



Sudan University of Science and Technology

Post Graduate College

Quality Centre

**Role of Total Quality Management in Setting
Occupational Safety and Health Management
System in Small and Medium
Size Organizations**

الاداره الشاملة الجودة و دورها فى وضع نظم
السلامة والصحة المهنية في المؤسسات
صغيرة ومتوسطة الحجم

**Thiess submitted in a partial fulfillment of the requirement
for MSc in managing quality excellence**

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بِسْمِ اللَّهِ الرَّحْمَنِ الرَّحِيمِ

الآية

: قال تعالى

{ إِنَّمَا أَمْرُهُ إِذَا أَرَادَ شَيْئًا أَنْ
يَقُولَ لَهُ كُنْ فَيَكُونُ* فَسُبْحَانَ
الَّذِي فِي يَدِهِ مَلَكُوتُ كُلِّ شَيْءٍ وَإِلَيْهِ
تُرْجَعُونَ }

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Dedication

**I wish to endure this study for those
whom I carry most passionate feelings....
Love.... sincerity and beauty -**

My mother

My father

My family

My colleagues.

ACKNOWLEDGEMENT

Thank Allah for giving me courage, support and strength to complete this thesis.

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I would like to take this opportunity to express my thanks and great full to academic and administrative staff of Total Quality Management Centre and Sudan University of Science and Technology for their cooperation.

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Abstract

This study was carried out in Khartoum state during (April 2012 to August 2013) to evaluate the role of total quality management in setting occupational safety and health management system in small and medium size Organizations (SMOs).

Researcher observed how weakness of institutions of OSH and quality which is reflects in total cost and loss in human and financial resource.

This study was tried to answer the following question:

Is there any relationship between total quality management (TQM) & occupational safety & health (OSH)?

Can work process improvement reduce occupational exposure?

Is total quality environment a friend to workers?

The statistical analysis (using chi square) shows that.

There is a significant difference between total quality management TQM & occupational safety OSH (sig equal 0.000) which is less than (0.05).

There is a significant difference between improving work processes and reduction of occupation exposure (sig equal 0.000) which is less than (0.05).

There is a significant difference between total quality management environment and workplace (sig equal 0.000) which is less than (0.05).

From this study it concluded that:

Total quality management (TQM) has direct influence on occupational safety and health when it explicitly focuses quality improvement effort on safety & health.

Improving work processes through using processes improvement techniques will reduce occupational exposure.

Total quality management leads to improvement in workplace environments

And the study based on finding recommends (among others):

Adapting and integrating TQM&OSH by SMOs would to increase the productivity and saves time and cost as it prevents duplicated effort and make OSH goals consistent with all the firms' goal.

Using TQM tools within OS&H to increase its performance, accident investigations (to find route causes) and setting control measure.

مستخلص الدراسة

أجريت هذه الدراسة فى ولاية الخرطوم خلال الفترة (ابريل 2012م حتى أغسطس 2013م) وهدفت الى تقييم دور الإدارة الشاملة للجودة فى وضع نظم إدارة السلامة والصحة المهنية فى المؤسسات متوسطة وصغيرة الحجم حيث لوحظ أن هنالك قصور فى تطبيق متطلبات السلامة والصحة المهنية فى تلك المؤسسات بالإضافة الى ضعف الإهتمام بالجودة مما ينعكس سلباً فى زيادة تكلفة الإنتاج وإرتفاع الهدر فى الموارد البشرية والمالية .

حاولت الدراسة الإجابة على الأسئلة الآتية :

هل هنالك علاقة بين إدارة الجودة الشاملة وإدارة السلامة والصحة المهنية ؟

هل تحسين العمليات يؤدى الى تقليل التعرضات المهنية ؟

هل بيئة الجودة صديقة للعاملين ؟

وقد أثبتت النتائج الإحصائية لهذه الدراسة:

وجود فروق معنوية ذات دلالة إحصائية بين الجودة الشاملة والسلامة والصحة المهنية(قيمته Sig تساوى(0.00) وهى اقل من (0.05)).

وجود فروق معنوية ذات دلالة إحصائية بين تحسين العمليات وتقليل التعرضات المهنية(قيمته Sig تساوى وهى اقل من (0.05).

وجود فروق معنوية ذات دلالة إحصائية بين بيئة الجودة صداقة للعاملين.

وبناءً على تلك النتائج خلصت الدراسة الى الآتي:

الإدارة الجودة الشاملة تأثير مباشر على السلامة والصحة المهنية فى حال إنها ركزت جهود تحسين العمليات بصورة مباشرة على سلامة وصحة العاملين.

تحسين العمليات باستخدام تقنيات تحسين العمليات يقلل من التعرضات المهنية.

الإدارة الشاملة للجودة تقود إلى تحسين فى بيئة العمل.

وبناء على هذه النتائج توصى الدراسة ب:

تبني المؤسسات صغيرة ومتوسطة الحجم لأنظمة الجودة الشاملة والسلامة والصحة المهنية وتكاملهما يرفع الإنتاجية ويقلل من الفاقد في التكاليف والوقت ويمنع تكرار الجهود ويجعل أهداف السلامة والصحة المهنية متسقة مع الكلية للمؤسسة.

استخدام أدوات الجودة الشاملة في السلامة والصحة المهنية في المؤسسات صغيرة ومتوسطة الحجم لرفع كفاءتها، التحقيق في الحوادث ووضع مقياس التحكم.

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List of Abbreviations

<i>Abbreviation</i>	<i>Full Term</i>
OSH	Occupational Safety and Health
TQM	Total Quality Management
SME	Small and Medium Size Enterprise
WHO	World Health Organization
ILO	International Labor Organization
WISE	Workplace Improvement in Small Enterprise
ILO-OSH 2001	International Labor Organization Occupational Safety and Health Manage System
ISO	International Organization for Standardation
S&H	Safety and Health

CHAPTER ONE

INTRODUCTION AND LITERATURE REVIEW

1. Introduction and literature review

1.1 Introductions

1.1.1background:

Occupational safety and health can simply be defined as providing secure working condition

For employee safety issue and can becoming more and more import every day, not the only in working environments but also in every activity within the societies, safety can be considered at both individual and institutional levels. Institutional safety is the total safety efforts and implementations throughout the whole taking both inside and outside environment into account ,the concept of safety now days needs to be expanding from individual safety to the institutional safety due to complexity of events and equipments as well as their interrelationship between different branch of the organization, This obviously indicates the importance of occupational safety and health (OSH) where safety issues to be at every level of the organization and in all without disregarding any organizational and production or service related issues.

On the other hand, Total Quality Management activities are conducted for making all employees and mangers responsible for the quality of product, as well as process to produce them, total quality management (TQM) is seen as strategic tool to improve organizational performance in both large and small and medium size organizations (SMOs) and any part of the world.

In recent years, the role of small and medium size organizations (SMOs) in the national economy has been highly regarded and understanding an importance of promotion of small and medium size enterprises' SMEs has been growing internationally, In many countries governments are making effort to tailor its small and medium size organizations' (SMOs) policies to creating new SMOs Company and nurturing them.

This section gives overview of research problem, important of the topic total quality management TQM, occupational safety and health OSH, small and medium size organizations' SMOs and research objective.

1.1.2 Research problem:

For organization to work effectively it had to manage numerous activities that integrated, to set the organization management system. One of these activities is occupational safety and health (OSH); beside its legal commitment. It has many roles in production process and in total cost of the product or service.

In other hand as quality is main target for organizations so the questions the study tried to answers is:

1. Is there any relationship between total quality management TQM and occupational safety and health OSH?

If so

- a. How can we apply TQM&OSH managements system to improve work processes and reduce occupational exposure
 - a. (Reducing the rate of accident losses)?
 - b. Is quality workplace is workers friendly (less hazardous)?

How to use effective total quality management (TQM) , system to improve occupational safety and health OSH management system and what organizations benefiting from adopting such system.

These call for serious study to develop and implement frame work that brings these losses to range of cross pounding industries throughout the regional and global industries, in order to give Sudanese industries, the possibility to compete in globalizations arena.

1.1.3 Importance of the topic:

In spite of existing legislation in occupational safety and health (OSH) but the researcher observed how much weakness of institution of occupational safety and health (OSH) whether in public or private sectors despite of swift development on industries or service sectors.

The weakness of OSH culture, cost control and quality, in face of global change, and the economics of free market added new burden over organization to improve its performance with aim of gaining competition, numerous organizations needed to obtain qualification certificate, but they didn't fulfill occupational safety and health OSH requirements.

The challenge remain within existence of the will to create integrate administration of organization by mean of applying comprehensive quality management concept over occupational safety and health (OSH)

1.1.4 Hypotheses

1. There is positive relation between the TQM and the OSH.
2. Improve quality will reduce occupational exposure.
3. Total quality environment is worker friendly.

1.2 .Literature review

1.2.1 Total quality management (TQM):

1.2.1.1 Total quality management TQM definitions

ISO Definition

The international organization for standard (ISO) has produced definition of total quality management TQM in the standard ISO 8402:1999 Quality management and quality Assurance –Vocabulary according to Kanji (1990).

Total quality management.

Management approach of an organization, centered on quality based on the participation of all it is members and aiming at long –term success though customer satisfaction and benefits to all it is members of the organization and to society.

Using three word definitions, Wilkinson and Wither (1990) define TQM as:

Total: every person is involved (its customers and suppliers).

Quality: customer requirement are met exactly.

Management: senior executives are fully committed.

Berry (1991) define TQM process as total corporate focus on meeting and exceeding customers expectations and significantly reducing costs resulting from poor quality by adopting a new management system and corporate culture (Yusof, 1999).

Wolkins (1996) outline that TQM as a tool to integrate fundamental management technique, existing improvement efforts and technical tools under a disciplined approach focused on continuous improvement.

1.2.1.2 Principle of Total quality management TQM:

Key element of Total quality management TQM;

TQM is system that includes both management philosophy and powerful set of tool for improving the efficiency of work processes. Some of common element of TQM includes the following (Saylor, 1992):

- a) Primary emphasis on quality
- b) Focus on meeting customer expectation (customer satisfaction).
- c) Viewing organization as a system (optimization).
- d) Commitment to employee participation and involvement (empowerment).
- e) Monitoring statistical output of the process (management by fact).
- f) Leadership (vision).
- g) Strong commitment to training (becoming learning organization).

1.2.1.3 Seven element of Total quality management TQM:

According to (Tang, 1995) there is seven element of TQM:

The Approach:

The commitment of top management is essential to success of TQM. This requires a fundamental culture shift from quality assurance and quality control, to culture where the responsibility for quality is delegated.

The Scope:

Total quality implies involvement of every person and every process within organization to satisfy their customer it is companywide.

The Scale:

Everyone in the organization has personal responsibility for quality and customer satisfaction .this is true even for people who do not have direct contact with external suppliers and customer. This concept of internal customer and supplier is fundamental to the philosophy of TQM. Hence internal customer supplier chain can be formed throughout whole organization.

The Philosophy:

The philosophy aims at prevention not detection of error s or defect. It recognizes that quality cannot be inspected into product or service. This lead continual seeking to improve all process in order avoids errors and defect.

The Standard:

People cannot just tell to get it right first time. However if there are provided with management commitment, encouragement, the right tool and resource and above all appropriate training then the resulting change in attitudes will promote a right first time culture

The Control:

The cost of quality statement is a main measure of quality improvement. By increasing the percentage of cost that are given to prevention of error and defect the percentage of failure cost reduce and there for the overall cost reduce.

The Theme:

Total quality is a road not an end. It embodies the theme of continuous improvement. In TQM people are empowered to take ownership of their own quality situation and teamwork is particularly important.

