ISSN: 0975-833X

Available online at http://www.journalcra.com

International Journal of Current Research
Vol. 11, Issue, 01, pp.703-710, January, 2019

DOI: https://doi.org/10.24941/ijcr.34007.01.2019

INTERNATIONAL JOURNAL OF CURRENT RESEARCH

RESEARCH ARTICLE

ASSESSMENT OF OCCUPATIONAL SAFETY AND HEALTH MANAGEMENT SYSTEM: AN INVESTIGATION OF CONTINGENCY FACTORS. THE CASE OF SELECTED FACTORIES IN HAWASSA CITY, SNNPR, ETHIOPIA

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ARTICLE INFO

Article History:
Received 20th October, 2018
Received in revised form
10th November, 2018
Accepted 14th December, 2018
Published online 31st January, 2019

Key Words:
Occupational Health and Safety Management System, Logistic Regression, Workplace Accident.

ABSTRACT

This study attempts to investigate antecedents of workplace accident of six selected factories in Hawassa city. The objective of the study was to examine determinant of injuries at work. Primary Data was collected from 130 employees working in six factories. The study evaluated five elements of occupational health and safety management system as determinants to accident using logistic regression. Management commitment, employee participation and employee commitment were found to be strong predictors of workplace accident/injury. The result indicated that employee safety training and mandatory intervention were not statistically significant. It was recommended that strong and true management & employee commitment to occupational health and safety should exist in order to improve workers' safety and reduce injury at work.

Citation: ***Gari Umeta Kenea*, 2019.** "Assessment of occupational safety and health management system: an investigation of contingency factors. The case of selected factories in Hawassa city, SNNPR, Ethiopia", *International Journal of Current Research*, 11, (01), 703-710.

INTRODUCTION

The human asset is the most important asset in any organization because its effective use determines performance of other assets (Armstrong and Baron, 2002) and as such human resource managers need to provide a safe and healthy workplace environment. In order to sustain performance of employees, and thus that of the organization, there is need to appreciate the value of employee safety and health management. Occupational health and safety represents those policies that are put in place to protect the lives of the employees to ensure that they enjoy good working conditions (Glanville, 2001). Safety management systems are integrated mechanisms in organisations designed to control the risks that can affect workers' health and safety. A good safety management system should be fully integrated into the firm and be a cohesive system, consisting of policies, strategies and procedures that provide internal consistency and harmonisation (Fernández-Muñiz et al., 2009). The health and safety of employees is critical to ensure the organization can operate effectively and achieve its mission of public safety. Employees who are healthy are less likely to suffer injuries at work, are more likely to return to duty quickly, and are more satisfied with their employment (Ozminkowski, 2002).

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Effective management of worker safety and health protection is a decisive factor in reducing the extent and the severity of work-related injuries and illnesses. Effective management addresses all work-related hazards, including the potential hazards that could result from a change in worksite conditions or practices. Additionally, it addresses hazards whether or not they are regulated by government standards (Steen kamp and Schoor, 2002). Boyle (2002) argued that Occupational health and safety is a complex international problem for management and society, and that it must always be a top priority. Small mistakes can have a major effect and disasters. The primary aim of occupational health and safety (OHS) is not only to ensure the maintenance of the working ability of the labor force, but also to ensure that hazards within the working environment are identified, assessed and prevented (Ahasan, 2002). It also ensures that workers carry out their jobs in safe environments, by establishing mechanisms that help to correct unsafe actions and eradicate unsafe conditions. To this end, top management of an organisation should establish the safety policy and the objectives that show its commitment and accountability on safety and health issues (Chan et al., 2004). Safety policy shows the commitment of top management on the safety and health issues, setting clear direction for the company and the employees to follow. Employee participation is could also be considered as an important element of OHS. Employee participation in OHS management can be seen as a form of employee empowerment, which refers to managerial

practices aimed to share information, work related knowledge, and decision-making authority with employees (Chan et al., 2004). The present study investigates the drivers of workplace accidents/injuries of selected factories in Hawassa city.

