ENSIGN COLLEGE OF PUBLIC HEALTH, KPONG

EASTERN REGION, GHANA

FACULTY OF PUBLIC HEALTH

DEPARTMENT OF COMMUNITY HEALTH

ASSESSMENT OF KNOWLEDGE, ATTITUDES AND PRACTICES OF AUTO-MECHANICS ON BODY MECHANIC TECHNIQUES AND ITS HEALTH IMPLICATIONS IN KORLE-GONNO AND MAMPROBI COMMUNITIES

BY

DAVID MYERS BINEY

MAY, 2020

ENSIGN COLLEGE OF PUBLIC HEALTH, KPONG, EASTERN REGION, GHANA

ASSESSMENT OF KNOWLEDGE, ATTITUDES AND PRACTICES OF AUTO-MECHANICS ON BODY MECHANIC TECHNIQUES AND ITS HEALTH IMPLICATIONS IN KORLE-GONNO AND MAMPROBI COMMUNITIES

BY

DAVID MYERS BINEY

A THESIS SUBMITTED TO THE DEPARTMENT OF COMMUNITY HEALTH, FACULTY OF PUBLIC HEALTH, ENSIGN COLLEGE OF PUBLIC HEALTH IN PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR THE MASTER OF PUBLIC HEALTH DEGREE

MAY, 2020

DECLARATION

I, **DAVID MYERS BINEY** solemnly declare that apart from specific references which have been appropriately acknowledged, this dissertation is my own work put together under the supervision of Dr. Stephen Manortey and that this work has not been presented in part or whole for the award of any other degree.

DAVID MYERS BINEY

(Index: **187100126**)
(Student) ..... Signature 10-06-2020 ..... Date

Certified by:
Dr. Stephen Manortey
(Supervisor) ..... Signature 10-06-2020 ..... Date

Certified by:
Dr. Stephen Manortey
(Head of Academic Program) ..... Signature 10-06-2020 ..... Date

DEDICATION

This research study is dedicated to God Almighty for his Guidance, Mercies and Blessings throughout this process. My next dedication goes to my family and all well-wishers. I also dedicate this study to Mr. Morrison Asiamah, Elenor Annor, and Mrs. Jennifer Annin for their unflinching support rendered to me throughout this research study.

ACKNOWLEDGEMENT

My greatest acknowledgement goes to God Almighty for his Guidance, Mercies and showers of Blessings bestowed upon my life throughout my program. I am very grateful to Dr. Steve Manortey for his unflinching support, priceless dedication and direction given me during my research study. My next thanks go to my research team for a very good job done. I also wish to thank Mr. Eric Dankwah and all the Auto mechanics who took part in this research study. I also thank Mr. Morrison Asiamah of Noguchi Memorial Institute for Medical Research for his wonderful and invaluable support. I also extend my appreciation to Madam Harriet of Taifa Polyclinic, Dr. Efo Mensah of Holy Trinity Medical Centre and the staff of Cocoa Clinic Anaesthesia and Theatre Units.

Finally, my acknowledgement goes to the management and faculty members of Ensign College of Public Health for their various assistance given me during my two-year program.

ABBREVIATIONS/ACRONYMS

ABBREVIATION	MEANING
APTA	American Physical Therapy Association
AOR	Adjusted Odds Ratio
BMI	Body Mass Index
COR	Crude Odds Ratio
DALY	Disability Adjusted Life Years
EU	European Union
GDP	Gross Domestic Product
GSS	Ghana Statistical Service
LBP	Low Back Pain
MMH	Manual Material Handling
MSD	Musculoskeletal disorders
NIOSH	National Institute for Occupational Safety and Health
ODI	Oswestry Disability Index
USD	United States Dollars
WHO	World Health Organisation
WMSD	Work-Related Musculoskeletal Disorder

ABSTRACT

Background: Universally, work-related illness and injury continue to be of great concern because it is the principal cause of surge in work productivity. It is estimated to cost nearly 2.8 trillion USD (4%) of annual GDP due to sickness absence, lost workday, worker's compensation and daily production interruption. Amongst these work-related illness and injuries, musculoskeletal pain is rife. It is projected to constitute about 32% of the work-related injuries. Musculoskeletal pain affects most body parts of the individual. It may affect the neck, shoulders, back, thighs, elbow, wrists or even the legs. Leading amongst these is the Low back pain accounting for over 60% of all musculoskeletal pain. The Low back pain is almost ubiquitous amongst all classes of professionals.

Methods: The study employed a cross-sectional study design with a quantitative approach to determine the factors influencing the risk of developing low back pain amongst auto mechanics. Participants were selected using Multistage random sampling. Fisher's exact test and Logistic regression were employed to test association. A $p\text{-value}<0.05$ was considered significant.

Results: The total number of Auto Mechanics included in this study was 192. The characteristics of the Auto mechanics indicated that nearly, 80% of the respondents were Apprentices, 11.5% were Masters, and the remaining 9.9% were Coworkers. In addition, the attainable highest level of education at the time of participation revealed 30.2% of them had no formal education, 40.1% had up to primary education, 24.5% had a secondary level of education and about 5.2% had tertiary education. The prevalence of Low Back Pain amongst the Auto mechanics at Korle Gonno and Mamprobi communities was found to be high with a proportion of 92.1%. However, the Level of

Back Pain intensity shows that 21.9% of respondents had Minimal disability, 62.0% had Moderate disability, and 9.4% had severe disability, while 6.8% of the participants were crippled. Assessing the Level of Knowledge of the Auto Mechanics on body mechanic techniques, 4.2% of the Mechanics had poor knowledge, 74.5% had adequate knowledge, while 21.3% had excellent knowledge on the body mechanic technique. From the study, it was realized that factors influencing the risk of developing low back pain included Job Support (AOR=17.34; 95% CI =1.10–273.16). Having high knowledge (AOR=0.06; 95%CI=0.01 – 0.48). Job Position, such as being an apprentice, was found to be statistically associated with low back pain (AOR= 0.13; 95 % CI=0.04–0.86).

Conclusion: The prevalence of Low back pain amongst Auto mechanics at Korle Gonno and Mamprobi was high with the majority of the mechanics experiencing moderate disability. Nevertheless, most of the Auto mechanics had adequate knowledge of body mechanic techniques. Job support, Job Position and Knowledge were found to influence Low back pain amongst Auto mechanics at Korle Gonno and Mamprobi communities.

