavioural change of that person (Moon & Kim, 2001) <sup>[9]</sup>. This theory was always used health promotion programs. An expansion of TRA is the Theory of Planned Behaviour (TPB).

### 1.3 Theory of Planned Behaviour

The Theory of Planned Behaviour (Ajzen, 1991) <sup>[10]</sup> suggested that when measuring attitude toward behaviour, only particular attitudes toward the behaviour performed can be expected to predict that behaviour. Subjective norms are the beliefs about how a person's social circle will view the behaviour in question and also, can be used as key to predict a person's intentions and knowing an individual's attitudes. Finally, perceived behavioural control is defined as a person's perceptions of their ability to execute a particular behaviour. These predictors all lead to intention.

TPB discusses questionable behaviours in relation to an individual's decision making or choice making behaviour. Decomposed Theory of Planned Behaviour (DTPB) is a model developed from TPB that provides new facet in handling safety issues and looking at the safety concerns from the management and psychological point of view (Taylor & Todd, 1995) <sup>[11]</sup>.

### 1.4 Social Support

Social Support defines the structure, processes and roles of social relationships and is one of the main functions in social relationships. Social networks are connections between individuals that may offer social support and that may assist

purposes other than giving support (Glanz, Rimer, & Lewis, 2002) <sup>[12]</sup>. Social networks are the term closely associated to social support. The relationship between social supports with health was established by Cassel (1976) <sup>[13]</sup>. Different interventions can be used for promoting health by being able to recognize the influence of social relationships on health status, health behaviors and health decision. Applications of social support approaches include identifying the importance of networking or training of individuals in networks. According to House (1981) <sup>[14]</sup>, social support can be categorized into four main types. **Emotional support** involves the sharing of life experiences. It consists of the formation of empathy, love, trust and caring. **Instrumental support** involves the offering of tangible support and services that directly help deprived individual. It is offered by individuals in close circles such as friends, fellow workers, and people in the neighbourhood. **Informational support** involves the offering of guidance, recommendations, and information that an individual can take to tackle problems. **Appraisal support** involves the offering of information that is beneficial for self-assessment purpose such as positive advice, assertion and social appraisal.

2. To study the relation between physical and psychosocial factors towards individual health and safety behavior.

Safety and health are two terms that are closely related to each other in terms of the effects of each domain on one another. Occupational health is concern with every aspect of safety and health at work and includes a key emphasis on primary prevention of hazards, according to the definition given by World Health Organization <sup>[15]</sup>. Health is characterized as 'a state of physical, mental and social well-being at whole and not merely the absence of disease or infirmity. As safety is mainly concern with physical hazards at the workplace, psychological hazards may effect on workers mental health and well-being that its consequences may be have adverse effects on the people and the individual himself. A broad range of workplace hazards also expose individuals in the workplace to occupational-related safety and health risks such as the exposure to chemicals, biological, physical, and ergonomic hazards, which involve a complex network of safety risks and a wide array of psychosocial risk factors <sup>[16]</sup>. The physical work environment is defined as the component of the workplace environment that can be noticed by human or technological senses, comprising the building, air, machineries, furniture, products, chemicals, materials and processes that exist or that take place in the work environment, and which can impact on the physical or mental safety, health and well-being of employees. While developed countries may regard this to be key aspect to occupational safety and health, the truth remains that in large parts of the world, hazards of this type endanger the lives of employees on every single day. And even in developed countries, completely avertible injuries and illnesses keep on occurring. Hazards that present in the physical environment typically have the likelihood to kill and disfigure employees at once and horrifically. When prioritizing issues for attending concerns it is reasonable to reflect on Maslow's (1943) <sup>[17]</sup> hierarchy of needs, where safety and security is at the bottom of the pyramid. Most hazards in the physical work environment would be categorised into this aspect of human needs. Healthy