1.2.2 Occupational safety and health

1.2.2.1 Occupational safety and health fundamental

The right to, to decent, safe and healthy working conditions and environment has been central issue for international labor organization (ILO) since its creation, The past 90 years have witnessed the development of significant body of laws and regulation at the national level, covering any areas relevant to occupational safety and health (OSH), Progress has been achieved in numerous countries and working conditions have improved significantly in many part of the world (Stellmann, 1998).

This section examines occupational safety and health.

1.2.2.2 Occupational safety and health (OSH) definition:

International Labor organization (ILO) and the world health organization (WHO) have shared common definition of occupational safety and health .It was adopted by joint ILO/WHO committee on OSH at its first session in 1950 and revised at it session in 1995 as Stellman, (1998) point out.

The definition reads:

Occupational safety and health should aim at promotion and maintenance of highest degree of physical and social well begin of workers in all occupation, the prevention amongst workers of departures from health caused by working conditions, the protection of workers in their employment from risk resulting from factors adverse to health, the

placing and maintenance of worker in an occupational environment adapted to his physiological and psychological capabilities, to summarize, the adoption of worker to man and of each man to his job.

Safety entails protecting against physical, social, financial, political, emotional, occupational, or other type of consequence of failure, errors, harm arising care (Weick, 1988).

The main focus in occupational safety and health OSH is on three objectives

- 1- Maintenance and promotion of workers health and working capacity.
- 2- Improvement of working environment and work to be conducive for safety and health.
- 3- Development of work organizations and working culture in a direction which supports health and safety at work and doing so also promotes appositive social climate and smooth operation and may enhance productivity of undertaking (Richtofen et al, 2002).

According to Richtofen (2002) the concept of working culture is intended in this context to reflection of essential value system adopted by undertaking concern, such culture is reflected in practice in managerial system, personnel policy and principle for participation, training policies and quality management of undertaking.

1.2.2.3 Core Occupational safety and health (OSH) principle:

Occupational safety and health is an extensive multidisciplinary field invariably touching on issues related to scientific area such as medicine –including physiology toxicology –ergonomic, physics and chemistry as well as technology, economic, law and other areas specific to various industries and activities (Benjamin O, ALLI 2008).

Despite this variety of concern and interest and according to Benjamin (2008), certain basic principle can be identified, including following:

1- All workers have right. Workers, as well as employers and government, must ensure that these rights are protected and must strive to establish and maintain decent working condition and decent working environment More specifically:

A- Should takes place in a safe and healthy working environment.

B- Condition of work should be consisting with workers well being human dignity.

C- Work should offer real possibilities for personal achievement, Self fulfillment and Service to society.

2- Occupational safety and health policies must be established .Such policies must be implement at both national (governmental) and enterprise level.

3- 3-Anational system for OSH must be established such system must include mechanisms and elements necessary to build and maintain safety and health culture.

4- National programs on OSH must be formulated.

5- Occupational safety and health programmes and policies must aim at both prevention and protection.

6- Continuous improvement of OSH must be promoted .This is necessary to ensure that national laws, regulations and technical standards to prevent occupational injuries, diseases and death are adapted periodically to social, technical and scientific progress and other change in the world of work

7- Information is vital for development and improvement of effective programmes and policies. The collection and dissemination of accurate information on hazards and hazardous materials, surveillance of workplaces, monitoring of compliance with policies and good practice, and other related activities are central to establishment and enforcement of effective policies.

8- Health promotion is central element of occupational health practice.

9- Occupational health service covering all workers should be established.

10 -Compensation, rehabilitation a curative service must be made available to workers who suffer occupational injuries, accident and work related diseases.

11-Education and training are vital component of safe, healthy working environment.

12-Workers, employers and competent authorities have certain responsibilities, duties and obligation.

13-Polies must be enforced .A system of inspection must be in place to secure compliance with occupational safety and health measure.

1.2.2.4 Risk assessment and control in workplaces:

Risk assessment is process of evaluating risk to workers safety and health posed by workplace hazards. It is systematic examination of all aspects of work, Employers are required to ensure the health and safety of workers and other persons, so far as possible, through application of certain principle. These principles include the evaluation of unavoidable risks and taking action to reduce them. Employers are requiring taking suitable and sufficient assessment of health and safety risks faced by workers in the normal course of their activities or duties, the purpose being to identify:

1. Group of workers at particular risk in the performance of their duties.

2. Measure to be taken to comply with employers duties under regulation. Among such measure is the prevention of occupational risks, the provision of information and OSH training for workers (Kediri S, 2006).

1.2.2.4.A Risk assessment:

Risk assessment is process of evaluating the risk to workers safety and health arising from hazards at workplace. It is systematic examination of all aspects of work that considers:

a. What could cause injury or harm?

b. Whether the hazards could be eliminated and, if not,

c. What preventive or protective measures are, or should be, in place to control the risk (Ibid).

As Kediri (2006) point out risk assessment is the starts of the risk management process .It enable employers to understand the action necessary to improve workplace health and safety, as well as to enhance productivity. The ultimate objective of risk assessment is to decide on an action plan designed to establish the control of risk and to ensure that risk control remain active ,according to Kediri ,(2006) there are two major types of risk assessment:

Quantitative risk assessment:

An objective probability estimate based on information about known risks and application of that information to the circumstances being considered.

Qualitative risk assessment:

Is based on personal judgment backed by generalized data on risk, Except in case of especially high risk, public concern, or where the severity of consequences arising from an accident is felt to be great and widespread, qualitative risk as assessment is adequate for purpose, and much simpler to make .

Approaches to risk assessment:

Approaches to risk assessment depend on the type of workplace and activity carried out in such workplace

The approach applied usually depends on:

1. The nature of the workplace
2. The type of process carried out

3. The task performed
4. The technical complexity of the workplace ((Kediri S, 2006).

Risk rating:

Risk is usually defined as “The combination of the likelihood of a hazardous event occurring combined with the severity of the harm that could result”.

Risk= (the likelihood of hazard occurring) probability *(the severity of the loss) Consequence Hazard means anything that can cause harm

1.2.2.4.B. Hierarchy of risk control:

In cases where a risk assessment has identified hazard that require control, there are some considerations that can be addressed before proceeding to setting priorities for their control. Hierarchy of control measures can be applied to all hazards, as follows (Benjamin o.alli, 2008):

- 1- Eliminate: If the hazard is removed, all the other management control, such as assessment, record –keeping, training and auditing is no longer needed. This brings subsequent savings of time and cost. For instance, materials can be supplied pre-painted rather than having to pain them, or remote operations
- 2- Substitute: If the hazard cannot be removed, introduce a lower hazard in it is place. For instance, water based paint can be used in place of spirit based paint.
- 3- Reduce: Use whatever it is that poses risk in small quantities, infrequently.
- 4- Adapt: where possible, adapt the work to the individual, taking account of the individual’s mental and physical capabilities.

- 5- Technical progress: Take advantage of technical progress, such as robotics.
- 6- Multiple controls: Multiple method of control, such as technical and procedural controls, can be applied.
- 7- Planned maintenance: Introduce planned maintenance and inspection of the plant and equipment to ensure the usability of components and elements, such as cables and emergency switches.
- 8- Personal protective equipment: This should be used as last resort, after all other control measures have been considered, as a short –term contingency during maintenance or repair, or as an additional protective measure.
- 9- Emergency arrangement: Example includes alarm system and backup control.

1.2.2.5. The workplace contributes to diseases and injuries

The workplace is significant and consistent contributor to diseases and injuries and associated fatalities. Diseases and injuries that occur due work have long –term consequence and represent significant cost, in social and economic term, to workers, employers, government and economy.

A reduction in the burden of disease and injury is depend on understanding the magnitude of that burden and its causes, and determining potential areas for efficient and effective deployment of resources. Current estimates indicate that occupational diseases account for greater mortality and morbidity than occupational injuries, but are harder to diagnose, measure and monitor for range of reason, including long latency periods exposure, difficulties distinguishing occupational disease from none occupational diseases and lack of awareness about occupational origins of some diseases.

International labour office ILO estimates in 2008 (for 2003) indicate that about 358,000 fatal and 337 million non-fatal occupational accidents occurred in the world and that 1.95 million persons died from work – related diseases. The annual economic cost of major occupational accidents alone at US\$5 billion.²

1.2.2.6. International labour organization ILO Instruments covering occupational safety and health OSH;

In some country; occupational safety and health OSH activities are in jurisdiction of labor ministries and are regulated by special occupational safety and health OSH authority, in other, this responsibility is shared by other ministries of labor, health, and/or social affair. In some countries, such as Italy, regulation covering occupational safety and health OSH service is embodied in health Legislation, or as in Fairland, in special ac. In United States and England, provision of occupational safety and health OSH service rest on voluntary wills in Sweden among other, it was once regulated by collective agreement (ILO, 1981).

The ILO convention (NO-155) requires government to organize policy for occupational safety and health OSH to be applicable to all enterprises' in all sectors of economy that is to be implementing by competent authority. This convention stipulates the responsibility of the authorities, employer and workers and supplements by concomitant recommendation No (164), define the key OSH activities of all relevant actors at both national and local level (Benjamin o.alli, 2008).

The international labor organization ILO supplement these in 1985 by the international convention No161 and recommendation No (171) on occupational safety and health OSH services. These contain provision on policy design, administration, and inspection and collaboration of occupational health services, activities by occupational safety and healths conditions of operation and responsibilities of employers and workers and

Furthermore offer guidelines for organizing occupational health services at level of enterprises. While they do not specify small and medium size organizations (SMOs) they were developed with these in

mind since no size limits were set for occupational safety and health (OSH) services and necessary flexibility in their organization was emphasized(Ibid).

Table NO 1-1 ILO Convention L Recommendation – OSH principle I Policies(Benjamin o.alli,2008)

Convention	Brief description
C155/ Occupational S& H Convention	Set objection and basic principle of national policy
R 164Occupational safety and Health	Further detail and Additional practical Quince on on previsions in C 155
Code of practice (OSHMS)	Management system approach to OSH – For use at national level
C 161 occupational health service convention	Policy instrument – provision of occupational health services
R 171 occupational safety and health service	Further guidance on implementing C 161 OSH service.
Code of practice 1998	Technical and ethical quid line for worker health service

C 187 promotional frame work for OSH Convention	Quid line in setting OSH policies and program me at national and enterprises level
C 181 labour inspection	Set out rules governing labor inspectorate- obligatory for industrial establishment and optional for commercial and non sector .

Source ILO

ILO-OSH 2001

This guideline calls for coherent policies to protect workers from occupational hazards and risks while improving productivity. They present practical approaches and tools for assisting organizations, competent national institutions, employers, workers, and others partners in establishing , implementing, and improving occupational safety and health management systems, with aim of reducing work –related injuries, ill health, diseases, incidents and deaths(ILO OSH,2001).

The guide line may be applied on two levels- national and organizational. At the national level, they provide for establishment of national framework for occupational safety and health (OSH) management system, preferably supported by national laws and regulation. They also provide precise information on developing voluntary arrangements to strengthen compliance with regulations and standards, which, in turn, lead to continual improvement of OSH performance, at organizational level, the guidelines encourage the integration of OSH management system elements as an important component of overall policy management arrangement. Organizations, employers, owners, managerial staff, workers and their representatives are motivated in applying appropriate OSH management principles and methods to improve OSH performance (Ibid).

1.2.2.7. OSH management system by standard setting organization:

A well –recognized standard for effective occupational safety and health OSH management has been objective health and safety community globally for many years.