Contents

LIST OF TABLES

LIST OF FIGURES

CHAPTER ONE

1.0 INTRODUCTION

1.1 Background Information

Body mechanic refers to the ability of a person's body to be in motion considered safe, energy preserving, and efficient, all together allowing the person to maintain stability and control. It involves how our body structure is held when we sit, stand, lift, carry, bend, and sleep. The inability to assume good body mechanics in terms of moving and handling may cause back pain and lower back injuries. Auto mechanics and general car mechanics engage in jobs that require much bending of body parts such as the waist, arching of the arms and legs, and the pushing and pulling of heavy metals and engines. Occupational related musculoskeletal disorders often constitute one of the major parts of work-related medical concern. The prevalence of such medical related problems weakens one's ability and quality of work, thereby increasing the medical cost of workers and loss of working days (Barkhordari *et al.*, 2014). Auto mechanics use body mechanics in their daily work schedules including lifting, carrying of heavy engines, bending and flexing of arms and legs; because of these, many auto mechanics are at risk for suffering from musculoskeletal pain as a result of physical strain and back injuries.

According to the statement of the National Institute of Occupational Health and Safety of America, work-related musculoskeletal disorders have a second grade in comparison to other illnesses in terms of importance, frequency, and the possibility of advance (Ghasemkhani *et al.*, 2007). In addition, findings from previous studies show 4 million workers suffering from work-related musculoskeletal disorders in Europe (Ghasemkhani *et al.*, 2007). Low back pain (LBP) and Lower back injuries (LBI) are some of the work-related diseases, and major public health

problem in both developed and developing industrialized societies and the socio-economic load of this canker has a huge breadth (Baker, 2016).

According to the World Health Organization (WHO), about 800,000 Disability Adjusted Life Years (DALY) are lost because of low back pain in the world (WHO Report 2002).

Appropriate body mechanics are grounded on the right body posture. Wanless defines appropriate posture as "when the spine is in a "neutral" or sloppy "S" position so it is not too rounded forward and not arched back too far in what is termed as a critical "C" position" (Wanless. 2017). Good posture is usually the very relaxed position that is considered to as the normal position of the backbone in a fit person. A posture is said to be optimal when it consists of an configuration of the backbone, permitting biomechanical competence, and allows the muscles to perform effectively and situate the joints in alignment. This decreases the amount of energy used and minimizes any impact on supporting body structures.

Posture can be either static or dynamic. When the body is almost motionless while standing, sitting or lying down it is considered static. It is dynamic when the body position involves movements e.g. dancing, jumping and twisting. Neutral standing posture can be evaluated through a comparison with the line of gravity. A perpendicular line drawn through the centre of the body, which is located through the second sacral vertebra, shows this. Once all body's frame is within the line of gravity, there is a decrease in burden around the joints. This leads to slightest stress exerted on the connective tissue of the supporting system. One needs to appreciate the impacts of gravity on body stability in order to understand body mechanics. The centre of gravity of an object is the point at which the object's mass is centered. In an upright position, the centre of gravity is located in the midpoint of the pelvis roughly mid-way between the umbilicus and the symphysis pubis. The line of gravity is a line that perpendicularly passes through our centre

of gravity. There is a continuous force exerted by the earth on every object towards its centre that helps to maintain a good posture and balance. One is said to be more stable when:

- the centre of gravity is close to your base of support
- the line of gravity goes through your base of support
- one has a wide base of support
- the centre of gravity is lower and closer to the base of support.

One way to prevent work-related musculoskeletal disorders is to practice good or proper body mechanics. Most auto-mechanics have the perception that their experience of back pain is the standard physical stress associated with their job.

A normal vertebral disc is made up of mostly water. It makes up nearly 90% of the disc. this slowly rehydrates at night when asleep and regular movement during the day as the spine moves in different planes of motion. This means that one of the simplest and most effective ways to reduce back pain is to increase daily intake of clean water and have good movement throughout the day. Literature indicates that Low back pain is precipitated by a plethora of issues, mainly associated with occupational and individual factors (Baker, 2016). Work-related tasks, such as protracted hours of sitting, awkward posture, and other psychological and organizational factors, are the principal causes of LBP, particularly among auto mechanics. Nonetheless musculoskeletal disorders are a common health concern among the working population, specifically within the automobile profession, it has not been given satisfactory considerations in the literature.

Damages of body structures such as; the muscles, joints, tendons, ligaments, nerves, bones and the localized blood circulation system. Furthermore, Low back pain is a chronic or acute musculoskeletal disorder such as pain, aches or trouble in the lumbar or buttock area. Studies

have established that Low back pain is prevalent among job-related disorders in nearly all physically tough occupations such as contractors, athletes etc. (Wami *et al.,* 2019).

Work-related musculoskeletal disorders (WMSD) caused by carrying manual load, i.e. lifting, carrying, moving, pushing and pulling may lead to physical disorders and impose stress and strain in the girdle, shoulders, and arms. Disorders of such nature might result in constant and prolonged pain and disability (Mohammadi *et al.,* 2012). WMSD does not only cause pain and disability for employees and their families, but also results in elevated social costs, taking into account productivity and wage losses, workers ' compensation and medical expenses (Da *et al*, 2010). In the United States, WMSDs, account for 65% of all occupational diseases. In the European Union (EU) countries, 39% of all occupational diseases are WMSDs (Widanarko *et al*, 2014). WMSDs impact workers' efficiency, threatens their health and lives, as well as bringing huge financial burdens on the mining sector and the nation (Fernández *et al.*, 2014).

1.2 Problem Statement

Globally, Low back pain is the leading cause of disability *(*Ahenkorah *et al.,* 2019). According to the WHO, 800,000 Disability Adjusted Life Years are lost because of low back pain problems in the world (WHO, Report 2002). Work-related musculoskeletal disorders caused by carrying manual load i.e. lifting, carrying, moving, pushing and pulling may lead to physical disorders and impose stress and strain in the girdle, shoulders and arms. Disorders of such nature might result in constant and prolonged pain and disability (Mohammadi *et al.*, 2012).

It incurs substantial fiscal costs, resulting from work absenteeism, decreased output and healthcare expenditures. It is known to affect about 47% of the work population. (Ahenkorah *et al.*, 2019). It is the major cause of pain that most people complain about and is a cautionary signal for the risk of tissue damage (Kebede *et al.*, 2019). Globally, low back pain is the fourth greatest

impact on health (Kebede *et al.*, 2019). Referring to the Lancet series, persons with laborious occupations are at an increased risk of developing low backache (Øiestad *et al.*, 2019). Working as an auto mechanic is known to be a physically laborious work hence predisposing mechanics to a potentiated chance of developing low back pain.

