DETERMINANTS OF OCCUPATIONAL HEALTH HAZARDS AMONG SCRAP METAL WELDERS AT JUA KALI ENTERPRISES IN ELDORET TOWN, KENYA

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A THESIS SUBMITTED TO THE SCHOOL OF POST-GRADUATE STUDIES IN PARTIAL FULLFILLMENT OF THE REQUIREMENTS OF THE DEGREE OF MASTER OF PUBLIC HEALTH OF THE SCHOOL OF HEALTH SCIENCE, DEPARTMENT OF PUBLIC HEALTH, KISII UNIVERSITY

MARCH, 2021
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I dedicate this work to the Almighty God who gave me the power and ability to ensure that this thesis succeeded. Also, to my dear wife Ruth Chebet and my children Obed, Joy, Jerotich and Terry who stood by me throughout the time. I do not forget student colleagues and friends who encouraged me to work hard in order to ensure that my dreams are achieved.
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<th>Description</th>
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<tbody>
<tr>
<td>COTU</td>
<td>Central Organization of Trade Union</td>
</tr>
<tr>
<td>dbA</td>
<td>Decibels Amps</td>
</tr>
<tr>
<td>DOSHS</td>
<td>Directorate Occupational Safety and Health Services</td>
</tr>
<tr>
<td>ILO</td>
<td>International Labour Organization</td>
</tr>
<tr>
<td>NIOSH</td>
<td>National Institute of Occupational Safety and Health</td>
</tr>
<tr>
<td>NRJE</td>
<td>North Rift Jua Kali Enterprises</td>
</tr>
<tr>
<td>OSH</td>
<td>Occupational Safety and Health</td>
</tr>
<tr>
<td>OSHA</td>
<td>Occupational Safety and Health Administration</td>
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<tr>
<td>PPE:</td>
<td>Personal Protective Equipment</td>
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<tr>
<td>SPSS:</td>
<td>Statistical Package for Social Sciences</td>
</tr>
<tr>
<td>USDL</td>
<td>United States Department of Labour</td>
</tr>
<tr>
<td>UV</td>
<td>Ultra Violet</td>
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<td>WHO</td>
<td>World Health Organization</td>
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ABSTRACT

The Jua Kali industry relies heavily on the supply of scrap metals from industrial operations and individual scrap dealers. In spite of the progress made in the scrap metal industry, workers are potentially exposed to hazards from ergonomic, noise, dusts, fumes, and powerful machinery. The study assessed the determinants of occupational health hazards among scrap metal welders at the Jua Kali Enterprises, Eldoret town, Uasin Gishu County. Specifically, the study identified socio-demographic factors associated with welders’ exposure to occupational hazards and determined the level of knowledge and practice on the use of personal protective equipment by the scrap metal welders. Further, the study assessed control measures put in place to address occupational hazards exposure to scrap metal workers. The study targeted 140 welders who were working in the North Rift Jua Kali Enterprises in Eldoret town. In addition, an official from the organization, labour and Public Health department in charge of occupational safety and health in Uasin Gishu County were interviewed. The study utilized a descriptive, cross sectional study design. Interviewer administered structured questionnaire and an observation checklist were used in data collection. All the analysis was done using statistical package for social sciences (SPSS V.20). P<0.05 was considered significant. The study found out that most of the welders were not aware of the importance of using personal protective equipment. It was noted that the welders were not using personal protective equipment like earmuffs, welding shields, industrial booths and gloves. Moreover, it emerged that provision of personal protective equipment, adherence to work procedures, training on occupational health and safety, provision of insurance policies and putting in place safety precaution measures could reduce occupational hazards among welders. Interviews and observations made pointed out that most common personal protective equipment used by welders were welding glasses/shields and aprons. The study further found out that there was a significant association between age and Occurrence of Occupational Health Hazards ($X^2 = 6.788; p = .000$) and Education level of the respondents and occurrence of occupational health hazards ($X^2 = 2.048; p = .001$). However, there was no association between gender and occurrence of occupational health hazards among welders ($X^2 = .057; p = .643$). In addition, there was a significant and a strong negative correlation between level of awareness on use of PPEs and occurrence of Occupational Health Hazards ($X^2 = .832; p = .000$). Age, educational level and level of awareness on use of PPEs of the respondents influenced the occurrence of occupational health hazards among welders while gender does not affect the occurrence of occupational health hazards among welders. The study recommended that there is need for training of welders on the importance of using personal protective equipment in order to reduce occupational hazards. Additionally, there is need for welders to be registered and provided with insurance policies. The Findings that was obtained may become useful to the unions and other concerned bodies as they will utilize the results in improving occupational safety and health, knowledge, attitude and practice of the scrap metal workers and policy development.
1.1 Background of the Study

The environment where small and medium enterprises, work is dangerous compared to that of bigger companies (Madsen, Hasle, & Limborg, 2019; Kolstad, Christensen, Jensen & Bonde, 2013). The interventions put in place to manage the risks faced by small enterprises are still ineffective (Champoux & Brun, 2010). This is brought about by the scarcity of resources and management that is solid in addition to this, safety awareness is also overlooked (Forouzanfar, et al., 2016). According International Labour Organization, (ILO) research done NU (2010), more than 80% of all the occupational accidents happen in enterprises which are small, and a higher number of accidents related to works are reported more than in large organizations or companies in the entire industrial sector (Cunningham & Sinclair, 2015).

According to Cunningham and Sinclair, (2015), in the job creation and the growth of the economy, small enterprises play an important role. This is brought about by their clientele centred and goals on the local or the regional needs and thus is a backbone in communities (Lortie, Nadeau & Vezeau, 2016). In order to control the high rates of accidents that occur in workplaces, there must be major improvements in the small enterprises which are vital to the economy and the management of risks in the working environment (Correa & Cardoso Junior, 2007), and the initiation of safety activities and culture in these businesses.

Research by Hadjimanolis, Boustras, Economides, Yiannaki and Nicolaides (2015) found that there was a positive relationship between the performance safety of small enterprises with OHS training provided to employees. However, in addition to these,
there is a major correlation between the performance and the employee participation effect in OHS decisions and commitment in the organization with the external safety inspections presence and the improvement of the unsafe manner that corrects OHS performance, other vital training variables are recorded, organization of workplace, recording of injuries, conditions that are unsafe are recognized by workers and also the workers injured have their functions changed (Nowrouzi et al., 2016).

Occupational health safety measures compliance at the place of work is a vital step in the provision of a healthier welding place; this is major in the developing countries that do not consider these measures. Some of the measures used for safety include; goggles wearing, face masks, gloves, plugs for ears, aprons, dustcoats and air filters (Tagurum et al., 2018). Developed nations follow strict regulations and measures to safety precautions, it’s completely different in the developing countries, which are in the nascent stage of development as most of them fall under the non-oganized sector hence do not follow the rules or laws placed for safety of workers. According to Fiebai and Awoyesuku, (2011), welding is a skilled profession that has been practised since the olden days. Metals are joined or cut using flames or an electric arc and other heat sources to melt and cut or join metal (Vaidya, Gangakhedkar, Shetty, & Waghalkar, 2020).

An injury sustained by a worker while performing his/her duties in the industry is known as an occupational injury (Aderaw, Engdaw, & Tadesse 2011). According to Porru, Calza and Arici, (2017), occupational injuries and diseases costs have always been the root cause for concern at the individual, national and the international levels. According to Young (2014), the deaths caused by work related diseases globally were 35% caused by cardiovascular and diseases of circulatory manner, 29% were from
cancer, then followed by 15% from occupational injuries and 10% of infectious diseases, all these were reported to be of about 2/3 deaths recorded globally. Over 2.3 million fatal and 313 million non fatal occupational injuries were reported by the International Labour Organization (ILO) and were caused by occupational accidents and diseases that were work related (ILO, 2014).

Injuries from work relation results from a more complex interplay of a variety of risk factors. The most common factor in workplace were the psychological factors and ergonomic factors. Socio-demographic characteristics of employees and the environmental and social conditions (Goddard & Wheeler, 2013; Das, 2015). Studies from different researchers have shown that early age employment (Berhe et al., 2015), lack of formal education, (Khashaba et al., 2017), low salary at the end of month (Gebrekiros, Abera, & Dessalegn, 2015) individuals smoking status (Kumar & Dharianipriya 2014), problems of sleeping (Salminen , 2010), alcoholism (Rajesh, Cheung & Fung, 2012), working on overtime (Stephan, & Ariane, 2011), lack of proper or no health and safety training, (Manay, et al., 2014), being either a metal or wood worker (Yessuf, Moges & Ahmed, 2014), job experience (duration), lack of personal protective equipment (PPE) during work (Mokuga, Mayega, & Bazeyo, 2012) and employee’s lack of satisfaction (Manay et al., 2014) were the main contributing factors for injuries that were occupational.

There is a high increase of occupational accidents and diseases in the developing countries and it has been estimated that more than 120 million accidents are normally placed at over 200,000 fatalities yearly in developing world (Lund & Marriott, 2011). According of World Health Organization (WHO) (2010) the gross national product (GNP) of 10-20% of a country is caused by poor occupational health and the
reduction of workers capacity, and worldwide occupational diseases illness and death accounts for a 4% of the country’s GDP this is according to (Amponsah-Tawiah & Mensah, 2016). According to ILO, in 2016 it was estimated that about 6300 people died daily and occupational accidents were the main reason and that over 2.3 million deaths occurred per year due to work related diseases (ILO, 2016).

The town of Eldoret town began in 1910 as a post office that was isolated and established for the convenience of the Boer farmers who had settled in an area that was large after the railway came from Londiani. Farm 64 was settled for the township since it was poor in agriculture and was a piece of land that was stony. The highway road serves the town therefore connecting it to other major Kenyan towns and lies on the Kenya-Uganda main railway (Komen, 2008). The town itself, has continually expanded in terms of population size, structures, distribution and the density and this is according to the Uasin Gishu District Development plan of 2002-2008.

According to Cheserek et al., (2012), the town’s population in 1962 was 19,605 people, 1979 it had 111,882 people, 1999 its population was 197,449 and the year 2002 it rose to 216,356 and the projected population according to the Eldoret District Statistics office of 2009 was 497,449 people.

The annual growth rate of Eldoret is 8.3% and has potential work force of about 60,000 in 1989 (Waweru, 2012). The factors that determine Eldoret high population growth rate include natural increment of population, movements, mechanical and the development of institutions of the town and the boundary expansion of the municipality in 1988. Eldoret town’s strategic location has made it a perfect centre for wholesale and retailing services of farm tools and the machineries, provision of administrative services and entertainment. In Kenya, Eldoret is one of the fastest
growing towns. Nonetheless, growth rate of the population has by far out spaced formal employment opportunities creation which results in an informal sector that is fast growing referred to as Jua Kali sector (Otiso, 2005).

The recycling of scrap metal is a vital part of Jua Kali sector in Kenya. It’s an industry that is large worldwide and its presence has been noted since the eighteenth century. The facilities of salvaged material reusing highlight a variety of different modern activities including welding and light cutting, shearing, destroying, preparing and the bundling of metals that are ferrous and non-ferrous, manual picking and material arranging, mass material development (Otiso, 2005). According to Asturias et al, (2006), the year 2002 had about 452,000 workers employed in USA as welders, cutters, solderers and brazers. According to the census data, 800,000 US workers were involved in welding or allied processes and were full time while more than a million workers performed welding intermittent (Asturias et al, 2016).

Diseases and disorders that are occupational in nature are those that occur in a particular occupation of industry due to physical, chemical, social, biological and psychological factors presently at the place of work as experienced over the span of employment (Kumar & Dharanipriya, 2014). Moreover, occupational hazards and diseases can also be credited to the improper conditions of work and the way they occur can be prevented. Kumar and Dharanipriya, (2014) stated that occupational hazard control lowers the incidences of accidents and diseases that are related with work and also improvement of health and the general morale of the labour force. In the long-run, it leads to increased efficiency in workers and decreases work absenteeism. Much of the time the financial advantages far exceed the costs of eliminating hazards (Oluwole et al, 2018). With the technology advancement,
increasing hazardous and perilous work place risks have created. A portion of these dangers have been perceived while some stay unseen and to tackle this issue, a word related wellbeing administration that is responsive is required.

According to the US Occupational Safety and Health Administration (OSHA), the well-known sicknesses experienced in the industry incorporates harming by substantial metals including lead, cadmium, nickel. Disorders related with rehashed injury incorporate skin ailments, and respiratory conditions related with contact or inhalation of harmful agents (OSHA, 2018). The most widely recognized events that lead to injuries from work included contact with an object or an equipment; overextension which may cause sprains, strains, heat burns, cuts, lacerations, and punctures (OSHA, 2018). Vibration dangers are firmly related or connected with hazards from noise since tools that produce vibration ordinarily likewise produce extreme levels of noise. Vibration related issues are not only serious, but also widespread (Waweru, 2012). Fatalities in this industry are normal; for instance, somewhere in the between 2007 and 2009 there were two lethal occurrences at two scrap metal recycling plant in the Seattle (Tappura et al., 2018).

