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Original Research Article

Relationship between Risk Assessment and Compliance to Health and Safety in Ugandan Secondary Schools

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Health hazards are part and parcel of human life necessitating the provision of safety in every organizational environment (WHO regional Office for Africa, 2004). Likewise, the area of safety and accident prevention is of great concern to school improvement. The study sought to investigate the relationship between Risk Assessment and Compliancy to Health and Safety in Secondary schools in Wakiso District. The study employed a cross sectional survey design on 31 secondary schools. The results established that there is a significant and a positive relationship between risk assessment and compliance to health and safety (r=.56, p≤ 0.05). The study concluded and recommended that, ensuring health and safety requires repetitive assessment of risks so as to minimize hazardous situations. It also demands the collective involvement of educational stakeholders in the task of risk assessment and implementation of health and safety laws and regulations in Ugandan and African Schools.

Keywords: Health and Safety, Occupational hazards, School health and safety

INTRODUCTION

Recent research has indicated that Workplace hazards and errors cost organizations, hundreds of billions of dollars each year, and the injured workers and their families endure considerable financial and emotional suffering (Burke, Clarke & Cooper, 2011). It is obvious that increasing employee health and safety pays because it minimizes increased risks of work-related accidents.

The accumulating evidence shows that investing in occupational health and safety results in improved social responsibility performance. The International Labour Organization (ILO) estimates that every year, there are 2.2 million fatal and 270 million non-fatal accidents or occupational diseases worldwide. Occupational Health and Safety looks at the research into what causes accidents and errors in the workplace. In line with other titles in the series, Occupational Health and Safety emphasizes the psychological and behavioural aspects of risk in organizations. It highlights how organizations differ in their health and safety performance, with case studies throughout and best practices. Key elements focus on: employee selection and training, fostering employee understanding, participation and engagement in health and safety matters, developing a health and safety culture at organizational and group/work unit levels, communicating and reinforcing safe workplace practices, and benchmarking one's organization against the industry leaders. The contributors to this volume come from various countries, reflecting the unique interest and knowledge in particular areas.

Because of the global necessity to manage health and safety in organizations, it is the duty of every employer to ensure the health, safety and welfare of employees at work

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CONCEPTUAL DIAGRAM

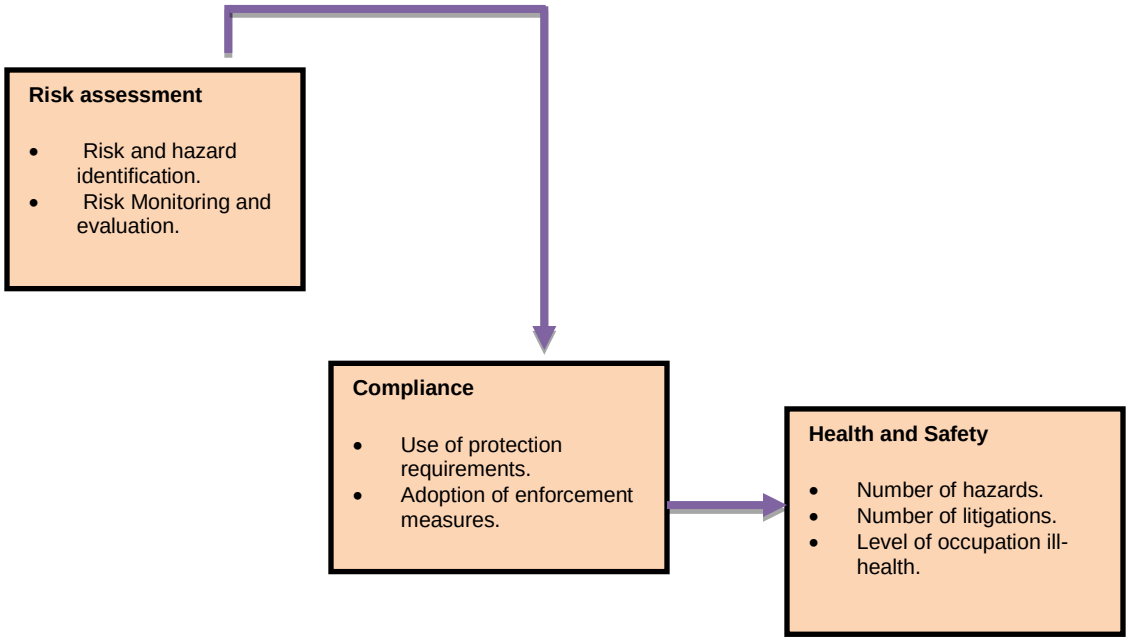

Figure 1: *Conceptual framework linking risk assessment to compliance to health and safety*

