EVALUATION OF WORK-RELATED MUSCULOSKELETAL DISORDERS AMONG HOUSEKEEPERS IN SELECTED HOTELS IN MOMBASA COUNTY, KENYA

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JOMO KENYATTA UNIVERSITY

OF

AGRICULTURE AND TECHNOLOGY

2024

Evaluation of Work-Related Musculoskeletal Disorders among Housekeepers in Selected Hotels in Mombasa County, Kenya

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A Thesis Submitted in Partial Fulfillment of the Requirements for the Degree of Master of Science in Occupational Safety and Health of the Jomo Kenyatta University of Agriculture and Technology

2024

DECLARATION

This research is my original work and has not been submitted for a degree in any other University.

Signature……..……..Date……

Enid Kanyiri Gikunda

This research has been submitted for examination with our approval as the University Supervisors

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DEDICATION

I want to dedicate this research to my family for their unwavering support, making it possible and less stressful for me to work on this project.

ACKNOWLEDGEMENT

First and foremost, I would like to extend my deepest appreciation to my supervisors, Dr. Mburu and Dr. Kibiti. Their guidance, expertise, and unwavering support throughout this journey have been instrumental in shaping the direction of my research. I am genuinely grateful for their invaluable input and constructive feedback, which have greatly enhanced the quality of this work.

Furthermore, I would like to thank the housekeeping supervisors in the selected Mombasa hotels. Their patience, cooperation, and support during the data collection process were crucial in ensuring the success of this research. Their willingness to provide feedback and insights from their housekeeping staff has been immensely valuable, and I sincerely appreciate them.

I am also grateful to my research assistants and data analysts for their analytical and critical input to this project. Their expertise and commitment have significantly contributed to the thoroughness and accuracy of the data analysis, substantially impacting the findings presented in this thesis. I am indebted to their dedicated hard work and will be forever grateful for their contributions.

Lastly, I acknowledge all the individuals who have supported me throughout this research endeavor, whether through their words of encouragement, willingness to participate in interviews or surveys, or general assistance. Your support has been vital in successfully completing this project, and I extend my heartfelt thanks to each of you.

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NOMENCLATURE AND ABBREVIATIONS

CTDs	Cumulative Traumatic Disorders
ERC	Ethical Review Committee
GDP	Gross Domestic Product
ICs	Industrialized Countries
IDCs	Industrially Developing Countries
ILO	International Labor Organization
JKUAT	Jomo Kenyatta University of Agriculture and Technology
KG	Kilogram
KUDHEIHA	Kenya Union of Domestic, Hotels, Educational, Institutions, Hospitals and Allied
LBP	Low Back Pain
NACOSTI	National Council of Science, Technology and Innovation
OA	OsteoArthritis
OOS	Occupational Overuse Syndrome
OSHA	Occupational Safety and Health Act
RA	Rheumatoid Athritis
RSIs	Repetitive Strain Injuries

SPSS	Statistical Packages for Social Sciences
WHO	World Health Organization
WR(MSDs)	Work Related (Musculoskeletal disorders)

ABSTRACT

Housekeepers in hotels attend to many clients who have varied needs. Many have complained of low back pain, which may be attributed to their working conditions, among other factors. Based on this backdrop, the study sought to evaluate work-related musculoskeletal disorders among housekeepers in selected hotels within Mombasa County. The study's objectives were to assess the annual prevalence of work-related musculoskeletal disorders, determine the risk factors associated with work-related musculoskeletal disorders, and ascertain strategies to prevent work-related musculoskeletal disorders among housekeepers in selected hotels in Mombasa County. The research design employed in this study was descriptive. The study targeted the housekeepers of registered hotels within Mombasa County. The sample size of 245 housekeepers was obtained by considering all the housekeepers available at the time of study from the purposefully 18 hotels selected due to the COVID-19 pandemic. The primary data collection tools were semi-structured questionnaires, in-depth interviews, and observation methods. A pilot study was conducted to test the questionnaire's validity and reliability. Collected data were descriptively analyzed using Statistical Package for Social Sciences (SPSS 23). The chi-square test and linear regression were applied to test the association between study variables. Analyzed data was presented using tables, graphs, and pie charts. While 91.7% of the housekeepers in selected hotels in Mombasa County complained of muscle and joint pains, a sign of work-related musculoskeletal disorder, the study established that only 42.4% sought medical advice. The results indicated that while gender was found not to have significance relationship with having individual preventive measures, the study found age, level of education and service duration to have significant ($P < .05$) relationship with individual having preventive measures of MSDs. Individual preventive measures, hotel preventive measures and adequacy of preventive measures significantly ($P < .05$) influenced WRMSD among the respondents. Carrying, lifting, pulling and pushing heavy things was also established to have a significant ($P < .05$) relationship with MSDs. The study concluded that long working hours, repetitive daily bed making, daily carrying, lifting, pushing, and pulling heavy things (more than 20 Kilograms) were the risk factors associated with MSDs among housekeepers. The study also concluded that there were preventive strategies to prevent WRMSDs among housekeepers. However, they were inadequate, and much-needed priority and attention were not given, especially by the younger workers below 45 years of age and the less educated (below diploma). The study recommended that hotels employ adequate staff to ensure reasonable breaks, job rotation, and teamwork and that the hotels should also consider mechanization of equipment, practical training, and reinforcing laws through health committees.

CHAPTER ONE

INTRODUCTION

1.1 Background to the Study

Musculoskeletal disorders (MSDs) identify a large group of conditions that result from body trauma over time. It is this cumulative buildup of trauma that causes the disorder. Hence MSDs are also referred to as Cumulative Traumatic Disorders (CTDs), Occupational Overuse Syndrome (OOS), or Repetitive Strain Injuries (RSIs). MSDs are defined in many ways. Additionally, musculoskeletal disorders (MSDs) include injuries and conditions that can affect the back, joints and limbs. Your employer must protect you from the risks of MSDs at work (Putsa, Jalayondeja and Mekhora, 2022). They must do something if you have a musculoskeletal disorder caused or made worse by work. MSDs remain a significant workplace health problem for government agencies and the private industry.

Work-related musculoskeletal disorder (WRMSDs) affects mainly the following body regions; the muscles, tendons, joints, intervertebral discs, peripheral nerves, and vascular system. Frequency and repetitiveness, or activities with awkward postures, are the primary work activities that cause the disorders. The lower back, neck, and shoulders are the most commonly affected body regions. Housekeeping staff, construction staff and nurses that routinely perform activities that require lifting heavy loads, lifting patients, working in awkward postures, and transferring patients out of bed and from the floor are some of the workers that are at high risk of WRMSD (Olutende, Kweyui and Wanzala,2022).

MSDs have been suspected to be related to work activities since the 18th century, but it was only in the 1970s that scientific studies were done to verify that association. Since then, studies and literature have increased significantly, yet the association between MSDs and occupational factors remains debated. WRMSDs are the leading cause of absenteeism

from work and reduced productivity, accounting for one-third of annual occupational injuries (Özcan *et al*. ,2019).

Globally, there is a large burden of musculoskeletal disorders, with some notable inter-country variation. Some countries have twice the burden of other countries. The proportion of prevalent cases according to category of musculoskeletal disorders in 2017 was greatest for low back pain (36.8%), followed by other musculoskeletal disorders (21.5%), OA (19.3%), neck pain (18.4%), gout (2.6%), and RA (1.3%) (Safiri, Kolahi and Cross, 2021).

WRMSDs are a worldwide issue experienced among Developed and Industrially Developing Countries (IDCs). In IDCs, the problems of workplace injuries are severe. The absence of an effective work injury prevention program and poor working conditions in IDCs has resulted in a high rate of WRMSD. Risk factors of WRMSDs include workplace activities such as heavy load lifting, repetitive tasks, and awkward working postures. In Nigeria, MSDs are prevalent among the quarry workers in Ebonyi State, Nigeria. Thus, there is an urgent need to increase the workers' and employers' awareness of appropriate ergonomic and personal measures needed to improve the workers' safety and well-being (Njaka,Yusoff and Edeogu ,2021).

In Uganda, a study indicated a high prevalence rate across certain sectors and advised that it was necessary to objectively evaluate postures and their level of risk using ergonomic tools, as well as to adapt the work environment to reduce exposure to MSDs with regard to the specificities of each profession (Jacquier-Bret and Gorce ,2023).

In Kenya, Munala, Olivier and Karuguti (2021) established that there was 68.1% prevalence of MSDs among flower farm workers with 38.1% of the MSDs reported in the lower back. There was a strong association between job designation, older age and duration worked as a farm worker and MSDs. Another study by Ndonye (2019) in Machakos County, also established musculoskeletal disorders of the Lower back are very

common among primary school teachers and were significantly associated with standing for long hours.

1.2 Statement of the Problem

Mombasa County is in the coast region of Kenya and is a popular tourist destination for its sceneries and great weather, among other reasons. Due to this, the area is home to many hotels. Housekeepers in these hotels attend to many clients with varied daily needs. At times, the ratio of housekeepers may be as high as one to twenty tourists, particularly in the high seasons.

Based on the background of this study, housekeepers are exposed to risk factors associated with MSDs according to previous studies.

A visit to the hotel's health clinics within the County revealed that housekeepers had visited these clinics with complaints of either low back, shoulder and or leg muscle pains, which may be attributed to their work and working conditions. The prevalence among housekeepers experiencing these conditions may not only affect their effectiveness at work. However, it may also have far-reaching social-economic implications among the affected staff in the hotel industry.

Studies among other sectors with similar working activities, such as health nurses, have shown the prevalence of muscular pain disorders associated with the nature of their work. However, studies have yet to be carried out in the hospitality sector, a key foreign exchange earner for Kenya, especially on housekeepers' safety and health. The study is therefore critical in the reduction of prevalence of musculoskeletal disorders among the workforce in this crucial sector that is one of the leading contributors to the Kenyan GDP. Based on this backdrop, the study sought to evaluate work-related musculoskeletal disorders among housekeepers in selected hotels within Mombasa County.

1.3 Justification of the Study

Evaluation of MSDs among housekeepers will help make intelligible conclusions on strenuous working conditions and their effects. The housekeeping department represents activities experienced by the majority daily, whether at work or home. Therefore, the findings can be used by each individual to change their lifestyle, by students to adopt a culture and foundation for importance of good posture, by workers to adopt proper working body mechanisms, and by management to employ preventive strategies for WRMSDs at the workplace.

Furthermore, this study will add to the existing data on the prevalence and impact of MSDs among workers and hopefully influence prioritization and attention to the disorders by institutions, workers, and even by the law governing the health and safety of workers. Therefore the study findings will help in reduction of prevalence of musculoskeletal disorders among the workforce in this crucial sector that is one of the leading contributors to the Kenyan GDP.

More so, policymakers can use this study's findings to formulate sound policies concerning the working conditions of hoteliers in the country to eliminate or reduce WRMSD. Finally, this study may be used for further research, adding to the existing knowledge.

1.4 Objectives of the Study

1.4.1 Main Objective

To evaluate work-related musculoskeletal disorders among housekeepers in selected hotels within Mombasa County in Kenya.

1.4.2 Specific Objectives

1. To assess the annual prevalence of work-related musculoskeletal disorders among housekeepers in selected hotels in Mombasa County, Kenya.
2. To determine the risk factors associated with work-related musculoskeletal disorders among housekeepers in selected hotels in Mombasa County, Kenya.
3. To ascertain strategies put in place to prevent work-related musculoskeletal disorders among housekeepers in selected hotels in Mombasa County, Kenya.

1.5 Research Questions

1. What is the annual prevalence of work-related musculoskeletal disorders among housekeepers in selected hotels in Mombasa County in Kenya?
2. What are the risk factors associated with work-related musculoskeletal disorders among housekeepers in selected hotels in Mombasa County in Kenya?
3. What strategies can be analyzed to prevent work-related musculoskeletal disorders among housekeepers in selected hotels in Mombasa County in Kenya?

1.6 Scope of the Study

The study focused on selected hotels within Mombasa County since Mombasa is a tourist destination that receives many tourists, particularly during the high seasons, which are: the summer season (July-August, which mainly attracts international tourists) and festive season (e.g., religious holidays, which attract local tourists).

1.7 Conceptual Framework

A conceptual framework is a model that shows the relationships between independent, intervening, and dependent variables. The dependent variable was the evaluation of work-related musculoskeletal disorders. The independent variables were the annual prevalence of work-related musculoskeletal disorders, risk factors associated with work-related musculoskeletal disorders, and preventive strategies for work-related musculoskeletal

disorders. Intervening variables were laws and regulations protecting housekeepers, awareness, and training of musculoskeletal disorders.