The word related security and Health Act of 2007 was authorized to give wellbeing, wellbeing and government assistance of laborers and protect people against risks to safety and health emerging out of, or regarding, the people’s activities at work. In any case, there are as yet countless mishaps at the work place. This study investigated the determinants of occupational health hazards among scrap metal workers at the North Rift Jua Kali Enterprise in Eldoret Town, in Uasin Gishu County, Kenya.
1.2 Problem Statement

According to International Labour Organization (ILO), (2016) it estimated that close to 270 million occupational accidents and 2 million work related deaths occur each year. The greatest occupational injuries occur in Sub-Sahara Africa followed by Asia (excluding China and India) (Lund & Marriott, 2011). One of the countries undergoing a significant industrialization and has scrap metal industry and employs quite a large number of workers who contribute to the construction industry is Kenya. Despite the fact that informal sector economy contributes greatly to the economy of the country, its explosive growth has brought more hazards than before. These include; physical hazards (injuries), biological hazards (bacteria), mechanical (vibrations and noise), chemical (lead poisoning) and psycho-social hazards (stress, fatigue) (Nwankwo, Karanja & Vasanthakaalam, 2017). Informal sector workers are not only harmed with hazardous working environment, but also enterprise productivity decrease which in the long run lowers income since there is poor health and the inability to effectively work (Theuri, 2012). With the records available from Uasin Gishu County labour office (2016) indicated that there are usually about 8 cases of various injuries on a daily basis recorded among welders within Eldoret town. Despite this a lot of cases of hazards among welders are unreported while those resulting from welding fumes take long to be noticed and could be life threatening.

1.3 Main Objective

The main objective of this study was to determine occupational health hazards exposure among scrap metal welders at the Jua Kali Enterprises, Eldoret town.

1.4 Specific Objectives

The following were the specific objectives of this study;
i. To identify socio-demographic factors associated with workers’ exposure to occupational hazards.

ii. To determine the level of knowledge and practice on the use of personal protective equipment (PPE) and gears and their importance among welders at North Rift Jua Kali Enterprises.

iii. To determine control measures put in place to address occupational hazards exposure to welders at North Rift Jua Kali Enterprises.

1.5 Research Questions

i. What are the socio-demographic factors associated with scrap metal welders’ exposure to occupational hazards?

ii. What is the level of knowledge and practice on the use of personal protective equipment (PPE) and gears among scrap metal welders at North Rift Jua Kali Enterprises?

iii. What are the control measures put in place to address occupational hazards exposure to scrap metal welders at North Rift Jua Kali Enterprises?

1.6 Justification

According to a global report, 271 million of work-related injuries were of the result of poor occupational health, deaths related to work relation was 2 million while 160 million were from diseases at the work environment per annum. According to Getnet, and Waju, (2015), in developing countries Kenya included, have approximately 10 to 20 times higher of reports of having work related injuries than that of developed countries.
About 70% of Kenya working population are considered to be engaged in the informal sector (Jua Kali). The workers in metal scraping industry mostly do not have formal training and are exposed to various occupational hazards. Those with training on use of PPEs at times are negligent on use of these equipment (Balkhyour, Ahmad, & Rehan, 2019). The scrap metal industry, though addressing the high unemployment rate being faced in the country, it employs a large workforce that has limited understanding of the consequences of the occupational hazards encountered. The potential exposure of these workers to toxic chemicals in metals is of unique concern to their occupational health, the tools and methods used and the unregulated setting that they usually work in frequently.

The research findings will be helpful to the unions and other concerned bodies as they will use the outcomes in improving occupational health safety of the scrap metal workers. The control of occupational hazards dangers diminishes the frequency of mishaps and business-related diseases and also improves the health and general morale of the work force. This will thus prompt expanded laborers proficiency and diminished non-attendance from work.
1.8 Conceptual Framework

This study was guided by the conceptual framework as presented in Figure 1.

INDEPENDENT VARIABLES

Socio-demographic Factors
- Age

Personal protective equipment (PPE)
- Level of use

Control measures
- Training

DEPENDENT VARIABLE

Occupational health Hazards
- Radiation fumes

Government Regulations

INTERVENING VARIABLE

Figure I: A conceptual Framework on Determinants of Occupational Health Hazards

Source: Researcher, 2019
1.9 Definition of Key Terms

**Hazard:** The chance of suffering harm, danger, peril.

**Informal sector:** Refers to small scale activity with little capital, labour intensive, less technology and skills, produce cheap goods and services with little earnings.

**Occupational diseases:** Are diseases suffered by employee due to exposure to hazards at workplace.

**Occupational hazard:** This is a disease or a harm that affects employee as a result of exposure to adverse working conditions at workplace or even after work termination.

**Occupational health:** Promotion of wellbeing of workers and maintenance of health at workplace.

**Risk:** The likelihood of harm to occur.
CHAPTER TWO
LITERATURE REVIEW

2.1 Occupational Health and Safety

Occupational accidents and diseases in developing countries are increasing in numbers. An estimation of over 120 million occupational accidents and over 200,000 deaths have been estimated every year in these nations (Lund & Marriott, 2011). In Africa, Sub-Saharan region seems to report the highest rate followed by Asia (Du & Leigh, 2011). About 42 million occupational accidents was expected with fatalities of more than 54,000 every year (Takala, Hämäläinen, Nenonen, Takahashi, & Chimed-Ochir, 2017).

Welding is among the number of professions that add to work related mishaps and sicknesses in regards to developing nations (Bhumika et al., 2014). Welding process remains one of the most widely recognized procedures of joining metals today and plays a major part in the art of fabricating metal that involves the creation of metal structures by cutting, bending and joining the metal. Giving the metal the polish, paint or coat of the pieces also goes hand in hand with the other processes (Takala et al., 2017; Bhumika et al., 2014).

Dangers of welding such as bright and blinding light of the welding arc, the welding fumes which has hazardous compositions, the edges of the metals that are sharp and also the hot flying molten metal parts, the machines which are fast moving producing noises and vibrations may contribute to the acute and chronic effects in health (Oluwole, et al., 2018).

According to Roach, (2018) some of the symptoms that are linked with welding metals include fever from metal smoke (influenza like indications with lopsided chills
and high fever that keep going several days), bothering of eyes, nose, chest and respiratory lot that cause hacking, wheezing, breathing issues, bronchitis, aspiratory oedema, pneumonitis and gastrointestinal impacts like sickness, hunger misfortune, regurgitating, issues and heartburn.

The industry of Scrap metal recycling is a large industry worldwide and has been in existence since eighteenth century. As a worker in this industry, one will be engaged in various types of activities that are important for production of goods and services. These activities will affect the physical and mental well-being of workers. Occupational health broadly deals with the total health of the employed person to maintain and promote the well-being of workers. Occupational health and safety services need to be put in place to protect workers from occupational related diseases and accidents. According to Balkhyour, et al., (2019), these services are preventive in nature. This section deals with the literature reviewed by other researchers. It specifically addresses the concept of occupational health, socio-demographic factors associated with workers’ exposure to occupational hazards, the level of knowledge and practice on the use of personal protective equipment (PPE) and gears and their importance, control measures put in place to address occupational hazards exposure and the summary of the literature reviewed with the gap therein.

2.2 Importance of Occupational Health and Safety at Workplace

Occupational health and safety (OHS) aimed at procedures and processes that enhance positive workplace, protecting, preserving and promoting the health, safety and well-being of the workers in their worksites. OHS is central to the total improvement of the working conditions for employees and any individual or groups of individuals associated with the work and the work environment (WHO, 2010).
Thus, OHS represents an important strategy, not only to ensuring the safety and well-being of workers but also contributes positively to productivity, corporate image and social improvement (Songstad, Moland, Massay & Blystad, 2012). Simply, healthy workers become better motivated, enjoy better job satisfaction and contribute better to productivity and services (Gilbreath & Karimi, 2012; Seidler et al., 2014). OHS therefore enhances the overall quality of life of workers, their families, the organization and the society and cannot be underrated.

The world over, OHS takes it route from the International Labour Organization’s (ILO) Conventions (OSHA, 2018; WHO, 2010). The health and safety concerns of workers have led ILO to formulate regulations and organized institutes for their member countries (Price et al., 2019). The conventions provide the guidelines as bases for the national OHS policies. In addition, organizations or institutions also draw their OHS policies or regulations from national safety policies (Roach, 2017). ILO regulations enjoin nations and employers to put in place measures that serve to protect the safety and well-being of their workers and other people affected by the operations of their companies or organizations.

ILO as a United Nation’s (UN) body is responsible for labour that caters for the health and safety of the workers worldwide. ILO also collaborates with other UN bodies such as WHO, FAO and UNICEF to achieve their aim of worker protection. Other national institutions like Occupational Safety and Health Administration (OSHA) of United State, National Institute of Health and Safety (NIHS) and Health and Safety Executives of United Kingdom and many other are also collaborators in the health, safety and well-being issues of the worker in the various countries (Mokdad et al., 2018).
National OHS policy is important for the promotion of workers’ health and safety in all organizations. Thus, organizations implement such national policies that in turn serve their workers’ health interests. Besides, such national policies may have institutions that serve as enforcers to the implementation of the policies to advance workers’ well-being (Annang, 2014). Indeed, even where public wellbeing and security arrangements don’t exist, similar to Ghana (Clark, 2008), associations have the ethical obligation to ensure and advance the wellbeing and prosperity of their most important asset [the worker] (Anderson, and Chun, 2014).

OHS doesn’t just save the individual wellbeing and security premium of the specialist and the general public, it advances corporate picture and profitability (Loyen, et al., 2018), for a solid labor force is a gainful labor force. Each country including Ghana needs an extensive public OHS strategy, solid well-resourced organizations for executing such arrangements. Likewise, associations need to make functional moves to giving vital wellbeing and security measures to defend the prosperity of the laborers.

Occupational health main importance is to gain the comprehension of the dealings and associations between the human wellbeing and work with an essential target of acquiring and keeping up the best condition of wellbeing while at the same time upgrading the efficiency of the workers. Work impacts positively people’s health as it’s a source of basic needs and also development socially. Detrimental health can be caused by the exposure to dangerous agents at work that can affect a worker’s health and also damaging the environment hence bringing occupational diseases, illness that are work related and accidents. Service delivery that is desired at workplace can be
hindered by workplace, poor health of the worker and the safety conditions (ILO, 2014).

Despite the progress made in working conditions and environment improvement and the undertaken efforts by all those concerned with OSH, the environment for working remains a dangerous environment. Occupational health hazards are common in numerous economic sectors and largely affect majority of workers. The total number of accidents occurring at work and the incidence of injuries that are occupational in nature and diseases are still too high worldwide (Forastieri, 2016). The International Labour Organization, estimates show that yearly, about two hundred thousand (200,000) workers lose their lives and approximately 120 million are injured or fall ill as a result of work. Some 68-157 million occupational diseases that are brand new cases brought by exposures that vary at the workplace and poor working conditions that are dangerous of which of about 30-40% may cause to chronic disease and almost 10% to permanent disability.

A lot of undiagnosed and unreported occupational diseases go by. In workers’ health protection and promotion, the service of occupational health has to attain the enterprise threshold that is acceptable and also that it serves and the workers employed in it. With the extensive industrial range and scope, the different economic activities (manufacturing, commercial, agricultural) with a main aim of laying down a programme of activity or an organization pattern and the operational settings for an OHS which should suit all the initiative and in all conditions is detailed is not possible. The International Labour Organization’s Occupational Health Services Convention No. 161, (1985), states the occupational health’s 16 services as “entrusted services with essentially functions of prevention and advising the employer on
responsibilities, the employees and their work representatives in the undertaking on the requirements for creation and maintaining a safe and an environment that is healthy for working, which will enable the best physical and mental health in relation to work, and the adaptation of work to the workers capabilities in the light of their state of physical and mental health”. OHS provision means taking and doing of activities at the work place with the main purpose of providing protection and the campaigning for workers safety and well-being as well and also the improvement of their conditions of working and the environment of working. All these services occupational health professionals individually operating or part of a select service units of the enterprise or of services that are outside (Forastieri, 2016).

Regardless of this work and wellbeing close relationship, the workers’ wellbeing can't just be controlled by the connections at the working environment but also by elements that are diverse, for example, the ecological variables, individual qualities that are socio-statistic in nature and encompassing network out of working environment that it's wrapped with, economic improvement, approaches of the legislature and laws among others. Along these lines, with the understanding that the soundness of an individual is because of a connection that is dynamic to the total life encounters, a methodology that is comprehensive in word related wellbeing is fundamental. Occupational health is essentially the rise and safeguarding of the degree that is most elevated of the physical, mental and social prosperity of laborers in all occupations by forestalling departures on account of medical problems, controlling of dangers that may occur for workers and the holding fast of work to individuals, and individuals to their employments rule (ILO, 2016).
Occupational safety and health (OSH) is essentially characterized as the craft of the desire, appreciation, estimation and control of risks that emerges in or from the working environment that could bring impairment to laborer's wellbeing and prosperity, mulling over the probable influence on the communities surrounding and the environment in general. The territories that are significantly in intrigue are; the working environment condition, states of working, structure of the organizational, laborers and their social cooperation (ILO, 2016).

2.3 Health and Safety in Metal Industry

One of the industries that have become a vital industrial activity is the scrap metal industry. The consumption world-wide of scrap metal each year is in the order of 500 million tons (Salem et al., 2013). The scrap metal increased importance as a source has been followed side by side by a frequency increase in that, radio-actively contaminated activated scraps of metal and also the scraps of metal with radioactive source(s) or even substances contaminated within it are detected in metal scrap shipments. Some radioactive scraps metals has gone undetected and has been smelted down accidentally or processed and has entered the consumer products stream on sale to the public. Radioactive scrap metal may be sourced from military applications such as uranium that is depleted, medical equipment’s discarded from hospitals having radiation sources, construction or storage materials contaminated with nuclear power plant (Salem et al., 2013).

Ship breaking in Bangladesh provides a substantial quantity of scrap metals used for iron and in steel industry. The complexity of ships is challenging in that majority of environmental safety and health issues are involved. in coastal area of Bangladesh is where majority of Ship breaking activities are being practiced and have brought an
increased demand of raw material for re-rolling mills and other purposes, but with impact that is negative. Moreover, accidents in ship breaking yards are a normal phenomenon. More than 400 workers were killed and 6000 were seriously injured within the last 20 years, several internal and external problems are faced in these activities. However, the process of extraction requires produce debris from the ships broken and the wastes that are a threat to environment and consequently human health. Furthermore, the adopted methods in the processes of extraction and demolition are scarce in safety aspect related to environment and workers (Muhibbullah, 2013).

