International Journal of Academic Research and Development
ISSN: 2455-4197, Impact Factor: RJIF 5.22
www.academicsjournal.com
Volume 1; Issue 12; December 2016; Page No. 01-07

Dynamics of occupational injuries among metal workers in Kamukunji Jua Kali Market, Nairobi, Kenya

Sammy Wafula Simiyu, Wilberforce Cholo

Mount Kenya University, School of Public Health, Kenya

Abstract
An occupational injury is any personal injury, physical damage to body tissues or death from an occupational accident. The metal workers have been significantly exposed to prolonged hammering and cutting activities in excessive noise and with awkward body postures. The purpose of this study was to determine the dynamics of occupational injuries among Jua kali metal workers. This was achieved by determining the magnitude, characteristics, causes and how to minimize the injury occurrence among the Jua kali metal workers; the study used a cross sectional descriptive design. The sampling frame was estimated to be 2455 workers in 782 workshops. Kamukunji Jua Kali Area was purposively selected because it is the biggest jua kali market in Nairobi County. Systematic sampling method was used to select 258 respondents. With the workshops as cluster, cluster sampling was used to determine the number of respondents interviewed in each workshop. The desired number of respondents was then randomly selected. Three officials from Kamukunji Jua Kali Association were interviewed at the Shauri Moyo office. The collected information was coded and analyzed. The data was then analyzed using specific statistical tests. Initial letter authorizing the study was obtained from Mount Kenya University and permission from the Nairobi City County. The prevalence of occupational health injuries among the Jua kali metal workers in Kamukunji Jua kali market was 96%. The findings established that high numbers of metal workers are injured and moroty are cut by sharp objects.

Keywords: prevalence, occupational injuries, metal workers, Jua kali

1. Introduction
The current global labor force stands at about 260,000 million and is growing continuously. Approximately 75% of these working people are in developing countries [1]. The officially registered working population constitutes 60-70% of the world's adult male and 30-60% of the world's female populations each year, another 40 million people join labor force, most of them in developing countries. Workplace injuries are therefore a threat to a large proportion of the world population. World records show that 250 million occupational accidents and 160 million work related diseases occur [2]. Injuries are the leading cause of morbidity and mortality among the workers. Thousands of people are killed annually in industrial accidents, and the number of disabling injuries is also a staggering figure. Many workers suffer job related injuries that result in lost work time, medical treatment, loss of consciousness, restriction of work or motion, or transfer to another job [1].

The magnitude of the global impact of occupational accidents and diseases, as well as major industrial disasters, in terms of human suffering and related economic costs, has been a long standing source of concern at workplace, national and international levels. Although significant efforts have been made at all levels to come to terms with this problem, ILO estimates that about 2.3 million workers die each year from work-related accidents and diseases, and that globally this figure is on the increase [3]. While it is estimated that every year 1.2 million workers in developing countries are killed through work related accidents and diseases. The economic loss related to these accidents is estimated at 4% of the world gross national production [1].

Occupational injuries are responsible for more lost time from work, productivity, and working years of life than any other health conditions. Today injuries continue to claim the lives, damage the physical and psychological well-being and consume the resources of workers and their families. Metal work is both physically demanding and stressful [3]. The metal workers have been significantly exposed to prolonged hammering and cutting activities in excessive noise and with awkward body postures. Moreover, stressors from heat and humidity, welding fumes and metal dusts often cause excess strain and are reflected in a deterioration of their physical work performance. Such workers frequently suffer from ache or pain in the musculoskeletal system and do have significantly more diagnosed musculoskeletal diseases [4].

An occupational health hazard is any material or condition that may cause an occupational injury and or illness. It may produce serious and immediate effects and or long-term health problems. Therefore someone with an occupational illness may not recognize the symptoms immediately [5]. According to the 2009 Kenya Population and Housing Census, the total population was 38.6 million people. The Kenya Economic Survey of 2010 indicates that the total number of employed persons in Kenya in all sectors in the year 2010 was 10,960,000. The number of workplaces in both the formal and informal economies was 140,000, most of which were micro or small sized enterprises with a low awareness of

OSH, and thus were exposing a huge number of workers to workplace risks [6].