Statement of the problem: Maintaining the safety and health of the employees should be the task of management. It is believed that a healthy employee works more efficiently, is more productive and possesses a better work attitude than a sickly one (Glanville, 2001). Lack of health and safety policies for employees in organizations leaves employees exposed to high risk work hazards resulting in injuries which affect morale towards work, levels of teamwork spirit, and consequently employee commitment towards work has deteriorated. This manifests itself in the form of lack of initiative and existence of counter productive work behaviors (Ahasan, 2002). Quinlan and Bohle (1991) argue that any strategy for the implementation of an effective safety management system entails the development and dissemination of an OHS policy, a clear definition of health and safety responsibilities of all employees, the development as well as maintenance of a clearly defined policy making and advisory channels, and a well defined procedures for the collation and evaluation of data. The various elements that make up a safety management system have been identified by Redinger and Levine (1998). They include management commitment and resources, employee participation, occupational health and safety policy, goals and objectives, performance measures, system planning and development, occupational health and safety management system manual and procedures, training system, hazard control system, preventive and corrective action system, procurement and contracting, communication system, evaluation system, continual improvement, integration and management review. Given the several elements of occupational health and safety management system as drivers of workplace accidents, the researcher is interested to investigate to what extent these elements affect accident/injury at workplace. This study, therefore, focuses on investigating determinants of workplace accidents and injuries with particular emphasis on management commitment, employee commitment, employee safety training, employee participation and mandatory interventions.

Objective of the Study: The general objective of this study is to investigate drivers of workplace accidents/injuries. To this end, the specific objectives are to examine those factors that are associated with workplace accidents/inquiries and assess the challenges related to occupational health and safety management system of factories under study.

MATERIALS AND METHODS

Study design: Depending on the purpose of the research, various literature classify research design into several categories. Churchil and Brown (2004) categorize research design as descriptive, exploratory, or causal and effects. This study employed a descriptive research design since the researcher has no control over the variables but can only portray what has happened or what is happening (Kothari, 1990). Descriptive research design includes survey and fact finding inquiries of different kinds that later be subjected to several correlational methods and comparative studies. Malhotra and Birks (2006) categorized descriptive research as cross-sectional and longitudinal research. Cross-sectional research design involves data that are collected at a single point in time, whereas, longitudinal research design involves data that are collected at multiple time points. The study employed cross-sectional design in that data were collected only once. Stratified random sampling technique was applied to get the desired sampling units. For the purpose of this study, the selected industries were stratified into six categories on the basis of the product they produce. The factories are: brewery factories, flour factories, textile factories, wood factories, plastic factories and soup factories. These six factories were selected on the fact that the natures of the job performed in these factories are different and they are accident prone factories. Employees who are only directly engaged in the production process were included in the study as they are more exposed to injuries. Management of the factories was also part of the survey. All the six industries are found in Hawassa. The required sample sizes for each stratum (from each factory) were allocated using proportionate sampling technique. Respondents from each factory were selected using simple random sampling technique. Regarding the sample size, 130 workers were selected from the six factories. The sample size from each factory are 30 from brewery, 25 from textile factory, 25 from flour factory, 15 from wood factory, 15 from plastic factory and 20 from soup factory. Out of 130 questionnaires distributed, only 117 were filled and returned out of which 4 questionnaire were incomplete. Pampel (2000) recommended sample size for logistic regression analysis not to be less than 100 otherwise the result will be misleading. In addition to workers, six questionnaires were distributed for human resource managers out of which five were completed and retuned.

Method of data analysis: Correlation analysis was conducted to assess the correlations among dependent and independent variables. Logistic regression was used to examine the predictive power these variables on accident/injury. Logistic regression is used to predict dichotomous dependent variable. Hair et.al (1995) argue that the logistic regression analysis presents a unique complement to multivariate regression in its ability to utilize binary dependent variable. Logistic regression provides ease of interpretation of the estimated coefficients as adjusted log odds ratio. The odds ratio is the change in odds of being in one of the categories of outcome when the value of a predictor increases by one unit (Long and Freese 2006)

$$\ln\left[\frac{p}{1-p}\right] = \alpha + \beta X$$

Where, p is the probability that Y is 1(the probability that accident/injury occur) and 1-p is 0 (the probability that accident does not occur).

$$\ln\left[\frac{p}{1-p}\right] = \alpha + \beta X = p = \frac{EXP^{(\alpha+\beta X)}}{1+EXP^{(\alpha+\beta X)}}$$

Logit (Y) = α+β1X1+β2X2+β3X3+β4X4+β5X5

Where:

Y = Workplace Accident (ACCIDENT)
X1= Management Commitment (MGCOM)
X2= Employee Commitment (EMPCOM),
X3=Mandatory Intervention (MANINT)
X4= Safety Training (SAFTNG)
X5= Employee Participation (PART).
α = Constant
β1, β2, β3, β4, β5 are coefficients.

