

**FACTORS INFLUENCING USE OF PERSONAL PROTECTIVE
EQUIPMENT (PPE'S) BY MOTOR VEHICLE REPAIR WORKERS IN
KIGANDAINI, THIKA**

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DEDICATION

I dedicate this work to my husband Wilson and daughter Joy for their encouragement and support throughout the study period.

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LIST OF ACRONYMS AND ABBREVIATIONS.

BLS	Bureau of Labor Statistics
EAC	East Africa Community
GDP	Gross domestic product
HSE	Health Safety Executive
ILO	International Labour Organization
IOM	Institute of medicine
KSHS	Kenya shillings
MVR	Motor vehicle repair
NHIS	National Health Interview Survey
OSH	Occupational safety and health
OSHA	Occupational safety and health Act
PPE	Personal protective equipment
PRECEDE	Predisposing, reinforcing and enabling causes in educational diagnosis and evaluation
TVET	Technical and Vocational Education and Training
WHO	World health organization

ABSTRACT

Workers across industries are exposed to a variety of hazards at the workplace. The use of Personal Protective Equipment (PPE) is an important strategy for preventing exposure to hazards that could result in injuries and illnesses among workers across various industries including those in motor vehicle repair sector. This particularly applies more to workers in work environments where it may not be practical to adopt other hazard mitigation strategies due to various constraints. Despite the widely acknowledged benefits of PPE use, studies have shown that PPE use remains low, inconsistent and inappropriate. Studies conducted have concentrated more on utilization levels of PPE rather than determinants of use. This study therefore sought to identify factors that influence use of PPE. The study used both quantitative and qualitative techniques in data collection. The sample size was 140 participants constituting 80 survey respondents and 40 focus group discussion participants. Stratified sampling method was used to generate the survey sample while purposive sampling was used to select the focus group discussion participants. Data from the survey was complemented by information from focus group discussions that comprised workers involved in different motor vehicle repair activities. Responses from study respondents were analyzed using Statistical Package for the Social Sciences (SPSS) while information from key informants and focus group discussions was analysed thematically. Study findings showed that measures adopted by workers in protecting themselves from work related hazards presented according to emergent themes included ; use of personal protective equipment, use of correct tools, excising caution while working among others. Misconceptions on protective measures were noted such as the belief by panel beaters and spray painters that taking milk eliminates effects of exposure to sanding dust and spray fumes. Reasons for failure to use PPE identified by the study included unavailability due to cost implications, interference of the PPE with speed of work and comfort issues and the need to conform to what others were doing or not doing. Others felt the PPE was not necessary for their work, this could imply that workers were not aware of some of the risks posed by their work. PPE use among the workers was found to be suboptimal. The study found that there was an association between workers age, work experience, income and PPE use. The workers education level was not found to be associated with use of PPE. The study recommends that quality and affordable PPE to be availed in the market and safety and health awareness and education programs to be extended to workers in the informal motor vehicle repair sector so as to sensitize the workers on how they can ensure their own safety and the safety of others while at work.

CHAPTER ONE

INTRODUCTION

1.1 Background to the Study

Most people notably the working population spend a considerable amount of their time at work than they do at homes. Virtually all workplaces have recognizable hazards which people are exposed to (Montgomery, 1996). For this specific reason, the protection of workers against occupational related injuries and illnesses has been an issue of great concern to employers, workers, governments, and the public in general. This is because a safe working environment does not only promote the physical, mental and social well-being of workers, but also saves costs associated with medical expenses, work injury or loss of life compensation, work interruption, loss of experienced personnel and the resultant recruitment and training costs of new workers , and others resulting from accidents at the workplace.

It is estimated that about 6,300 people die every day as a result of accidents at the places of work or occupational related diseases resulting in over 2.3 million deaths per annum (ILO 2010). This is on the background of over 337 million on-the-job accidents annually resulting from poor occupational safety and health practices (ILO 2001). However, the rate of related injuries (both reported and non-reported) is believed to be much higher. Globally there are about 2.3 million deaths each year for reasons attributable to work. Of these, two million deaths are linked to work-related diseases, while three hundred thousand deaths are linked to work related injuries. Consequently, there is an estimated economic loss of more than \$1.25 trillion annually, which is equivalent to 4.0 % of the world's Gross Domestic Product (Jukka, et.al 2012; ILO, 2003). The direct costs for employers include costs that are related to; treating and compensating the injured worker, production interruption costs, lost time of injured worker, time lost by management to follow the injured worker, training costs for new workers. The direct costs for workers include bodily pain and suffering from the injury or illness, loss of income, loss of a job and health-care costs, and other costs include time lost by family members to care the disabled worker and abrupt disruption of livelihoods (Leigh et al., 1999).

In countries where workplace accident, incidence, injuries and illnesses reporting systems are well developed, the motor vehicle repair industry is among those that rank highest in terms of reported fatal and non-fatal injuries (Smith, 2007). In the United States for example, between the year 2003 and 2005, one hundred forty seven mechanics were killed on the job. In addition, there were 15,680 non-fatal injuries and illnesses to mechanics involving days away from work. In the United Kingdom, over 7,000 motor vehicle repair sector injuries were reported to the Health and Safety Executive and local authorities between 2007 and 2013. Fatal and major motor vehicle repair injuries reported between the same period was 1,633 (HSE, 2014).

In developing countries and particularly African countries, there is paucity of data on occupational accidents and diseases information in various industries due to nonexistence or poorly developed reporting stems. In addition under reporting of injuries and accidents impairs availability of information on injuries or illnesses (Theuri, 2012). In cases where data on accidents and diseases information is available, such data is mostly from the formal sector and very little or no information is available from the informal sector. A primary difficult in getting statistics from the informal sector is attributed to lack of coverage of the sector by governments' labour inspectorate departments that only monitor firms that are registered with the labour departments (Theuri, 2012).

Protection of workers from workplace hazards is crucial in reducing mortality and morbidity in the workplace. The use of Personal Protective Equipment is an important strategy to prevent occupational injuries and illnesses resulting from exposure to workplace hazards. Personal protective equipment, or "PPE" as is commonly referred, is any equipment worn by the worker or held to minimize exposure to serious workplace injuries and illnesses (Osha.gov, 2016). These injuries and illnesses may result from direct contact with chemicals, radiological, physical, electrical, mechanical, or other workplace hazards (Osha.gov, 2016). Research studies have shown that more than 90% of all occupational injuries are preventable through the adoption of safety measures as well as use of personal protective equipment (Nichol et al., 2008, Lipscomb, 2000). In addition, studies have determined that failure to use PPE was a primary contributor of exposure to hazards that could cause injuries and illnesses among workers in various occupations. A research study conducted in the United States among workers across

various industries on occupational eye injuries found that about 60% of those who had occupational related eye injuries were at the time of the injury wearing wrong or inappropriate eye protection devices or were not wearing any eye protecting devices (Bureau of Labor Statistics, 1999). Other estimates from the National Health Interview Survey (NHIS) data shows that although 29.3% of U.S. adults perform work tasks that could cause eye injuries only, 32.1% used appropriate eye protection while performing such activities (Forrest et al., 2008).

Personal protective equipment (PPE), such as helmets, goggles, gloves, face shields, respirators, dust masks, safety shoes and safety glasses, are often very effective when donned and well fitted in preventing the exposure or impact to the various body parts of foreign bodies, chemicals, hot particles, biological agents, and radiation. In addition they PPE reduce the severity when an exposure or an impact happens (Mancini et al., 2005; Forest et al., 2006; Lipscomb, 2000). For instance in a review on the efficacy of interventions to prevent work-related injuries, it was reported that either the rate of injury, severity and lost work time can be reduced by 50% or more when PPE is used (Lipscomb, 2000).

Workers use of Personal Protective Equipment may be influenced by individual factors, such as knowledge of hazards they are exposed to as well as knowledge on how they can protect themselves (Nichol et al., 2008, Lu, Shi, Han, & Ling, 2015). Personal beliefs about the efficacy and effectiveness of Personal Protective Equipment may also affect a workers decision of whether or not to use Personal Protective Equipment (IOM, 2008). In addition workers perceptions of risk, past injury history or experience may also influence their decision on use of personal protective equipment. Finally socio demographic characteristics such as age of the worker, gender of the worker, the level of education of the worker, work experience of the worker are also important determinants of personal protective equipment use by workers (Nichol et al., 2008). Other than individual factors, work environment factors, such as ready access or availability of equipment and organizational factors, such as training, encouragement from coworkers in terms of PPE use and general social support including peer or coworkers use of may also be also important determinants of personal protective equipment use by workers (IOM, 2008)

Kigandaini Jua Kali cluster comprises of small firms situated off Thika-Garissa road. It is a multi-sectoral cluster with firms engaged in different activities like manufacturing, motor vehicle repair, electrical and glass works. The motor vehicle repair activities were started in Kigandaini as early as 1975 there (Kinyanjui, 1998). The local vehicle repair industry has grown due to factors such as market liberalization that has increased the number and types of both previously owned vehicles and spare parts. Since the vehicles that are brought into the country are not refurbished, many of them develop problems requiring the attention of motor vehicle repair workers such as those in the Kigandaini-Thika Jua Kali (McCormick, 1998).

In motor vehicle repairs, different Personal Protective Equipment are required depending on the activities workers are involved or specialization. The personal protective equipment is aimed at limiting exposure to various hazards that motor vehicle repair workers are exposed to including dust, noise, fumes, chemicals, welding sparks, welding glare, heavy objects, electrical current, sharp objects among others. Panel beaters are required to wear ear protectors, safety goggles, safety shoes, hand gloves, overalls and dust masks. Welders are required to have welding goggles or face shield, helmets, hand gloves, safety shoes and overalls. Spray painters are required to have full face respirators, hand gloves, safety shoes and overalls. Auto electricians on the other hand should have nonconductive shoes, helmets, gloves and overalls. Auto mechanics are required to have overalls, gloves, safety shoes, dust masks, helmets and safety goggles (Health Safety Executive, 2009).

Various stakeholders in workplaces have different duties and responsibilities in regard to PPE use. Employers are obliged by law to provide PPE and to train their workers on how to use them. In addition they are required to enforce the use of the provided PPE. Self-employed persons are also required to take precautions for ensuring their own safety and health and that of any other person in their workplace or within the environs of the workplace. In addition they are supposed to ensure the use of appropriate safe systems of work, preventive and control measures and where not feasible, use suitable personal protective appliances and clothing (OSHA Act, 2007).

While the use of personal protective equipment has been identified as an important hazard control strategy in work environments where it may not be practical to adopt other strategies, there is a great concern however that PPE usage remains low. Several studies have been done to establish why PPE compliance is low despite the availability of the PPE in some workplaces and known benefits of PPE usage (Nichol et al., 2008, Lu, Shi, Han, & Ling, 2015). Commonly cited reasons include individuals not being aware of hazards or not considering the use of PPE necessary, personal discomfort that is associated with PPE use, unavailability of PPE, PPE not being easily accessible at the work site and lack of coworkers, supervisors or managers influence in PPE use (Torp, 2005; Lombardi, 2009; Macpherson 2007; Pyrek, 2001).

Although a few studies have been done investigation utilization of Personal Protective Equipment and assessing the knowledge, attitudes and practice of PPE use in Kenya, there is a dearth of studies investigating the factors influencing PPE use among workers. This study investigated the individual as well as the work environment factors that may influence PPE utilization among motor vehicle repair workers in Kigandaini Jua Kali cluster in Thika town, Kenya. Specifically the study identified the safety measures taken by workers to protect themselves from injuries or harm while working, described Personal Protective Equipment utilization levels and other safety practices among the different specializations in motor vehicle repair, described individual's believes and attitude as well as their perception of risks posed by work activities. Lastly the study assessed how the work environment including social support for PPE use and availability of Personal Protective Equipment influenced PPE use by workers. The study addresses a critical gap in understanding factors that influence Personal Protective Equipment utilization in Kenya's informal garages and contributes to the workplace safety research in the informal sector.

1.2 Statement of the Research Problem

PPE use by workers across industries should keep them safe from injuries, illness and fatalities resulting from work related hazards (Kirenga, 2004). Hazards arising from workplaces could impair the health and well-being of the workers. The use of Personal Protective Equipment is an important strategy for preventing exposure to hazards that could result in injuries and illnesses among workers across various industries including those in motor vehicle repair sector. Despite the availability of Personal Protective

Equipment and its widely known protective value, the frequency of occupational injuries remains high throughout the developed as well as the developing world. Research studies carried out across the world show that workers use of PPE is low, not correct, and often incomplete and is not consistent. ((Lombardi et., al, .2009, Z'gambo, 2015, Chepkener 2013, Muema, 2016)). Therefore, both organizations and individual workers should strive to ensure workers safety through use of suitable PPE's when working, motivation and optimize knowledge related to work place risk management (Salman, 2009).

The Kenyan government may have put in place measures to reduce risks associated with workplace hazards through legislation and administrative mechanisms. In 2007, the Occupational Safety and Health Act (OSHA, 2007) was enacted. OSHA put in place specifications and measures that industries are expected to adhere to so as to improve health and safety at the work place by reducing the occurrence of injuries and illnesses. OSHA contains provisions on quality and safety standards of any manual or mechanized work. Among these is the provision relating to use of personal protective equipment and appliances in situations where workers are exposed to hazards in the workplace. However, Occupational Safety and Health Administration (OSHA) has placed responsibilities of policy implementation on the employers and self-employed persons without providing proper monitoring mechanisms. Employers and self-employed persons henceforth can choose whether to use PPE or not hence weakening significance of the policies (OSHA, 2007). This has therefore resulted into many accidents and illnesses at work places in Kenya due to lack of implementation of proper risk management systems (Chepkener, 2013). Most of these accidents that happen in informal sector go unreported due to lack of requisite reporting systems and failure by workers to understand their rights in working environments.

Studies of PPE usage among informal motor vehicle repair workers in African countries are few with results indicating high awareness of motor vehicle repair hazards, high awareness of some of the required PPE but reporting low usage of PPE by workers engaging in various vehicle repair activities (Chepkener 2013, Monney et, al.,2014, Sambo and Shamang, 2012). The studies carried out have assessed the knowledge, attitude and practice regarding PPE use among workers. Further, studies on PPE usage among workers in Kenya have only reported PPE utilization rate among workers but

have not examined their predictors (Chepkener, 2013, Muema, 2016). An important question on determinants of PPE use among workers therefore remains. It is against this background that the study evaluated the utilization of Personal Protective Equipment among workers in motor vehicle repair workers at Kigandaini Thika by understanding factors that affect their use which in turn would contribute to reduce accidents and injuries in the workplace.

1.3 Research questions

The overall question that this study sought to answer was: how do individual and work environment factors influence the use of Personal Protective Equipment's by motor vehicle repair workers at Kigandaini, Thika?

Specific research questions

To answer the overall research question, the following specific research questions were posed:

1. Which safety measures are taken by motor vehicle repair workers in Kigandaini to prevent or limit exposure to injury or illness while working?
2. How do workers demographic characteristics influence their utilization of personal protective equipment?
3. How do workers perceive risks posed by their work and what are their attitudes and beliefs towards PPE use?
4. How does the work environment influence PPE use by motor vehicle repair workers at Kigandaini Thika?

1.4 Study objectives

The broad objective of this study was to determine how individual and work environment factors influence the use of Personal Protective Equipment's by motor vehicle repair workers at Kigandaini, Thika.

Specific objectives

To achieve the broad objective the following specific objectives were pursued:

1. To describe the safety measures taken by motor vehicle repair workers in Kigandaini to prevent or limit exposure to injury/illness

2. To describe how the workers demographic characteristics influence their utilization of personal protective equipment?
3. To describe the workers perception of risk posed by their work and their beliefs and attitude towards PPE use.
4. To describe how the work environment influences PPE use by motor vehicle repair workers at Kigandaini Thika.

1.5 Justification for the study

Research on occupational safety and health is aimed at the eliminating from the workplace as many dangers and risks as possible (Cavassa and Serpe, 2009). Although several works have been carried out in the area of PPE utilization to identify motivational factors and barriers to PPE use in workplaces (Torp, 2005; Lombardi, 2009; Macpherson 2007; Pyrek,2001), very few studies have focused on examining the predictors of PPE use among motor vehicle repair workers in the informal sector.

This study investigated factors influencing use of PPE among motor vehicle repairers with focus of giving recommendations that would help in improving usage, which would in turn result to safer working environments. The findings in this study helps in informing, educating and ultimately protecting workers in motor vehicle repair sector. This study also draws recommendations to the employers and workers in motor vehicle repair industry to promote and enhance risk management in work places through proper use of PPEs, and following strictly occupation safety and health regulations (OSHR). Similarly, this study sheds light on informal sector where little is known in relation to safety and use of PPEs using Kigandani Thika as a model example. This henceforth raises level of awareness among motor vehicle repairers on risks, health and safety procedures in their field of work.

In addition, information from this study may help governments and other stakeholders in Occupational Health and Safety docket, not only to come up with appropriate regulations and laws but also mitigate procedure of enhancing them. The study outlines to them how to overcome shortcomings that inhibit use of PPEs by outlining factors limiting their usage. The result also raises understanding to the employers and workers in informal sector on importance of training and putting to practice regulations

(knowledge) on Occupational Safety and Health. It also promotes the need for the employers and self-employed persons to enforce safety regulations. Through this study, government may benefit from reduced economic burden that culminates from bills that are related to work place accidents, injuries and illnesses. Employers also stand to benefit from sustainable labour force which is at times interrupted when occupation accidents happen while the general society and individual workers and their families in general will be spared from emotional and economic stress that result when workers are rendered unable to support their families due to fatalities, injuries and illness resulting from working environment.

CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

This section contains both theoretical and empirical literature. The first section reviews the theoretical literature focusing on the theories that inform this study. The second section comprises empirical literature review that looks at findings from previous studies focusing on the individual and work environment factors that influence the use of Personal Protective Equipment by workers across various industries.

2.2 Theoretical Literature

Factors influencing or determinants of a workers decision making on the use of PPE are complex and they are not similar in the same work environments and even in different work environments (Graveling et al., 2009). There are a variety of model sand theories developed to explain why people adopt or fail to adopt self-protective behaviors' (De Joy, 1996).

Two models; the **PRECEDE** model and the Health Belief Model provides the theoretical framework for this study. The PRECEDE model is a contextual and environmental model that attempts to explain why people engage or fail to engage in health promoting behavior (Dejoy, 1996). The model postulates that individual and work environmental factors combine in influencing worker safety behavior. The health belief model is a classified as a decision making model. The main tenet in the model is the notion that people estimate how serious the risk is, analyze the benefits and costs of various actions and then choose a specific course of action that will maximize a desired outcome (DeJoy, 1996)

2.3 Health Belief Model

The Health Belief Model was designed purposely to explain health behavior. The model predicts that an individual's perceived threat of disease or illness will largely determine their likelihood of adopting healthy behaviors. Individuals' perceived threat of disease is determined by various factors that include the individual perceptions of susceptibility to disease and disease severity, modifying factors such as demographic variables and socio psychological characteristics and the appraisal of the benefits and costs of the

health behavior. Certain cues to action may trigger or initiate a change in behavior including internal cues such as adverse health symptoms or external cues such as social pressure. The model is relevant to this study as it points out that individuals likely to be adherent to the use of PPE have to perceive themselves as more vulnerable to the hazards posed by their work, perceive the risks from hazards as a serious threat to their health and evaluate the benefits of the health behavior in these case PPE usage, to outweigh personal discomfort that may be associated with the use of PPE. This model postulates that when an individual is anticipating negative repercussions from their behavior, the more they tend to take action aimed at self-protection. Anticipation for negative repercussions has to be accompanied by have the desire to avoid the repercussions and the ability to take precautionary measures. In addition, the motivations to take preventive measures require one to be aware of the risks and have the knowledge and skills to take preventive actions. The model further postulates that, those who are more likely to take risks tend to be less aware of risks and lack the ability to protect themselves.

This model additionally highlights the role of social influences on individuals. The desire to gain social approval from supervisors or managers or generally role models at workplace can influence the decision of workers to use PPE (DeJoy, 1996). The model further points out the importance of social support and encouragement towards adopting particular health behavior in this case the use of personal protective equipment. Use of personal protective equipment is likely to increase if people receive social support and receive constant encouragement from those around them.

The health belief model emphasizes how individuals' attitudes, beliefs, risk perceptions and influence their reactions to various health threats in or outside the workplace. Although the individual level factors that influence behavior are important, the main limitation of using the model to explain workplace self-protective behavior is that it fails to address the environmental factors in the workplace that combine with individual determinants to influence behavior (DeJoy, 1996) (Kretzer & Larson, 1998).

2.4 PRECEDE Model

The PRECEDE model is a contextual or environmental model that tries to explain why people engage or fail to engage in health enhancing behavior (Dejoy, 1996). The model

postulates that individual and work environmental factors combine in influencing worker behavior. The model further takes social and environmental factors and the context in which the individual operates into consideration. The model goes beyond person-focused variables and takes a more holistic approach to analyzing what determines health behavior (DeJoy, 1996) and is more suited to examine work-related health behaviors.

This study sought to determine how individual and work environment factors influence the use of personal protective equipment by motor vehicle repair workers in Kigandaini, Thika. Therefore the model was relevant to this study as constructs identified in the model were investigated to determine their influence on the use of personal protective equipment by workers.

The PRECEDE model was developed by various authors (Green and Kreuter, 1991; Green, and Partridge, 1980). “PRECEDE” is an acronym for “predisposing, reinforcing, and enabling causes in educational diagnosis and evaluation,” The model was developed as a framework to be used in planning health education programs (Dejoy, 1996).

According to the PRECEDE model, there are three sets of behavioral factors that drive the development of prevention strategies. Predisposing factors are the characteristics of the individual including beliefs, attitudes and values that facilitate or hinder self-protective behavior. Predisposing factors are conceptualized as providing the motivation for behavior. This study examined the individual workers beliefs and attitudes on the effectiveness of PPE in offering protection while working. In addition the study examined the workers risk perceptions.

Enabling factors refer to objective aspects of the environment or system that block or promote self-protective action. (Green et al., 1980) define enabling factors as “factors antecedent to behavior that allow motivation or aspiration to be realized” (p. 68). The skill and knowledge necessary to follow prescribed actions would be included here, as would the availability and accessibility of protective equipment and other resources. Most barriers or costs would be classified as enabling factors. This study established how knowledgeable motor vehicle repair workers were about hazards posed by their work, knowledge on how they protected themselves while working and the knowledge

of the PPE required while working. In addition, the study determined how available PPE to workers and if workers were trained in safety and health.

Reinforcing factors involve any reward or punishment that follows or is anticipated as a consequence of any behavior. The social approval or disapproval received from fellow workers, supervisors, and managers are some of the reinforcing factors in workplace settings. This study established how social support; encouragement to use PPE by fellow workers and supervisors and peer or coworker use of PPE influence use of PPE by motor vehicle repair workers.

The PRECEDE model is particularly important in understanding healthy behavior in the workplace as it seeks to direct attention to the skills and resources that are prerequisite to the achievement of behavioral goals, and viewing the environment as an important source of social support for behavior change and maintenance.

In any trial to develop intervention strategies to change worker safety and health behavior, it is important to understand that efforts to influence the beliefs and attitudes of workers and, thus, motivate them to follow safe practices may fail if the work environment is non-supportive. This diverts the attention to the importance of task related barriers, the availability of PPE, and the importance of safety training in facilitating self-protective behavior. Additionally, even a well-motivated and well-trained worker may not respond appropriately if doing so is not recognized by fellow workers supervisors or those around the work environment (De joy, 1996).

2.5 Review of Empirical literature

2.5.1 Individual and work environment factors associated with PPE use

Implementing a PPE program is one of the strategies in hazard and risk management control. It starts by recognizing the need for PPE by both employers and employees. It is paramount that those with decision making responsibilities at the workplace are aware of the hazards involved in different tasks; know of the possible consequences of exposure to these hazards and recognize and accept the role which correctly selected and worn PPE can play in the control of those hazards Graveling et al., 2009).

Decision makers at the workplace including managers or employers need to recognize that they have a role to play in health and safety and that their attitudes and behavior can

be a major positive or negative influence. Their role in an effective PPE program includes ensuring that PPE is provided and is accessible at the work site. Employers should also ensure that information and training needs are met; employees should be made aware of the hazard and subsequent risks arising thereof which the PPE aims to reduce or eliminate. Employees on the other hand have a responsibility of using the provided PPE, maintaining the PPE in a good state and reporting any hazard they identify at the place of work.

Despite the availability of PPE's in some workplaces and their widely known protective value, the frequency of occupational injuries remains high throughout the industrialized world as well as the developing world. This has prompted researchers to carry out studies examining the issue of PPE use across various occupations to better inform workplace prevention strategies.

Literature on factors influencing PPE use across various industries suggests that a various factors could positively or negatively impact PPE related behavior, use and compliance. The factors are put into three categories: The first category consists of individual factors, such as knowledge of hazards and PPE, beliefs and attitudes towards PPE and PPE use, perception of risks posed by work, history of injury experience, and socio demographic factors ; the second category consists of work environment factors, including availability of equipment and negative or positive pressure; and the final category consists of organizational factors, such as performance feedback, workplace policies, and training and education programs (IOM, 2008, Lombardi et al.2009, Olson et al., 2009, Cavazza and Serpe, 2009).

2. 5. 2 Individual Factors Influencing PPE Use

Research published across various occupations shows a number of individual factors as important determinants of PPE use among workers. These factors include knowledge and awareness of occupational hazards and risks, knowledge of requisite PPE, personal beliefs about the efficacy of the PPE's, risk perception, prior injury experience or history and socio demographic characteristics.

According to various theories in health behavior research, knowledge is a key component of motivation to engage in health enhancing behavior and or avoiding unhealthy behavior. (Ajzen, 1991, 2002; Prochaska and DiClemente, 1982). When workers are made aware of the hazards in their workplace, they are more inclined to use PPE to protect themselves from exposure to the hazards. Conversely if workers are provided with PPE but are not told why or how to use PPE, it is likely that such PPE will not be utilized.

Several studies carried out have pointed at the importance of workers having knowledge of the hazards and risks posed by their work and how they can protect themselves from such hazards. For instance, Lombardi et al. (2009) in a study of factors influencing workers use of eye protection in various industries found that workers were more likely to understand the risks involved in the job when they were told at the beginning when being hired that PPE is required and they were trained on PPE use.

Similarly, Hughson et al, (2002) in a study assessing awareness of hazards and the role played by training in influencing use of PPE found that Personal Protective Equipment was most likely donned when workers were more aware of the risks and more so in work sites where the risk was more apparent and obvious for example higher noise levels and other more apparent risks like bright light and sparks from welding.

Knowledge of consequence resulting from exposure to hazards has also been shown to be a predictor of PPE use. In a study conducted to assess awareness of safety and health practices and respiratory protective equipment use, the major determinants for the use of PPE included risk of exposure and knowledge of the consequence of the exposure (Health Safety Executive, 2009).

Risk perception among individuals has also been shown to influence use of PPE. A perception is defined as the result of a cognitive process whereby a person interprets information based on his or her understanding of that object (National safety council, 2014). Understanding workplace hazards and risk and how the two are perceived by workers is a important step towards developing programs and forums for raising awareness to make workplaces safer. Risk perception is the ability of an individual to discern a certain amount of risk. Theoretically, the inability to perceive risk by an individual may lead to higher risk taking behavior (National Safety Council, 2014).

In a study by the Health and Safety Executive an occupational research body in the UK on respiratory protective equipment across four industries; brick making, construction, stonemasonry, quarrying, results from the study indicate that despite workers being aware of the hazard, individual risk perception was often low. The study attributed this to many factors that affected risk perception notably age. The study reported older and more experienced workers did not consider the risk to be sufficient to require one to use PPE. In addition, the study showed that although peer support or pressure can be of positive effect, generally, peer influences were more negative. Older workers were found to dismissing the training and information received by younger workers who were new to the workplace thereby undermining the information received by the workers.

A study among immigrant farm workers exposed to pesticides on the farm assessing the PPE use among other self-protective practices highlighted that workers having information about the risks posed by their work, their personal beliefs about the effectiveness or benefit of using PPE and their perception of risk as determinants of PPE use. The study found out that workers with low risk perception were less likely to use provided respirators (Vaughan et al. 1993)

Perception of hazards by workers has also been shown to be an important determinant of PPE use. for instance in a study among farmers in California, the proportion of farmers reporting to wearing respirators when exposed to pesticides was higher at 50% compared to the proportion of framers reporting to wear respirator when exposed to dust. According to the study dust was not considered a serious hazard to warrant use of respirators all the time. Rather it was considered as a common nuisance.

In healthcare based studies, health care workers were observed to be more compliant to the use of PPE notably gloves when working surgical rooms as compared to when they were working in settings where exposure to sharps was low. A positive relationship between high perception of risk and wearing of gloves was reported (Linn et al. 1990, Akduman et al. 1999). Similarly, another study among surgical nurses in Poland observed that nurses handling patients suspected of having infectious ailments were more afraid of acquiring the infections and hence reported higher PPE usage. Further the study showed that those nurses trained in handling suspected infectious diseases

patients were also more inclined to wear required PPE (Ganczak et al., 2007). The study also identified barriers to PPE compliance by health care workers which included non-availability of the PPE (37%); interference with patient care (32%), lack of time to wear PPE in emergency situations (19%); the perceived ineffectiveness of the provided PPE provided (9.8%).

Other studies have shown that individual workers characteristics such as level of education, age, gender and work experience, also affect use of personal protective equipment (Z'gambo, 2015; Phillip et.al, 2014.). In a study of occupational hazards and use of personal protective equipment among small scale welders in Lusaka Zambia, the results of the study indicated that welders with no education had the least proportion reporting to use PPE, compared to those with primary and higher education. Furthermore, the study found out that the proportion of welders reporting to use PPE increased with an increase in work experience. Additionally the study found out that the proportion of welders using at least one type of PPE was least in the youngest participants who were twenty eight years and below (Z'gambo, 2015).

Similarly, in a study on protective eyewear, age emerged as an important factor influencing risk perception. Older and more experienced workers reported that they were more likely to wear PPE than their younger or less experienced counterparts. Older workers attributed this phenomenon to younger workers' lack of experience and feelings of invincibility. Younger workers suggested that they had not yet formed a habit of using PPE or did not realize its importance for certain tasks. In the same study, Worker perceptions were also determined by task duration. For example, workers reported a lower rate of PPE use for tasks that took shorter period to accomplish and did not involve repetitive work (Lombardi et al, .2009).

However in a study of occupational safety and health practices among vehicle repair workers in Ghana, results from the study indicated that no association between use of Personal Protective Equipment and respondents' educational level. In addition the study further showed no statistically significant association between work experience and use of personal protective equipment (Monney et al, .2014).

In a study among farmers in Australia, farm chemical training and schooling was associated with wearing of PPE that included gloves, boots, coveralls and respirators. On the age variable and use of the said PPE, older farmers reported lower use of PPE. This was attributed to older workers not having had a chance to be trained on the importance of the PPE. The study also made the observation that farmers mostly used respirators during the mixing phase of the pesticides but not in the application phase of the pesticides. This was attributed to perceived seriousness of expected consequences of exposure to concentrated pesticide as compared to diluted pesticides. (MacFarlane et, al., 2007).

On past injury history, the protection motivation theory states that risk perception and use of personal protective equipment increase when workers have reason for concern, oftentimes as a result of having suffered an occupational injury or illness. In a study of use of personal protective equipment among off shore workers, the workers who had experienced an accident or incident in the past felt less safe and were more aware of the risks than those who had not experienced an accident or incident (Mearns et, al., 1998).

2.5.3 Work environment factors and PPE use

In regard to work environment, social support is an important work environment factor associated with PPE use. Protection motivation theory postulates that people are more inclined to take risks because of peer pressure or the perception in the community or environment where they operate that a certain activity has low risks. A person is more likely inclined to engage in unsafe behavior if “everyone else is doing it” or the community around him or her does not perceive an action to be unsafe. In the case of use of personal protective equipment, peer pressure can encourage or discourage use. If co-workers use personal protective equipment, an individual worker is more likely to use PPE.

Coworker and supervisor influence have also been cited as factors which impacts workers’ decisions to use or not use PPE. Lombardi et, al., (2009) in a study on factors influencing the use of protective eyewear among workers across various industries Participants noted that supervisors should provide ongoing positive feedback to encourage use.

Other factors that have been shown to influence the use of PPE include time taken to complete a task, nature of the task and type of PPE required for specific activities. The length taken to accomplish a task has been shown to be a determinant of PPE use. Broughton et al, (2010), in a study of assessing the awareness of safety and health practices on the use of isocyanate paint in the motor vehicle repair industries in the UK, found out that sprayers involved in minor dent repair and spraying on vehicles reported not using PPE despite being aware of the paint hazard. They attributed this to low exposures as a result of brevity of the spray duration. Similarly in a study of protective eyewear across several high risk industries, the duration of the task was reported as an important determinant of PPE use. Workers performing short tasks reported not using the PPE during such tasks. This observation was also made by Chepkener, 2013 in a study of metal Jua kali workers in Kenya. The study reported that welders involved in welding or soldering small areas reported not using PPE if the area to be worked on was small.

In other studies PPE awareness and use seem to be influenced by the type of PPE. For example in a study of PPE use among welders in Zambia, the study found out that of the different types of PPE recommended for welders, the welders in the study showed low level of awareness regarding hearing and respiratory PPE, but were more aware of safety shoes, work suits/coveralls, welding goggles and safety gloves (Z'gambo, 2015). The activity undertaken by the workers or nature of the activity undertaken also affects use of PPE. In work processes where the hazards and risks are easily identifiable, PPE usage in such enterprises increased (Graveling et al., 2009). For example, in a study on factors influencing use of protective eyewear in high risk industries, it was reported that those who engaged in tasks such as welding works, surgeries, chemical laboratory procedures, or grinding reported a higher rate of PPE use than those performing tasks with lower perceived risks. The research attributed the results to the nature of the involved tasks where there are risk of burns and high exposure to biological hazards and hence the perception of the said activities as high risk activities (Lombardi et al. 2009). In addition perceived barriers to PPE use are also determinants of PPE use. In the health sector, the commonly cited reasons for non-compliance with PPE use include lack of time, interference of the PPE device with the good care of the patient and discomfort (Kelen et al., 1990; Linn et al., 1990; Hammond et al., 1990; Willy et al., 1990; Hoffman-Terry, 1992; Gershon et al., 1995; Akdumman et al., 1999, Preston et al.,

2002; Nickell et al., 2004). Conversely in this industry lack of knowledge about the consequence of exposure has not been found to be a barrier to the use of PPE (Gershon et al., 1995; Helfgott et al., 1998; Bryce et al., 2008).