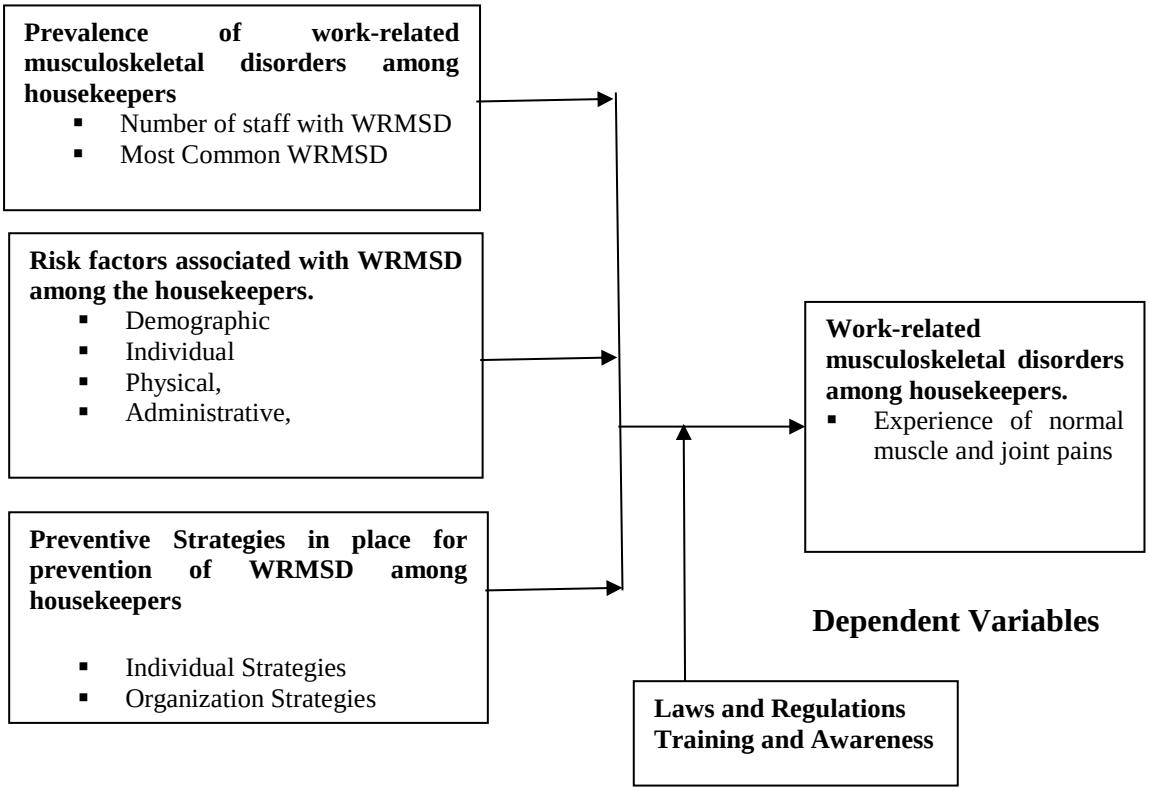

Figure 1.1: Conceptual Framework

CHAPTER TWO

LITERATURE REVIEW

2.1 Theoretical Principles

2.1.1 Information Theory

Adapted from Özcan *et al*. (2019), this theory attempts to discover the process structures and mechanisms that determine what happens to information from when it is sent to when it is received and enforced. It also shows that information can only be transmitted with mediums such as the mass media, including print and electronic media, health education seminars, talk shows, and community health programs.

Knowledge gap theory suggests that learning can differ if an individual is exposed to prior media information. Such individuals tend to learn faster (O'Sullivan, 2005). Contrary, individuals with lower education and less prior information tend to learn less, thus representing an increase in the knowledge gap. Against this backdrop, this theory is essential to the study in emphasizing the importance of awareness of the risk factors associated with work-related musculoskeletal disorders among housekeepers in selected hotels in Kenya. The theory acknowledges the importance of awareness among the disposing factors that contribute to musculoskeletal disorders among housekeepers in hotels in Kenya.

2.1.2 Herzberg Two-Factor Theory

In 1943, Abraham Maslow recorded his theory of motivation called the motivation-hygiene theory. In this theory, he brings out two dimensions of conditions; motivation and hygiene factors. According to Hertzberg's study, it was generally believed that employees' satisfaction and dissatisfaction and hence motivation or lack of it were opposite. Furthermore, it meant that either people were satisfied with their jobs or not satisfied. Motivators, similar to Maslow's higher-level needs, improve an employee's

satisfaction and are associated with the nature of the work itself; recognition at work, achievement, responsibility, and growth.

On the other hand, hygiene factors are associated with Maslow's lower-level needs and do not necessarily improve motivation or satisfaction but reduce job employee dissatisfaction. Hygiene factors include company policy, administration, supervisor relationships, and work conditions. For example, a worker can have a high salary but not be satisfied. Cianci and Gambrel (2023) considers high salary as extrinsic motivator. Intrinsic motivators tend to create motivation when they are present, whereas extrinsic motivators tend to reduce motivation when they are absent.

Intrinsic motivators represent more emotional needs, such as challenging work, recognition, relationships, and growth potential. Extrinsic motivators represent basic needs, such as status, job security, salary, good work conditions, and fringe benefits. Extrinsic motivators are necessary and cause dissatisfaction if absent. Intrinsic motivators, on the other hand, can provide extra motivation. Because of this, extrinsic and intrinsic motivators are independent; they do not depend on each other. Noticeably, the management is tasked with differentiating when job satisfaction is needed

Results of a study by Stangrecka, and Bagieńska, (2021) established that management and friendly staff relationships contribute to job satisfaction. However, this result contradicts the view of Herzberg (1968), who supported the view that supervision is irrelevant to job satisfaction. Promotion factors such as temperature, lighting, ventilation, hygiene, noise, working hours, and resources are part of working conditions. The worker would instead desire working conditions that will result in greater physical comfort and convenience. The absence of such working conditions, amongst other things, can poorly impact the worker's mental and physical well-being. This theory is relevant to the study in assessing the work-related conditions (activities and strategies in place for Prevention) that might lead to MSD among hoteliers in Kenya. The theory also highlights motivators to work in conditions that expose the staff to MSD conditions in the selected hotels in Mombasa, Kenya.

2.2 Previous Related Studies

2.2.1 Prevalence of Musculoskeletal Disorders

He, Xiao and Wu (2023) conducted a study on the prevalence of work-related musculoskeletal disorders among workers in the automobile manufacturing industry in China. The study included Systematic Review and Meta-analyses method under the most up to date PRISMA guidelines on the epidemiology of WMSDs among auto workers in China from inception to August 2022. The study established that the overall 12-month prevalence rate of WMSDs among workers was 53.1% [95% Confidence Interval (CI) = 46.3% to 59.9%]. The lower back/waist was the body region affected most (36.5%, 95%CI = 28.5% to 44.5%). Obesity, high educational level, long job tenure, female, logistic workers, and foundry workers are factors that led to a high prevalence rate of WRMSDs in the lower back/waist.

Özcan *et al*. (2019) also assessed the prevalence and risk factors of occupational musculoskeletal pain in workers working at metal work. The annual prevalence of musculoskeletal pain among metal workers was 83.0%. The study also indicated that annual prevalence of the complaints was; 64.8% low back, 52.9% back, neck 48.0%. Notably, as the population continue to experience growth and ageing, the number of people living with musculoskeletal conditions and associated functional limitations, is rapidly increasing. A study by WHO (2022) musculoskeletal health established that approximately 1.71 billion people have musculoskeletal conditions worldwide where the conditions are the leading contributor to disability worldwide, with low back pain being the single leading cause of disability in 160 countries. Additionally, musculoskeletal conditions significantly limit mobility and dexterity, leading to early retirement from work, lower levels of well-being and reduced ability to participate in society.

Norouzi, Tavafian and Cousins (2023) conducted a study on understanding risk factors for musculoskeletal disorders in Iranian housewives. The study used comprehensive model that comprised of 24 subcategories, eight categories and three themes. The findings

of the study indicated a high prevalence of musculoskeletal pain: 41% and 83%, with the latter study suggesting that more than 50% of housewives are disabled by MSDs. Similarly, in Iran, prevalence studies indicate that an estimated 53% of housewives have MSDs.

Moon, Yang and Do (2019) evaluated the prevalence of musculoskeletal symptoms, presumptive diagnosis, medical care use, and sick leave among female service workers in Japan. The study used retrospective analysis to analyze data from the musculoskeletal disease screening program. The study presumptive diagnosis of musculoskeletal disease was 95% hospital visits and sick leave over 7 days, due to MSDs.

Kee (2023) analyzed trends for work-related musculoskeletal disorders (WMSDs) from 1996 to 2020 in Korea and to investigate characteristics of WMSDs. The study obtained from the official yearbooks for industrial accidents published by the Ministry of Employment and Labor and those obtained personally from the Korea Workers' Compensation & Welfare Service. The study established that the incidence rate of WMSDs was approximately 5.0 per 10,000 workers, and the proportions of WMSDs among industrial accidents were almost 9%. Low back pain was the leading cause of WMSDs; WMSDs occupied 9.5−71.5% of total occupational diseases by year and occurred most frequently in the manufacturing industry, followed by construction, transportation/warehouse and communication, and mining industries, and nearly 60% of WMSDs occurred in small business with <50 workers.

Melese, Gebreyesus and Alamer (2020) conducted a study on the prevalence and Associated Factors of Musculoskeletal Disorders Among Cleaners Working at Mekelle University, Ethiopia. The study established that low back pain was the most prevalent among cleaners (34.8%), followed by wrist pain (17.4%). This study found that the prevalence of MSDs within the past 12 months was 52.3% (95% CI=45.9–58%), which was similar to studies done in the UK (52%), and Norway (56%). Trends by continent seem to emerge regarding the prevalence of MSDs by healthcare profession. Africa and

Europe showed prevalence three times higher than Asia and America for lower back MSDs among physiotherapists.

Wami *et al*. (2019) conducted a related study on the impact of work-related risk factors on developing neck and upper limb pain among low-wage hotel housekeepers in Gondar town, Northwest Ethiopia. The institution-based cross-sectional study established that the overall magnitude of the self-reported neck and upper limb musculoskeletal disorders among hotel housekeepers in the last 12 months was 62.8%. The main body areas of concern were neck pain (50.7%), shoulder pain (54%), elbow/forearm (47.2%), and hand/wrist (45.5%). Age, number of rest breaks taken, repetitive movement, reaching/overstretching, organization concern for health and safety, and job satisfaction were the risk factors significantly associated with neck and upper limb musculoskeletal disorders.

A study by Kisilu, Gatebe and Msanzu (2017) that assessed the prevalence of work-related musculoskeletal disorders among housing construction workers in Mombasa County, Kenya, established a 31% prevalence of musculoskeletal disorders and that the majority (98.1%) of the workers reported having had body pain as a result of their daily work activities within the past 12 months of his study. According to the study, musculoskeletal disorder symptom was low back pain at 68%. Only 2.7% of the respondents had sought medical advice for musculoskeletal disorders experienced within 12 months. The study noted that factors contributing to musculoskeletal disorders were physical, organizational, and individual factors. A further regression analysis at a 95% level of confidence established that physical factors, organizational factors, and individual factors significantly influenced the prevalence of musculoskeletal disorders.

2.2.2 Risk Factors Associated with Work-Related Musculoskeletal Disorders

As employees perform regular job duties, they face issues (risk factors) that can increase the risk for injury. A study conducted by Colorado State University (2019) on the musculoskeletal disorders, risk factors & reporting. Through literature review of secondary data established that as exposure to risk factors increases, the risk for injury also increases. When the requirements/demands of a job exceed the capability of an employee performing the job, fatigue, discomfort, pain, and injury may occur.

Another study by Putsa, Jalayondeja and Mekhora (2023) evaluated the factors associated with reduced risk of musculoskeletal disorders among office workers: a cross-sectional study 2017 to 2020. The study through a cross-sectional study established that prolonged sitting at work should be avoided to reduce the risks of either noncommunicable diseases (NCDs) or musculoskeletal disorders (MSDs) among office workers. A short duration of breaks in sitting every hour can reduce cardiometabolic risk factors contributing to NCDs.

Shockey (2018) conducted a study in the United States on frequent exertion and frequent standing at work by industry and occupation groups in the United States. He established that hotel workers are 40% more likely to be injured at work other than service-sector workers in general and that housekeepers suffer from the highest rates of injury among those workers. Additionally, the study established that room productivity targets are often set without considering widely divergent workloads or burdens of cleaning rooms high versus low square footage, with larger versus smaller beds or mattresses, low versus high star hotels, and check-out clean versus daily clean.

Miranda and Moreno (2022) evaluated the risk factors for work-related musculoskeletal disorders. The study was conducted in the inner regions of Alagoas and Bahia. The study adapted questionnaires, including the Job Content Questionnaire, Copenhagen Psychosocial Questionnaire II, Effort-Reward Imbalance Questionnaire, Nordic Questionnaire, and items associated with the work characteristics. WMSD was associated with increased pain in the foot; and the perceived meaning of work (OR = [0.75; 0.85])

and control over work (OR = [0.80; 0.84]) were associated with a reduced risk of pain in some regions.

Another study by Kar, Aruna and Mihir (2023) conducted a study on the risk factors associated with work-related musculoskeletal disorders among dumper operators, in China. The study through a machine learning approach and A self-report custom and the standard Nordic questionnaire were used for collecting data about risk factors and WRMSDs. The mean rank of the risk factors showed that age is the most critical parameter, followed by awkward posture, experience in mines, job demand, alcohol consumption, smoking cigarettes, work design, and marriage status.