(Stranks, 2010). This is possible through information sharing, training in health and safety, close supervision of risky destinations and control. Since health and safety precautions are not emphasized in many organisations, many individuals have attempted suicide or committed suicide, several people suffer accidents leading to permanent disability, anxiety, mortality exposure and withdrawal behaviours such as absenteeism, tardiness and turnover which lead to loss of morale and performance (Burke et al., 2011).

This study seeks to concentrate on health and safety in schools in Uganda. Thus, several hazards have been identified in a number of schools around the country. For example, school fires sometimes propelled by deviant students or even risky health and safety environments in the schools, kitchens built near schools, hostels and classrooms, exposed electricity transformers, the lack of information to alert the school about deadly corners that are health and safety hazards and many other such emergencies.

Consequently, the cost implications of all these incidents are quite high in terms of economic compensation, legal redress, psychological trauma and loss of public trust in the school and the administration. They are also costly on the part of rejuvenating the public image of an educational institution. But these incidents and their cost implications can be avoided if schools create a suitable learning environment, which protects people from physical hazards. But also there seems to have been a failure on the part of the school authorities to carry out health and safety risk assessment as an avenue of sustainable control. This study seeks to examine the relationship between risk assessment and compliance to health and safety in secondary schools in Uganda.

This conceptual framework was developed from the related literature. Risk assessment is concerned with the identification of hazards and the analysis of the risks attached to them (Armstrong 2006). When carrying out risk assessment it is necessary to consider who might be harmed and the magnitude of the risk available at a workplace which is based on the safety auditor. Risk assessment is not completed when action has been initiated. It is essential to monitor the hazards and evaluate the effectiveness of the action in eliminating it or reducing it to an acceptable level (Ferreira et al. 2005). This will lead to compliance, which involves; the use of protective equipment to be in position, operating and effective to avert risks (Andrew, H 1993).

In the same way, management of health and safety in secondary schools needs a committed group of parents, guardians, the state, teachers, administrators and education policy makers Edison et al. 2005). To achieve this, stakeholders need to have a sound understanding of health and safety issues as well as the desire to improve it (Armstrong 2006). This means making health and safety expectations clear, support them financially and building caring company culture (Edison et al. 2005) Communication and consulting on matters of health and safety are also vital in organizing for health and safety Lawton 1995). They help to promote a positive culture and secure the implementation and continued development of health and safety policies (HSE Report 2001). When these factors are put in place, it can lead to managed health and safety of secondary schools.

LITERATURE REVIEW

The conduction of risk assessments is concerned with the identification of hazards and the analysis of the risks attached to them to initiate preventive measures that lead to action (Armstrong, 2001). He adds that a hazard is anything that can cause harm (e.g. working on roofs, lifting heavy objects, chemicals, fragile building, etc...). A risk is the chance, large or small, of harm actually being done by the hazard. Risk assessments are concerned with looking for hazards and estimating the level of risk associated with them. As suggested by Holt and Andrews (1993), risk can be calculated by multiplying the severity estimate by a probability estimate. He further argues that there are two types of risk assessment. The first is quantitative risk assessment, which produces on an objective probability estimate of risk based on information that is immediately applicable to the circumstances in which the risk occurs and qualitative risk assessment, which is subjective based on judgment looking at the process of events.

Quantitative risk assessment is preferable if the specific data are available. Qualitative risk assessment may be acceptable if there is little or no specific data as long as it is made systematically on the basis of analysis of working conditions and hazards, and informed judgment of the likelihood of harm actually being done. He further asserts that assessing the risk is necessary to know the magnitude of the risk available for secondary schools and who might be harmed that is, student, teachers or visitors, etc… which is based on a safety auditor, who carries out a safety audit of course, to initiate preventive action. They enable control measures to be devised on the basis of understanding of the relative importance of risks.