In other industries including construction, metal work and agriculture, the barriers to PPE use included lack of comfort; poor fit, accessibility, and availability are also cited as important. Others include environmental factors such as rain, too much heat, dirt, or grease. (Lombardi et al., 2009; Chepkener, 2013; Muema 2016).

According to the above studies, the decision of a worker to use PPE may be influenced by various factors ranging from individual demographic characteristic such as age, gender, work experience and educational levels. Other individual factors include knowledge of hazards posed by work and knowledge of measures that can be taken to mitigate the hazards. Workers perception of risks is also a determinant of PPE use. Further the studies have shown that risk perception may be influenced by other factors such as workers previous injury experience and various demographic factors.

2.6 Conceptual Framework

A conceptual framework explains the relationships among linked concepts and explains the connections between the variables under study (Ravitch & Riggan, 2012). The conceptual framework for this study has been developed based on the theoretical literature mainly from the PRECEDE model that informs this study. The individual and work factors influencing use of PPE's constitutes the independent variable while use of PPE's is the dependent variable.

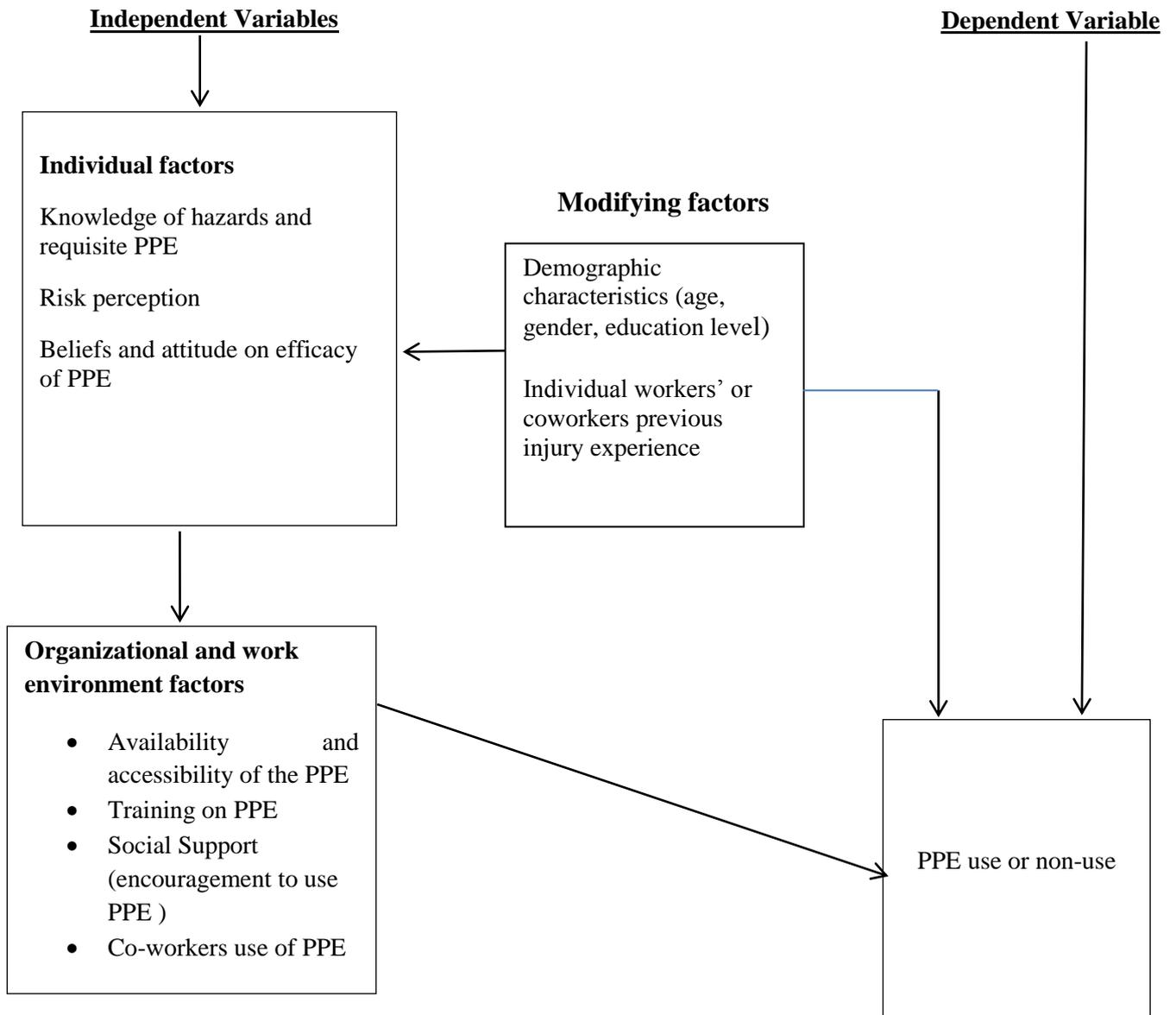
Individual factors include knowledge of work hazards, knowledge of measures to protect oneself from the hazards and knowledge of required PPE for particular work. Workers are more likely to use personal protective equipment if they are aware of the hazards posed by their work and if they know the measures they can take to protect themselves from the hazards posed by their work. Other individual factors include beliefs and attitudes concerning PPE usage and risk perception. In addition workers are more likely to use PPE if they believe that PPE can offer them protection and if they feel that the PPE are effective in protecting them from risks posed by the hazards they are exposed to while working. Finally on risk perception and use of PPE,

increased/heightened personal risk perception is likely to result in higher rates of PPE use among workers.

Work environment factors include availability of PPE, training, social support for PPE including encouragement to use PPE and coworkers use of PPE. Workers are more likely to use PPE if the PPE is accessible and available for use while working. In terms of social support and use of PPE, workers are more likely to use personal protective equipment if coworkers or supervisors are using them and if there is encouragement to use PPE from those around the worker, mainly coworkers and supervisors. Finally on training and PPE use, workers who are trained in safety and health at work are likely to be more aware of hazards posed by their work, the measures they can take to protect themselves from the various sources of harm at work and hence are more likely to use PPE while working.

Modifying factors such as demographic characteristics which include age, gender, level of education, income and work experience as well as previous injury experience are suggested to indirectly influence health related behavior (PPE use in this case), exerting their influence through the individual and work environment factors that directly affect PPE use behavior. Studies have shown that age and work experience are important factors in influencing risk perception. In terms of age, older and workers who have more experience in the field are more likely to wear PPE than their younger or less experienced counterparts. Level of education may influence use of PPE, where those with at least primary and secondary education. On the variable past injury experience/history, risk perception and use of personal protective equipment increase when workers have reason for concern, often due to involvement in a previous incident or accident. Workers who have experienced an incident /injury in the past feel less safe and may be more aware of risky tasks than those who have not experienced an incident or injury. This relationship is shown on Figure 2.1

Figure 2.1: Conceptual Framework



Source: (Authors Conceptualization, 2017)

2.7 Operational Definitions and Description of Variables

2.7.1 Independent Variable

The independent variable for this study comprises of individual and work environment factors that may influence a motor vehicle repair worker utilization of personal protective equipment.

A motor vehicle repair worker in this study is defined as someone who is involved in any one of the activities of motor vehicle repair including general mechanic, welding, auto electrician, panel beating and spray painting. The worker may be an employee, self-employed, a contract employee, a casual worker, an apprentice or employer (self-employed /own account worker with employees).

For this study the individual factors that may influence utilization of PPE by workers and are of interest to this study include demographic characteristics (age, gender, level of education and work experience).The demographic characteristics are proposed to have indirect influences on health related behavior (PPE use in this case), exerting their influence through the individual and work environment factors that directly affect PPE use behavior. In this study, the variables will be described as follows; age (18 years and above, complete years), gender (male/female), level of education (primary complete to university degree) and work experience / length of service (complete years).

Individual factors include knowledge of hazards posed by work, beliefs and attitudes towards use of PPE, risk perception and work environment factors. Knowledge of hazards one is exposed to while working, the measures they can take to protect themselves from risks posed by the hazards and the requisite PPE they can use to protect themselves from the hazards.

Knowledge refers to an understanding of people about a given topic. Data on knowledge of hazards that one is exposed to while working, measures that they can take to protect themselves from risks and knowledge on required PPE will be sought by asking the respondents to list the particular knowledge items. For example if the respondent is a welder, they will be asked to indicate the hazards they are exposed to as welders when working, the measures they can take to protect themselves from the

identified hazards and the type of PPE they should use when welding. The responses will be grouped according to emerging themes and coded for further analysis.

For the variables risk perception, beliefs and attitudes toward PPE usage, Likert scales will be used. A Likert scale is a type of psychometric response scale often used in questionnaires (Likert, 1932). It is also the most widely used scale in survey research. Respondents are often required to specify their level of agreement to a statement regarding the particular variable.

Risk perception refers to the ability of an individual to discern a certain amount of risk. A 5 point likert scale of *strongly disagree, Disagree, Neutral, Agree and strongly agree* will be used to measure risk discernment by individuals in relation to their work. Two questions regarding how dangerous/risky respondents feel their work is were posed. Responses were assigned a numeric value. Summing of numeric values was done which yielded a total score range of 2-10. The scores were further categorized into; high risk perception and low risk perception.

Belief refers to the acceptance or a conviction to hold something as truth. Attitude refers to personal feelings which are based on the subjective perception towards a particular subject. Likewise, a 5 point likert scale of *Strongly disagree, Disagree, Neutral, Agree and Strongly agree* was used to measure a respondents beliefs and attitudes towards PPE use by establishing their feelings concerning efficacy of PPE or the role of PPE in protecting them from injuries or harm that might result from their work. Three questions assessing worker beliefs in the efficacy of PPE in offering protection and attitude towards PPE use were posed. Responses were assigned a numeric value. Summing of numerical values for the three questions was done and yielded a total score range of 3-15. Scores were further categorized into; positive beliefs and attitudes and negative beliefs and attitude toward PPE use.

The work environment factors of interest in this study included availability of the Personal Protective Equipment, training, coworker use of PPE/ peer influence and social support for PPE use. Availability of PPE in this study referred to the ability to obtain/ ready access to protective devices or clothing. Availability of PPE was measured by asking respondents their level of agreement with the statement "I can obtain protective

devices or clothing when I need to use or replace them”. A 5 point likert scale of *strongly disagree, Disagree, Neutral, Agree and strongly agree* will comprise the responses a participant will chose from. Training was measured through the question “have you received any training in safety and health”. Response options were dichotomous a YES or F If a respondent answered yes, follow up question of the type of training received were asked.

Coworker use of PPE/ peer influence was measured by asking participants to indicate whether coworkers use PPE when exposed to chemicals substances or when performing risky activities? A dichotomous response of YES or NO was expected. Further a five point likert scale of *always, mostly, sometimes, rarely and never* was used to further determine the frequency of PPE use by peers. Social support for PPE use was measured by asking participants to indicate whether they get encouragement to use PPE from coworkers or supervisors. A dichotomous response of YES or NO was expected. Further a five point likert scale of *always, mostly, sometimes, rarely and never* was used to further determine how often the workers get the encouragement to use PPE from coworkers.

For all likert scale questionnaire items, data was treated as ordinal where applicable and reduced to a dichotomous variable for analysis. A response of *strongly agree/agree* indicated presence of the variable and a response of *neutral/disagree/strongly disagree* indicated absence of the variable. Likewise a response of *always/ mostly* in relation to frequency of use indicated PPE use or social support for PPE use while a response of *sometimes, rarely and never* indicated PPE non-use or lack of social support for PPE use and lack of encouragement to use personal protective equipment .

2.7.2 Dependent Variable

The dependent variable for this study was Personal Protective Equipment use. PPE use in this study was defined as the self-reported use of one or more requisite/recommended PPE for a particular motor vehicle repair activity.

Data on PPE use was gathered by asking the participants to state whether they use any PPE while working. The responses were dichotomous; Yes or NO. Further, in addition to the determination of the number of workers who used at least one type of PPE, total numbers of PPE or PPEs used by each respondent were computed to determine the utilization rate. The scores or totals were then categorized into low (those who only one type of PPE), moderate (used between 2 and 3 types of PPEs) and high (used four or more PPEs).

2.7. 3 Modifying Variable

Modifying factors such as past injury experience has been shown to influence risk perception in individuals. Risk perception and use of personal protective equipment increase when workers have reason for being concerned often as a result of their involvement in a previous injury or illness experience (Mearns et al., 1998). The respondents were asked to indicate whether they have ever experienced an occupational injury in the past. Further they were also asked if their coworkers have had an occupational injury in the past. The researcher sought to establish if there is a relationship between past injury experience, the risk perception and use of personal protective equipment by workers.

CHAPTER THREE

RESEARCH METHODOLOGY

3.1 Introduction

This section describes the research design, study site, unit of analysis, sampling method, data sources and data collection methods and data analysis.

3.2 Research Design

The study adopted a mixed methods research design (a combination of quantitative and qualitative research methods). Quantitative methods constituted a survey and qualitative methods constituted focus group discussions and key informant interviews. To get more information on the study area, the researcher traveled to Thika on a reconnaissance journey to familiarize with the location and get more information on the participants in this sector from Thika Jua Kali Welfare Association.

3.3 Study Site

Kigandaini is located in Thika town just off Garissa Road, and opposite the Kenya Nut Industries, along Factory Road. Thika is a town in Kiambu County commonly known as a center for industry, specializing mostly in food and horticulture manufacturing. The other industries include tannery, motor vehicle manufacture repair and maintenance, cigarette manufacturing, and industrial chemicals. Both small-scale industries as well as major factory setups exist within the town. According to 2009 Kenya National Bureau of Statistics Census, Thika had a population of approximately 139,853 (KNBS, 2009). The study was carried out in Kigandaini Jua Kali sector located in Gatwanyaga ward. This sector operates from a 2.4 hectares piece of land that belonged to the Municipal Council of Thika which is today under County Government of Kiambu. The land was originally set aside for the development of a fire station to serve Thika town, the adjacent industrial area zone and the nearby residential areas. However, in 1988, the municipality made plans to relocate the informal Jua kali traders away from the town centre, and they were therefore allocated the site in 1989. The site was earmarked for development in terms of workshops and stalls in the early 90's, during retired president Daniel Arap Moi's Jua kali development agenda, but this never fully materialized , with only two functional workshops erected to serve the operators.

The cluster is an employment zone that is made up of informal sector manufacturing enterprises, car repair and other small scale retail enterprises. The cluster has about three hundred enterprises carrying out various activities (Kinyanjui, 1996). Research studies conducted have investigated motor vehicle repair and maintenance as well as other related manufacturing and trading activities in the cluster (McCormick et al. 1996; Kinyanjui, 1996, 1997, 1998; McCormick, 1998). Majority of the enterprises (36%) of the enterprises are involved in motor vehicle repair, an additional 8% of the enterprises sell vehicle spare parts, and 5% are involved in the manufacture of spares. The other enterprises manufacture furniture, fabricate metal products, cooking stoves and lantern lamps, mops, cushions, mattresses, and others are involved in the trading of scrap metal and food (McCormick et al. 1996; Kinyanjui, 1996)

Proximity of Thika to Nairobi City highlights that the town plays a major role in absorbing workers who are unable to secure employment opportunities in Nairobi city. This has led to the growth of informal sector in the town, thus making workers more susceptible to the safety and health concerns arising thereof. Informal sector workers are faced with myriad safety and health challenges due to insecurity surrounding their employment status and lack of or minimal control of the conditions of their employment. They often face poor working conditions: physical overexertion or repetitive motion; high risk of injuries, exposure to toxins and limited access to training and protective gears (Chepkener, 2013).

In addition to Thika towns' playing an important role in absorbing the growing size of labour force from Nairobi, the study also focused on Kigandaini Jua Kali Cluster because no studies on PPE utilization or any other studies on occupational safety and health issues have been carried out in the cluster. In addition there is a high concentration of vehicle repairers. Other considerations included proximity and accessibility hence saving on time and cost.

3.4 Study population

There are a total of eight hundred (800) motor vehicle repair workers working in the Kigandaini area and are registered members of the Thika Jua kali welfare Association (Thika Welfare Jua kali Association, 2017). They are involved in different activities namely; general mechanical work, welding, panel beating, spray painting and wiring.

The motor vehicle repair workers are either self-employed or own account workers or employed.

3.5 Target population

The study sought to describe both individual and organizational or work environment factors that influence the use of personal protective equipment by motor vehicle repair workers in the Jua Kali Cluster in Thika. Therefore the target population for this study was all motor vehicle repair workers who may be employed or self-employed or own account workers. The study used the Thika Jua Kali welfare Association register of members as the sampling frame. The association members compose of about 90 % of all workers working within the Jua Kali site (see table 3.1). Workers in the different activities namely; general mechanical work, welding, panel beating, spray painting and wiring were included in the study.

Table 3.0.1: Target Population

Category	Number of Workers	Percentage
General mechanics	285	35.6
Wiring/auto electricians	231	28.9
Welders	142	17.8
Panel beaters	89	11.1
Spray painters	53	6.6
Total	800	100

Source: Thika Welfare Jua kali Association, 2017

3.6 Sampling design and Sample Size

Stratified sampling method was applied to generate the survey participants while purposive sampling was used in the selection of the focus group discussion participants. Stratified sampling method sought to ensure that data is collected from each stratum and hence ensure representation from the various groups of the motor vehicle repair workers. The sample in each stratum was proportionately allocated to each category of motor vehicle repair activity. Simple random sampling was used to select the workers to be involved in the study.