Oluka, Obidike and Ezeukwu (2020) conducted a study on the prevalence of work-related musculoskeletal symptoms and associated risk factors among domestic gas workers and staff of works department in Enugu, Nigeria. The cross-sectional targeted one-hundred adults (DGW = 50, SWD = 50) and used Nordic Musculoskeletal Questionnaire and a demographics questionnaire were used to assess the prevalence of WMSS and related risk factors. Data were analyzed using independent *t*-test or Mann-Whitney U, chi-square, and logistic regression at $p < 0.05$. The findings of the study established that diastolic blood pressure (DBP) (OR = 1.29, p = 0.018), work duration > 8 h/day (OR = 0.001, p = 0.028), female gender (OR = 6.98–10.26, p < 0.05), sleep duration < 6 h/day (OR = 0.56–0.73, p < 0.05) and poor exercise behavior (OR = 0.15, p = 0.013) were the identified independent risk factors of WMSS among DGWs, while DBP (OR = 0.99, p = 0.012) and female gender (OR = 6.47, p = 0.032) were the only identified independent risk factors for MSDs.

A study by Kadota *et al.* (2020) on the impact of heavy load-carrying among women in the Shinyanga region, Tanzania, showed an association between increasing load-carrying exposures, long trip durations, and knee pain. The study also established an association between exposure to overhead work, heavy load lifting, forceful work, repetition, and shoulder disorders. Lastly, a study by Carayon *et al*. (2018) also evaluated work organization, stress at work, and work-related musculoskeletal disorders. They concluded that work organization and psychosocial factors could contribute to upper extremity

disorders. The results further indicated that work organization and ergonomic factors though independent, might interact to affect the musculoskeletal system.

Olutende, Kweyui, Wanzala and Mse (2022) investigated the risk factors for work-related musculoskeletal disorders among nurses in Kakamega county. The descriptive cross-sectional study used quantitative methods that targeted hospitals in Kakamega county Kenya. A self-administered questionnaire was used to gather information from randomly selected nurses (n = 130). The study established that nurses are exposed to work-related musculoskeletal disorders because of long hours of static work with awkward postures, heavy load lifting and repetitive movement. The study also established a significant association between working while injured or hurt and the WRMSD among the study participants ($p < 0.05$). On working while injured or hurt, 6.2% of nurses had no problem when continuing to work while injured or hurt. The study concludes that working in the same positions for long periods, treating a high number of patients and carrying or transferring dependent patients were risk factors of WRMSD identified.

2.2.3 Preventative Strategies to Curb Musculoskeletal Disorder

A study by California University (2024) on preventing musculoskeletal disorders and repetitive strain injuries. The study used literature review to evaluate preventing musculoskeletal disorders. The study advised that there was need of maintaining erect position of back and neck with shoulders relaxed, minimizing twisting and bending motions during work tasks, keeping one's body directly in front of and close to major work tasks, to avoid bending neck forward for prolonged periods of time and whenever typing from a manuscript, place the document on a holder beside or below the computer screen, remain some of the preventative strategies to curb musculoskeletal disorder. Additionally, the study advised on the need for avoiding static positions for prolonged periods. Muscles fatigue faster when they are held in one position.

Proper design of tools and equipment notably reduces the force needed to perform a task. Matos et al. (2018) pointed out that in companies that require manual work, providing the

worker with the proper handles and tools with springs or fixtures such as anti-vibration materials for tasks that require force and repetition saves much muscular effort from awkward positions. In addition, these tools and equipment should be well maintained for less strain on muscles

Soares, Pereira and Marcondes (2023) performed a narrative review based on a survey of databases PubMed and BIREME and included studies published in English, Spanish or Portuguese. The study found that workplace exercise is beneficial for both employers and workers. Risk analysis of MSDs is essential for early identification of occupational hazards and to prevent health consequences and costs associated with absenteeism.

Another study by Van Eerd, Irvin and Nasir (2020) evaluated the workplace musculoskeletal disorder prevention practices and experiences. The study employed a descriptive approach that was informed by Qualitative Description as this allows for comprehensive descriptions about who is doing what in the workplace. Web-based survey involved the sending potential participants invitation email to participate in a web-based survey. The study established that there is evidence that interventions to address MSD hazards such as modified equipment, adjustable workstation elements, work breaks, stress management programs among others are effective in reducing relevant MSD outcomes such as pain and work ability.

A study done by Sánchez-Rodríguez *et al.* (2022) in the Balearic Islands in Spain explored the work conditions and perception of hotel housekeepers on health and occupational risks preventive measures and found that a high percentage of housekeepers of the Balearic Islands reported chronic pain and low compliance with Occupational Risks preventive measures. More years worked, type of contract, and number of hours positively correlated with the housekeeper's perception of preventive measures.

Dartey, Tackie and Lotse (2024) conducted a qualitative study of work-related musculoskeletal disorders among midwives in selected hospitals in Ho municipality, Ghana. The study used educational programs on prevention and coping mechanisms for

musculoskeletal disorders should be made mandatory for midwives. The study adopted a qualitative research approach with a phenomenological study design where purposive sampling was employed to select participants that focused on midwives. The study through thematic content analysis highlighted that there was need to avoid awkward posture assumption during care delivery, increase logistics, struggle with quality of life, enhanced work performance, increased rest and good body mechanics, and teamwork.

In Uganda, a study by Tamale, Ssekamatte and Isunju (2024) evaluated work-related musculoskeletal disorders among desludging operators in Uganda. The study used digitalized structured questionnaire was used to collect cross-sectional data on musculoskeletal disorders and routine workplace activities from 303 desludging operators in 11 cities in Uganda. were significantly associated with WMSDs. Interventions should focus on ensuring adequate provision of ergonomic equipment and promoting practices that reduce the physical strain associated with desludging tasks. Additionally, comprehensive training programs addressing proper lifting techniques and posture awareness could significantly mitigate the risk of WMSDs among desludging-operators.

2.3 Existing Legal Framework

According to the Promotional Framework for Occupational Safety and Health Convention (No. 187), the global tourism industry continues to grow, and hotel housekeepers need adequate occupational safety and health measures to protect their health and wellness in the workplace (Beigi and Salesi, 2022). The broad rights to OSH protections in international treaties and national constitutions manifest the importance of these rights and the global consensus on the need for their enforcement. International law (ILO) provides a broad framework for protecting occupational health and safety, mainly built around the right to health.

Health, Safety and Environment United Kingdom guidelines, suggest that the maximum safe lifting weight an individual should lift or carry without assistance is 25kilogrammes (55 pounds) for men and 16Kilogrammes (35 pounds) for women.

The lifting equation establishes a maximum load of 51 pounds, which is then adjusted to account for how often one lifts, twists during lifting, the vertical distance of the load from one's body, and the distance one moves while lifting the load (OSHA 2021)

The Management of Health and Safety at Work Regulations require employers to assess the risks to the health and safety of their workers. The assessment may identify risks covered by other regulations relevant to MSDs in the workplace and one should also comply with those regulations. Mirshkary, Kamari and Kakallahi (2020) evaluated the legal framework for OSH mechanisms in Argentina, Indonesia, and India, these laws remain underdeveloped and under-enforced; hence there is no auditing and inspection of employer sites. Petitions to courts to vindicate established rights to physical damages compensations are not well documented, and OSH claims are not routinely litigated in national or labor-specific courts. Therefore, it is evident that national OSH regimes contain major gaps in protection for housekeepers across both substantive and procedural law.

Ndegwa and Ng'ang'a (2021) conducted a study on the legal framework as a determinant of implementation of occupational health and safety programmes in the manufacturing sector in Kenya. The study adopted descriptive cross-sectional survey design but however intended to gather both qualitative and quantitative data. A self-administered questionnaire was used to collect data from 257 OSH officers drawn randomly from 735 manufacturing industries registered by Kenya manufacturers association. The findings of the study also established there was a positive significant relationship between legal framework and implementation of OSH programmes.

CHAPTER THREE

MATERIALS AND METHODS

3.1 Study Design

The research design that was employed in this study was descriptive cross-sectional study method. A descriptive cross-sectional study inspects the prevalence of a condition or a characteristic in a defined population at a specific point or period in time without attempting to draw any inferences or offer any causes for the prevalence. A cross-sectional study is a type of research design in which you collect data from many different individuals at a single point in time. In cross-sectional research, you observe variables without influencing them. Therefore, a descriptive cross-sectional study design was used to describe the risk factors associated with work-related musculoskeletal disorders among housekeepers in selected hotels within Mombasa County. In addition, descriptive cross-sectional study design allowed the researcher to collect qualitative and quantitative data for the study.

3.2 Study Area and Population

The study area was Mombasa County, Kenya. Mombasa County is one of the 47 counties in Kenya, reconstituted from a district in 2013. It is the smallest County in Kenya. Mombasa County is situated in the southeastern part of the former coastal province. It borders Kilifi County to the North and Kwale County to the south. Being in the coast region of Kenya, Mombasa County consists of many hotels and attracts many local and foreign tourists during the peak season, which are the summer and holiday seasons (Materialscientist, 2020).

Mombasa is a metropolitan city and is the second largest city in Kenya, with a population of approximately 1.2 million (National Bureau of Statistics, 2019). It is the country's oldest (circa 900 AD). It is a regional cultural and economic hub with a large port on the Indian Ocean, an international airport, and a center of coastal tourism.

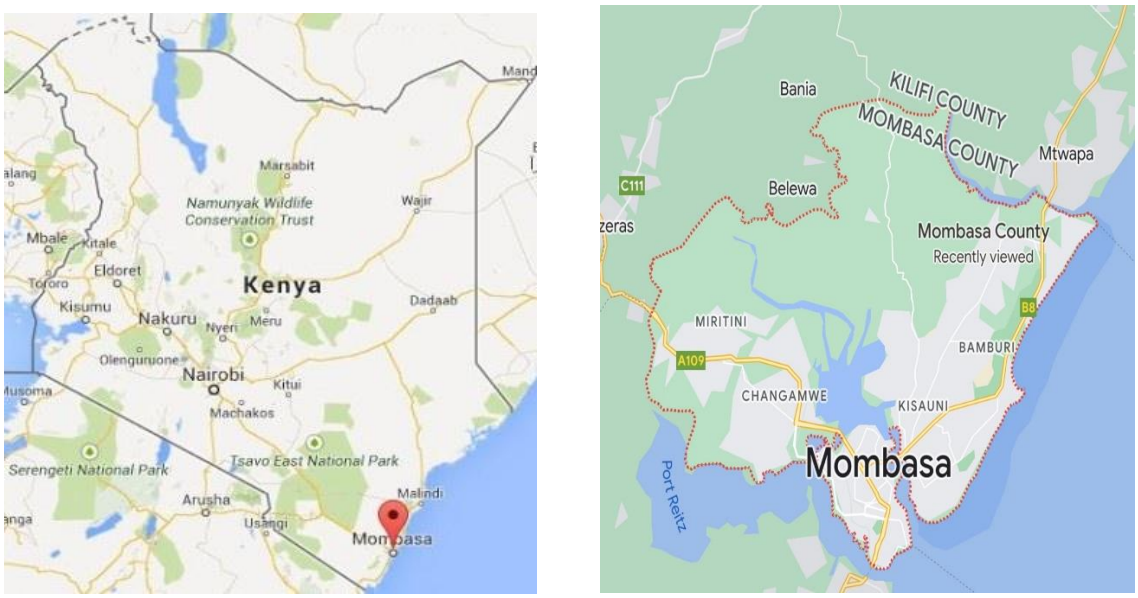

Figure 3.1: Map of Kenya and Mombasa County (Wikipedia)

The target population was housekeepers working in hotels within Mombasa County. According to Tourism Regulatory Authority (2019), the County is home to approximately 200 registered hotels and lodges. The hotels range from one star to five stars per the hotel categorization. The study targeted hotels with bed occupancy of at least 50 (because they have a desired number of housekeepers). Such hotels were about 60 from a list by KAHC (Kenya Association of Housekeepers and Caterers in Kenya). This representative body brings together duly registered hotels, camps, and lodges in Kenya.

The hotels within Mombasa County have a bed capacity of about 8000 beds and average annual bed occupancy of 64%. The situation changes during the peak tourism months of April, August, and December, with hotels registering over 99% of bookings (Tourism Regulatory Authority, 2018).

3.2.1 Inclusion and Exclusion Criteria

Inclusion Criteria: Housekeeping staff that work in the selected hotels in Mombasa County.

Exclusion Criteria: Non-housekeeping staff that work in the selected hotels in Mombasa County, workers in other institutions, firms and other organization apart from the selected hotels in Mombasa County.

3.3 Sampling Method

Purposeful sampling was used to select the hotels that suited the study and those that were possible to research due to the COVID-19 effects on hotels in Mombasa at the time of data collection.