Definition and Operationalization of Variables

Dependent Variable: Respondents were asked a single scale item "Have you ever faced work related accident/injury as an employee of this company?" Respondents were asked to answer the question by choosing either yes or no. The variable is therefore a dichotomous outcome variable.

Independent Variables: The independent variables used in the study are: management commitment (4 items), employee commitment (4 items), employee safety training (3 items), employee participation (5 items) and mandatory interventions (4 items). Seven-point Likert Scale items were adopted from (Robson et al. (2007), Mearns *et al.* (2003), Clarke and Ward (2006), Vinodkumar and Bhasi (2010), Vredenburgh (2002) …..) with anchors '1 = strongly disagree and 7 = strongly agree'.

Table 1. Descriptions of Construct

Scale		Item Description
Management commitment, 4 items	MGCOM	Management of our factory is committed to ensuring safety at work
		Management continuously implements policies and programs that promote health and safety
		We are always warned by our managers when our actions are unsafe
		Management provides sufficient personal protective equipments for the workers
Employee commitment, 4 items	EMPCOM	I am committed to ensuring safety at our factory
		I always work safely even when I am not being supervised
		I think health and safety is not my problem–it is up to management(R)
		My co-workers reacts strongly against people who break health and safety procedures
Employee safety training, 3 items	SAFTNG	I received adequate training and orientation about safety issue when I was recruited
		Safety issues are given high priority in training programmes
		I am not adequately trained to respond to emergency situations in my workplace(R)
Employee participation, 5 items	PART	Management encourages my involvement in decision making about safety related matters.
		Management consults me regularly about workplace health and safety issues
		I actively participate in health and safety training program.
		I often sincerely participate in identifying safety problems
		I regularly participate actively in devising, executing and monitoring safety plans.
Mandatory Interventions, 4 items	MANINT	There are periodic checks by the government on implementation and compliance level of safety measures.
		Systematic inspections are conducted periodically
		Proper investigation is carried out whenever there is accident/incidents.
		Employees have mechanism to report safety issues to appropriate authorities.
Workplace Accident	ACCIDENT	Measured in single item scale

Table 2. Dichotomization of independent variables

	Statistics				
	MGCOM	**EMPCOM**	**MANDINT**	**SAFETRNG**	**EMPART**
N	113	113	113	113	113
Median	3.50	4.50	4.00	3.67	3.60
Frequency/Percent	62/55	70/62	59/52	62/55	63/56
Cut off point	≤3.5 low (1)	≤4.5 low (1)	≤4.0 low (1)	≤3.67 low (1)	≤3.6 low (1)
	>3.5 High(2)	>4.5 High (2)	>4.0 High (2)	>3.67 High (2)	>3.6 High(2)

Dichotomization of independent variables: Before performing binary logistic regression analysis, the researcher converted the independent variables into dichotomous variables. The researcher split the observation at the median for all the independent variables yielding high (ex: high management commitment) and low (low management commitment) groups using median as cut-off point. For example, the median 3.5 was used as a cut-off for management commitment (MGCOM) containing 55 % of observation (shown in table 2). Callum et al. (2002) argue that a common form of dichotomization is the median split, where the independent variable is split at the median to form high and low groups, which are then compared with respect to their means on the dependent variable. However, Humphreys (1978) argue that there are negative consequences associated with dichotomization of continuous independent variables, either by selection of high and low groups as it results in the loss of information about individual differences and the bias in estimates. This negative consequence was minimized by assessing correlation among independent & dependent variables using correlation matrix. Maxwell and Delaney (1993) showed that the impact of dichotomization on main effects and interactions depends on the pattern of correlations among independent and dependent variables.

This, however, is not strong justification for dichotomization of variables according to Callum et al. (2002). Table 2 above depicts the median split of independent variables to form high and low groups. The median for MGCOM (management commitment) is 3.5 with 55 % of the observation. The researcher divided observation ≤3.5 (i.e., 55%) in to low category and the remaining 45% (>3.5) in to high group. These dichotomized variables were then used in logistic regression.