The cluster houses about eight hundred registered motor vehicle repair workers involved in a variety of motor vehicle repair activities (Thika Welfare Jua kali Association, 2017). Mugenda and Mugenda (2003) recommend that 10 percent or more of the target population is representative of the population where the appropriate method of sample design is applied. A sample of 80 workers stratified by activity they are engaged in were selected for the survey. The strata used in this study included; general mechanics, panel beaters, spray painters, welders and auto electricians.

Table 3.0.2: Sample size per stratum

Category	Target Population	Sample Size Per stratum
General mechanics	285	29
Wiring/auto electricians	231	23
Welders	142	14
Panel beaters	89	9
Spray painters	53	5
Total	800	80

Further, five focus group discussions, each with eight participants were conducted. Hence 40 workers participated in the focus group discussions. Every focus group interview had workers from one of the five categories of motor vehicle repairers; general mechanics, auto electricians, welders, panel beaters and spray painters. During the survey, a contact person from each of the five categories of motor vehicle repair was identified. The contact person helped in identifying the participants in the focus group discussions.

Further, purposive sampling was used to select the key informants who included three (3) employers, one (1) representative of the Thika Jua Kali Welfare Association, one (1) Occupational Safety and Health Officer from the Directorate of Occupational Safety and Health Services.

3.7 Data Sources and Collection Methods

This study used both primary and secondary sources of data. Primary data was gathered from individual workers, focus group discussions and key informants. A questionnaire

was administered by the interviewer to workers. Focus group interviews were conducted and interviews with key informants were also carried out. The key informants included; employers or the own account workers who had employees, representatives of the Thika welfare Jua kali Association and the County based Occupational Safety and Health officer.

3.7.1 Survey

Interviewer administered questionnaires were used to collect information from 80 motor vehicle repair workers. The information sought included; demographic characteristics of the workers; measures taken by motor vehicle repair workers to protect themselves from injuries while working, the type of PPE used by the workers, workers beliefs and attitudes towards PPE, workers perception of risks posed by their work and social support from coworkers in terms of PPE use.

The survey instrument had open ended as well as close-ended questions. The responses to the close-ended questions were mainly drawn from literature reviewed while the open ended questions were meant to accord the participants freedom to give as much information as possible without the constraints of pre-determined responses. Open ended questions were particularly important for obtaining information on the variable; participants' knowledge of risks posed by particular motor vehicle repair activity and measures that can be taken to eliminate or reduce the risks and finally knowledge of personal protective equipment's required for the particular vehicle repair activity.

3.7.2 Key Informant Interviews

Key informant interviews were conducted with three employers, one official from the Thika Jua Kali Welfare association and one County Occupational Safety and Health officer. The three employers were interviewed to gain insights into PPE usage at the garages and to establish the challenges encountered in regards to PPE use. In addition employers were interviewed to provide information to help the research understand more about enforcement, social support for PPE usage, and issues related to cost and supply of personal protective equipment.

The interview with an official from the welfare association was conducted to establish whether the association has any programs focusing on the safety and health of workers at the Jua kali site.

Key informant interviews were also conducted with the County Occupational Safety and Health officer based at the Directorate of Occupational Safety and Health Services to determine the measures if any that are being taken by the Ministry to enhance the safety and health of workers in the informal sector and more so in the informal garages in Thika.

3.7.3 Focus Group Discussions

Five focus group discussions, each with eight participants were conducted to complement the data from the survey. The five focus groups constituted of the five categories of motor vehicle repairers; general mechanics, welders, auto electricians, panel beaters and spray painters. The focus group discussions sought to gather information on safety measures that the workers take to ensure their safety while working, their perception on how risky they consider their work to be and beliefs and attitudes of workers in relation to the effectiveness of PPE in offering them protection while working. In addition the focus group interviews sought to gather data on reasons for use or non-use of PPE and barriers for PPE use.

3.7.4 Secondary data

Secondary data was collected from published and unpublished works including books, academic journals, project papers, theses and reports among others. Secondary data sought to understand the factors influencing PPE usage among workers and to contextualize the research questions and identify gaps regarding predictors of PPE use or the factors that influence PPE use by workers.

3.8 Data Analysis

For survey data, completed questionnaires were reviewed and cleaned to ensure accuracy, clarity and completeness of responses. Analysis of responses to any open-ended questions was listed in order to identify the emerging themes. The responses were then grouped into thematic areas and coded.

After coding, quantitative data was analyzed using statistical analysis techniques in form of generating frequency distribution, graphs and cross tabulation to explore the relationship between variables. This was done using Statistical Package for the Social Sciences (SPSS).

The researcher used thematic analysis for analysis of data gathered from the focus group discussions and the key informant interviews. Each individual answer/quote was sorted and then all quotes were grouped by major themes. Different emerging themes were captured and presented as narrations.

3.9 Challenges Faced During Data Collection

The researcher faced several challenges during the data collection phase. To begin with, most of the respondents interviewed were workers who are paid piece work on completion of specific tasks. As a result of this, during the survey most workers were willing to take part in the study so long as they did not have to stop the activities they were engaged in at that particular time. This may have influenced the quality of some of the responses as the interviewer would have to ask questions quickly with respondents giving brief responses or explanations in order to save on time.

The focus group discussions were conducted on site hence it was difficult for the researcher to have audio recordings as a result of the high background noise from various activities such as hammering, welding, grinding, cutting, engine revving during testing and people conversing. The researcher had to rely on note taking but this was adequately done as the researcher had assistance from a note taker.

The interviewers also had concerns for their personal safety as most of the interviews were conducted as the participants and those around the vicinity conducted various motor vehicle repair activities. However the interviewers felt that if they conducted the interviews donning some form of PPE, this would really make them appear different and may have led to bias in responses and hence decided not to wear any PPE. This in turn meant that the interviewers were not very relaxed during the interviews.

CHAPTER FOUR

STUDY FINDINGS AND DISCUSSION

4.1 Introduction

This chapter is comprised of findings, discussion and presentation of the study based on the research objectives. The study targeted motor vehicle repair workers at the Kigandaini Jua Kali Cluster who are involved in various activities namely; general motor vehicle mechanics, welding, panel beating, spray painting and auto wiring. The main research objective was to determine how individual and organizational/work environment factors influence the use of Personal Protective Equipment's by workers in the Jua kali cluster. To achieve this, the study sought to describe safety measures taken by motor vehicle repair workers in Kigandaini to prevent or limit exposure to injury or illness, to determine how the workers demographic characteristics influence utilization of personal protective equipment, to describe the workers perception of risks posed by their work and their beliefs and attitude towards PPE and to describe how the work environment influences PPE use by motor vehicle repair workers at Kigandaini Thika.

The sample size for the survey was 80 respondents and they all responded therefore a response rate of 100% was achieved. A response rate of 50% is adequate for analysis and reporting while 100% response rate is excellent (Mugenda and Mugenda, 1999). Further a total of 40 workers participated in the focus group discussions. The forty workers were in five groups each group with eight participants from each of the motor vehicle activities namely; general mechanics, welders, spray painters, panel beaters and those involved in wiring activities.

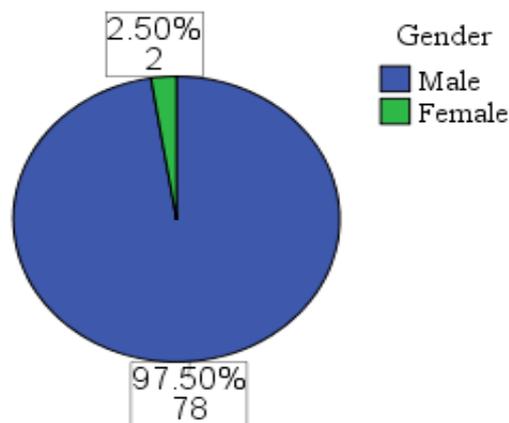
4.2 Demographic characteristics of the sample population

Understanding the individual characteristics of the motor vehicle repair workers such as age, gender, level of education and work experience helps put the study into context. Understanding these characteristics was a key component to this study since earlier studies as well as available literature have suggested these characteristics as factors that may influence workers decision on whether to use or not to use personal protective equipment while working. The findings are discussed as follows.

4.2.1 Gender of the respondent

Motor vehicle repair workers at Kigandaini were found to be predominantly male at 78 (97.5%) while 2(2.5%) of the sample were female (figure 4.1). The low number of female respondents in study population could be attributed to the laborious nature of motor vehicle repair work activities.

Figure 4.1: Gender distribution of the respondents

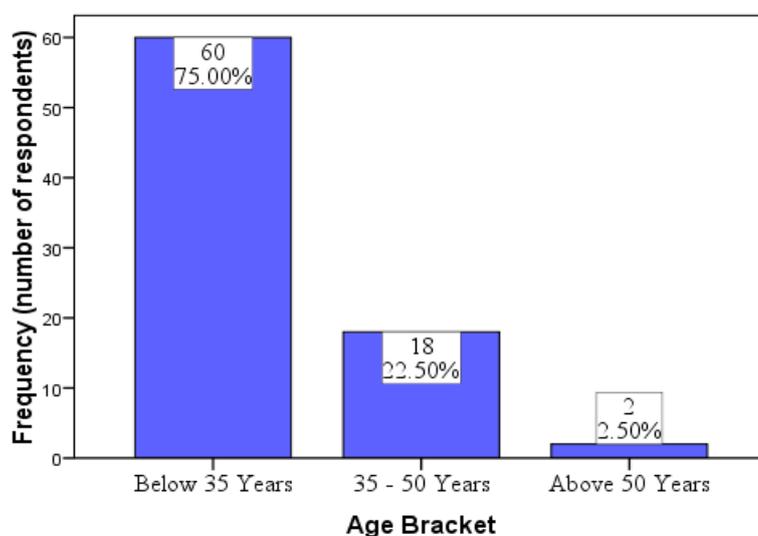


Source: survey data, 2017

4.2.2 Age of Respondents

The youngest respondent in the study sample was 18 years while the eldest was 64 years. The mean age of the motor vehicle repair workers was 28.48 years while the median age was 26.50. Majority of motor vehicle repair workers 60(75%) were within ages 18 and 34 years hence could be considered youth, while 18(22.5%) were between 35 and 50 years, only 2(2.5%) were above 50 years of age (see figure 4.2 and table 4.1). The results indicate that very few aged persons are working in the motor vehicle repair sector. This could be explained by the laborious nature of the work.

Figure 4.2: Age distribution of the sample population



Source: Research data, 2017

Table 4.1: Age distribution of the respondents

		Frequency	Percent	Cumulative Percent
Age Bracket	18 - 22	23	28.8	28.8
	23 - 27	20	25.0	53.8
	28 - 32	17	21.2	75.0
	33 - 37	7	8.8	83.8
	38 - 42	7	8.8	92.5
	43 - 47	2	2.5	95.0
	48 - 52	3	3.8	98.8
	63 - 67	1	1.2	100.0
	Total	80	100.0	

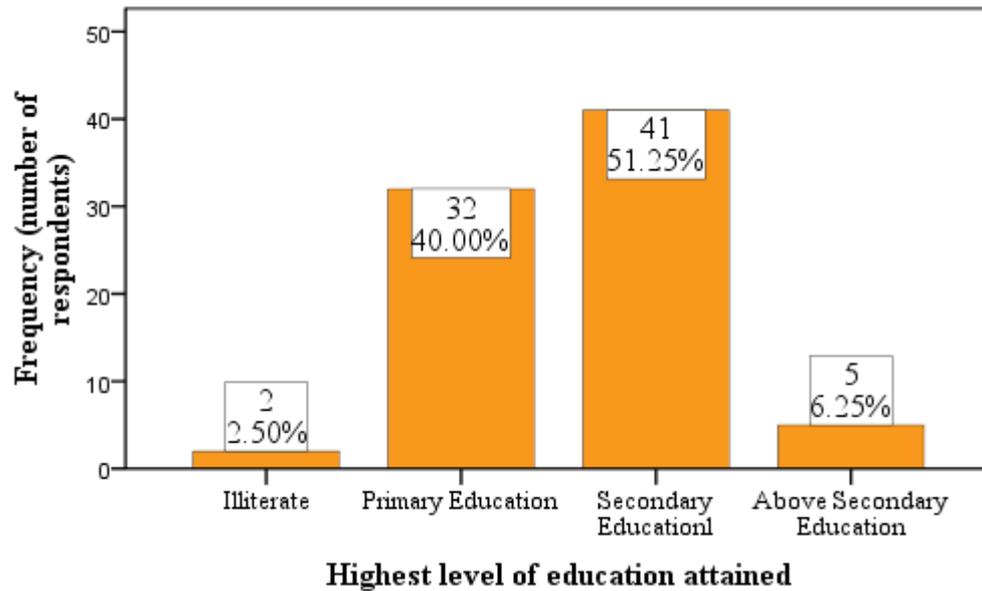
Source: Survey data, 2017

4.2.3 Highest level of education

Study showed that almost all motor vehicle repair workers had attained some form of formal education. Those who had completed secondary school education were 41(51.2%) while those who had completed primary school education were 32(40%). Further, 6.3% had gone up to college or university where they attained a certificate, diploma or degree while only 2(2.5%) had no formal schooling (figure 4.3). The result indicated that work in informal sector attracted people with different educational attainment, and was not only a reserve for those with no formal schooling or with very

low educational attainment. The result therefore indicated that most of workers were literate and could easily be trained on safety, work related risk management and technical education related to PPE's in motor vehicle repair industry.

Figure 4.3: Education status of respondents



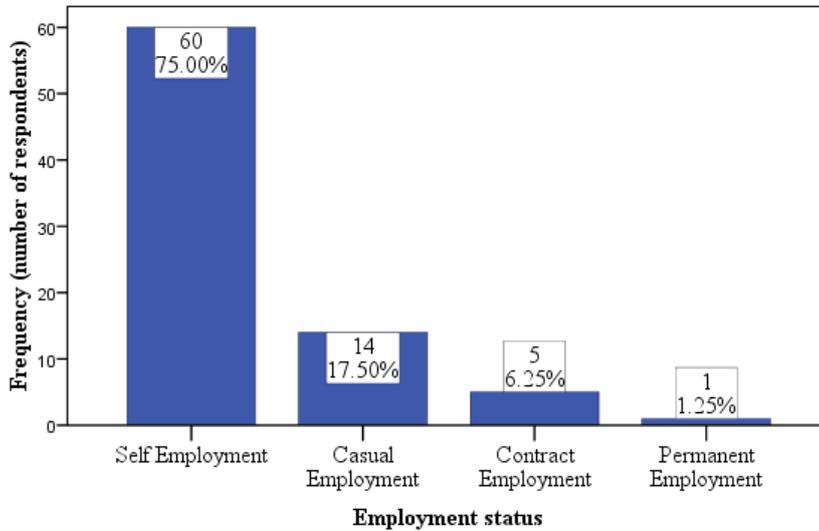
Source: Survey data, 2017

4.2.4 Employment status

Study as shown in figure 4.4 below indicated that majority of motor vehicle repair workers 60(75%) were self-employed while casually employed workers were 14(17.5%). A smaller proportion 6(7.5%) took contractual jobs with only 16(20%) of the total study sample attaching themselves to particular garages or enterprises. Those attaching themselves to particular garages comprised of workers who were in contract or casual employment and their attachment to a particular garage ended after elapse of a specific period of time or for the duration of a specific task.

The researcher also observed that there were no fixed working spaces but workers utilized whichever space that was available. All workers were paid for work done often upon completion of piece of work, and there were no standard rates of payment.

Figure 4.4: Employment Status of Respondents

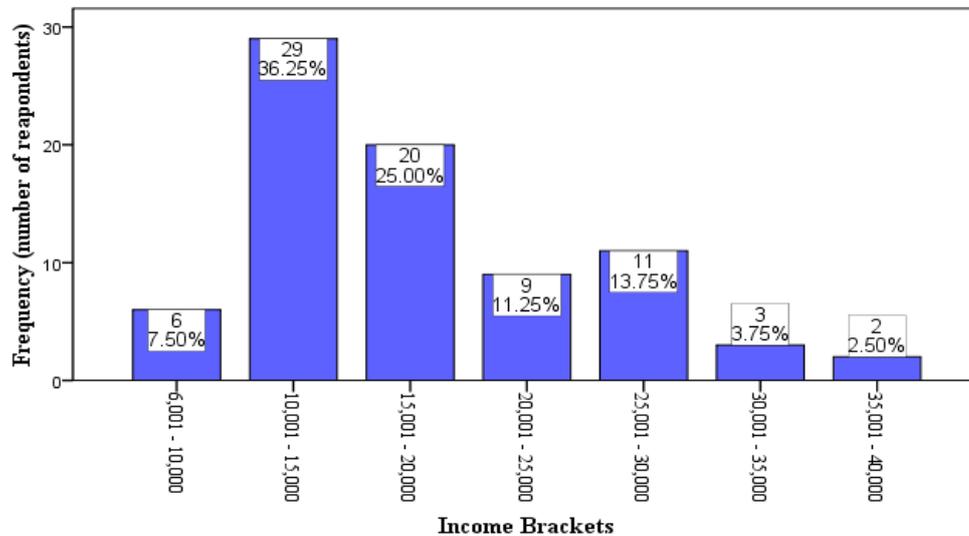


Source: Survey Data, 2017

4.2.5 Income per month

Results from the study indicated that approximately half of the sampled motor vehicle repair workers 49(61.3%) earned between Kshs 10,001 - 20,000, about a quarter 20(25%) earned between Kshs 20,001 - 30,000, only 5(6.3%) earned between Kshs 31,000 - 40,000 while 6 (7.4%) earned less than Kshs 10,000. In general, it was observed that monthly earnings were low which could result in financial challenges and hence may have implications on workers ability to purchase PPE.

