

**EVALUATION OF WORK-RELATED HEALTH AND SAFETY RISKS
ASSOCIATED WITH HAIRDRESSERS IN NAIROBI CITY COUNTY, KENYA.**

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Q139/CTY/PT/22741/2012

**A RESEARCH THESIS SUBMITTED IN PARTIAL FULFILLMENT OF THE
REQUIREMENTS FOR THE AWARD OF THE DEGREE OF MASTERS OF
SCIENCE IN OCCUPATIONAL HEALTH AND SAFETY IN THE SCHOOL OF
PUBLIC HEALTH AND APPLIED HUMAN SCIENCES OF
KENYATTA UNIVERSITY**

JANUARY, 2022

DECLARATION

This thesis is my original work and has not been presented for a degree in any other university.

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DEDICATION

I dedicate this work to my family who offered love and support and have always been there for me. Thank you so much.

ACKNOWLEDGEMENTS

Firstly, I am grateful to God who makes all things done in his own best time.

I would like to thank my supervisors Dr. Peterson Warutere and Dr. Bernard Awuonda for their unreserved support and constructive comments in every step of the progress of this thesis.

I would like to acknowledge Kenyatta University School of Public Health and Applied Human Sciences and the Department of Environmental and Occupational Health their support during the study.

I acknowledge my family and friends for their support during this thesis work.

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ABBREVIATIONS AND ACRONYMS

CCOSH	Canadian Centre for Occupational Safety and Health
DOSHS	Directorate of Occupational Safety and Health Services
EU-OSHA	European Agency for Safety and Health at Work
GDP	Gross Domestic Product
HSWA	Health and Safety at Work Act
ILO	International Labour Organization
MSDs	Musculoskeletal Disorders
MSEs	Micro and Small Enterprises
NACOSTI	National Commission for Science Technology and Innovation
NIOSH	National Institute of Occupational Safety and Health
OSH	Occupational Health and Safety
OSHA 2007	Occupational Health and Safety Act 2007
PEL	Permissible Exposure Limit
PPE	Personal Protective Equipment
WHO	World Health Organization
WISHA	Washington Industrial Safety and Health Act
WMSDs	Work-related Musculoskeletal Disorders

DEFINITION OF OPERATIONAL TERMS

- Ergonomics:** A field of study that seeks to fit the job to the person, rather than the person to the job, through the evaluation and design of workplaces, environments, job tasks, equipment. It involves optimizing the interface between human beings, and the designed objects and environments they interact with.
- Hairdresser:** A person whose occupation is to cut or style hair in order to change or maintain a person's image.
- Hazard:** Any source of potential damage, harm or adverse health effects on something or someone under certain conditions at work.
- Occupational health and safety:** The science of the anticipation, recognition, evaluation and control of hazards arising in or from the workplace that could impair the health and well-being of workers, taking into account the possible impact on the surrounding communities and the general environment.
- Risk:** Probability that a person will be harmed or experience an adverse health effect if exposed to a hazard.
- Working conditions:** Conditions in which individual or staff works, including but not limited to such things as amenities, physical environment, stress, noise level, degree of safety or danger, working time (hours of work, rest period, leaves and work schedules), work efforts and remuneration, work organizations.

ABSTRACT

Hairdressers work towards changing or maintaining a person's image. They are exposed to awkward posture, prolonged standing, long working hours and chemical hazards capable of causing adverse health effects. They are at high risk for safety and health risks which have not been well elucidated. This study sought to evaluate the safety and health risks associated with hairdressers. Specifically, it investigated whether salon designs, ergonomic risk factor and hairdressing tasks have impact on hairdressers' health and safety. The study used descriptive cross-sectional and analytical design. Systematic random sampling was used to select salons and hairdressers. Closed and open-ended questionnaires were distributed to 286 hairdressers who consented to participate in the study. Observation checklist, WISHA caution checklist, thermometer, light meter and noise level meter were used to collect data in the sampled salon. To determine the impacts of salon designs, ergonomic risk factors and hairdressing tasks on the health and safety of hairdresser, data were analyzed descriptively and with regression analysis. The findings indicate that the space in most salons is inadequate. The average space for salons is 7.22M² and that most (68.5%) hairdressers work for long hours (11-12 hours). It was also established that few salons (5.48%) have adequate amount of light and that 8.22% salons have high temperatures. Results also showed that aprons are the most used PPEs by hairdressers. It was revealed that manual handling of salon equipment and awkward posture cause musculoskeletal disorders among the hairdressers. Their odd ratios impacting health and safety of hairdressers were 2.706 and 2.728 respectively. All hairdressing tasks were done on awkward positions. The study revealed that hairdressing salon designs; space, affect the lighting and temperatures affect the health and safety of hairdressers. The hours off work and minimal or no breaks also have negative impacts on the health and safety of hairdressers. The study recommends the enforcement of the enacted legislation by the ministry of health and regular provision of hairdresser-based information on ergonomic risks to minimize the health and safety risks in the industry.

CHAPTER ONE

INTRODUCTION

1.1 Background to the study

Hairdressing is an occupation in the hair and beauty industry and is predominantly feminine occupation with over 80% female workers (Bedru 2016) and therefore most salons attract female hairdressers. Women and girls spend a lot of time experimenting with their hair; therefore, perceived to be naturally inclined to the profession. The sector is characterized by young workforce with an average age of 26 years (Scranton, 2014). The hairdressing trade is dominated by small establishments; therefore salons have an average of 2- workers, run by self-employed hairdressers who often work on their own without dependent employees. It deals with cutting, dyeing, bleaching, perming, blow-drying or styling hair in order to change or maintain a person's image. Hairdressers are exposed to various hazards in the workplace such as awkward posture, prolonged standing, heat stress, noise, load on the muscles, long working hours, physical and chemical agents. These are capable of causing adverse health effects, particularly the musculoskeletal disorders, respiratory problems and other stress-related psychological disorders (Mahdavi, 2014). Work-related injuries and diseases have been a worldwide issue with huge economic burden in terms of direct medical costs, loss of work productivity, work disability, increased time off work, early retirement and absenteeism. It is estimated that 30% of sick leave taken by hairdressers is related to psychological complaints (Peixin 2014).

The International Labour Organization (ILO) estimates that, globally, about 2.3 million people die every year from occupational injury and illness (Bureau of Labor Statistics,

2018) with their cost estimated at 2-14% of the Gross National Product (GNP) and 4% of the Gross Domestic Product (GDP) of the various countries (EU-OSHA, 2014, US. Department of Labour, 2012). Although there is a scarce global Occupational Safety and Health (OSH) statistics regarding the hairdressing sector (Niu, 2014), the musculoskeletal disorders (MSDs), migraine headaches and stress complaints among the hairdressers have evolved gradually and are becoming a greatest problem of concern. Verhamme (2015), reports that 75% of hairstylists suffer from MSDs affecting hands, fingers, wrists, shoulders, necks, backs and legs. MSDs have been found to cause 21% of all years lived with disability (Petersen 2015). Occupational heat exposure threatens the health of hairdressers not only when heat illness occurs but also when their performance and work capacity is impaired (Boschetto *et. al*, 2016).

Workplace organizational and physical designs affect the well-being and comfort of a hairdresser. Research studies have shown that prevalence of MSDs, headaches and psychological problems among hairdressers are high in developing countries. A study to identify the determinant factors for MSDs in female hairdressers in Ethiopia shows that the MSDs prevalence is 76.5 % (Bedru, 2016). According to a study done to investigate the causes of work-related health problems among hairdressers in Nigeria, 86% are as a result of poor working conditions (Taiwo, 2014). As one of the developing countries, Kenya has a fast growth of hairdressing enterprises. The hairdressing industry has been given minimal consideration and even neglected by key players in the labour ministry; to most people, it seems unprofessional and is just supplementary source of income (Onsongo, 2015).

Nairobi County is the country's largest city by population with approximation of 4.397million people. The number of salons keeps growing which steepens the competition among hairdressers (Onsongo, 2015). There are many small salons which have sprouted outside the Nairobi central business district, especially Roysambu Sub-County but the output in terms of work productivity is minimal. There is scarce information regarding the health and safety of hairdressers. To ensure hairdressers work safely and productively in the work environment, work arrangements such as work-rest, shift work, workstation and workspace should be carefully managed (Omondi, 2017). The study therefore sought to evaluate the health and safety risks among hairdressers in Roysambu Sub-County.

1.2 Statement of the problem

Directorate of Occupational Safety and Health Services (DOSHS) through Occupational Safety and Health Act, 2007 strive to ensure that all workplaces have safe and healthy working environments and complying with occupational health and safety regulations. Hairdressers are exposed to several hazards in the course of their operations including manual handling, inhalable fumes, burns, loud noise, chemical spills, repetitive tasks as well as slips, trip and falls (Hakim and Abdel, 2019). Workers normally stand for long hours in awkward postures with limited movements and there is a risk of straining their muscles (Kozak, 2019). Studies done in Ethiopia showed that there is 70.2% prevalence rate of musculoskeletal disorders among hairdressers (Mekonnen, 2019). They carry out their operations repeatedly and faster so as to strive to increase their daily earnings.

According to the Occupational Safety and Health Act (OSHA) 2007, all workers should be trained on safe work practices for example identification and control of hazards and risks

yet this may not be the case for all the hairdressers (Government of Kenya, 2010). Additionally, all workers should observe safe work procedures in their daily duties but in most cases, this may not be so as hairdressers are seen working without aprons, gloves, eye and foot protection and that some fix electric appliances such as blow dryers on open sockets. Some hairdressers, while at work, complain of back and leg pains yet the work-related ergonomic risk factor for such health problems are not clearly known. There is very scarce information regarding health and safety risks faced by hairdressers. It is not clear whether the salon workplace designs, organizational ergonomic or the job tasks that pose health and safety risks to hairdressers. In response to these problems, the study aims to assess the work-relate health and safety risks among hairdressers in Roysambu Sub-county.

1.3 Justification of the study

Hairdressing falls under micro, small enterprises (MSEs) which contribute 20-25% GDP and providing employment to many school drop-outs (Onsongo, 2015). Although hairdressing is the third (79.7%), after healthcare (90.3%) and agriculture (86.9%), mostly affected occupation by the musculoskeletal disorders (Kozak, 2019), the health and safety risks among hairdressers in Kenya have not been established. Work-related health complaints among the hairdressers contribute to an economic burden in terms of direct medical costs, loss of work productivity, work disability, increased time off work and early retirement (Mekonnen, 2019). Kim (2019) identifies musculoskeletal disorders as the second cause of disability worldwide. The population at the highest risk in the industry is women and the youth.

Roysambu Sub- County is a low-income residential estate in Nairobi that has a high density of hairdressing salons as compared to other Sub-Counties in Nairobi with workplace designs that are perceived to be harmful to the workforce. The hairdressers lack the occupational information as to what the safe working conditions and their safety rights are. These have threatened their safety in the industry as they are continually exposed to harmful and unsafe working conditions. This study aims to establish the potential harmful ergonomic practices and the safety concerns among the hairdressers. Due to lack of specific safety regulations and the perceived existence of harmful working conditions among hairdressers, there was therefore need to evaluate the work-related health and safety risks affecting hairdressers in Roysambu Sub-County, Kenya.

1.4 Research questions

1. What are workplace designs that may pose health and safety risks to hairdressers in Roysambu Sub-County?
2. What are the probable ergonomic risk factors associated with health and safety of hairdressers in Roysambu Sub-County?
3. What are the job tasks that are perceived to be harmful to the hairdressers in Roysambu Sub-County?

1.5 Objectives of the study

1.5.1 Broad objective

To evaluate the work-related health and safety risks associated with the hairdressers in Roysambu Sub-County, Nairobi County, Kenya.

1.5.2 Specific objectives

1. To identify the probable workplace designs that pose health and safety risks to hairdressers in Roysambu Sub-County.
2. To establish the probable ergonomic risk factors associated with health and safety of hairdressers in Roysambu Sub-County.
3. To determine the job tasks perceived to be harmful to the hairdressers in Roysambu Sub-County.

1.6 Significance of the study

The results and the recommendations from the study will invaluablely provide the ministry of labour with information that helps in the establishment of safer conditions of work for hairdressers. The workforce union, Kenya Union of Hair and Beauty Salon workers (KUHABSWO) will be enlightened to organize for training of hairdressers on safe work practices, safe working conditions, use of personal protective gear and ergonomic risks. They will enable hairdressers be aware of health and safety risks that contribute to health problems and in turn advocate for safer working conditions. The findings will help improve health and safety practices among the hairdressers leading to reduced musculoskeletal complaints. It also establishes a foundation for further and related studies that will contribute to the existing body of knowledge.

1.7 Limitation and Delimitation of the Study

1.7.1 Limitation

The study was affected by lack of willingness by some of the hairdressers to give the needed information. Some participants didn't reveal exactly what their ages and wages

were. The resources for conducting the research were limited only to enterprises in a sub-county. Better outcome and determination of health and safety risks among the hairdressers would have been realized by covering the whole county since there are few salons but with better working conditions. The random sampling used in sampling the salons might have left out the enterprises that would reveal more information on the risks of interest. The revelation of a true picture of the ergonomic risk factors and the behavior of hairdressers in using the protective gear in Kenyan salons was limited by the descriptive cross-sectional that was used in the study.

1.7.2 Delimitation

The study was concentrated to hairdressing salons in Roysambu Sub-County only. This was because of the density of the salons in the area. Hairdressers were chosen as population of study: hairdressing occupation has gone neglected by the key players in the ministry of labour, health and economic sector altogether. It is looked as unprofessional area yet creating employment for the youth. The workforce is exposed to various hazards and risks which have not been established in Kenya. The use of four point scale response on the questionnaire was used to get specific data that would have been missed by using one sentence responses.

1.8 Conceptual framework

The findings from the determination of the identified independent variables: working conditions (physical and organizational design) of their workplace, the tasks they carry out and ergonomic risks factors at work, will determine the health and safety of hairdressers.

A hairdressing salon design has both physical (salon equipment, space and environmental conditions) and organizational (working hours, breaks and wages).

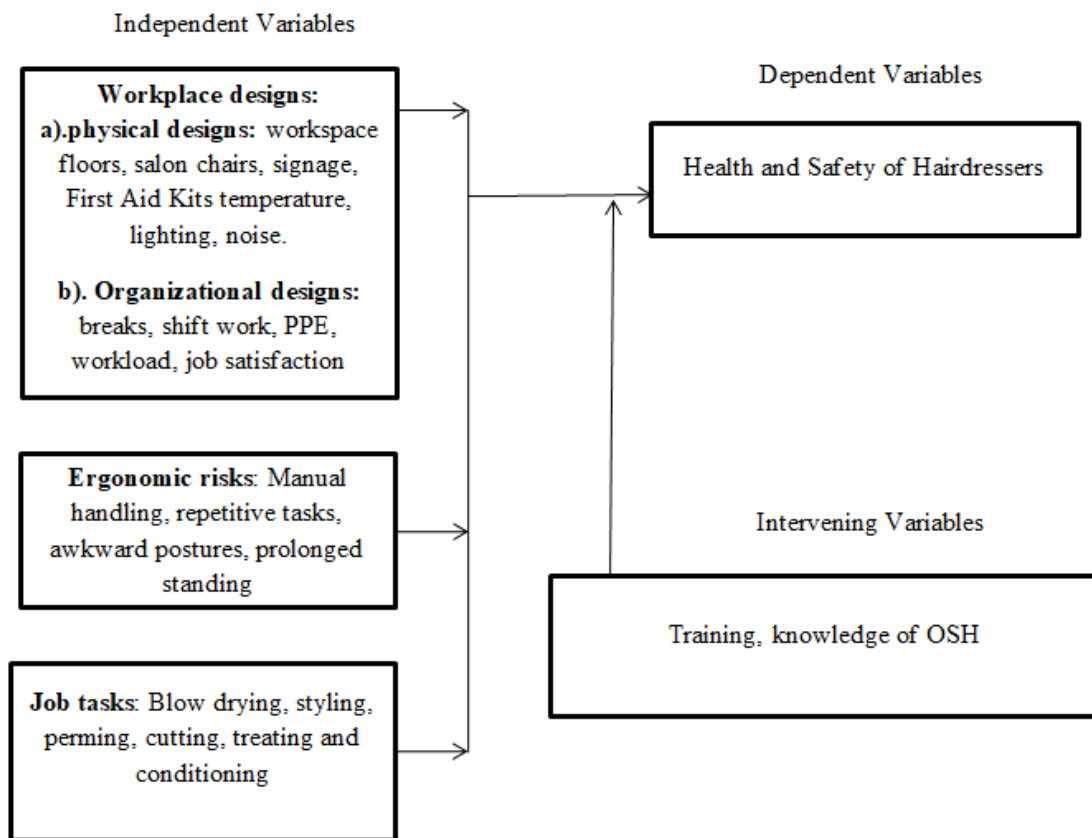


Figure 1: conceptualizing health and safety risks among hairdressers framework

CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

Hairdressing occupation is one of the micro and small enterprises (MSEs) in Kenya. It plays a significant role in providing employment opportunities (Onsongo, 2015). The industry encompasses majorly women and youth with a wide range of products and services (Bradshaw *et al*, 2016). Numerous Kenyan hairdressing salons are small roadside establishments. Hairdressers implement their duties with the help of mechanical tools. The hairdressers' work environment has predominantly mechanical, ergonomic and chemical hazards and risks. Risks of cuts, bruises or burns, standing for long periods of time, awkward postures, poor earnings, harassments, repetitive movements, means hairdressers face several potential health and safety issues (Martolia, 2019, Tsegay, 2019, Tolera 2018). The regulation of working conditions in this sector continues to pose a challenge to occupational health authorities in developing countries

2.2 Health and Safety Executive (HSE) provisions for beauty salons-United Kingdom

Health and Safety Executive (HSE) provides the relevant legislations for all beauty salons. There key laws which apply to the hairdressing sector are the Health and Safety at Work Act 1974, the Control of Substances Hazardous to Health Regulations (COSHH) 2002 and Cosmetic Products (Safety) Regulations 2004. It is a legal requirement that workplaces display health and safety posters approved by Health and Safety Executive (Health and Safety Executive, 2011)

Health and Safety at Work Act (HSWA) maintains that all employers must provide and maintain safe working environment. They should also provide safe systems of work and information, training and supervision. All employees must provide appropriate personal protective equipment for the employees. The legislations provides that all workers should act responsibly so as not to endanger self and others by an individual's action. They should also co-operate with the employer to fulfill the duties.