From a study conducted in Spain assessing the effectiveness of the body mechanic checklist tool, the findings from that research pointed to an interesting fact that increasing the knowledge of participants on good body mechanic techniques was associated with a surge in the inclusion of body mechanic techniques practices amongst participants (Akhtar *et al.*, 2017). To decrease Low back pain, an ergonomic mediation such as the use of machine-driven or other aide equipment should be used with adequate training and education in order for it to be efficient with a general goal of achieving reduced stress exerted on an individual's backbone when lifting heavy objects. The research, therefore, sought to assess the knowledge, attitudes, and practices of auto-mechanics on the body mechanic techniques and its health implications in Korle-Gonno and Mamprobi Communities in the Accra Metropolis District of Greater-Accra Region.

1.3 Rationale of the Study

The relevance of this study is to obtain scientific knowledge on factors that could increase the risk of developing low back musculoskeletal pain among Auto mechanics and to assess the knowledge of these Auto mechanics on musculoskeletal pain and on proper body mechanic techniques. Knowledge obtained from this study will help policy formulation and implementation. Also, assessing the knowledge of Auto mechanics on body mechanics would help stakeholders to offer targeted education on how to observe body mechanics so as to avoid an occupational hazard.

1.4 Conceptual framework

The conceptual framework in Figure 1 below presents the risk factors associated with LBP among auto mechanics at the Korle-Gonno and Mamprobi Communities. The risk factors associated with LBP are categorized as organizational, physical, psychosocial and individual factors. Organizational issues such as the length of work time, workload per staff, variation of the task and workplace design are believed to be associated with work-related musculoskeletal symptoms. The number of hours employees spend per day at their post coupled with the type of work assigned them to a large extent, lead to work-related musculoskeletal symptoms (Da *et al.*, 2010).

Physical hazard is still an everyday occurrence and it is considered as one of the risk factors for work-related musculoskeletal disorders. It most frequently accounts for work-related reduced productivity in most industries. Physical workload factors are classified as; manual material handling (lifting a weight with an upright trunk, holding, carrying, pulling and pushing), Awkward postures-trunk postures, static/dynamic crouching, kneeling, squatting, arms above shoulder level, lack of physical activity; sitting without breaks or with lack of movement, standing without effective relief (Stock *et al.*, 2005).

Poor psychosocial work factors could induce work-related musculoskeletal symptoms among employees (Ye *et al.,* 2017). That is, psychosocial factors such as high work overload; job satisfaction; job control and social support induce occupational low back pain and upper extremity musculoskeletal disorder. Subsequently, these affect the ability of employees to work effectively. Psychosocial factors such as work stress were apparently associated with musculoskeletal disorders. The mechanism can be explained by strain because work stress

becomes a symptom of the musculoskeletal system when the recovery of inflammation is interrupted, or the pain threshold is lowered (Han *et al.*, 2009).

Demographic factors include age, sex, educational status, body mass index (BMI) and marital status. For instance, type of work and designated workstation of employees are influenced by their educational level and these to a large extent could lead to suffering Low Back Pain (LBP) (Ahmad and Alvi, 2017).

Figure 1: Conceptual Framework

Source: *Author's own construct*

1.5 Research Questions

1. What is the level of knowledge of Auto mechanics on the importance of body mechanic techniques?

2. What is the prevalence and level of Low back pain amongst Auto mechanics?

3. What are the behaviours and practices of Auto mechanics contributing to Low back pain?

4. What are the factors influencing the risk of developing Low back pain amongst Auto mechanics working in Korle-Gonno and Mamprobi communities?

1.6 General Objective(s)

Largely, the interest of the researcher of this study was to assess knowledge, attitudes, and practices of auto-mechanics on body mechanic techniques and its health implications in Korle-Gonno and Mamprobi Communities in the Accra Metropolis District in Greater- Accra Region.

1.7 Specific Objectives

a) To assess the knowledge of auto mechanics about the importance of body mechanic techniques.

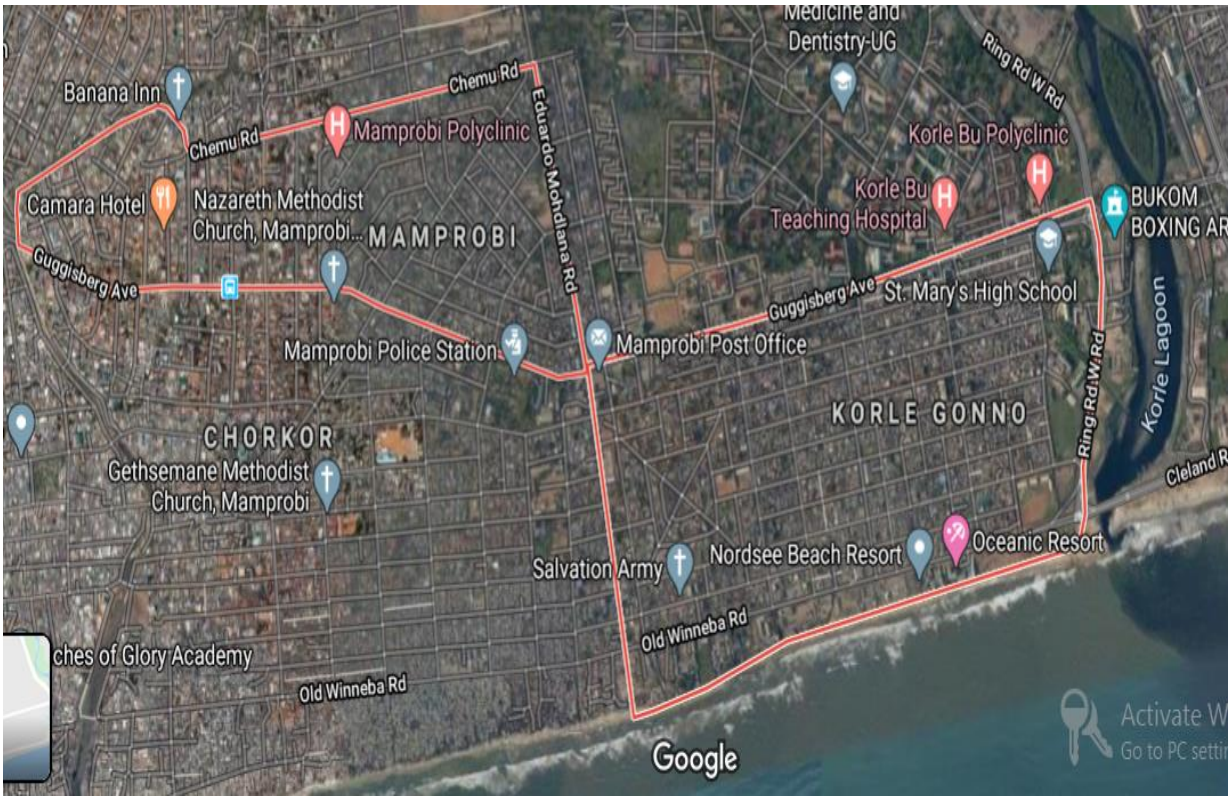
b) To measure the level of lower back pain among auto mechanics using the Oswestry Disability Index.