Figure 4.5: Monthly income of the respondents



Source: Survey data, 2017

4.2.6 Work experience in the motor vehicle repair industry

Duration of work experience ranged between 1 to 40 years. The mean duration of work experience was 7.09 years while the median duration of work experience was 5 years. Research data showed that majority 21 (26.2%) had been working for a duration of between 3 to 4 years, followed closely by those who had experience of 1 to 2 years, an almost similar proportion to those who had worked for a duration of between 5 and 6 years. Further, 10(12.5%) and 5(6.2) had experience of between 7 to 8 years and 9 to 10 years respectively. A significant number of respondents 15(18.7%) indicated they had worked in the field for a period exceeding 10 years. Data on experience of respondents in the field of study is summarized in table 4.2 below.

Table 4.2: Years of experience in motor vehicle repair industry

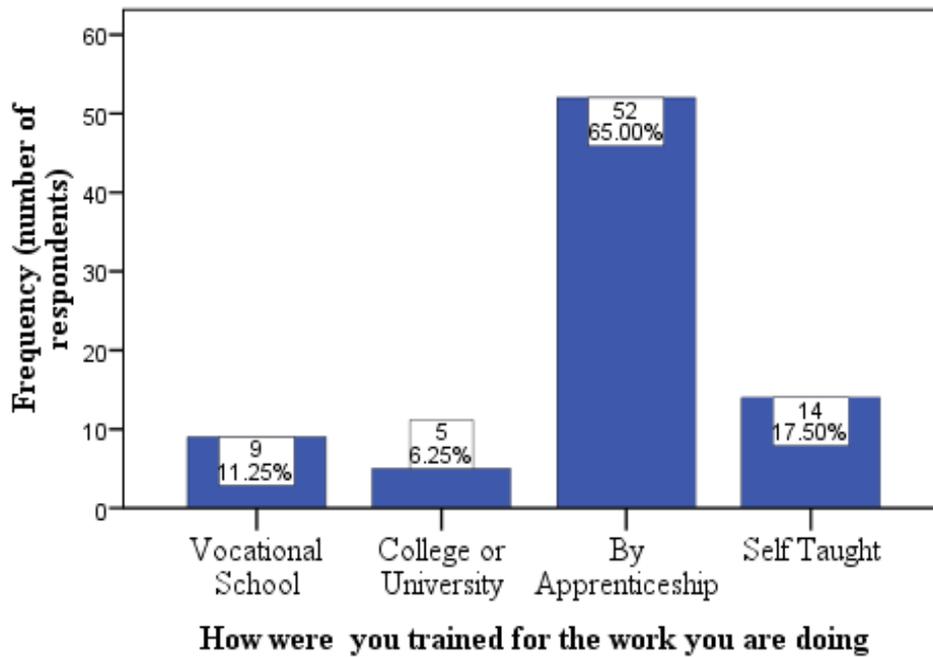
		Frequency	Percent	Cumulative Percent
Number of years	1 – 2	15	18.8	18.8
	3 – 4	21	26.2	45.0
	5 – 6	14	17.5	62.5
	7 – 8	10	12.5	75.0
	9 – 10	5	6.2	81.2
	Above 10 Years	15	18.8	100.0
	Total		80	100.0

Source: Survey data, 2017

4.2.7 Occupational training type

The study sought to find out how workers were trained for the particular motor vehicle repair activity they were engaged in. The results showed that majority 52(65%) were trained through apprenticeship (learn from other repairers as they work), 14(17.5%) were self-taught through observation, 9(11.3%) were trained in vocational schools and institutions while 5(6.3%) had trained in college or university (See figure 4.6 below).

Figure 4.6: Method of training for the work being done

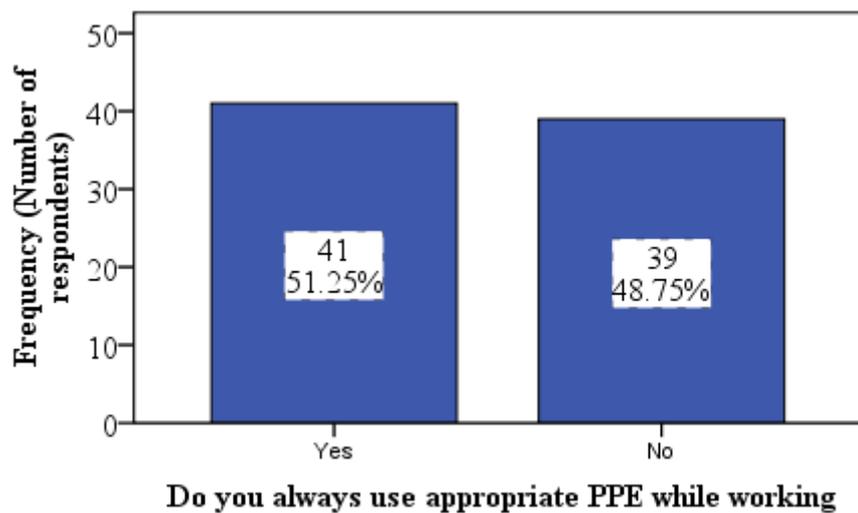


Source: Survey Data, 2017

4.3 Use of PPE during work

The study sought to determine the usage of appropriate PPE by the motor vehicle repair workers at all times while they were working (figure 4.7). Results showed that slightly above half 41(51.25%) used appropriate PPE while 39(48.75%) indicated that they did not use all the appropriate PPE.

Figure 4.7: Use of appropriate PPE while working



Source: Survey Data, 2017

Most of the respondents who did not use appropriate PPE (see table 4.3) were general mechanics 21(72.4%) followed by spray painters 2(40%) out of 5 respondents. Slightly lower proportions were noted in auto wiring 9(39.1%), welders 5(35.7%) and panel beaters 2(22.2%) respectively.

Table 4.3: Use of appropriate PPE across motor vehicle repair activity

		Motor Vehicle Repair Activity					Total
		General Mechanic	Welder	Auto Wiring	Panel Beater	Spray Painter	
Do you use appropriate PPE while working	Yes	8 27.6%	9 64.3%	14 60.9%	7 77.8%	3 60.0%	41 51.2%
	No	21 72.4%	5 35.7%	9 39.1%	2 22.2%	2 40.0%	39 48.8%
Total		29 100.0%	14 100.0%	23 100.0%	9 100.0%	5 100.0%	80 100.0%

Source: Survey data, 2017

In addition to the determination of the number of workers who used appropriate PPE, total numbers of PPE used by each respondent were computed to determine the utilization rate. The scores or totals were then categorized into low (those who only one type of PPE), moderate (used between 2 and 3 types of PPEs) and high (used four or more PPEs). Results indicated that close to half of the sampled workers 35(43.7%) of the sample had low PPE utilization rate, slightly more than half of the workers 41(51.3%) had moderate PPE utilization rate and only 4(5%) of the sample had high PPE utilization rate.

Overall, among all the categories of motor vehicle repair workers, the most utilized PPE was the whole body protection PPE (overalls and dust coats) utilized by 78(97.5%) of the sample workers (table 4.4). This result compare well with past studies (Z'gambo, 2015) that showed that work suits or overalls as the most utilized PPE. None of the sampled workers used head protection (helmet) and ear protection (table 4.4). Further 79% did not use eye protection, 93% did not use gloves while working and 86% did not use any respiratory protection PPE. The results of the study also indicated that workers in certain categories of motor vehicle repair used inappropriate PPE's. Among the

welders, 50% indicated they used normal goggles or sunglasses as protective equipment instead of using welding goggles (see appendix 1a). Similar findings had been reported in past studies (Z'gambo, 2015). Sunglasses offer minimal or no protection to the eyes from welding related hazard which include the bright light and sparks. Among the spray painters, 80% indicated they use dust masks instead of using respirators while spray painting (see appendix 1b). Dust masks offer minimal or no protection from inhalation of fumes during the spray painting process. In regard to feet protection, the results show that among all the motor vehicle repair workers, 66% indicated they use normal shoes while working instead of safety shoes (table 4.4).

Table 4.4: PPE use among motor vehicle repair workers (n=80)

	Device used for protection	Frequency	Percent
Eye Protection	Safety goggles/Clear Goggles	3	3.8
	Welding Shield/Goggles	7	8.8
	Normal sun goggles	7	8.8
	None	63	78.8
Respiratory Protection	Dust Masks	10	12.5
	Respirator	0	0
	None	70	87.5
Feet protection	Safety Boots/safety shoes	27	33.8
	Normal shoes/no safety shoes	53	66.3
Whole Body Protection	Overalls	55	68.75
	Dust Coats	23	28.75
	None	2	2.5
Gloves	Leather	4	5.0
	PVC	2	2.5
	Cotton	0	0
	None	74	92.5
Head Protection	Helmet	0	0
	None	80	100
Ear Protection	Ear Plugs	0	0
	Ear Muffs	0	0
	None	80	100

Source: Survey Data, 2017

4.3.1 Relationship between age and use of PPE's

Data collected showed an association between workers age and use of PPE. Respondents were required to give information on whether they always wore appropriate PPEs while working. Majority of respondents 16(69.6%) in the age group 18 to 22 years indicated they didn't while only 7(30.4%) out 23 respondents indicating they did. Use of PPEs was found to improve as age progressed. In the age group

between 23 and 27 years, a substantial number 12(60%) out of 20 respondents indicated they didn't always use PPEs while 8(40%) noted that they did. Further, in the age group between 28 and 32 years, 9(52.9%) indicated they used PPEs always while a smaller proportion 8(47.1%) indicated they didn't. Use of PPEs kept improving with age whereby in the age bracket 33 to 37 years a larger proportion 5(71.4%) used them regularly while a much smaller proportion 2(28.6%) did not, 6(85.7%) in age group 38 to 42 used PPEs always while only one person indicated they do not use PPEs always. The rest 5 respondents between the ages 43 to 67 years indicated they used PPEs always (see table 4.5 below).

Table 4.5: Relationship between age and use of PPE

	Do you always use appropriate PPE while working		
	Yes	No	Total
Age Bracket			
18 – 22	7(30.4%)	16(69.6%)	23
23 – 27	8(40.0%)	12(60.0%)	20
28 – 32	9(52.9%)	8(47.1%)	17
33 – 37	5(71.4%)	2(28.6%)	7
38 – 42	6(85.7%)	1(14.3%)	7
43 – 47	2(100.0%)	0	2
48 – 52	3(100.0%)	0	3
63 – 67	1(100.0%)	0	1
Total	41(51.2%)	39(48.8%)	80(100.0%)

Source: Survey data, 2017

Similarly during the focus group discussions, the age of the worker was mentioned as an important factor that could influence PPE utilization. The finding is similar to a study conducted by (Lombardi et al, .2009) assessing factors influencing use of protective eyewear among workers. The study respondents were agreeing that elder workers and

those with lengthy work experience were more likely to wear protective gears compared to the younger workers or those who had not worked in the industry for long. In addition, there was a general belief among the MVR workers that younger workers more often lack sufficient work experience to know the consequences of not utilizing PPE. Younger workers however suggested that they are lack knowledge of some of the PPE they should be utilizing and have not yet gotten used to using the PPEs. The younger workers suggested that use of PPE among the young and inexperienced workers could be enhanced if they received more support from elder and more experienced workers and from the supervisors. One younger worker noted:

“Elder workers are more likely to have experience and hence know what could happen if they do not use them (PPE).”(Respondent 6, FGD, May 2, 2017).

Another young welder added

“It could be good if elder and more experienced workers encouraged young and inexperienced workers to use PPE and let them know the consequences of not wearing goggles.”(Respondent 4, FGD, May 2, 2017).

4.3.2 Relationship between age group and monthly income

In the light of information in table 4.5 above, the researcher wanted to understand why use of PPEs improved with age. The respondents were therefore required to indicate their monthly income. Data collected showed that there was a relationship between age and income of the respondents. Most respondents who were below 35 years of age featured mostly on lower income brackets. From table 4.6 below, we can denote that all respondents 6(7.5%) of the sample who earned between Kshs 6001 and 10,000 were all below 35 years of age. In the income bracket between Kshs 10,001 and 15,000, majority 25(86.2%) of percentage within income bracket were below age 35 years while 4(13.8%) were between 35 to 50 years.

Table 4.6: Relationship between income and age

Income Brackets	Age Bracket			Total
	Below 35 Years	35 - 50 Years	Above 50 Years	
6,001 - 10,000	6(100.0%)	0	0	6(7.5%)
10,001 - 15,000	25(86.2%)	4(13.8%)	0	29(36.2%)
15,001 - 20,000	14(70.0%)	6(30.0%)	0	20(25%)
20,001 - 25,000	6(66.7%)	2(22.2%)	1(11.1%)	9(11.3%)
25,001 - 30,000	6(54.5%)	4(36.4%)	1(9.1%)	11(13.7%)
30,001 - 35,000	2(66.7%)	1(33.3%)	0	3(3.8%)
35,001 - 40,000	1(50.0%)	1(50.0%)	0	2(2.5%)
Total	60(75.0%)	18(22.5%)	2(2.5%)	80(100.0%)

Source: Survey data, 2017

4.3.3 Respondents work experience in relation to PPE use

Data collected showed a relationship between years of experience and use of PPEs whereby the higher the number of years of working experience showed improved utilization of PPEs while working. Majority 10(66.7%) among respondents who had experience between 1 and 2 years did not always use PPEs while working compared to 5(33.3%) who used. Similarly, 12(57.1%) of respondents who had working experience of 3 to 4 years did not use appropriate PPEs while working against 9(42.9%) who cited they used. This scenario was observed to change for respondents who had work experience from 5 years and above. In the category 5 to 6 and 7 to 8 years of experience equal proportions 7(50%) and 5(50%) respectively indicated use or non-use of appropriate PPEs when working. Majority of respondents 4(80%) who had experience of between 9 and 10 years used appropriate PPEs always when working with only 1 individual who indicated non use. A similar picture was drawn from respondents who had experience above 10 years whereby 11(73.3%) noted that they used PPEs always

when working while only 4(26.7%) who indicated they didn't always use them. Comparative data on use of PPEs in relation to working experience is summarized in table 4.7 below.

Table 4.7: Relationship between use of PPEs and work experience

	Do you use appropriate PPE while working		Total	
	Yes	No		
Years of Experience				
	1 - 2	5(33.3%)	10(66.7%)	15(100.0%)
	3 - 4	9(42.9%)	12(57.1%)	21(100.0%)
	5 - 6	7(50.0%)	7(50.0%)	14(100.0%)
	7 - 8	5(50.0%)	5(50.0%)	10(100.0%)
	9 - 10	4(80.0%)	1(20.0%)	5(100.0%)
	Above 10 Years	11(73.3%)	4(26.7%)	15(100.0%)
	Total	41(51.2%)	39(48.8%)	80(100.0%)

Source: Survey data, 2017

The findings were collaborated by findings from focus group sessions where some of the participants who had quite a number of years in experience indicated they did not use PPE always because they felt that they had enough experience of performing tasks without getting injured. This is illustrated by the excerpts below;

“Experienced workers have mastered the tactics of working safely and avoiding any kind of danger.”(Respondent 2, FGD, May 5, 2017).

“I have been involved in welding for more than 15 years and I have never been injured. I know how to do the work safely.”(Respondent 3, FGD, May 2, 2017).

However other participants especially the younger ones generally agreed that more experienced workers are likely to use PPE than their counterparts who are inexperienced or have little experience. One participant linked this to levels of income that come with experience as illustrated in the excerpt below.

“Older and more experienced workers earn more hence they are more likely to afford the PPE required”.(Respondent 5, FGD, May 5, 2017).

4.3.4 Relationship between education attainment and use of PPEs

Education of the respondents had a significant impact on use of PPEs especially comparing respondents who had no formal schooling with those who had some formal education. However, there was no significant difference between those who had basic education to those who had higher education. Research data showed that all 2 individual who had no formal schooling did not use appropriate PPEs when working. Among respondents who had attained primary education, 18(56.2%) used appropriate PPEs when working while 14(43.8%) did not. Almost similar proportions were registered by respondents who had attained secondary education whereby 21(51.2%) used appropriate PPEs when at work and 20(48.8%) did not. Respondents who had education above secondary were 5 and among them, 2(40%) used appropriate PPEs when working against 3(60%) who did not always use PPEs. The results are similar to a study carried out carried out among motor vehicle repair artisans in Ghana that found no association between PPE use and respondents education level. (Monney et al, 2014). However these results differ with findings from a study carried out among welders in Nigeria (Z'gambo, 2015), that found that education was associated with PPE use where the proportion of workers using PPE was higher among workers with primary and secondary education compared to workers with no education.

Data on relationship between education and use of PPE is tabulated in table 4.8 below.