The Control of Substances Hazardous to Health regulations 2002 (COSHH) require that appropriate assessment and precaution is taken to protect against harm from hazardous substances. In salon environment, these substances could be the cleaning and coloring products.

2.3 Occupational Safety and health Act (OSHA) 2007

The Occupational Safety and Health Act (OSHA) 2007 provide that every occupier should ensure safety, health and welfare at work of all persons working in his workplace for a safe and healthy workplace. It is the duty of every occupier to provide information, instruction, training and supervision to ensure safety and health at work of every person employed. It provides that occupiers to provide safe working environments without risks to health of all workers. The OSHA 2007 maintains that self-employed persons must take the necessary precautions to ensure their health and safety at work and that they should use the protective gear at all times while at work. It also provides that every employee must ensure his or her safety and health at work. They should also use the protective equipment and comply with the given health and safety procedures. The Directorate of Occupational Safety and Health

Services regulations and the local government laws in Kenya provide for the inspection of workplaces for the improvement of sanitations (Government of Kenya, 2010)

2.4 Designs of Hairdressing Salon

2.4.1 Physical designs of a salon

The European Agency for Safety and Health at Work (EU-OSHA) recognized that hairdressers are exposed to serious occupational health and safety risks and that improving working place conditions should be a priority (EU-OSHA, 2014). The physical factors of any workplace have a direct impact on the employees' productivity, performance, concentration and health and safety. These factors include the workspace, floors, equipment and the environmental factors. A hairdressing salon that is not well-designed can result injuries. Ensuring that the workstation and equipment are within easy reach and can be adjusted for all hairdressers can reduce the risks (Martolia, 2019). Effective application of ergonomics in hair salon work system design can achieve work balance between hairdresser's characteristics and task demands (Senthong and Wittayaslip, 2018).

2.4.1.1 Workspace

Workspace is any location where a person's work is performed, as well as the furniture, accessories, equipment, environmental conditions, and psychosocial workplace factors within these locations (Verhamme, 2015). The National Hair and Beauty Federation suggests an estimate size of a hairdressing salon depending on the number of workers; the average size of every salon should be 120square meters (Yasmin, 2017).

Sufficient clear space needs to be allocated to ensure hairdressers have the full range of movement required to do the job and can move without strain or injury (Dollard and

Bakker, 2015). It should also be appropriate to the work being performed. It should be neat and free from overcrowding (Verhamme, 2015).

2.4.1.2 Floors

Adequate space and proper organization in a salon is important to provide free movement of the workforce and customers. To prevent trips, electrical cables and cords should not be crossing salon floors. Slips can be prevented by drying the floor surfaces immediately after spills (EU-OSHA, 2014). Hairdressers should ensure that floors are free from hairs, obstacles, water and chemical spillages (Wetzels *et al.*, 2014). Standing on a hard concrete floor for long periods puts undue stress through hairdresser's feet, knees, and back (Verhamme, 2015, Peixin, 2014). The floor surfaces must be horizontal, void of cracks and tile breakages and slip proof. Hairdressers should always wear non-slip footwear (EU-OSHA, 2014).

2.4.1.3 Chairs

Hairdressing chairs come in all sizes and various designs; salons must ensure each hairdresser has a chair suitable for his or her height and body support and allow them vary their positions between sitting and standing. The type of seating should be suitable and appropriate to the type of work being performed (Yasmin, 2017). Adjustable rotating chair can be effectively introduced to reduce static loading on hairdressers' muscles. (Verhamme, 2015).

2.4.1.4. Salon equipment

Hairdressing enterprises have a wide range of equipment which includes chairs, dryers, trolleys, cabinets, shelves, and counters among others. Manual handling of heavy

equipment can be implicated with lower back injuries (WHO, 2012). There are considerations on the salon equipment that should be taken: they should be within the reach of hairdressers; they should be light and not bulky. This can be facilitated by the use of trolleys with wheels (Middlesworth, 2015). This helps avoid awkward postures of the hand and arm and prevent the user from experiencing excessive exertion or vibration. Hair dryers vibrate and therefore may lead to the use of too much force when gripping objects (EU-OSHA, 2014).

Trolleys used are not movable and sufficiently high; hairdressers have to stretch or tilt, to reach for their tools or keep walking around the chair to get an item. Handheld driers and scissors used by hairdressers heavy hence increasing stress in the wrist and arms. They should be comfortable to use over time and should avoid repetitive stress injury (Linares, 2019).

Every hairdressing salon requires appropriate storage for their operation materials; shelves, counters and cabinets are not on proper positions and locations, hence hairdressers stretch to reach their items. This poses risks of strain to their shoulders and hands muscles (Verhamme, 2015).

Water taps, sinks and shampooing basins should be properly fixed to avoid leakages and spillages. Hand, hair wash basins and sinks should be located in the main salon area in an accessible location for effective use by workers. However, most salons have their sinks fixed on the walls which force hairdressers to bend as they serve their clients (Yasmin, 2017, Wetzels *et al.*, 2014).

2.4.1.5 First Aid kits, signage and material safety data sheets

The Health and Safety (first-Aid) Regulations 1981 requires employer to provide adequate and appropriate equipment, facilities and persons to ensure their employee receive immediate attention if they are injure or taken ill at work. These regulations apply to all workplaces including those with less than five employees (Health and Safety Executive, 2011). Hairdressing salons should have appropriate and sufficient warning systems designed in a way to allow hairdressers understand and act in the intended safe manner hence reduced mistakes, reduced working time and improved productivity. Hazard alert posters are rarely seen in most hairdressing enterprises (Yasmin 2017). Hairdressers are rarely informed and reminded to carry out safe acts; therefore, they get exposed to chemical and mechanical risks. Most hairdressing salons in Kenya do not have First Aid Kits and material safety data sheets (Verhamme, 2015).

2.4.2 Salon's physical environment

The physical environmental factors: temperatures, illumination and noise, in hair salons my increase health risks as beauty workers are susceptible to various adverse health outcomes, like occupational-relate musculoskeletal disorders (Khalaf and Osman2019). Inadequate and inappropriate illumination, high temperatures and noise level can lead to fatigue, reduce ok efficiency and increased accidents in hair salons (Health and Safety Executive, 2011). Salon's microclimate should be adjusted to provide the maximum comfort for both hairdressers and customers (EU-OSHA, 2014).

2.4.2.1 Temperature

Health and Safety Executive regulations provide that hairdressing salons should maintain temperature range that is comfortable and suitable to their operations. Every workplace should have temperature levels of 24-26 degrees Celsius (WHO, 2012). But the Hairdressing Guidelines 2015 provide that hairdressing salons should have 13 to 16 degrees Celsius (ACT Government, 2015). Where temperature is too high or too low, it causes heat stress, headaches, fatigue and hence strained muscles and human errors. Most hairdressers use hairdryers and work very close to this source of high temperature (EU-OSHA, 2014).

2.4.2.2 Lighting

The lighting in a workplace needs to allow hairdressers and others to move about easily and to carry out their work effectively without adopting awkward postures or straining their eyes to see. Salon work areas should be adequately illuminated by natural or artificial light. Poor lighting induces headaches and causes eyestrain which can result in accidents (EU-OSHA, 2014). According to the Health and Safety Executive legislations, every workplace must have suitable and sufficient lighting and as far as is reasonable and practicable be by natural lighting (Health and Safety Executive, 2011). Dark salons in developing countries are those surrounded by tall buildings (Khalaf and Osman, 2019). According to Hairdressing Guidelines 2015 hairdressing salons should have a minimum lighting of 500 Lux (ACT Government, 2015).

2.4.2.3 Noise

Excessive noise in the workplace poses a risk of hearing damage and other health problems. The risk of hearing loss increases as the noise becomes louder. Length of exposure is important too. According to Occupational Safety and Health Act 2007, the Permissible Exposure Limit(PEL) for all workers for an 8-hour day is 90 dBA, while NIOSH recommends limiting the 8-hour exposure to less than 85dBA(NIOSH, 2018, ILO, 2012). Noise levels should be regularly monitored and work practices continuously improved to preserve the hearing of workers. Most salons are located in noisy places, for example, bars, along busy roads and welding places (Tolera, 2018, Mekonnen, 2019). All workplaces including hairdressing salons should have noise levels of less than 85Dba (Health and Safety Executive, 2011, ACT Government, 2015).

2.5 Organizational design of salon

Organizational health and safety focuses on the development of specific measures and programs aimed at protecting employees in the course of performing their tasks to maximize productivity and improve the overall organization's performance (Boschetto *et al.*, 2016, ILO, 2012)). They involve organizational structures, policies, and processes (Sparks 2013). The health of a worker is a major determinant of productivity. The conditions under which most informal workers operate are unhealthy and safe (Hammam, 2014). According to Dollard and Bakker (2015), organizational designs in hairdressing enterprises are concerned with resource management, communication, work systems, design of working times, teamwork, cooperative work and their service quality management.

Poor organizational design can contribute to work-related stress an increasingly critical well-being issue (WHO 2019). Hairdressing is one of the sectors most affected by musculoskeletal disorders and psychosocial factors including stress. The awkward posture, minimal breaks, long working hours, workload, lack of worker motivation and communication are the important factors to be causing psychosocial issues among hairdressers (Ferreira, 2016, Kozak, 2019)

2.5.1 Hairdressers' remuneration and job satisfaction

Inadequate pay is the largest work-related stress factor which is the biggest health related issue facing workforces globally (WHO, 2019). It is found that 74% of hairdressers report that the biggest issue causing them stress is their wages. There are limited policies designed to ensure the satisfaction of the needs of all hairdressers and their families. There are no provisions for remuneration for any overtime work done (Ferreira, 2016). Their mental health gets affected when they cannot meet their own needs with what they get as their pay (Pasad, 2016).

Hairdressers are paid on commission term and therefore they do not have specific salaries and salary scales. In the developed countries, hairdressers earn an average of \$9.99 per hour (Bureau of Labour Statistics, 2018).

2.5.2 Hairdressing working time.

Most hairdressers operate in poorly designed shift-work arrangements and long working hours that do not balance the demands of work with time for rest and recovery. Hairdressers work on an irregular and extended work schedules. Working long hours can over-tire an individual mentally and physically (Ferreira, 2016, Sparks, 2013).

Where there are insufficient breaks, a lot of the groups of muscles used for the work do not get the chance to recover, hence musculoskeletal disorders (Verhamme, 2015). This can result in fatigue which is an important factor in the working hours–health relationship; hence, accidents, injuries and ill health. It can also lead to imbalance in terms of meeting the needs of their families and work schedules, hence development of psychosocial problems (Taiwo, 2014). Hairdressers who work for 4 hours continuously should have a break of 30 minutes. Hairdressers in developed countries are entitled to annual leave and maternity leave, just like employees in formal sector of employment (CCOSH, 2016).

2.5.3 Hairdressing workload

Hairdressing is very demanding as the hairdressers handle different clients with different needs for long hours (Verhamme, 2015). The daily workload of a hairdresser is high and aggravated by the lack of regular breaks (Kozak, 2019). Where hairdressing workload is too heavy, hairdresser's posture and movement are put under more concentrated strain over a shorter period of time. This result in excess muscle workload especially in the shoulders legs and lowers back; hence fatigue and development of MSDs (Sparks, 2013, Khandan 2015).

2.5.4 Social environment for hairdressers

Hairdressers in most cases are affected by lack of necessary skills, emotionally demanding interactions, harassment, conflicts, monotony of work and lack of job satisfaction. Stress is always associated with dealing with clients in attempt to satisfy them and fast paced work. These have negative impacts on their health. (Masike *et al*, 2014).

2.5.5 Communication

Communication is very important in all workplace as it is the key to a healthy, safe and productive workplace. Communication is key to ensuring roles and directions are understood, warning against danger is given, avoiding unsafe practices, reporting of hazards and risks, (WHO, 2012). Effective communication and clearly identified lines of communication provides and promotes health and safety by identifying potential risks and preventive measures and emergency procedures in the event of accidents (Ferreira, 2016). Salon communication may be hampered with loud music, noisy dryers, levels of education and psychological factors of workers; hence becoming a risk factor (Tolera 2018, Mekonnen, 2019). Narayan (2019) established communication mediums in occupational health and safety; policies, strategic plans and OHS mission statements, checklists, manuals and operating procedures, safety inductions, trainings, risk assessment, hazard accidents results and Occupational Health and Safety statistics.

2.5.6 Occupational health and safety knowledge and training

Hairdressers' knowledge of health and safety matters easily poses ergonomic risks especially psychosocial risks (Katunge, 2016, Ferreira, 2016). Proper knowledge of safe work practices and hazardous exposure lead to reduction of adverse health effect (Hakim and Hamid, 2019). The complaints of musculoskeletal disorders among the hairdressers are relate to lack of knowledge on ergonomics in the form of prolonged standing, use of vibrating objects and uncomfortable body postures (Titolayo, 2019, Hakim and Hamid, 2019). Majority of hairdressers undergo training courses especially on salon practices, desirable workplace behaviors and the use of personal protective equipment but few describe specific health content; therefore, do not result in awareness of potential health

risks (Sparks, 2013). Hakim and Hamid (2019) reported that only 32% of hairdressers in developing countries understand the importance of using personal protective equipment.

2.5.7. Personal Protective Equipment

Personal Protective Equipment is worn to minimize exposure to hazards that cause serious workplace injuries and illnesses. The Health and Safety Executive, United Kingdom provide legislations on Personal Protective Equipment (PPE) which apply to all workplaces: Personal Protective Equipment Regulations 2016 for the supply of appropriate protective clothing and equipment, Personal Protective Equipment (Enforcement) Regulation 2018 on the enforcement of the supply of PPE for use at work and Personal Protective Equipment at Work regulations 1992 which relates to the use of PPEs (Health and safety Executive, 2019). Salon PPEs are health and safety measure for the hairdressers.

According to OSHA 2007, it is the responsibility of every employee at all times to wear or use any protective equipment or clothing provided by the employer for the purpose of preventing risks to their safety and health (Government of Kenya, 2010). In a salon environment, this may include the provision of gloves and masks when handling colorants and chemicals, face shields, closed shoes, plastic gowns to protect employees and capes to protect the client (Hudgson, 2019, Ferreira, 2016). Any equipment used should be of an appropriate fit, be well maintained and stored correctly. All employees should be trained on how to use of equipment (WHO 2012).