Theory, research model and hypothesis

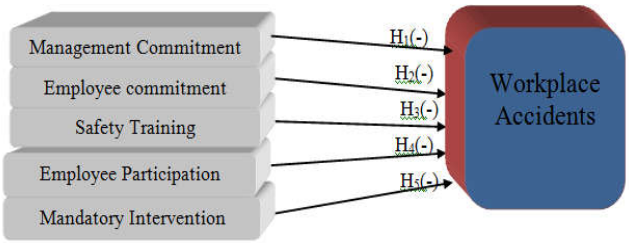
Social exchange theory: In this study, social exchange theory was used to build an argument for management commitment, employee participation &commitment and employee safety training. Social exchange theory, according to Blau (1964), states that as one party acts in ways that benefit another party, an implicit obligation for future reciprocity is created. Social exchanges entail unspecified obligations; when one person does another a favor, there is an expectation of some future return, though exactly when it will occur and in what form is often unclear (Gouldner, 1960). Employees tend to take a long-term approach to social exchange relationships at work, with the pattern of reciprocity over time determining the perceived balance in exchanges (Blau, 1964).This conceptualization of social exchanges arising between and among organizational members has been used as the foundation for a number of different areas of investigation within the organizational

sciences (Hofmann and Morgeson, 1999). Two forms of social exchange has been investigated by social exchange researchers -perceived organizational support (POS) and leader-member exchange (LMX). According to Eisenberger et al. (1990), exchanges between an employee and employing organization are called perceived organizational support (POS) and Exchanges between the employee and his or her leader (supervisor) are referred to as leader-member exchange (LMX). Eisenberger et al. (1990) argue that when employees perceive their organization values and is committed to them (i.e., high perceived organizational support), an implied obligation develops for future reciprocity aimed at benefiting the organization. The implied obligation may be related to increased willingness to make suggestions to improve the organization including safety related matters. Hofmann and Morgeson (1999) suggest that if the organization actively attempts to demonstrate that it values and cares for its workers, then employees should perceive that management would be open to the raising of safety concerns, because the raising of these concerns is designed to improve the physical well-being of the workforce.

Zohar (1980) argue that management's commitment to safety is a major factor affecting the success of safety programs in industry, and that this commitment can manifest itself through such things as job training programs, participation of management in safety committees, and taking safety into consideration in job design. Leader-member exchange (LMX) theory suggests that an interpersonal relationship evolves between supervisors and subordinates out of a formal organization structure. The relationship is based on social exchange, wherein each party must offer something the other party sees as valuable and each party must see the exchange as reasonably equitable or fair (Scandura, Graen and Novak, 1987). The greater the perceived value of the tangible and intangible commodities exchanged, the higher the quality of the LMX relationship. Therefore, it can be argued that an employee who is committed to safety can benefit their leader by helping to establish an outstanding safety management, which will be viewed positively by their leaders.

Conceptual Model: Some benefits of good health and safety management system in an organization as outlined in White and Benjamin (2003). These include a maximization of the well being and productivity of employees, a reduction in the number of workplace injuries, illnesses and deaths, the protection of a company's reputation, a higher profitability, a better relationships with contractors, as well as a minimized likelihood of penalties. Occupational health and safety management systems are an effective way to reduce injuries, illnesses, fatalities, and costs. Figure 1 below illustrates the conceptual model of the study from which five hypothesis were formulated.

Management commitment and workplace accident (H1): Management actions influence employee perceptions regarding the safety climate of the organization (Hofmann and Morgeson, 1999). Management commitment to safety has been measured in terms of management concern for employee well-being and management attitudes toward safety (Zohar, 1980). If the organization actively attempt to demonstrate that it values and cares for its employees through committing itself to OHS management issues, workplace accident/employees injury rate is reduced. The researcher argues that the higher the commitment of management for safety of the employees, the lower will be workplace injury or accidents.



Source: Researcher own drawing

Figure 1. Conceptual Model

Hypothesis 1: *There is negative association between management commitment and workplace accidents and injuries such that high management commitment in safety issues leads to low accident and injury than low management commitment.*

Employee commitment and workplace accident (H2): According to Hofmann and Morgeson (1999), a strong commitment to safety benefits the organization by increasing safety compliance behavior or following accepted safety practices, reducing the number of accidents, and reducing the costs associated with accidents such as workers' compensation insurance. The degree to which employees feel free and are willing to raise safety concerns, their commitment to following accepted safety procedures and practices, and the occurrence of accidents reduces. Following this argument, the following hypothesis was formulated.