The International Organization for standardization (ISO) has long discussed the possibility of an ISO standard similar to its Environment Management ISO14001 since mid-1999s. since no agreement was reached, British Standard institution led a group of organization in promoting the Occupational Health and Safety Assessment series (OHSAS18001) specification in 1999. In order to promote worker involvement in the development of OS&H management system even more, the ILO issued its Guideline on occupational safety and health (ILO-OSH2001) in 2001. More recently, the American National Standard Institute has developed its, ANSI Z.10 (v) standard on this subject.

1.2.2.7. A. OHSAS18000:

An international occupational safety and health OSH management system specification developed by the London BSI group, multinational business chiefly concerned with production and distribution of standards related service, OHSAS1800 comprises two parts, OHSAS18001 and OHSAS18002 and embraces number of other publication. OHSAS1800 is internationally recognized assessment specification for OSH management system. It was developed to address gap where no third party certifiable international standard exist. This specification for OSH management system operates on the basis of policy, planning, implementation and operation, checking and corrective action, management review and continual improvement.

The British standards – occupational safety and health (OSH) management systems requirements standards BS OHSAS18001 was developed within the framework of international standard organization ISO standard service. Allowing it to integrate better into the large system of ISO specifications. ISO9001 Quality management system and ISO14001 Environmental management system can work in tandem with BS OHSAS18001/18002 to complement each other for better overall system. Each component of the system is specific, auditable and accredit able by a third party after review.

1.2.2.8. Occupational safety and health (OSH) In Sudan

Occupational health and safety service are regard as a part of the fundamental aspect of the economic development of nation. The success of these services is measured in terms of the level of health and safety status of employee. The level is reflected by the number of occupational injuries, occupational disease, losses incurred through property, damage, loss of production, process and even profit in industry. All these factors form the foundation of essential economic base OSH is key social protection. Promoting the safety and health of workers has been share responsibility of ministry of human resource development and labor in partnership with ministry of health (Benjamin o.ali, 2008)

Work safety and health regulation, law and enforcement, as well as compliance support activities or regulators are among other factor that contribute to regulate willingness and capacity (Lindblam, 2006).

There is good evidence that the achievement of social goal such as preventing work related death, injuries and illness is higher when law exist, is effectively communicate, and compliance is inspected and enforced.

Occupational safety and health service has following fundamental basis:

- 1-Legislative frame work (laws, regulation and standards).
- 2- Central authority for laws enforcement (Wolfgang Von Richthofen, 2002)

1.2.2.8. A. Legislation of occupational safety and health

Work health and safety regulation, law and enforcement, as well as other compliance support activities or regulators are among the factors that may contribute to regulate wellness and capacity (Lindblam ;2006).

According to Lindblam (2006) there is good evidence that the achievement of social goals such as preventing work related death, injuries and illness is higher when law exist, effectively communicate, and compliance is inspected and enforced. Ministry of human recourse development and labor is responsible of issuing enforcement and

implementing of occupational safety and health OSH legislations and standards.

1.2.2.8 B. National legislations;

1. Lab our law; This law consigned the eleven chapter for occupational safety and health {industrial safety} which involving 24 article as general frame for occupational safety and health so it defines assignments and responsibilities of workers and work owners in addition to legal frames of safety inspection and safety inspector propriety.

Most important article is [95] which stipulating that every owner of factory contains not more than 300 worker, not less than 150 worker must appoints unconsecrated safety officer {not full-time}, and if the number is more than 150 worker and less than 500 he must appoints consecrated safety officer {full-time} but if the number increase than 500 worker he must forms safety committee under the factory manager chairmanship (labour Act 1997).

2. Factories regulation1981; contains articles related to precaution against fire and dangerous materials as well as protection of residential areas safeguarding against mechanical hazards involving boilers in addition to winches and care of general materials(Factories regulation1981).
3. Occupational health regulation1981; involving stipulations of health in factories and industrial process as well as stipulations of work environment– lighting – humidity, lead processes, periodical medical detection and first relieving in addition to work owner responsibility (Factories regulation occupational health1981).
4. Compensating Act of work injuries 1981; involves materials relating to injuries and compensating of injuries in addition to many stipulations relating to contractors and subcontractors commitments (compensation Act of work injuries, 1981).

1.2.3. Small& medium size Organizations (SMOs):

The performance of small and medium size Organizations SMOs, whether in terms of efficiency, working conditions or degree of social protection, is mixed. In many countries there are SMEs that are high profitable and provide good working conditions, but in other parts of the world , particularly in developing countries , productivity, efficiency, working conditions and social standard are poor, and in many cases unacceptably low. A growing body of evidence available at the international labour organization ILO indicates that improvement in working conditions and the environment can be key ingredients for business efficiency and competitiveness (Richthofen, 2002).

1.2.3.1. Small medium size Organizations (SMOs) Definition

There are varying ward wide definition of what constitutes small and medium size Organizations SMOs although they tend to use the same metrics of employment, turnover, and asset base. For example, the European Union defines a SME made up of enterprises which employ fewer than 250 people (micro 1-9, small 10-49, medium 50-2490) and which have annual turnover not exceeding 50 million euro, and \or an annual balance sheet not exceeding 43million euro (EU, 2005) (96\280\EC, Official Bulletin 1996).in USA, the employment size threshold is 500 people, with small firms employing 100 people (SBA, 2009).IFAC has chosen to define SME entities as entities consider to be of small and medium size enterprises SME by reference to quantitative (for example assets, turnover, employee)and \or qualitative characteristics (for example concentration of ownership and management on small number of individual).what constitutes an SME differ depending on the country(Ibid).

1.2.3.2. The Economic Benefits of effective Occupational safety and health OSH to Small& medium size Organizations (SMOs):

Occupational safety and health (OSH) that is reasonably or exceptionally effective and efficient can help small and medium size organizations (SMOs) to build better performing businesses ((EU-OSHA)-European Agency for Safety and health at Work,2007).SMEs stand to suffer substantial losses as result of poor OSH but conversely an gain most if

proper system are in place. For example, research has shown that 60% of companies that have a disruption lasting more than 9 days out of business (HSE, 2005). Since SMEs generally lack readily available credit, it is therefore essential that they understand the economic benefits of improving their OSH performance. One Finnish study was able to show the economic benefits of achieving good OSH among SMEs. The study surveyed 340 companies across different sectors and found specific benefits that could be achieved over the course of the year. While good OSH brings financial benefits, this is rarely assessed within SMEs. The negative impact of ill health and accident, on the other hand, is well documented, particularly in terms of high cost involved when things go wrong. For example, in the EU15 in 2000 (European Commission).

- A. Accident cost E55 billion, 88% of which was due to lost working time.
- B. There were 5327 fatal work-related accidents, costing an estimated E3.8 billion.

The costs of accidents are of particular concern to SMEs, because SMEs account for 82% of all occupational injuries and 90% of all fatal accidents (Roxane et al, 2009).

As Roxane (2009) point out the impact of serious OSH incident could be catastrophic for SMEs:

1. It is far more difficult for SMEs to recover from OSH incident.
2. The relative impact is greater than on comparable larger enterprises'
3. Key worker cannot easily or quickly replace.
4. Short-term interruptions of business can lead to loss of client and important contract.
5. A serious accident can lead to closure of business due to direct cost of dealing with accident or loss of contractor and /or customer.
6. Even small incidents and cases of ill health can double the level of sickness absence.

Another way to gain the attention of SMOs is by stating the benefit to be gained by addressing the economics of intervention to prevent injuries, ill health and accident. Some of these benefits are listed below:

1. Higher productivity.
2. Greater business continuity (fewer accidents and incident reduce the length and impact of disruption).
3. Lower insurance premiums and /or compensation payments to workers and higher staff motivation and moral.

Table NO 1-2 The Economic Benefits of effective OSH

OSH activity	Economic benefits(estimated saving)		
	Low	High	Average
Reducing sickness absenteeism	E 286 (FIM 1.700)	E 942(FIM 5.600)	E 448(FIM2.666)
Musculoskeletal disorder			E 209(FIM1.245)
Work community measure			E 82 (FIM 485)
Increased individual productivity	E 622(FIM3.700)	E 858(FIM 5.100)	

FIM : The Finish MARKKA , and was currency in use in fin land until 28.2.2002 as legal tender , the Euro (E) was introduction on 1.1.2002 (Source (Roxane etal,2009).

1.2.3.3. The influence of Legislation on small and medium size Organizations SMOs:

Legislation may sometimes be the most feasible option to encourage small and medium size enterprises SMOs to make improvement in occupational safety and health OSH. Indecon (2006) conduct two surveys, on targeting construction companies and the other industries in general. The findings from the construction survey showed that more than have the responded (54%) believed that S&H legislation led to a reduction in the cost of accidents, and many (40%) believed that it reduced insurance cost. The majority said that they had realized a net benefit from legislation, the survey of general industries found that the

legislation reduced accident – related costs and employers believed that the benefits of legislation outweighed its costs (Indecon, 2006).

Other research has shown that businesses do not find it problematic to comply with new directives, nor are they worried about the cost involved in implementing such regulation or directive. It is important that some small and medium size enterprises (SMEs) may respond only to legislation (Pawlowska, etal 2003).

1.2.3.4. Occupational Exposure in small and medium size Organizations (SMO):

Workers in small and medium size enterprises SME face the range of hazards experienced in larger enterprises, physical (noise, heat, dust, electrical), chemical (pesticides, solvent, acids, resins etc), mechanical (cutting, grinding, and other tools, vehicles), ergonomic (poor working platforms, and positions) and biological (such as animal-borne disease and injury in farms work with animal draught power), as well as problem relate to the organization of the work .In SME sector workers have poorer access to clean workplaces, toilet, and adequate water(Kogi .K.1989).

Small and medium size enterprises SME are exposed to agrochemicals, owing particularly to increase pressure for fertilizer and pesticide use with shifts in crop production, use of hybrid seeds and need to increase yield to match input cost. Small and medium size enterprises SME farmers commonly apply chemicals manually using old, poorly maintained equipment. Thus not only are exposures to chemicals increased, but ergonomic hazard are involved, owing to use primitive hand tools, hoes and ploughs, lifting heavy loads and sustained physical work.

The common factors that undermine workplace safety in these situations are:

1. Low levels of capital, use of primitive tools and technique and tendency to innovate or take shortcuts in production that, while necessary for economic survival, may pose serious hazard to the worker; Poor working conditions poorly regulated by labor or health and safety laws and poorly monitored by governmental and non governmental agency.

2. Poor access to information, lack of knowledge about hazard, their effects and controls and pressure to generate an income at whatever cost. Occupational use of carcinogenic agent may affect the general population when work environment are close to living environment. While waste from large- scale sector processes are is more substantial risk for communities adjacent to mining, processing and agricultural enterprises, unregulated environmental contamination from SME production also poses potential hazard (Ibid).

1.2.3.5. International labor organization (ILO) framework for small and medium size enterprises (SME)

ILO has developed systematic approach to the improvement of working conditions and productivity in SME enterprises in developing countries. The resulting program is a new training method called WISE (Short for Work Improvement in Small Enterprises), Short for Work Improvement in Small Enterprises. WISE is designed because SME are a sector of high priority, both for development and for the improvement of working condition.

A new approach is necessary because traditional method inspection-based for protecting workers are often inadequate. The approach attempts to take into account the specific characteristics of SME. In spite of their economic and social importance, many small enterprises have very precarious existence. In part because the manager is preoccupied by these economic and social problem, work conditions of the work, welfare facilities and occupational safety and health can be unsatisfactory. Because of these same difficulties, appropriate working conditions as well as environment policies and programs should not add new burden to the

Enterprises (Hiba J.C, 1994).

As Hiba (1994) point out they should provide:

1. Practical advice ('How to', not 'you must').
2. Low cost solutions.
3. Productivity –raising, quality –enhancing solutions (Ibid).