2.6 Ergonomic risks factors among hairdressers

Hairdressers are exposed to various biomechanical risk factors. They are among the above average prevalence for back pains. Female hairdressers belong to the top six high risk

occupations for back pains (Kozak, 2019). Musculoskeletal disorders are highly prevalent in manual- intensive occupation such as hairdressing. They are one of the severe occupational health issue among the workforces worldwide (Mishra, 2019). Hairdressers' work ability and health condition may be affected by specific work-related activities. The most hazardous factors for health among hairdressers are repetitive movements, awkward postures and prolonged standing (Mishra, 2019, Kozak, 2019). These factors reduce the overall productivity of the workers and decreased quality of work as well. Studies have reported that inappropriate space and associated tools force hairdressers to adopt awkward posture for more extended periods which lead to work-related MSDs (Titilayo 2019, Tolera, 2018).

2.6.1. Repetition and manual handling

Repetition is observed during all client-related activities (Kozak, 2019, Mishra 2019). Frequently repeated and prolonged motions are a risk factor for fatigue, muscle strain, accumulation and trauma to the joints and surrounding tissues among hairdressers (Paunovic, 2013). Movement is essential for them to keep their muscles from stiffening. Alternating tasks is able to help them break repetition (Ferreira, 2019, Kozak 2019).

2.6.2 Awkward Posture

Hairdressers often have arms and shoulders raised when cutting, perm winding, and setting (Kozak, 2019). This causes their arms to be outstretched and the trunk to be bent forward causing undesirable stress to the spine. This awkward posture often leads to hairdressers becoming round shouldered and in old age can lead to a hunched back (Verhamme, 2015).

2.6.3 Prolonged standing

Many hairdressers are required to stand for long periods of time without being able to walk or sit down. Several studies have shown that hairdressers work for more than 8 hours a day; duration of standing is between 82% and 99% of total work time (Waters and Dick, 2016). The major health risks identified are chronic venous insufficiency, musculoskeletal pain of the lower back and feet, neck and shoulder pains (Kozak, 2019).

2.7 Hairdressers' tasks

Hairdressers' activities are extensive and range from cutting hair to performing scalp treatments. Their typical services include cleaning, bleaching, coloring, waving, shampooing, blow drying, cutting, styling and treatments. Most of these tasks are done while standing hence causing strain to the back, neck, shoulder and leg muscles of hairdressers (Senthong and Wittayasilp, 2019, Hakim and Hamid, 2019). Hairdressers anticipate the needs of their customers, prepare for styling by analyzing the hair conditions of their clients and recommending appropriate hairstyles (EU-OSHA, 2014). The daily task analysis showed that hairdressers spend an average of 29% cutting, 17% dying, 10%, blow-drying and 8% washing hair. These activities require constant twisting of the back, static postures and prolonged standing periods. Repetition is also observed in all these client-related tasks (Kozak, 2019).

Hair dying and treatment expose hairdressers to numerous different skin and respiratory-damaging factors due to the chemicals in the care products (Nassaji, 2016). Some chemical exposures can lead to dermatitis and respiratory problems. The use of persulfates during hair bleaching has been linked with increased risk of asthma, laryngitis, dermatitis and

rhinitis. (Senthong and Wittayasilp, 2019). Studies have shown that 70% of hairdressers suffer from work-related skin disorders at some point during their career. The cost of work-related skin diseases has been estimated to be about 5 billion euros a year in Europe alone (Abia, 2015, EU-OSHA, 2014).

In addition, work-related asthma is frequent among hairdressers due to exposure to fixatives, detergents, conditioners, dyes and bleaches (Haibati and Jaakkola, 2018). When the hairdressers mix the substances that are used that are used in dyeing or bleaching, some chemicals are released into the air and are inhaled by the hairdressers, causing respiratory symptoms. Some studies revealed that there is twice as high prevalence of asthma (14.6%) among hairdressers compared to the general population (Abia, 2015, Haibati and Jaakkola, 2018).

Hairdressers are exposed to several biomechanical hazards in all their tasks. The tasks are carried out with arms above shoulder level, repetitive movements, forceful exertion of upper extremities, awkward back postures and movements, high mechanical workload and prolonged standing (Mishra 2019, Abia 2015). Working with elevated arms above shoulders cause risk of shoulder disorders while high force exertion with prolonged exposure cause severe hand and wrist pain. Compared to other occupational groups, hairdressers complain significantly more frequently about MSDs in different body parts (Kozak, 2019). Besides, the 2016 Global Burden of Disease survey reported that MSDs are leading cause of disability-adjusted life years with 61.1% of years lived with disability (Mekonnen, 2019).

2.8 Related studies

The Global burden of disease data shows that back pains account for the highest proportion (4.7%) of years lost to disability of all conditions, with neck pains and other MSDs all in the top ranking (Bevan, 2015). A recent study done in India, showed that the limited workspace of hairdressers played a significant role in the poor working posture adopted by hairdressers (Mishra, 2019). A recent analysis of the European Working Conditions Survey (Wetzels *et. al*, 2014) indicates that hairdressers are more likely to report exposure to vibrations, breathing in dangerous vapors, being in skin contact with chemicals, work in tiring positions and carry out repetitive movements compared to workers in other sectors.

The results from a study carried out in Thailand to determine the working conditions and health risks in hair salons revealed that all hairdressers were working for more than 8 hours per day with chemicals and those hair salons were small with poor ventilation. Hairdressers complained about skin irritation and bad odors during the preparation and application of hair care products. Most salons had temperatures of 34 degrees Celsius and mean illumination of less than 300 Lux which is below the recommended standard of 500Lux. The noise levels were below 85dBA (Senthong and Wittayasilp, 2019).

In a study that assessed the awareness of occupational health hazards among hairdressers in Cameroon, showed that the knowledge and awareness was inadequate (Abia, 2015). Titilayo (2019) in a recent study in Nigeria reported that 90% of hairdressers know that wearing of aprons, gloves and nose covering during work protect them from harmful chemicals but do not have training on the use of personal protective equipment.

Musculoskeletal disorders (MSDs) are one of the most common causes of occupational injuries and disability in both industrialized and developing countries. They have a 48% part of all work-related diseases. This is according to studies done in Iran (Khandan, 2015). Middlesworth (2015), showed that 60% and more than 45% of hairdressers suffer from respiratory and skin problems respectively due to lack of adequate ventilation. According to Niu (2014), 30 % of the sick leaves taken by the hairdressers are related to musculoskeletal and respiratory complaints. A study in Taiwan done to investigate the risk factors for WMSDs among hairdressers by identifying the body regions associated with significant discomfort shows that 33.4% report a mild-to-moderate level of shoulder discomfort, followed by neck (25%) and lower back (25%) (Fang, 2014, Verhamme, 2015).

A higher prevalence of 75.6 % WMSDs has been observed among hairdressers in Nigeria (Bakker, 2015). The recommendations made about hairdressing sector in the past include performing a wide reaching awareness campaign for hairdressers to improve their working conditions and development of legislative regulations in the sector (Verhamme, -2015). Nevertheless, the industry is still affected by a myriad of work- related ergonomic risks.

In a survey done by Hakim and Hamid (2019) in Egypt, the results reported that 68% of hairdressers did not know that their work exposures have effect on their health. The study also revealed that prolonged standing, repetitive tasks and use of vibrating objects and awkward postures were the factors causing MSD among the hairdressers

2.9 Summary of review and study gaps

Most of the studies have not addressed conclusively the aspect of occupational health and safety risks among hairdressers and recall bias in their research work. Most of the work

that was reviewed on health and safety of hairdressers was done in developed world and has based their studies on practical scenarios in their respective countries. This is however against the rationale of a background of high exposures to occupational hazards in the developing countries. The studies have also inclined majorly to areas such as musculoskeletal disorders, dermatitis and respiratory complaints. Ergonomic risks factors have been extensively looked into in developing countries leaving out other factors that significantly affect the health of hairdressers.

Some of the studies ought to have been conducted in some of the third world countries where there are confounding factors in order to draw comprehensive findings and conclusions. These factors could include awareness on health and safety risks and lack of enforcement of legislation. The studies have failed to convincingly address the physical and organizational environment of hairdressing salons which are factors contributing to the health and safety of hairdressers; these areas are evaluated by this study.

The literature review hardly revealed any studies on the work-related health and safety risks in Nairobi City County and there are scarce related studies nationally. With Kenya's labour ministry still facing challenges to meet the expectations of the workforce in the small and micro enterprises, further studies need to be conducted to address the working conditions of hairdressing sector. Studies need to be done to establish the work-related health and safety risks among the hairdressers.

CHAPTER THREE

METHODOLOGY

3.1 Introduction

This chapter describes the research design used in the study, the study area, study population, inclusion and exclusion criteria. It also describes the sampling methods used, sample size determination formula and the instruments of data collection. Methods used in data analysis and presentation are also described.

3.2 Study Design

The research took a descriptive cross-sectional design and analytical. Descriptive cross-sectional studies provide data for describing the status of phenomena at a fixed point in time. This can be thought of as a snapshot of the frequency and characteristics of a condition in a population at a particular point in time. The participants in a cross-sectional study are recruited based on the inclusion and exclusion criteria set for the study (Aggarwal and Ranganathan, 2019). Cross-sectional studies are often used to measure the prevalence of health outcomes, understand determinants of health and describe features of a population. They are useful for establishing preliminary evidence in planning a future advanced study (Wang, 2019). Descriptive research design helps the researcher to clearly identify and describe true characteristics of a research problem without manipulation of research variables (Mugenda, 2008).

3.3 Variables

The independent variables in the study included the physical and organizational designs of a salon, ergonomic risks perceived to be related with hairdressing and the hairdressers

tasks. Socio-demographic factors also formed the independent variables. The health and safety outcome of hairdressers was the dependent variable.

3.4 Study Area

This study was conducted in Roysambu Sub-County in Nairobi County, Kenya. It covers an area of 48.80Km². Geographically, it is 1°13'06.1''S (-1.21837S) and 36°53'12.6''E (36.8868E). Administratively, it is divided into five wards (Kahawa west, Githurai, Kahawa, Zimmerman and Roysambu). The study included all the wards in the Sub-County.

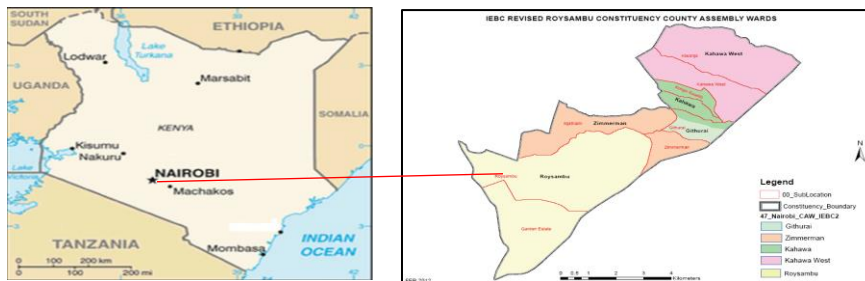


Figure 2. Location of study, Roysambu Sub-County in Nairobi County, Kenya.

3.5 Study Population

The participants consisted of hairdressers working in various salons in Roysambu Sub-County. The hairdressers included both self-employed and that employed. According to the information collected from the Ward Licensing Offices, the study area had approximately 300 hairdressing salons. On average, there were 2-3 hairdressers working in a particular salon. Therefore, 900 hairdressers were targeted. The subjects consisted of both male and female hairdressers.

3.6 Sampling Techniques

The study area was selected purposively since it is one of the low-income residential areas in Nairobi with higher concentration of salons that serve both low-and middle-income clients (County Licencing Offices). All the five wards in Roysambu were selected for study. Each ward was proportionately allocated the sample size according to the population of salons using systematic random sampling. A systematic random interval was established by dividing the population size by the desired sample size; that is,

$$\text{Sampling interval (K)} = \frac{\text{Population size (N)}}{\text{Desired sample size (n)}}$$

For the participants;

$$K = \frac{900}{300} = 3$$

Hairdressers in sampled salons were; therefore, listed and systematic random sampling was done.

3.7 Sample Size Determination

The study area has an estimate of 900 hairdressers (Ward Licensing Offices). Therefore, the sample size was calculated using the Fisher's formula (Fisher *et.al* 2002). The formula is: $n = (Z^2pq)/d^2$ where:

n is the desired sample size,

Z is the standard normal deviate, usually set at 1.96 which corresponds to the 95% confidence level,

P is the proportion in the target population estimated to have a particular characteristic (0.5),

q = 1- p = 0.5 and

d is the degree of accuracy desired, usually set at the 0.05 level.

$$n = (1.96 * 1.96 * 0.5 * 0.5) / (0.05)^2$$

$$= 384.$$

Number of salons was obtained from the Ward Licensing Offices in Roysambu Sub-County. An estimate of 300 registered salons was provided. In each hairdressing salon, there was an average of 2-3. Therefore, the population of hairdressers is estimated at 900. According to Mugenda and Mugenda (2003) when the population is less than 10,000, the following formula applies:

$$nf = n / (1 + n/N)$$

Where **nf** is the desired sample size when population is less than 10,000,

N is the estimated sample size

n is the estimated sample when the estimated total population (**N**) is greater or equal to 10,000.

$$n = 384,$$

N = 900 (estimated total population, according to Ward Licencing Offices).

Therefore;

$$nf = \frac{384}{1 + 384/900} = 270$$

10% of the calculated desired sample size was added to cover for non-response. This adjusted the sample size to 297 which was then rounded off to 300. Therefore, 300 hairdressers formed the study population.

Table 1: Systematic random sampling of salons

Ward Name	Number of salons	Sampled salons
Roysambu	60	12
Zimmerman	125	25
Kahawa west	60	12
Githurai	75	15
Kahawa(Wendani)	45	9
	365	73

Table 2: Systematic random sampling of respondents

Ward Name	Number of hairdressers	Sampled hairdressers
Roysambu	166	55
Zimmerman	300	105
Kahawa west	156	52
Githurai	192	64
Kahawa(Wendani)	72	24
	886	300

3.8. Recruitment criteria.

3.8.1 Inclusion Criteria

The study involved all the hairdressers, both male and female hairdressers who were working in hair salon, who have had at least one-year experience, working as full time or part time workers were engaged in hair dressing activity.

3.8.2 Exclusion criteria

Those hairdressers who did not consent to participate in the study were excluded from the study. Those who were not working in the selected area of study were also excluded.

3.8.3 Confounding factors

Both male and female participants were included in the study. Participants with different education levels including those with no formal education were recruited. Expectant participants were not included in the study. All the measurements were taken at the same time of the day.

3.9 Pre-testing

A pretest was done in Kasarani sub-county, Mwiki Ward, before the actual study. This helped determine the effectiveness of the data collection instruments and feasibility of the study. Thirty respondents were targeted. This formed the 10% of the total study population.

3.9.1 Validity

This is the test of the degree of accuracy. It is the extent to which a measure actually represents what is intended to measure. It was ensured through accuracy of data collection tools and triangulation.

3.9.2 Reliability

This is the consistency or repeatability of measurements. This was ensured through consistency of the questions, selection of samples, collection of data, data cleaning and use of standard validated tools like the WISHA caution checklist.

3.10 Data collection instruments

The data was collected using open and closed ended questionnaires (Appendix II). Focus Group Discussions (Appendix V) and Key Informant Interviews (Appendix VI) were also. Observation checklist (Appendix III) was also used to monitor the activities of hairdressers. Tape measure was used to measure the size of salons. A digital thermometer (model Thermometer world) was used to get the temperatures in each salon while a digital light meter (model MrC Lx-103), and digital Sound level meter (model BAFX33T0) were used to measure the illumination and noise levels in salons. WISHA caution checklist (Appendix IV) was used in identifying the hazards and risks among hairdressers. All data collection techniques involved the principal researcher using the mentioned tools.

3.11 Data collection techniques

Data collection was conducted upon receiving approval from and a research permit from. The questionnaires were administered after obtaining participants' consent (Appendix I). As the participants were filling the questionnaires, the researcher observed for the presence of the First Aid kit, signage, Material Safety Data sheet, PPEs and anti-skid floors in the salons using an observation checklist. Upon completion of filling the questionnaires, the researcher determined the ergonomic risks using the WISHA checklist.