Hypothesis 2: *Employee commitment is negatively associated with workplace accidents and injuries, such that high employee commitment in safety related issues leads to low accident and injury.*

Employee safety training and workplace accident (H3): In order for an organization improves its employee safety; it should institute a systematic, comprehensive occupational safety and health training programme for employees. According to Cohen and Jensen (1984) a well-designed and administered training program should emphasize safe work practices and should be based on proper training need assessment. Zohar (1980) found that those companies with lower accident rates were characterized by good safety training for employees. Therefore, safety training is considered as an important safety management issue. Safety training is measured by the extent to which employees believe their company provides the necessary training to perform their jobs in safe ways. Employees who obtain training on safety issues become more safety conscious and thereby reduce the occurrences of injury/accident at work. Based on this reasoning, the following hypothesis was formulated.

Hypothesis 3: *Safety training is significantly correlated with workplace accidents and injuries, such that a more safety training is associated with lower accident and injuries.*

Mandatory Intervention and workplace accident (H4): Government through its legislation, its policies on acceptable levels of deviance and compliance and on regulation/ deregulation impinge on the regulation of health and safety management and therefore on its practice. Mandatory ooccupational health and safety management systems arise

from government legislation and their use is enforced through inspections, fines, etc. (Robson et al., 2007). The researcher proposes that mandatory occupational health and safety management systems intervention is an important element in reducing workplace accident or leading to low injury rates. Companies who comply with safety rules and regulation experience lower workplace accident/injury as compared others. Hence, the study proposes the effectiveness of mandatory interventions on employee health and safety and its associated outcomes on reducing workplace accident.

Hypothesis 4: *Mandatory intervention is negatively correlated with workplace accidents and injuries*.

Employee participation and workplace accident (H5): According to Vredenburgh (2002), worker participation is a behavioural-oriented technique that involves individuals or groups in the upward communication flow and decision-making process within the organization. The amount of participation can range from no participation, where the supervisor makes all decisions, to full participation, where everyone affected by the decision is involved. Mearns *et al.* (2003) argue that management practices, such as empowerment, delegation of responsibility for safety, and encouraging commitment to the organization, which depend on employee consultation and involvement, have been significantly associated with better safety performance. Following this argument, the researcher proposes that to the extent that employees have active participation in safety related issues at work the less will be the workplace accident/injury employees face.

Hypothesis 5: *Employee participation is negatively associated with workplace accidents and injuries, such that the high employee participation in health and safety issues leads to lower accident.*

RESULT

Correlation Matrix: The correlation matrix depicted in the Table 3.1 Below shows that all the predictor variables i.e. management commitment, employees commitment, safety training, mandatory interventions and employee participations are negatively correlated with workplace injury or accidents as it was projected. The correlation matrix reveals a significant negative relationship between management commitment and accident (r = -.304), employee commitment and accident (r = -.255), and employee participation and accident (r = -.309). The significance of the association between mandatory intervention and accident(r=-.023) and employee safety training and accident (r =-.194) was not convincing. In terms of the direction of the relationship, all hypotheses were supported. It is also observed the correlations among independent variables are very less. According to Pallant (2011) high correlation exists between the independent variables when correlation (r) ≥0.9. The result of the correlation matrix of this study shows that all values are less than 0.9. This implies that the variables do not have multi-co-linearity problems and therefore logistic regression can be conducted.

Logistic Regression Model: The study used logistic regression model to predict workplace accident and injuries. Logistic regression is appropriate when the dependent variable is dichotomous (Hair et.al 1995). In this study the dependent variable is accident. The respondents were asked to respond Yes or No the question whether they have ever faced accident in their work place. The independent variables are management commitment (MGCOM), employee commitment (EMPCOM), mandatory interventions (MANINT), safety training (SAFETNG) and employee participations (PART). The following logistic regression model was estimated from regression output.

Logit (Y) =9.084-0.618MGCOM 0.492EMPCOM-0.294 MANINT-0.330SAETNG-0.626PART.

The results of Cox and Snell R Square and Nagelkerke R square estimates shown in the (appendix1) indicated that the whole model explained between 24% and 31.9% of the variance that can be predicted from the independent variables. The model classified correctly 66.7% of the respondents who faced accident and 75% who did not face any accident/injury and an overall classification success rate of 70 % (Appendix 1).