c) To assess the behaviour and practices of auto mechanics towards body mechanic techniques.

d) To determine factors that influence the risk of developing low back pain amongst auto-mechanics.

1.8 Profile of Study Area

The study area of the research was Korle-Gonno and Mamprobi communities. Korle-Gonno is in the Accra Metropolis District which is one of the ten districts in the Greater Accra Region. It has a population of 27,826 (GSS, 2000). It has several Junior High Schools, churches and a popular Senior High School (Saint Mary). Also, within Korle-Gonno is the Korle-Bu Teaching Hospital, one of the largest teaching hospitals in West Africa. It has a major market called "Tuesday Market". The market is named so because Tuesday is the main market day. There are many fitting shops in the community that repair and maintain vehicles. Korle-Gonno shares boundaries with Mamprobi in the Accra Metropolis which has similar socio-economic activities. They both have many fitting shops that repair and maintain vehicles. These fitting shops serve as training facilities and also a source of income for the indigenes, especially the youth.



Source: Google Map
Figure 2: Map of Korle Gonno and Mamprobi.

1.9 Scope of Study

The research covered Korle-Gonno and Mamprobi Communities in the Accra Metropolis of the Greater-Accra Region.

1.10 Organization of Report

The study is sectioned as a six chapter research work. The first Chapter gives an overview to the study providing contextual information of the study, problem statement, the rationale of the study, conceptual framework, research questions, general objective(s), specific objectives, a profile of study area, scope of study and organization of the report.

Chapter Two covers existing literature review on the subject under study. Chapter Three provides the study methodology. The fourth chapter offers an analysis of study results. Chapter Five provides the discussion by linking research questions, objectives, key variables, literature review and results. Chapter Six is made up of conclusions and recommendations.

CHAPTER TWO

2.0 LITERATURE REVIEW

2.1 Introduction

This chapter reviews a far-reaching, and methodical examination of existing studies and findings pertinent to this research project. It expounds key variables of selected areas of the research study. The review has been organized as follows:

2.2 Prevalence of low back pain

Several empirical research works have determined the prevalence of Low back pain among various sections of their studied populations. A study assessed that the prevalence of Low Back pain was about 70% to 85% of the global population (Tinitali *et al.,* 2019). In high income nations, the issues of Low Back Pain ranges from 26.4% to 79.2%. Among employees with physical demanding jobs, the proportion is much higher as against that of other professionals, ranging from 12% to 95% (Tinitali *et al.,* 2019). In Shanghai (China), the prevalence was a third of the respondents; while in the South American country, Brazil, the reported proportion of low back pain was found to be 13.7%. In selected cities across Brazil, there were observed local variations. For example, Pelotas recorded 13.4%, in Porto Alegre it was 42.1%, and in Petrolina 46.9% (Bento *et al.*, 2019). A finding from Fergurson in United states of America indicated that a 12-month period prevalence of LBP, which lasted for up to 7days, was 25% while the prevalence for those seeking medical care was 14%.

A current systematic review by Orthopaedic Section of the American Physical Therapy Association (APTA) approximates the one year incidence of the first-ever episode of low back pain range between 6.3% and 15.3% while evaluations of the one year incidence for an episode of low back pain range between 1.5% and 36% (Delitto *et al.,* 2016). In addition, individuals who

have suffer low back pain with reduced activity often experienced recurrent occurrences with proportions ranging between 24–33%. Low back pain (LBP) has developed to be progressively common in young people. Studies have revealed that 13% of 7 to 10-year-olds, 17% 12-year-olds and 60% of 18year-olds at some point in their life experience Low Back Pain (Schwertner *et al.,* 2019).

A national survey by the Austrian Health Interview Study revealed that a quarter of nationals suffered chronic pain at various body sites and a year period prevalence of chronic LBP was found to be a tenth of the adult population (Grabovac *et al.,* 2019).

2.2 Knowledge and importance of body mechanic techniques.

Occupational–related musculoskeletal disorders largely constitute one of the major parts of work-related medical concern. The prevalence of such medical related problems retards one's ability and quality of work, thereby increasing the medical cost of workers and loss of working days (Barkhordari *et al.,* 2017). Several studies have explained that adequate knowledge of body mechanic techniques and its practice during daily regular activities reduces the incidence and prevalence of musculoskeletal pain (Al Eisa *et al.,* 2013). It is therefore imperative to determine the knowledge of auto mechanics on body mechanic techniques.

Firstly, a descriptive correlational study was conducted on knowledge and practice of body mechanic techniques among nurses at Mangalore. The study findings revealed that 43.33% had good knowledge. A similar proportion of respondents had average knowledge whilw 13.34% had poor knowledge of body mechanics and only 43.34% performed body mechanics technique satisfactorily (Vidya *et al.,* 2014). Findings from another study carried out in Spain on the usefulness of the body mechanic checklist tool, showed that with the inclusion of knowledge, there was a reduction in musculoskeletal injuries and there was an increase in the performances

of the body mechanic techniques amongst respondents (Mwilila, 2008). Adequate knowledge has thus been found to reduce and improve the risk of developing musculoskeletal back pain.

Linton and Kamwendo (1987) evaluated 16 studies on low back pain and body mechanic techniques in colleges revealed that there is an overall absence of evidence to back the effectiveness of these body mechanic techniques. Several of the researches assessed, lacked suitable comparators and measurement techniques; hence, inferences vis-à-vis the efficacy of low back pain in colleges cannot be ascertained using the available data. Linton and Kamwendo proposed that more studies would be required in order to evaluate the quantum of knowledge, respondents recall and in addition, the magnitude of behavioural transformation realized as a consequence of body mechanics training.