Occupational high levels noise remains a problem in all regions of the world. In the United States of America, for example, hazardous noise exposure affects more than 30 million workers. In Germany, 4-5 million (12-15% of the workers) are exposed to noise level that is defined as hazardous by WHO (2016). A revealed literature review of workplace noise has a series of health effects which include; hearing impairment, displeasure, hypertension and ischemia heart problems and many more (Okedere 2011).

The informal scrap metal business In Ghana is a relatively profitable venture for majority of the people from the country’s northern part and the countries neighboring residing in old Fadama. The youth go through mountains of discarded gadgets, dismantling and removing components that are metallic in nature including iron, silver and even copper by burning with fire and worn out tyre strips. The dense black smoke is inhaled without the use of protective gears risking their health. The smoke possess a fatal secondary danger to the people and the immediate environment
because of the toxic smoke which is not a dreadful threat to men directly involved in the business of scrap metal.

The dealers of scrap metal themselves do not seem to be aware of the exposure of health hazards in their business. Yusif Anda, a scrap metal dealer involved in the trade for much longer, explains that although he is not sick visibly, he coughs black phlegm. He explains further that its deafening to hear the sound of tools smashing and crushing of metal (Bannah & Lamptey, 2011).

There are a number of varieties of activities, methods, materials, products and by-products in the industry that deals with metal. Knowledge of what transpires in the industry provides an in-depth knowledge comprehension of the dealings and associations between the human wellbeing and work with an essential target of acquiring and keeping up the best condition of wellbeing while at the same time improving the efficiency workers OHR (2015) and thus fulfills with Alma-Ata resolution number 14 of 1978 on occupational health which says,

“to provide special attention to workers by the improvement of care in occupational health and as a vital contribution to this social call”.

This resolution plays an big role in supporting the ILO which main aim is to improve the field of labor related to injustices, adversity and industry privatization. Its structure includes measures for workers protection against sickness, diseases and injuries in employment.

In Kenya, the Central Organization of Trade Union (COTU) and the Federation of Kenya Employers (FKE), have included OHS in their discussions and negotiations (Buyela, 2018). Some of the metal industry processes include but not limited to,
establishing and fabricating machines operation to cut, bend, or straighten metal; metal shaping over anvils, blocks, or forms, by hammering; soldering and welding equipment operation to join sheet-metal parts; inspection, assembling, and smoothening seams and joints of burred surfaces (Madsen et al., 2019).

Health impact Assessment of occupational risks is vital for social acknowledgement of these occupational risks, to strategize and facilitate interventions adequately for their prevention and to manage adequately the burdens of health they cause. The International Labour Organization and World Health Organization have since brought together information on the worldwide health problem due to occupational risks. At a meeting of WHO/ILO in Geneva, July 1997, it was raised that non-wage or employment in the informal sector merits more attention provided the fact that information on this sector is limited and quantified poorly.

2.4 Classes of Health Hazards

According to Madsen et al., (2019) workplace hazards can be categorized into five primary groups; physical, substance, biologic, ergonomic and psychosocial. The risks Exposure may cause immediate or late reactions relying upon the peril attributes, the force, and event rate and presentation duration just as the exposed individuals’ character. The peril highlights are essentially controlled by the kind of procedure, state of the procedure and the surroundings in which they are created.

The ILO has named probably the most widely recognized main drivers of injury and ailment in the business of iron and steel: slip-ups, stumbling and tumbling down on a similar dimension; tumbling from heights; machinery that are unsupervised; objects falling; engulfment; working in spaces that are limited and are difficult to maneuver; machines that move, on-site transports., forklifts and cranes mis-activities; being
presented to controlled and uncontrolled energy sources; exposure to asbestos; mineral wools and exposure to fibers; agents breathed in (gases, vapors, cleans and exhaust); contact on the skin with synthetic substances that are aggravations (acids, soluble bases), solvents and sensitizers; hot metal contacts; fire and blasts; extraordinary temperatures; radiations (non-ionizing, ionizing); clamors and vibrations. Different sources incorporate issues with electrical wires, switches, neurotic natural agents, and ergonomic perils that range from stances that are cumbersome, redundant movements and developments, handling of equipment manually and lifting of heavy loads.

The crucial causes are deficient or need preparing on health and safety, absence of policies that are clearly about safety and wellbeing, organizational structure that are poor, preventive estimates that are insufficient and viable, absence of supervision, absence of successive work environment reviews and investigation. The constraints in the arrangement of emergency treatment and crisis care, medicinal administrations access is poor and social security are a portion of the few difficulties looked in health and safety (Madsen et al., 2019).

2.5 Occupational Hazards in Scrap Metals

According to Njoroge, Kimani and Ndunge, (2014), a number of negative consequences also relate at stages that are different in the scrap metal industry in spite of the advantages being associated with scrap metals recycling. Flooding of weighty metals into the climate might be capable from metal purifying enterprises that refine, salvaged material, and waste consuming containing these components.

Road et al., (2020) states that manufacturing plants representatives that do metal piece reusing are ordinarily presented to assortments of wellbeing risks like material taking
care of techniques, metals themselves (as residue or exhaust), and furthermore with the substances that are perilous used to refine or discover these metals. Word related risks openness with the resultant wounds, infections and even demise has profound impacts both on the profitability stage in function just as on the social monetary specialists' prosperity, their families and their kids. These risks are principally found in the casual area.

As indicated by Okuga et al, (2012), The actual danger wounds introduced at the work measures fluctuate from consumes, cuts, hearing impedance coming about because of uproarious commotions and eye wounds because of unnecessary bright radiation and respiratory dysfunctions because of hurtful metal exhaust breathed in. Globally more than three million people die each year from injuries and a third of all hospitalized are caused by injuries. Injuries are important public health problem because they are common and cause death and ill health. They are also largely preventable. Injuries are always accidental, but sometimes intentional and they are growing health problem in Sub-Saharan Africa. WHO has ranked accidental injury fifth globally among causes of death (Buyela 2018). In US the scrap metal recycling industry in 2001 employed 16,000 workers and approximately 3,000 injuries and illnesses was reported with the most common cause of illnesses being poisoning from lead and cadmium, disorders caused by repeated trauma, skin diseases and breathing problems due to inhalation of or being in contacts with agents that are toxic. The common injuries mostly witnessed were; sprain and strain, heat burns and cuts, lacerations and punctures (OSHA, 2018).

There was likewise the danger of psychosocial perils, for example, worry at work and fatigue notwithstanding the ergonomic risks that included chiefly musculoskeletal
wounds as; muscle sprain, muscle agony, disengagement and break (Okuga et al, 2012).

Amid scraps metals stacking and emptying, laborers are much of the time presented to more wellbeing risks which can be stayed away from by the utilization of the proper mix of Personal Protective Equipment (PPE) like gloves, hard caps, durable boots, thick dress, and respirators (Balkhyour, et al., 2019). If dust that is dangerous created and amid task in order to be adequately shielded from safety and health hazards (Street et al., 2020). The decrease of the size of the metal piece is a basic advancement in the re-usage of scrap metals and the breaking processes every now and again including substantial physical work to separating enormous or complex heaps of scrap metal, or to cut or break the pieces into littler sizes that can be effectively fed into a heater. Improper handling of sharp or pointed bits of metal piece can give cuts or abrasion dangers to hand or body. Employees engaged with exercises of this nature might be presented to fumes from metal, smoke, environments that are hot, and materials that are hot when working near heaters, and can come into contact with hot metals that present risks through both the skin and inhalation.

Thermal gas fires open employees to dangers of sprays or sparks and metal residue particles, high temperatures, harming bright lights (light in both within and the outside of the obvious range), and different gases. Gas chambers that are packed can likewise show threats of blast because of excessive heat or being harmed physically (Street et al., 2020).

Discharges from the preparation of scrap metals as residue and air are for the most part at levels that are little (Muchova & Eder, 2010). Nonetheless, risky air toxins released might be brought about by the auxiliary metal generation in a flame/heater.
including dioxins, furans and metals/metal oxides, for example, lead and zinc. An expansion in cost of scrap metals, particularly the metals that are non-ferrous, has the likeliness to spur an increment in robbery of metal from the environment built. For example, the demand of copper has fuelled a discernible ascent in the plundering of the developed environment around the globe (Bennett, 2017).

2.5.1 Noise Pollution

Occupational health and safety are interdepended and integral to one another it assumes an imperative part in the existence of laborers. Hearing misfortune because of clamor contamination is perhaps the most well-known word related sickness, more consideration is being paid to its unsafe impacts (Loukzadeh et al., 2014; Zamanian et al., 2013). Commotion hearing misfortune has been recorded as the third scourge sickness around the world, it can cause physiological and mental brokenness (Yuen, 2014). Commotions make physiologically, tinnitus and mentally negative consequences for individuals. Among the physiological impacts, the vast majority of the regular is hearing misfortune (Attarchi et al., 2010; Fada and Osiasanya, 2017). Improvement of word related guidelines and guidelines has been begun from the times of the old Babylonians (Buksh, Nargis, Yun, He, and Ghufran, 2018).

The protected and sound work environment is vital for laborers, these days this is a developing proficient theme (Buksh, et al., 2018). Word related wellbeing is a significant concern, gathering of working age people groups bear inability weight and ailment because of work place wounds, as commotion is drawn a worldwide issue which prompts lasting hearing misfortune (Gilks and Logan, 2010). Hearing misfortune can seriously bargain the productivity of laborers and their capacities,
because of uproarious clamor it is in non-reversible and may prompt lifetime clinical consideration or perpetual brokenness (Yankaskas, 2013; Yong and Wang, 2015).

The impact of commotion can be isolated into four classes; Physical impacts (hearing imperfections), Psychological impacts (crabbiness and stress), Effects on work execution (decrease of profitability) and Physiological impacts (expanded circulatory strain) (Gordon et al., 2016). Word related hearing misfortune keeps on being among ten driving word related perishes and it is likewise a disturbing sign as hearing is in danger (Gilks and Logan, 2010; World Health Organization, 2014). As indicated by the factual report, 600 million laborers are presented to word related commotion around the world (HSME magazine, 2012). For the most part the modern laborers like development, mining, material, stone cutting, and topsoils are seriously influenced by this issue (Engdahl and Tambs, 2010; Masterson et al., 2015). It is essential for modern specialists to know about the significance of Primary Protective Equipment to conquer the persistent impact of clamor (Fada and Osiasanya, 2017).

A few examinations have been distributed to feature the negative impacts of clamor contamination. Buxton et al., (2017), distinguish the solid connection between's Occupational commotion and blood vessel circulatory strain (systolic and diastolic), beat rate, and hearing edge levels at various frequencies. Yuan, Yin, Sun and Chen, (2019) in their examination distinguished a huge contrast of 16mmHg of systolic pulse in rest time existed between two openings bunch at vehicle industrial facility in China. As per the Alsheikh and Dana (2012), they distinguish the conceivable impact of clamor contamination related blood oxygen immersion, hearing edge levels, beat rate and pulse, they showed laborers presented to commotion in excess of 90 dB. The
current examination decided the word related wellbeing risks openness among salvaged material laborers at the North Rift Jua kali undertakings, Eldoret town.

2.6 Hazards Routes of Entry and Target Organs

Some of the different routes hazards and dangerous substance may be able to enter an individual’s body are; thought ingestion through the mouth then into the gut, breathing into to lungs hazardous fumes, skin absorption and direct entries through cuts and wounds. The hazardous and dangerous substances do not enter the body and attack indiscriminately. Organs are affected differently with these substances and in any case, any of the substance can affect a number of organs. These hazardous substances may be broadly be categorized into seven groups namely; carcinogenic, corrosive, dermatitic, flammable, irritant, radioactive and toxic (Yeoh et al, 2014).

Toxic hazardous substance mostly targets the kidneys, liver and bone marrow and the reaction or symptom is that the functioning of the liver is affected. Carcinogenic substance targets the lungs, bladder, skin and also the liver. The reaction here is that warts and ulcers are developed and malignant growth among those affected. Dermatitic substance target the skin causing inflammation a condition referred as dermatitis. Irritant substance affects the eyes, skin and lungs causing inflammation, fibrosis of the lungs and dermatitis. Sensitive organs are the main targets of radioactive substances such as bone marrow eyes and gonads; however, inflammable toxics affect the skin causing burns (Yeoh et al., 2014).

A research study that was carried out in Zaria Nigeria among Roadside Mechanics on determinants of occupational health hazards found that the most common injuries were like; burns, bruises, crushed digits and cuts. Other hazards reported were pains of the joints back, hernia and sprains among ergonomic hazards (Sambo et al, 2012).
2.7 Types of Scrap Metals

The metal industry has two divisions, namely; ferrous and non-ferrous metals (Turkish Metal Industry Report, 2010) while the salvaged material grouping is additionally along these two sorts of metals.

2.7.1 Ferrous Scraps

Reusing of ferrous scraps turns away the environmental burden of accumulation of huge piece building up in landfill locales and different regions of disposal. Reusing is additionally energy effective. It is additionally assessed that in each ton of steel that is reused it spares roughly 1,000,000 kg of iron mineral, 600 kg of coal and 54 kg of limestone (Ansari, et al., 2018). This furthermore brings about the abatement of digging practices for the rough materials, again lessening the ecological weights. Different advantages in the environment happens as 86% less contamination of air, 76% less contamination of water, 40% water utilized decrease, and a 1.28 ton decrease in the solid wastes generation (Thirunavukarasu et al., 2018).