Table 3. Correlations Matrix

	Accident	MGCOM	EMPCOM	MANDINT	SAFETRNG	EMPART
Accident	1	-.304**	-.255**	-.023	-.194*	-.309**
MGCOM		1	.113	-.177	.031	.125
EMPCOM			1	-.159	.073	.130
MANDINT				1	-.019	-.034
SAFETRNG					1	.094
EMPART						1

**. Correlation is significant at the 0.01 level (2-tailed).
*. Correlation is significant at the 0.05 level (2-tailed).
Source: SPSS output

Table 4. Logistic regression output predicting workplace accidents

8		B	S.E.	Wald	df	Sig.	Exp(B)	95% C.I.for EXP(B)	
								Lower	Upper
Step 1[a]	MGCOM	-.618	.216	8.210	1	.004	.539	.353	.823
	EMPCOM	-.492	.212	5.366	1	.021	.612	.403	.927
	MANDINT	-.294	.218	1.817	1	.178	.745	.486	1.143
	SAFETRNG	-.330	.184	3.225	1	.073	.719	.502	1.031
	EMPART	-.626	.232	7.252	1	.007	.535	.339	.843
	Constant	9.084	2.181	17.350	1	.000	8816.332		
Cox & Snell R Square	0.24	Nagelkerke R Square		0.319	Accident		Yes	66.7%	70.8%
							No	75%	
a. Variable(s) entered on step 1: MGCOM, EMPCOM, MANDINT, SAFETRNG, and EMPART.									

The results of the data analysis presented in Table1 3 shows the logistic regression coefficients, Wald test, and odds ratios for each of the predictor variables. The odds ratios presented in column Exp (B) predict the likelihood of workplace accident, for instance the odds ratio for management commitment (MGCOM) indicates that high management commitment is about 0.539 times more likely to reduce workplace accident than low management commitment, other variables held constant. It also means that high management commitment reduces the chance that employee face accident by 53.9% compared to low management commitment, other variables held constant. The result of logistic regression shows that management commitment, employees commitment, and employee participations are significant predictor of workplace accidents. The result supported hypotheses 1, 2 and 5. Hypothesis 3 and 4 was not consistent with researcher expectation. The model also shows that odd ratios are less than zero for all predictors indicating the negative association of predictors with outcome variable i.e. workplace accidents. The result of the regression model shows that high management commitment is associated with low workplace accident since management commitment predictor was found to be significant at $p<0.01$ with $\beta1= -.618$ and odd ration of 0.539. Thus, increasing management commitment to safety issues reduces workplace accidents.

Employee commitment was found significant predictor of accident/injuries at $p< 0.05$ with $\beta2= -.492$ and odd ratio of 0.612. The odd ratio of 0.612 indicates that high employee commitment is about 0.612 times more likely to reduce workplace accident/injuries than low employee commitment, other variables held constant. It also means that high employee commitment reduces the chance that employee face accident by 61.2%. The result also demonstrates that employee participation is a significant predictor of the outcome variables and is statistically significant at $p<0.01$ with $\beta5 =-0.626$ and odd ratio of 0.535. The odd ratio of 0.535 indicates that high employee participation is about 0.535 times more likely to reduce workplace accident/injuries than low employee participation, other variables held constant. It also means that high employee participation reduces the chance that employee face accident by 53.5%. The result of the analysis implies that when there is high management commitment, high employees commitment, and high employee participations, workplace accident is reduced.

DISCUSSION

The study result of management commitment to safety (H1) and safety training (H3) as significant factors is congruent with Zohar (1980) who argued that management's commitment to safety is a major factor affecting the success of an organization's safety programs. It was found that the more management is committed to implement effective occupational health and safety management system, the more likely workplace accident will be reduced(EXP(B)=.539, $p<0.01$) Employee safety training was also shown negative relationship with workplace accident. However, the association is not significant (EXP (B) =.719, p=0.073). The result is congruent with Zohar (1980) who found that those companies with lower accident rates were characterized by good safety training for employees. The result of employee participation (H5) is in line with Mearns *et al.* (2003) findings. It was found that workplace accident/injury has significant negative relationship with employees' participation (EXP (B)=535, $p<0.01$).