3.4 Sample Size Determination

Due to the COVID-19 pandemic, hotel occupancy was low, leading to fewer employees; hence the study considered all the available housekeepers as respondents.

Using the Taro Yamane's statistical formular to determine the adequate sample size of respondents under study. This would hence be

$$n = N/ 1+ N(e)2$$

$$n = 635/1+ 635(0.05)2$$

$$n= 245.4106.$$

Therefore, a sample size 245 respondents out of the entire population of 635 respondents would therefore be the lowest acceptable number of responses to maintain a 95% confidence level.

Table 3.1: Summary of Sample Size Determination of Housekeepers

	Target Population	Sample Size	Sampling Method
Hotels	60	18	Purposefully selected
Housekeepers	635	245	All the housekeepers from the selected hotels

3.5 Research Instruments

The main data used by this study was Primary data. Data collection instruments used to collect data, either primary or secondary for the study were questionares, interview guide and Observation list..

3.5.1 Questionnaire

Semi-structured questionnaire was used to collected data for this study. The questionnaire contained both close-ended and open-ended questions. The questionare was based on the objectives of the study. The researcher preferred using questionnaires for data collection because they were affordable and believed that the respondents could read. The questionare contained Section A: Demographics, Section B: Annual Prevalence of WRMSD, Section C: Risk factors associated with WRMSD, Section D:,Preventive Strategies of WRMSD and Section F: Intervening Variables.

3.5.2 Observation List

The researcher also used a checklist to collect data out of observation of the housekeepers at work, from the selected 18 hotels under study, which aimed at assessing the working conditions of the respective hotels in order to identify MSDs's risk factors.

3.5.3 Interview Guide

An in-depth interview of the housekeepers was also carried out using the questionnaire.

The weight of the respondents was measured using the digital weighing scale for ease and accuracy. The height of the respondents was measured using a retractable measuring tape which is flexible and portable. As shown table 3.2.

Digital weighing scale **Round retractable measuring tape**

Figure 3.2: Images of Digital Weighing Scale and Retractable Measuring Tape

3.6 Reliability and Validity of Instruments

3.6.1 Validity of the Study Instruments

Validity can be defined as the extent to which an instrument measures what it is supposed to measure and performs as it is designed to perform (Kerlinger, 2006). It is also the degree to which results obtained from the analysis of data represent the phenomenon under the study (Loebet al., 2017).). The researcher worked with the allocated supervisor in enhancing the validity of the study instruments and the suggestions proposed was incorporated in the final tools that was administered to the respondents in the study.

3.6.2 Reliability

Reliability refers to the degree of consistency and stability in an instrument (Kumar, 2010). Reliability was measured using the Cronbach's Alpha coefficient. George and Mallery (2003) provide the following rules of thumb for the Cronbach's alpha test: "_ > .9 – Excellent, _ > .8 – Good, _ > .7 – Acceptable, _ > .6 – Questionable, _ > .5 – Poor, and_ < .5 – Unacceptable". According to Cooper and Schindler (2006), Cronbach's alpha

coefficient ranging between 0.7 and 0.9 is considered good. The study established a Cronbach's alpha of .8 and above which was considered good.

3.7 Data Processing and Analysis

Data analysis is the process of raw data into practical and reliable information (Kothari, 2004). All the collected data were cross-checked to detect errors, omissions, consistency, and completeness. The study used both qualitative and quantitative data analysis. Quantitative data was coded and entered into Statistical Package for Social Sciences (SPSS 23) for analysis. This study used descriptive and inferential statistical analysis to analyze quantitative data collected from the structured questions. Descriptive statistical analysis, including frequencies and percentages, and inferential statistical analysis, including the Chi-square test and linear regression, were used to establish the association between variables. On the other hand, the qualitative analysis included thematic analysis (a method for analyzing qualitative data that involves reading through a set of data and looking for pattern in the meaning of the data, to find themes). The study's findings from the quantitative analysis were presented in a frequency table, bar graphs, and pie charts, while analysis from the thematic analysis was presented in narrations and was based on the study objectives that will include main points according to each of the variables under investigation.

3.7 Ethical Considerations

Approval to conduct the study was sought from Jomo Kenyatta University of Agriculture and Technology. The identity of the respondents was concealed. The researcher also ensured the confidentiality and privacy of the information provided by the participants. The respondents had the choice to participate in the study willingly. Ethical Approval was obtained from The Ethical Review Committee (ERC) of The Technical University of Mombasa while the other approval was from National Commission for Science, Technology, and Innovation (NACOSTI) before collecting data. Copies of the ERC approval and NACOSTI Licence, attached in the appendices V and VI respectively.

CHAPTER FOUR

RESULTS AND DISCUSSION

4.1 Response Rates

Out of the total 245 questionnaires that were sent to the respondents (housekeepers), 205 were dully filled and returned by the respondents, yielding a response rate of 74.3%. These were considered very reliable response rates for generalizations of study findings since, according to Zikmund et al. (2010), a response rate of 70 percent and above is said to be reliable.

4.2 Demographic Information

Demographic analysis is important because it gives valuable information that can be used to make good decisions that affect the future of the respondents or the phenomenon under invest. It helps people understand the characteristics of a population and how it might change in the future, which is important for making decisions. The findings of the study on the demographic findings are as follows.

Table 4.1: Demographic Information

Variable	Category	N	Percentage (%)
Gender	Male	87	42.4
	Female	118	57.6
Age Group	26-35	47	22.9
	36-45	111	54.1
	46-55	23	11.2
	>55	24	11.8
BMI	26.3-26.9	103	50.3
	27.01-27.34	87	42.4
	27.36-27.47	15	7.3
Education Level	Primary	23	11.2
	Secondary	120	58.5
	Certificate	54	26.4
	Diploma	8	3.9
Marital Status	Single	79	38.5
	Married	126	61.5
Department	Common areas/Public Attendants	44	21.4
	Room Stewards	114	55.6
	Linen Store	23	11.2
Duration of Service	0-5	55	26.8
	6-10	110	53.7
	11-15	40	19.5

The study established that 57.6% of the respondents were female, while 42.4% were male. This study's findings represented both genders well at the respective hotels. The distribution of the age group of the respondents showed that majority, 54.1% of the respondents were between 36-45 years, 22.9% of them were between 26-35 years, 11.8% of them were above 55 years old while only 11.2% of them were between 46-55 years.

Analysis on weight and height to find out BMI of the respondents, indicated that half of them 50.3% had a BMI of between 26.3-26.9, 42.4% of them had a BMI of between 27.01-27.34, while only 7.3% of them had a BMI of between 27.36-27.47. The findings revealed that most respondents had a BMI of (26.3-26.9) that was not ideal and termed as overweight, since with a BMI of 18.5 to 24.9 - you have a healthy weight range for young

and middle-aged adults. 25.0 to 29.9 - you are overweight. Over 30 - you are obese (NHS, 2023). Being overweight or obese, can affect physical functioning at work.

Results also indicated that more than half of the respondents, 58.5%, had attained secondary education, 26.4% had attained a college certificate, 11.2% had attained primary education, and only 3.9% had attained a college diploma. None of the respondents had University degree or postgraduate degree. The study also showed 61.5% of the respondents were married, while only 38.5% were single.

The study's findings show that most respondents, 55.6%, work as room stewards while the rest of the housekeepers work as public attendants and at linen stores at 21.4% and 11.2%, respectively.

The results of the study also showed that the majority of the respondents 53.7% had worked in their respective hotels between 6-10 years, 26.8% of them had worked in their respective hotels between 0-5 years while 19.5% of them had worked in their respective hotels between 11-15 years respective. Majority (53.7%) had worked a reasonable duration of time (6-10 years) to give reliable responses to the study. This indicated most of the respondents had worked in the hotels for more than 6 years and therefore were exposed to the risk factors for long and this explains the prevalence of MSD among the respondents.

4.3 Annual Prevalence of Work- Related Musculoskeletal Disorder

The study sought to assess the annual prevalence of work-related musculoskeletal disorders among housekeepers in selected hotels in Mombasa County. The study's findings revealed that 91.7% (188) of the respondents stated that they had experienced muscle and joint pains and knew the possible causes. In comparison, 8.3% (17) only stated that they did not experience muscle or joint pains within a year of responding.

These findings are shown in Figure 4.1 below.

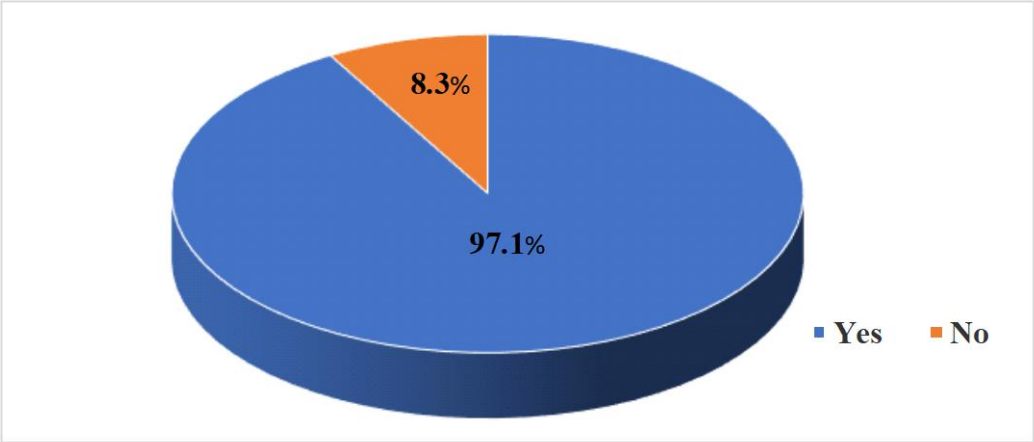

Figure 4.1: Muscle and Joint Pain Experience

The results are aligned with the findings of Özcan *et al*, (2019), who also assessed the prevalence and risk factors of occupational musculoskeletal pain in workers working at metal work. The annual prevalence of musculoskeletal pain among metal workers was 83.0%. The prevalence rate of 97.1% remains higher than 68.1% reported by Munala *et al*, (2021) among flower farm workers in Kenya.

4.3.1 Part of the Body Affected by Pain

To further assess the prevalence of work-related musculoskeletal disorders among housekeepers in selected hotels in Mombasa County, the respondents were asked to indicate the part of their bodies that experienced muscle or joint pain. The results are indicated in Table 4.2 below:

Table 4.2: Muscle and Joint Pains and Part of the Body That Was Affected

Experience muscle and joint pains		**Lower back pains**	**Neck and shoulder pains**	**Leg pains**
Frequency	188	181	152	50
Percentage	91.7%	96.1%	81.0%	26.8%

The results indicated that 96.1% of the housekeepers who experienced muscle and joint pains experienced it in the lower back, 81.0% had neck and shoulder pains, and 26.8% experienced leg pains indicating that lower back pain was the most prevalent pain among the housekeepers.

The results revealed that the hotel housekeeping staff experienced muscle or joint pains in the lower back, neck and shoulders, legs or shoulders. These findings further emphasized the prevalence of work-related musculoskeletal disorders among housekeepers in selected hotels in Mombasa County.

The study's findings align with the findings of Özcan *et al.* (2019), that found that the annual prevalence of the complaints was; 64.8% low back, 52.9% upper back, and neck 48.0% among metal workers.

Table 4.3: Association between Different Parts of Body Pains

Pain	Had leg pain	Did not Have Leg pain	Total	Chi-Square
Had lower back pain	53(26.7%)	145(73.3%)	198(96.6%)	.598
Had Upper back (Neck and Shoulder) pain	45(26.6%)	124(73.4%)	169(82.4%)	.603

The above indicated that 48% of the staff would be experiencing leg, upper back, and lower back pains. Results also indicated that out of the 96.6% of the total staff who had lower back pain, 26.7% of them would also have leg pains. Furthermore, 26.6% of the 82.4% of staff who had upper back pain also experienced leg pain. According to the study, housekeeping staff with musculoskeletal disorders who experience lower and upper back pain do not always report pain in their legs ($p > .598$; $p > .603$)

4.3.2 Duration of Experiencing Muscle Pain

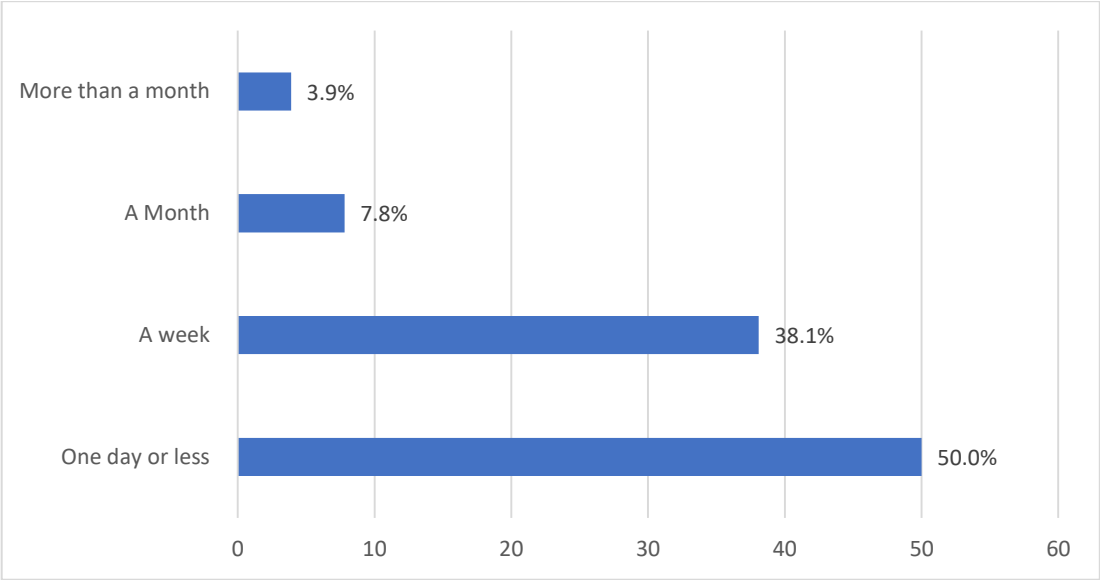

Figure 4.2: Duration of Experiencing Muscle Pain

The study further sought to determine how long respondents experienced muscle or joint pains. Half of the respondents 50.0% stated that they experienced pain for a day or less, 38.1% stated that they experienced pain for a week, 7.8% stated that they experienced it for a month and 3.9% for over a month.