2.7.2 Non-Ferrous Scraps

Non-ferrous piece incorporates metals that don't contain iron. New changes in the high level development have inconceivably decreased liberally the proportions of non-ferrous piece made as the things are being created utilize more slim check metal and moreover with the extended utilization of different materials, for instance, plastics for things including drink containers and lines (Merino et al., 2017). The most widely recognized non-ferrous metals generally reused and are customarily found and isolated in household waste in adequately amounts that are enormous are fundamental; aluminum, copper, lead and brass. The most widely recognized type of metal is Aluminum (by volume) found in pretty much every residential waste,
comprising basically of cans utilized for beverage (Ansari et al., 2018). Sources of non-ferrous pieces can likewise be arranged into three, much the same as that of ferrous metals. Aluminum scraps sources incorporate vehicle and transportation, development and building destinations, wastes of aluminum packaging, cabled wire and home electronic gear's (Muchová & Eder, 2010). Brass is a blend of copper and zinc. Health hazard effects from mechanical processes such as cutting, grinding, welding torching can bring about irritation of the respiratory track on upper side. Nausea and muscle cramps can be brought about by over exposure. Long-lasting over exposure can cause anaemia, pigmentation changes, damage to the central nervous system, sensitization of the respiratory and carcinogenicity of the lungs and reproductive (SDS, 2015).

Since the beginning of civilization, lead has been a naturally occurring element that people have used mostly. Most lead adult exposures are occupational and majorly occur in industries related with lead, such as lead smelting, refining, manufacturing, construction and painting. Between 0.5 million and 1.5 million workers are generally exposed to lead in the workplace. Most exposure to human to lead occurs is through inhalation or ingestion. One can inhale fumes during welding, dust or swallow foods contaminated, or smoking in a lead infected environment. Exposure to lead can bring about brain damage, nervous system damage, kidney, blood cells and reproductive system. It can cause headache, depression, dizziness, fatigue, memory loss and joints pain (Ansari et al., 2018; Muchová & Eder, 2010). Copper is a reddish metal involved with face focused cubic crystalline structure. Modern presentation to copper fumes, mist or residue may result in metal smoke fever with atrophic changes in nasal mucous membrane (Okafor, 2016).
2.8 Control Measures for the Occurrence of Occupational Health Hazards among Welders

Welding work is always associated with hazards and therefore avoiding these hazards requires preparing, ability, expertise and care from businesses and laborers alongside an orderly way to deal with security. Dangers rising up out of workplaces could debilitate the prosperity and flourishing of the workers; thusly, it is essential to expect, see, survey and control such risks (Gebrezgiabher, Tetemke and Yetum 2013). The use of individual cautious stuff (PPE) reliably is a respectable and safe practice by welders to protect from receptiveness to dangers and wounds during welding or cutting (Oluwole et al., 2018).

A study by Adelani, Adewale, Oladeji and Bello (2014) on use of safety devices by welders in Nigeria recommended the use of engineering and administrative controls, regulations and enforcement to enhance the safety of welders in their occupations. Additionally, a study by Tagurum et al., (2018) found out that most of the respondents were aware of workplace hazards including welding fumes, manual handling of welding equipment, noise and vibrations as well as some of the welding related health problems.

Mechanical security and medical issues are turning out to be significant difficulties in most creating on account of low word related hazards care, nonappearance of workplace prosperity and prosperity technique, and inefficient security the chief’s structure (Bhumika et al., 2014). On account of these organizations, workers and the public authority are losing quantifiable costs.

Work of safety efforts and practices among welders are critical techniques for thwarting or reducing the levels of prosperity risks related with the occupation (Ajayi
et al., 2011). Regardless, Adewoye et al., (2013) saw that while adherence to these security measures is practically comprehensive in the made world, little is contemplated the situation in making world. Therefore the current study determined the control measures put in place to address exposure to occupational hazards among welders in Eldoret town, Kenya.

Throughout the last 10-15 years the wellbeing science writing has accentuated the multidimensional attributes of dangers to laborers, and the comprehension of how to forestall mishaps at the working environment (Lund, Alfers, and Santana, 2016). While mishaps beforehand were seen from a specialized, legitimate or human variables point of view, as of late social and hierarchical elements have become significant extra viewpoints remembered for wellbeing mediation programs in the work environment (Spangenberg, 2010). Wellbeing mediations for the counteraction of mishaps at work are in this way described as an unpredictable cycle, which for the most part coordinates various segments, for example, security crusades, wellbeing preparing, enactment or machines guarding. Exploration has underlined the significance of coordinating these different segments to accomplish an undeniable degree of wellbeing at work 5 (Smith, Hughes, DeJoy and Dyal, 2018). An audit of security intercession programs by Lund et al., (2016) reasons that the biggest impact is gotten by a mix of attitudinal, conduct and underlying methodologies, hence diverse mediations.

A security intercession may comprise of a solitary segment, for example, a wellbeing effort inside the working environment pointed toward changing mentalities or wellbeing preparing pointed toward changing conduct or it can comprise of a blend of such segments, including wellbeing environment, attitudinal, social or primary
segments. A security intercession may run for a more limited or longer timeframe or address a perpetual change, concerning model new guidelines or enactment. A security mediation program can be started at the work environment by the business or the representatives, or started from outside the working environment by open specialists, social accomplices or different partners. Notwithstanding, the intercession should occur and pointed toward improving wellbeing in the work environment or during work (Dyreborg, et al., 2011).

Accordingly, European Agency for Safety and Health at Work (2014) illustrated that businesses have clear techniques and obligations regarding wellbeing and security and that everybody be made mindful of their own and others' duties to security. Along these lines, bosses should make moves to distinguish the fundamental dangers to wellbeing and security and made a move to take out or decrease them, make plans for the upkeep of work hardware sufficient and furnish laborers with appropriate individual defensive gear (PPE) and train the labor force in the utilization of such gadgets. Moreover, laborers be given data on the dangers and be prepared in safe working, crisis strategies and detailing hazardous conditions and mishaps. Additionally, made brief moves to research mishaps, close to misses and announced issues, consistently assessing working environment, and watching that laborers are following safe working techniques are acts dependable security the board rehearses (Ansah, and Mintal, 2012). Having a framework for investigating wellbeing and security strategy and working techniques are similarly pertinent to mishap counteraction and defending laborers' lives.

Security measures are intentional viable activities taken by the ranking directors of associations to ensure, keep up and advance the wellbeing, wellbeing and prosperity
of their labor force both inside and outside the workplace. Wellbeing measures are signs of the executives backing and need for and obligation to laborers' wellbeing and security. Furthermore, such measures depend on authoritative support and correspondence of security (Dollard et al., 2012). In an ordinary association, wellbeing measures may incorporate establishing word related wellbeing and security arrangements, framing work environment wellbeing advisory group, regulating or potentially implementing consistence to the approaches.

Furthermore, PPE and preparing laborers in safe work techniques, and giving clinical consideration including pre-business clinical screening and undertaking danger appraisal and the executives improve wellbeing (Boustras, and Hadjimanolis, 2012). These security measures are interrelated. Accommodating one measure, for example, initiating worksite security strategy or giving PPE without upholding the arrangement to expand consistence or administering laborers to wear the defensive gadgets, will fail to impress anyone. For instance, upholding established approaches without accommodating other working environment security estimates like preparing in wellbeing methodology, giving wellbeing offices, will generally discourage and diminish wellbeing execution of laborers. This can prompt high wounds and medical affliction among the laborers. In this manner, causing ailment truancy, presenteeism, low profitability, significant expense of wellbeing charges, low work power good and an overall monetary weight on the specialist, the family, the organization and the general population everywhere (Glendon, Clarke, and McKenna, 2016).

Accommodating these security measures, not withstanding, terribly influences the manner in which laborers act to ensure themselves at their different working environments (Oduro, et al., 2020). The safety measures covered under this write up
include safety risk assessment and management, safety policy and enforcement, safety training/education, provision of safety facilities, and PPE.

2.8.1 Employee Safety Training

Employee safety training or instruction has been perceived since the time of modern transformation as a powerful instrument in advancing laborers' wellbeing rehearses (Price et al., 2019). OHS preparing encapsulates educating laborers to perceiving known perils and helping them to utilize accessible work cycles and systems to secure themselves. Also, specialist instruction sets them up to manage likely dangers or unexpected issues at work environments. Accordingly, preparing or instruction gives direction in approaches to turn out to be better or educated specialist that takes action(s) pointed toward taking out work environment dangers and ensuring lives and property. By and large, preparing alludes to guidance and practice for getting abilities and information on rules, ideas or mentalities essential for work environment risk acknowledgment and measures taking to controlling such dangers. Laborers preparing additionally include learning safe work rehearses, appropriate use of PPE, securing information on crisis methodology and preventive activities fundamental for wellbeing (Bovopoulos, et al., 2018).

Likewise, preparing gives laborers approaches to acquire extra data about potential word related wellbeing dangers and how to control these risks (Dimoff, et al., 2016). Moreover, preparing gives laborers abilities to accept a more dynamic job in executing danger control programs or to impact authoritative changes that improve worksite insurance (Price et al., 2019). OSHA (2010) suggests that businesses give preparing to their representatives on the risks of their positions in a language that the laborers comprehend. The specialists should be prepared in the wake of being
employed and before they start their work particularly in the positions apparent to having high dangers to wellbeing (Bovopoulos, et al., 2018). For example, training in first aid might be essential. The availability of first aid facilities with trained person encourages provision of health assistance to injured or ill workers before professional help is sought (Salwa, Abu-Elseoud, Heybah, & Azhar, 2010).

According to Lingard et al., (2015), first aid training is important to increase workers’ knowledge about their likelihood of suffering from work-related injury or illness. In addition, workers willingness to accept the levels of OHS risks could be minimized through first aid training. Moreover, first aid training provides workers with the ability to control the workplace risks and also safeguard their well-being (Salwa, et al., 2010). Training and intervention endeavors planned in entire or to a limited extent are additionally accepted to improve laborer information on working environment risks and influence conduct change that guarantee consistence with safe work rehearses. Preparing additionally prompts different activities pointed toward improving work environment wellbeing and wellbeing assurance and lessening the danger of word related injury or infection. Proof likewise propose that most preparing intercessions can prompt beneficial outcomes on wellbeing information, appropriation of safe work practices or practices and security results at work environments (NS, 2014).

As per Health and Safety Executive (2010), man ought not be utilized regarding the capacity, passing on or apportioning of petrol (fuel) until he has gotten sufficient preparing. Such preparing ought to be given to recently enrolled representatives. Furthermore, customary supplemental classes are significant for any remaining representatives. All staff who may have a part in managing a crisis ought to get far
reaching preparing on the methods for managing such crisis circumstances. For example, such preparing ought to include capacities, activities and utilization of electrical gadgets for managing conveyance of petroleum to underground stockpiling tanks or gas tanks of vehicles, on account of fuel station specialists (Lingard, et al., 2015).

Barajas et al., (2019) reasoned that preparation laborers in wellbeing methods of their positions affects the real levels of their security practices. In the connection among word related and hierarchical factors and business-related wounds, Schulte et al., (2019) brought up that representatives revealing absence of wellbeing preparing had higher business-related wounds rate proportions than the individuals who announced some measure of preparing. Additionally, laborers revealing absence of wellbeing preparing were more presented to substance and actual perils than representatives who got security preparing. Absence of security preparing stays critical danger factors for deciding business related wounds (Barajas et al., 2019).

Moreover, training workers in the appropriate use of PPE is strongly advised (Dedy, Sudiarno, & Ambarwati, 2018). On-time training is also likely to provide adequate preparation for groups of workers requiring the use of specialized PPE during work (Gentry et al., 2014). The protective capability of the PPE may some way or another be crushed by inappropriate dealing with, inaccurate gathering, upkeep, ill-advised put on and take off systems. Stress, distress and actual obstruction may likewise debilitate execution in the utilization of PPE. However, acclimatization through training will mitigate these effects and enhance the compliance with the appropriate use of PPE among workers. Dedy, et al. (2018) revealed that more than 80% of workers noticed and understood the toxicity of lead when they were trained in
occupational health and safety matters. The workers also understood the importance of protecting themselves against lead exposure after receiving training. Moreover, the trained workers regularly protect themselves by wearing PPE such as long sleeved shirts, trousers and masks while at work. In the opinion of these authors, training also increases understanding of and compliance to safety regulation at work (Vinodkumar, & Bhasi, 2010).

Similarly, Zierold, (2016) added that training workers in the use of PPE is as important as their supply if workers were to make beneficial use of such advices. Thus, workers trained in the use of self-protective devices would always wear PPE on the job compare with untrained ones. Therefore, occupational health education including safety training, collaboration between workers and their managers are always effective tools to promote safety behaviours of workers and reduce the risk of ill health among them. For example, an observation by Öz, Özkan, and Lajunen (2010) indicated that motorists with less safety orientation made higher frequencies of road errors than those with higher orientation. Additionally, such motorists with less safety orientation violate more regulations than those motorists with high work orientation.

Van der Molen, Zwinderman, Sluiter, & Frings-Dresen (2011) found that safety training workshop led to the highest reduction in the number of self-reported needle stick injuries among some registered nurses. Besides, Oltedal, and McArthur (2011) recorded that enhanced safety training and feedback on reported events related significantly to higher reporting frequency of unsafe work procedures. These evidences underscore the importance of safety training in the delivery of health and safety measures to workers. Provision of safety training may not be enough to protect
the health and safety of workers. Öz, et al. (2010) pointed out that more than one half of the trained employees were not using PPE regularly. Accordingly, the workers demonstrated awareness of the benefits of the regular use of PPE at work. However, the result revealed some-what negative attitude of the workers towards the regular use of PPE. This therefore points out that there exists a gap between the workers’ knowledge and practices with respect to using personal protective devices and therefore the current study was undertaken to determine measures put in place to ensure safety of welders.