Carlton, (1987) researched body mechanics instruction and consequent job performance. Findings of this study indicated or revealed that most works did not transfer, or if any, transferred minute amount of knowledge acquired on body mechanic techniques to their everyday duties at their workplaces. Carlton, further explained the benefits of worker's pre-established patterns to describe the absence of application of training to the work setting and recommended providing intervention at the initial stages of the individual’s work career. This he believed would stimulate subcortical learning and developing the culture of observing the proper body mechanic practices. Carlton also recommended the provision of job-specific training in the workplace.

2.3 Level of low back pain among auto-mechanics.

The most common and known cause of incapacity in the industrial sector is Low Back Pain (Widanarko *et al.,* 2014). Occupational therapists mostly manage persons with incapacitating backbone injuries. Flower *et al.,* (1981), defined a two-phase occupational therapy program in which a physical disability therapist and a psychiatrist should work as a team to manage both the

physical and emotional facets of chronic back pain. Body mechanics training and education was thus an important and integral element encompassed in both phase of the program (Flower *et al.*, 1981).

A study on the consequence of body mechanic behaviours on Low back pain conducted in an Automobile manufacturing factory by Toraman *et al*.,(2014), showed that about a tenth of the affected staffs are female. In addition, 74.8% of these affected staff were married and 36.9% of them were high school graduates (Toraman *et al*.,2014). The findings indicated that the low back pain recurrence in about 48.3% of the workers was very mild. The pain was moderate in 24.8% of the workers, in 10.3% of them was mild. Oswestry Disability Index (ODI) is a tremendously relevant assessment tool that researchers and disability evaluators employ to assess a patient's permanent functional disability. This tool is therefore considered the 'gold standard' of low back functional outcome tool (Fairbank *et al.*, 2000). A significant difference was realized between Oswestry Disability Index (ODI) classification and paying attention to the position of the spine while lifting, paying attention to the position of the head, shoulder, and back while walking, and paying attention to suitable sitting position. The study concluded that workers' low back pain complaints varied. Complaints were found from "minimally disability" to "crippled" on the ODI classification. It is therefore obvious that body mechanic behaviours of the staff have an association on the Oswestry Disability Index.

Isci and Esin, (2009) assessed that employees complaining of low back pain were as a result of body posture at job. The researchers observed that most of the staff sat for long periods. These workers are frequently admitted to the hospital due to frequent musculoskeletal disorders such as low back pain, neck pain, and headaches (Isci *et al.*, 2009). Working groups including those that require too much physical activity and carrying of heavier objects, squatting and exposing

the body to tremor have a higher low back pain incidence. Jobs that require activities such as carrying, squatting, pulling, bending over by turning and sudden pelvic moves are reported to be the ones with the highest impact on low back pain in terms of incidence. Automobile mechanics, heavy industry duty staff, drivers of buses and heavy truck, hospital workers, are among the professional groups with an increased risk of low back pain prevalence.

Baba. Deros *et al.*, (2010) in as research conducted to evaluate the pattern of musculoskeletal disorders and the proportion of these disorders amongst employees who perform manual material handling (MMH) in an automobile engineering corporation in Malaysia, realized that musculoskeletal disorder with the highest prevalence was low back pain (Baba Deros *et al.*, 2010). This was closely trailed by ankle and foot pain and then pain in the upper back sections of the body. In addition, almost one-third of the study population claimed to feel discomforting pain at their upper back and lower back. During the study, the workers said the back pain is due to extreme strength and gestures used. It was believed that the back pain the workers were witnessing might be a consequence of their lack of knowledge in the appropriate and ergonomic techniques in materials management.

2.4 Factors that prevent auto-mechanics from practicing correct body mechanic techniques.

Physical, psychosocial, individual and organizational risk factors account for work-related musculoskeletal disorders, especially lower back pain (Choobineh *et al.*, 2016;Piranveyseh, *et al.*, 2016). Smedley *et al.*, (2014), informed that some of the risk factors that contribute to the development of MSDs are physical factors that include prolonged postures, prolonged sitting, whole-body vibration, and years of experience, duration of work, operator age and repetitive

movement (Smedley *et al.*, (2014). Furthermore, the period of exposure to predisposing factors of MSDs has also been thought out as an integral risk factor for the precipitation of the disease.

Lack of knowledge in body mechanic techniques, insufficient training in body mechanic techniques, not practicing body mechanic techniques though there may be some knowledge, and the use of back belts are some of the factors that may prevent auto-mechanics from practising body mechanic techniques. Many people, including auto-mechanics, nurses and other groups of workers, assume that by putting on back belt, they do not have to pay attention to body mechanics. Putting on a back-belt does not substitute for proper body mechanics. A research done by the Back Belt working group in America Institute for Occupational Safety and Health (NIOSH), indicated that back belt has no protection against injury resulting from repeated lifting, pushing, pulling, twisting or bending (Wassell *et al.*, 2000).

In a study conducted by Maureen (1984), on the effect of body mechanics training on work productivity among young workers, it was established that between two arms, an arm received body mechanics instruction as an intervention and the comparator arm received no intervention (McCauley, 1984). The instruction focused on proper spinal alignment in the work environment. Training on low back pain, commenced with one classroom gathering prior to the workers' initial day of work and continued during employment with two on-site meetings. The impact of training was measured through the observation of body mechanics practices by participants during actual work routine. The findings of the research reflected that the intervention arm performed significantly better than the comparator arm. Thus, there is a significant correlation between knowledge and practice of body mechanic techniques and prevention of low back pain as well as performance at work places.

Auto mobile staff are predisposed to psychosocial factors such as increased demand from their jobs which potentially could lead to a decreased or lost to the job control and a resultant effect of low job satisfaction or a collective lost in interest for one's job. Largely these factors could ultimately contribute greatly to an increased risk of developing musculoskeletal disorders such as low back pain in this class of professionals (Smedley, Finlay and Sadhra, 2014). Moreover, Eatough *et al.,* (2012) asserted in a study that not having enough or full grasp of authority over a job, poor satisfaction at workplace and employed in a potentially hazardous environment may increase the stressors of heavy equipment operators. This may subsequently result in musculoskeletal disorders to major body parts (Eatough *et al.,* 2012). A similar finding was obtained in a study in which some non-physical factors such as the perception of increased job assignments, inadequate control over job, poor gratification, low social backing and low self-esteem donated to the advancement of Musculoskeletal diseases (Johanning, 2000).