A safety audit, according to Armstrong (2001), tests the whole organization in order to find out whether it is meeting its safety aims and objectives. It will examine hierarchies, safety planning procedures, decision-making, delegation, policy making, monitoring and evaluation of the hazard and compliance as well as all areas of safety programming planning. Armstrong (2006) further elaborates that a healthy and safety audit should show how managers, team leaders and supervisors committed to health and safety, and support the designing and implementation of health and safety policies. This shows that there is a relationship between risk assessment, organizational collective commitment, and compliance hence healthy and safety.

However, Groeneweg (1998) asserts that safety audits (evaluation of safety) can be conducted by safety advisors (consultants) and personnel specialists and the involvement of stakeholders. Stubbs (2009) argues that audits are often carried out under the auspices of a health and safety committee with members taking an active part in conducting audits. Saunders (1992) on the other hand, he explains that managers are also responsible for conducting audits, but trained in the skill, with the existence of records of risks. Armstrong (2006) further adds that risk assessment is not completed when action has been initiated. It is essential to monitor the hazard and evaluate the effectiveness of the action in eliminating it or at least reducing it to an acceptable level.

Health and safety Executive (2001) argue that health and safety differs from many areas measured by managers because success results in the absence of an outcome (injuries or ill health) rather than a presence. But a low injury or ill health rate, even over a period of years is no guarantee that risks are being controlled and will not lead to injuries or ill health in the future. This is particularly true in secondary schools where there is low probability of accidents, but where major hazards are present. Here the historical record can be a deceptive indicator of safety performance. Secondary schools need to recognize that there is no single reliable measure of health and safety performance. What is required is the basket of measures or a balanced score card providing information on a range of health and safety performance. As organizations recognize the importance of managing health and safety, they become aware of the problems of using injury and ill health statistics alone as the only measure of health and safety performance. Saunders (1992) adds that measurement is a key step in any management process and forms the basis of continual improvement. If the measurement is not carried out correctively, the effectiveness of health and safety management is undermined and there is no reliable information to inform managers how well the health and safety risks are controlled.

Hoffman et al. (1995) recommend that schools should designate someone to be responsible for the identification of accident risks, expediting immediate physical changes, supervise environments that facilitate intimidation and attempt to change them, supervise students during their activities to promote safety and periodically inspect means of transport, such as school buses. The development of a process-risk assessment receives varied approaches from several scholars (Reinhold et al. 2001, Ruhl & Recker, 1994) however, much of this literature is picked from western models, and it does not apply to Ugandan situations necessitating a novel study to bridge this gap. Protection from health and safety hazards means setting up a strict risk assessment criterion (Health and Safety Executive 2009). Risk assessment requires gathering the general knowledge required for protection from hazard, especially the information needed, and specific data sheets or records (Kaup & Polhl, 1999).

Bibbings and Hearsy (2003), safety programs deal with the prevention of accidents and with minimizing the resulting loss and damage to persons and property. They relate more to systems of work that is the working environment, but both safety and health programs are concerned with problems against hazards, and their aims and methods are clearly interlinked. The Royal Society for the prevention of accidents (Bibbings 2003) has made the following observation on accident prevention. We fail to prevent accidents not just because of incomplete control of the circumstances which give rise to them, but because of partial knowledge of how things really are and of course, our inevitably incomplete knowledge of what will happen in the future. Good investigation of accidents, where it takes place, tends almost invariably to show that failures to prevent them are rooted either in weaknesses in risk assessment or in the implementation of control measures.

This, to Reinhold et al. (2001), means training, hazardous substance experts, goal setting, and the need for prescriptive requirements. For instance, the above views by Health and Safety Executive (2009) and Kaup and Polhl (1999), seem to be sophisticated, requiring that secondary school educators need to train risk experts, gather information on risks, and purchase gadgets to be in a position to avert risks in schools. Holt and Andrews (1993) add that health and safety training is a key part of the preventive programme. It should start as part of the induction course. Safety training spells out the rules and provides information on the potential hazards and how to avoid them. Further refresher training should be provided and special courses laid down to deal with new aspects of health and safety or areas in which safety problems have emerged.