Table 4.8 : Education of the respondents in relation to use of PPEs

		Do you use appropriate PPE while working		Total
		Yes	No	
Highest level of education attained	No formal schooling	0	2(100.0%)	2(100.0%)
	Primary Education	18(56.2%)	14(43.8%)	32(100.0%)
	Secondary Education	21(51.2%)	20(48.8%)	41(100.0%)
	Above Secondary Education	2(40.0%)	3(60.0%)	5(100.0%)
Total		41(51.2%)	39(48.8%)	80(100.0%)

Source: Survey data, 2017

4.4 Safety measures adopted by workers to prevent or limit exposure to workplace hazards

The study sought to identify and describe the safety measures that are taken by motor vehicle repair workers in order to prevent exposure to hazards or limit the effects if exposure occurs. Overall, among all the motor vehicle repair workers, emergent themes of measures taken by the workers to protect themselves from injuries or illnesses as a result of exposure to various hazards included; use of Personal Protective Equipment such as overalls, safety shoes, dust masks, gloves and goggles. Use of correct tools while working was also identified as a safety measure. Taking particular meals and observing caution while working were also identified as measures that workers take to protect workers themselves from work related injuries and illnesses.

Among the spray painters, PPE use was identified by respondents as a measure they take to prevent or limit exposure to chemical hazards posed by the paints and thinners they handle. All the sprayers (100%) used overall, 40% used safety goggles to protect their eyes from the spray mist, and 80% indicated they used dust masks for respiratory protection from spray fumes, 40 % used PVC gloves, and 20% used safety shoes (See appendix 1a,1b,1c and 1d). The results on PPE usage among the spray painters indicate that the most utilized PPE was overall at 100% while the least utilized were safety shoes. The results also indicate that the usage of gloves was low among the spray painters. At 20% Inappropriate PPE usage among the spray painters is also evident from the results that indicate that 80% used dust masks (See appendix 1b). Use of dust masks by spray painters offers very minimal protection from spray fumes. A respirator in this case is the appropriate PPE for spray painting (Chepkener, 2013). The survey result on use of dust masks is collaborated by qualitative responses during focus group discussions. Reasons for the choice of dust masks included unavailability due to cost implications of acquiring a respirator. This is illustrated by the comments made by respondents as follows.

“I use the sweepers dust masks while spray painting. This is because I cannot afford to buy the respirator.” (Respondent 4, FGD, May 3, 2017).

“Depending on the amount I am being paid for the job, I use either a dust mask or I just tie a piece of cloth usually a handkerchief around my nose. I would buy a respirator if I got a well-paying job.” (Respondent 1, FGD, May 3, 2017).

“Although we know that we are supposed to use respirators while spray painting, most of us cannot afford to buy them. We instead opt to buy the normal dust masks even though they are not very effective.” (Respondent 7, FGD, May 3, 2017).

In addition to the use of PPE, spray painters reported that they take milk to protect themselves from illnesses that may result from inhalation of paint fumes. Similar results have been reported from studies conducted in the past where spray painters and panel beaters mention drinking milk as a protective measure (Chepkener, 2013). The respondents indicated that milk helps to soothe an irritated throat after a spray painting job. The responses below illustrate this point.

“I always ensure that I take a 500ML packet of milk after I am done painting. The milk helps to clear my throat and the effect of inhaling paint fumes.” (Respondent 2, FGD, May 3, 2017).

“When I worked as a painter when I was employed, we used to be given 1 litre of milk every day. Here I cannot afford to buy myself a litre of milk every day but I ensure that I take some milk after every painting job”. (Respondent 3, FGD, May 3, 2017).

The comments above indicate that the respondents believe that milk indeed neutralizes the harmful effects that may be caused by inhalation of spray fumes. It should be noted that there is no documented evidence of milk neutralizing the effects of paint fume inhalation. However, painters have reported that milk alleviates throat dryness that is caused by spray paint fumes. The claims however remain invalidated.

Welders too reported use of Personal Protective Equipment as a measure to protect themselves from welding related hazards such as sparks and bright light. Results show that 50% of the welders reported that they used welding goggles while the other 50% reported using normal sun goggles in protecting their eyes from bright light and welding sparks (See appendix 1a). Further, 38% of the welders indicated they used safety shoes, while 14% reported that they used leather gloves and all welders (100%) reported that they used overalls (See appendix 1c, 1e, and 1d) respectively. Despite the presence of welding fumes and noise hazards in repair activities, none of the welders used any form of respiratory protection from welding fumes and also none of the workers used ear protectors to reduce the noise levels from the welding and cutting operations (See appendix 1b and 1g).

Apart from the use of PPE, welders reported that they ensure that the tools they use for example the grinder is well guarded. One welder noted that

“It is very dangerous for one to use a grinder that is not appropriately guarded. It can cause severe injuries”. (Respondent 1, FGD, May 2, 2017).

Temporarily looking away from the spot being welded was also a measure that was mentioned by some of the welders. Welders generally agreed that looking away would avoid exposure to welding sparks that may get in the eyes. This is illustrated by the following comment.

“When I am welding a small spot, i simply turn my face away from the area I am working on.” (Respondent 3, FGD, May 2, 2017).

Protective measures taken while working as reported by those involved in wiring/auto electrical works include the use of PPE such as safety shoes and dustcoats. Nonconductive shoes are particularly an important PPE for the wiring technicians. From the study only 35% of the auto electrician reported that they used nonconductive safety shoes (See appendix 1c). Further a majority of the auto electricians 91% used dust coats (See appendix 1d). In addition to the use of PPE, following recommended procedures such as correct handling of terminal and wires and working with caution were identified as measures that workers take to protect themselves while working.

Among the panel beaters, 100% indicated that they used overalls while working, 57% used dust masks and 22% used safety shoes (See appendix 1d, 1b and 1c) respectively. Despite the risks posed by some of the chemicals used in body work such as fillers, none of the workers reported to using gloves while working (See appendix 1e). In addition body work on vehicles at times involves generation of noise during hammering and straightening bent parts, none of the workers again reported to using ear protection devices (See appendix 1g). Vehicle sanding activities also generate a lot of dust and despite this, none of the workers reported to using safety goggles while working (See appendix 1a).

Apart from the use of PPE, similar to spray painters, panel beaters also reported that they take milk after sanding activity that generates and exposes them to a lot of paint dust. They reported that milk “washes down” the dust from the throat after sanding.

Finally among the mechanics, 100% reported that they used overalls, 38% used safety shoes, 6.9 % used gloves when handling oil, 3% reported that they used safety goggles and another 3% also reported that they used dust masks (See appendix 1d,1c,1e,1a and 1b) respectively. None of the general mechanics reported that they used any form of head protection despite having to go under vehicles at times to work (See appendix 1f). In addition none of the general mechanics indicated that they used ear protectors despite high noise levels from revving engines during repairs and testing (See appendix 1g).

To protect themselves from ergonomic related hazards that could arise from lifting of heavy vehicle parts such as engines, the general mechanics reported that they usually use lifting equipment that they hire such as forklifts.

Among all the MVR workers use of the whole body protective clothing that is the overalls and dust coats was noted to be almost 100%. The researcher sought to understand this and found that apart from the protective benefit that overalls and dust coats offered, the main reasons cited by the workers for using the clothing was to prevent dirt from getting to their clothes and bodies for those who do not remove the home clothes. In addition the respondents expressed that donning the overalls was an identification sign to prospective clients. This is illustrated by the excerpts below.

“I wear the overall to avoid getting my clothes dirty. You see, I use public means of transportation and since I am sitting next to people in the Matatu, I have to always wear my overall when working to ensure my clothes will be clean when going home”. (Respondent 5, FGD, May 4, 2017).

“I wear the overall so that client can identify me as a mechanic and approach me to repair their vehicle”. (Respondent 2, FGD, May 4, 2017).

4.5 Reasons for not using required protective devices or clothing

The results indicated that none of the workers utilized the full complement of PPEs required to protect them from chemical, physical or mechanical hazards that they may be exposed to while performing various motor vehicle repair activities. The study sought to understand the reasons for failure to utilize any or some of the required protective devices.

Results indicated that the most mentioned reason for not using all required PPE was unavailability as 47.5% of the cases indicated that they did not have the PPEs (Table

4.9). Further, 13.8 % cited the cost of the PPE as a barrier to accessing the PPE hence not using. During the focus group discussions, unavailability of some PPEs was noted as a reason of failure to use PPE. For those involved in wiring and welding, they cited the importance of one having safety shoes that do not conduct electricity. For other workers involved in other repair activities such as general mechanics and panel beaters, they too noted that safety shoes were important for their work to shield their feet from falling objects. However most noted that they did not have safety shoes because of cost implications. One respondent noted that;

“ I do not use safety shoes because I do not have them and the reason I do not have them is because I cannot afford to buy them” another noted *“a pair of safety boots cost around 2000 shs, and that is for a used one, the cost is too high. I cannot afford that”* (Respondent 23, April 28, 2017)

Further, discomfort experienced while using PPE was identified as a reason for failure to use PPE. 37.5% mentioned it was uncomfortable wearing or handling the PPE. Workers involved in wiring noted that it was cumbersome handling wires with gloves.

“I have gloves but I do not use them because it is hard to manipulate wires with gloves on. They make my hands sweat and it becomes difficult working with them” (Respondent 10, April 26, 2017)

One general mechanic noted that

“If I am handling oil, the gloves are slippery hence uncomfortable using them” (Respondent 31, April 28, 2017)

Interference with the speed of work was also cited as a reason for non-use of PPE. 7.5% cited PPE slowed their work speed. One respondent, a welder noted that

“I am paid for the work I do, so using something like gloves will reduce my speed because I cannot have a firm grip. So I would rather not use them if I want to work fast and finish the piece of work I have so that if another customer comes, I can also do their work” (Respondent 2, April 25, 2017)

Conforming to norms was also cited as a reason for failure to use PPE. 6.2 % of the cases cited that they do not use because others do not use and they want to conform. One respondent who was a woman working as a general mechanic noted that;

“If I wear gloves when I am working, people will think I fear dirt and since this job involves dirty work, they won’t give me work. I do not want to be different from the others” (Respondent 33, April 28, 2017)

Another respondent noted that

“When I came here as an apprentice, I found people using overalls only. They do not use other PPEs. Why should I be different?” (Respondent 40, April 26, 2017)

Yet another respondent expressed the same feelings

“There is a saying that goes, when you go to Rome do as the Romans do. I found others not using PPE and I followed suit.” (Respondent 60, April 28, 2017)

Finally 31.2 % of the cases indicated that their work does not require them to use PPE. The researcher sought to understand this response and from the focus group discussion conducted various explanation emerged. Welders felt there was no need to use respiratory protection, hence seemed to be ignorant of the hazards posed by fumes from the welding process. General mechanics indicated they did not need to use ear protection, head protection and respiratory protection. They too seemed to be ignorant of hazards posed by noise, falling objects when working under vehicles and dust.

During the focus group discussions, ignorance as a reason of not using some of the recommended PPEs during work was mentioned. Across all the categories of motor vehicle repair workers, respondent indicated that although they had knowledge of the PPE they are required to use, they fail to utilize them. This was attributed to majority of the workers being uninformed on the long-term consequences of failing to utilize the PPE.

In addition the duration of the task was mentioned as a reason of not using PPE. These results compare well with past studies (Chepkener, 2013), that found that respondents cited brevity of work tasks as a reason for failure to use welding goggles. Most welders, panel beaters and spray painters cited the length of the time required to complete a task as an influence on their decision to use PPE or not. One welder noted;
“If I am welding only a small area, I do not need to use eye protection” (Respondent 8, April 27, 2017)

A sprayer noted

“When I am only spraying a small spot, I do not need to use a mask because I will be done very fast” (Respondent 72, April 29, 2017)

Table 4.9: Reasons for not using PPE (Multiple Responses)

Reasons for not using PPE ^A		Responses		Percent of Cases
		n	Percent	
I do not have the protective device or clothing		38	33.0%	47.5%
It is uncomfortable wearing or holding them		30	26.1%	37.5%
They make me work slower		6	5.2%	7.5%
I cannot afford, cost, expensive		11	9.6%	13.8%
To conform/others don't use		5	4.3%	6.2%
my work does not require me to use them		25	21.7%	31.2%
Total		115	100.0%	143.8%

a. Dichotomy group tabulated at value 1.

b. Source: Survey Data, 2017

4.6 Source of PPE

The study sought to find out where the workers get the protective device or clothing they used during work. Majority 90.0% indicated that they bought the PPE themselves, 5.1% indicated that they were given by political aspirants who were vying for various political seats in the locality while 2.5% indicated they were provided for by the employer while another 2.5% indicated that they had borrowed. The results show that majority of the workers have bought the devices themselves. This is attributed to most of them being in self-employment.

Table 4.10: Source of protective devices or protective clothing

Source of protective device or clothing	Frequency	Percent
My employer bought/ provided	2	2.5
I bought	72	90.0
I borrowed	2	2.5
given by political aspirant	4	5.1
Total	80	100.0

Source: Survey Data, 2017

4.7 Perception of Risk, Beliefs and Attitude towards PPE

The third objective of this study was to describe workers perception of risks associated with their work and describe their beliefs and attitudes towards the use of PPE .This section analyses data on perception of occupational risk, Beliefs and Attitude towards utilization of PPE.

4.7.1 Beliefs and attitudes towards PPE use

The study sought to establish workers beliefs in the efficacy of PPE in offering protection from work related injury or illness. Results as indicated in (table 4.11), indicated that 89 percent of the participants believed that PPE could offer protection if used when working, while 11% believed that PPE use offers no protection from hazards while working

Table 4.11: Believe on efficacy of PPE in offering protection from hazards.

Do you believe that PPE use could offer protection from work related hazards?	Frequency	Percent
Yes	71	88.8
No	9	11.3
Total	80	100.0

Source: Survey Data, 2017

Further, more questions on attitude and believes on efficacy and benefit of PPE use were posed. The first item in (table 4.12) sought to establish the workers belief on efficacy of PPE use in prevention of exposure to hazards while the second and third item sought to establish the workers attitudes towards PPE use.

Table 4.12: Beliefs and attitude in efficacy of PPE in offering protection from work related hazards

Items on Beliefs and attitude in efficacy of PPE in offering protection from work related hazards	strongly agree	Agree	Neutral	Disagree	Strongly disagree
	<i>f</i> (%)	<i>f</i> (%)	<i>f</i> (%)	<i>f</i> (%)	<i>f</i> (%)
1. exposure to a harmful substances or injuries can be reduced if I use protective devices or wear clothing to protect myself against harm or injuries while working	49 (61.3)	20(25)	4 (5)	2 (2.5)	5(6.3)
2. I feel uncomfortable when using devices or wearing protective clothing while working	30 (37.5)	12 (15)	7(8.8)	6 (7.5)	25 (31.3)
3. I think using devices or wearing protective clothing will reduce my work speed and therefore lessen my income	19(23.8)	14(17.5)	8(10)	8(10)	31(38.8)

Source: Survey Data, 2017

Results as indicated in (table 4.12, item 1) shows that 86.3% (61.3% and 25%) of the workers were in agreement (strongly agreed or agreed) that PPE use during work could reduce exposure to injury/illness causing hazards. However, 8.8% (2.5 and 6.3%) were in disagreement (disagreed or strongly disagreed) that PPE use during work could reduce exposure to injury/illness causing hazards. Only 5% neither agreed nor disagreed that PPE use during work could reduce exposure to injury/illness causing hazards. This means that majority (86.3%) of the participants had positive beliefs in the efficacy of

PPE in offering protection from work related hazards, while 13.8% had negative beliefs or did not consider PPE to be effective in offering protection from work related hazards.

The study also sought to establish the workers attitudes towards the use of PPE (table 4.12, item 2). Results from the study indicate that 52.5% of the MVR workers were in agreement (strongly agreed or agreed) that they feel uncomfortable when using PPE during work. However, 38.8% of the MVR workers were in disagreement (disagreed or strongly disagreed) that using PPE during work makes them uncomfortable. Only a few proportions of workers (8.8%) neither agreed nor disagreed. The results imply that that more than half (52.5%) of the participants had a negative attitude towards the use of PPE while 38.8 % had a positive attitude towards use of PPE.

Results on the third item on attitude of workers towards PPE use, (table 4.12, item 3), indicate that 41.3% (23.8 and 17.5%) were in agreement (strongly agreed or agreed) that using PPE during work slows their speed of work hence reducing their income. However, 48.8% were in disagreement (disagreed or strongly disagreed) that using PPE during work slows their speed of work hence reducing their income. Only, 10% of the MVR workers neither agreed nor disagreed that PPE interferes with speed of work. This means that close to half (48.8%) of the participants had a positive attitude towards the use of PPE while 41.3 % had a negative attitude towards use of PPE.

A sum score of individual workers beliefs and attitudes towards PPE use was calculated with scores ranging from 3-15. Lower scores translated to negative beliefs and attitudes towards PPE use while higher scores translated to positive believes and attitude towards use of PPE. Scores were categorized into two; negative attitude (3-9) and positive attitude (10-15). Results from the computed scores show that close to half (43%) of the participants had negative beliefs and attitudes towards PPE use, while slightly more than half (57%) of the participants had positive beliefs and attitudes towards PPE use.

4.7.2 Perception of workers regarding risks associated with their work

Risk perception has been shown to be an important factor influencing the use of personal protective equipment. Workers who perceive their work to be risky are more likely to take precautionary measures including the use of more than those who do not

perceive their work to be risky. The study sought to establish the motor vehicle repair workers general perceptions of risks or threats posed by their work.