2.9 Summary of Literature

A hazard is a hazardous wonder, substance, human action or condition that can possibly cause the demise, wounds or different effects on wellbeing, harm of property, earnings misfortune and administrations, disturbance both social and financial, or harm to the climate. It is essentially any genuine or expected reason for hurt. It could be: an activity, an occurrence, a methodology, a wonder, a condition, a cycle, an occasion, a circumstance or outrageous temperatures (GoK, 2009). in agricultural nations, The quantity of word related mishaps and illnesses are expanding (Lund and Marriott, 2011; Du and Leigh, 2011; Takala, et al., 2017). one of the occupations that add to business related mishaps and illnesses is welding, in the setting to non-industrial nations (Bhumika et al., 2014; Takala et al., 2017; Bhumika et al., 2014; Oluwole et al., 2018).
CHAPTER THREE
MATERIALS AND METHODS

3.1 Introduction
This chapter describes the methodology used in the research to conduct the study and includes the research design applied, target population, sample size and sampling procedures used, data collection instruments and procedures applied, data management and analysis techniques used and ethical considerations.

3.2 Study Site
The study was done at the North Rift Juakali enterprises Eldoret town Uasin-Gishu County. Eldoret is the headquarters of Uasin-Gishu County and it is located approximately 300 km from Nairobi and approximately 308 km from Kampala Uganda. Eldoret town lies south of the Cherangani Hills, with the local elevation varying from about 2100 meters at the airport to more than 2700 meters in nearby areas (7000–9000 feet). It is situated at latitude 0° 30' 51.3972" N and longitudes 35° 16' 11.2044" E.

According to 2009 census, the population Uasin-Gishu county where Eldoret is being found is 497,449 and the town has attracted several economic activities including; steel mills and cereal mills, industries, food factories, plastic manufacturing industries and textile. Other infrastructure includes; provision of medical facilities such Moi Teaching and Referral Hospital, private hospitals and county hospital. Eldoret international airport is also located within the town along Eldoret Kisumu road near Kapsare.
3.3 Study Design

The study thus employed a cross-sectional descriptive study design according to Polit and Beck (2008). It is a study design in which the data is collected at one particular point in time.

3.4 Study Population

This examination focused on every one of the welders working in North Rift Jua Kali Enterprises (NRJKE) in Eldoret town and key sources including, official from NRJKE, work official and general wellbeing official accountable for word related security and wellbeing (OSH). According to the Ministry of labour North Rift Chapter, there are 140 registered welders in the region which formed the study Population. The 140 welders provided quantitative data while qualitative data was provided by the three key informants.

3.5 Sample Size

Sample size for welders was determined by Yamene Taro formula (Israel, 2006) for finite population. The formula is given as

\[ n = \frac{N}{1 + Ne^2} \]

Where,

- \( n \) = required sample size
- \( N \) = population size (140)
- \( e \) = standard error in this case 0.05.

\[ n = \frac{140}{1 + 140(0.05^2)} = \frac{140}{1 + 0.35} = 103.7 \]
Therefore, the minimum sample size is 104 welders and three key informants.

3.6 Sampling Procedures

Sampling is the procedure adopted in the selection of a number of individuals as stated in the sample size in such a way that the individuals chosen for the study are considered to be a representative of the large collection where they were chosen. Chosen elements from the sample and the huge gathering of respondents from which they were chosen from the populace (Benoot, Hannes & Bilsen, 2016). In this study, two strategies; simple random and purposive sampling were used to select the respondents.

Simple random sampling method was utilized to test the welders dependent on their business numbers or enrollment numbers. Each number was recorded on a piece of paper, folded, put in a container, thoroughly mixed and picked randomly up to the required sample size.

In addition, to select key informants, purposive sampling technique was employed to the study from NRJE, public health and labor departments. They were believed to have the required information on the determinants of occupational health and safety and thus selected purposively. This is in line with the recommendations of Creswell & Plano Clark (2011) who pointed out that purposive sampling involved the identification and choosing of individuals or groups of people that are skilled and well-informed with the interested phenomenon.
3.7 Inclusion and Exclusion Criteria

3.7.1 Inclusion

Adult workers consenting to participate and had worked at least six months in their place of work were included in the sample. In addition, one official from NRJKE, area work official and general wellbeing official accountable for word related security and wellbeing (OSH) were included in the study since they are mostly dealing with Jua Kali artisans including welders.

3.7.2 Exclusion criteria

i.  Welders under 18 years were not included in the sample.

ii. People who work in the welding industry but were not welders. For example, painters and transporters.

iii. Those who did not consent to participate in the study

3.8. Research Instruments

This research study utilized the questionnaire and an observation checklist as the main research instruments tools.

3.8.1 Questionnaire

There were two kinds of semi-structured questionnaires that were developed, one kind was for welders and other one was for key informants. A pre-testing semi-structured questionnaire was used. According to Evans et al., (2017), questionnaire use as an instrument of examination typically gives the respondent's an ideal opportunity to give very much idea reactions in the things in the survey and empowers enormous examples to be covered inside a brief timeframe.
The pre-testing questionnaires were both open and shut sort and contained inquiries dependent on the individual and history of control of laborers just as data on word related perils, influencing factors and also the knowledge and practice of measures of safety. Specifically, it had information on demographics, attributes of exposure risk factors, workplace environment, workspace, ventilation, exposure control measures employed both personal and engineering and awareness about health hazards in regards to welding and training on professionalism from a recognised technical institution.

3.8.2 Key Informants’ Interview

In this study, the chairman of welders, representative of the ministry of labour and the public health officer in charge of the jurisdiction area of study were interviewed. The interviews provided qualitative data for the study. The three key informants had adequate information on determinants of occupational health hazards.

3.8.3 Observation Checklist

The researcher used the tool to observe if the workers/employees (welders) were using protective garments including overalls, overcoats, gloves, industrial boot and protective gears such as mouth mask, goggles, face mask and ear muffs. On working environment researcher checked on shelter, ventilation and waste disposal.

3.9 Validity and Reliability of the Research Instruments

3.9.1 Validity of the Instrument

Mugenda and Mugenda (2008) defined validity as the state to which a test measures what it was supposed to measure. In ensuring validity of the research instruments, a review of the questionnaire was done by the experts in the area of study (supervisors)
to gauge it in relation to the research objectives. Their unified inputs were included in the final copy of the questionnaire.

3.9.2 Reliability of the Instrument

Reliability is the extent to which research results are consistent and replicable (Taber, 2018). To ensure this, a pilot pre-test study was carried out at Turbo involving 10 scrap metal workers (10% of the sample size). Split half technique was used in order to determine the reliability of the questionnaire. This involved overseeing the questionnaire once and distributing the questionnaire items into two parts. The sum of the scores of the two sets of data was correlated by use of Pearson Product Moment Correlation (PPMC). A correlation coefficient of ≥0.5 was considered reliable (Taber, 2018). In this study, a reliability coefficient of 0.72 was found showing that the instruments were reliable and therefore adopted for this study.

3.10 Data Collection Procedures

After being granted permission to conduct the study, the researcher went to the area of study. Questionnaires were self-administered and handed to the respondents to complete. The respondents were provided a day to complete filling the questionnaires and the questionnaires completed on the same day were collected by the researcher. This was done so as to avoid loss of filled questionnaires. Additionally, a 30-minute interview was administered to public health officer, representative of the Ministry of labour and the chairman of the welders. The researcher completed the observation checklist by observing available and unavailable indicators of interest regarding the study objectives.
3.11 Data Analysis

Questionnaires completed were coded and entered in a database designed using the Statistical Package for Social Sciences (SPSS V.20). Data was analyzed by use of both descriptive and inferential statistics. This involved; frequencies, mean and standard deviation in summarizing the data. Chi-square Analysis was adopted to check for association between the independent and dependant variables (occupational hazards). Results were considered significant at 95% confidence level. Data presentation was in the form of table, bar graphs and pie-charts. In addition, qualitative data from talk with timetables, perception and archive investigation was specifically ordered and organized before they were accounted for in portrayals and citations according to the destinations of the examination.

3.12 Ethical Considerations

The researcher sought the approval to conduct the research from the Institutional Research and Ethics Committee (IREC) Baraton University. A written informed consent was sought from the respective scrap metal workers after exhaustive clarification of the principal goals and the methodology of the investigation. Additionally, the advantage of the investigation was altogether disclosed to the examination participants. Respondents’ participation was voluntary. Confidentiality was ensured through anonymity of the research instruments. Hard copies were kept under key and lock while data entered in the computer were protected using security codes.
CHAPTER FOUR
RESULTS

4.1 Introduction

This section provides the results of analyzed data. The research investigated the determinants of occupational health hazards among scrap metal workers at North Rift Jua Kali Enterprises in Eldoret Town, Kenya. It specifically addresses the socio-demographic factors associated with workers’ exposure to occupational hazards, the knowledge level and practices on the use of Personal Protective Equipment (PPE) and gears and their importance among welders and the control measures placed to address occupational hazards exposure to welders. The chapter begins with the respondents’ demographic information.

4.2 Response Rate

In this study, 98 out of 104 respondents duly completed and returned the questionnaires. The questionnaire’s return rate of used up for data analysis was 94.2% which was considered adequate to provide reliable information on determinants of occupational health hazards among scrap metal workers at North Rift Jua Kali Enterprises in Eldoret Town. Arguments are there expressing that potential biasness could result from low reaction rate (Brick and Williams, 2013) consequently in this investigation, high-rate reaction was straightforwardly connected with high dependability in social affair of data. Further Fosnacht, Sarraf, Howe, and Peck (2017) noted that survey investigators have for a long time presumed that the best method to obtain impartial estimations is to attain a high response proportion. However, most researchers have begun to query the extensively-held supposition that low response levels may give biased outcomes (Peytchev, 2013; Massey & Tourangeau, 2013).
4.3 Socio-Demographic Factors Associated with Workers’ Exposure to Occupational Hazards

The first objective of this study was to identify the socio-demographic factors associated with worker’s exposure to occupational hazards among welders in Eldoret Town. Some of the demographic data collected from respondents included; gender, age, and highest level of education. According to Wise (2012), when planning an overview, the examination needs to evaluate who to review and how-to breakdown generally speaking study reaction information into significant gatherings of respondents. The two appraisals depend on segment contemplations. The socio-segment data that that were examined in this examination were; sex, age, training level and terms of administration in work.

4.3.1 Gender of the Respondents

Respondents were asked to indicate their gender in the questionnaire. The results of the analyzed information is presented in Figure 4.1.

![Figure 4.1: Gender of the Respondents](image)

Female, 11.20%
Male, 88.80%
The results in Figure 4.1 shows that majority (88.8%) the respondents were male showing that welding is a male dominated occupation. This shows that there is isolation of gender at the workforce which contributes strongly to differences in gender and in working conditions, and hence differences in gender and in exposures to hazards and health outcomes as noted by European Agency for Safety and Health at Work (2003).

4.3.2 Age of the Respondents

Further, the respondents were asked to indicate their aged bracket in the questionnaire. The results of the analysed data are presented in Figure 4.2.

![Bar chart showing age distribution of respondents.](chart.png)

**Figure 4.2: Age of the Respondents**

Figure 4.2 shows that 36(36.7%) respondents were aged 26-35 years, 28(28.6%) respondents were aged 36-45 years and 26(26.5%) respondents were aged below 25 years while 8(8.1%) respondents were aged over 46 years. The study shows that most of the welders in Eldoret town are aged 26-35 years. View of specialist security and individual wellbeing conduct is influenced by segment factors like sex, age, insight, instruction, work level, conjugal status, and number of wards in family (Hinze and
Teizer, 2011). It was seen that the age of a laborer and the danger of a mishap are contrarily related (Jackson, 2016) potentially in light of the fact that more seasoned specialists are more capable, have great work information, and better abilities contrasted with more youthful laborers. Further, Amabye (2017) in his investigation discovered that there was a measurably huge contrast in the degree of openness to word related dangers and perils among laborers of various age bunch with laborers in the lower age bunch being all the more exceptionally presented to word related dangers and risks in the work place.

4.3.3 Education Level of the Respondents

In addition, the respondents were asked to indicate their highest level of education they have attained. The results of the analysed information are presented in Figure 4.2.

![Education Level of the Respondents](image)

**Figure 4.3: Education Level of the Respondents**

Figure 4.3 shows that 43(43.9%) respondents had primary school level of education, 26(26.5%) respondents had secondary education level and 21(21.4%) respondents had tertiary level of education while 8(8.2%) respondents had informal education. From
the responses, it can be shown that most of the welders had primary level of education. Laborers' consciousness of word related risks is reliant on their expanded degree of instructive fulfillment. This is in concurrence with study directed in Nigeria (Oluwole et al., 2018). This may be because of the way that specialists who achieved a more significant level of instruction could tend to change accessible data into develop stage which expanded their attention to perils.

4.3.4 Terms of Service

Further, the respondents were asked to indicate their terms of service in employment. The responses were tabulated and the results are presented in Figure 4.4.

Figure 4.4: Terms of Service in Employment

Figure 4.4 shows that 86.7% of the respondents were employed as casuals while 15.3% of the respondents were self-employed. There were no employees who were employed on permanent basis. From the reactions subsequently, it very well may be shown that dominant part of the welders in Eldoret town were casuals. The
discoveries of this examination likewise showed no distinction in openness to word related dangers and perils among the perpetual and easy-going laborers. This is conflicting with an examination that announced higher (54.5%) openness among easy-going specialists (Norkaew, et al., 2015).

On interviewing the key informants, it emerged that level of education and experience in the welding industry were the major socio-economic factors influencing the occurrence of occupational health hazards among welders. It emerged that young, uneducated welders were mostly affected by welding hazards. According to the key informants, most of the time, these welders complained of coughing, wheezing, irritation of the eyes. This is an indication that these workers were affected by welding.

4.3.5 Relationship Between socio-demographic factors and occupational Health hazards

The principal target of this examination was largely to discover the impact of elements on socio-demographic event of occupational health hazards dangers among welders in Eldoret Town. To accomplish this, plan and testing of null hypothesis was done. The null hypothesis expressed that;

**H01**: There was no significant relationship between socio-demographic variables and occurrence of occupational health hazards dangers among welders in Eldoret town.