Following this study, sector specific arrangements are a promising new way to promote the safe handling of hazards

through the use of set rules and regulations. However, Edison et al (2005), argues that set rules and regulations depend on the rational health assessment mechanism. On the other hand, Hale (1998) provides that to have an organization-wide risk assessment procedure, planning should be at the center stage containing health and safety policy. However, the next stage is to design program content as well as the procedures to implement and adjust the program (Health and Safety Executive, 2005). The problem is that most secondary schools do not plan risks and also do not assess these risks, which is why secondary schools are often victims of these accidents.

In most work environments, health and safety involve specialist levels (HSE, 2005 & Miguel, 2009). However the problem is that in Uganda it is often hard to get specialists to occupy the specialist levels. These specialist levels are usually found in developed countries, which have enough resources to afford specialist levels. A case in point is when the Minister for disaster preparedness in a television interview held in March 2010 after the occurrence of the Bududa incident, confessed to be ill equipped, lacking a disaster management policy, and lacking trained personnel. This implies that the risk assessment process can only be successful if manpower is trained in health and safety consciousness. For example, if fire extinguishers are installed in secondary schools, people should be trained in their use and the ability to detect danger.

In construction companies where health hazards are high, Quan Zhou et al. (2006), argue that high fatality and injury rates have been fondly associated with the employees' inability to manage the risk. By considering previous safety climate models Miguel (2009), further elaborates that knowledge of managing the risk may have a more significant influence on safety factors. He proposed providing education on risk equipment and systems and to provide such information, instruction, training and supervision as it is necessary to ensure health safety at work and for students. Hale (1998) further hints that there is a need to check health and safety equipment suppliers' instructions and understand them, information on materials, check on records of accidents and this indicates that risk assessment is linked to compliance. This however requires a monitoring and evaluation exercise. Complement monitoring and evaluation of risks can be done through a review periodically so as to amend the process indicators (Quan et al. 2006). The process could be based on the strategic plan, identifying risky places with loose cables, spillages or uneven floors, look at sharp corners, and provide a record of injuries (Edison et al. 2005).

Furthermore, the key elements of risk assessment procedure involve: policy planning and implementation, identification of hazards and standards should be set in places of work, training people and supervising them (The Health and Safety click, 2009). One of the preventive precautions to reduce injuries in school organizations requires the identification of factors that contribute to health and safety through an evaluation process (Catholic University Leuven, 2008). However, HSE (2001) adds that a guide to health and safety is based on tracking the progress of health and safety history of the organization and how much is invested in there.

Godwin (2008) states that the construction industry is, understandably, one of the most hazardous premises in most developed economies. However, a better approach to proactive efforts to health and safety would entail; keeping a record of risk progress, ensuring periodical evaluations of possible risks, and providing health and safety facilities to countervail the risk. According to Safety Representatives and Safety Committee (1997), internal communication is essential if health and safety in schools is to be understood and prevented and consistently implemented. This indicates that there is a relationship between risk assessment and compliance.

METHODOLOGY

A cross sectional survey design was used and it looked at health and safety as it was in secondary schools in Wakiso district at that time. In addition to this, the research used the quantitative method of data collection. Self-administered questionnaires were also used to collect the quantitative data. Data for this study was collected from private and public secondary schools in Wakiso district. Wakiso district has 89 secondary schools (Wakiso District Education Report of 2009). Wakiso district was selected because it had more secondary school accidents compared to other districts of Uganda.

The sample size of 73 secondary schools, both public and private was used. Out of the 73 schools, responses from only 31 secondary schools were received indicating a response rate of 42.3%. 42 schools did not respond, this was because the study was carried out in periods when the rate of incidents in schools were high and the Ministry Education and Sports was inspecting and closing all the schools that were found not complying with health and safety standards. Therefore, some administrators of some schools were not willing to disclose the health and safety status of their schools to the researcher. The secondary schools were cut into strata of private and public and out of those schools various respondents were selected who were also cut into strata of top management (Head teachers) middle managers (3 Teachers) and the lower managers (a School Nurse and warden). These were considered because they are directly charged with ensuring and promoting health and safety in schools. Self-administered questionnaires were used to collect data from respondents. The respondents were given 3 days, after which the researcher with the help of 2 assistants started collecting the completed questionnaires from the schools, 250 questionnaires were issued to 73 schools, 136 questionnaires were returned from 31 schools and 114 questionnaires were never returned.