Table 4.13: Workers perception of risks posed by their work

Items on risk perception	strongly agree <i>f (%)</i>	Agree <i>f (%)</i>	neutral <i>f (%)</i>	disagree <i>F (%)</i>	strongly disagree <i>F (%)</i>
1. I am at risk of getting an injury or being exposed to a harmful substance that can cause an illness through my work	46 (57.5)	17 (21.3)	5(6.3)	4(5.0)	8(10)
2. I am concerned I may be exposed to injuries or harmful substances at work	35 (43.8)	18 (22.5)	13(16.3)	5 (6.3)	9 (11.3)

Source: Survey Data, 2017

Results as indicated in (table 4.13, item 1) shows that 78.8% (57.5 and 21.3%) of the MVR workers were in agreement (strongly agreed or agreed) that they were at risk of getting an injury or suffering an illness as a result of their work. However 15% of the MVR workers were in disagreement (disagreed or strongly disagreed) that they were at risk of getting an injury or suffering an illness as a result of their work. Only 6.3% neither agreed nor disagreed that they were at a risk of getting an injury as a result of their work. This means that majority (78.8%) of the participants perceived their work to be risky while 21.3 % did not perceive their work to be risky. Further in (table 4.13, item 2) 66.3% (43.8 and 22.5%) of the workers were in agreement (strongly agreed or agreed) that they were concerned that they may be exposed to injuries or harmful substance at work. However, 17.6 % of the MVR workers (11.3 and 6.3%) were in disagreement (disagreed or strongly disagreed) that they were concerned that they may be exposed to injuries or harmful substance at work. 16.3% neither agreed nor disagreed that they may be exposed to injuries or harmful substances at work. This implies that more than half of the MVR workers (66.3%) were concerned for their safety and health at work while 17.6% of the MVR workers were not concerned about their safety and health at work.

A sum score of individual workers perception of risk posed by their work was calculated with scores ranging from 2-10. Lower scores translated to lower risk perception of work activities while higher scores higher risk perception of work activities. Scores were categorized into two; low risk perception (2-6) and high risk perception (7-10). Results from the computed scores show that majority (75%) of the participants had a high perception of risks posed by their work, while only 25% of the participants had low perception of risks posed by their work.

4.8 Influence of work environment on PPE use by motor vehicle repair workers

The fourth objective of the study was to establish whether the work environment influences workers decision to use PPE. Work environment in this study constituted several variables that included availability of the personal protective equipment, training in safety and health/PPE use, social support for PPE use which included encouragement from coworkers or supervisors to use PPE and coworkers' use of PPE. Workers are more likely to use PPE if PPE is readily available and accessible. On training, workers who are trained in safety and health or PPE use are more likely to understand the hazards they are exposed to and measures they can take to protect themselves, hence they are more likely to use PPE. On social support for PPE use, workers who receive positive feedback or are encouraged to use PPE by their peers or supervisor are more likely to use PPE. In addition workers are more likely to use PPE if their coworkers or supervisors are using the PPE.

4.8.1 Availability and access of PPE to the MVR workers

The study sought to find out how individual workers rate their ability to access PPE when they have to use or replace them. Results from the study indicate that only 26.3% of the participants strongly agreed or agreed that they can obtain PPE if they need to use or replace them. 15% neither agreed nor disagreed while more than half the participants (58.8%) disagreed or strongly disagreed with the statement that they can obtain PPE when they need to use or replace them. Most of the participants were self-employed and hence the responsibility for acquiring PPE that they need to use at work. Results indicate that the majority of the participants (58.8 %) may be unable to obtain PPE when they need to use them. These findings are collaborated by data from the previous findings (Table 4.9, pg 65). Unavailability of the PPEs was cited as an important reason why workers are not the full complement of required PPEs (Table 4.9, pg 65). The cost

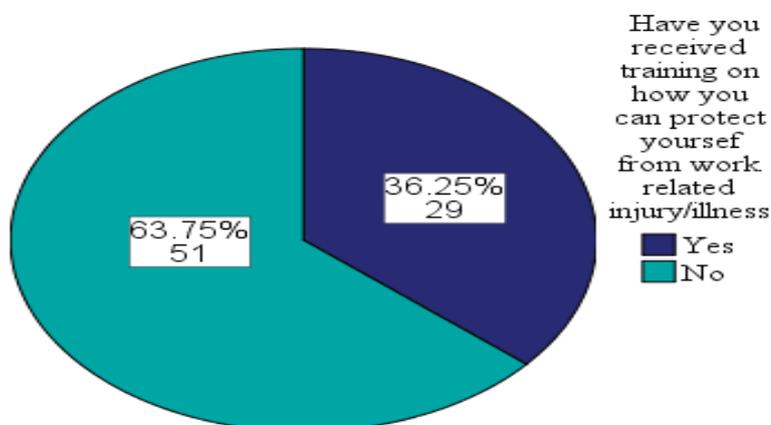
of the PPE was cited as an important factor in determining availability of the PPEs to the workers. During the focus group discussions workers suggested that if PPE was made readily available and at a cost that they could afford, they would definitely acquire and utilize the PPE's while working.

4.8.2 Occupational safety and health training

The study sought to establish whether the respondents had received any training on how they can protect themselves from work related injury or illness. The findings were that more than half of the MVR workers (63.8%) had not received any training on how they could protect themselves from work related injury/illness, while 36.3% had received training on how they could protect themselves from work related injury/illness. On type of training received, the study established that 35% had received training in safety and health which includes training on work hazards and mitigation measures including the use of PPE. 1.3 % had received training in fire safety. Majority of the respondents who indicated they had received training said the training was done in formal workplaces where they had been employed prior to working in the informal sector.

Since the majority of the workers indicated they have not had any formal/informal training on safe work systems. This may tend to make them vulnerable to the workplace hazards and risks due to lack of knowledge of hazards posed by work as well as the mitigation measures against the hazards.

Figure 4.7: Training on safety and health at work



Source: Survey Data, 2017

4.8.3 Social support for PPE use and coworker use of PPE

The study sought to establish how social support in terms of encouragement to use PPE by coworkers and supervisors and coworker use of PPE influence workers decision to use or not to use PPE. The study participants were asked to indicate the extent to which the use of PPE is emphasized in their workplaces and whether they received encouragement to use PPE from the coworkers. Results as indicated in (Table 4.15) showed that only 36.3% were in agreement (strongly agreed or agreed) that the use of PPE is emphasized at their place of work. However, majority of the MVR workers (56.3%) disagreed (strongly disagreed or disagreed) that the use of PPE is emphasized where they work while 7.5% were neutral. These results imply that majority of the MVR workers feel that there is no social support for PPE use at their place of work.

Table 4.14: Emphasize placed on PPE use at the workplace

Emphasize on PPE use.	strongly agree <i>F (%)</i>	Agree <i>F (%)</i>	neutral <i>F (%)</i>	disagree <i>F (%)</i>	strongly disagree <i>F (%)</i>
My workplace emphasizes on the use of protective devices or clothing while working	19 (23.8)	10(12.5)	6(7.5)	17(21.3)	28(35)

Source: Survey Data, 2017

4.9 MVR workers past injury/ill health experience

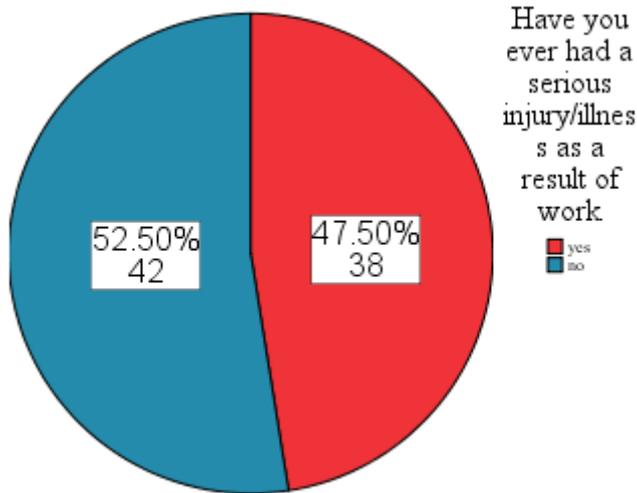
This section reviews data on past injury or ill health experience. A workers previous injury experience has been shown to have indirect relationship to the use of PPE. Workers who have previously been involved in a serious injury or whose coworkers have been previously experienced serious injuries have a heightened perception of risk and are therefore expected to adhere to the use of PPE.

4.9.1 Past Injury/Illness Experience

The study sought to find out whether the study respondents have had a serious work-related injury or suffered work related illness that necessitated their absences from work for at least 3 days or seeking treatment in a health facility.

The study found out that majority 42 (52.5%) had never had a serious injury/illness while in the course of work while 38 (47.5%) reported having had a serious injury/illness that resulted in at least three days away from the workplace (Figure 4.8).

Figure 4.8: Have you ever had a serious work related injury or illness

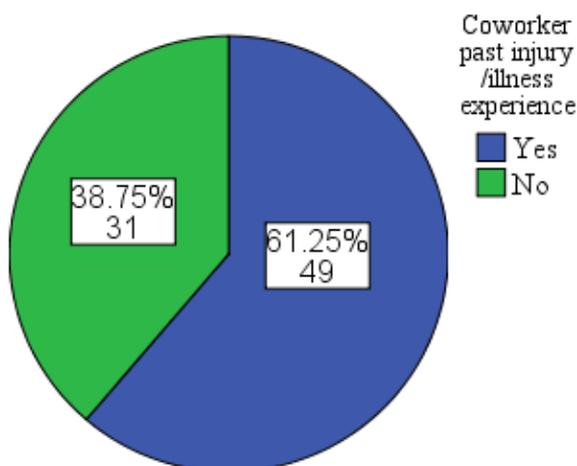


Source: Survey Data, 2017

4.9.2 Co-worker past injury /illness experience

The study found that majority 49 (61.3%) knew a co-worker who had experienced a serious injury /illness while 31 (38.8%) did not know of a co-worker who had experienced an injury /illness in the past (Figure 4.5)

Figure 4.9: Co-worker past injury /illness experience



Source: Survey Data, 2017

CHAPTER FIVE

SUMMARY, CONCLUSION AND RECOMMENDATION

5.1 Introduction

This chapter gives an overview of the various aspects of the project paper, reviews the main findings, and discusses the implications thereof. Further, the chapter draws conclusions based on the study findings and suggests recommendations.

5.2 Summary of findings

The study sought to identify and describe the safety measures that are taken by motor vehicle repair workers to protect themselves from hazards while working. Emerging themes on protective measures taken included the use of Personal Protective Equipment such as overalls, dust coats, protective eyewear, safety shoes and dust masks. Other protective measure included use of correct tools, exercising caution while working and diet.

Misconception was also noted among some of the motor vehicle repair workers on ways of protecting themselves from injuries or illnesses while working. The panel beater and spray painters felt that taking milk after exposure to dust and spray fumes respectively could eliminate effects of exposure to those hazards. Some welders too expressed that temporarily looking away while welding would protect them from welding sparks, light and fumes.

It was noted that different hazards exists in motor-vehicle repair sites. These included physical, chemical or mechanical hazards. There was no work site organization depending on activities performed. This meant that workers are exposed to different hazards that could result from working near specific repair activities that one was not involved in. the exposure to these hazards hence necessitates use of personal protective to reduce or minimize the exposure or contact to injurious hazards. A work hazard cannot be eliminated by PPE, but the risk of injury can be eliminated or greatly reduced by use of PPE. For example, use of ear protectors reduces the likelihood of hearing damage when the earplugs or ear muffs are appropriate and are used properly and consistently. The study hence sought to determine the usage of personal protective equipment by the motor vehicle repair workers while they were working. Results showed that slightly more than half 41(51.25) indicated they used appropriate PPE at all

times while working while close to half 39(48.75%) indicated that they do not use appropriate PPE at all times when working.

Further the results indicated that the most utilized PPEs by the motor vehicle repair workers were overalls and dust coats at 97.5%. The least used PPE were gloves at 93%, respiratory protectors at 86% and protective eyewear at 79%. None of the workers sampled used head protection as well as ear protectors.

The results also indicated that workers in certain categories of motor vehicle repair used wrong or inappropriate PPE's. Among the welders, 50% indicated they used normal goggles or sunglasses as protective equipment instead of using welding goggles. Among the spray painters, 80% indicated they used dust masks instead of using respirators while spray painting. Tying a piece of cloth around the nose instead of using a respirator by some of the spray painters was yet another example of wrong PPE use. In regard to feet protection, the results showed that among all the motor vehicle repair workers, more than half of the participants (66%) indicated they used normal shoes while working instead of safety shoes.

The study sought to identify the demographic factors influencing PPE use. Results of the study indicated that there was an association between workers age, work experience and income while the level of education did not influence the usage of PPE by MVR workers.

Positive beliefs and attitudes towards PPE could increase workers use of PPE. Results showed that close to half (43%) of the participants had negative beliefs and attitudes towards PPE use, while slightly more than half (57%) of the participants had positive beliefs and attitudes towards PPE use. More than half of the participants reported that they were uncomfortable using PPEs during working due to heat, interfering with grip due to slipperiness. This showed a somewhat negative attitude towards PPE use. However on PPE interference with speed of work close to half of the participants felt that PPE did not slow down their speed of work hence had a positive attitude towards the use of PPE.

On perception of risks posed by work, results from the study showed that majority of the participants were aware of the risks posed by their work; however there seems to be a gap between awareness of hazards and the use of PPE.

Finally the study sought to establish how the work environment influences use of personal protective equipment. This was assessed through variables that included availability of PPE, receiving training in safety and health and social support for PPE use that included encouragement to use PPE from coworkers and coworkers' use of PPE. On availability, more than half of the workers reported that PPE availability and access was an issue due to the cost implications of acquiring the PPE. On training, findings were that majority (63.8%) had not received any training on how they can protect themselves from work related injury/illness. Those who had received training got the training in former places of employment and had not had a chance to be re trained while working in the Jua kali sector. Minimal training on use and need of PPE in motor-vehicle repair sites was noted. This could explain the low usage of PPE by MVR workers and the negative attitude towards PPE and PPE use. Lack of a positive safety culture among the MVR workers was found to be responsible for the more tolerance of risk taking behavior and adoption of work practices that are unsafe.

On social support for PPE use, the results showed that majority of the participants felt that there was no social support for PPE use in the workplace. PPE use among the MVR workers is often seen as a personal decision taken on own volition.

Additionally the study found that most workers were trained through apprenticeship; this finding may imply that workplace mentors and trainers form an important group to target for inclusion in the dissemination of motor vehicle garages safety information. This may also imply that the on job trainers are ill-equipped and may not sufficiently include safety in their training programs. Where such training is offered, it may mean that the training may inadequate in terms of quality and content. Often workers become aware of the dangers or risks associated with their work through direct and first-hand experience when they get injured in the course of their work. This in essence is a dangerous and costly way of learning (McDonald, and Hyman, 2008).

In addition most of the workers surveyed did not have a great deal of experience in motor vehicle repair industry having worked in the sector for not more than five years. Most of them join the industry without any skill and learn the motor vehicle repair craft skills through on job training. This may mean that majority of the workers do not have

adequate experience and appropriate qualification to be effective in identification and mitigation against safety hazards on site received craft skills informally.

There is a need to understand barriers to PPE use and incorporating strategies that address these barriers. Barriers to PPE use or reasons for not utilizing PPE as identified by this study included unavailability mostly due to cost issues, interference with work as a result of comfort issues, and some workers felt the PPE was not necessary for their work. Other workers wanted to conform and do what ‘everyone else’ was doing.

5.3 Conclusions

The analysis of individual and work environment factors that influence the use of Personal Protective Equipment by motor vehicle repair workers was meant to understand the factors that can be used to explain the decision of workers in regard to utilization of Personal protective equipment meant to protect them from hazards while working. This information is useful to the government and other interested stakeholders in the development of strategies for addressing occupational safety and health concerns arising from workplaces. The study concludes that demographic characteristics of workers, workers attitudes and beliefs in efficacy of PPE, workers perception of risk and work environment factors including availability of PPE, training and social support for PPE use plays crucial roles in workers decision making process regarding utilization of Personal Protective Equipment.

This study concludes that workers utilization of PPE is suboptimal hence leaving the workers exposed to a variety of hazards some of which could easily have been controlled or reduced if all requisite PPE was utilized.

The study further concludes that training of workers in safety and health which covers identification of hazards and measures to mitigate the hazards is very important for improving the overall safety and health of workers in workplaces. This will in turn raise the level of hazard awareness among the MVR workers. Improved awareness among the workers is further expected to increase the perception of risks posed by work and influence positive beliefs and attitudes about PPE use among workers. This is especially true because as earlier observed most workers are trained through apprenticeship. This means that on the job trainers should have adequate knowledge in

safety and health so that they may be able to pass the right information to the trainees. This will in turn improve the wellbeing of MVR workers in the workplace.

5.4 Recommendations

Occupational risks can be significantly reduced or avoided to save lives and prevent accidents through good Occupational Health and Safety practices. Good occupational health and safety practices can contribute significantly to improved well-being of workers and productivity. They should therefore be strengthened through meaningful development and maintenance of general safety awareness in the workplace and more so in the informal sector where oversight by government safety departments is lacking to a large extent. The following are the recommendations of this study

5.4.1 Recommendations for Motor vehicle repair workers

The motor vehicle repair workers who already have the correct type of PPE, should ensure that the PPE is used always when working in order to prevent or limit exposure to the various hazards that they may be exposed to when repairing vehicles.