These findings reveal that most of the pain experienced by 88.1% (who experienced pain for a week or less) of the housekeepers was not chronic but was recurrent. 11.9% of those who experienced pain for a month or more were likely chronic because they did not seek medical attention at the initial stages of pain and those who have worked as housekeepers long enough (over 5 years) to experience the effects.

4.3.3 Whether They Sought Medical Advice

The study had sought to establish whether the duration one felt the WSDs pains and seeking medical advise amoung housekeeping in selected hotels in Mombasa County in Kenya and the follwing were the responses.

Table 4.4: Whether They Sought Medical Advice

Category	Percentage	Chi-Square (exact)	df	P value
Sought medical advice	42.4			
Did not seek medical advice	57.6	4.562	1	0.031

The respondents were also asked whether they sought medical advice due to the muscle or joint pains that they were experiencing. The study's findings indicated that 42.4% of the respondents experiencing joint and muscle pains sought medical advice from doctors, physiotherapists, hotel nurses, or clinicians due to the muscle pains they were experiencing. In comparison, 57.6% of them stated otherwise- that they get over-the-counter medication, massage, or self-treatment.

These results make known that a significant number of respondents (57.6%) did not take work-related musculoskeletal disorders seriously or were unaware of the implications of recurrent pains irrespective of severity, and these disorders among housekeepers in selected hotels in Mombasa County. The study also established a significant (*P <.05)* relationship between the duration one felt the MSDs pains and seeking medical advice among housekeeping in selected hotels in Mombasa County in Kenya. The study's findings are consistent with the findings by Ndegwa et al (2021), that highlighted that more than a half of the staff with MSDs do not seek medical consultation about their illness. They instead seek treatment such as over-the-counter medication (18%) and purchase local creams and sprays (35.6%) from local pharmacies. As a result, the patients incur significant expenses for treating LBP, which is not always effective and may lead to chronic lower back pain. Nonetheless, the results show that a higher percentage of housekeepers complaining of muscle and joint pains sought treatment than 9% in an earlier study by Norouzi (2023) highlighted a significant increase in addressing the MSDs associated pains.

4.3.4 Relationship between Length of Pain and Seeking Medical Advice

The study sought to establish the length of pain experienced and whether the housekeepers sought medical advice, and the study's findings established that 40.7% of the housekeepers who experienced pain for a day or less sought medical advice, and 84.2% of the housekeepers who experienced pain for a week sought medical advice. In comparison, 60.0% of the housekeepers that experienced pain for more than a month sought medical advice.

Table 4.5: Length of Pain Experienced and Whether the Housekeepers Sought Medical Advice

Length of pain experienced		Sought medical advice	Did not seek medical advice
A day or less	%	40.7	59.3
A week	%	84.2	15.8
A month	%	100.0	0.0
More than a month	%	60.0	40.0

The study conveys that the longer the pain experienced by housekeepers, the more the chances of seeking medical advice. Therefore, most of those experiencing muscle and joint pains did not seek medical attention because they waited for more than a week or more trying other interventions before the pain persisted or disabled ability to perform.

The study had sought to evaluate the relationship between demographic factors and MSD conditions through a statistical technique called chi-squared test (represented symbolically as χ^2) was employed to examine discrepancies between the data distributions that are observed and those that are expected. the response was as follows.

Table 4.6: Relationship between Demographic Characteristics and MSD

Demographic Characteristics of the Respondents	chi-square χ^2	df	Sig. relation with MSD at 95% confidence level
Gender	0.3862	1	0.797
Age Group	3.6712	1	0.044
BMI	0.9421	1	0.093
Education Level	0.7912	1	0.222
Marital Status	0.6134	1	0.840
Duration of Service	4.881	1	0.022

The study evaluated the relationship between demographic factors and MSD conditions. The results indicated that the housekeeping staff's age and duration of service had a significant ($P< .05$) influence on their MSD condition. In contrast, their gender, BMI, education level, and marital status did not significantly ($P> .05$) influence their MSD condition.

These findings indicate that the longer the housekeepers worked, the more likely the cumulation of strain and work repetition that caused muscle and joint pains. Housekeepers still experienced pains irrespective of their gender, BMI, level of education, and marital status. The findings align with a study by Moon et al (2019) that established differences in terms of gender and age had significance in prevalence rate registered among older workers that had more years of service. These findings are also supported by a study by Sánchez-Rodríguez et. al (2022) that found that many housekeepers in the Balearic Islands reported chronic pain and that more years worked correlated with chronic pain. Physical activities and BMI were not statistically associated with pain.

The findings show that WRMSDs are prevalent among housekeepers in selected hotels in Mombasa County. The study findings are in line with a study conducted by Wami *et al*. (2019) on the impact of work-related risk factors on developing neck and upper limb pain among low-wage hotel housekeepers in Gondar town, Northwest Ethiopia. The institution-based cross-sectional study established that the overall magnitude of the self-reported neck and upper limb musculoskeletal disorders among hotel housekeepers in the

last 12 months was 62.8%. The main body areas of concern were neck pain (50.7%), shoulder pain (54%), elbow/forearm (47.2%), and hand/wrist (45.5%).

However, the study indicates the same with other sectors with similar workplace risk factors in Kenya where Munala (2019) did a study that registered 68.1% MSD prevalence rate among flower farm workers in Kenya.

4.4 Risk Factors Associated with Work-Related Musculoskeletal Disorders

The study sought to determine the risk factors associated with work-related musculoskeletal disorders among housekeepers in selected hotels in Mombasa County.

4.4.1 Duration of Time the Housekeepers Worked Per Day and Week

The study sought to determine the hours the housekeepers worked daily and how many days per week.

Table 4.7: Time the Housekeepers Worked Per Day and Week

Category	Number of Hours/Days	Percentage
Number of Hours in a Day	8-10 Hours	19.0
	8-12 Hours	69.8
	8-15 Hours	12.9
Number of days in week	6 Days	96.6
	7 Days	3.4

The results indicated that almost all the respondents (96.6%) worked six days a week, while 3.4% worked all days of the week. The study also established that 69.8% of the respondents worked between 8-12 hours, 19% worked between 8-10 hours, and 11.2% worked between 8-15 hours daily. Based on the study findings, almost all the respondents have long working hours with only one resting day a week, which could pose as a risk to the high prevalence of WRMSDs among housekeepers in selected hotels in Mombasa County. Figure 4.4 illustrates the study findings.

The findings are similar to those by Dartey et al (2024), work-related musculoskeletal disorders among midwives in selected hospitals in the municipality of Ghana which established that long shifts and lack of in between breaks were associated with MSDs. Additionally, working about 12 hours per day showed a significant increase in reported MSDs in the back, neck, and shoulders.

4.4.2 Carrying, Lifting, Pulling or Pushing Items

The study also sought to establish whether the respondents carry, lift, pull or push items as part of their daily activity.

The respondents were asked whether they carried, lifted, or moved heavy things (more than 20 kilograms) daily. The study's findings indicated that almost all respondents, 92.2%, carried, lifted, or moved heavy things (more than 20 kilograms) daily. In comparison, only 7.8% of them stated otherwise (Fig 4.2). Among the items carried, lifted, or moved included beds and heavy-duty mattresses (54.5%), room furniture (hardwood tables, chairs) (22.8%), laundry bags or piles (14.3%), 20-litre jerricans of water (4.2%) and detergent (4.2%). Figure 4.3 summarizes these findings.

The study further established that all the respondents 100% pulled or pushed heavy items daily as part of their work routine. Among the items that the respondents stated that they either push or pull included beds (43.4%), room furniture (30.7%) as well as un serviced trolleys with laundry/linen (25.9%). Fig 4.3 illustrates the findings of the study. The study findings show that 92.2% of the respondents carry, lift or move items weighing more than 20 kilograms daily, meaning it is repetitive, and is a risk factor for causing WRMSDs.

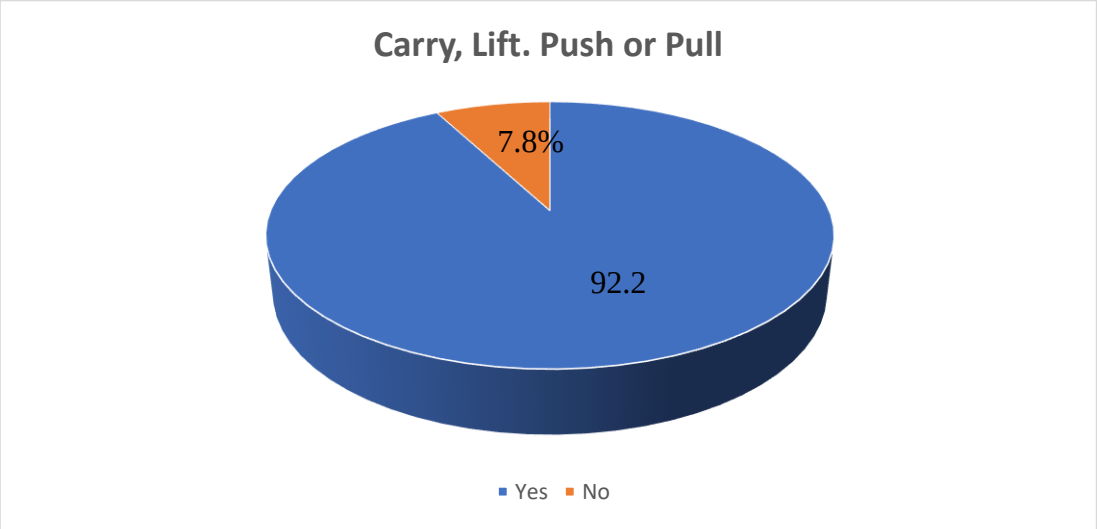

Figure 4.3: Carry, Lift, Pull or Pushes Items

The study established that 92.2% of the respondents carry, lift, pull or push items as their daily tasks while 7.8% of the respondents stated that they did not carry, lift, pull or push items as their daily tasks.

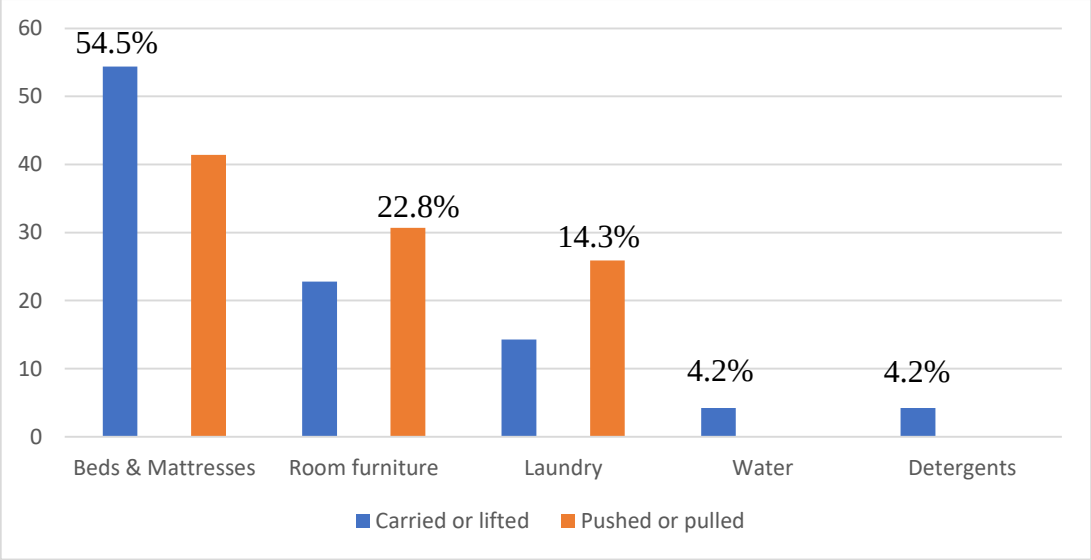

Figure 4.3: Items Carried, Lifted, Pulled or Pushed

4.4.3 Time Taken for Breaks

The study's results also revealed that for most respondents, 85.5% had a break of 45-60 minutes, 21% had more than 60 minutes, and only 12.5% had 30-minute breaks. However, the breaks were combined with lunch breaks, thus not very effective in assisting the respondents with time to relax from strain while performing their daily tasks. These findings show that the housekeepers have much work to cover within their working hours, so they have no time for breaks between tasks.