workplace issues in the physical environment consist of the different types of hazard that may be present in the physical work environment, such as: chemical, physical, biological, ergonomic, and mechanical. Physical safety hazards are typically the first type of hazard to be encompassed in safety & health legislation, when it exists. If injuries are caused from these hazards, they are also the most likely to be covered by any type of workers' compensation that is available. Despite the possibility that most nations have some kind of regulation to prevent these types of injuries, they continue to occur at a worrying rate. Furthermore, non-physical, or psychosocial hazards in the workplace can also have an effect on physical safety. Moreover, psychosocial hazards can be linked with injuries in either a direct or indirect way. When workers lack sufficient control over dangerous situations at work, they not have the control required to diminish threats. Therefore, lack of control can *directly lead* to an injury. Nevertheless, *indirect* effects can be just as hazardous. Employees being exposed to psychosocial hazards may sleep poorly, using unnecessary or excessive medications, indulge in heavy drinking, feel depressed, feel distress, agitated and nervous, and feeling angry and impulsive, frequently caused by a sense of unfairness or inequity. When individuals engage in these behaviours or emotional states, it is more likely they will have temporarily diverted attention, make serious mistakes in judgement, put their bodies under stress, and proliferate the likelihood for strains and sprains; and fail in normal activities that involve hand-eye or foot-eye coordination.

### 2.1.1 Human Error

According to Reason (1990) <sup>[18]</sup>, human error is defined as a general concept that covers all occurrences where a chain of physical or mental tasks unable to reach its expected outcome and when these failures cannot be attribute to the intervention of some accidents. Human error is a multifaceted concept that has gained perpetual attention among investigators of human factors, and has been constantly recognised as a causal factor in a high numbers of accidents in complex and dynamic systems (Reyes, de la Rivaa, Maldonadob, Woocaya, & de la Oa, 2015) <sup>[19]</sup>. Human factors are referred as individual's' perceptual, mental and physical abilities to interact with their work and occupational environment, and the impact of machine and system design on human performance. This also includes occupational safety-related behaviour which is being influenced by the type of organisations (*Health and Safety Executive*, 1989) <sup>[20]</sup>.

### 2.1.1.2 Individual Attributes towards Errors

Exposure to hazards such as moving parts of machines can result in serious injuries or even deaths (Chinniah, 2015) <sup>[21]</sup>. Also that, exposure to hazards in different forms such as chemicals, biological agents, physical factors, ergonomic conditions, allergens, a complex linkage of dangers that jeopardises safety, and a wide range of psychosocial risk factors can present risks to safety and health of workers although international standards, national standards, and regulations have covered the principles regarding machine safety, risk assessment

and risk reduction (Akalpa et al., 2015) <sup>[22]</sup>. Another possible factor that has been recognised in safety and health behaviours and in the context of individual safety are the demographic characteristics of employees at work. The role of gender on the perception of safety in the workplace, compliance with safety management, and accident frequency was investigated in a study done by Gyekye and Salminen (2011) <sup>[23]</sup> in which female workers were found to have a more positive safety perception, more complaint towards safety management procedures, and had a lower rate of accident compared to male workers. The lower number of female workers can be the reason on the difference in occupational injuries faced by male and female workers in high risk industries (Toscano, Windau, & Knestaut, 1998) <sup>[24]</sup>. This was in contrast with a study done by Taiwo et al. (2009) <sup>[25]</sup>, where females were more frequently involved in injuries than males in heavy manufacturing sectors. *Congruent Theory* (Holland, 1997) <sup>[26]</sup> and *Person-Environment Fit* (Sherry, 1991) <sup>[27]</sup> are two theories that based gender and job characteristics in which individuals involve themselves in or given roles that are appropriate with traditional views on femininity and masculinity. Female workers are commonly given roles that are less physically demanding and are seldom positioned in risky or dangerous job situations as compared to male workers which in turn reduced their exposure to accidents (Konrad et al. 2000) <sup>[28]</sup>. It is reported that male workers be disposed to disregard safety measures and voluntarily involve in unsafe behaviours more frequently than females (Harris & Jenkins, 2006) <sup>[29]</sup>. Females have the disposition to appraise common danger more frequently and the tendency to apprehend the severity of adverse consequences and thus avoiding them (Harris & Jenkins, 2006) <sup>[29]</sup>. For instance, a study by Waldron, MacClosky, & Earle (2005) <sup>[30]</sup> on road accidents found that women be likely to wear seat belts voluntarily in contrast to men. Another study revealed that women also less frequent to run yellow lights (Holland & Hill, 2007) <sup>[31]</sup>.