Workers should use the Thika Jua Kali association or other organized groups at the workplace as platforms for communicating with relevant government ministries as well as other stakeholders. The associations could be used to lobby for support to enhance safety and health of workers in the Jua kali site. The association can help the motor vehicle repair workers increase their chances of accessing health education information regarding motor vehicle repair hazards and PPE as well as information on safe work practices.

5.4.2 Recommendations for Government Agencies

The government through its departments such as Kenya Bureau of Standards should ensure that quality Personal Protective Equipment are available to the market at an affordable rate. This will enhance the ability of even the low income workers to acquire them hence this may translate to higher usage.

The Ministry of EAC, Labour and social protection through the Directorate of Occupational Safety and Health services should develop strategies of training and delivering safety and health education information to small and informal garage

enterprises in order to raise awareness of motor vehicle repair hazards, use of PPE and other protective measures. The workers should be trained on: identifying and control hazards related to motor vehicle repair activities, health effects resulting from exposure to hazards that are related to their work and the selection and proper utilization of Personal Protective Equipment. Training of workers will increase their perception of risks and enhance their perceptions of the benefits of PPE in offering protection from work related hazards. Specifically training programs should be targeted at young and less experienced workers and may be effective in raising their level of awareness of hazards posed by work and hence their perception of risk.

Additionally TVET institutions should incorporate Occupational Safety and Health in their curriculum in order to impart knowledge and skills on workplace safety to the trainees. The trained persons can pass on the knowledge acquired to others who learn on the job.

The study also recommends that MVR workers be trained in reporting workplace accidents. This can be done through their associations and the information can be passed on to the relevant authorities for compilation, analysis and subsequently be used in strategy development. This will also improve availability of data on Occupational Safety and Health in informal workplaces and more so on injuries and illnesses that can be accessed by other interested stakeholders.

Information should also be provided to the general public on various motor vehicle repair related hazards from welding, panel beating, spray painting, wiring and general mechanical work hazards and their consequences on health in order to help them identify and avoid them whenever they are in close proximity to motor vehicle repair garages.

5.4.3 Recommendations for further research

This study identified important demographic, individual and work environment factors that influence workers decision in regards to PPE utilization among informal motor vehicle repair workers. Through workers self-reported data, the study was able to provide a snapshot of the determinants of PPE use among workers. Although general observations of the practice of PPE use were made, this was not done comprehensively

as not all the study respondents continued with their tasks during the interviews. Future studies may incorporate structured observations in order to validate self-reported data in the practice of PPE use.

The study also demonstrated that workers risk perception is an important determinant of personal protective equipment use. However, workers perception of risks was examined in a general manner. Future studies may disaggregate the risks and study workers perception to specific risks such as chemical, physical, mechanical, ergonomic, psychosocial as well as biological risks that may arise out of the various motor vehicle repair activities.

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APPENDICES

Appendix 1: PPE USE AMONG DIFFERENT MVR WORKERS

1a: Eye protection use among different MVR workers

MVR activity		Type of Eye Protection used				Total
		safety goggles	welding goggles	normal/sun goggles	none	
General mechanic	Count (%)	1 (3.4)	0 (0.0)	0 (0.0)	28(96.6)	29 (100.0)
Welder	Count (%)	0(0.0)	7 (50.0)	7 (50.0)	0 (0.0)	14 (100.0)
Auto wiring	Count (%)	0(0.0)	0 (0.0)	0 (0.0)	23 (100.0)	23 (100.0)
Panel beater	Count (%)	0(0.0)	0(0.0)	0 (0.0)	9 (100.0)	9 (100.0)
Spray painter	Count (%)	2(40.0)	0 (0.0)	0 (0.0)	3 (60.0)	5(100.0)
Total	Count (%)	3(3.8)	7 (8.8)	7 (8.8)	63 (78.8)	80 (100.0)

1b: Respiratory Protection use among different MVR workers

MVR activity		Respiratory Protection		Total
		dust masks	none	
General mechanic	Count (%)	1(3.4)	28 (96.6)	29(100.0)
Welder	Count (%)	0(0.0)	14 (100.0)	14(100.0)
Auto wiring	Count (%)	0(0.0)	23 (100.0)	23(100.0)
Panel beater	Count (%)	5(55.6)	4 (44.4)	9 (100.0)
Spray painter	Count (%)	4(80.0)	1 (20.0)	5 (100.0)
Total	Count (%)	10(12.5)	70 (87.5)	80(100.0)

1c: Feet protection use among different MVR workers

MVR activity		Feet protection use		Total
		safety boots	normal shoes	
general mechanic	Count (%)	11 (37.9)	18 (62.1)	29 (100.0)
welder	Count (%)	5 (35.7)	9 (64.3)	14 (100.0)
auto wiring	Count (%)	8 (34.8)	15 (65.2)	23 (100.0)
panel beater	Count (%)	2 (22.2)	7 (77.8)	9 (100.0)
spray painter	Count (%)	1 (20.0)	4 (80.0)	5 (100.0)
Total	Count (%)	27 (33.8)	53 (66.2)	80 (100.0)

1d: Whole Body Protection used among different MVR workers

MVR activity		Whole Body Protection used			Total
		overall	dust coats	none	
general mechanic	Count (%)	29 (100.0)	0 (0.0)	0 (0.0)	29 (100.0)
welder	Count (%)	14 (100.0)	0 (0.0)	0 (0.0)	14 (100.0)
auto wiring	Count (%)	0 (0.0)	21 (91.3)	2 (8.7)	23 (100.0)
panel beater	Count (%)	9 (100.0)	0 (0.0)	0 (0.0)	9 (100.0)
spray painter	Count (%)	3 (60.0)	2 (40.0)	0 (0.0)	5 (100.0)
Total	Count (%)	55(68.7)	23 (28.8)	2 (2.5)	80 (100.0)

1e: Gloves used among different MVR workers

MVR activity		Gloves used			Total
		leather	pvc	none	
general mechanic	Count (%)	2 (6.9%)	0 (0.0)	27 (93.1)	29 (100.0)
welder	Count (%)	2 (14.3)	0 (0.0)	12 (85.7)	14 (100.0)
auto wiring	Count (%)	0 (0.0)	0 (0.0)	23 (100.0)	23 (100.0)
panel beater	Count (%)	0 (0.0)	0 (0.0)	9 (100.0)	9 (100.0)
spray painter	Count (%)	0 (0.0)	2 (40.0)	3 (60.0)	5 (100.0)
Total	Count (%)	4 (5.0)	2 (2.5)	74 (92.5)	80 (100.0)

1f: Head Protection use among different MVR workers

MVR activity		Head Protection used	Total
		none	
general mechanic	Count (%)	29 (100.0)	29 (100.0)
welder	Count (%)	14(100.0)	14(100.0)
auto wiring	Count (%)	23(100.0)	23(100.0)
panel beater	Count (%)	9(100.0)	9(100.0)
spray painter	Count (%)	5(100.0)	5(100.0)
Total	Count (%)	80(100.0)	80(100.0)

1g: Ear Protection used by different MVR workers

			Ear Protection used		Total
			ear plugs	none	
MVR activity	general mechanic	Count (%)	0 (0.0)	29(100.0)	29(100.0)
	welder	Count (%)	0(0.0)	14(100.0)	14(100.0)
	auto wiring	Count (%)	0(0.0)	23(100.0)	23(100.0)
	panel beater	Count (%)	0(0.0)	9(100.0)	9(100.0)
	spray painter	Count (%)	0(0.0)	5(100.0)	5(100.0)
Total		Count (%)	0(0.0)	80(100.0)	80(100.0)

14. How often do you use/wear the following PPE while working?

[1] Always [2] Mostly [3] Sometimes [4] Rarely [5]Never

PPE	Always	Mostly	Sometimes	Rarely	Never
Whole body protection(<i>overall/dust coat</i>)	1	2	3	4	5
Eye/face protection (<i>safety goggles/welding shield</i>)	1	2	3	4	5
Feet protection (<i>safety boots/safety shoes</i>)	1	2	3	4	5
Ear protection (<i>ear plugs/ earmuffs</i>)	1	2	3	4	5
Hand protection/ <i>gloves</i>	1	2	3	4	5
Respiratory protection (<i>dust masks/respirator</i>)	1	2	3	4	5

15. What are the reasons for not using any or some of the required protective devices or clothing? (*You can tick more than one*)

I do not have the protective devices/or clothing [1] I do not know how to use them [2]

It is uncomfortable wearing/holding them [3] They make me work slower [4]

Others (please explain).....

16. Where did you get the protective device or clothing you wear or hold or use at work (*specify device and source*)

My employer bought/ provided [1] I hired [2] I bought [3]

I borrowed [4] [] Any other source [5]

17. Have you received any training on how to use the protective equipment?

Yes [1] No [2]

18. Where did you first learn about the protective devices/clothing meant to protect you from injuries while working?

Newspapers/magazines [1]	Radio [2]	Television [3]
Teachers /lecturers [4]	Safety Trainers [5]	Health workers [6]
Co-workers [7]	others specify _____	

Beliefs and attitude, risk perception, availability of PPE, Co-Worker Use/support for use of PPE

Beliefs and attitude

19. Do you believe that using any devices or wearing any clothing meant to protect against injuries can help protect someone from work related injury or illness?

Yes [1] No [2]

20. To what extent do you agree with the following statements regarding the role of personal protective equipment in protecting workers from sources of harm or injuries while working? (*Please tick one*)

i. It is possible to reduce exposure to a harmful substance or prevent injuries if I use protective devices or wear clothing to protect myself against harm or injuries while working

Strongly disagree [1]	Disagree [2]	Neutral [3]
Agree [4]	strongly agree [5]	

ii. I feel uncomfortable when using devices or wearing protective clothing while working

Strongly disagree [1]	Disagree [2]	Neutral [3]
Agree [4]	strongly agree [5]	

iii. I think using devices or wearing protective clothing will reduce work speed and therefore lessen my income

Strongly disagree [1]	Disagree [2]	Neutral [3]
Agree [4]	Strongly agree [5]	

Risk perception

21. To what extent do you agree with the following statements regarding the dangers/hazards associated with your work? (*Please tick one*)

iv. I am at risk of getting an injury or being exposed to a harmful substance that can cause an illness through my work.

Strongly disagree [1]	Disagree [2]	Neutral [3]
Agree [4]	strongly agree [5]	

25. Do your coworkers encourage you to use protective devices or clothing?

Yes [1] No [2]

26. How often do you get the encouragement to use PPE from coworkers?

Always [1] Mostly [2] Sometimes [3]

Rarely [4] Never [5]

Past injury/ill health experience, availability of first aid, health seeking

27. Have you ever had a serious work-related injury or suffered work related illness?

(Where you took days off work)

Yes [1] No [2]

28. If yes, briefly describe the last injury you had.

29. What happened after the injury?

I got first aid at the workplace [1]

I went to hospital [2]

Other

30. Has any of your co- workers been involved in a serious work related injury or suffered work related illness? *(took days off work)*

Yes [1] No [2]

31. What happened after the injury?

They got first aid at the workplace [1]

They went to hospital [2]

Other

32. Briefly describe the last injury they had.

THAT IS THE END OF THE INTERVIEW.THANK YOU.

APPENDIX 3: KEY INFORMANT; EMPLOYERS INTERVIEW GUIDE

Date..... Interview Guide No.

INTRODUCTION

My name is Flaciah Munyua. I am a postgraduate student at the Institute for Development Studies of the University of Nairobi pursuing a Masters degree in Development Studies. As part of the requirement for the award of the degree, I am expected to undertake research in my area of study. My research is looking at the factors influencing use of personal protective equipment by motor vehicle repair workers at Kigandaini Jua Kali Cluster. The information gathered is only intended for academic purposes and thus whatever information you provide will be kept with utmost confidentiality. I would really appreciate if you spare your time in order to facilitate completion of this study. This interview is likely to take about 25 minutes.

1. How long has your enterprise been operating
 - How many employees work at your enterprise?
2. How do you employ/ terms of workers engagement
 - How are they paid?
3. As an employer, what arrangements have you made towards ensuring that every work activity is performed safely thereby minimizing or elimination injuries or illnesses as a result of work ?
 - Are you aware of any occupational health and safety laws?
 - What do you know about the Occupational Health and Safety Act of 2007?
 - How are you implementing it as an as an employer?
4. Who do you think should be responsible for providing work protective devices or clothing (PPE) for workers?
 - Do you provide protective device or clothing for your workers meant to protect them from injuries while working?
 - Do you offer any training to your workers on the use of PPE?
 - Are there any measures you take to encourage PPE use at the workplace
 - What measures do you take to ensure the use of PPE at the enterprise by workers?
5. How would you describe the use of personal protective equipment by motor vehicle repair workers in this Jua kali cluster?
6. What do you think influences the use of personal protective equipment by motor vehicle repair workers?

- Knowledge of PPE and hazards exposed during work
 - Age, gender and work experience of worker, previous injury experience ,income
 - Work environment including availability of PPE
7. What happens in the event of a work-related injury in terms of time off to seek medical attention, the cost of treatment?
 8. How would you describe the relationship between the Jua Kali sector and the government?
 9. Are there specific ways you would like the government to help you to assure the occupational safety of your workers?

THAT IS THE END OF THE INTERVIEW.THANK YOU.

APPENDIX 4: KEY INFORMANT. INTERVIEW GUIDE (SITE ASSOCIATION LEADER)

INTRODUCTION

My name is Flaciah Munyua. I am a postgraduate student at the Institute for Development Studies of the University of Nairobi pursuing a Masters degree in Development Studies. As part of the requirement for the award of the degree, I am expected to undertake research in my area of study. My research is looking at the factors influencing use of personal protective equipment by motor vehicle repair workers at Kigandaini Jua Kali Cluster. The information gathered is only intended for academic purposes and thus whatever information you provide will be kept with utmost confidentiality. I would really appreciate if you spare your time in order to facilitate completion of this study. This interview is likely to take about 25 minutes.

1. What are the roles/purpose of Thika welfare Jua kali welfare association?
2. What are the requirements for membership?
3. What are the benefits of being a member of Thika Jua kali Association?
4. What health and safety concerns or challenges if any do your members face ?
 - How are you addressing these and how?
5. How would you describe use of personal protective equipment at the kigandaini Jua Kali Cluster
6. What do you think influences the use of personal protective equipment by motor vehicle repair workers?
 - Knowledge of PPE and hazards exposed during work
 - Age, gender and work experience of worker, previous injury experience
 - Work environment including availability of PPE, peer influence
7. Are you aware of any occupational health and safety laws?
 - What do you know about the occupational health and safety act?
 - How are you ensuring its implementation by your members?
8. How would you describe the relationship between the Jua Kali sector and the government?
9. Are there specific ways you would like the government to help you to assure the occupational safety of your members?

THAT IS THE END OF THE INTERVIEW.THANK YOU.

**APPENDIX 5: KEY INFORMANT; DIRECTORATE OF OCCUPATIONAL
HEALTH AND SAFETY SERVICES (OCCUPATIONAL SAFETY AND
HEALTH OFFICER KIAMBU COUNTY) - INTERVIEW GUIDE**

INTRODUCTION

My name is Flaciah Munyua. I am a postgraduate student at the Institute for Development Studies of the University of Nairobi pursuing a Masters degree in Development Studies. As part of the requirement for the award of the degree, I am expected to undertake research in my area of study. My research is looking at the factors influencing use of personal protective equipment by motor vehicle repair workers at Kigandaini Jua Kali Cluster. The information gathered is only intended for academic purposes and thus whatever information you provide will be kept with utmost confidentiality. I would really appreciate if you spare your time in order to facilitate completion of this study. This interview is likely to take about 25 minutes.

1. Is there or has there been any interaction between the Directorate of Occupational Health and Safety Services and the Thika Jua Kali clusters?
 - What sort of interaction?
2. Do you receive any report of injuries or illnesses from informal workplaces (Kigandaini Jua kali cluster)?
 - If yes what action does the directorate take in case of any report of injuries or illnesses?
3. Does the Directorate conduct inspections/site visits in informal workplace in Thika or the county?
4. Are there any measures taken by the Directorate to address safety and health issues at the informal workplaces?
5. Are there challenges encountered by the department in addressing safety and health issues in informal sector workplaces?
6. What do you think should be done to address safety and health issues arising from informal workplaces?

WE HAVE COME TO THE END OF THE INTERVIEW.THANK YOU VERY MUCH.

APPENDIX 6: FOCUS GROUP DISCUSSION GUIDE

1. What are the dangers/ potential sources of harm associated with your work?
What is dangerous about the work you do?
2. Of all the potential sources of harm/danger identified, which do you rank as the most serious threat to your health? *Rank them in order.*
3. Which safety measures do you take to protect yourself from potential sources of harm while working*?
4. Which PPE's are important for the work you do?
5. Are there times or instances when you would feel the need to use PPE more than other times?
What times or instances are these?
6. Are there times or instances when you would feel you do not need to use PPE
7. What times or instances are these?
8. What are some of the reasons for using PPE when working*?
Of all the reasons we have discussed, what is the most important reason for using PPE?
9. What are some of the reasons for not using PPE?
Which reason/s would you rank highest for your failure to use PPE? Rank from most important.
10. What do you think should be done to increase the rate of PPE usage among workers?
11. Which category of workers are more likely to use PPE and why? e.g younger or older workers, male or female, income, experienced, more educated