The findings of the study were also consistent with the findings by Dartey *et al* (2024), that breaks between shifts and rests were associated with MSDs that were related to back pains. Also, working long hours such as about 12 hours per day, showed a statistically significant increase in reported MSDs in the back, neck, and shoulders.

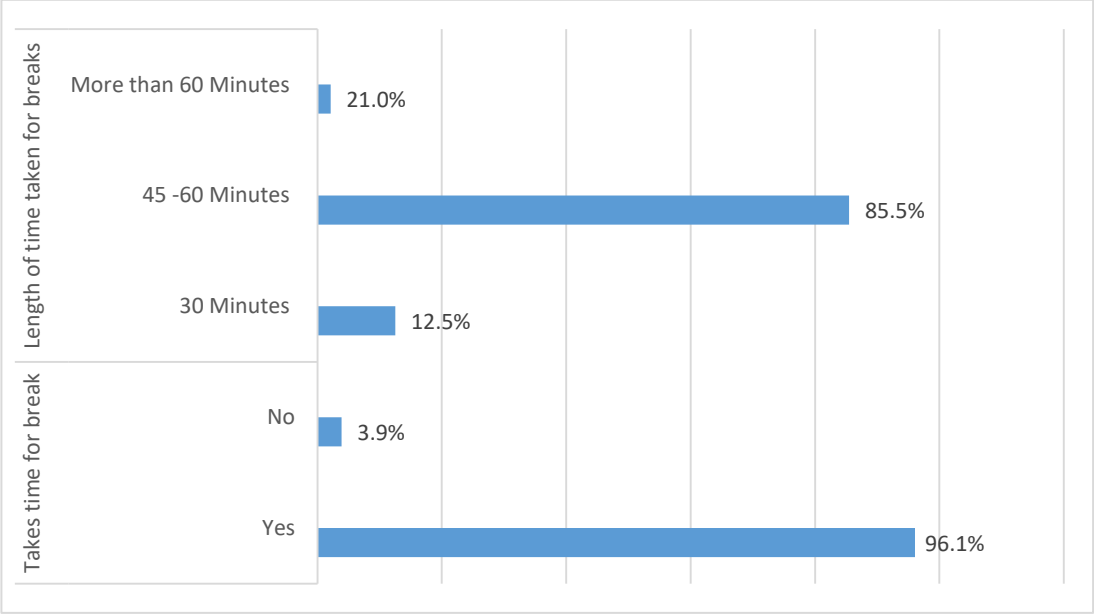

Figure 4.4: Time Taken for Break

4.4.4 Working Positions

The study further sought to establish the positions the respondents use the most while performing the above daily tasks or activities.

Table 4.8: Working Positions

Position	Response	Frequency	Percentage
Sitting	Yes	7	3.4
	No	198	96.6
Standing	Yes	205	100
	No	0	0
Squatting	Yes	61	29.8
	No	144	70.2
Bending	Yes	205	100
	No	0	0

The study established that of the respondents, 100% stood or bent while performing their daily tasks, while only a few of the respondents squatted (29.8%) or sat down (3.4%) while performing their daily tasks.

These findings indicate that the housekeepers are not keen to correct working postures due to high workload. The housekeepers are also unaware of the effects of correct working, lifting, and carrying positions and postures.

4.4.5 Association between Risk Factors and WRMSD

The researcher further sought the relationship between the risk factors and the prevalence of musculoskeletal disorders among housekeepers. Below in table 4.7 is the summary of risk factors associated with low back pain.

Table 4.9: Risk Factors Associated with Low Back Pain

Risk Factors		Yes %	No %	Chi-Square (exact)	df	P value
Carrying/lifting Pulling/pushing heavy things >20 kilograms	Yes	95.8	4.2	0.705	1	0.506
	No	100	0			
Taking breaks	Yes	95.9	4.1	0.338	1	0.723
	No	100	0			
Standing	Yes	100	0	0.294	1	0.754
	No	96	4			
Bending	Yes	100	0	3.527	1	0.056
	No	94.4	5.6			

The results indicated that all the risk factors (carrying/lifting heavy things >20 kilograms taking a break, standing, and bending) had no significant association with low back pain at a 95% confidence level, implying that none of the risk factors has got significant impact on low back pain. Bending was close to association ($P<0.05$) with prevalence of low back pains. Hence, the reason we have a prevalence of 96.1% of housekeepers experiencing low back because all respondents indicated that they bend as they perform their tasks.

The findings of the study are similar to an earlier study by Sim and Wright (2005) reported that 9-19% of back pains are caused by twisting and 12-14% by prolonged bending. The study also indicated that lifting contributes from 37-49%, pushing from 9-16%, pulling from 6-9%, and carrying from 5-8% of the cases of back pain.

Table 4.10: Risk Factors Associated with Neck and Shoulder Pains

Risk Factors		Yes %	No %	Chi-Square (exact)	df	P value
Carrying/lifting /pushing/pulling heavy things	Yes	83.6	16.4	10.809	1	0.003
	No	50	50			
Taking breaks	Yes	80.2	19.8	1.956	1	0.179
	No	100	0			
Standing	Yes	100	0	1.703	1	0.351
	No	80.3	19.7			
Bending	Yes	75.4	24.6	1.746	1	0.242
	No	83.3	16.7			

The results also indicated that standing, bending and taking breaks had no significant association with neck and shoulder pains. However, there was a significant association between carrying things with neck and shoulder injury at a 95% confidence level. There is a likelihood that housekeepers that carry or lift heavy things may be affected by shoulder pains.

These findings align with Kadota (2020) that established a significant relationship between heavy load carrying and neck and shoulder injury among other musculoskeletal pain and disability among women in Shinyanga Region, Tanzania.

Table 4.11: Risk Factors Associated with Legs

Risk Factors		Yes %	No %	Chi-Square (exact)	df	P value
Carrying/lifting /pulling/pushing heavy things	Yes	29.1	70.9	6.363	1	0.015
	No	0	100			
Taking breaks	Yes	27.9	72.1	3.052	1	0.078
	No	0	100			
Standing	Yes	0	100	2.657	1	0.108
	No	27.8	72.2			
Bending	Yes	24.6	75.4	0.222	1	0.387
	No	27.8	72.2			

The results also indicated that taking breaks, standing and bending had no significant association with leg pains. However, there was a significant association between carrying things and leg injury at a 95% confidence level, indicating that housekeepers who carry or lift heavy things are more likely to get leg injuries than those who do not. This is likely because of the technique applied in carrying out the tasks by the housekeepers. These results also align with a study by Kadota *et al.* (2020) that showed an association between increasing load-carrying exposures, long trip durations, and knee pain among women in Shinyanga Region, Tanzania.

The findings of the study objective, risk factors associated with WRMSDs, have also been supported by the findings of Van Eerd et al (2020) that carrying, lifting, pulling, pushing heavy things, long hours of working and not taking breaks between daily tasks significantly affected WRMSDs. In another study, Tamale *et al* (2024) highlighted that, workers that lift things daily, complain of MSDs. However, additional risk factors include vibrations, repetitive movement, and falls that lead to MSDs.

4.4.6 Check List Analysis

The researcher also conducted checklist on the of MSD factors in the targeted 18 hotels under study, which aimed to assessing the working conditions of the respective hotels in order to identify the prevalence of MSD and possible risk factors.

Table 4.12: Checklist

Activities	Yes	No
Were correct postures observed when performing tasks?	38.9% (7)	61.1% (11)
Were rest breaks during work observed?	77.8% (14)	22.2% (4)
Was the work design and layout good? For example, proper lighting, good working heights?	88.9% (16)	11.1% (2)
Did the workers have or use suitable equipment (mops, serviced trolleys, lifting aids) and wear appropriate protective clothing (non-slid shoes, gloves) while performing tasks?	55.6% (10)	44.4% (8)

The findings of the study showed that in the majority of the hotels, 88.9% had proper work design and layout (proper lighting and good working heights), and 77.8% of them had rest breaks during work; however, it was one break and not in between tasks. It was a combined lunch break.

55.6% of the respondents used the right essential equipment and wore appropriate clothing while performing tasks, while a significant percentage, 44.4%, were not in appropriate protective clothing (for example, Mombasa being a humid area, these percentage of respondents were observed to be in open shoes)

These results implied that many hotels need to provide their staff with the right equipment and uniforms while performing their tasks. The hotels and housekeepers do not pay keen attention to using the right ergonomic equipment and protective clothing, which increases the prevalence of musculoskeletal disorders.

Finally, the study findings also revealed that only 38.9% of the hotels under study had their staff in the correct postures while performing tasks.

4.7 Preventive Strategies to Work-related Musculoskeletal Disorders

The study sought to analyze strategies to prevent work-related musculoskeletal disorders among housekeepers in selected hotels in Mombasa County. The respondents were asked whether they had individual preventive measures for muscle and joint pains.

4.7.1 Individual Preventive Measures

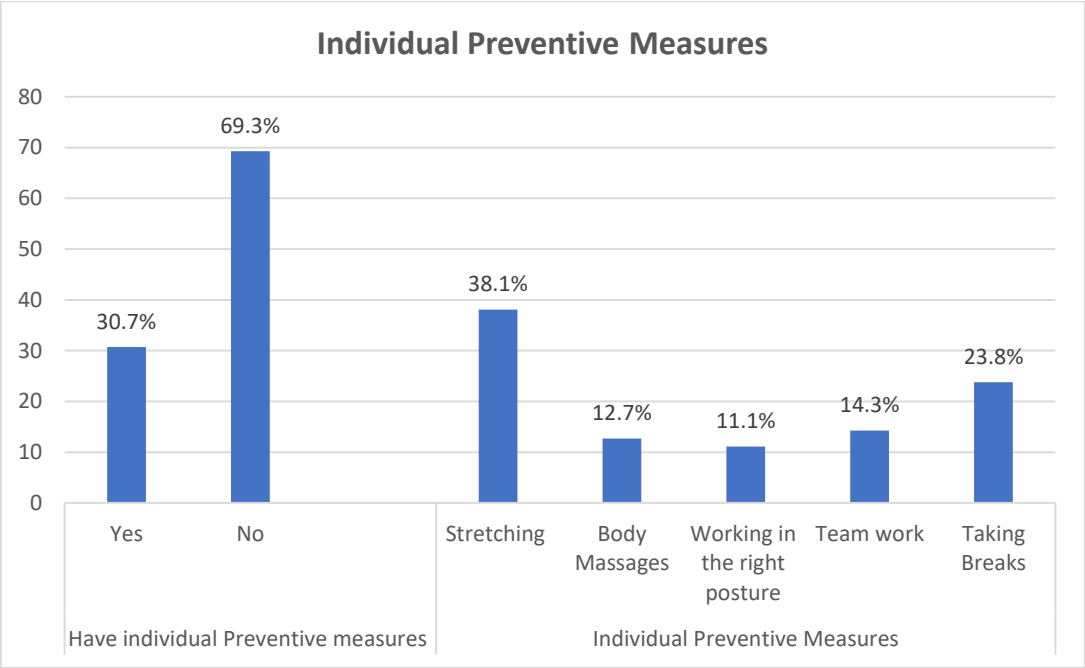

Figure 4.5: Individual Preventive Measures

The results revealed that 30.7% of the respondents had individual preventive measures for muscle and joint pains. In contrast, 69.3% of the majority stated they did not have individual preventive measures for muscle and joint pains. These results imply that most housekeepers in selected hotels in Mombasa County are unaware of preventive measures, do not have time for preventive measures, and do not give much attention to work-related muscle and joint pains.

The respondents who stated they had individual preventive measures for muscle and joint pains were further asked to list them. The majority of the respondents 38.1% stated that they stretched in between work and after work, 23.8% of them stated that they took short breaks in between tasks, 14.3% of them stated that they teamed up with their fellow staff, especially in carting heavy loads or moving heavy furniture, 12.7% of them stated that

they had regular personalized massage sessions to handle muscle and joint pains. In comparison, 11.1% of them stated that they maintained the correct working posture.

4.7.2 Hotel Preventive Measures

The researcher also sought to establish whether the hotels had any preventive measures to prevent their staff from experiencing muscle pains and discomfort.