The training method being developed by the ILO is a voluntary approach, devised along these lines.

Training methodology:

Six basic principles are followed.

1. Build on local practice.
2. Focus on achievements.
3. Link working conditions and other management goals
4. Use learning by doing.
5. Encourage exchange of experience.
6. Promote worker involvement.

According to Hiba the technical content of each program will depend on specific problems and opportunities existing in participant enterprises. However, a number of problems and opportunities are very common, and it can safely be assumed that they should be covered. Nine technical topics have been identified as core issues in this respect, they are:

1. Materials storage and handling.
2. Workstation design.
3. Productive machine safety.
4. Control of hazardous substances.
5. Lighting.
6. Welfare facilities and services.
7. Work premises.
8. Work organization.
9. Worker involvement.

1.3. Objectives:

1.3.1. General objectives:

To evaluate the role of total quality management (TQM) in setting occupational safety and health (OSH) management system in small and medium size enterprises so as to encourage small and medium size enterprises SMEs to adopt both total quality management TQM& occupational safety and health OSH.

1.3.2. Specific objectives:

1. To examine the relationship between total quality management TQM and occupational safety and health OSH.
2. To evaluate the impact of quality improves in working conditions and Circumstances (reduce hazardous).
3. To verify weather total quality management is workers friendly or not.

CHAPTER TWO

MATERIAL AND METHODS

2. Material and methods

2.1. Materials:

2.1.1. Study design:

Based on the literature on the subject under study and relates to the research objectives, scope and the adapted research design, descriptive study was carried out, three hypotheses were postulated to evaluate the role of total quality management in setting occupational safety & health management system for SMEs, survey questionnaire was administered to sample of (60), statistical analysis were conducted using SPSS to calculate reliability of questionnaire, descriptive statistic and statistical inference were used to test the hypotheses.

2.1.2. Study area:

This study was conduct in Khartoum states during (April 2012 to August 2013) involving Giade Elsewedy Cable Company, some small and medium size enterprises SMEs occupational safety and health OSH officers and OSH inspectors from ministry of human resource development.

2.1.3a. Study population:

The targeted population of this study consists of both qualities professional, OSH inspector in ministry of human resource development and labor and OSH officers in private sector (SMEs).

2.1.3b. Sampling:

Sample of 60 were 60 were selected from target population using simple random sample, (56) complete usable questionnaire were return from respondent.

2.1.4. Inclusion criteria:

The participant in this study is chosen according to the following criteria:

- a. Occupational safety and health OSH or quality professional.
- b. Occupational safety and health OSH officer or employee representative in OSH committee in SMEs.
- c. Occupational safety and health OSH inspectors in public sector.

2.1.5. Exclusion criteria:

The participant in this study is excluded according to the following criteria:

- a. Less than two years experience for OSH & TQM professional.
- b. Less than two years experience for OSH officer and employee representative.
- c. Less than four years experience for OSH inspectors.
- d. Undergraduate OSH officers and employee representative

2.1.6. Ethical consideration:

Firstly I got permission from the participant whom involved in this study and treating their options honestly, fairly, respectfully and not allowing my personal biases and options to get into the study, professional and scientific responsibility were adhere to highest scientific and professional standard and accept responses.

Information's provided by responded were kept confidential and used only for this study.

2.1.7. Data analysis

2.1.7.1. Reliability consistency of tool

Data from questionnaire are collected and tested for internal questionnaire reliability and consistency of tool using (Cronbach Alpha) parameters from SPSS (Statistical package for social science).

Reliability means that the question which included by the tool (questionnaire form) is measuring actually what needed to be measured, and constancy is referring to consistency of results. Whichever means if the measure is repeated we will gain the same results. Relating to confirmation of Reliability and constancy of tools throughout this research, the researcher measured constancy which used in the questionnaire tool, and through Cronbach's Alpha one of constancy measure methods. The researcher also used credibility self-disciplines what means square-root for constancy coefficient. The researcher also used analysis statistic program (**SPSS**) to get Reliability and constancy parameter for answers of samples individuals in this study.

We observe that the constancy of axis parameters and constancy of questionnaire all-out; equal 0.6 and up foreword, and this is an accepted statistic ratio and the rate of credibility of the questionnaire of this study so high exceed 70%. According to this acceptable scientifically and statistic results, the used tool in this study makes the statistic result, much intact and scientifically acceptable.

2.1.7.2. Quantitative data analysis:

The first phase of data analysis was essentially questionnaire .this phase dealt with primary statistical analysis of responses to survey, all completed questionnaire returned from respondents were review for completeness, accuracy, and quality of data.(56) usable questionnaire were coded and entered into a preset SPSS package. Basic statistical analysis was conducted using both descriptive statistics and statistical inference (for testing hypothesizes)

2.2. Method:

2.3. Tool

Primary data

Closed ended questionnaire survey was used to obtain accurate primary data with aim of producing data for analysis, the questionnaire is consist of three part related to the hypothesis under study, the questionnaire was approved by statist ant, OSH professional and quality professional.

For data analysis both descriptive statistics and statistical inference were used.

Secondary data

The literature review Based on t the subject under study and relates to the research objectives and scope for this review, the research centered on finding information about the topic under studies (OSH, TQM&SMEs) the method involved an extensive search of books, references, journal, published research and internet for example, the search focused on obtaining literature from rang of authoritative special book that covered OSH, TQM&SMEs.

Also specific site including:

[Http// osha.europa.eu/en publication.](http://osha.europa.eu/en/publication)

[Http// osha.europa.eu/business/SMEs/index.html.](http://osha.europa.eu/business/SMEs/index.html)

[Http// osha./ Topic /risk assessment.](http://osha./Topic/risk%20assessment)

The flowing key wards were used in search:

1. OSH
2. SMEs& TQM

CHAPTER THREE
ANALYSIS

3. Analysis

This study was conducted in Khartoum state, the target populations consist of OSH professional and inspectors, TQM professional and OSH officers in comes from Giade Elsewedy Cable Company, some small and medium size enterprises SMEs occupational and ministry of labor.

(56) Usable closed ended questionnaires were coded and entered into Statistical package for social science SPSS.

Both descriptive and statistical inferences were used. In this section, the results of statistical analysis carried out using chi esquire are presented.

Table: 3-1 Reliability and constancy of questionnaire samples

	Cranach's Alpha	Internal reliability coefficient
((First hypotheses	0.56	0.75
(second hypotheses)	0.745	0.86
((Third hypotheses	0.766	0.88
Questionnaire	0.842	0.92

Table: (3-2) Worker participation is necessary for OSH management

Worker participation is necessary for OSH management		
	Frequency	Percent
Neutral	1	1.8
Agree	16	28.6
Strongly agree	39	69.6
Total	56	100.0

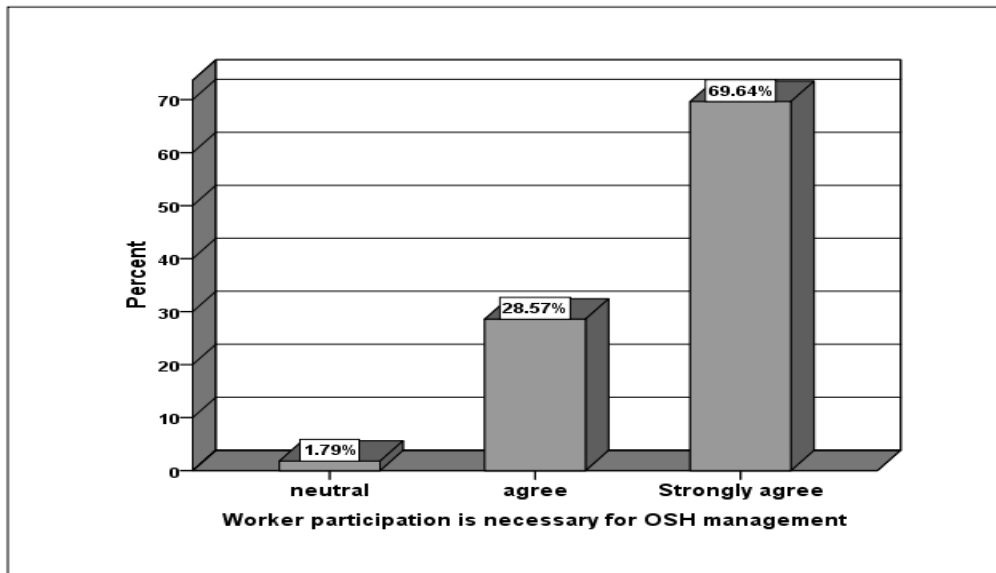


Figure NO: (3-2) Worker participation is necessary for OSH management

Table: (3-3) Top management commitment is necessary for OSH

Top management commitment is necessary for OSH				
		Frequency	Percent	Valid Percent
Valid	Disagree	1	1.8	1.9
	neutral	2	3.6	3.7
	agree	10	17.9	18.5
	Strongly agree	41	73.2	75.9
	Total	54	96.4	100.0
Missing System		2	3.6	
Total		56	100.0	

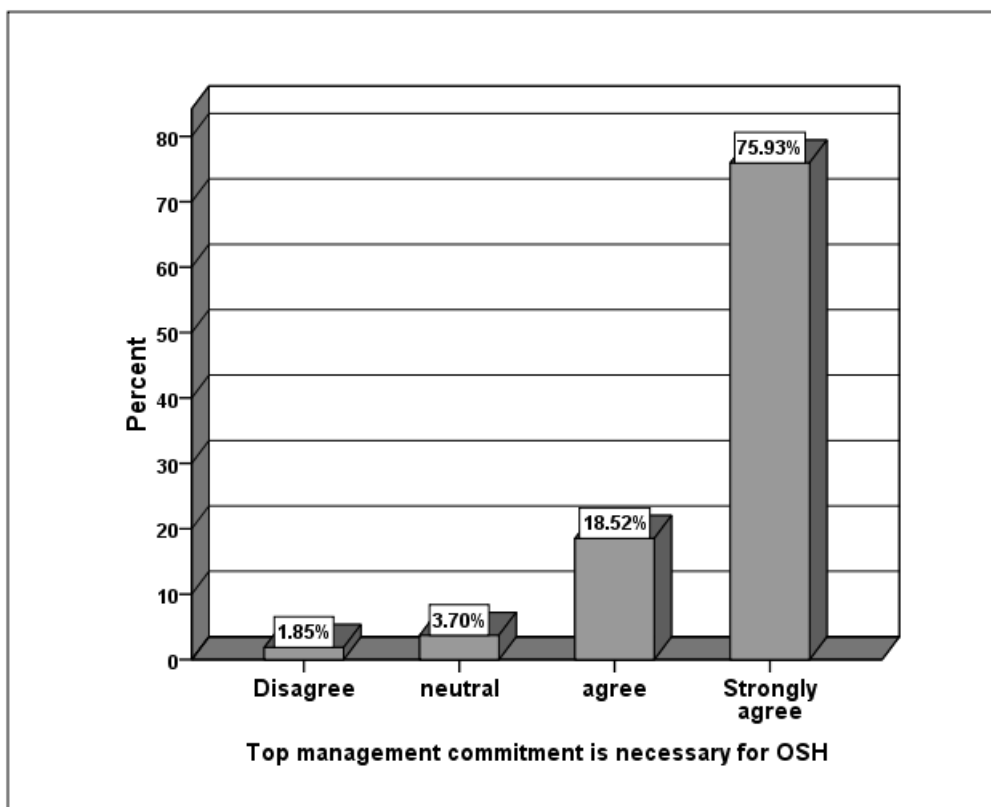


Figure NO: (3-3) Top management commitment

Table :(3-4) OSH objectives is a part of TQM strategic goals

OSH objective is a part of TQM strategic goals			
		Frequency	Percent
Valid	Neutral	1	1.8
	Agree	20	35.7
	Strongly agree	35	62.5
	Total	56	100.0