Higher degrees of job satisfaction, organizational support, organisation citizenship behaviours, work safety perception, and safety compliance are found in older workers compared to young workers (Gyekye & Salminen, 2009b, 2009c) <sup>[32][33]</sup>. A review conducted by Breslin et al., 2007 <sup>[34]</sup> on nine cross-sectional studies showed that hazard exposure, perceived work overload and job characteristics have different effects on work injuries that occurred among young workers. Young workers that were school dropouts had three times occupational injuries as compared to young workers with a high school degree in Canada (Breslin, 2008) <sup>[35]</sup>. It is also shown that experience solely did not lower the rate of injuries independent of age (Gun & Ryan, 1994) <sup>[36]</sup>. Researches on the associations between work experience and compliance with safety policies is relatively scarce and contradictory. A study carried out by Zeitlin (1994) <sup>[37]</sup> found overall safety compliance to be highest among the inexperienced workers while another study done by Paul and Maiti (2007) <sup>[38]</sup> which employed a multivariate analysis did not found such correlation in which both experienced and inexperienced workers have the tendency to ignore safety procedures. Workers that had more experience possessed greater views relating to safety as compared to inexperienced workers and this positive correlation could be attribute to the concept of

familiarity and risks perception in which awareness of safety, sensitivity to unsafe circumstances, and thoughtfulness be likely to increase with experience. Workers displayed more compliance towards safety procedures when they have the prior knowledge on the type of hazards they are being exposed to within a particular organisational context (Probst, 2002; Probst & Brubaker, 2001)<sup>[39][40]</sup>, in contrast to inexperienced workers who comparatively have less knowledge and familiarity with conditions at the workplace that can contribute to inappropriate or incorrect safety behaviours. Education is commonly referred as a learning process in which individuals develop their cognitive abilities and to acquire knowledge and information (Gyekye & Hyabatollahi, 2015)<sup>[41]</sup>. In a study done by Gyekye and Salminen (2009a)<sup>[42]</sup>, the findings indicated that there was a positive relationship between education and safety perception. Also, higher educated employees were reported to have the best perceptions on safety and were the most compliant group with safety management policies. In a study conducted by Stojadinovic et al. (2012)<sup>[43]</sup>, highly educated underground coal miners in Serbia had the lowest injury rate.

In developed nations, females are exposed more than males to highly repetitive activities and awkward body positions, and their risk of musculoskeletal disorders (MSDs) is more than a few times higher<sup>[44][45][46]</sup>. What is not generally known is that psychosocial environments associated to the organization of work can be one of the risk factors as well<sup>[47][48]</sup>. However, the notion that psychological stress can lead to, or cause, MSDs is not intuitively clear. Various physiological mechanisms that take place during stress most likely are a factor to this relationship, comprising increases in non-voluntary muscular tension and cortisol levels, changes in pain perception and decreases in muscle repair and blood testosterone levels<sup>[49]</sup>. A finding indicated that the cost of a diabetic employee to a company is five times higher that of employees without diabetes<sup>[50]</sup>. Numerous studies done in the past have shown that poor health negatively influences productivity. Individuals that suffered from poorly controlled allergies were 13% less productive as compared to other employees<sup>[51]</sup>. Burton et al., (1999) established a comprehensive Worker Productivity Index and presented that as the number of health risk factors greater, productivity lessened<sup>[52]</sup>. Other findings showed that health-related productivity costs were 4 times higher than medical and pharmacy costs<sup>[53]</sup>. The direct costs for the organization of poor health in employees varies greatly on the regulatory system in the nation concerned, and the system primary health care is delivered. In developing countries, it is not as likely that the employer will pay for health insurance, but they still shoulder the cost of absent workers. As the population get older, these will become even more prevalent, and the consequence on productivity is formidable to foresee.