The informal sector (jua kali) and its many industries is a major neglected part of the economies of developing countries. These industries have many health injuries arising from various activities which include metal fabrication where we have welding, cutting and brazing, spray painting, panel beating, forging of metals, blacksmithing among many other activities [7]. The explosive growth of the informal sector has brought with it more injuries than before. These include physical, biological, mechanical, chemical and psychological injuries, as revealed in a comparative survey involving interviews with 100 workers from four major towns, namely Nairobi, Mombasa, Nakuru and Kisumu [8].

An injury is any wound or damage to the body resulting from an event in the work environment. Examples include but not limited to; Cut, puncture, laceration, abrasion, fracture, bruise, amputation, insect bite, electrocution, or a thermal, chemical, electrical, or radiation burn. Sprain and strain injuries to muscles, joints, and connective tissues are classified as injuries when they result from a slip, trip, fall or other similar accidents. An injury or illness is considered work-related if an event or exposure in the work environment caused or contributed to the condition or significantly aggravated a preexisting condition. Work-relatedness is presumed for injuries and illnesses resulting from events or exposures occurring in the workplace, unless an exception specifically applies. The work environment includes the establishment and other locations where one or more employees are working or are present as a condition of their employment [9].

In Kenya the labor is growing while the numbers of formal jobs are declining mainly as a result of adjustment programmes that have brought about retrenchments and a growing informal sector [10]. Workers have reacted by fighting for job security while neglecting the need to promote the quality of work life even though the provision of a safe and healthy work environment is a human's right issue. Even though investment in occupational health and safety yield improved working condition, higher productivity and a better quality of goods and services [11].

Since 1970 Kenya has been experiencing rapid growth in the manufacturing sector particularly in machine building technology [12]. The growth has however been a little slower when compared to such countries as South Korea, Singapore and India which have for a long time adopted a more advanced technology in their production process such as flexible manufacturing systems (FMS). FMS is simply the use of computerized and automated equipment and industrial robots. The practical experience of the above mentioned countries has shown that the only way of developing in the direction of industrialized countries like USA, Japan and many others in this group is by applying modern technology in production. However, these do not mean we should forget about the 'jua kali sector' which will play a role in creating job opportunities for the 14 million workers by the end of the century [13].

Workplace environmental injuries are a threat to a large proportion of the world workers in small scale industries are exposed to various injurious substances which include dusts when grinding, cutting or spray coating metals and to vapours when cleaning or finishing materials. Vapours elaborated in the production of metal art are hydrocarbon vapour. Chemical injuries are common among the motor vehicle repairs since they deal with a number of acids, solvents and points, fumes and gases are predominant in premises in sprays painting areas. A large number of workers are exposed to fumes from a spray painting process. These include a large number of self-employed workers mainly in the open – air garages and others in small confined motor workshops without fume extractions [14].

In metal fabrication major medical problems are due to inhalation of fumes and gases such as fluoride, ozone and nitrogen dioxide. Fluoride fluxes produce a gas that dissolves in the lung, producing hydrofluoric acid, a corrosive agent. Phosgene is a toxic substance that causes irritation to the pulmonary tree and a sensation of chocking. High level of exposures from nitrogen dioxide can cause laryngospasm, bronchospasm and pulmonary edema, cough dyspena, hemoptysis and chest pain. Sufficient exposure from organic solvents may cause serious injury to liver, reproductive system, kidneys and cardiopulmonary system [14].

The industries affected are those involved in welding works. The workers are compelled by the law and expected to wear protective clothing mainly the overall and leather hand gloves in most instances, it is very common to find a worker putting an overall on top of his/her personal clothing because there is no enough accommodation for personal clothing. Theft of personal clothing is rampant in work place so the other safest way to protect them is not to remove them [15].

Metal artisan make such as metal boxes, hoes, forks water tanks etc and are exposed to visible radiation since most of them do not use protective equipment. They suffer from poor access to formation like lack of knowledge about injuries, their effects, mode of input and control. This lack of knowledge was attributed to lack to training and sufficient information about injuries [16]. Workshops are mainly open shelters, which lack sanitary facilities and potable water and suffer from inadequate refuse disposal methods. Waste disposal becomes a problem because local authorities do not accept the responsibility of collecting such production wastes in an improper manner, which is not monitored, have an adverse impact in the environment. The workers are also at risk of being exposed to injurious substances [16].