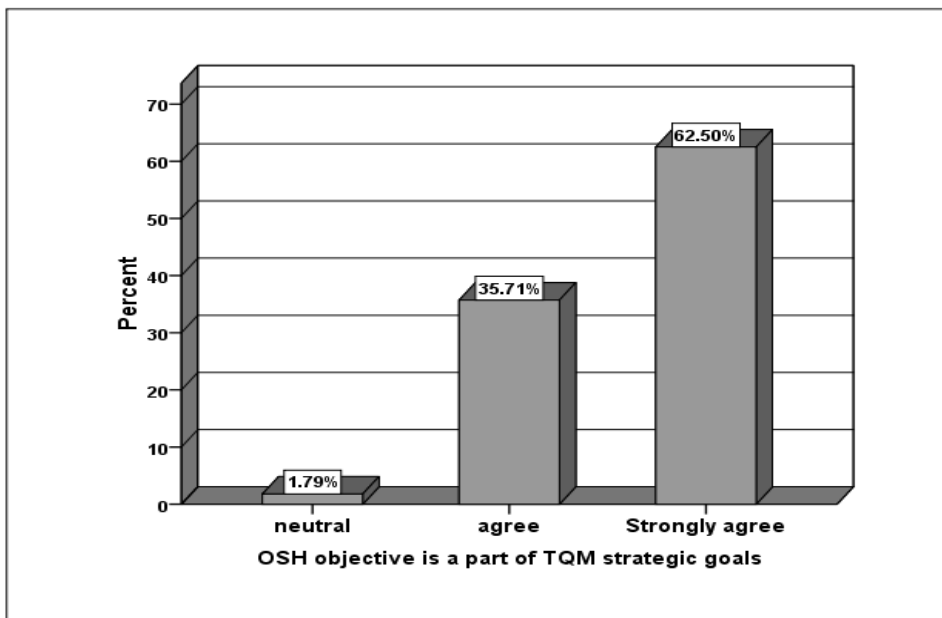


Figure NO: (3-4) OSH objectives is a part of TQM strategic goals

Table :(3-5) Remove of the barrier is essential for OSH

Remove of the barrier is essential for OSH				
		Frequency	Percent	Valid Percent
Valid	Strongly disagree	1	1.8	1.8
	disagree	2	3.6	3.6
	neutral	2	3.6	3.6
	agree	25	44.6	45.5
	Strongly agree	25	44.6	45.5
	Total	55	98.2	100.0
Missing System		1	1.8	
Total		56	100.0	

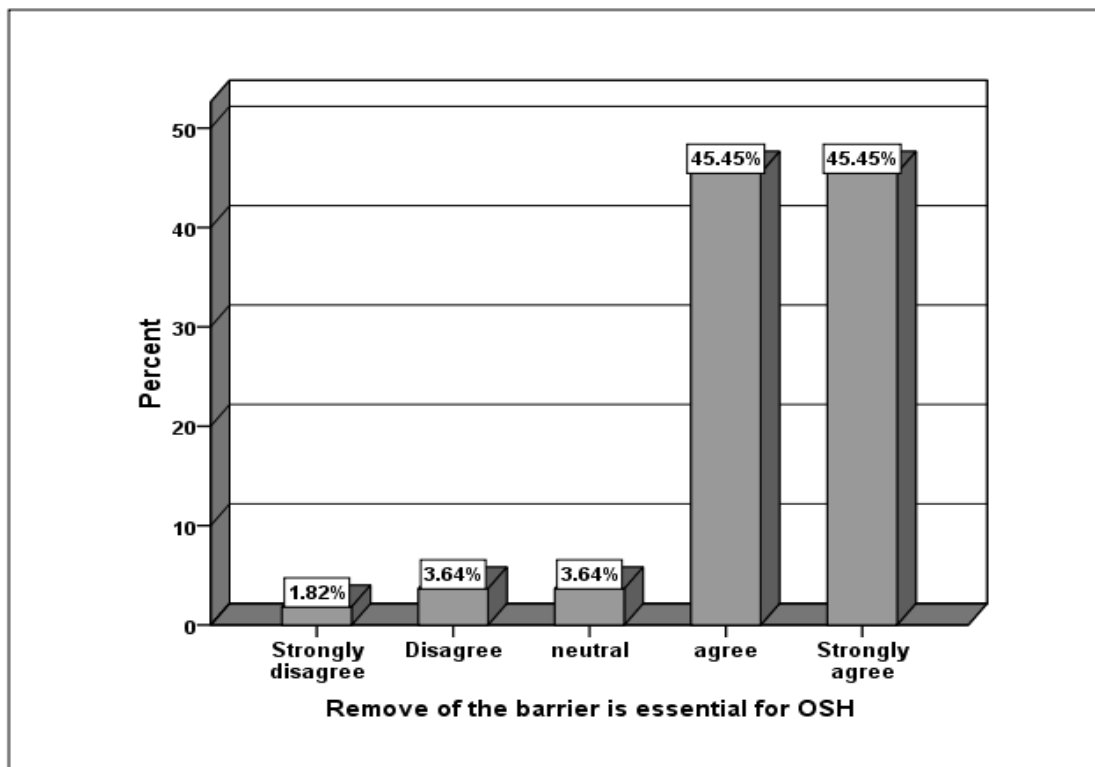


Figure NO: (3-5) Remove of the barrier is essential for OSH

Table: (3-6) Employee self education and improvement programs is essential

For OSH

Employee self education and improvement programs is essential for OSH			
		Frequency	Percent
Valid	neutral	2	3.6
	agree	16	28.6
	Strongly agree	38	67.9
	Total	56	100.0

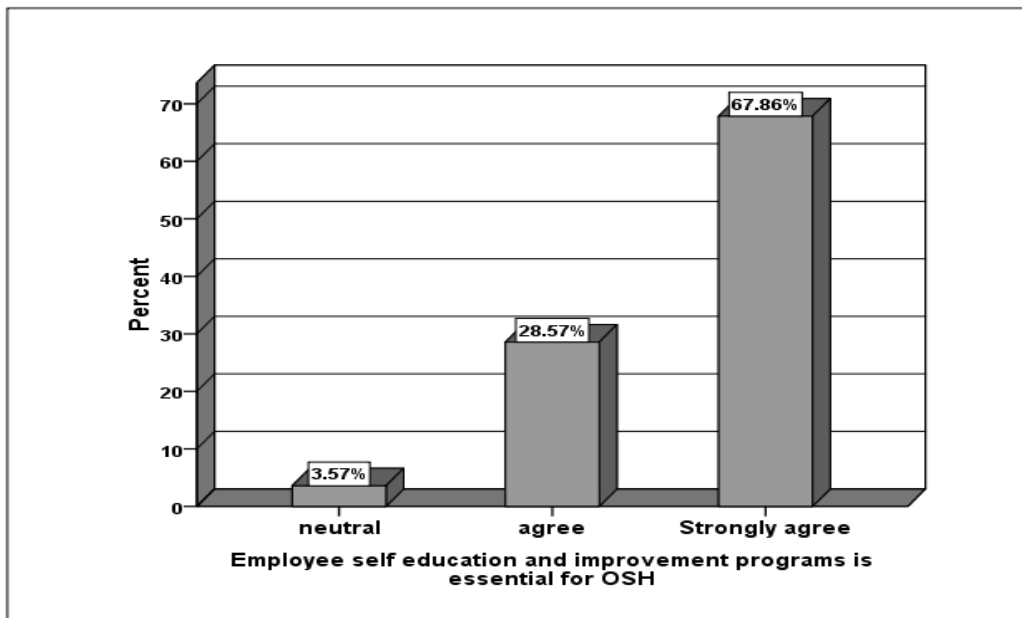


Figure NO: (3-6) Employee self education and improvement programs

Table: (3-7) Preventive maintenance is a part of prevention program

Preventive maintenance is a part of prevention program			
		Frequency	Percent
Valid	agree	11	19.6
	Strongly agree	45	80.4
	Total	56	100.0

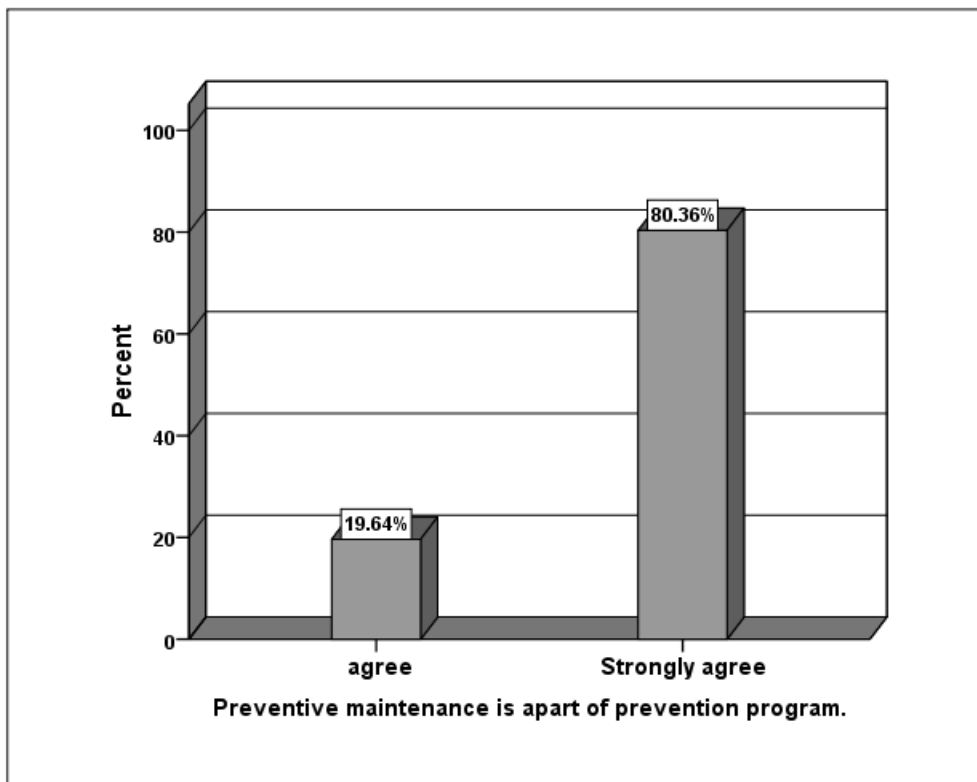


Figure NO: (3-7) Preventive maintenance is a part of prevention program

Table: (3-8) Identification and Communication of OSH standard is essential

for reducing occupation exposure.