### 2.1.1.3 Relationship between physical and psychosocial factors towards individual safety and health behavior

When physical health is affected, it has an impact on the mind, and when mental health and well-being are affected, it influences the physical body. When workers are ill of whatever reason, their productivity at work will be reduced. If the worker is too ill to attend work, there are the absenteeism-associated costs of recruiting and getting a replacement worker, training that worker, and possibly facing decreased quality or quantity of job from that alternative. If the sick worker is present at work in spite of the illness, which called "presenteeism," that defines the lowered productivity of a person who is either physically or mentally ill, and as a result not as efficient as he or she would usually be. The employer has to pay for both cases. Various circumstances in the workplace can be described "psychosocial hazards" as they are associated to the psychological and social contexts of the workplace instead of physical contexts, and they can be damaging to mental (and physical) health of employees. These are sometimes denoted to as *work stressors*. Besides increasing overall mental health and well-being, such attempts can also aid to increase the productivity of the workers and lower the increasing costs of insurance claims for physical and mental health illnesses. Employees showing signs of mental illnesses or disorders will have undesirable qualities that influence productivity and quality of job, consequently directly affecting the organization. Impaired mental health and/or job dissatisfaction linked to work-family conflict also has a significant influence on productivity at work, particularly associated to absenteeism and intention to quit. Study reveals that employees facing high work-family conflict display up to 13 times as much nonattendance, and have a 2.3 times greater intention of resigning<sup>[54]</sup>.

Ensuring health by eliminating hazards in the workplace, and accordingly preventing disease, does not ensure that employees will have optimum health. A worker's health is also affected by his or her own health practices. Study has indicated that smoke-free workplaces are linked with a decrease daily cigarette smoking by workers, and a lowered prevalence of smoking<sup>[55]</sup>, and on the other hand, that build up workplace stress can contribute to a rise in cigarette smoking<sup>[56]</sup>. This is an example of an evidence of how a workplace influences personal health behaviour. Furthermore, energy used during working periods is negatively related with physical activity during leisure time<sup>[57]</sup>. It is relatively evident that work be able to, and does, have an effect on individuals' health choices that can add to risk factors for acute and chronic, communicable and non-communicable diseases. The work-related factors that affect an employee's ability to take up a healthy lifestyle are not gender neutral at all times. Females are disposed of to having jobs with a less degree of decision latitude<sup>[58]</sup>, so that even when flexibility is given to make available allow time for workout, females may not have as much actual leeway as males. Moreover, it is well understood that females who work outside the home usually do more unpaid labour in the house, before and after work, than males' do<sup>[59]</sup>. Another noteworthy perspective examines the interrelationships between risk factors in the workplace setting and personal risk factors. For instance, obesity has a complex relationship with occupational hazards. Schulte et al. (2008) mention that obesity "has been found to have an effect on the relationships between exposures to occupational hazards and disease or injuries and

may also exist as a co-risk factor for them <sup>[60]</sup>. Inversely, workplace hazards may have an effect on obesity-disease associations; exist as one of the co-risk factors for disease, injuries, or obesity. Disease risk may also be affected by workplace design, work organization, and work culture.

## V. CONCLUSION

Delay in receiving care for health problems can be costly and dangerous, it is necessary to increase awareness and to health educate people on this problem. It is necessary to increase awareness on personal safety at the workplace and the relation to health as the delay in seeking treatment or care for occupational health problems might be costly and dangerous. According to a study conducted by Brosseau and Li (2005) <sup>[61]</sup>, owners of small enterprises believe that by improving health and safety at work will make employees feel healthier, happier, and attentive towards work; reduce the cost of compensation, and increase the efficiency of the workforce. This in turn lowers the organisations' expenditure and producing higher quality products. Owners that have a higher attitude and intentions toward health and safety have higher probability of paying attention to employees' wellbeing at the workplace. A study done by Muñiz et al. (2014) <sup>[62]</sup> demonstrated that proactive risk management and transformational leadership in safety behavior promotion is important as the improvement safety outcomes is associated to employees' safety behavior. The results gave organizations the aspects that should be encouraged in reducing risks and increase safety performance. There are various individual factors that need to be studied in order to understand and improve health-related behaviour. Although policies, laws, and regulations can impact on health behaviours, it is crucial to examine health-related behaviour for the future of public health and the well-being of individuals and this become the basis for public health activities and efforts (Glanz, Rimer, & Lewis, 2002) <sup>[10]</sup>. The benefits of positive change should be recognised and promote with the aim of attracting participants along the stages of change and by allowing for changes in public health programs particularly in work safety education and environmental support in order to help individuals to maintain changes. Most individuals have performed a period of less than optimal health behaviours and hence it is not rational to assume that momentous and permanent changes will take place within a short time frame as change is incremental.

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