Metal working is the main activity of the manufacturing Jua kali sector and these enterprises provides ideal example of various kind of environmental impact. Metal foundries, where aluminum or brass scrap is melted, contribute to air pollution, the rinsing and polishing residues from electroplating activities go directly into the open drains contaminating the soil and surface water as well as causing occupational health problems. Most of the Jua kali enterprises are either home-based or located near residential areas, hence causing noise pollution, which result from forging, cutting and riveting of metal. Not only workers do face health injuries, but also residents in the vicinity [17].

Many workplace accidents and injuries can be prevented if workers know the causes of accidents and they are taught how to protect themselves to avoid injury. Although no one wants to get hurt at work, there are four major causes for injuries on the job. The number one cause of on-the-job injuries is physical overload. These injuries are cause by lifting, straining, overreaching, bending, and twisting. To protect your back against injury, learn and use proper lifting techniques, never bend or twist while lifting or carrying, and whenever possible, use a mechanical aid or get help with the load from another worker. The second most common cause of worker injury is being hit by or hitting against an object. The best way to protect against these accidents is to be alert to the potential hazards and to use appropriate protective equipment. To avoid injuries from falls, be sure that your footing is firm and wear slip-resistant soled shoes. The fourth major cause of on-the-job injury is machine-related accidents, that is, getting caught by moving machine parts. When working around any moving equipment always use safety shields, guards, and lock-out procedures (18).

Many organizations are still far from maintaining the standard Safety of Employees in Kenya. There are many accidents that are happening in work places that leave the employees badly injured to a point of not being able to work again and sometimes they get killed. Irrespective of the many accidents cases in the workplaces, organizations are reluctant to provide Safety of Employees in Kenya. Work place accidents are reported to be the second most type of disaster after road accidents. The industrial accidents become the most common among the work place disasters in Kenya. Most of the Kenyans industries are ignorant of the workers safety and they are aimed at increasing the profits by avoiding such costs. Other working places are ignorant of the employees' safety even after experiencing major accidents (19). Despite the Kamukunji Jua Kali metal work cluster in Nairobi having been in existence for more than two decades now, the occupational hazards associated with metalwork are scantily known to the workers, their employers and academics. So is the impact of such hazards on the health of the individuals involved and the spillover effects on their families and other dependants. Many workers are known to have died due to health complications arising out of the nature of their work. In other cases, the resultant medical bills have depleted family savings and thrust such families into poverty. In still other cases, sole bread winners have been maimed or rendered blind by failure to use appropriate protection gear (20). The purpose of the study was to determine the Dynamics (Magnitude and Characteristics of, the causes and how to minimize) occupational injuries associated with Jua kali workers in Kamukunji.

2. Methods and materials

This study was carried out at Kamukunji Jua kali market. The area was purposively selected because it is the largest Jua kali market in Nairobi County. It falls under Pumwani ward, Kamukunji Sub-county, Nairobi City County. Kamukunji Sub-county consists of central to eastern area of Nairobi County Kenya. The Sub-county borders Starehe Sub-county on the North and West, Makadara Sub-county on the East and Southern part, and a narrow section of Kasarani Sub-county. The Sub-county has an area of 11.7sq km of which half of the space is occupied by Moi Airbase. This leaves about only 5.8sq km space for human occupation, commercial centres and other social amenities.

The study used cross sectional descriptive design. Descriptive research portrays an accurate profile of persons, events, or situations. A cross-sectional study involves data collected at a defined time. Cross sectional studies are very cost effective as they are completed in a short period. This study was useful in establishing associations rather than causality and for determining prevalence, rather than incidence of occupational injuries among metal workers.

The study targets were persons working in Jua kali metal workshops in Kamukunji Jua kali market. The sampling frame is estimated to be 2455 workers in 782 workshops.