The testing hypothesis was done by utilization of Chi-square test. Chi-square test is a nonparametric test that is utilized for two purposes; to test the hypothesis of no relationship between groups of at least two, population or criteria utilized and furthermore to test how likely the dispersion of observed data fits with the distribution
that is expected (to test the goodness of-fit). It is utilized to analyze categorical data and isn't intended to analyze parametric or continuous data (Rana & Singhal, 2015).

The formula for calculating a Chi-square statistic is:

\[ \chi^2 = \sum_{i=1}^{n} \frac{(O_i - E_i)^2}{E_i} \]

Where,

O = Observed frequency,

E = Expected frequency.

However, Chi-square test only provides us with the probability of independence of the distribution of data or in other words it will only test whether two variables are completely linked with each other or not. It will not tell us that how closely they are associated. Table 4.1 shows the respondents’ association between gender and occurrence of occupational health hazards.

**Table 4.1: Association between Respondents’ Demographic Factors and occurrence of occupational health hazards**

<table>
<thead>
<tr>
<th>Socio-Demographic Factor</th>
<th>Chi-square Values ($\chi^2$)</th>
<th>p values</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gender</td>
<td>.057</td>
<td>.643</td>
</tr>
<tr>
<td>Age</td>
<td>6.788</td>
<td>.000</td>
</tr>
<tr>
<td>Educational Level</td>
<td>2.048</td>
<td>.001</td>
</tr>
</tbody>
</table>
Table 4.1 shows that there was no relationship that was significant between gender and occurrence of occupational health hazards among welders \( (X^2 = .057; p = .643) \). This therefore shows that gender does not affect the occupational health hazards occurrence among welders. This is recognized to the fact that the welders were male and were the majority. However, Nwanko et al., (2018) on a research study on knowledge, attitudes and beliefs about the health hazards brought by biomass smoke exposure in the commercial food vendors in Nigeria found out that gender of the individual had a significant relationship with occurrence of occupational health hazards.

In addition, the results in Table 4.1 states that there was a significant association between age and occurrence of occupational health hazards \( (X^2 = 6.788; p = .000) \) and occurrence of occupational health hazards. This shows that age influences the occurrence of occupational health hazards among welders with younger welders getting more injured frequently in comparison to the elderly welders. This is consistent with the works of other researchers who found out that workers who were young are in precise need of occupational safety and health (OSH) services (Kines et al., 2013). It is well acknowledged, for example, that the rates of injury are significantly higher among workers who are young than the older ones and workers who were experienced (Lay et al., 2017).

Similarly, education level of the respondents was associated with occurrence of occupational health hazards \( (X^2 = 2.048; p = .001) \). This shows that education level of a respondent influences the occurrence of occupational hazards. An increase in education level is deemed to reduce the level of occurrence of occupational health hazards.
4.4 Level of Knowledge and Practice on Use of Personal Protective Equipment

The second objective of this study was to determine the knowledge level and practice on the personal protective equipment use (PPE) and gears and their importance among welders at North Rift Jua Kali Enterprises. To achieve this goal, the respondents were requested to rate their agreement level in a five-Likert scale questions in the questionnaires. Results of the analysed data are presented in Table 4.2.

Table 4.2: Responses on Level of Knowledge and Practice on Use of Personal Protective Equipment

<table>
<thead>
<tr>
<th>statement</th>
<th>SD</th>
<th>D</th>
<th>UD</th>
<th>A</th>
<th>SA</th>
</tr>
</thead>
<tbody>
<tr>
<td>i. I always use ear murffs during welding process</td>
<td>41</td>
<td>37</td>
<td>2</td>
<td>15</td>
<td>3</td>
</tr>
<tr>
<td>ii. While welding I use always welding googles for my own safety</td>
<td>15</td>
<td>21</td>
<td>2</td>
<td>26</td>
<td>34</td>
</tr>
<tr>
<td>iii. I always use Welding shield when doing welding works</td>
<td>28</td>
<td>38</td>
<td>3</td>
<td>12</td>
<td>17</td>
</tr>
<tr>
<td>iv. I have industrial gloves which I always use at work</td>
<td>30</td>
<td>43</td>
<td>1</td>
<td>10</td>
<td>14</td>
</tr>
<tr>
<td>v. I wear an apron always at work</td>
<td>23</td>
<td>23</td>
<td>0</td>
<td>28</td>
<td>24</td>
</tr>
<tr>
<td>vi. I have been provided with industrial booths for use during my work</td>
<td>40</td>
<td>32</td>
<td>4</td>
<td>13</td>
<td>9</td>
</tr>
<tr>
<td>vii. I always use mouth mask during my work</td>
<td>29</td>
<td>35</td>
<td>6</td>
<td>20</td>
<td>8</td>
</tr>
</tbody>
</table>

Source: Field Data, 2017
Table 4.2 shows that 41(41.85) respondents strongly disagreed with the statement that they always used earmuffs during welding process, 37(37.2%) respondents disagreed with the statement and 15(15.3%) respondents did agree with the statement while 3(3.1%) respondents strongly agreed with the statement. The study findings showed that majority (79.6%) of the respondents never always used earmuffs during the welding process. This implies that welders were exposed to sound of various frequencies which could affect their hearing capabilities.

Moreover, 34(34.5%) respondents strongly agreed that while welding they were always using welding googles for their own safety, 26(26.5%) respondents agreed with the statement, 21(21.4%) respondents couldn't help contradicting the assertion. Nonetheless, 15 (15.3%) respondents unequivocally couldn't help contradicting the inquiry while 2(2.0%) respondents were not settled on the appropriate responses they would give. The examination additionally showed that lion's share (61.0%) of the welders in Eldoret town detailed that they were utilizing welding googles for their own wellbeing during the welding interaction. This infers that a large portion of the welders knew about the harms caused to their eyes during welding measure and consequently they favored utilizing welding googles.

Also, 38(38.8%) the respondents couldn't help contradicting the explanation that they generally utilized Welding safeguard when doing welding works, 28(28.6%) respondents unequivocally couldn't help contradicting the assertion and 17(17.3%) respondents firmly concurred with the assertion while 12(12.2%) respondents concurred with the assertion. From the reactions, it arose that dominant part (67.4%)
of the welders were not continually utilizing Welding safeguard when doing welding works.

Likewise, 43(43.9%) respondents couldn't help contradicting the explanation that they had mechanical gloves which they generally utilized at work, 30(30.6%) respondents unequivocally couldn't help contradicting the assertion and 14(14.3%) respondents firmly concurred with the assertion while 10(10.2%) respondents concurred with the assertion. From the reactions, it arose that lion's share (74.5%) of the welders in Eldoret town were not utilizing modern gloves in their work. This shows that their hands were presented to different perils during welding.

Further, 28(28.6%) respondents concurred with the explanation that they generally wore covers at work, 24(24.5%) respondents emphatically concurred with the assertion and 23(23.5%) respondents unequivocally couldn't help contradicting the assertion while another 23(23.5%) respondents couldn't help contradicting the assertion. The investigation discoveries showed that greater part (53.1%) of the welders were utilizing covers. Covers are viewed as a significant PPE gear altogether mechanical work.

Furthermore, 40(40.8%) respondents firmly couldn't help contradicting the explanation that they had been given modern stalls for use during welding, 32(32.7%) respondents couldn't help contradicting the assertion, 13(13.3%) respondents concurred with the assertion while 9(9.2%) respondents emphatically concurred with the assertion. The investigation showed that dominant part (73.5%) of the welders announced that they didn't have modern corners for use during welding. This infers that welders were presented to sharp articles which could prick them coming about to leg wounds.
Further, 35(35.7%) respondents couldn't help contradicting the explanation that they generally utilized mouth veils during welding, 29(29.6%) respondents unequivocally couldn't help contradicting the assertion, 20(20.4%) respondents concurred with the assertion while 8(8.2%) respondents emphatically concurred the proclamation. The reactions showed that lion's share (65.3%) of the welders were not utilizing mouth covers during welding. This shows that greater part of the welders didn't know about the dangers related with breathing in of vapor during welding.

On interviewing key informants, it emerged that the most common personal protective equipment used by welders were welding glasses/shields and aprons. However, most of the personal protective equipment were not used by the welders. This shows that majority of the welders were exposed to occupational health hazards associated with welding.

On observation, it emerged that most of the welders were using sun glasses instead of UV welding shields, aprons, industrial booths or gloves (Plate 1), Earmuffs (Plate 2) (Appendix iii). Sun-glasses are not effective in preventing UV radiations from affecting the welders.

4.4.1 Relationship between awareness on use of PPEs and occurrence occupational Health hazards

The second null hypothesis of this study stated that:

$H_{02}$: There is no significant relationship between awareness on use of PPEs and occurrence occupational Health hazards among welders in Eldoret town

This hypothesis was tested using Chi-square test. The results are presented in Table 4.3.
Table 4.3: Association between awareness on use of PPEs and occurrence of occupational Health hazards

<table>
<thead>
<tr>
<th>Awareness on Use of PPEs</th>
<th>Occupation Health Hazards</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>( X^2 = 16.832 )</td>
</tr>
<tr>
<td></td>
<td>( p = .000 )</td>
</tr>
<tr>
<td></td>
<td>( n = 98 )</td>
</tr>
</tbody>
</table>

Table 4.3 shows that there was a significant association between level of awareness on use of PPEs and Occurrence of Occupational Health Hazards (\( r = 16.832; p = .000 \)). This shows that an increase in level of awareness leads on use of PPEs leads to a reduction on the occurrence of occupational health hazards among welders. Therefore, the null hypothesis which stated that there is no significant relationship between awareness on use of PPEs and occurrence occupational Health hazards among welders in Eldoret town was rejected and the alternate accepted.

4.5 Occurrence of Occupational Health Hazards

The main purpose of this study was to assess the determinants of occupational health hazards among scrap metal workers at the North Rift Jua kali enterprises, Eldoret town. The dependent variable occupational health hazards which was determined through the occurrence of various hazards during welding. In this case, the study respondents were asked to rate their level of agreement on a five-point Likert scale items in the questionnaire on occurrence of specific hazards related to welding. The responses of study participants were tabulated and the results are presented in Table 4.4.
Table 4.4: Responses on Occurrence of Occupational Health Hazards

<table>
<thead>
<tr>
<th>Statement</th>
<th>SD</th>
<th>D</th>
<th>UD</th>
<th>A</th>
<th>SA</th>
</tr>
</thead>
<tbody>
<tr>
<td>After welding I usually get external injuries like burns</td>
<td>11</td>
<td>21</td>
<td>4</td>
<td>35</td>
<td>27</td>
</tr>
<tr>
<td>After welding I usually experience unusual headache</td>
<td>14</td>
<td>12</td>
<td>6</td>
<td>27</td>
<td>39</td>
</tr>
<tr>
<td>I have had some skin diseases after welding but was treated by a doctor</td>
<td>9</td>
<td>22</td>
<td>11</td>
<td>31</td>
<td>25</td>
</tr>
<tr>
<td>After performing welding duties at daytime, I usually have some itchy eyes at night</td>
<td>7</td>
<td>14</td>
<td>8</td>
<td>41</td>
<td>28</td>
</tr>
</tbody>
</table>

Key: SD-Strongly Disagree; D-Disagree; UD- Undecided; A-Agree; SA-Strongly Agree

Table 4.4 shows that 35(35.7%) respondents were in agreement with the statement that after welding they usually get external injuries like burns, 27(27.6%) respondents unequivocally concurred with the assertion, 21(21.4%) respondents were in conflict with the assertion and 11(11.2%) respondents emphatically couldn't help contradicting the assertion while 4(4.1%) respondents were unbiased on the articulation. The investigation finding showed that greater part (63.3%) respondents acknowledged that after welding they usually get external injuries like burns. This implies that most of the welders are not using welding gloves therefore getting exposed to welding fires thus usually being injured. This, points out that welders in Eldoret were not using PPEs and therefore they need to be encouraged and trained on the importance of using PPEs.
Similarly, 39(39.8%) respondents emphatically concurred with the explanation that in the wake of welding they typically experienced surprising migraines, 27(27.6%) respondents were in concurrence with the assertion, 14(14.3%) respondents unequivocally couldn't help contradicting the assertion and 12(12.2%) respondents were in conflict with the assertion while 6(6.1%) respondents were unsure on the articulation. From the reactions it arose that larger part (67.4%) of the examination respondents announced that they usually experience unusual headache after welding. This implies that welders never use welding masks thus exposing themselves to welding fumes which causes headaches. A significant peril of electric welding is the openess of electric curve welders to welding smoke which is supposed to be indistinguishable from the welding interaction as the actual cycles lead to the age of smoke.

Additionally, 31(31.6%) respondents concurred with the explanation that they as a rule experience some skin infections subsequent to welding, 25(25.5%) respondents emphatically concurred with the assertion, 22(22.4%) respondents couldn't help contradicting the assertion and 11(11.2%) respondents were unsure on the proclamation while 9(9.2%) respondents were unequivocally in conflict with the assertion. The investigation finding recommended that greater part (57.1%) of the welders in Eldoret town reported that they have had some skin diseases after welding showing that the welders are more exposed to occupational diseases as a result of welding.

In addition, 41(41.8%) respondents agreed with the statement that they usually have itchy eyes at night after performing welding duties at daytime, 28(28.6%) respondents strongly agreed with the statement, 14(14.3%) respondents were in disagreement with
the statement and 8(8.2%) respondents were undecided on the statement while 7(7.1%) respondents were strongly in disagreement with the statement. From the responses, it emerged that majority (70.4%) of the welders in Eldoret town acknowledged that they usually experience itching of the eyes at night after performing welding duties at daytime. This implies that welders usually do not use welding googles thus exposing themselves to welding light thus affecting their eyes.