Identification and Communication of OSH standard is essential for reducing occupation exposure				
		Frequency	Percent	Valid Percent
Valid	agree	20	35.7	36.4
	Strongly agree	35	62.5	63.6
	Total	55	98.2	100.0
Missing System		1	1.8	
Total		56	100.0	

Figure NO: (3-8) Identification and Communication of OSH standard

Table: (3-9) the promotion of proactive culture and consider OSH as value

Reduce occupation exposure

The promotion of proactive culture and consider OSH as value reduce occupational exposure			
		Frequency	Percent
Valid	Neutral	1	1.8
	Agree	10	17.9
	Strongly agree	45	80.4
	Total	56	100.0

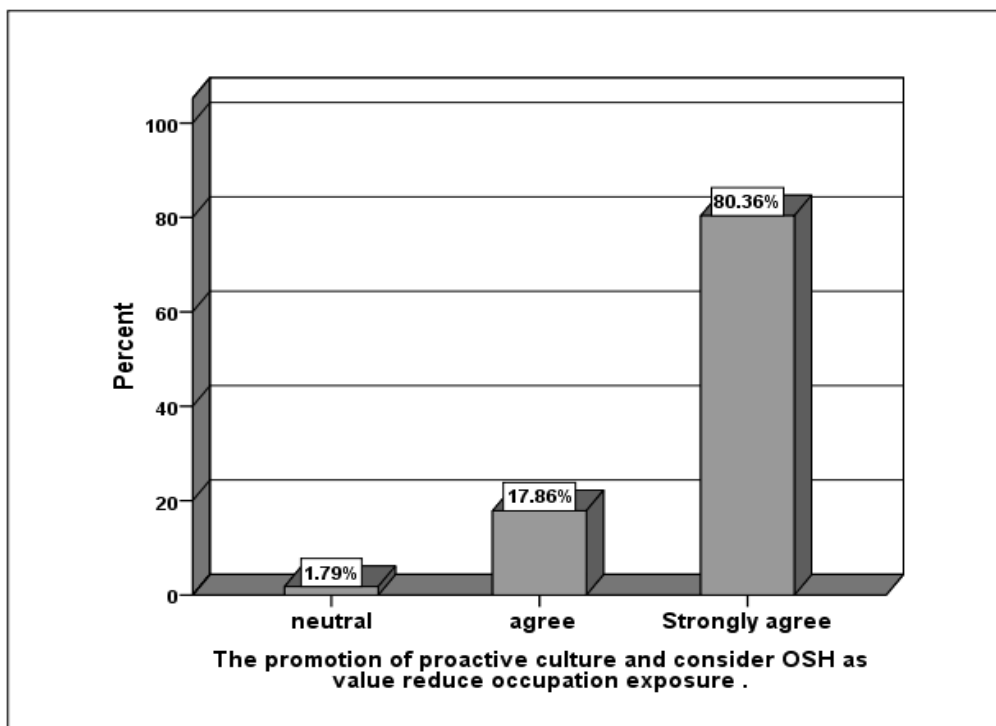


Figure NO :(3-9) the promotion of proactive culture.

Table: (3-10) Consider OSH as system based on scientific fact.

Consider OSH as system based on scientific fact reduce occupational exposure			
		Frequency	Percent
Valid	Disagree	1	1.8
	Neutral	4	7.1
	Agree	16	28.6
	Strongly agree	35	62.5
	Total	56	100.0

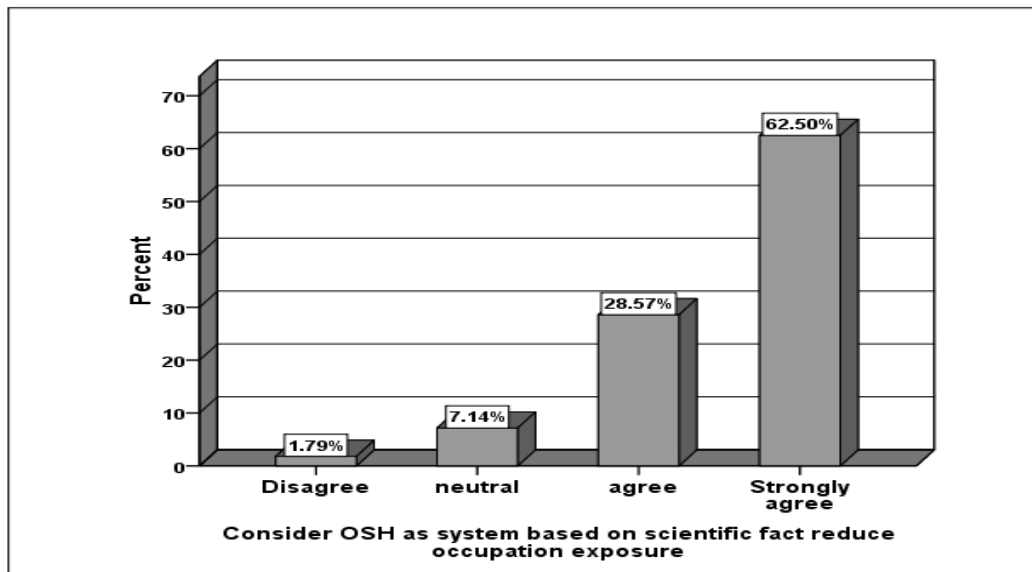


Figure NO: (3-10) Consider OSH as system based on scientific fact

Table: (3-11) Quality assurance procedure improve Working conditions

Quality assurance procedure improve Working conditions			
		Frequency	Percent
Valid	Disagree	1	1.8
	Neutral	1	1.8
	Agree	16	28.6
	Strongly agree	38	67.9
	Total	56	100.0

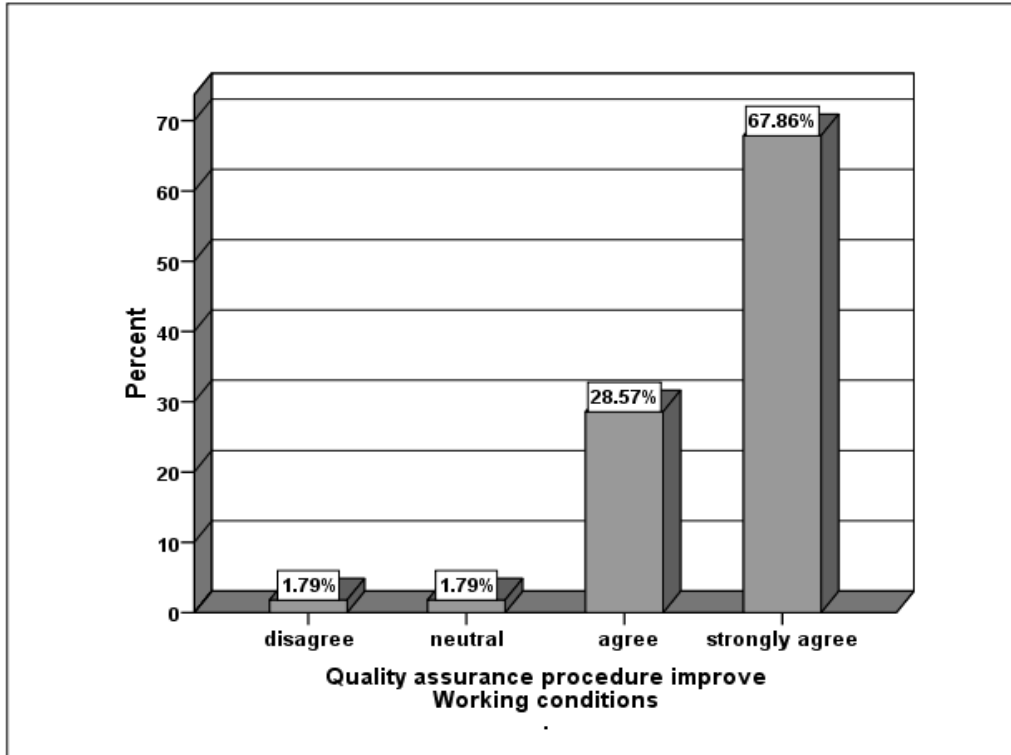


Figure NO: (3-11) Quality assurance procedure improve Working conditions

Table: (3-12) Use of work instruction reduce occupation exposure

Use of work instruction reduce occupation exposure			
		Frequency	Percent
Valid	disagree	1	1.8
	agree	18	32.1
	Strongly agree	37	66.1
	Total	56	100.0

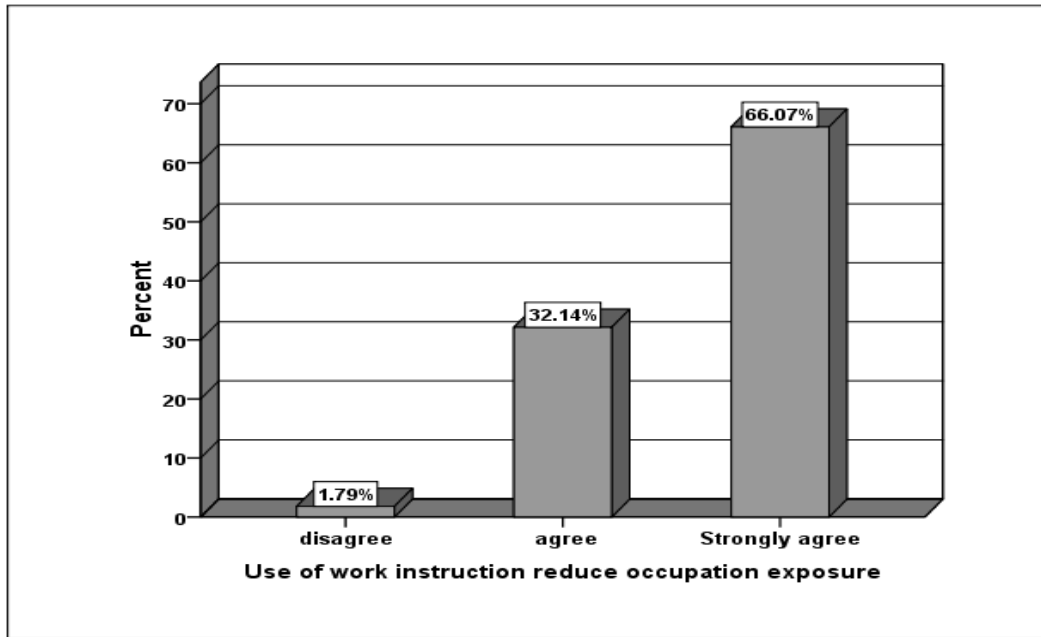


Figure NO: (3-12) Use of work instruction reduce occupation exposure

Table: (3-13) Process improvement makes it less hazardousness

Process improvement makes it less hazardousness				
		Frequency	Percent	Valid Percent
Valid	Neutral	3	5.4	5.7

	Agree	19	33.9	35.8
	Strongly agree	31	55.4	58.5
	Total	53	94.6	100.0
Missing System		3	5.4	
Total		56	100.0	

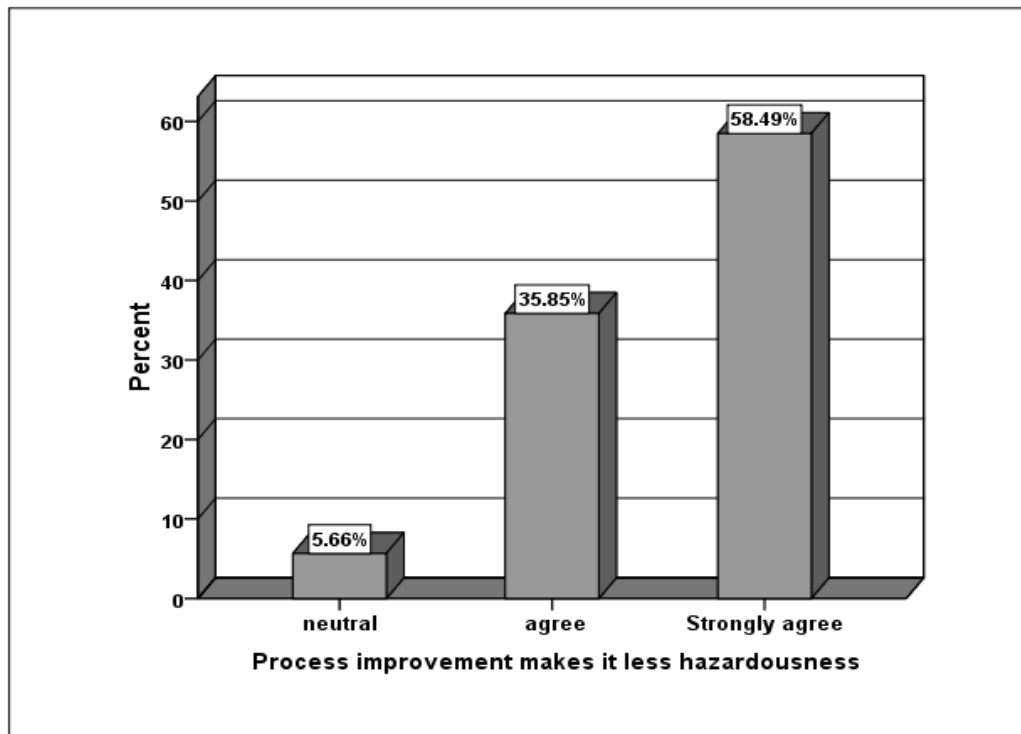


Figure NO: (3-13) Process improvement makes it less hazardousness

Table: (3 -14) Prevailing of proactive culture instead of preventive culture reduce occupational exposure