Two Focus Group Discussions were conducted in Zimmerman and Githurai wards to gather information regarding ergonomic risks among hairdressers. There were 6 participants from Zimmerman ward and 7 participants from Githurai ward. Key informant interviews were conducted to collect information in regard to job tasks, salon's physical designs and ergonomic risks among hairdressers. There were 15 hairdressing trainers

drawn from 5 beauty training institution in Roysambu Sub-county: Jewel Professional College, St. Kizito School for hairdressing, Musoni Beauty College, E-motion hair and Beauty College and Gorgeous Beauty College. The researcher employed the WISHA Caution checklist to establish the possible ergonomic risks among the hairdressers. As the participants carried out their tasks, potential caution zones; awkward job posture, repetitive motions, arm vibration and manual handling of equipment were evaluated and the results recorded in the checklist.

A tape measure was used to determine the space of a salon. The length and width of a salon floor were measured in meters. The values were recorded in meters square and were compared to the National Hair and Beauty Federation (NHBF) space requirements for all salons depending on the number of stylists (table below). The federation recommends that each hairdressing salon should be 150M² in size and on average, 120M²; where there are 3 hairdressers, salon should have working space of 42-56 M² (NHBF,2018).

Table 3: Space dimensions for hairdressing salons

Number of stylists	Square feet
3	450-600
4	600-800
5	750-1000
6	900-1200
7	1050-1400
8	1200-1600

Noise level measurements were carried out in each sampled salon using a digital sound level meter (model BAFX33T0) with measuring range 30dBA to 130dBA. The sound level

meter was held 2 meters from hairdresser's workstation. Measurements were taken 3 times a day in each salon at intervals of 3 hours; 11.00am, 2.00pm and at 5.00pm. The minimum value for each individual salon was arrived at by calculating an average of the three measurements. Comparison of recorded values with the WHO and NIOSH recommended noise levels standards ($\leq 85\text{dBA}$) for all workplaces (WHO, 2012, NIOSH, 2018) was made.

Digital Lux meter (model MrC Lx-103) with a measuring range of 0 to 100000Lux was used to take the illumination measurements for the sampled salons. It was calibrated by Zero point calibration method before taking the measurements. The device was held at height of 2 meters from the salon floor. Measurements were carried out three times a day at intervals of 3 hours; 11.00am, 2.00pm and at 5.00pm. The minimum amount of light in each salon was calculated by taking an average of the three measurements. The values were recorded and compared with the Health and Safety Executive and WHO recommended Lux standards (500Lux) for hairdressing salons (WHO, 2012, Health and Safety Executive, 2019).

A thermometer (model Thermometer world) with a measuring range of -20°C to 50°C was used to measure temperatures in the sampled salons. Measurements were also taken 3 times a day at intervals of 3 hours; 11am, 2.00pm and at 5.00pm. The thermometer was held at a height 2 meters from the salon floor. An average of the recorded values in the 3 measurements was determined and recorded. It was then compared to the Health and Safety Executive and WHO recommended standards ($24\text{-}26^{\circ}\text{C}$) of temperature for hairdressing salons (WHO, 2012, Health and Safety Executive, 2019).

3.12 Data Management

3.12.1 Data storage

All the hard copy research materials were safely kept in lockable drawers. The soft copy questionnaires, observational checklist and WISHA checklists were securely kept in electronic storage devices. Both raw and analyzed data was stored in hard disks and electronic files. Protection from loss was done by backup in both internet and flash disks.

3.12.2 Data analysis

All the quantitative data collected were checked, cleaned, coded and tabulated in excel sheets. They were then transferred to Statistical Package for Social Sciences version 18.0 for analysis. Various statistical data analysis methods were employed; descriptive statistics, Chi-squares and logistic regression analysis. Results were then presented in tables, charts and graphs. Qualitative data were collected from the Focus Group Discussion and the Key Informant Interviews. The data were gathered, reviewed and explored. The data was coded and put into themes and thematically analyzed.

3.13 Ethical Considerations

In order to conduct the study, ethical approval (Appendix IX) was sought from Kenyatta University Ethics and Review Committee. Approval for proposal (Appendix VIII) was obtained from the Kenyatta University Graduate School. Research permit (Appendix X) was obtained from NACOSTI. The participants were informed of the confidentiality of the information they were giving. Consent was sought from them. Participation was voluntary. Participants were also free to opt out if they wished without any risk to themselves. There were no monetary rewards for participating in the study.

Since the study did not involve any invasive procedures, there was minimal risk of physical harm or pain to the participants. Results from this study were useful for policy on workplace safety and ergonomics of hairdressers, and may be presented in seminars or published in peer reviewed journals.

CHAPTER FOUR

RESULTS

4.1 Introduction

This chapter describes data presentation and findings. Data was collected using questionnaires, observation checklist and WISHA caution and hazard checklist. Data was entered into Excel sheet before transferring to SPSS for analysis. The researcher aimed at establishing the workplace physical designs, organizational designs, probable ergonomic risks and job tasks that would pose risks to hairdressers as they carried out their operations.

4.2 Participants response rate

Three hundred hairdressers (300) in Roysambu Sub-County were selected to participate in the study; 286 hairdressers responded (Fig 3). This means that the respondents were willing to participate and the threshold was met.

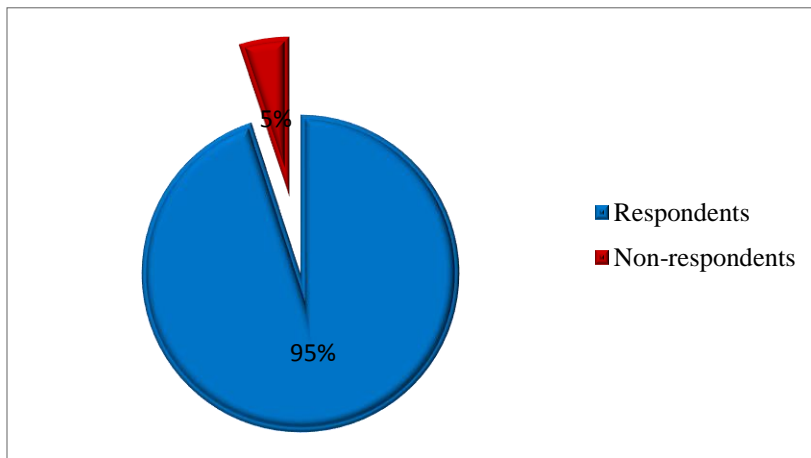


Figure 3: Response rate

From this study, 53(96.3%) participants sampled from Roysambu ward and 99 (94.3%) from Zimmerman ward participated in the study. There were 51(98.1%) respondents from Kahawa West ward, 62(96.8%) from Githurai ward and 21(87.5%) from Kahawa Wendani ward (Fig. 4).

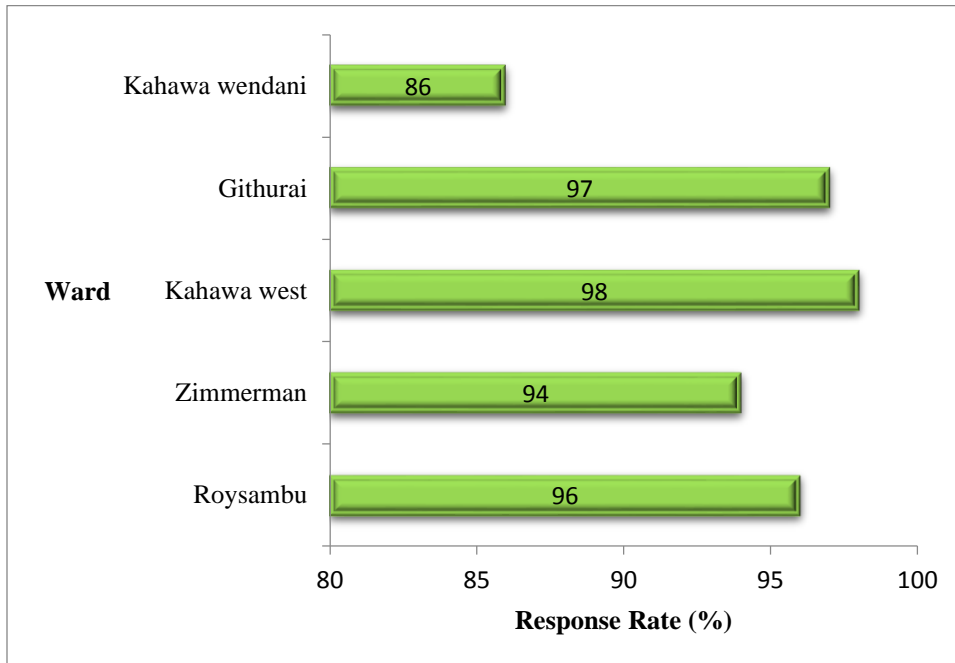


Figure 4: Participants response rate

4.3 Social and other demographics of the study population

Amongst the 286 respondents, there were 242(84.6%) females and 44(15.4%) males (Fig. 5). In this study, most salons had between 2 (n= 121, 44.8%) and 3 (n=110, 40.7%) hairdressers. Twenty one salons had 8(0.4%) hairdressers, 17 salons had 4 hairdressers and 8 salons had 5 hairdressers (Table 4). Majority of the hairdressers belonged to 24-28 year age group (n=133, 46.5 %). The second largest group consisted of workers of 29-33 year age group (25.9%) followed by those who had 19-23 year age group (17.1%). Thirty (n=30,

10.5%) hairdressers were more than 33 years of age. The mean age of sample population was 27 years (Table 4).

In this study, 141(49.3%) participants had attended secondary school, 125(43.7%) had attended tertiary institutions while 20(7.0%) hairdressers had primary level of education. No hairdresser was found to have not gone to school. (Table 4) Most hairdressers had basic educational level.

One hundred and fifteen(40.2%) hairdressers in Roysambu Sub-County had worked for less than five years, 102(35.7%) had 5-9 year experience range, 42(14.7%) had a 10-14 years' experience range while 27(9.4%) hairdressers had worked for between 15-19 years (Table 4).

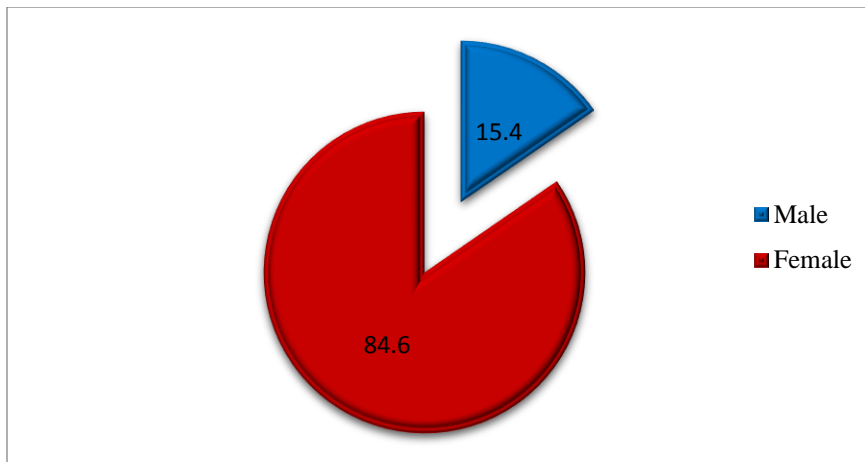


Figure 5: Gender

Table 4: Other demographic features of respondents

demographic features	Frequency	Percent %
Number of hairdressers		
1	21	7.3
2	123	43.0
3	115	40.2
4	19	6.6
5	8	2.8
Age		
19-23 years	49	17.1
24-28 years	133	46.5
29-33 years	74	25.9
>33 years	30	10.5
Educational level		
Primary	20	7.0
Secondary	141	49.3
Tertiary	125	43.7
Work experience		
<5 years	133	46.5
5-9 years	102	35.7
10-14 years	42	14.7
15-19 years	9	3.1

4.4 Physical designs of salons in the study

4.4.1 Space and other physical elements of a salon

A tape measure was used to determine the size of the salons. From the results, the average space in hairdressing salon is 7.22 M² (Table 5) below, which is lower than the recommended size; hence limited space.

Table 5 : Size of salon

	N	Range (m ²)	Minimum (m ²)	Maximum (m ²)	Mean (m ²)
Size	73	21.33	3.78	25.11	8.79
Valid N	73				

From the observation results 66 (90.6%) hairdressing salons did not have adjustable chairs, 59 (81.1%) salons had height adjustable hair dryers. Fifty two hairdressing salons (71.3%) did not have adjustable trolleys while 21(28.7%) had trolleys on positions where they could easily reach. Sixty one salons (83.2%) had a wash basin fixed on the wall which forced the hairdressers stand on the sides. Fifty nine salons (80.8%) agreed that their scissors fit to their fingers well and were comfortable to use them. Sixty nine (94.8%) had slippery tiles and did not have the anti-skid floor mats. Sixty eight (93.4%) salons did not have First Aid Kit in their workplace, while 4(6.6%) had it but had a few contents Seventy (95.5%) salons did not have material safety data sheet for the salon chemicals while 2(2.8%) had signage kept on shelves but were not displayed on the walls (Table 6)

Table 6 : Other physical elements of salons

Variable	Yes (%)	No (%)
Adjustable chairs	9.4	90.6
Adjustable dryer	81.1	18.9
Anti-skid floor	94.8	5.2
Comfortable scissors	80.8	19.2
Sufficiently high trolleys	28.7	71.3
Fixed washbasin	83.2	28.7
First Aid kit	6.6	93.4
Signage	2.8	97.2
Material Safety Data Sheet	4.5	95.5

4.4.2 Physical environments of salons in the study

From the results, 4(5.5%) salons had a range of between 401-500Lux, 15(20.5%) salons had illumination of 1-100Lux, 15(20.5%) salons had between 101-200Lux illumination, 19(26.0%) salons had illumination of 201-300Lux while 20(27.4%) salons had illumination range of 301-400Lux (Fig. 6).

The results showed that 2 (2.7%) salons had temperature range of 28-29 °C, 6(8.2%) had temperatures between 22-23 °C, 38(52.1%) had temperatures between 24-25 °C while 27(37.0%) salons had temperatures ranging from 26-27 °C (Fig. 7).