Often, modifiable and non-modifiable factors occur at the same time in complex interactions influenced by psychological and social contexts, and socioeconomic status (Hartvigsen *et al.,* 2018).

2.4.1 Demographic factors

The demographic characteristics of the individual may influence their risk of developing musculoskeletal pain. For instance, marriage was found to influence low back pain. It was realized that married individuals are at a greater risk of developing LBP in the general population when likened to individuals who are not married, i.e. divorced or single (Farrokhi *et al.,* 2017). additionally, a study by (Ludwig *et al.,* 2017) identified that the older an individual gets, the more likely that individual may develop musculoskeletal pain. Individual factors under study include age, gender, academic status, body mass index (BMI), marital status etc. For instance, type of

work and designated workstation of employees are influenced by their educational level and these to a large extent could lead to suffering WMSD (Ahmad *et al.*, 2017).

2.4.2 Health-related factors

According to the Lancet series from 2018, persons employed in sectors that requires enormous physical strengths, illness, and folks with lifestyle risk factors such as smoking, high body mass index, and sedentary attitude seem to be mostly at an increased risk of developing low back pain (Øiestad *et al.*, 2019). Some studies have suggested that obese persons are more likely to develop musculoskeletal pain (Yang *et al.*, 2017). This is because their weight exerts a lot of pressure on the spine of the individual hence increasing friction between the vertebral disc of the individual. This results in enormous pain at the back. Most at the lower back.

In addition to the influence of obesity on low backache, other studies such as Petre *et al.,* (2015) and Green *et al.*, (2016) have identified smoking as a health-related contributor to low back pain. Petre *et al.*, (2015) found that comparing contributors to developing low back pain in nonsmoking members to smoking members, individuals who smoked had a stronger linkage between the nucleus accumbens and the medial prefrontal cortex. This connection is thought to contribute to the increasing risk of developing chronic back pain in smokers over non-smokers.

Though it is thought that alcohol has pain relief effects, the utmost analgesic effects of alcohol happens when alcohol is consumed at amounts exceeding guidelines for moderate daily alcohol consumption. Hence many people turn to consume alcohol to numb their pain or help them relax their muscles, it has been established that excess alcohol consumption increases the constriction of blood vessels thereby causing painful small fiber peripheral neuropathy worsening any existing pain (NIH, 2013). Some postulations are that the dehydrating effect of alcohol increases

the friction between intra-vertebrae discs leading to back pain. It is also known that ethanol potentiates nociceptor responses thereby increasing sensitivity to pain (Trevisani *et al*., 2002).

2.4.3 Work-related factors

Work-related musculoskeletal disorders (WMSDs) are explained as numerous indications which can distress the musculoskeletal system of the individual and occur in relation to the work activities or lifestyle of the person (Ezzatvar *et al.,* 2019). A research findings by Ezzatvar *et al.,* (2019) identified that persons who worked for over 45hours per week were 1.7times more likely to experience musculoskeletal pains compared to persons who work for less than 35 hours per day. The habit of standing for long hours also exerts loads of pressure on the spinal cord leading to low back pain (Andersen *et al.,* 2007). This is similar to the assertions of Sazarina *et al.,* (2014). Sazarina *et al.,* (2014) established that amongst automobile workers, frequent standing increases the incidence of emerging low back pain experienced by the automobile workers for the past 12 months compared to those who do not stand frequently

2.4.4 Psychosocial factors

The impact of psychological factors on musculoskeletal pain has been explained in most studies. A growing body of evidence lately seems to proposes that efficacious treatment of LBP should comprise not only biomedical and pharmaceutical care, but psychological, and social assessments should be incorporated in order to expansively handle the patient's unique pain experience (Farrokhi *et al.,* 2017). This has led to the biopsychosocial model for pain. The above presents the essence of considering the psychosocial factors influence the odds of increasing prevalence of back pain. Some factors that are considered under the psychosocial factors are job satisfaction, job support, and job demand among others.

Auto mechanics are predisposed to certain psychosocial factors such as increased job workload demand, lost of job authority or control and poor work consummation, which harness largely to Musculoskeletal disorder such as low back pain in this section of work professionals (Smedley, Finlay and Sadhra, 2014). Even more, Eatough *et al.*, (2012) pointed out in a research findings that losing authority over at the workplace, reduced satisfaction with work or occupation, and working in an potentially harmful work atmosphere could aggravate the heavy equipment operators' stress level and its resultant effect is developing or worsening Musculoskeletal pain disorders of essential body parts (Widanarko *et al.*, 2015). A comparable research finding was attained in a research work executed by Johanning, (2000). The outcome of the work explained that certain non-physical factors such as the perception of increased duties at work, limited authority and job satisfaction, low environmental support and low self-esteem could be attributed to the increase development of Musculoskeletal Pain Disorders.

Psychosocial factors such as high work overload, career gratification, work control and social support induce occupational low back pain and upper extremity musculoskeletal disorder (Chiu *et al.*, 2007). Subsequently, these affect the ability of employees to work effectively. Psychosocial factors such as work stress was apparently associated with musculoskeletal disorders. The processes can be elucidated by strain because work trauma becomes an indication of the musculoskeletal system when the recovery of inflammation is sporadic or the pain threshold is lowered (Han *et al.*, 2009).

2.4.5 Knowledge

Lack of knowledge in body mechanic techniques, insufficient training in body mechanic techniques, not practicing body mechanic techniques though there may be some knowledge, and the use of back belts are some of the factors that may prevent auto-mechanics from practicing

body mechanic techniques. Many people, including auto-mechanics, nurses and other groups of workers assume that by donning a back-support belt, they are not required to observe to body mechanics practices. Putting on back belt would not substitute for proper body mechanic techniques. A research done by the Back Belt working group in America Institute for Occupational Safety and Health (NIOSH) indicated that back belt offers no guard against damage resulting from repetitive stretching, pushing, squatting, dragging, twisting or winding.