Walters, Wadsworth and Quinlan (2013) argue that the involvement of workers towards occupational health and safety management were associated with reporting positively on measures of health and safety management (i.e. reduced workplace accident). Vredenburgh (2002) added that eempowering workers provides them with authority, responsibility, and accountability for required decisions and ensures that both employees and management are involved in setting goals and objectives. Hypothesis 4 (H4) is inconsistent with the researcher expectation that mandatory interventions would be effective in lowering injury at work. It was expected that that mandatory interventions result in increased occupational health and safety management system implementation, increased awareness, improved employee perceptions of safety issues, increased workers' participation, decreases in lost-time injury rates and increases in workplace productivity. The reason for this weak result of the present study, according to researcher explanation, may be either because of poor implementation of the intervention by the companies or absence of the intervention by the government. In addition to logistic regression analysis, responses of open ended questions for all the factories under study are summarised as follows.

Types of accidents/injuries employees face frequently: boiler explosion, steam generator, falling down, injury to finger while working on machine, injury on leg, bottle explosion, injury by forklift.

Potential risk area for safety and health for employees: chemicals in the process of saponification, boiler explosion, pressure vessels, furnace tank, fluffs, strong noise (sound pollution), slippery floor, dust flue, pieces of fibers, uncovered rotated machine, acid/base, fire.

Challenges of occupational health and safety management system as perceived by employees: lack of awareness about safety issues, bureaucratic structure, less commitment from management, poor implementation of safety rules and regulations, employees negligence, lack of safety materials and equipment, absence of first aid/emergency treatment, absence of life insurance, poor safety management culture.

Opinion of respondents to improve health and safety management of their companies: creating awareness, high commitment from management and employees, being alert to use safety material, put fire extinguishers at risk areas, management should give high attention to occupational health and safety management system, developing proactive mitigation strategy, systematic risk assessment should conducted, the company should have safety management expert , establish safety committee, provide training concerning safety matters for new and existing employees, provide air conditioning, management must provide proper safety materials, facilitate conditions for employees to obtain subsidised milk, emergency door and windows must be opened all the time, there must be proper follow up and control by the government, employees participation must be encouraged, emergency aid/first aid must exist.

Conclusion

This study shows that management commitment, employees commitment, and employee participations tend to predict workplace accidents. Result shows that the negative

association was found among the predictors and the outcome variable. The result of logistic regression indicates that under high management commitment, high employees commitment, and high employee participations, workplace accident is reduced than under conditions of low management commitment, employees commitment and employee participations.

Implications and Limitations: Strong and true management and employee commitment to occupational health and safety should exist in order to reduce workplace accident/injury and improve workers' safety. Any attempts to improve occupational health and safety at the workplace without sincere management and employee commitment are likely to fail. Encouraging employee participation and involvement in safety issues and providing effective employees' safety training should be given more attention by the management in order to minimize workplace accidents. Although mandatory intervention was not shown significant predictor of workplace accident in this study, it is in the researcher believe that the implementation of effective occupational health and safety management system by the companies must be urged by the government so that it can be used by companies in their day-to- day practice (the same was capitalized by employees in their response to an open ended questions). There are several limitations in this study. First, determinants of workplace accidents are not limited to determinants under this study. Secondly, the results of this study were derived from a cross-sectional survey and this nature of the cross-sectional data prevents the researcher from making definitive causal conclusions. To further clarify the determinants of workplace accidents the researcher recommends future studies to investigate by including other determinants with a longitudinal research design.

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Appendix I. Logistic Regression Output

Model Summary			
Step	-2 Log likelihood	Cox & Snell R Square	Nagelkerke R Square
1	125.702[a]	.240	.319
a. Estimation terminated at iteration number 5 because parameter estimates changed by less than .001.			

Classification Table[a]					
Observed			Predicted		
			Accident		Percentage Correct
			No	Yes	
Step 1	Accident	No	38	19	66.7
		Yes	14	42	75.0
	Overall Percentage				70.8
a. The cut value is .500					

Variables in the Equation									
		B	S.E.	Wald	df	Sig.	Exp(B)	95% C.I.for EXP(B)	
								Lower	Upper
Step 1[a]	MGCOM	-.618	.216	8.210	1	.004	.539	.353	.823
	EMPCOM	-.492	.212	5.366	1	.021	.612	.403	.927
	MANDINT	-.294	.218	1.817	1	.178	.745	.486	1.143
	SAFETRNG	-.330	.184	3.225	1	.073	.719	.502	1.031
	EMPART	-.626	.232	7.252	1	.007	.535	.339	.843
	Constant	9.084	2.181	17.350	1	.000	8816.332		
a. Variable(s) entered on step 1: MGCOM, EMPCOM, MANDINT, SAFETRNG, EMPART.									

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