The results showed that 3(4.1%) salons had noise level of 31.0-40.9dBA, 8(11.0%) salons had 41.0-50.9dBA noise levels, 9(12.3%) salons had 71.0-80.9dBA noise levels, 13(17.8%) salons had 51.0-60.9dB level while 24 salons had 61.0-70.9dBA range of noise level (Fig. 8))

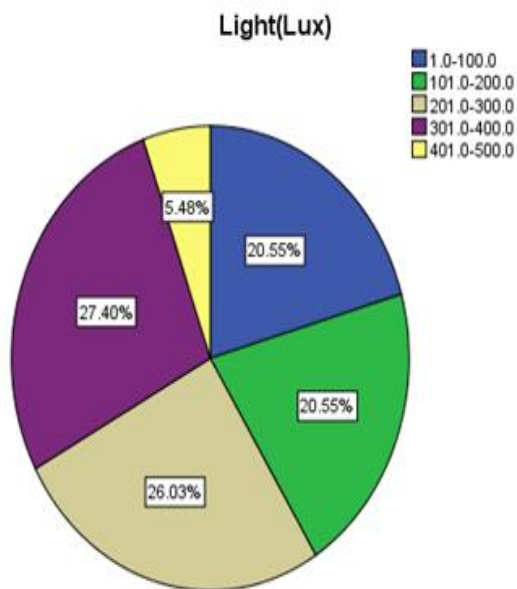


Figure 6: Illumination in salons

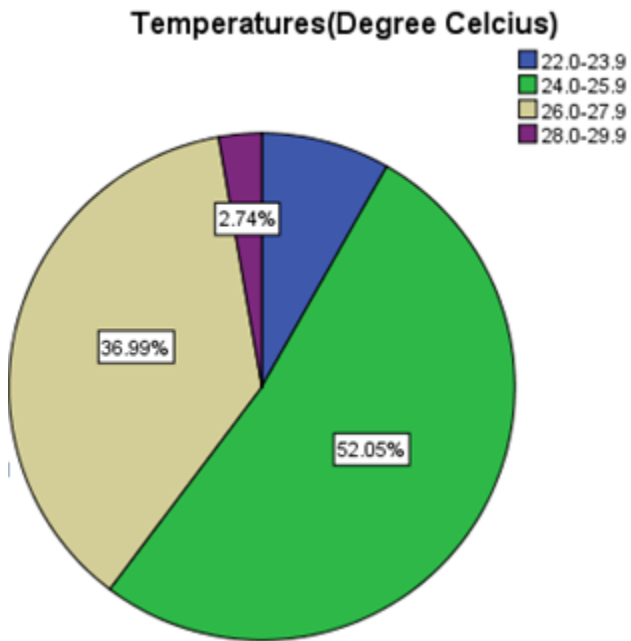


Figure 7: Temperatures in salons

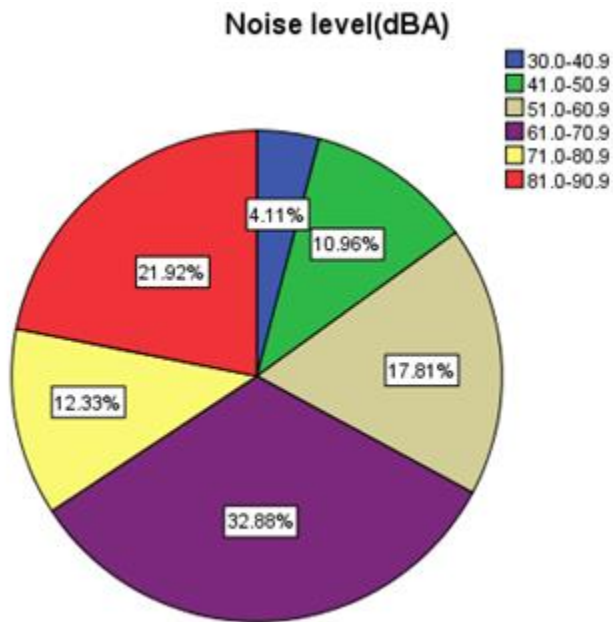


Figure 8: Noise levels in salons

4.5 Organizational designs of the study salons

From this study most of the hairdressers (n=196, 68.5%) worked for 11 to 12 hours a day, 52 (18.2%) worked for 8 to 10 hours a day, while 38 (13.3%) worked for more than 12 hours a day (Fig. 9). Two hundred and thirty (80.4%) hairdressers worked for 6 days a week while 56 (20.0%) worked for 7 days a week (Fig. 10).

One hundred and fifty one (52.8%) hairdressers had breaks while 135 (47.2%) did not have breaks. Seventy three (25.5%) hairdressers had a break-length of 21-30 minutes, 61 (21.3%) had a break-length of 10-20 minutes and 17 (5.9%) participants had a break-length of more than 30 minutes (Table 7)

The participants gave ranges of their earnings; 93 (32.5%) hairdressers earned between 2100-3000 Kenya shillings a week, 65 (22.7%) earned between 3100-4000 Kenya shillings a week, 59 (20.6%) earned less than 2100 Kenya shillings a week, 51 (17.8%) participants earned between 4100-5000 Kenya shillings a week while 18 (6.3%) hairdressers earned between 5100-6000 Kenya shillings a week. No participant was found to earn over 6000 Kenya shillings a week (Table 7).

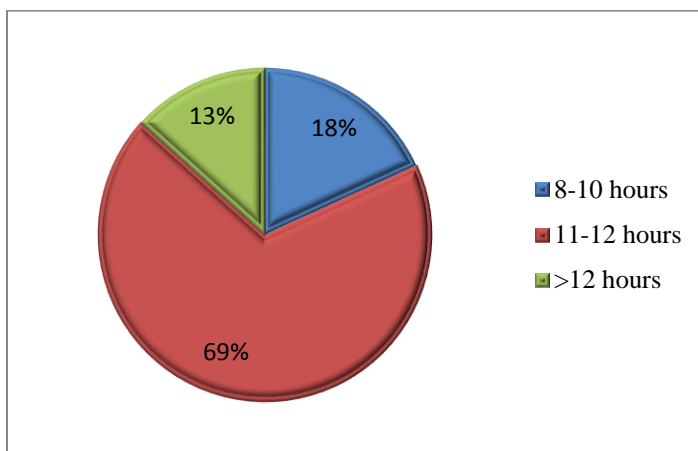


Figure 9: Hairdressers' working hours

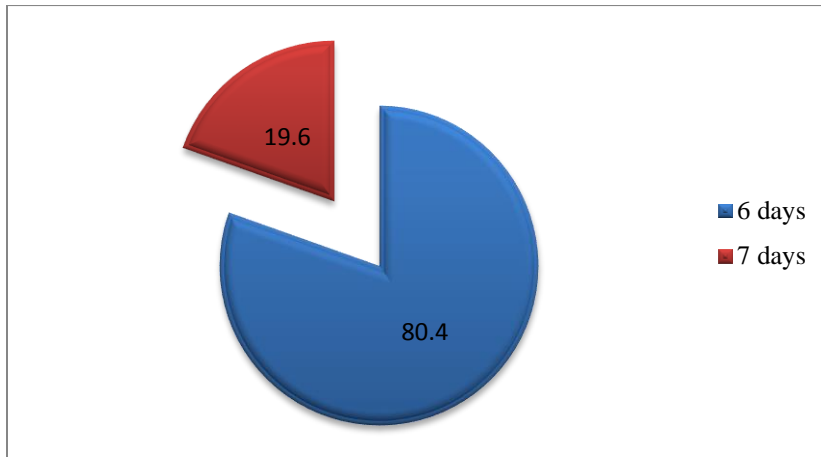


Figure 10: Hairdressers' number of working days

Table 7: Organizational design of salons

Variable	Frequency	Percent %
Break Length		
None	135	47.2
10-20 minutes	61	21.3
21-30 minutes	73	25.5
>30 minutes	17	5.9
Leave type		
Annual break	50	17.5
Maternity Leave	60	21.0
child and or family care	48	16.8
off day	68	23.8
Sick Off	60	21.0
Pay per week(kshs)		
<2100	59	20.6
2100-3000	93	32.5
3100-4000	65	22.7
4100-5000	51	17.8
5100-6000	18	6.3

4.5.1 Leave/Off type among study population

The results showed that in the last one year, 163 (57.0%) hairdressers had an off day, 61(21.3%) had maternity leave, 76(26.6%) got sick off, 53(18.5%) had annual break where they would close their businesses for December holidays while 66 (23.1%) had a day to care for their families (Fig. 11)

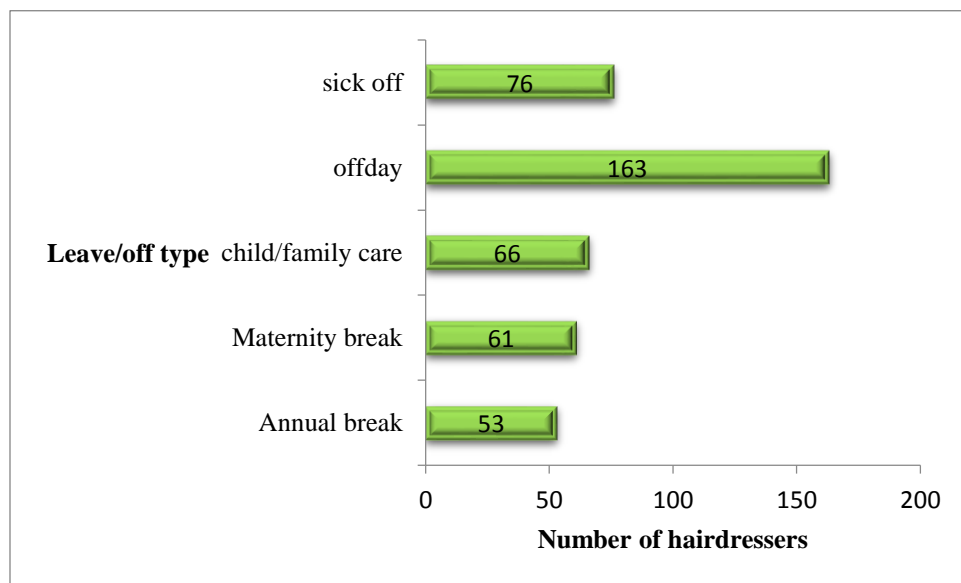


Figure 11: Leave/Off type

4.5.2 Knowledge and training of respondents on OHS

From the study, 58(20%) respondents reported that they knew about occupational health and safety in salons while 6(2%) had received training on the same (Fig. 12 and Fig. 13).

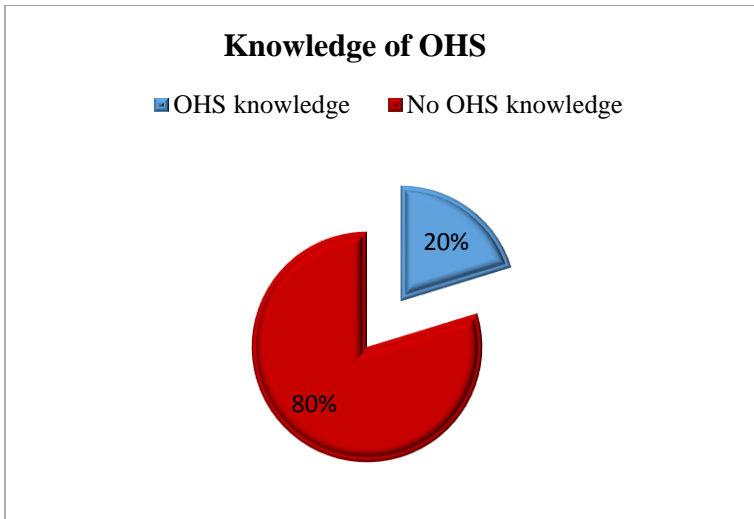


Figure 12: Hairdressers’ knowledge of Occupational Safety and Health

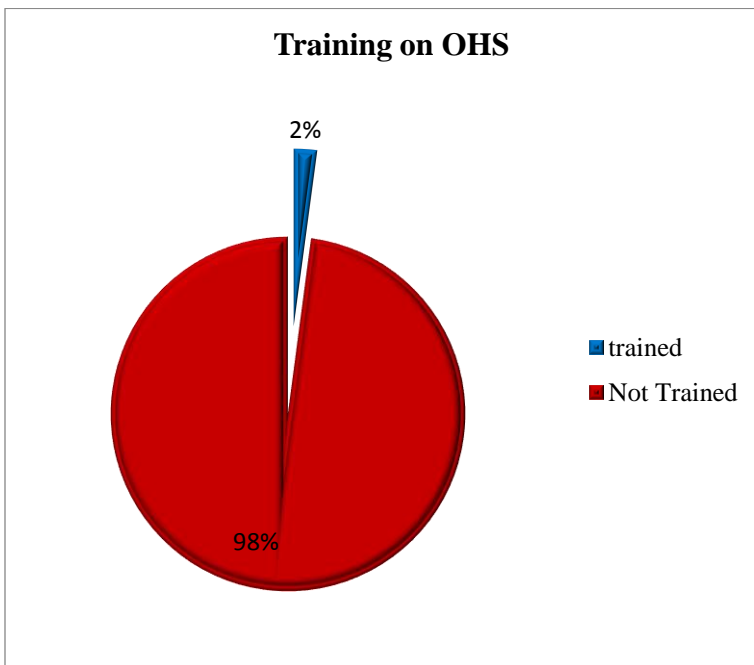


Figure 13: Hairdressers’ training on Occupational Safety and Health

4.5.3 Personal protective equipment

In this study, they used particular PPE depending on the task they carried out; all the participants (100%) reported that they used PPE at their workplaces. Among them, 140(49.0%) used aprons, 108(37.8%) used gloves, 104(36.4%) used facemasks, 45(15.7%) used flat-closed shoe (Fig. 14).

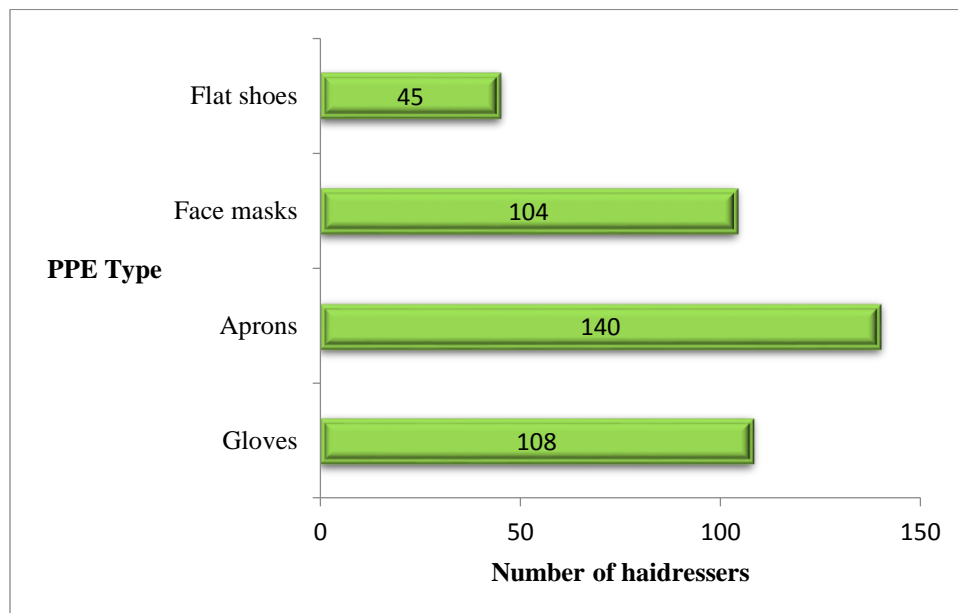


Figure 14: PPE Type used by hairdressers

4.5.4 Psychosocial risk factor among study population

Among the respondents, 71(24.8%) reported that poor communication was a factor to psychosocial risks, 97(33.9%) reported conflicts as risk factor, 98(34.3%) reported adverse social behavior (gossip) in their enterprises as a risk factor. Still 30 (10.5%) respondents reported that lack of social support contributed to psychosocial issues while 40(14.0%) reported that poor relationship with employer would result in psychosocial problems (Fig. 15).

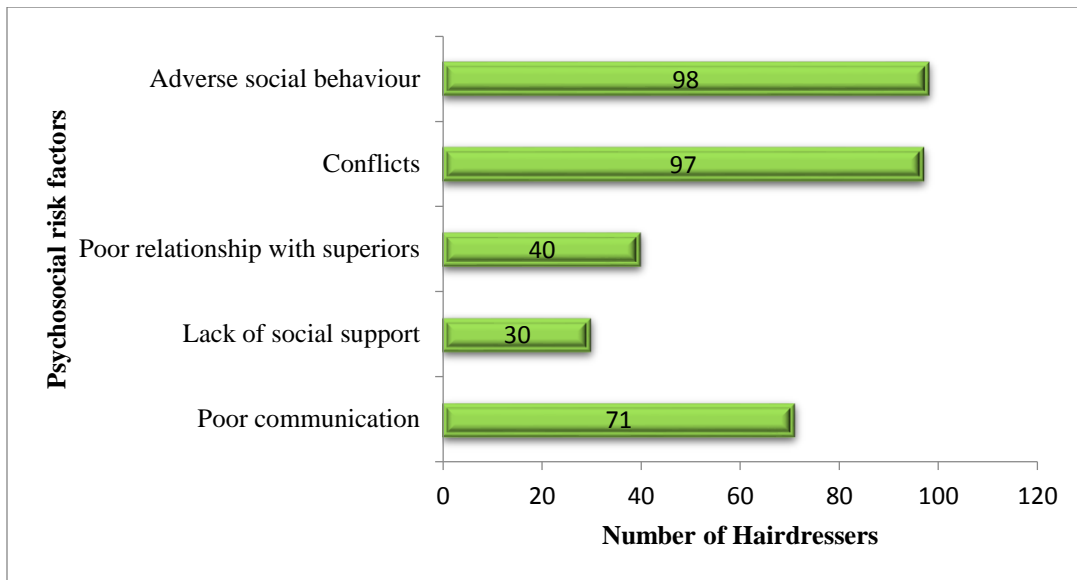


Figure 15: Psychosocial risk factors among hairdressers

4.5.5 Psychological risk factors among study population

Among the respondents, 234(40.5%) complained of long working hours; they would work longer than 10 hours a day, 97(16.8%) respondents reported conflicts in their workplaces as psychological risk factor, 217(37.5%) reported that low wages contributed to psychological problems, 30(5.2%) reported that insufficient skills or job was a risk factor (Fig. 16).