In a study conducted by (McCauley, 1984) on the consequence of body mechanics techniques on work-related productivity among young employees, it was established that between two sets, one class received an intervention in the form of body mechanics technique and the other comparator did not receive any intervention. The intervention focused on the appropriate vertebral configuration at the workplace. Another research by Benson et al in a cross-sectional design study realized that 96.4% of the respondents had Good knowledge of work-related musculoskeletal pain disorders. How like other studies assessing the influence of knowledge on practice of body mechanic techniques, findings from Benson et al indicated that the knowledge of the subjects on body mechanic techniques did not influence their practice. A contrary study conducted to assess the impact of knowledge acquired from body mechanic training showed that the knowledge acquired from body mechanics training programs reduced the risk of low back pain amongst nurses of an intensive care unit in Tanta University (Ibrahim and Elsaay, 2016).

2.5 Behaviour and practices of auto-mechanics towards body mechanic techniques.

A research conducted in Iran by Da *et al.,* (2010) established that the considerable prevalence of work-related musculoskeletal disorders is associated mainly with the high repetitive motions of manual load-carrying task. Auto-mechanics by virtue of their work are not an exception from this. They are at a high chance of developing musculoskeletal disorder (Da *et al.*, 2010)

Isci & Esin, (2009) in a research showed that occupational predisposing factors have an integral role in the development and progression of low back pain and disability (Toraman *et al*., 2014). Professional groups, including jobs that require lots of physical activity and lifting weighty objects, squatting and exposing the body to vibrations, have a greater chance of increasing low back pain incidence. A study on the implications of body mechanic behaviours on low back pain conducted in an automobile manufacturing plant by Toraman *et al.*, (2014) showed that workers' low back pain complaints are changeable (Toraman *et al*.,2014). Grievances from participants were found to be "minimally disability" to "crippled" on the Oswestry Disability Index (ODI) cataloging. Thus, it became very obvious that the body mechanic behaviours of the employees had an impact on Oswestry Disability score. Laborers were found to be callous about body mechanic behaviours such as been attentive to the posture of the body on the spine while going about daily work activities.

Summary

This chapter provides a review of available literature on Low Back Pain. it considers findings of other research works on the occurrence of Low Back Pain amongst several working classes. The prevalence found between as high as 85% and was realized to be influenced by the nature of the participants. Some factors were identified to impact the chance of developing low back pain. most literature categorised these factors as psychosocial, work related, sociodemographic and health related. On the knowledge of respondents on body mechanic techniques, most literature realized that participants had moderate or adequate level of knowledge. In addition, available literature iterated the importance of Body mechanic techniques at reducing Low back pain.

CHAPTER THREE

METHODOLOGY

3.0 Introduction

The methodology presents a vivid narrative of the processes, measures and techniques that were employed in collecting, collating, processing, coding, analyzing and presenting information for the captured data. It captures the research methods and design, data gathering procedures and instruments, target population, study variables, sampling, pre-testing, data analysis plan, ethical considerations, limitations of the study, and assumptions.

3.1 Research Methods and Design

The research was a descriptive cross-sectional survey design that employed a quantitative method for data collection. This design involved a one-time collection and descriptions of collected data to answer the research questions concerning the subject under study.

3.2 Data Collection Techniques and Tools

Primary data was collected in order to acquire suitable evidence about the objectives of this research study. The principal data was gathered from auto-mechanics in selected mechanic workshops in Korle-Gonno and Mamprobi communities using questionnaires. Primary data collected was to help in the final data analysis and interpretation. The questionnaire administration method was adopted as the mode of collecting data. The questionnaire captures the employee's socio-demographic data form, the body mechanics behaviour form and the Oswestry Disability Index form were used as the instruments in collecting data.

3.3 Study Population

The target participants for this research was auto-mechanics in selected mechanic workshops in Korle-Gonno and Mamprobi Communities in the Accra Metropolis in the Greater-Accra Region of Ghana.

3.4 Study Variables

The study variables for the research included low back pain and lower back injuries, knowledge, and practice of body mechanics, and factors preventing the use of body mechanic techniques. The dependent variable was low back pain, which was measured using the Oswestry Disability Index. The Oswestry Disability Index (also known as the Oswestry Low Back Pain Disability Questionnaire) is a tremendously vital instrument that researchers and disability evaluators employ to measure an individual's permanent functional disability.

The test indices are considered the 'preferred standard' of low back functional outcome instrument. It is made up of 10 sections. For a section, the total possible score is 5: a score of 0 is awarded if the first statement of the section is marked; if the last statement is marked, the section is awarded a score of 5. Each section is scored on a 0–5 scale, 5 indicating the worst musculoskeletal disability. The index is calculated as the quotient of the summed scores of all the section over the total likely score, which is then multiplied by 100 and expressed as a percentage. Thus, for every question not answered, the denominator is reduced by 5.

Where a respondent selects more than one response in a section, the highest-scoring response is recorded as a true suggestion of disability. After scoring, **0% to 20%** is described as a **'minimal disability**'. The patient can endure the musculoskeletal discomfort with most living activities. Usually, no pain management is specified besides advice on observing body mechanic practices. Meanwhile, **21%-40%** is considered as the individual experiencing **'moderate disability'**: The

patient suffers more pain and difficulty with daily activities due to the musculoskeletal pain. Furthermore, **41%-60%** is assessed as a **severe disability**: with severe disability, the pain of the individual remains the chief issue in this category, and the activities of the individual is often severely affected. These individual generally necessitate a detailed examination or assessment. In addition, **61%-80%** is described as **crippled**: the back pain intrudes on all aspects of the patient's life and this influencing the daily activity of the individual so much such that the discomfort may be unbearable. Hence, a positive intervention such as pharmacotherapy or physiotherapy is obligatory, and **81%-100%** is considered **bed ridden.** These patients are often incapacitated by their disorder to an extent of either bed-bound and any activity only exaggerates their symptoms.