The standard statistical formula, (21) was used to obtain the size as follows:

$$\mathbf{n = \frac{z^2pq}{d^2}}$$

Where:

n = desired sample size

z = the standard normal deviation usually set at 1.96 (95% confidence level).

p = the proportion of the target population estimated to have a particular Characteristic usually measured at 0.5.

q = 1- p = 0.5

d = the error risk assuming 95% confidence level, usually set at 0.05 or 0.02

Therefore,

$$\text{Sample size (n)} = \frac{(1.96)^2\,(0.5)^2}{(0.05)^2} = 384$$

Since the population is less than 10,000 the second formula was used to calculate the sample size as follows:

$$nf = \frac{n}{1 + {}^{n}/_{N}}$$

Where:

nf = desired sample size

n = the actual population

N =estimated population

Therefore;

$$nf = \frac{384}{1 + 384/2455} = 332$$

= 332 respondents

The above formula was also used to determine the number of workshops to be sampled as follows:

$$nf = \frac{384}{1 + 384/782} = 258$$

= 258 respondents

Purposive sampling was employed to select the study area. A Purposive sample was selected based on the knowledge of a population and the purpose of the study. Kamukunji Jua Kali Area was purposively selected

because it is the biggest jua kali market in Nairobi County. Systematic sampling method was used to select 258 workshops. This is a method of choosing a random sample from among a larger population.
The sampling interval (k) was calculated as follows:

$$k = {}^{N}/_{n}$$
$$k = {}^{782}/_{258} \quad = 3$$

Where, n is the sample size, and N is the population size.
From the sampling frame, a starting point was chosen at random, and choices thereafter were at regular sampling intervals of 3. With the workshops as clusters, cluster sampling was then employed to determine the number of respondents to be selected in each workshop. The desired number of respondents was then randomly selected. In simple random sampling, individuals are chosen at random and not more than once to prevent bias that would negatively affect the validity of the result of the experiment. All respondents in the selected workshops were assigned random numbers e.g. 1, 2, 3… N. Respondents were then selected using a table of random numbers.
Structured questionnaires were used for data collection. The data collection was done in 4 phases. Permission was sought from respondents before administration of questionnaires by the research assistants and the researcher. The questionnaires were distributed by the researcher to all the selected respondents. Adequate time was allowed to respondents in order to achieve correct feedback the issues that were raised. An observation checklist was then filled by the investigator. Key informants interviews were carried out by the investigator on three officials from Kamukunji Jua kali Association.
To ensure content validity, a pilot study was conducted in the neighbouring ward, which was not included in the sample population. Equally, the questionnaire was given to my supervisors and my colleagues who examined the items critically and pass on their comments to the researcher. The aim was to assess the clarity of the items in the instruments so that those found to be ambiguous are discarded or modified to ensure validity.
The test re-test method was used to measure reliability of the research instruments containing both closed and open ended items. This involved administering the same questions at an interval of one week to respondents in five workshops. The five workshops were excluded in the final study. This aimed at finding out if results are consistent to determine the reliability of the instruments. All used research tools were counterchecked by the researcher at the end of each day for any mistakes and errors. This aimed at finding out if results are consistent to determine the reliability of the instruments.
We used triangulation, which refers to the use of more than one method for gathering data. This was achieved by collecting the data through structured questionnaires from respondents, observation checklist and interview from key informants. The collected information was coded and entered in a computer where Statistical Packages for Social Science (SPSS). Data were edited to check for errors and mistakes. Data analysis was done using specific statistical tests including descriptive statistics as guided by the variables and objectives.

The researcher obtained the letter authorizing the study from the Nairobi City County. Informed consent was sought from the respondents before conducting interviews. The respondents were informed that there were no risks or benefits in participating in the study. The researcher assured the respondents of maintaining anonymity and confidentiality of the data at all levels of the study.

3. Results

Socio-Demographic Information

Table 1: Socio-demographic information of the workers

Characteristic	Frequencies	Percentage (%)
Age (years)		
18 – 28	185	56%
29 – 39	72	22%
40 – 50	47	14%
51 and above	28	8%
Gender		
Male	318	96%
Female	14	4%
Level of education		
Primary	103	31%
Secondary	140	42%
College/university	89	27%
Work experience		
1 – 2 years	29	9%
2 – 5 years	107	32%
5 years and above	196	59%

Most of the workers (56%) in the Jua kali metal work industry were youth aged between 18 – 28 years, 22% were age between 29 – 39 years, 14% between 40 – 50 years while 8% were 51 years and above. Majority (96%) of the workers were males while 4% were female. The entire workers had attended formal education with 42% attaining secondary level of education, 31% had primary level and 27% being college/university graduates. Most (59%) of the respondents were experienced with a work experience of 5 years and above, 32% had 2 – 5years experience and 9% had 1 -2 years experience.