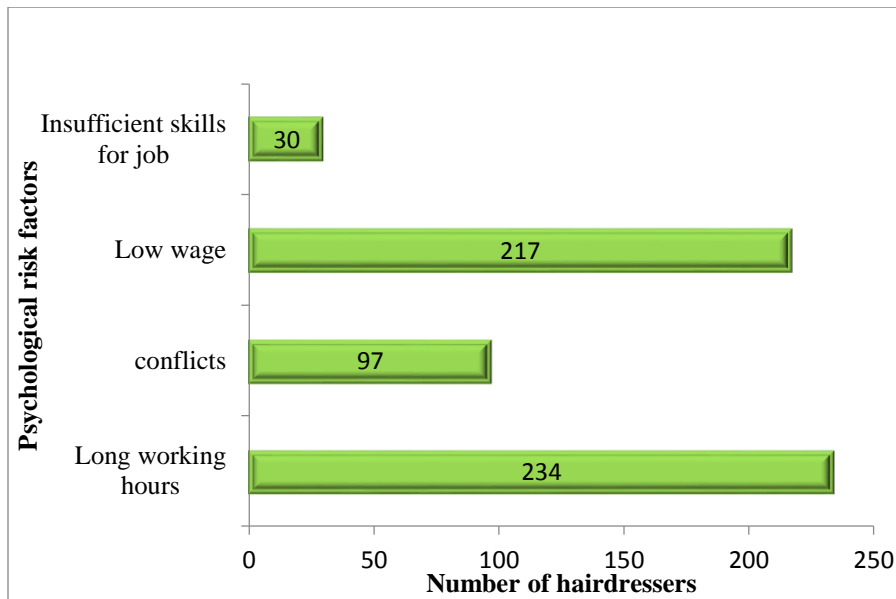


Figure 16: Psychological risk factors

The results of regression analysis showed that hairdressers' hours of work were uniquely significant to the model, (**OR**=0.115, 95% **CI**: 0.024 to 0.543). The logistic regression model was statistically significant, $\chi^2(5) = 20.261$, $p < 0.05$. The model explained between 6.8% (Cox & Snell R-square) and 10.5% (Nagelkerke R^2) of the variance in whether the participants were safe and healthy and correctly classified 78.3% of cases (Table 8).

Table 8: Organizational factors as predictors for health and safety of hairdressers
Variables in the Equation

	B	S.E.	Wald	df	Sig.	Exp(B)	95% C.I. for EXP(B)	
							Lower	Upper
Step 1a Know_OHS(1)	-.569	.437	1.698	1	.193	.566	.240	1.332
Training(1)	-.377	.427	.780	1	.377	.686	.297	1.584
Hoursofwork			8.088	2	.018			
Hoursofwork(1)	-2.165	.793	7.454	1	.006	.115	.024	.543
Hoursofwork(2)	-1.582	.753	4.421	1	.036	.206	.047	.898
Breaks(1)	.184	.300	.377	1	.539	1.202	.668	2.164
Constant	3.255	.762	18.238	1	.000	25.919		

4.6 Ergonomic risk factors associated with the study population.

Regarding the ergonomic risk factors, the major theme of the interviews was major ergonomic risk factors among hairdressers. The Focus Group Discussion results revealed that prolonged standing and awkward positions taken while working were the major factors causing muscular pains (Table 9). *“The problem with our job is that it is better done in standing than sitting position...by the time we close our day’s work we are fatigued”* Participants. *“I stand for more than three hours to serve one customer especially when doing raster hair style. I even take much time with children because they keep turning, their attention gets diverted easily. Some customers have light hair that makes styling hard”* Participants

Table 9: Ergonomic risk factors among respondents

Group of participants	Prolonged standing (mean percentage of interview data)	Awkward positions (mean percentage of interview data)
Githurai participants(n=7)	85.71%	71.42%
Zimmerman participants(n=6)	66.66%	50.00%

In this study, 243(85.0%) respondents were observed doing the plaiting, shampooing, and styling, processes that took more than two hours on twisted positions, while 43(15.0%) did not show positive sign for caution (Table 10).

Among the respondents 257(89.9%) had repetitive motion of the hand, shoulders and fingers for more than two hours a day, as they carried out their tasks. Two hundred and fifty two (88.1%) respondents showed a positive sign for ergonomic risk where were observed putting force on their hands especially the wrists area (Table 10).

One hundred and forty nine (52.1%) participants had frequent lifting for more than two hours total a day while 137(47.9%) did not have frequent lifting of equipment and materials (Table 12). One hundred and sixty (55.9%) respondents used vibrating dryers for more than 2 hours a day (Table 10).

Table 10: Observations for ergonomic risk factors

Ergonomic risks	Positive result (%)	Negative result (%)
Carrying out hairdressing tasks in awkward positions	85.0	15.0
Removing, using of blow dryers and returning when serving clients	88.1	11.9
Repetitively moving and twisting fingers while plaiting	89.9	10.1
Frequently lifting hair dryers when serving customers	52.1	47.9
Using vibrating blow dryer	55.9	44.1

4.6.1 Severity of musculoskeletal disorders among study population

From the results, 68(23.8%) reported that they have had severe back pains in the last six months, 180(62.9%) said that they had moderate back pains in the last six months while 38(13.3%) had mild back pains in the last six months (Table 11).

The study showed that participants had neck pains in the last six months; 28(9.8) have had severe neck pains, 168(58.7%) had moderate neck pains while 48(16.8%) had mild neck pains in the last six months (Table 11).

Among the respondents, 150(52.4%) reported that they have had moderate pains in their hands, 57(19.9%) had mild hand pains and 79(27.6%) did not have pain in the last six months (Table 11).

One hundred and forty three (50.0%) had felt pain in the ankles of their legs in the last six months, 75(26.2%) had mild pain in their legs while (24.8%) did not have pains in their legs in the last six months of their work (Table 11).

Table 11: Severity of perceived musculoskeletal complaints

Severity of musculoskeletal complaints				
Complaint	None	Mild	Moderate	Severe
Back pains	0	13.3	62.9	2.8
Neck pains	14.7	16.8	58.7	9.8
Hand &Wrist pains	27.6	19.9	52.4	0
Sore feet/ Leg pains	23.8	26.2	50	0

4.6.2 Relationship between musculoskeletal complaints and work experience

Most of the complaints showed statistically significant association with the work experience; back pains($\chi^2(6)=24.870$, $p<0.005$), neck pains ($\chi^2(9)=26.096$, $p<0.005$), hand and wrist pains ($\chi^2(9)=25.777$, $p<0.005$). Sore feet and leg pains did not show statistically significant association with the work experience ($\chi^2(6) =4.360$, $p>0.005$) (Table 12).

Table 12: Musculoskeletal complaints and work experience

Complaint	Response	Work Experience				<i>df</i>	χ^2	<i>p</i>
		<5 years	5-9 years	10-14 years	15-19 years			
Back pains	Severe	14(20.6)	28(41.2)	17(25.0)	9(13.2)	6	24.870	0.002
	Moderate	86(47.8)	65(36.1)	16(8.9)	13(7.2)			
	Mild	15(39.5)	9(23.7)	9(23.7)	5(13.2)			
Neck pains	Severe	7(25.0)	9(32.1)	7(25.0)	5(17.9)	9	26.096	0.023
	Moderate	85(50.6)	57(33.9)	15(8.9)	11(6.5)			
	Mild	14(29.2)	19(39.6)	10(20.8)	5(10.4)			
Hand & wrist pains	None	9(29.2)	17(40.5)	10(23.8)	6(14.3)	6	25.777	0.010
	Moderate	55(36.7)	68(45.3)	16(10.7)	11(7.3)			
	Mild	28(49.1)	17(29.8)	4(7.0)	8(14.0)			
Sore feet or leg pains	None	32(40.5)	17(21.5)	22(27.8)	8(10.1)	6	4.36	0.628
	Moderate	61(42.7)	46(32.2)	22(15.4)	14(9.8)			
	Mild	27(36.0)	28(37.3)	14(18.7)	6(8.0)			
	None	27(9.7)	28(41.2)	6(18.8)	7(10.3)			

The results showed that awkward postures and manual handling were significant to the model, awkward postures (OR=2.728, 95% CI: 1.276 to 5.834) and manual handling (OR=2.706, 95% CI: 1.145 to 6.395). The logistic regression model was statistically significant, $\chi^2(5) = 13.868$, $p < 0.05$. The model explained between 4.7% (Cox & Snell R-square) and 7.3% (Nagelkerke R-square) of variance in whether the participants were safe and healthy the harm experience and correctly classified 80.0% of cases (Table 13).

Table 13: Controlling for the ergonomic risk factors**Variables in the Equation**

		B	S.E.	Wald	df	Sig.	Exp(B)	95% C.I. for EXP(B)	
								Lower	Upper
Step 1a	Standing in awkward postures(1)	1.004	.388	6.697	1	.010	2.728	1.276	5.834
	Manual handling(1)	.996	.439	5.148	1	.023	2.706	1.145	6.395
	Using vibrating objects(1)	.098	.311	.098	1	.754	1.102	.599	2.030
	Repeating actions(1)	-.866	.560	2.390	1	.122	.421	.140	1.261
	Frequent lifting(1)	-.295	.304	.937	1	.333	.745	.410	1.353
	Constant	.495	.547	.820	1	.365	1.641		

4.6.3 Managing work-related musculoskeletal complaints by the study population

Work-related health problems among salon workers can be managed through either massaging, medication, taking rest or doing exercises. These helps relieve pain and one can continue with work. Among the participants in this study, 194(67.8%) respondents would massage the areas where they felt pain, 77(26.9%) managed their health problem by taking over the counter painkillers, 63(22.0%) took rests whenever they had health problems while 36(12.6%) did exercises to relieve the pain (Fig. 17).

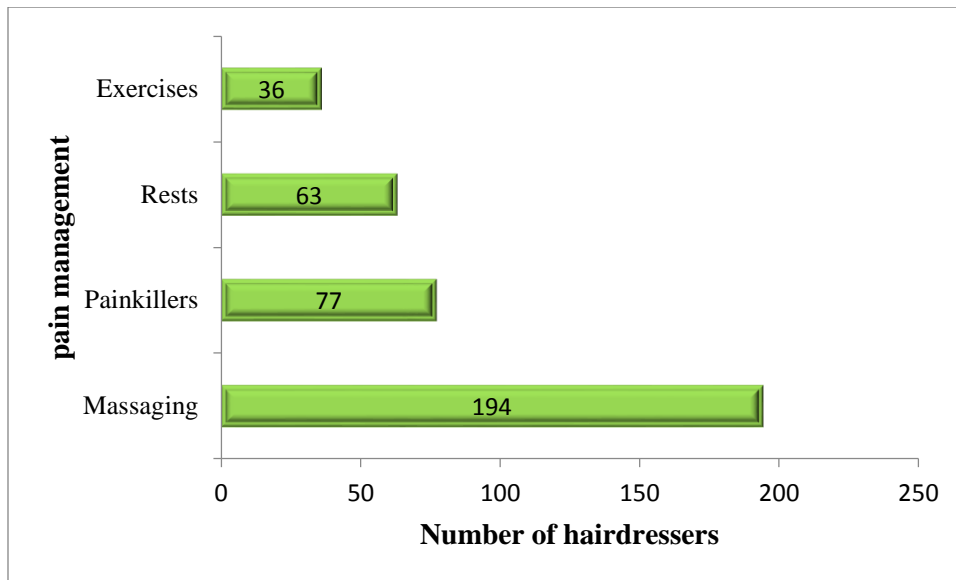


Figure 17: Managing Musculoskeletal Complaints

4.7 Job tasks perceived to be harmful to the study population

In this study, 174(60.8%) participants did shampooing, 69(24.1%) hairdressing did cutting, 109(38.1%) did styling, 145(50.7%) did blow drying, 210(73.7%) treatment and hair coloring (Fig. 18).

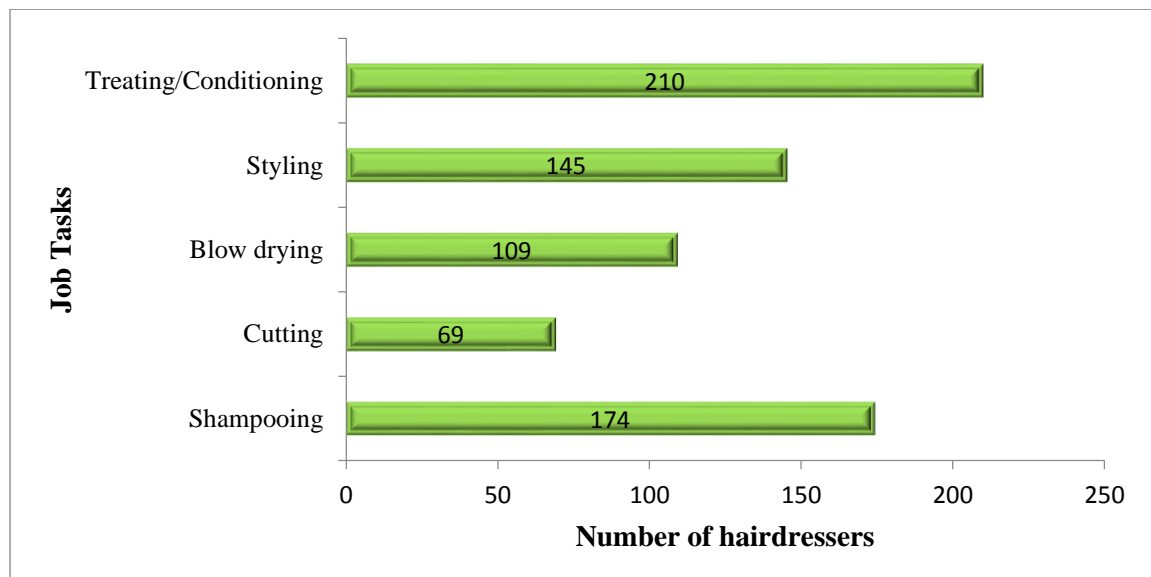


Figure 18: Hairdressing Job Tasks

Regarding the hairdressers tasks, the main theme of the interviews was the contributions of hairdressing tasks on musculoskeletal complaints. The results revealed that all hairdressing tasks were carried out repetitively in standing position (table). *“Their work is majorly standing; they cannot do much while sitting. Also, shampooing areas are fixed on the walls because it is cheaper that way; therefore, they have to stretch our backs and necks in order to serve the client well. Their shoulders are also folded, they feel pain but they have to do their work”* participants. *“They are frequently exposed to static physical stress and chemicals in this occupation. We touch and inhale chemicals”* Participants.

The Key Informant Interview results also revealed that hairdressing tasks take much time and therefore hairdressers have limited breaks to rest (Table 14). *‘What is most important is break. Hairdressers do not normally have breaks. It is not the number of clients but the type of task and the timing involved that keep them from having a break. Some hairstyles are very engaging, keeping in mind the clients’ needs; they want excellent service and so they take a lot of time dealing with one customer’* Participants.

Table 14: Hairdressers tasks and musculoskeletal complaints

Hairdressing operations	Zimmerman (n=3)	Roysambu (n=3)	Githurai 44 (n=3)	Kahawa west (n=3)	Kahawa wendani(n=3)
Done in standing positions	3	3	3	3	3
Done repetitively	3	3	3	2	3
With no breaks	2	3	2	2	2

4.7.1 Chemical exposures among the study population

To establish the chemical exposures and the use of PPEs hairdressers were asked whether they have had respiratory ailments and skin problems in the last six months. Among the respondents, 16(5.6%) reported that they have had severe respiratory problems especially chest pains and congestion, 106(37.1%) reported that they had moderate respiratory problems, 94(32.9%) had mild respiratory problems while 70(24.5%) did not have respiratory ailments in the last six months (Table 15).

Dermatological problems are common among hairdressers; 50(17.5%) hairdressers said that they had had exposure to chemicals which led to severe skin problem, 112(39.2%) reported that they had moderate dermatological problems, 66(23.1%) had mild skin infections while 58(20.3%) hairdressers said that they did not have exposure to chemicals in the last six months, hence did not have skin problems. Exposure was due to hairdressers not using gloves or using damaged gloves (Table 14).