Measurement of variables

Risk assessment, as an independent variable, was measured by looking at how risk assessment is carried out i.e. health and safety risk identification; Risk monitoring and evaluation; this is in line with Armstrong (2006). Compliance was measured by considering sub variables such as the use of protection requirements and adoption of enforcement measures (Armstrong, 2006).

Health and safety was measured using a checklist designed to rate health and safety standards and performance in schools as the dependent variable but based on universal check list as the occupational health and safety management system quiz (2009), then the variables were measured on a five Likert scale (5(strongly agree), 4(agree), 3(Not sure), 2(disagree), 1(strongly disagree) and four Health and Safety; 5(very low, 4(low), 3(moderate), 2(high), 1(very high). Then reliability and validity of instruments were assessed using the Cronbach Alpha (1946) (Table 1). The items in the research questionnaires were both valid and reliable as indicated by the Cronbach alpha was above 0.7 in either case.

Methods of data analysis

The data was collected using questionnaires, edited and coded. It was analyzed using the Statistical Program for Social Scientists (SPSS). The regression and correlation were carried

Table 1: Reliability and validity of instrument

Variable	Cronbach Alpha
Risk assessment	**.758**
Collective commitment	**.961**
Compliance	**.876**
Health and safety	**.811**

Source: Primary data

Table 2: Zero order Correlation Matrix

	Risk Assessment	**Compliance to Health And Safety**
Risk Assessment	1	
Compliance to Health and Safety		**0.56****

Source: Primary data

Table 3: Regression analysis model

Model	**Un standardized Coefficients**		**Standardized Coefficients**	**t**	**Sig.**
	B	**Std. Error**	**Beta**		
(Constant)	-.627	1.087		-.577	.569
Risk assessment	.208	.252	.462	.824	.417
Dependent Variable: compliance to Health and Safety					

Source: Primary data

out with an aim of establishing the relationship between the independent variable (risk assessment) and the dependent variable (compliance to health and safety).

DATA ANALYSIS AND INTERPRETATION

Pearson correlation was used to determine the relationships between study variables as shown in table 2. These include risk assessment and compliance to health and safety.

Results in correlation matrix above show that risk assessment positively relates to compliance to compliance to health and safety ($r=.56$, p-value>0.05), this implies that risk assessment is related to compliance to health and safety in secondary schools. Regression analysis was also used to predict the health and safety compliance of the schools with risk assessment. Results are shown in table 3.

The regression results show that the independent variable was examined linearly and significantly being fit in the model to explain the dependent variable ($F=3.48$, $p<0.05$). A combination of risk assessment and compliance to health and safety were found to explain 46.2% of the variance in the dependent variable health and safety of schools.

DISCUSSIONS AND CONCLUSIONS

The correlation analysis shows that risk assessment positively relates to compliance to health and safety in secondary schools ($r =0.56$, p = value > 0.0.5 (table 2). This implies that schools comply with health and safety through carrying out risk assessment. Risk assessment is concerned with the identification of hazards and the analysis of the risks attached to them to initiate preventive measures that lead to action (Armstrong, 2006). Godwin (2008) concurs with the correlation that risk assessment is necessary to know the magnitude of the risk available which is based on a safety auditor who carries out a safety audit.

He further elaborates that a health and safety audit should show how managers, team leaders and supervisors committed to health and safety, and support the designing and implementation of health and safety policies. The health and safety suggest that most accidents are caused by a few key activities. It is advised that assessors should concentrate initially on those that could cause serious harm. When carrying out a risk assessment, it is also necessary to consider who might be harmed, e.g. employee, visitors (including cleaners and contractors and the public when calling in to visit their children or enlist services).

Hazards should be ranked according to their potential severity as a basis for producing one side of the risk equation (Armstrong, 2006). A simple three point scale can be used such as low, moderate and high. A more complex severity rating scale has been proposed by Holt and Andrews (1993), as follows:

- Catastrophic i.e. imminent danger exists, hazard capable of causing death, illness on a wide scale.
- Critical hazards that can result in serious illness, severe injury, property and equipment damage.
- Marginal i.e. hazards that can cause illness, injury or equipment damage, but the results would not be expected to be serious.
- Negligible i.e. hazards will not result in serious injury or illness; remote possibility of damage beyond minor first aid case.