Prevailing of proactive culture instead of preventive culture reduce occupational exposure				
		Frequency	Percent	Valid

				Percent
Valid	disagree	2	3.6	3.8
	Neutral	3	5.4	5.7
	Agree	17	30.4	32.1
	Strongly agree	31	55.4	58.5
	Total	53	94.6	100.0
Missing System		3	5.4	
Total		56	100.0	

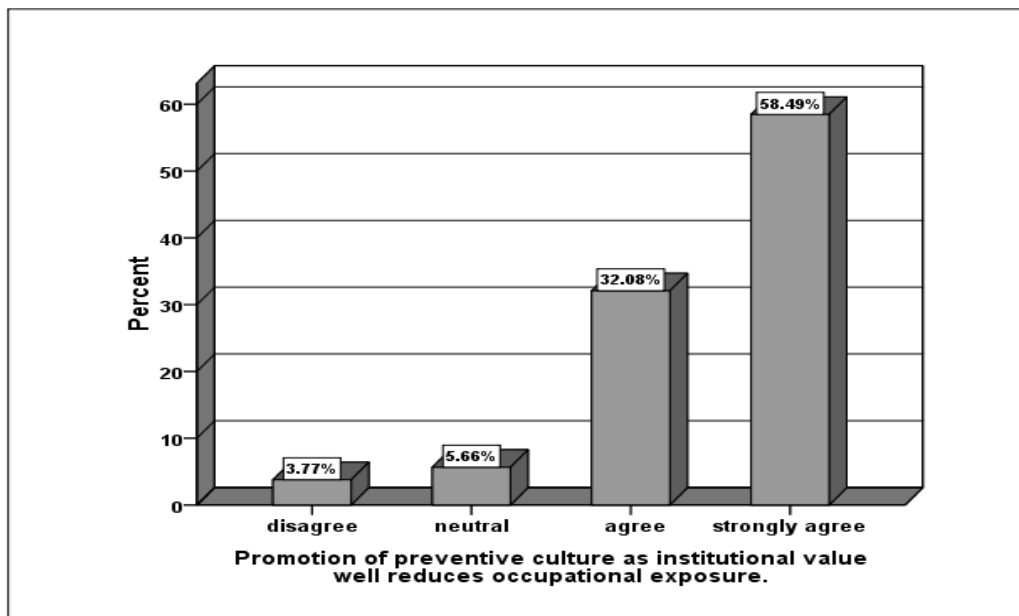


Figure NO: (3 -14) Prevailing of proactive culture

Table :(3-15) Top management support to mangers and supervisor reduce

Occupational exposure in workplace

Top management support to mangers and supervisor reduce occupational exposure in

workplace			
		Frequency	Percent
Valid	Disagree	1	1.8
	Agree	19	33.9
	Strongly agree	36	64.3
	Total	56	100.0

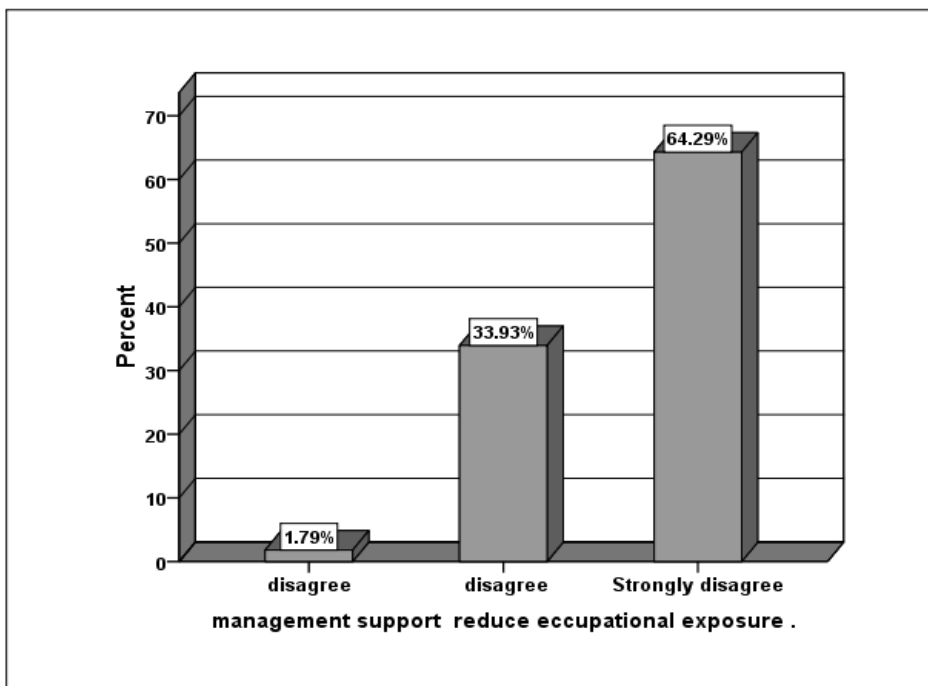


Figure NO: (3-15) Top management support to mangers

Table: (3-16) Total quality environment is less stressful

Total quality environment is less stressful				
		Frequency	Percent	Valid Percent
Valid	Neutral	2	3.6	3.6
	Agree	21	37.5	38.2
	Strongly agree	32	57.1	58.2
	Total	55	98.2	100.0
Missing System		1	1.8	
Total		56	100.0	

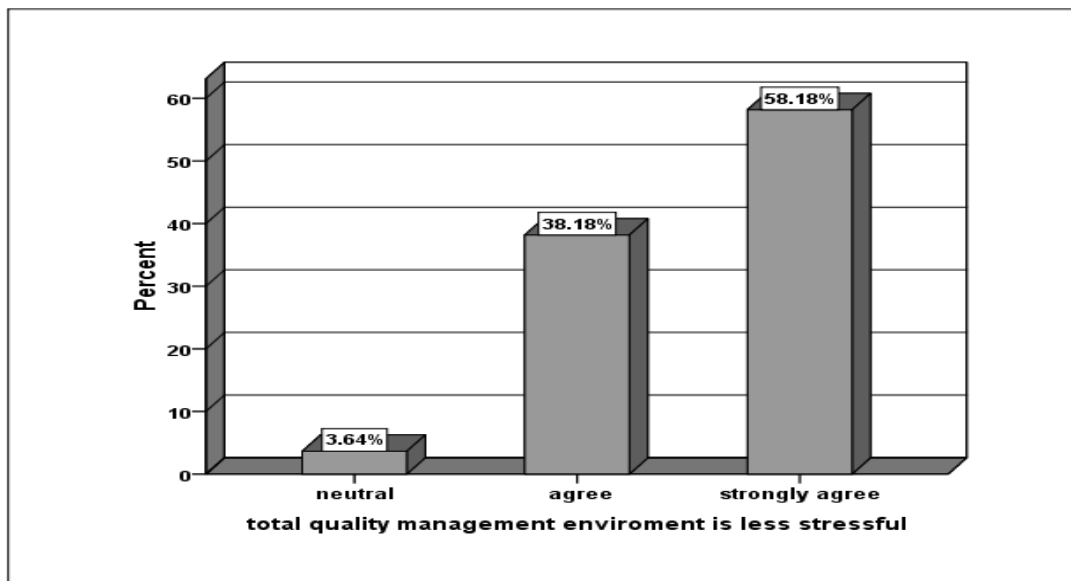


Figure NO:(3-16) Total quality environments is less stressful

Table :(3-17) In quality environment the values of respect, cooperation and trust

In quality environment the values of respect , cooperation and trust are prevailing			
		Frequency	Percent
Valid	Neutral	2	3.6
	Agree	21	37.5
	Strongly agree	33	58.9
	Total	56	100.0

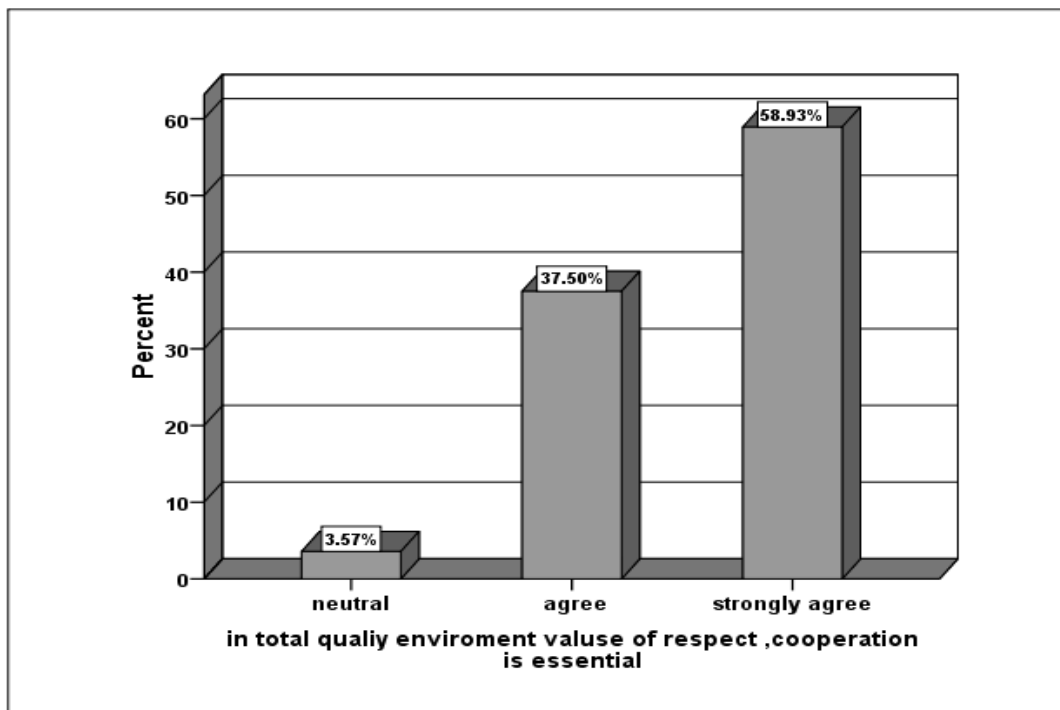


Figure NO: (3-17) in quality environment the values of respect, cooperation and trust

TEST OF HYPOTHESIS

Table: (3-18) there is positive relationship between TQM and OSH

	Df	Sig
Worker participation is necessary for OSH .1 management	2	0.000
Top management commitment is necessary .2 for OSH	3	0.000
OSH goal is strategic goal for TQM.3	2	0.000
Remove of the barrier is essential for OSH.4	4	0.000
Employee self education and improvement .5 programs is essential for OSH	2	0.000

Sig equals 0.000

Significant (sig) equal 0.000 which is less than 0.05

Degree of freedom (DF)

Table: (3-19) there is positive relationship between TQM and OSH

(There is positive relationship between TQM and OSH) Chi-Squaretest
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	Frequency	Df	Sig
Strongly disagree	1	4	0.000
Disagree	3		
Neutral	8		
Agree	87		
strongly agree	178		
Total	277		

Sig equals 0.000

Table :(3-20) Second Hypothesis; Improve quality reduce occupational Exposure.