Table 15: Chemical exposures among hairdressers

Complaint	Response	Frequency	Percent (%)
Respiratory ailments	Severe	16	5.6
	Moderate	106	37.1
	Mild	94	32.9
	None	70	24.5
Dermatological problems	Severe	50	17.5
	Moderate	112	39.2
	Mild	66	23.1
	None	58	20.3

4.8 Summary of the results

The results of the study showed that 286 out of 300 hairdressers participated in the study; there was a 95% response rate. There were more (84.6%) female participants than the male (15.4%) participants. The age of most respondents was between 24 and 28 years with an average of 27 years and that most (40.2%) of them had worked for less than five years. Regarding education level, most (49.3%) respondents had attended secondary school. Regarding the physical design of salons, the results of the study showed that the average space of salons was 7.22M². Most (90.6%) salons did not have adjustable chairs and 93.4% did not have First Aid kits. The temperatures in most salons were within the recommended range of 24-26°C; 2.7% salons had high temperatures of between 28-28°C. Sixteen (21.9%) salons had noise level of between 81.0 and 90.9 dBA while 94.5% salons had illumination levels that were below the recommended levels of 500Lux.

Most salons (68.5%) operated for 11 to 12 hours a day while 18.2% worked for 8 to 10 hours. Most (80.4%) respondents worked for 6 days every week. The major psychosocial risk factors among the respondents were conflicts (97%) and adverse social behavior (98%) especially gossips. The study showed that long working hours and wages were the major factors affecting hairdressers psychologically by causing stress. All hairdressers agreed that they used personal protective gear in their workplace; but the most used PPEs were aprons (49.7%) and gloves (37.3%).

From the findings of the study, 85% of the respondents' tasks were carried out in awkward positions, 88.1% were done repetitively while 89.9% of the tasks involved manual handling. All the operations were done for extended period of time; participants work for

more than 2 hours with little variations of hands, wrists, fingers and shoulders, while standing in awkward position where their necks and backs are bent for more than 45°. They also involve the use of chemicals whose contents are harmful especially to skin and respiratory system. Due to prolonged standing in awkward postures, 62.9% participants had suffered moderate back pains while 2.8% had suffered severe back pains in the last six months; 58.7% respondents had suffered moderate and 9.8% respondents had had severe neck pains in the last six months. Regarding management strategies for health problems employed by hairdressers, the study showed that most (67.8%) participants massage the areas where they had pain.

4.9 Discussion

The study established the health and safety risks among hairdressers in Roysambu Sub-County. From the findings, 84.6% of the participants were females. This is in agreement with the study done in Iran (Bradshaw 2016). The age of most hairdressers was between 24 and 28 years with an average of 27 years and that most of them have worked for less than five years and the average is five years. This was favorably comparable to the studies done in Ethiopia (Bedru, 2016) and Egypt (Hassan, 2015) on self-reported work-related symptoms in hairdressing. Regarding education level, most hairdressers have attended secondary school which is consistent with a study done in Ethiopia (Bedru, 2016).

Regarding the physical design of salons, the results of the study showed that the average space in most salons was 7.22M² which is far lower than the recommended 120 square meters. This showed that salons in Kenya do not meet the threshold and therefore likelihood of straining to carry out their tasks. Most salons (90.6%) did not have adjustable

chairs. They used billows to adjust the height needed to attend to a client. Fifty two hairdressing salons (71.3%) did not have adjustable trolleys, 69 had slippery tiles and did not have the anti-skid floor mats while 61 salons had a wash basin fixed on the wall which forced the hairdressers stand on the sides. Fifty nine salons agreed that their scissors fit to their fingers well and were comfortable to use them. Sixty eight salons did not have First Aid Kit in their workplace, while 70 salons did not have material safety data sheet for the salon chemicals and only 2 salons had signage kept on shelves but were not displayed on the walls. These results were not comparable to other studies due to lack of and legislative enforcement and compliance.

The results of the study revealed that 2.7% salons had higher temperature of 29-29°C while most of the salons had temperature range of 24- 25°C. The results were not comparable to other studies done on the effects of physical environment on hairdressers' health (Verhamme, 2015, Bedru, 2016 and Peixin, 2014).The discrepancy might be due to the weather conditions of the study areas. Sixteen (21.9%) salons had noise level of between 81.0 and 90.9 dB, which is in consistent with the studies in Iran (Verhamme 2015).These salons were located near busy streets, bars, welding places and shops with loud music. Forty nine salons had illumination of 300Lux and below. These salons were located below tall and congested buildings. Hairdressers would strain to see during evening hours. This is a risk causing strain of eyes, shoulder and back muscles. This factor did significantly predict the health and safety of the hairdressers while at work.

Regarding the organizational design of the hairdressing salons, most salons operated between the hours of 9am and 9pm; with little or no breaks in between their operations. The study showed that most hairdressers (68.5%) worked for 11 to 12 or more hours per day with an average of 11 hours per day. This is not consistent with other studies in the past (Bedru, 2016 and Sparks, 2013) where the average working hours is 8.9. The difference could be resulting from lack compliance to labour regulations and the fact that hairdressing occupation is informal; therefore making the workforce work for longer hours. The Chi-square analysis showed that hours of work were significantly associated with work experience. Those who worked for 11 or more hours had over 10 years work experience.

With the number of days of work per week, most hairdressers work for six days a week which is consistent with the studies done in Ethiopia (Bedru, 2016) and Iran (Bradshaw, 2016). Hairdressers also compete to earn more money; therefore, they spend a lot of time working. This will usually include working on Saturday, with one day off during the week (Verhamme, 2015). In this study, most of the hairdressers do not have a break which is comparable to studies done in Nigeria and Ethiopia (Bedru, 2016). The discrepancy could be due to a few hairdressers not getting a break per day. Different studies conducted in hairdressing salons showed that availability of sufficient break within a day decrease the likelihood of work-related musculoskeletal complaints, respiratory ailments and back pains but in this study there is no significant difference in health and safety by availability of break time, which may be due to very small hairdressers had break within a day that may not create difference between those who didn't have break within a day (Kozak, 2019).

The study showed that hairdressers in Kenya are not entitled to any leave plans, except that they leave work for few days for maternity breaks. A few respondents in this study got maternity break which is not comparable to what other researchers have reported (Scranton, 2015). In Brazil, Ferreira (2015) recommended maternity leave for female hairdressers. The difference might be due to the compliance to health and safety legislation and regulations at hairdressing workplaces.

The major psychosocial risk factors among hairdressers were conflicts (97%) and adverse social behavior (98%) especially gossips. This is in consistent with Verhamme (2015) studies which showed that hairdressing salons are social workplaces characterized by gossips and conflicts. Despite having conflicts at times in their place of work, most hairdressers have got good relationship with their employers. The study showed that long working hours (40.5%) and wages (37.5%) were the major factors affecting hairdressers psychologically by causing stress. This is in agreement with other studies done before that psychological risk factors caused ergonomic risks among hairdressers (Boschetto, 2016, Kozak, 2016)

All hairdressers agreed that they used personal protective gear in their workplace; but the most used PPEs were aprons (49%) and gloves (37.3%). Even with their responses, most hairdressers were observed working without the required PPE. These were comparable with other studies done in Egypt (Titilayo, 2019). The organizational factors; breaks, job tasks, wages, hours of work are significantly associated with the health and safety of hairdressers. This is in line with the studies done in Egypt (Hammam, 2014). The extended hours of work are related to exposure to hazards a more time causes more harm. Where

hairdressers have more expenses than wages their satisfaction may not be met hence stress. All the hairdressers' activities expose them to risks of developing musculoskeletal disorders, respiratory and dermatological problems.

Regarding the ergonomic risks among hairdressers, the results of the study revealed that awkward postures (85%), repetitive actions (88.1%) and manual handling (89.9%) of salon equipment were the major ergonomic risk factors. From the two Focus Group Discussions, it was established that prolonged standing (85.71% and 66.66%) and awkward postures (71.42% and 50%) caused the perceived musculoskeletal disorders among the participants. As regards the body postures, the results from this study show that hairdressers work for more than 2 hours with little variations of hands, wrists, fingers and shoulders, while standing in awkward position where their necks and backs are bent for more than 45°. These factors are significantly associated with the harm the hairdressers experience in salons. These results were comparable to studies done in Cameroon (Abia, 2016, Kozak, 2016). Although the association is very positive, after controlling for the variables, it was manual handling and awkward postures which predicted the odds of hairdressing not being safe and healthy at their workplace. They contributed to development of musculoskeletal disorders.

Regarding the work-related musculoskeletal complaints by hairdressers, the results of this study show that participants were likely to develop back pains, neck pains, hand and wrist pains and sore feet or painful legs. This is in agreement with the studies conducted by different studies (Bevan, 2015). From the results, 23.8% respondents had had severe back pains in the last six months, while 62.9% said that they had moderate back pains in the last

six months while. Also, 9.8 had had severe neck pains while 58.7% had moderate neck pains in the last six months. The results were favorably compared to other studies (Bedru, 2016, Kozak, 2016, Fang, 2014). The present study showed that most 67.8%) hairdressers massage the areas where they had pain either with hot water or ointments in order to manage the pains. They did it themselves at workplace or at home after work. These results were comparable with the study conducted in Ethiopia (Bedru, 2016).

From the findings of this study, the respondents' tasks included plaiting, waving, treatments, conditioning, shampooing, drying and cutting. These activities required constant twisting of the back, static postures, prolonged standing periods, high hand force and manual handling of salon equipment. Repetition was also observed in all these client-related tasks. They also involved the use of chemicals whose contents are harmful especially to skin and respiratory system. The results were favorably comparable to other studies done in the past (Mishra, 2019, Tolera, 2018, Tsegay, 2019, Kozak, 2019). Due to the awkward positions and prolonged standing on hard floors, the respondents, the hairdressing tasks were associated with the perceived musculoskeletal disorders among the participants.

The results of the study revealed that hairdressers' tasks can cause respiratory and dermatological problems. Among the respondents, 5.6% reported that they had had severe respiratory problems especially chest pains and congestion, 37.1% reported that they had moderate respiratory problems, 32.9% had mild respiratory ailments in the last six months. The results were in agreement with the studies done before in Iran (Habaiti and Jaakkola, 2019) and Egypt (Titilayo, 2019)

Dermatological problems are common among hairdressers due to wet works. The results established that 17.5% hairdressers had had exposure to chemicals which led to severe skin problem, 39.2% reported that they had moderate dermatological problems in the last six months. The results were comparable with other studies in the past (Hakim and Abdel, 2019, Abia, 2015)

CHAPTER FIVE

CONCLUSIONS AND RECOMMENDATIONS

5.1 Conclusion

Hair and beauty industry has long been accorded inferior consideration and has gone neglected by the ministry of labour and ministry of health yet hairdressers are continually exposed to various health hazards and risks at their workplace. Due to the alarming rates and prevalence of musculoskeletal disorders, dermatological and respiratory problems among the hairdressers especially in the third world countries, researchers are implementing new strategies of diagnosis and containment of the cases. In developing countries, Kenya included the rates of asthma, skin infection and back pains are soaring. The workspace, physical environments, working hours, personal protection gear, hairdressing tasks and ergonomic risk factors are all compounding factors in the rise of the cases. All of the tasks carried out by hairdressers are done in twisted positions with bent backs and necks and with repetitive movements of fingers and wrists for extended period of times. These are the major ergonomic risk factors causing the musculoskeletal complaints among the workforce. Researchers are campaigning for the safe and healthy working environments of the hairdressers but the sector is looked at as unprofessional; therefore, there is limited enforcement of occupational health and safety legislation for the hairdressing sector. There is also lack of sufficient knowledge of health and safety requirements and even hazards among the workforce. There is also lack of compliance to the hairdressing laws because the hairdressers do not have knowledge and training on the same. There is also a gap in adherence to control and prevention measures through use of the PPEs by the workforce and ministry of labour.

5.2 Recommendations

Based on the findings of the study, it is recommended that the ministry of labour in Kenya should consider hair salons just like any other workplace with health hazards and ensure compliance to the set health and safety regulations and legislation, especially legislation specific to salon space, physical environments, working hours, wages and the use of PPEs. They should clearly state the sufficient space needed depending on the number of hairdressers. The ministry should also raise awareness of safety and health hazards and risks in hairdressing salons among all the hairdressers. They should be enlightened on the importance of sufficient working space, light and the right temperature and noise levels. All hairdressers should be trained on the right working postures and the negative impacts that prolonged standing and extended working times have on their health.

The ministry of labour through the Directorate of Occupational Safety and Health Services should organize regular inspections on hair salons so as to identify the hazardous areas and ergonomic risks. The ministry should also guide the hairdressers on the organizational interventions to minimize or eliminate the ergonomic risk factors. Regulations on working hours including breaks should be established and supervision carried out on hairdressing sector. Hairdressers should have breaks so as to reduce the impacts of repetition, awkward posture and static forces. Alternatively, through different associations for example, Hairdressers, Barbers and Beauty Association (HABEBA) and Kenya Association of Private Employment Agencies, it should schedule working hours for the hairdressers.

The beauty college in Kenya should incorporate the occupational health and safety topics in their trainings. Hairdressers should limit the length of their working hours to the standard

set by the Kenyan labor laws, which is eight hours per day or forty-eight hours per week. They should also adjust break time within working hours and equip the salon by necessary ergonomic tools and promote safe work environment. All hairdressing tasks are harmful; therefore, hairdressers should practice emphasize on having comfortable body posture when performing hair dressing tasks.

5.3 Further Research

This study was able to show that hairdressers are not safe and healthy in their as they are exposed to various risks; physical environments, chemicals and ergonomics. However, the prevalence of work-related health problems and impacts of interventional health and safety education are some of the gaps in the hairdressing sector in Kenya that should be investigated.

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APPENDICES

Appendix I. INFORMED CONSENT

My name is **Winnie Chebet Koskei**. I am a Master student from Kenyatta University. I am conducting a study on "Evaluation of work-related ergonomic risks among hairdressers in Roysambu Sub-County, Nairobi County". The information will be used by the Ministry of Labour, Social Security and Services in establishment of safer working conditions for hairdressers.

Procedures to be followed

Participation in this study will require that I ask you some questions. I will record the information from you in a questionnaire.

You have the right to refuse participation in this study.

Please remember that participation in the study is voluntary. You may ask questions related to the study at any time. You are also free to stop participating in the study if you so wish without any risk to yourself. You may refuse to respond to any questions and you may stop an interview at any time.

Discomforts and risks

Some of the questions you will be asked are on intimate subject and may be embarrassing or make you uncomfortable. If this happens, you may refuse to answer these questions if you choose so. You may also stop the interview at any time.

Benefits

If you participate in this study you will help us to learn how to provide effective working conditions to the hairdressers. You will also benefit as a participant by being aware of the health and safety matters in hairdressing sector.

Reward

There will be no monetary rewards for participating in the study.

Confidentiality

The interviews will be conducted in a private setting within the salon. The questionnaire will be kept in a locked cabinet for safe keeping at Kenyatta University. Everything will be kept private.

Contact information

If you have any questions you may contact Dr. Peterson Warutere on 0721993833 or Dr. Bernard Awuonda on 0721598901 or the Kenyatta University Ethical Review Committee Secretariat on chairman.kuerc@ku.ac.ke , secretary kuerc@ku.ac.ke.
Ercku2008@gmail.com

Participant's statement

The above information regarding my participants in the study is clear to me. I have been given a chance to ask questions and my questions have been answered to my satisfaction. My participation in this study is entirely voluntary. I understand that I will not get monetary benefits from the study.

Code of participant.....

Signature or thumb print

Date

Investigator`s statement

I, the undersigned, have explained to the volunteer in a language she/he understands, the procedures to be followed in the study and benefits involved.

Name of interviewer.....

Interviewer signature.....

Date

Appendix II. QUESTIONNAIRE

HAIRDRESSERS' WORKING CONDITIONS QUESTIONNAIRE

Dear respondent,

I am a student at the Kenyatta University, undertaking a research study as part of my studies for the award of Master of Science in occupational Health and Safety. The aim of this questionnaire is to collect information about the working conditions of the hairdressing salons in Roysambu Sub-County, Nairobi County. The information is specifically for study purposes, and is highly confidential. I value your opinion and thank you in advance for your time.

Questionnaire Number..... Date of interview.....