Magnitude of Occupational Injuries

Injury while at work

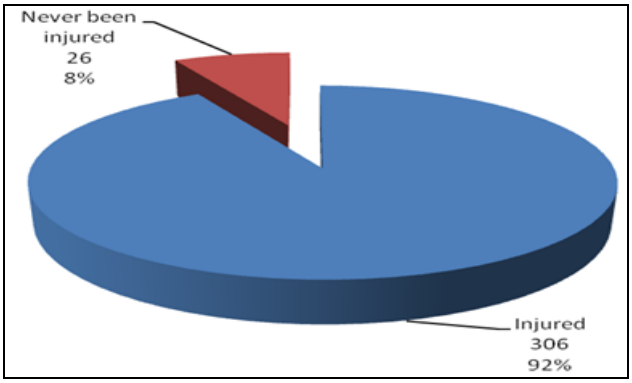

Fig 1: Whether respondents had ever been injured while at work

Majority (96%) of the workers had been injured while at work while 8% had never been injured.

Type of injury

Table 2: Characteristics of injury experienced by the respondents (n = 306)

Type of injury	Frequencies	Percentage (%)
Cuts by sharp objects	229	74.84
Chest injury	56	18.30
Eye injury	82	26.80
General body arches	120	39.22
Hit by falling objects	113	36.93

This question attracted multiple responses as most of the workers had experienced more than one type of injury by the time the study was being carried out. Most (74.84%) of the workers had experience cuts by sharp objects, 39.22% general body arches, 36.93% had been hit by falling objects, 26.80% eye injuries and 18.30% had experienced chest injuries.

Time taken for the injury to heal and workers to return back to work

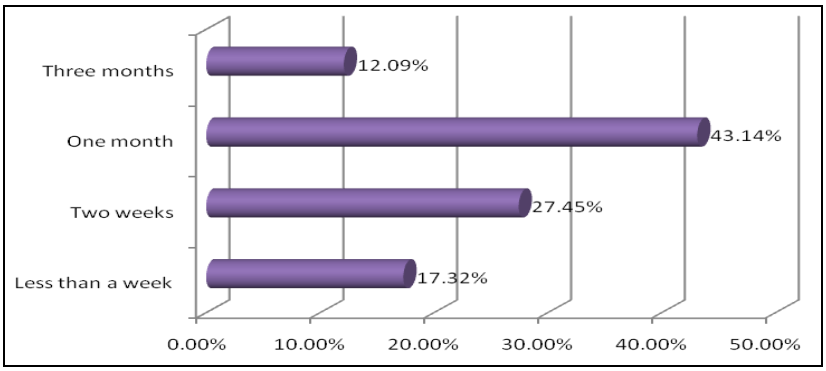

Fig 2: Time taken for the injury to heal and workers to return back to work (n = 306)

Most (43.14%) of the workers said it took them one month to fully recover from the injury suffered and return to work, 27.45% said two weeks, 17.32% said less than a week while 12.09% said up to three months.

Common causes of injuries at workplaces

Table 3: Causes of injuries at workplaces (n = 332)

Cause	Frequencies	Percentage (%)
Use of cutting tools	124	37.35
Grinding and welding processes	51	15.36
Lack of PPEs	73	22
Long working houses	84	25.30
Total	332	100

The Table above shows, most (37.35%) of the respondents said injuries at workplaces were caused by use of cutting tools, 25.30% said due to long working hours, 22% due to lack of PPEs, and 15.36% because of grinding and welding processes.