4.6 Control Measures Put in Place to Address Occupational Hazards

The third objective of this study was to assess control measures put in place to address occupational hazards exposure to welders at North Rift Jua Kali Enterprises. To accomplish this unbiased, respondents were approached to rate their degree of concurrence on five-point Likert scale things in the surveys. Their reactions were organized and the outcomes are introduced in Table 4.5.
Table 4.5: Responses on Control Measures to Address Occupational Hazards among Welders

<table>
<thead>
<tr>
<th>Control measure</th>
<th>SD</th>
<th>D</th>
<th>UD</th>
<th>A</th>
<th>SA</th>
</tr>
</thead>
<tbody>
<tr>
<td>i. Provision of personal protective equipment</td>
<td>2</td>
<td>2.0</td>
<td>11</td>
<td>3</td>
<td>43</td>
</tr>
<tr>
<td>ii. Adherence to work procedures</td>
<td>5</td>
<td>5.1</td>
<td>16</td>
<td>4</td>
<td>47</td>
</tr>
<tr>
<td>iii. Training of welders on occupational health and safety measures</td>
<td>1</td>
<td>1.0</td>
<td>6</td>
<td>2</td>
<td>40</td>
</tr>
<tr>
<td>iv. Provision of insurance policies to welders</td>
<td>9</td>
<td>9.2</td>
<td>14</td>
<td>5</td>
<td>33</td>
</tr>
<tr>
<td>v. Safety precaution measures to be put in place</td>
<td>13</td>
<td>13.3</td>
<td>10</td>
<td>8</td>
<td>31</td>
</tr>
<tr>
<td>vi. Ensuring that all welders are registered and adhere to code of conduct during the welding procedures</td>
<td>3</td>
<td>3.1</td>
<td>4</td>
<td>4.1</td>
<td>44</td>
</tr>
</tbody>
</table>

Key: SD-Strongly Disagree; D-Disagree; UD- Undecided; A-Agree; SA-Strongly Agree

Table 4.5 shows that 43(43.9%) respondents did agree to the statement that provision of personal protective equipment to welders reduces occupational hazards, 39 (39.8%) of respondents, emphatically concurred with the assertion and 13 (13.2%) respondents were in all out conflict with the assertion while 3(3.1%) respondents were neutral.
Majority (83.7%) of the welders in the study showed and believed that the provision of personal protective equipment greatly reduces the workplace hazards that are associated with welding. The utilization of individual defensive gear (PPE) is one of the essential estimates used to shield laborers from the openness to word related risks, particularly in the agricultural nations where the traditional word related security control standards stay enormous a test to carry out (Balkhyour, et al., 2019).

Further, the respondents 47(48.0%) did agree with the statement that adherence to work procedure reduces hazards related to welding, 26(26.5%) strongly agreed with the statement, 16(16.3%) couldn't help contradicting the assertion and 5(5.1%) emphatically couldn't help contradicting the assertion while 4(4.1%) were uncertain on the proclamation. From the results of the analysed data, it emerged that majority (74.5%) of the welders in Eldoret town reported that adherence to work procedures reduced welding related hazards.

Similarly, 49(50.0%) respondents strongly agreed that training of welders on occupational health and safety measures reduces workplace hazards, 40(40.8%) respondents concurred with the assertion and 7(7.1%) respondents were in conflict with the assertion while 2(2.0%) respondents were unsure on the explanation. From the reactions, it very well may be shown that lion's share (90.8%) of the welders accepted that they required preparing on word related wellbeing and security.

In addition, 37(37.6%) respondents emphatically concurred with the explanation that arrangement of protection strategies to welders lessens work place related risks, 33(33.7%) respondents concurred with the assertion, 14(14.3%) respondents couldn't help contradicting the assertion and 9(9.2%) respondents unequivocally couldn't help contradicting the assertion while 5(5.1%) respondents were unsure on the
proclamation. The examination discovered that dominant part (71.3%) of the respondents were of the view that provision of insurance policies to welders reduces work place related hazards. The provision of insurance policies ensures that welders who are injured at work have their medical bills taken care of by the insurer and therefore welders will have reduced medical bills.

Moreover, 36(36.7%) respondents strongly agreed with the statement that safety precaution measures need to be put in place to reduce work related hazards, 31(31.6%) respondents concurred with the assertion, 13(13.3%) respondents emphatically couldn't help contradicting the assertion and 10(10.2%) respondents couldn't help contradicting the assertion while 8(8.2%) respondents were uncertain on the articulation. The examination discovered that larger part (68.3%) of the welders announced that there is need for wellbeing insurance measures to be set up to diminish work place related risks.

Furthermore, 44(44.9%) respondents agreed with the statement that work place hazards can be reduced by ensuring that all welders are registered and adhere to code of conduct during the welding procedures, 43(43.9%) respondents emphatically concurred with the assertion and 7(7.2%) respondents couldn't help contradicting the assertion while 4(4.1%) respondents were uncertain on the proclamation. The examination showed that lion's share (88.8%) of the welders noted all welders need to be registered and need to adhere to code of conduct during the welding procedures. This will reduce on the number of accidents occurring at workplace.

Interviews conducted with the key informants found out that despite the fact that welders were given PPEs they were sometimes working without the PPEs leading to injuries.
CHAPTER FIVE

DISCUSSIONS

5.1 Introduction

This chapter gives the discussions of the study findings based on the objectives of the study;

5.2 Socio-Demographic Factors Associated with Workers’ Exposure to Occupational Hazards

The first objective of this study was mainly to identify the socio-demographic factors linked with worker’s occupational hazards exposure among welders in Eldoret Town. The studies found out that majority of the respondents were male showing that welding was an occupation that the male dominated. This shows that there is gender biasness of the workforce which strongly contributes to gender differences in the working conditions, and hence gender differences in exposures to hazards and health outcomes. In addition, most of the welders in Eldoret town are aged 26-35 years.

Workers safety Perception and safety behavior of individual is affected by the demographic factors such as age, experience, education, employment level, gender, marital status, and dependents number in the family (Hinze & Teizer, 2011). A different study found that the worker’s age and the risk of an accident are related inversely (Jackson, 2015) on grounds that older workers are experienced more, have knowledge and good work, and skills that are better compared to workers who are younger. Further, Amabye (2017) in his study discovered that there was a difference that was statistically significant in the exposure level to the occupational risks and hazards among different age group of workers with the lower age group workers being more exposed highly to occupational risks and hazards in their work place.
Further the study found out that most of the welders had primary level of education. Awareness of workers on occupational hazards is directly dependent on their increased level of educational attainment. This agrees with conducted study in Nigeria (Oluwole et al., 2018). This might be due on the fact that workers who have a higher level of education could have the tendency to alter the information available into mature stage which increases their awareness of hazards.

In addition, majority of the welders in Eldoret town were casuals. The study findings also showed there was no difference in occupational risks and hazards exposure among the permanent and casual workers. The inconsistency with a study that reported higher (54.5%) exposure among casual workers (Norkaew, 2009). It further emerged that young, uneducated welders were mostly affected by welding hazards. According to the key informants, most of the time, these welders complained of coughing, wheezing, irritation of the eyes. This is an indication that these workers were affected by welding.

The study found out that there was no significant relationship between gender and occurrence of occupational health hazards among welders ($X^2 = .057; p = .643$). This therefore shows that gender does not affect the occurrence of occupational health hazards among welders. This is attributed to the fact that majority of the welders were male. However, Nwanko et al., (2018) on a study on knowledge, attitudes and beliefs about the health hazards of biomass smoke exposure amongst commercial food vendors in Nigeria found out that gender had a significant relationship with occurrence of occupational health hazards.

In addition, there was a significant association between age and occurrence of occupational health hazards ($X^2 = 6.788; p = .000$) and occurrence of occupational
health hazards. This shows that age influences the occurrence of occupational health hazards among welders with younger welders getting more injured frequently in comparison to the elderly welders. This is consistent with the works of other researchers who found out that the young employees were in particular need of occupational safety and health (OSH) services (Kines et al., 2013). It is documented well, for instance, the injury rates are significantly higher among workers who were young than the older and workers with more experienced (Lay et al., 2017).

Similarly, education level of the respondents was associated with occurrence of occupational health hazards ($X^2 = 2.048; p = .001$). This shows that education level of a respondent influences the occurrence of occupational hazards. An increase in education level is deemed to reduce the level of occurrence of occupational health hazards.

### 5.3 Level of Knowledge and Practice on Use of Personal Protective Equipment

The second objective of this study was to determine the level of knowledge and practice on the use of personal protective equipment (PPE) and gears and their importance among welders at North Rift Jua Kali Enterprises. The study findings showed that majority (79.6%) of the respondents never always used earmuffs during the welding process. This implies that welders were exposed to sound of various frequencies which could affect their earing capabilities. This is consistent with the findings of Balkhyour, et al., (2019) and Budathoki, et al (2014) who found in their studies that although of welders identified noise as a hazard at their workplace, but only a few were aware about the use of earmuffs.

Moreover, majority (61.0%) of the welders in Eldoret town reported that they were using welding googles for their own safety during the welding process. This implies
that most of the welders were aware of the damages caused to their eyes during welding process and therefore they preferred using welding googles. These study findings were found to be similar to those of Budhathoki, Singh and Sagtani (2014) who found in their study in Nepal that 90.7% of welders were aware of the fact that welding goggles/eye shield protected their eyes during welding. They further noted that excessive brightness was the most frequently identified hazard by the welders in the study.

Similarly, majority (67.4%) of the welders were not always using Welding shield when doing welding works. This supports an earlier research by Sambo et al., (2017) in a study in Nigeria where welding shield use was seen among only 18% of welders. This implies that most of the welders were not protecting their faces and ears and this leads to injuries during their work. In addition, majority (74.5%) of the welders in Eldoret town were not using industrial gloves in their work. This shows that their hands were exposed to various hazards during welding. The findings are similar to those of Zierold (2016) which posited that only 23% of welders in his study were using industrial gloves.

Moreover, majority (53.1%) of the welders were using aprons. Aprons are considered to be an important PPE equipment in all industrial work. Singh (2017) in a study in Nepal pointed out that majority of the industrial workers were aware of the importance of using aprons during the works. This was found to be similar to this study findings since majority of the welders were using aprons during their work.

In the same vein, majority (73.5%) of the welders reported that they did not have industrial booths for use during welding. This implies that welders were exposed to sharp objects which could prick them resulting to leg injuries. Further, majority
(65.3%) of the welders were not using mouth masks during welding. This shows that majority of the welders were not aware of the risks associated with inhaling of fumes during welding. This study findings were found to be consistent with those of Budhathoki et al (2014) who found out in their study that welding masks were used by none of the welders, while mask made of cotton was used by about 45% of the 300 welders who reported that they aware of welding masks.

The study further found a significant and a strong negative correlation between level of awareness on use of PPEs and Occurrence of Occupational Health Hazards ($r = - .832; p = .000$). This shows that an increase in level of awareness leads on use of PPEs leads to a reduction on the occurrence of occupational health hazards among welders. Therefore, the null hypothesis which stated that there is no significant relationship between awareness on use of PPEs and occurrence occupational Health hazards among welders in Eldoret town was rejected and the alternate accepted.

### 5.4 Occurrence of Occupational Health Hazards

The main objective of this study was to evaluate the determinants of occupational health hazards among scrap metal workers at the North Rift Jua kali enterprises, Eldoret town. The study finding showed that majority (63.3%) respondents acknowledged that after welding they usually get external injuries like burns. This implies that most of the welders are not using welding gloves therefore getting exposed to welding fires thus usually being injured. This is consistent with the works of Adewoye et al., (2013) whose study found that among the electric arc welding hazards included the risk of being electrocuted, accident from fire, burns, problems of musculoskeletal, cut and injuries from metals that are heavy which are all avoidable when necessary precautionary measures are followed. These points out those welders
in Eldoret were not using PPEs and therefore they need to be encouraged and trained on the importance of using PPEs.

Similarly, majority (67.4%) of the study respondents reported that they usually experience unusual headache after welding. This implies that welders never use welding masks thus exposing themselves to welding fumes which causes headaches. The exposure of the electric arc welders to the smoke produced during welding which is inseparable from the process of welding as process leads to the production of smoke which is an important electric welding danger. The course of exposure to the welding is basically through inhaling the smoke or the eye contact. Smoke exposure during welding may bring about health problems that are either long term or short term. Some of effects of short-term effects are having fever brought about by the metal fumes that contain zinc, magnesium, copper and copper—dioxide. Fever brought about by metal fumes consists of a flu-like symptom that may come with a interchanging chills and fever that is considered higher than normal and can last for several days. Other short-term effects that can occur are headaches, irritation of the eyes, nose, chest and also breathing that can cause coughing frequently and having a cough among other symptoms (Holm et al., 2012).

In addition, majority (57.1%) of the welders in Eldoret town reported that they have had some skin diseases after welding showing that the welders are more exposed to occupational diseases as a result of welding. Skin disease is a long-term effect that is associated with exposure to welding fumes and smokes as pointed out by Sellapa et al., (2011). Moreover, majority (70.4%) of the welders in Eldoret town acknowledged that they usually experience itching of the eyes at night after performing welding duties at daytime. This implies that welders usually do not use welding googles thus
exposing themselves to welding light thus affecting their eyes. This is in agreement with the findings of Andrea et al., (2012) who have reported that among the short-term effects associated with welding fumes are irritation of the eyes, nose, chest and respiratory tract infections. However, a study by Adewoye et al (2013) pointed out that majority of the respondents in their research study used eye goggles. The awareness of the eye goggles as a form and means of protection against the dangers that are linked with the eye goggles by the respondents.