(a) Background information:

1. Business name (Name of Salon) _____
2. Ward name _____
3. Total number of workers in a salon _____
4. Sex of worker;
 - a) Male b). Female.
5. Age of worker (in years) _____
6. Education Level:
 - a) No formal education at all b). Primary education c). Secondary education) d).
Tertiary education
7. Where is your place of residence? _____

8. How many dependents do you have? _____
9. For how long have you worked in this occupation? _____

(c) Work-related health problems and hazards

10. Have you experienced the following work-related health problems in the last six months?

Work –related health problem	Strongly agree	agree	uncertain	disagree	Strongly disagree
Skin problems					
Respiratory ailments					
Back pains					
Neck pains					
Hand/wrist pains					
Sore feet /painful legs					

11. Have you experienced the following in your workplace in the last six months?
- a) Burns Yes No
- b) Falls Yes No
- c) Cuts Yes No
- d) Needle picks Yes No
12. How do you manage the health problem(s) mentioned?

- a) Massaging b) using painkillers c) rest d) Exercises e) not yet done anything

(b) Organizational Working conditions

13. How many hours do you work in a day?
14. How many days do you work in a week?
15. Do you take breaks while carrying out hairdressing tasks?
- a) Yes, b) No

If yes, how long are the breaks? _____

16. Do you have the following day offs in your workplace? (Indicate the number of days and tick where necessary in the columns)

Plan	Yes	No	No. of Days	Paid	Not paid
Annual leave					
Maternity Leave					
Child/family care off					
Off day(s)					
Sick off(s)					

17. What is your task at salon(job tasks)

- a) Shampooing and blow dry
- b) Shampooing, blow dry and plaiting
- c) Conditioning, treatment and perming
- d) Conditioning, treatment and coloring
- e) Plaiting and waving
- f) Plaiting, waving and cutting
- g) Shampooing, treatment, conditioning and perming
- h) All

18. Approximately, how much are you paid per week? _____

19. Do you experience psychosocial risks at your workplace?

- a) Yes b) No

20. What could be some of the sources of psychosocial risks in your workplace?

- a) Poor communication
- b) Lack of social support
- c) Poor relationship with superior
- d) Conflicts

e) Adverse social behavior (gossips).

(c) Physical workplace designs

21. Are the following salon designs and equipment adequate and ergonomically designed?

a) Workstation Yes No

b) Workspace Yes No

c) Salon floor Yes No

d) Hairdressing chair Yes No

e) Hair dryers Yes No

f) Scissors Yes No

g) Trolleys Yes No

h) Wash basin Yes No

22. What is the amount of temperatures, light and noise level in your salon?

	Amount
Temperatures(Degree Celsius)	
Lighting(Lux)	
Noise Level(Db)	

(d) Ergonomic risks at hairdressers' workplace

Do you experience the following?

- a) awkward postures
- b) high hand force,
- c) use of vibrating objects,
- d) repetitive motions and
- e) frequent lifting

(Use of WISHA caution zone checklist to identify the risks).

Appendix III. OBSERVATION CHECKLIST

1. Do they have the chemical material safety data sheet?
2. Do they use the required PPEs? (Gloves, aprons, masks, flat closed shoes)
3. Are there any notable physical hazards? (Wet floors, open sockets, wet paints, sharp object)
4. Do they have a complete first aid kit?
5. Do they have warning systems? Are they visible?
6. Do they have ergonomically designed workstation, workspace, dryers, chairs, trolleys, wash basins, floors and scissors


Appendix IV. WISHA CAUTION ZONE CHECKLIST





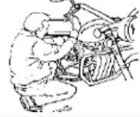

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WISHA Caution Zone Checklist

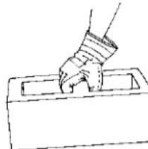

Caution Zone Checklist Use one sheet for each position evaluated.









<p>Movements or postures that are a regular and foreseeable part of the job, occurring more than one day per week, and more frequently than one week per year.</p>	<p>If done in this position ...  the box</p>	<p>Job Position Evaluated: Date:</p>	<p># of employees in these jobs?</p>
--	---	---	--------------------------------------

AWKWARD POSTURE **COMMENTS / OBSERVATIONS**

	<p>1. Working with the hand(s) above the head, or the elbow(s) above the shoulders more than 2 hours total per day.</p>	<input type="checkbox"/>	
	<p>2. Working with the neck or back bent more than 30 degrees (without support and without the ability to vary posture) more than 2 hours total per day.</p>	<input type="checkbox"/>	
	<p>3. Squatting more than 2 hours total per day.</p>	<input type="checkbox"/>	
	<p>4. Kneeling more than 2 hours total per day.</p>	<input type="checkbox"/>	

HIGH HAND FORCE **COMMENTS / OBSERVATIONS**

	<p>5. Pinching an unsupported object(s) weighing 2 or more pounds per hand, or pinching with a force of 4 or more pounds per hand, more than 2 hours total per day (comparable to pinching half a ream of paper).</p>	<input type="checkbox"/>	
	<p>6. Gripping an unsupported objects(s) weighing 10 or more pounds per hand, or gripping with a force of 10 or more pounds per hand, more than 2 hours total per day (comparable to clamping light duty automotive jumper cables onto a battery).</p>	<input type="checkbox"/>	

HIGHLY REPETITIVE MOTION		COMMENTS / OBSERVATIONS
 <p>7. Repeating the same motion with the neck, shoulders, elbows, wrists, or hands (excluding keying activities) with little or no variation every few seconds, more than 2 hours total per day.</p>	<input type="checkbox"/>	
 <p>8. Performing intensive keying more than 4 hours total per day.</p>	<input type="checkbox"/>	
REPEATED IMPACT		COMMENTS / OBSERVATIONS
 <p>9. Using the hand (heel/base of palm) or knee as a hammer more than 10 times per hour, more than 2 hours total per day.</p>	<input type="checkbox"/>	
HEAVY, FREQUENT OR AWKWARD LIFTING		COMMENTS / OBSERVATIONS
 <p>10. Lifting object weighing more than 75 pounds once per day or more than 55 pounds more than 10 times per day.</p>	<input type="checkbox"/>	
 <p>11. Lifting objects weighing more than 10 pounds if done more than twice per minute, more than 2 hours total per day.</p>	<input type="checkbox"/>	
 <p>12. Lifting objects weighing more than 25 pounds above the shoulders, below the knees or at arms length more than 25 times per day..</p>	<input type="checkbox"/>	
MODERATE TO HIGH HAND ARM VIBRATION		COMMENTS / OBSERVATIONS
 <p>13. Using impact wrenches, carpet strippers, chain saws, percussive tools (jack hammers, scalers, chipping hammers) or other tools that typically have high vibration levels, more than 30 minutes total per day.</p>	<input type="checkbox"/>	
 <p>14. Using grinders, sanders, jigsaws or other hand tools that typically have moderate vibration levels more than 2 hours total per day.</p>	<input type="checkbox"/>	

Appendix V. FOCUS GROUP DISCUSSION

Questions

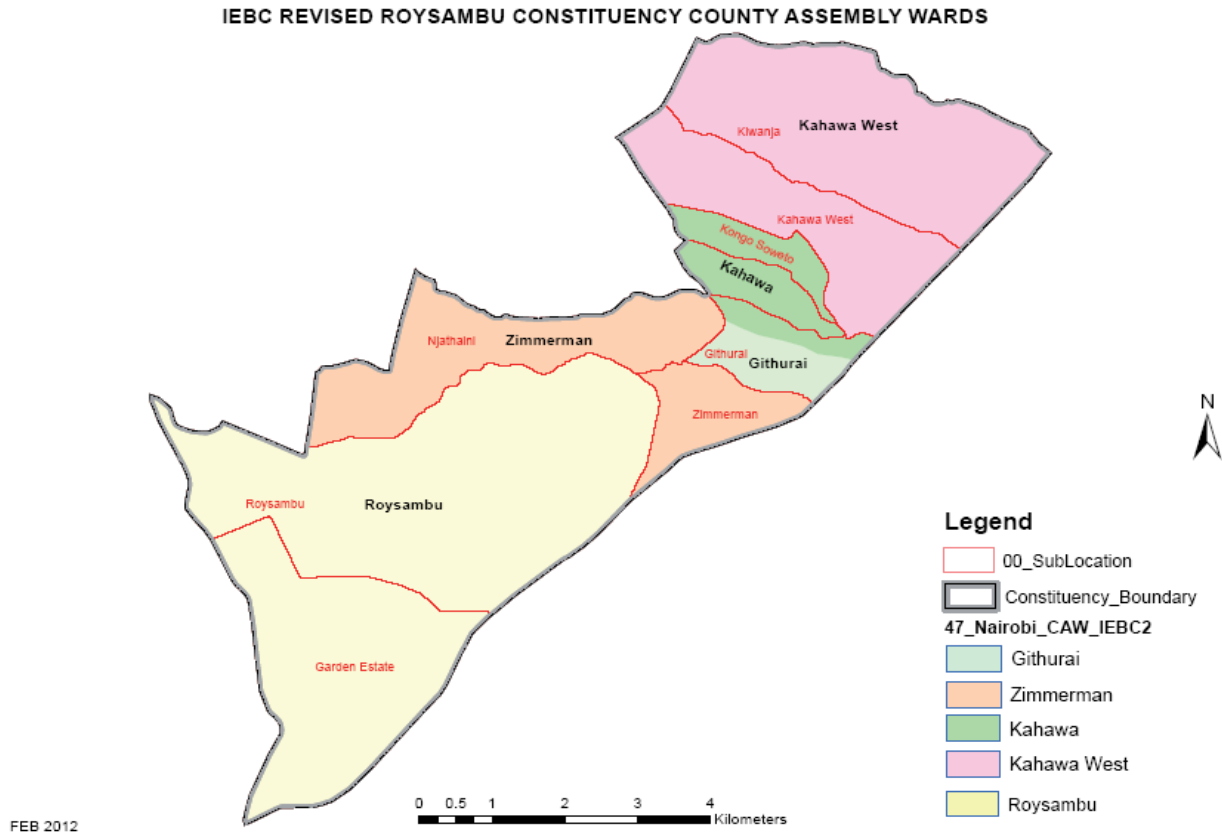
- a) What are some of the health and safety issues associated with your occupation?
- b) What are the possible risk factors for complaints of back shoulder and neck pains?

Appendix VI. KEY INFORMANT INTERVIEW

Questions

- a) What are the job tasks that are risk to your health and safety?
- b) What are the impacts of organizational and physical designs of your salon?

Appendix VII. MAP OF ROYSAMBU



Appendix VIII. GRADUATE SCHOOL APPROVAL

**KENYATTA UNIVERSITY
GRADUATE SCHOOL**

E-mail: dean-graduate@ku.ac.ke

P.O. Box 43844, 00100
NAIROBI, KENYA
Tel. 020-8704150

Website: www.ku.ac.ke

Internal Memo

FROM: Dean, Graduate School

DATE: 25th May, 2018

TO: Ms. Koskei Winnie Chebet
C/o Department of Environmental and
Occupational Health

REF: Q139/CTY/FT/22741/12

SUBJECT: APPROVAL OF RESEARCH PROPOSAL

=====

This is to inform you that Graduate School Board, at its meeting on 9th May, 2018, approved your Research Proposal for the M.Sc. Degree entitled, "Evaluation of Work-Related Ergonomic Risks Associated with Hairdressers in Roysambu Sub-County, Nairobi County, Kenya."

You may now proceed with your Data collection, subject to clearance with the Director General, National Commission for Science, Technology & Innovation.

As you embark on your data collection, please note that you will be required to submit to Graduate School completed Supervision Tracking Forms per semester. The form has been developed to replace the Progress Report Forms. The Supervision Tracking Forms are available at the University's Website under Graduate School webpage downloads.

Thank you.

**JACKSON LUVUSI
FOR: DEAN, GRADUATE SCHOOL**



CC. Chairman, Department of Environmental and Occupational Health
Supervisors:

1. Dr. Peterson Warutere
C/o Department of Environmental and Occupational Health
Kenyatta University
2. Dr. Bernard B. O. Awuonda
School of Medicine
Maseno University
C/o Department of Environmental and Occupational Health
Kenyatta University

Appendix IX. KENYATTA UNIVERSITY ETHICS REVIEW COMMITTEE APPROVAL



KENYATTA UNIVERSITY ETHICS REVIEW COMMITTEE

Fax: 8711242/8711575
 Email: kuerc.chairman@ku.ac.ke
kuerc.secretary@ku.ac.ke
 Website: www.ku.ac.ke

P. O. Box 43844,
 Nairobi, 00100
 Tel: 8710901/12

Our Ref: **KU/ERC/ APPROVAL/VOL.1 (201)**

Date: 6th September, 2018

Koskei Winnie Chebet
 P.O Box 43844-00100
 NAIROBI

Dear Winnie,

**APPLICATION NUMBER: PKU/878/1941 "EVALUATION OF WORK- RELATED
 ERGONOMIC RISKS ASSOCIATED WITH HAIRDRESSERS IN ROYSAMBU SUB-
 COUNTY NAIROBI COUNTY."**

1. IDENTIFICATION OF PROTOCOL

The Application before the committee is with research topic "**Evaluation Of Work -Related Ergonomic Risks Associated With Hairdressers In Roysambu Sub-County Nairobi County**" on 18th May, 2018 and discussed on 14th August, 2018

2 APPLICANT

Koskei Winnie Chebet

3. SITE

Roysambu Sub-County Nairobi County

4. DECISION

The committee has considered the research protocol in accordance with the Kenyatta University Research Policy (section 7.2.1.3) and the Kenyatta University Ethics Review Committee Guidelines and **APPROVED that the research may proceed for a period of ONE year from 14th August , 2018.**

5. ADVICE/CONDITIONS

- i. Progress reports are submitted to the KU-ERC every six months and a full report is submitted at the end of the study.
- ii. Serious and unexpected adverse events related to the conduct of the study are reported to this committee immediately they occur.
- iii. Notify the Kenyatta University Ethics Committee of any amendments to the protocol.
- iv. Submit an electronic copy of the protocol to KUERC.

When replying, kindly quote the application number above.

If you accept the decision reached and advice and conditions given please sign in the space provided below and return to KU-ERC a copy of the letter.



PROF. JUDITH KIMBYWE
CHAIRMAN ETHICS REVIEW COMMITTEE

I ... KINME CHEBET KOSWEI ... accept the advice given and will fulfill the conditions therein.

Signature..... KA Dated this day of... 11/09 2018.

cc.
DVC-Research Innovation and Outreach

Appendix X. NACOSTI RESEARCH PERMIT

THE SCIENCE, TECHNOLOGY AND INNOVATION ACT, 2013

The Grant of Research Licenses is guided by the Science, Technology and Innovation (Research Licensing) Regulations, 2014.

CONDITIONS

1. The License is valid for the proposed research, location and specified period.
2. The License and any rights thereunder are non-transferable.
3. The Licensee shall inform the County Governor before commencement of the research.
4. Excavation, filming and collection of specimens are subject to further necessary clearance from relevant Government Agencies.
5. The License does not give authority to transfer research materials.
6. NACOSTI may monitor and evaluate the licensed research project.
7. The Licensee shall submit one hard copy and upload a soft copy of their final report within one year of completion of the research.
8. NACOSTI reserves the right to modify the conditions of the License including cancellation without prior notice.

National Commission for Science, Technology and Innovation
 P.O. Box 30623 - 00100, Nairobi, Kenya
 TEL: 020 400 7000, 0713 788787, 0735 404245
 Email: dg@nacosti.go.ke, registry@nacosti.go.ke
 Website: www.nacosti.go.ke



REPUBLIC OF KENYA



National Commission for Science,
 Technology and Innovation
RESEARCH LICENSE

Serial No.A 21341

CONDITIONS: see back page

THIS IS TO CERTIFY THAT:
MS. WINNIE CHEBET KOSKEI
of KENYATTA UNIVERSITY, 0-20203
Londiani, has been permitted to conduct
research in Nairobi County
on the topic: EVALUATION OF WORK
RELATED ERGONOMIC RISKS AMONG
HAIRDRESSERS IN ROYSAMBU
SUB-COUNTY, NAIROBI COUNTY, KENYA

Permit No : **NACOSTI/P/18/86665/25525**
 Date Of Issue : **18th October,2018**
 Fee Received : **Ksh 1000**

for the period ending:
17th October,2019



Applicant's Signature

Director General
 National Commission for Science,
 Technology & Innovation