When hazards have been identified, it is necessary to assess how high the risk are that is what is the worst result? How likely is it to happen? And how many students could be hurt if things go wrong? Risk assessment should lead to action. The type of action can be ranked in order of potential effectiveness in the form of a safety procedure sequence. Hazard elimination is by use of barriers that is removing the hazard from the student or removing the student from the

hazard, using warning systems like signs, instructions, labels and use of personal protective clothing. Risk assessment is not complete when action has been initiated. It is essential to monitor the hazard and evaluate the effectiveness of the action in eliminating it or at least reducing it to an acceptable.

Identifying, assessing and controlling hazards are a key to workplace health and safety. Good hazard management will help you to reduce significantly the number and severity of injuries in schools. It is noted that before all these catastrophes happen, there is totally lack risk assessment measures initiated to prevent accidents. Health and safety audit provide for a much more comprehensive review of all aspects of health and safety policies, procedures practices programmes. A safety audit will examine the whole school in order to test whether it is meeting its safety arms and objective. It examines hierarchies, decision making, delegation, policy making and implementation as well as all areas of safety program planning.

A safety audit can be conducted by safety advises or personnel specialists, but the more administrators, employees and trade union representatives are involved the better. Audits are often carried out under the auspices of a health and safety committee within its members taking an active part of conducting them. Managers can also be held responsible for conducting audits within their departments and even better, individual members of these departments and also students can be trained to carry out audits in particular areas. The conduct of an audit should be facilitated and a simple form should be used to record the results.

A health and safety audit should cover health and safety policies meet legal requirements, managers are committed to health and safety, the presence of a health and safety committee and how effective the committee is getting things done. However, Reinhold et al (2001) asserts that risk assessment seems to be sophisticated, requiring that, school educators need to train risk experts, gather information on risks and purchase gadgets to be in a position to avert risks. The problem is that most schools do not plan risks and do not assess risks. This implies that risk assessment processes can only be successful if man power is trained in health and safety consciousness to detect danger.

Health and safety training is a key part of the representative programme. It should start as part of the induction course. Safety training spells out the rules and provides information on potential hazards and how to avoid them. Further refresher training should be provided and special courses laid on to deal with news aspects of health and safety or areas in which safety problems have emerged. Furthermore, Sherry and Nancy (2003) write that compliance to health and safety requires financial resources to monitor the progress of the school policies, programs and plans. Most schools in Uganda, it is hard to ensure an efficient health management system because there are no rules, policies and regulations to control risks.

Health and safety differs from many areas measured by managers because success results in the absence of an outcome (injuries or ill health) rather than a presence. But a low injury or ill-health, even over a period of years is not a guarantee that risks are being controlled and will not lead to injuries or ill health in the future. This is particularly true in organizations where there is low probability of accidents, but where major hazards are present. Here the historical record can be a deceptive indicator of safety performance. Organizations need to recognize that there is no single reliable measure of health and safety performance. What is required is the basket of measures providing information on a range of health and safety activities. As organizations recognize the importance of managing health and safety they become aware of the problems with using injury and ill-health statistics alone as the only measure of health performance.

CONCLUSION

In conclusion, ensuring health and safety requires strict observance and enforcement of health and safety rules and regulations. In addition, it demands the collective involvement of education stakeholders. Enforcement of these rules and regulation requires sensitizing, training and mentoring of enforcers or whoever in the jurisdiction of the school. Health and safety concerns everyone management in general and individual managers in particular.

Management develops and implements health and safety policies and ensures that procedures for carrying out risk assessment, safety audits and inspections are implemented. Importantly, management has the duty of monitoring and evaluating health and safety performance and taking corrective action as necessary. With collective commitment, it requires setting a clear platform for equal sharing and participation in decision making regarding health and safety, and an open door policy. Therefore, schools are requested to consider and adopt compliance and collective commitment because they have been found to be important in enhancing health and safety in schools of Wakiso District. Head teachers should develop and implement health and safety policies to ensure that procedures for carrying out risk assessment, safety audits and inspection are implemented.

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