	Df	Sig
Preventive maintenance is a part of .1 .preventive program	1	0.000
Identifying and communicating OSH .2 .requirement reduce occupational exposure	1	0.043
Promotion of preventive culture as .3 institutional value well reduces .occupational exposure	2	0.000
Consider OSH as system based on .4 scientific fact reduce occupational exposure	3	0.000
Quality assurance procedures improve .5 .work condition and environment	3	0.000
use of work instruction reduce <i>hazardous exposure</i>	2	0.000

Sig equals 0.000

Table :(3-21) Second hypothesis Improve quality reduces occupational exposure.

Second hypothesis ((Improve quality reduce occupation exposure Chi-Square test			
	Frequenc y	Df	Sig
Disagree	3	3	0.000
Neutral	6		
Agree	91		
Strongly agree	235		
Total	335		

Sig equals 0.000

Table: (3-22) Third hypotheses: total quality management

Environment is workers friendly

	Df	Sig
Improve work processes reduce .1 .occupational exposure	2	0.000
Prevailing of proactive culture instead of preventive culture improve work condition	3	0.000
Top management support to managers and supervisors improve work condition	2	0.000
TQM environment is less stressful	2	0.000
In quality environment the values of respect, .corporation and equality are prevailing	2	0.000

Sig equals 0.000

Table:(3-23) Third hypothesis total quality management

Environment is workers friendly.

Third hypothesis (total quality management environment is workers friendly) Chi-Square test			
	Frequency	Df	Sig
Disagree	3	3	0.000
Neutral	6		
Agree	91		
Strongly agree	235		
Total	335		

Sig equals 0.000

CHAPTER FOUR,
CONCLUSION

4. Discussion, conclusion and recommendation

4.1 Discussion:

To survive in today's high competitive, business environment, company must hold down expenses in every area of operation (Chapoell1995).

Downsizing, quality system, and team approach are view of term used in industries to describe the focus of the business today and of the future.

What the impact of the new and future of way of doing business have on OSH profession on the workplace.

OSH have economic impact on the organization beside it ethical commitment and the demand for OSH service remains highly mainly to fulfill the short term need for compliance with OSH regulation and standard (Corn, 1994, p-113).

(Chi-Square) has been used for the first hypothesis test which state that there was such (positive relation between total quality and occupational safety and health) table(3-17) we observe that the value of (sig) equal (0.000) which less than (0.05) that indicate There is significant difference between total quality management TQM & occupational safety OSH within the answers of samples individuals around the term behave the answer that has more frequency which was the accepters behave hypothesis.

And throughout using the same test (Chi-Square) for checking second hypothesis which stated that (improvement of quality will help in reducing hazards inside work environment.) ,table (3-19)we observe that the value of (sig) equal (0.00) which less than (0.05) that indicate existence of significant difference between improving work processes and reduction of occupational exposure within the answers of samples individuals around the term behave the answer that has more frequency which was the accepters behave hypothesis. The same test can be used (Chi-Square) for checking the third hypothesis which stated that (total quality environment is a workers friendly) and from table (3-20) we observe that the value of (sig) equal (0.00) which less than (0.05) that indicate of existence of significant difference between total quality management environment and workplace within the answers of samples

individuals around the term behave the answer that has more frequency which was accepters behave hypothesis.

Omie Shepherd and others in their study about component that contribute to success of safety and health program as perceived by company managers and workers in an industry setting where TQM philosophy is used. They find that there were significant relationship between total quality management and occupational safety and health, safety was an integral part of business success, and that total quality support occupational safety and health.

Barrier between levels of management must be removed for quality and OSH method of management to be successful, support employee participation and involvements and others findings that support the findings of this study.

Rustem Key keles in his study present in 4th research/expert conference with international participation “The role of OSH in TQM “found that TQM& OSH are two different management approaches which support each other and adapting total quality management well reduce occupational exposure and improve working environment and total quality tool can used for occupational safety and health .

4.2 Conclusion

From this study we conclude that

1. Occupational safety and health and TQM are two different management approaches which support each other’s and there are a lot of similarities in both systems. Integrating these two systems in SMEs depending on employee participation, continuous improvement, risk management and hazard identification on would definitely decrease loss and increase the productivity and save time and cost.
2. TQM management can support OSH activities effectively by improving work processes using processes improvement techniques to improve quality that leads to reduction in occupational exposure in SMOs.

3. Prevailing of proactive culture (TQM) instead of reactive culture (traditional management), makes TQM environment less hazardous, less stressful and improve work conditions and circumstance that makes TQM environment workers friendly.

This study explains the role of TQM management activities for creating a successful OSH in SMOs. It point out the importance of integrating OSH and TQM management.

Implication of the research:

Regarding the implication for further research, the study can broadened to include not only SMEs but all institutions that seek to control losses and improve its competitive poisons in the global market. In additions research to survey method used in this study interview and focus group can carried out with trade union, employees and employers union and others stakeholders, furthermore studies related to the organization culture, loss control and human factors in both TQM& OSH can be conducted which will help institutions to have better understanding of TQM & OSH.

4.3 Recommendation

This study based on findings recommend following:

1. Adapting and integrating TQM&OSH by SMOs would to increase the productivity and saves time and cost as it prevents duplicated effort and make OSH goals consistent with all the firms' goal.
2. The fostering and promotion of preventive culture of TQM is fundamental basis for improving OSH performance(for SMOs) in the long term, Preventative safety and health culture is one which the right to safe and health working environment is respect at all level, Building and maintaining a preventative safety and health culture require making use of all available means to increase general awareness, knowledge and understanding of concept of hazard and risk and how they may be prevented or controlled, and introducing system approach to OSH management using TQM.

3. Using TQM tools within OS&H to increase its performance, accident investigations (to find root causes) and setting control measure.

4- Developing simple OSH action plan In SMEs, setting out the firms' general OSH objective, procedure and allocation of duties together with list of its principle hazard, the control measure and any additional action needed target date for compliance, effectiveness of this action plan must be evaluated and reviewed.

4. Promote training activities for workers and managers in the area of integrated management systems.

References:

القران الكريم

Ahonen. G, May 1998 “The nation-wide program for health and safety in SMEs in Finland”, Helsinki, Finland institute of OSH, PP 151-157.

Chappell . D.W, (1995)“Win with team safety and health”.

Corn. M, (1999), “the state of safety in American workplace to Day”, occupational hazard 56, 113-114.

Dan Peterson, 1988.”Industrial safety management”, second edition Goshen New York,pp 109-120.

Factory regulation 1987.

Heilpern, J. 1998 “Are American companies hostile to quality improvement”

Quality EX (November).New York.

Hiba J.C, (1994). “Workplace improvement achieved by WISE methodology

In Latin America” IEA 94 VOL 15 Ergonomic and the work.

ILO.2000: ILO Standards- related activities in area of OSH, Report and Provisional record NO 22 , internal labor conference Geneva.

Indecon (2006), “report on economic impact of safety, health and welfare A t Work; Legislation department of enterprise, trade and employment, ILO office, Geneva.

Kanji, G.K.,(1999), TQM in UK higher education institution, Vol . 10,pp.125.

Kogi. K, Phoon W, Thurman J, 1983. "Low cost ways of improving working

condition" ILO office, Geneva.

Occupation health regulation 1997.

Pawlowska, Z, Recillo, M "The cost and benefits of implementing EU Directive of OSH the option of polish enterprises", pracy – Naukai Praktyka 2003, Vol .10, pp. 10-22.

Wolkins, D.O. (1996), Total Quality: Aframework for leadership.

Yusof, S.M. & Aspinwall, E.M. (1999) Total quality management

Implementation framework: comparison and review, total

Quality management, Vol.11, pp.281-294.

Stallman, Jeanne, Merger. 1998 "Encyclopedia of occupational safety and

Health" 4th ed. Geneva, ILO, PP 34.33-34.35.

Rasmussen,J. Human errors. Taxonomy for describing human malfunction

In industrial installation, F Occupation Act 4:311-333.

Saylor,J.H.(1992),TQM field Mannual, McGraw Hill, USA.

Tang, (1995), Beyond strategic advance & TQM,Competitive

Dominance:New York, Van Nostrand Reinhold.

Richthonfen Von W. (2002) Labor inspection: Guide to the professional

Geneva,ILO.

2001 ILO Guideline on OSH management system (ILO-OSH2001).

Sudan labor Act 1997.

Newsletters and periodical:

African newsletter for occupational safety and health (1995)

EU-OSH-European agency for safety and health at work, 1996,

“Economic impact of OSH in member state of European Union”,

Luxemburg, Office For official of European communities.

European Commission. 1996,”Guidance on risk assessment at workplace”,

Luxembourg

European Commission (EC), 2004. “Statistical analysis of cost of accident at

In the European union”, Luxembourg.

Muchiri F. K.2010, “Working condition in Kenya” African

Newsletter, Volume20, pp 36-37

Weick, KE. (1988), “Enacted sense making in crisis situations”

Journal of management Studies , 25: 305-317.

Widfeldt, A K and Wideldt (1992) “Total quality management in American

Industry”. AAHON journal 40(7):311-333

Gibson, V.M (1995) “the new employee rewards system”, Management

Review, 13—19.

Howard, R. 1990 “Value makes company”, Howard business RE

(September-October):133-144.

Health and safety executive (HSE), “Updates cost to Britain of workplace
Accidents related ill health”.HSE press released: E 139:4-6

Web sites:

1. [Http// osha.europa.eu/en publication.](http://osha.europa.eu/en/publication)
2. [Http// osha.europa.eu/business/SMEs/index.html.](http://osha.europa.eu/business/SMEs/index.html)
3. [Http// osha. / Topic /risk assessment.](http://osha.europa.eu/Topic/risk-assessment)

Appendices

Sudan University of science and Technology
Post Graduate College
Quality Centre

Questionnaire

Dear

Thanks for your response; the data in this questionnaire will be used for study carried out to evaluate the role of total quality management in setting occupational safety & health management system in small & medium size enterprises.

This data will be use only for scientific research.

There is positive relationship between TQM and OSH

	Strongly agree	agree	neutral	disagree	Strongly disagree
Worker participation is .1 necessary for OSH management					
Top management .2 commitment is necessary for OSH					
OSH goal is strategic goal for.3 TQM					
Remove of the barrier is .4 essential for OSH					
Employee self education and .5 improvement programs is essential for OSH					

Improve quality reduce occupation exposure)

	Strongly agree	agree	natural	disagree	Disagree
Preventive maintenance .1 is a part of preventive .program					
Identifying and .2 communicating OSH requirement reduce .occupational exposure					
Promotion of .3 preventive culture as institutional value well reduces occupational .exposure					
Consider OSH as system .4 based on scientific fact reduce occupational exposure					
Quality assurance procedures .5 improve work condition and .environment					
use of work instruction reduce <i>hazardous</i> <i>exposure</i>					

Total quality management environment is
workers friendly)

	Strongly agree	agree	natural	disagree	disagree
Improve work .1 processes reduce .occupational exposure					
Prevailing of proactive culture instead of preventive culture improve work condition					
Top management support to managers and supervisors improve work condition					
TQM environment is less stressful					
In quality environment the values of respect, corporation and equality are .prevailing					