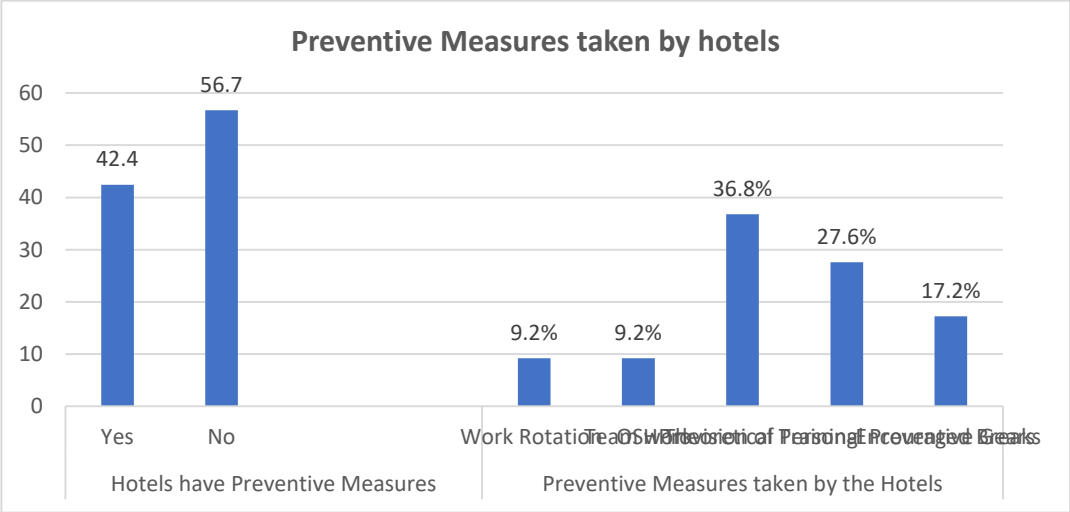

Figure 4.6: Hotel Preventive Measures

The results revealed that 42.4 % of the hotels put in place to prevent their staff from experiencing muscle pains and discomfort, while slightly more than half of them, 56.7% stated otherwise. These results show that work-related musculoskeletal disorders among housekeepers in selected hotels in Mombasa County should be given much-needed priority and attention.

The respondents were further asked to state the preventive measures put in place by their hotels to prevent their staff from experiencing muscle pains and discomfort. The majority of the respondents, 36.8% stated that their hotels provided regular OSH theoretical training, 27.6% of them stated that their hotels provided them with personal protective gear and equipment when working, and 17.2% stated that their hotels allowed them to

take breaks while working. In comparison, 9.2% of them stated that their hotels practiced employee rotations and encouraged them to team up to handle heavier responsibilities respectively.

4.7.3 Employees Provided with Suitable Clothing and Equipment

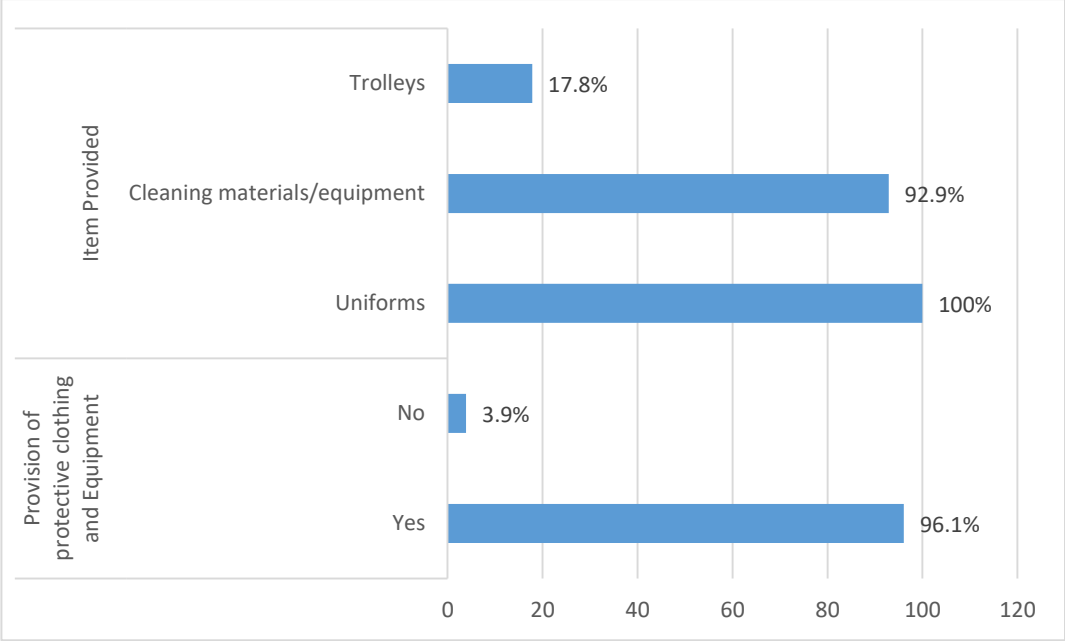

Figure 4.7: Provision of Protective Clothing and Equipment

The study further sought to establish which suitable clothing and equipment the housekeepers were provided with while working. Almost all respondents, 96.1%, stated they were provided with the essential suitable clothing and equipment while working, while only 3.9% stated otherwise. This finding indicates that selected hotels in Mombasa County knew employee safety.

The respondents were further asked to state the suitable clothing and equipment they were provided. Out of the 100% of respondents that stated that they were provided with uniforms, 92.9% of them stated that they were provided with cleaning materials and detergents. In comparison, only 17.8% of them stated that they were provided with trolleys

to help them carry heavy loads, laundry, or linen. The findings confirm that the aiding equipment and protective clothing the hotels provide are basic essentials and do not include better assistive aids like serviced trolleys, lifting aids, or slid shoes.

4.7.4 Adequacy of the Existing Preventive Measures

Finally, the study sought to find out from the respondents whether the existing preventive measures were adequate to curb work-related musculoskeletal disorders among housekeepers in selected hotels in Mombasa County.

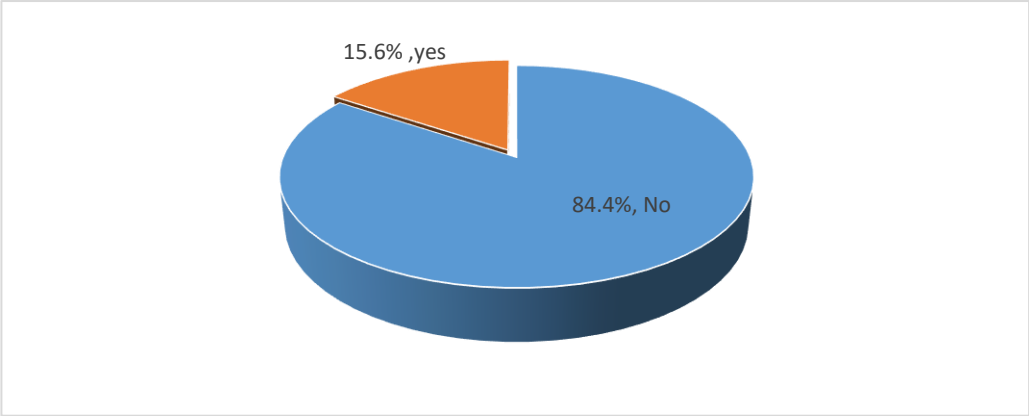

Figure 4.8: Adequacy of Preventive Measures

The majority of the respondents (84.4%) stated that existing preventive measures were not adequate to curb work-related musculoskeletal disorders among housekeepers in selected hotels in Mombasa County because many of them still experience normal muscle and joint pains after walking or working for long hours and after pushing unserviced trolleys. Only 15.6% of the respondents stated that preventive measures were adequate to curb work-related musculoskeletal disorders among housekeepers since minimal injuries occur at work.

4.7.5 Association between Preventive Measures and WRMSD

The researcher sought to determine the association between Individual Preventive Measures and WRMSD (normal joint and muscle pain). The results are summarized in Table 4.11 below.

Table 4.13: Association between Preventive Measures and WRMSD

Model		Unstandardized Coefficients		Standardized Coefficients		
		B	**Std. Error**	**Beta**	**t**	**Sig.**
1	(Constant)	1.894	.201		9.408	.000
	Individual Preventive Measures	.432	.085	.494	7.956	.000
	Hotel Preventive Measures	.509	.064	.611	5.085	.000
	Adequacy of preventive Measures	.515	.074	.650	7.013	.000

The results from the multi-regression analysis indicated that all the preventive measures (individual, hotels, and Adequacy of preventive measures by the hotel) would have a significant ($P< .05$) influence on WRMSD cases among housekeeping staff at the hotels in Mombasa. Additionally, the results indicated a .432 change in Individual Preventive Measures, a .509 change in Hotel Preventive Measures and a .515 change in the Adequacy of Preventive Measures would have a unit change in the prevalence of WRMSD among the housekeepers in hotels in Mombasa.

The study's finding is consistent with the findings of Dartey et al (2024) that stressed the need of frequent breaks and stretching that is necessary in the reduction of WRMSDs. Stretching is a form of physical exercise. Stretching has many benefits, including increased flexibility, improved range of motion within joints, improved circulation, improved posture, stress relief, and generally improved mood and motivation at work.

The need of designing jobs to fit workers may include mechanization, job rotation, job creativity, and enrichment or teamwork have been stressed by Kee (2023). Where eliminating these factors is impractical, prevention strategies such as redesigning workplace layout, tool and equipment designs, and work practices should be considered. Mechanizing the job is one method to reduce repetitive tasks. In addition, training should be mandatory for workers involved in jobs that include repetitive tasks. Workers must know how to use and adjust workstations to fit the tasks and their individual needs. Lewis *et al* (2022) also emphasized the importance and right of rest periods between tasks to relax the muscles by changing position or moving around and how to consciously and intentionally control muscle tension throughout the entire work shift.

Table 4.14: Association between Demographic Characteristics and Having Individual Preventive Measures

Risk Factors		**Yes %**	**No %**	**Chi-Square (exact)**	**df**	**P value**
Gender	Male	27.6	72.4	0.703	1	0.402
	Female	33.1	66.9			
Age	26-35	17	83	17.265	3	0.001
	36-45	28.8	71.2			
	46-55	65.2	34.8			
	>=55	33.3	66.7			
Level of education	Certificate	13	87	26.6	3	0.000
	Diploma	100	0			
	Secondary	33.3	66.7			
	Primary	34.8	65.2			
Status	Single	30.4	69.6	0.007	1	0.931
	Married	31	69			
Service duration	0-5	0	100	33.451	2	0.000
	6-10	42.7	57.3			
	11-15	40	60			
Department	Common Area/Public Attendants	100	0	90.574	4	0.000
	Linen Store	0	100			
	Steward room	23.9	76.1			
Working hours	8 or less	25.8	4.2	0.416	1	0.338
	More than 8	31.6	68.4			
Working days	6 or less	28.3	71.7	16.336	1	0.000
	Whole week	0	100			

There is a significant association between age, level of education, service duration, department and working days, and staff individual preventive measures. Senior staffs are

more likely to have individual preventive measures than their younger counterparts. Diploma holders take individual preventive measures more seriously than their peers. Staff who served longer are more likely to take individual preventive measures than those who have served for fewer periods.

Public attendants have put individual preventive measures in place, while room stewards are more likely to have individual preventive measures than staff serving in the linen store. Most staff (71.7%) working six or fewer days still need individual preventive measures. No staff working seven days a week has individual preventive measures. The findings show that the senior and more experienced staff know the importance of Individual preventive measures. Those with a day break will likely have time for individual preventive measures.

These findings are supported by a study by Sánchez-Rodríguez et. al (2022) that found that many housekeepers in the Balearic Islands reported chronic pain and low compliance with occupational risk preventive measures. More years worked, type of contract, and number of hours positively correlated with the housekeeper's perception of preventive measures.

The findings are also similar to those by He *et al,* (2023) that found out that high education level, long job tenure, weight, gender and type of work had an influence in prevalence of MSDs.

4.8 Intervening Variables

The study further sought to establish the effects of intervening variables of the study. The study's findings showed that 62% of the respondents belonged to a housekeeping regulatory body, while 38% stated that they did not belong to a housekeeping regulatory body. However, only a quarter, 25.5% of the respondents who stated that they belonged to a housekeeping regulatory body stated that such bodies were influential, with three-quarters of them, 75.5% stating otherwise. In addition, slightly more than half of the

respondents 54.1% stated that they had health committees in their respective hotels, while more than three-quarters of them 85.6% stated that they were provided with training once a year on how to perform their work physically correctly without injuring their muscles, joints or on a related matter respectively.

Table 4.15: Staff Response on Intervening Variables

Variable	Response	Frequency	Percentage
Membership to any housekeeping regulatory body	Yes	127	62.0
	No	78	38.0
Effectiveness of the body	Yes	32	25.2
	No	95	74.8
Health Committee present at the hotels	Yes	111	54.1
	No	94	45.9
Trainings to illustrate how to work correctly to avoid injuries	Yes	120	85.6
	No	85	14.4

These results further confirm that work-related musculoskeletal disorders among housekeepers in selected hotels in Mombasa County are not given the much-needed priority and attention. The regulatory bodies are not effective neither are the trainings since there is still a high percentage of housekeepers not adopting the correct working practices.