How injuries can be minimized

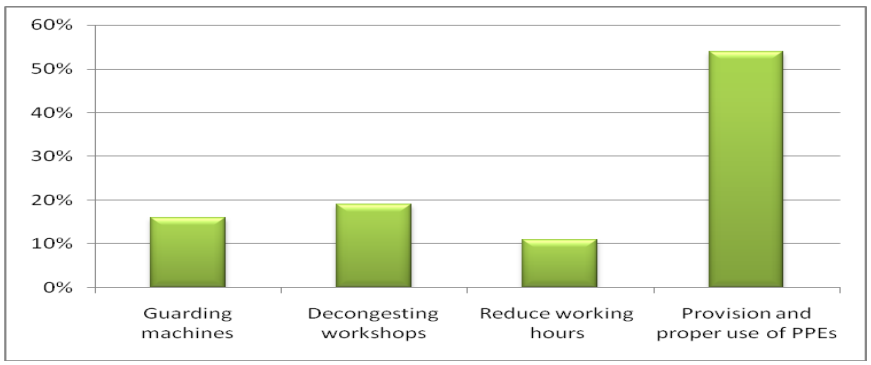

Fig 3: How injuries can be minimized

The figure above shows, most (54%) of the respondents said injuries could be minimized by provision and proper use of PPEs, 19% by decongesting workshops, 16% by guarding of machines and 11% by reducing working hours.

4. Discussion

The study revealed that 96% of the workers had been injured while at work. This shows the high prevalence of occupational health injuries among the Jua kali metal workers.

Despite the progress made in the improvement of working conditions and environment and the efforts undertaken by all those concerned with occupational safety and health, the workplace remains a hazardous environment. Occupational health hazards are common in many economic sectors and affect large numbers of workers. The number of work accidents and the incidence of occupational injuries and diseases are still too high worldwide [22].

The (1LO) estimates show that each year about 200,000 workers lose their lives and as many as 120 million are injured or become ill as a result of work. The type of injury mostly experienced by the workers was cuts by sharp objects followed by general body arches, hits by falling object, eye injuries and chest injuries followed in that order respectively. This agrees with [2] that common workplace injuries include head injuries, back and neck injuries, and sprains or broken bones result from employees doing physical activity around the workplace without proper precautions; unsafe work environment; fatal and traumatic accidents are more common in factory and unskilled laborer jobs such as construction or assembly line work.

Another common kind of injury is to the back. This is second most common cause of people taking time off after the common cold. Back strains are a result of damage to the muscles, ligaments, and/or tendon in the back and are caused by over-stretching this body part. The most common problem in this area is a strained or a pulled muscle. These kinds of injuries are most common in jobs where the workers are required to move or lift heavy objects or are required to make heavy movements. It is also common in jobs where the workers are exposed to full body vibrations. Awkward posture, such as sitting in chairs for long working hours, which are uncomfortable, is another common reason for back problems. Another common kind of work related injury is to the lower body parts, like legs. These are usually sprains, strains, or muscle tears. These are usually acute injuries caused by lifting improperly, twisting the ankle, falling, or some other reasons. These can be avoided with properly designed work areas and safety precautions (18). Workplace environmental injuries are a threat to a large proportion of the world workers in small scale industries are exposed to various injurious substances which include dusts when grinding, cutting or spray coating metals and to vapours when cleaning or finishing materials (14). According to the study, most of the workers stayed home for one month to fully recover from the injury suffered and return to work with some going up to three months. Common causes of injuries at workplaces included cutting tools, to long working hours, lack of PPEs, and grinding and welding processes.

The study found out that respondents thought injuries could be minimized by provision and proper use of PPEs, decongesting workshops, guarding of machines and by reducing working hours. This clearly shows the workers are aware of the possible ways of reducing or preventing occupational health injuries at the workplace. This agrees with [2] who states that many workplace accidents and injuries can be prevented if workers know the causes of accidents and they are taught how to protect themselves to avoid injury.

According to this study, the occurrence of injuries at their workplace was regular as compared to the rare occurrence amounting to 6%. Most of the respondents injured their hands, 18% injured the feet, 15% the eyes were injured, 5% chest and 3% injured their back. Out of all the injuries experienced 12% injuries experienced were fatal. Nature of fatal injury was as a result of cuts by old iron sheets, due to deep cuts, as a result of using poisonous materials and inhalation of acidic fumes. This concurs with [14] that Vapours elaborated in the production of metal art are hydrocarbon vapour. A large number of workers are exposed to fumes from a spray painting process. These include a large number of self-employed workers mainly in the open – air garages and others in small confined motor workshops without fume extractions.