The occurrence of the ocular injuries that is high among the employees/workers might also be among the reasons for the high usage of eye goggles. Similar studies done by Oluwole et al (2018) found that the findings from this study were higher than any other similar study done. Adewoye (2013) did a study and discovered that 60.9% of the respondents in the Northern Nigeria that were interviewed reported that the they used of eye goggles while also in Benin City in Nigeria reported that welders that were interviewed used eye goggles. Continuous usage of eye goggles will highly reduce the number of incidences of ocular injuries between the welders in the society.

5.5 Control Measures Put in Place to Address Occupational Hazards

The third objective of this study was to asses control measures put in place to address occupational hazards exposure to welders at North Rift Jua Kali Enterprises. The study showed that majority (83.7%) of the welders believed that provision of personal protective equipment reduces workplace dangers brought by welding. Personal protective equipment (PPE) usage is one of the measures that is more important to workers protection from occupational hazards exposure, especially in developing countries where conformist occupational safety control principles remains big a challenge to implement (Malik, et al., 2010; Akintayo, 2013). PPE usage by Workers
use is basically affected by the socio-demographic, behavioural and work environment factors (Jaiswal, 2012).

Further, majority (74.5%) of the welders in Eldoret town reported that adherence to work procedures reduced welding related hazards. A study by Ayieko (2011) shows that, workers in flower farms have poor adherence to safety practices at work place resulting in high rate of occupational health hazards. This therefore shows that welders need to be trained on work place procedures so as to reduce occupational health hazards.

Similarly, majority (90.8%) of the welders believed that they required training on occupational health and safety. This further supports the research of Ayieko (2011) on health problems for Timau flower farm workers who concluded that majority of the workers lacked basic training on health and safety. Balkhyour, et al., (2019) noted that few a number of employees have the necessary skills, knowledge, abilities and competencies that was required to work. In the end, this many require more extensive training to attain the necessary skills that are able to make contributions that were substantive towards the growth of the organisation.

In addition, majority (71.3%) of the respondents were of the view that provision of insurance policies to welders reduces work place related hazards. The provision of insurance policies ensures that welders who are injured at work have their medical bills taken care of by the insurer and therefore welders will have reduced medical bills. Moreover, majority (68.3%) of the welders reported that there is need for safety precaution measures to be put in place so as to reduce work place related hazards. WHO (2010) posits that measures of prevention and control should not be used in an adhoc manner, but joined into inclusively, managed well and sustainable programmes
at the workplace level, involving the supervision, the personnel, the production and occupational health professionals. This will ensure that work related hazards are reduced.

Furthermore, majority (88.8%) of the welders noted all welders need to be registered and need to adhere to code of conduct during the welding procedures. This will reduce on the number of accidents occurring at workplace. Occupational injuries and diseases incidences linked with the industrialization has gone down significantly following the science and technology developments such as controls in engineering, equipment’s used for protection, machines and processes that are safer and regulation and labour inspection adherence. According to Porru, Calza, and Arici, (2017), occupational injuries and diseases incidences linked with the industrialization has drastically decreased following the developments in the science and technology sector, such as the engineering controls., the protective equipment provided and the processes and adherence the set regulations and the labour inspections.
CHAPTER SIX

CONCLUSIONS AND RECOMMENDATIONS

6.1 Introduction

This chapter is divided into two main sections namely; Conclusions and recommendations and these sections are basically learnt through the purpose of the study and results in general.

6.2 Conclusions of the Study

The following are the conclusions of this study based on the findings;

i. The determined that welding in Eldoret town is a male dominated occupation with most welders being aged between the years of 26-35. Additionally, majority of the welders had attained primary level of education which made them more susceptible to occupational hazards. Occupational hazards awareness is majorly dependent on their level of educational attainment increase.

ii. Also, the study concluded that most of the welders in Eldoret town were not aware on the importance of using personal protective equipment. It was noted that the welders were not using personal protective equipment like earmuffs, welding shields, industrial booths and gloves. This exposed them to hazards associated with the welding industry.

iii. Lastly, was established that protective equipment provision for personal usage, adherence to work procedures, occupational health and safety training, provision of insurance policies and putting in place safety precaution measures could reduce occupational hazards among welders.
6.3 Recommendations of the Study

Some of the recommendations of this study based on the findings and are as follows;

i. Need for welders training on the personal protective equipment usage and importance so as to reduce occupational hazards is required.

ii. There is need for welders to be registered and provided with insurance policies. Registration will enhance adherence to work regulations which in turn reduces work place related hazards.

iii. Safety precaution measures need to be put in place in all industries. This will enhance workers’ awareness on the procedures of evacuation and reduction of occupational hazards.

iv. There is need for development of welders’ policy at national level to enhance safety and training of welders

6.4 Suggestions for Further Studies

Due to the scope of the study, there are issues that are vital in this study that were unable to be addressed. Some of the recommendations that are recommended in this study for further research are as follows;

i. Similar studies at the national level needs to be undertaken in order to allow for study findings generalization.

ii. A study on other different factors that influences the occupational health and safety of the entire workers in both the formal and informal sectors of employments is required.
REFERENCES


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APPENDICIES

APPENDIX I: INTRODUCTION LETTER

Dear Participant,

RE: PARTICIPATION IN THIS STUDY

I am Mr. Benjamin K. Kipkilor, a Master of Science in Public Health student at Kisii University undertaking a research on “Determinants of occupational health hazards among scrap metal workers at North Rift Jua Kali Enterprises in Eldoret” I request you to participate in this activity.

Information obtained is strictly for learning purposes and the responses shall be treated as private and confidential. No names required. Put a thick in the bracket as you require.

Yours Faithfully,

Benjamin Kipkilor
APPENDIX II: RESEARCH PERMIT

OFFICE OF THE DIRECTOR OF GRADUATE STUDIES 
AND RESEARCH
UNIVERSITY OF EASTERN AFRICA, BARATON
P. O. Box 2500-30100, Eldoret, Kenya, East Africa

November 16, 2016

Kipkiror Benjamin Kibet
Kisii University
Department of Public Health

Dear Kipkiror,

Re: ETHICS CLEARANCE FOR RESEARCH PROPOSAL (REC: UEAB/3/11/2016)

Your research proposal entitled “Determinants of Occupational Health Hazards among Scrap Metal Workers at North Jua Kali Enterprises in Eldoret Town, Uasin-Gishu” was discussed by the Research Ethics Committee (REC) of the University and your request for ethics clearance was granted approval.

This approval is for one year effective November 16, 2016 until November 16, 2017. For any extension beyond this time period, you will need to apply to this committee one month prior to expiry date. Note that you will need a clearance from the study site before you start gathering your data.

We wish you success in your research.

Sincerely yours,

[Signature]

Dr. Jackie K. Obey
Chairperson, Research Ethics Committee

A SEVENTH-DAY ADVENTIST INSTITUTION OF HIGHER LEARNING
CHARTERED 1991

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APPENDIX III: RESEARCH QUESTIONNAIRE

Socio-demographic factors

1. Gender: [1]. Male (2). Female


3. Level of education:
   (1) Informal (2) Primary (3) Secondary (4) Tertiary (6) University.

4. Terms and service of employment:
   (1) Self employment (2) Permanent employment (3) Casual

5. How long have been working in North Rift Jua Kali Enterprises?
   (1) 1-10 yrs (2) 11-20 yrs (3). 21-30 yrs (4). 31-40 yrs (5) above 41 yrs

6. Did you have any formal training on your job? (1) Yes (2) No.

8. If yes to the question above, from which category of institution? (1). Vocational (2). Tertiary (3). University
Section B: Level of Knowledge and Practice on the Use of Personal Protective Equipment (PPE)

Indicate the level of agreement in the following likert scale items on level of use of PPE

SD=Strongly Disagree; D=Disagree; UD=Undecided; A=Agree; SA= Strongly Agree

<table>
<thead>
<tr>
<th>Statement</th>
<th>SD</th>
<th>D</th>
<th>UD</th>
<th>A</th>
<th>SA</th>
</tr>
</thead>
<tbody>
<tr>
<td>I always use ear muffs during welding process</td>
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<tr>
<td>While welding I use always welding googles for my own safety</td>
<td></td>
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<tr>
<td>I always use Welding shield when doing welding works</td>
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<tr>
<td>I have industrial gloves which I always use at work</td>
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<td>I wear an apron always at work</td>
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<td>I have been provided with industrial booths for use during my work</td>
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<tr>
<td>I always use mouth mask during my work</td>
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</table>

Section C: Control measures put in place to address occupational hazards exposure to welders

<table>
<thead>
<tr>
<th>Statement</th>
<th>SD</th>
<th>D</th>
<th>UD</th>
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<tr>
<td>Provision of personal protective equipment</td>
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<td>Adherence to work procedures</td>
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<td>Training of welders on occupational health and safety measures</td>
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<td>Provision of insurance policies to welders</td>
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<td>Safety precaution measures to be put in place</td>
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<td>Measure</td>
<td>SD</td>
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<tr>
<td>Ensuring that all welders are registered and adhere to code of conduct during the welding procedures</td>
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<td>Conducting medical examination before and during employment</td>
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<td>Training of welders on the importance of using personal protective equipment and gears at place of work</td>
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<td>Having welders’ representatives to attend seminars and workshops on occupational safety and health</td>
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<td>Having first aid kids at work place</td>
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<td>Putting in place fire safety measures</td>
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**Element of occupational health hazards’ exposure**

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<tr>
<td>After welding I usually get external injuries like burns</td>
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<td>After welding I usually experience unusual headache</td>
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<td>I have had some skin diseases after welding but was treated by a doctor</td>
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<td>After performing welding duties, I usually have some itchy eyes</td>
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THANK YOU
APPENDIX IV: KEY INFORMANTS’ INTERVIEW

Letter of Introduction

I am Mr. Benjamin K. Kipkiror, a master of science in public health student from Kisii University. I request you as key informant to participate in this educational research on “Determinants of occupational health hazards among scrap metal workers at North Rift Jua Kali Enterprises in Eldoret”. Information given is strictly for learning purposes and there is no financial gain. The responses shall be treated as private and confidential. No names are required. Put a tick in the bracket and write on the spaces provided as required.

Yours faithfully.

Benjamin Kipkiror

MHS16/40005/14

1. Gender: (1) Male    (2) Female

2. Department: (1) Health    (2) Labour   (3) NRJE

3. Level of education: (1) None   (2) Primary   (3) Secondary    (4) Tertiary   (5) University

4. Designation/rank: .................................................................................................................................

5. Work experience duration: specify period of time.................................................................

6. Do you visit scrap metal workers to check on occupational hazards at their workplace?        (1) Yes        (2) No

7. If your choice is yes to question 6, state the frequency at a specific period of time.
........................................................................................................................................................
8. Is there any occupational safety and health training and guidelines that you offer to scrap metal workers in regard to the nature of their occupation? (1) Yes (2) No

9. If yes to the above question, please, state the kind of training and guidelines given. ..........................................................................................................................................................................................
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10. Do you do inspection of scrap metal workers’ workplace to ascertain its suitability? (1) Yes (2) No

11. If your answer to question 10 above is yes, what action do you take in case of poor conditions at workplace?
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12. Are there any incidents of injuries and deaths associated with scrap metal work reported to your office? (1) Yes (2) No

13. If yes to question 12 above, please, state the figure of injuries and deaths in relation to their gender and the year of occurrence.
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14. Are scrap metal workers at North Rift Jua Kali Enterprises covered by National Hospital Insurance Fund (NHIF) or under any other medical insurance cover? (1) Yes (2) No (3) Don’t know

15. If your answer is No to the above question, how do victims of injuries and deaths meet their medical bills?
........................................................................................................................................................................................................

THANK YOU
APPENDIX V: OBSERVATIONAL CHECKLIST

This is a guide to check on availability of hazard prevention provisions at workplace and whether they are properly used among welders on work. A cross or a tick is marked in the brackets given accordingly.

Personal Protective Equipment’s

1. Overall: (1) Yes   (2) No   Proper use: (1) Yes   (2) No
2. Industrial gloves:  (1) Yes  (2) No   Proper use: (1) Yes   (2) No
3. Industrial boots:   (1) Yes   (2) No   Proper use: (1) Yes   (2) No
4. Mouth mask/respirator:  (1) Yes  (2) No   Proper use: (1) Yes   (2) No
5. Goggles: (1) Yes     (2) No       Proper use: (1) Yes     (2) No
6. UV rays shield:  (1) Yes      (2) No     Proper use: (1) Yes      (2) No
7. Ear muffs:   (1) Yes     (2) No       Proper use: (1) Yes     (2) No
8. Helmet: (1) Yes      (2) No       Proper use: (1) Yes      (2) No

Workplace provisions

9. Shelter:  (1 ) Yes  (2) No  Proper use: (1) Yes  (2) No
10. Ventilation: (1) Yes     (2) No,  Proper use: (1) Yes     (2) No
11. Exit door: (1) Yes      (2) No  Proper use: (1) Yes      (2) No
12. Fire safety equipments: (1) Yes     (2) No,  Properly placed: (1) Yes     (2) No
13. Waste disposal containers: (1) Yes     (2) No,  Proper use: (1) Yes     (2) No
14. Workplace arrangement: (1) Poor    (2) Fair    (3) Good    (4) Excellent
APPENDIX VI: MAP OF THE STUDY AREA
APPENDIX VII: PLAGIARISM REPORT

DETERMINANTS OF OCCUPATIONAL HEALTH HAZARDS EXPOSURE AMONG SCRAP METAL WORKERS AT NORTH RIFT JUA KALI ENTERPRISES IN ELDORET TOWN, UASIN-GISHU COUNTY, KENYA

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12% INTERNET SOURCES
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APPENDIX VIII: LIST OF PLATES

PLATE 1: MAN, WELDING WITH NO GLOVES, BOOThS, APRON AND USING SUN-GLASSES
PLATE 2: WELDER WITHOUT EARMUFFS