The findings align with a study on the legal framework for OSH mechanisms in Argentina, Indonesia, and India, and these laws remain underdeveloped and under-enforced. There is no auditing and inspection of employer sites. Petitions to courts to vindicate established rights to physical damages compensation is not well documented, and OSH claims are not routinely litigated in national or labor-specific courts, therefore, making it evident that national OSH regimes contain significant gaps in protection for housekeepers across both substantive and procedural law (Putsa,2022).

CHAPTER FIVE

CONCLUSION AND RECOMMENDATION

5.1 Conclusion

5.1.1 Prevalence of Work-Related Musculoskeletal Disorders among Housekeepers

The study concluded that the prevalence of WRMSDs among housekeepers in selected hotels in Mombasa County that complained of muscle and joint pain was at 91.7%. The lower back was the most affected, followed by the neck and shoulders, then lower limbs. At 96.1%, 81%, and 26.8% respectively. Additionally, the results indicated that a significant number (57.6%) of the respondents did not seek medical advice due to the muscle and joint pains that they were experiencing, implying that joint and muscle pains were not taken seriously among housekeepers in selected hotels in Mombasa County.

The study findings show that 100% of those who sought medical advice, did so after experiencing pain for a month and 60% after experiencing pain for over a month, which would be considered a disorder at that point.

From the relationship tests done, the study concluded that the housekeeping staff's age and duration of service had a significant ($P < .05$) influence on the housekeeping staff's MSD condition. In contrast, their gender, BMI, education level, and marital status did not significantly ($P > .05$) influence their MSD condition.

5.1.2 Risk Factors Associated With Work-Related Musculoskeletal Disorders among Housekeepers

The study concluded that several risk factors associated with work-related musculoskeletal disorders among housekeepers in selected hotels in Mombasa County would have a significant ($P < .05$) influence on WRMSD cases among housekeeping staff at the hotels in Mombasa.

The results indicated that all the risk factors (carrying/lifting heavy things >20 kilograms taking a break, standing, and bending) had no significant association with low back pain at a 95% confidence level, but there was a significant association between carrying things and neck, shoulder and leg injury at a 95% confidence level.

5.1.3 Strategies Put in Place to Prevent Work-Related Musculoskeletal Disorders among Housekeepers

The study concluded that there were strategies put in place to prevent work-related musculoskeletal disorders among housekeepers in selected hotels in Mombasa County. However, the preventive measures (individual, hotel and adequacy of preventive measures) have a significant ($P< .05$) influence on WRMSD cases among housekeeping staff at the hotels in Mombasa.

Additionally, the older staff (above 40), diploma holders and above, and those who have served longer are more likely to have individual preventive strategies than their counterparts. Room attendants are also observed to be keener on individual preventive strategies than public attendants. Public attendants expressed having a high workload and fewer opportunities for breaks. Therefore the study concludes that there is a need for orientation and training for younger, new, and less educated housekeepers, on WRMSDs and their preventive strategies.

The study also concluded that the laws governing housekeepers in Kenya need to be better reinforced. Hotels have health committees and housekeeper unions that are more on paper but ineffective in performing their roles. The trainings are also not effectively conducted.

Finally, the results indicated that the laws governing housekeepers in Kenya need to be better reinforced. Noticeably, the hotels have health committees and housekeeper unions that are more on paper but ineffective in performing their roles. The trainings are also not effectively conducted.

5.2 Recommendations

Based on the findings of the study, the researcher recommends that:

5.2.1 Prevalence of Work-Related Musculoskeletal Disorders among Housekeepers

There is need of identifying the factors that contribute to the prevalence of MSD among the house keeping staff in selected hotels in Mombasa County. Hotels should employ adequate staff or consider mechanization of equipment to ensure that their staff have reasonable working hours per day with breaks in between chores and reasonable time off duties so that it is practical to implement good postures and techniques while performing their duties. Housekeepers need to be enlightened on prevalence of WRMSDs so that they do not take muscle and joint pains as a normalcy as it can lead to disorders.

5.2.2 Risk Factors Associated with Work-Related Musculoskeletal Disorders among Housekeepers

There is need of identifying the risk associated with work-related musculoskeletal disorders among housekeepers that include carrying/lifting heavy things >20 kilograms taking a break, standing, and bending in order to identify ways to address them. The management of the hotels should also consider making work efficient for their housekeepers by investing in serviced trolleys, lifting aids as well as laundry rooms/or stores within easy reach for big hotels to control work-related musculoskeletal disorders among housekeepers, since carrying, lifting, pushing, pulling, long-standing and walking long distances in a day, came out as significant factors associated with WRMSDs among housekeepers.

5.2.3 Strategies Put in Place to Prevent Work-Related Musculoskeletal Disorders among Housekeepers

The hotels should reinforce workers' laws through workers' unions and health committees in the hotels which can go a long way toward curbing musculoskeletal disorders among

hotel housekeepers. Policies to have ergonomic training as an essential learning course in school would help individuals mature up with good posture and lifting techniques in all disciplines. MSD should not be a low-ranked burden as pain affects productivity and quality of life. In addition, the management of hotels should consider having practical training and demonstrations, particularly on correct postures and techniques while working, especially among the less educated, the younger ones, and the newly employed, to control work-related musculoskeletal disorders among housekeepers.

5.3 Study Limitations and Suggestions

5.3.1 Limitations

1. The study was limited to work-related musculoskeletal disorders among housekeepers in selected hotels within Mombasa County. Future studies should be conducted among hotels in other cities, like Nairobi, Nakuru, Eldoret, and Kisumu, for comparison.
2. The study was limited to primary data only and did not consider secondary data. Therefore, the study could have benefited with exploration of OSH Audit documents in order to establish the level of compliance.
3. The study was also limited to purposefully selected hotels, due to Covid pandemic at the time of data collection.

5.3.2 Suggestions

1. An experimental study can be used to establish the type of disorders, since muscle and joint pains were generalized due to knowledge limitation by the respondents.
2. A similar study can be conducted in the manufacturing industries in Kenya or among domestic workers, health workers, and housing construction workers in the country. Further study can also be done on this study's specific objective to provide more profound knowledge.

3. Lastly, the study evaluated prevalence, risk factors, and strategies for addressing WRMSD. Future studies should include variables not covered by this study, for example, the effects of WRMSDs among workers and institutions.

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APPENDICES

Appendix I: Introductory Letter

Jomo Kenyatta University of Agriculture and Technology,

P.O. Box 81310-80100

MOMBASA.

Dear Sir/Madam

Ref: Request for Data Collection

I am a postgraduate student at Jomo Kenyatta University of Agriculture and Technology pursuing a master's degree in Occupational Safety and Health. I would wish to carry out a research on the following topic: **Evaluation of work-related musculoskeletal disorder among housekeepers in hotels within Mombasa County.**

Kindly note that the research will be carried only for academic purposes and that the information gathered will be treated with utmost confidence and solely for academic purposes only. Strict ethical and professional principles will be observed to guarantee confidentiality and the research results and reports will not reference to any person. Your kind assistance and cooperation in this issue will highly appreciate.

Yours Sincerely,

ENID KANYIRI GIKUNDA

Appendix II: Consent Form

Dear Respondent,

RE: Consent letter

My name is Enid Kanyiri Gikunda. I am an Occupational Safety and Health postgraduate student at Jomo Kenyatta University of Agriculture and Technology conducting a research study on the evaluation of **work-related musculoskeletal disorders among housekeepers in selected hotels within Mombasa County**.

I wish to request for your voluntary participation and honest responses regarding the questions. You are free to choose either to participate or not to participate. There will be no monetary benefits for those participating. Information given will be treated with utmost confidentiality and will be used for the purpose of the study only. No names will be used to identify you and the information gathered will help enhance better understanding of the study topic.

I have read and understood this consent form and I volunteer to participate in this research study.

Sign…… Date…….

Participant

Sign…… Date……

Researcher

Appendix III: Questionnaire

Answer Appropriately

Section A: Demographics

Please tick as appropriate

1. Code of the hotel……
2. Gender Male ( ) Female ( )
3. Age

   18 - 25 ☐

   26 - 35 ☐

   36 - 45 ☐

   46 - 55 ☐

   Above 55 ☐

4. Height……
5. Weight…….
6. Education level Certificate ( ) Diploma ( ) Degree ( ) Postgraduate ( )
7. Status: Single ( ) Married ( ) Others ( )…….
8. Department and job designation…….

9. Duration of Service……...

Section B: Annual Prevalence of WRMSD

a) Have you ever experienced normal muscle and joint pains within the last one year?

Yes ( ) No ( )

b) Do you know about muscle pains and what could cause them?

Yes ( ) No ( )

Tick against the part of the body that was affected and specify the part.

	Yes	**No**
Back: Low or upper.		
Neck and Shoulders		
Leg		

c) For how long did you experience such pains?

A day or less	**A week**	**A month**	**More than month**

d) Did you seek medical advice? Yes () No ()

Section C: Risk factors associated with WRMSD

a) i) How many hours do you work per day?.....hours

ii) How many working days per week?.....days

b). What tasks do you perform on a daily basis?

i) Carrying, lifting or moving heavy things e.g. more than 20 kilograms Yes ( ) No ( )

If yes, explain what you lift, carry or move and how?

……...

…….....
....

ii) Pulling or pushing? Yes () No ( )

If yes, please explain briefly what and how……

……
……

iii) Do you take breaks while performing the tasks? Yes () No ()

how long?.....mins/hours

c) Which of the above mentioned tasks do you find most strenuous during the procedures?

……
……
……

d) What position do you use while performing the above tasks? Mark against positions used.

Sitting	
Standing	
Squatting	
Bending	

Section D: Preventive Strategies of WRMSD

a) Do you as an individual have any preventive measures for muscle and joint pains?

Yes () No ()

b) If yes, state them

……

……

……

c) Does the hotel have any preventive measures put in place to prevent you from these muscle pains and discomforts?

Yes () No ()

d) If yes, state them

……

……

……

e) Are you provided with the appropriate protective clothing and equipment for work? Explain……

…….

……

……..

c) Are these preventive measures adequate? Explain your answer.

Yes () No ()

……

……

……

d) What do you think should be done to eliminate or minimize muscle and joint pains among hoteliers in Kenya?

……

……

……

Section F: Intervening Variables

18. Are you a member of any housekeeping Regulatory body? Yes (). No ()

a) If yes, how effective is it?

Explain……
……

b) Do you have a health committee in your institution? Yes (). No ()

19. Have you had any training on how to perform your work physically correctly without injuring your muscles and joints, or on a related matter?

THANK YOU FOR YOUR COOPERATION

Appendix IV: Observation Checklist

ACTIVITIES	YES	NO
1.Were correct postures observed when performing tasks?		
2. Were rest breaks during work observed?		
3. Was the work design and layout good? For example proper lighting, good working heights.		
4. Did the workers have or use right equipment and wear appropriate clothing while performing tasks?		

Appendix V: Ethical Review Committee Approval

NACOSTI ACCREDITED

ERC/MSc/021/2019R

Pwani UNIVERSITY

ETHICS REVIEW COMMITTEE

ACCREDITTED BY THE NATIONAL COMMISSION FOR SCIENCE, TECHNOLOGY AND INNOVATION (NACOSTI, KENYA)

CERTIFICATE OF ETHICAL APPROVAL

THIS IS TO CERTIFY THAT THE PROPOSAL SUBMITTED BY:

ENID K. GIKUNDA

REFERENCE NO:
ERC/MSc/021/2019R

ENTITLED:
Evaluation of work related musculoskeletal disorders among housekeepers in selected hotels in Mombasa County, Kenya

TO BE UNDERTAKEN AT:
MOMBASA COUNTY, KENYA

FOR THE PERIOD
FROM: 5/02/2021 TO: 4/02/2022

HAS BEEN **APPROVED** BY THE ETHICS REVIEW COMMITTEE

AT ITS SITTING HELD AT PWANI UNIVERSITY, KENYA

ON THE 4/02/2021

CHAIRMAN	SECRETARY	LAY MEMEBER

Pwani UNIVERSITY

Ethics Review Committee,
Pwani University, www.pu.ac.ke, email: t.rewe@pu.ac.ke, j.ndiso@pu.ac.ke tell: 0719 182218, 0720785791
The ERC, Giving Integrity to Research for Sustainable Development

Appendix VI: National Commission for Science, Technology & Innovation Approval

REPUBLIC OF KENYA

NATIONAL COMMISSION FOR SCIENCE,TECHNOLOGY & INNOVATION

Ref No: **509299**

Date of Issue: **19/February/2021**

RESEARCH LICENSE

This is to Certify that Ms.. Enid Kanyiri Kanyiri of Jomo Kenyatta University of Agriculture and Technology, has been licensed to conduct research in Mombasa on the topic: EVALUATION OF WORK RELATED MUSCULOSKELETAL DISORDERS AMONG HOUSEKEEPERS IN SELECTED HOTELS IN MOMBASA COUNTY, KENYA for the period ending : 19/February/2022.

License No: **NACOSTI/P/21/8883**

509299

Applicant Identification Number

Director General
NATIONAL COMMISSION FOR SCIENCE,TECHNOLOGY & INNOVATION

Verification QR Code

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