5. Conclusion

The Jua Kali Metal work industry is a highly labour intensive trade is largely dominated by male youth within the age bracket of 18 – 28 years with secondary level of education. The prevalence of occupational health injuries among the Jua kali metal workers in Kamukunji Jua kali market was 96%. Most of the workers stayed home for one month to fully recover from the injury suffered and return to work with some going up to three months. Common causes of injuries at workplaces included cutting tools, to long working hours, lack of PPEs, and grinding and welding processes.

6. References

1. Jovanovic J. Occupational accidents and injuries: Results of a safety preventive programme. Arh Hig Rada Toksikol. 2008; 55:261-8.
2. World Health Organization. The World Health Report. Geneva, Switzerland, 2008.
3. Seiji Machida. System for collection and analysis of occupational accidents data. African Newsletter Occupational Health and Safety. 2009; 19:4-6
4. Gikonyo E. The impact of occupational injuries on the health of metal workers in Kenya's jua kali sector. Project paper. Nairobi, Kenya, 2012.
5. Afubwa SO. Assignment on accident investigation health and safety at work. Curtin University. Taskinen, Australia, 2004.
6. Kenya National Bureau of Statistics (KNBS). Kenya Facts and Figures. Ministry of Planning and National Development. Nairobi, Kenya, 2007.

7. Batino JM. Work improvement in small enterprises. Asian-Pacific newsletter on occupational health and safety. 2012; 12:2-36.
8. Atambo HG. Work Injuries in Jua kali industries in Kenya. African Newsletter on Occupational Health and Safety. 2009; 5(2):32.
9. OSHA. Occupational injury and illness records, 2004. Available online: https://www.osha.gov/recordkeeping/new-osha300form1-1-04.pdf
10. Gitonga SK. Proceedings of the regional symposium on occupational health and safety. African Newsletter on occupational Health and Safety. 2010, 2.
11. Karanja IWM, Muchiri FK, Muruka A. Safety and health in the informal economy. African Newsletter on occupational Health and Safety. 2008; 13:4.
12. Sorock GS, Lombardi DA, Hauser RB, Eisen EA, Herrick RF, Mittleman MA. A case-crossover study of occupational traumatic hand injury: methods and initial findings. Am J Ind Med. 2009; 39(2):171-179.
13. Mayaka AN. New Technology in machine building in Kenya. African Newsletter on Occupational Health and Safety. 2008, 2.
14. Chester J. Weiss and Steven Constable. Mapping thin resistors and hydrocarbons with marine EM methods, Part II — Modeling and analysis in 3D. GEOPHYSICS. 2006; 71(6):G321-G332. doi: 10.1190/1.2356908
15. Odhiambo CB. Injuries in steel industry. African Newsletter on Occupational Health and Safety. 2012, 1-3.
16. Mburu J. Journal of Agriculture and Rural Development in the Tropics and Subtropics, 106. 2005; 2:119-129. Ogutu J.O; 2005.
17. Conclusions concerning decent work and the informal economy. ILO, Provisional Record 25, Ninetieth Session, Geneva, 2002.
18. Maxwell A. Industrial Injuries, Health and Safety Handbook. 2005, 2nd Edition.
19. Beatrice N. Kituyi. National Profile on Occupational Safety and Health - Kenya. International Labour Office, Geneva. Republic of Kenya – Ministry of Labour, 2013.
20. McCormick D. Enterprise Clusters in Africa: From Collective Efficiency to Industrialization', paper prepared for research project on Collective Efficiency and Small Enterprise in Kenya and presented at Institute of Development Studies, Sussex, UK and Institute for Development Studies, University of Nairobi, Nairobi, 1998.
21. Fisher AJ, *et al.* Nonradioactive assay for cellular dimethylallyl diphosphate. *Anal Biochem.* 2001; 292(2):272-9.
22. Forastieri, Valentina. Occupational Health Services at the workplace, Multidisciplinary Team for Central America Safe Work Programme on Safety, Health and the Environment International Labour Organization (ILO), 2002.