Table 1: **Study Variable**

Variable	Operational definition	Measurement
Low back pain	Measured using the Oswestry disability index	Categorical variable
Knowledge	A 9-item composite variable on low backache	Categorical variable
Age	Age of participant from last birthday	Continuous variable
Work hours	How long the participant works in a day	Ordered categorical
Work experience	How the participant has worked in years	Ordered categorical
Medical History of pain	History of low back pain	Unordered categorical
Family History of pain	Whether a family member has ever had or has chronic low back pain	Binary
BMI	The weight in relation to the height of the participant	Categorical variable
Rank at work	Role of the participant at work	Categorical variable
Breaks at work	The time duration of the break at work	Continuous variable
Alcohol consumption	Whether the participant consumes alcohol	Binary
Smoking status	Whether the participant smokes	Binary
Sexual activities	Frequency in indulging in sexual activity	Ordered categorical
Weightlift	Indulging in weight lifting exercises	Binary
Job Demand	operationalized as psychosocial demands	Binary
Job Control	Whether the participant feels in control of the job	Binary
Job satisfaction	Whether the participant is content and happy with work	Binary
Training on occupational safety	Whether participants have any training on ways to ensure occupational safety	Binary
Frequent standing	Whether the participant stands for long hours, i.e. over 2hours	Binary

3.5 Sampling

The projected sample size for the study was 139 respondents. This was calculated using the Cochran 1977 Sample Size calculation formula (Cochran, 1977), with a known low back pain prevalence of 87.4% (Nasaruddin *et al*., 2014) on a 95% Confidence Interval with a margin of error of 5%.

$$n = \frac{Z^2 \times p \times q}{d^2} = \frac{1.96^2 X\ (0.874) \times (0.126)}{0.05^2} = 169$$

Where, ***n*** **=** the required sample size,

p = estimated prevalence of LBP

q = complement of the estimated prevalence

Z = score at 95% confidence level

d = precision (fixed at 5%)

A 15% non-respondent rate adjustment brought the total estimated sample size to about 195.

The sample of (195) auto-mechanics were sampled from selected mechanic workshops in Korle Gonno and Mamprobi communities. Multistage random sampling was used in selecting the respondents for the study. Each community was divided into 12 clusters according to the major streets within the community. Each cluster was numbered, and eight (8) randomly selected using an online random number generator. Selected clusters were initially scanned for available auto mechanic shops. Each identified auto mechanic was numbered and selected using an online random number generator. Participants within each selected shop were educated and informed on the rationale for the conduct of the study. Consents of the participants were sought and eligible candidates enrolled.

3.6 Pre-testing

To safeguard or guarantee the reliability of this research work, a draft questionnaire was offered to 15 auto mechanics, at Old Fadama to evaluate the bearing of the questions, and revise them prior to the final administration.

3.7 Data Handling

The data handling process entails the storage, archiving and the appropriate disposal off of study data during and after the study has concluded. It often involves the policies and procedures developing in accordance with ethical standards. In the "data management guidelines issued by the British Medical Research Council" which states that "if the data are collected electronically, the data should be regularly backed up on disc; a hard copy should be made of particularly important data; relevant software must be retained to ensure future access, and special attention should be given to guaranteeing the security of electronic data". The data of this research followed the above British Medical Research Council data management guidelines. Thus, the data were recorded electronically with a backup on disc, and a hard copy with adequate security.

3.8 Data Analysis

The field data collected were coded and entered on Microsoft Excel 2012 and subsequently by the use of STATA statistical software package (*StataCorp. 2007. Stata Statistical Software. Release 15. StataCorp LP, College Station, n, TX, USA*) version 15, the data were analyzed by using descriptive statistics techniques. Frequency distribution tables and graphs were adopted to help generate descriptive visual impressions for affordable explanation of results as reflection of the population.

The dependent variable, Low back pain was categorized as a binary outcome. Hence, Fisher's exact test was carried out between the dependent variable and the various independent variables.

Independent variables that showed statistically significant associations under the bivariate analysis were included in the multivariate logistic regression analysis to test for significance of the strength of the association between the outcome variable and the independent variables. Variables that were statistically significant under the multivariate analysis were considered as the factors influencing the dependent variable, low back pain. Statistical significance was considered for a p-value < 0.05.

3.9 Ethical Considerations

Ethical approval was acquired from the Ensign College of Public Health Ethics Review Board. Included respondents were verbally informed about the aims and objectives of this research work to seek their consent. They were told that they have the liberty to withdraw from the research whenever they wished, and moving forward their identity would be given the necessary security.

3.10 Limitations of Study

Research studies in any form can be lumbered with plethora of limitations, and this project was not exceptional. In this regard, it was indicative that, the major limitation was getting the participants to talk to as most of them were engaged with their work. Also moving from one mechanic workshop to the other was very tedious.

Given the sample size used for this, it will not be appropriate to extrapolate the key findings to be the true reflection of auto mechanics in a general population.

3.11 Assumptions

The following assumptions were made

1. Potential participants would willingly and truthfully participate in the research study.
2. That participant would willingly take part in the process, not expecting any financial benefits.
3. That the questionnaire would be answered by potential participants

CHAPTER FOUR

4.0 RESULTS

4.1 Introduction:

This chapter presents the results of the data collected and analysed to provide answers to the research objectives. Frequencies and percentages were employed for the descriptive statistics. These were presented in tabular form.

4.2 Demographic Characteristics of Auto Mechanics

The total number of respondents who completed the questionnaire in this study was 192 out of a projected sample size of 195, yielding a 98.5% response rate. Amongst this number, 41.7% were within the age category of less than 20 years, while 45.3% of the respondents were between the ages of 20 to 39 years. The remaining proportion of respondents were 40 years and older. Considering the job position of the respondents, nearly, 80% of the respondents were Apprentices, 11.5% were Masters, and the remaining 9.9% were Coworkers.

An evaluation on the respondents' attainable highest level of education at the time of participation revealed 30.2% of them had no formal education, 40.1% had up to primary education, 24.5% had a secondary level of education and about 5.2% had tertiary education. Married participants made up 25.0% of the respondents of this study, while the majority (71.4%) reported being single and 3.7% were divorced.

It was also observed from the data that most of the respondents were Christians and made up 77.6% of the study population. About 17.2% of the participants were Muslims, while the remaining proportion were from other religions. The prevalence of Low Back Pain amongst the respondents was 92.1%.

Table 2: **Demographic Characteristics of the Study Population**

Variable	Categories	Frequency	Percentage
Age Groups	Less than 20	80	41.67
	20 - 39	87	45.31
	Greater than 39	25	13.02
Position	Master	22	11.46
	Coworker	19	9.90
	Apprentice	151	78.65
Educational Level	No education	58	30.21
	Primary	77	40.10
	Secondary	47	24.48
	Tertiary	10	5.21
Years of Experience	Less than 4years	134	69.79
	4 – 6years	41	21.35
	Greater than 6	17	8.85
Marital Status	Married	48	25.00
	Single	137	71.35
	Divorced	7	3.65
Religion	Christianity	149	77.60
	Islam	33	17.19
	Other	10	5.21
Low Back Pain	No	16	7.94
	Yes	176	92.06

4.3 Health-Related Characteristics of Auto Mechanics

Univariate analysis of health-related factors in Table 3 shows that 3.6% of the respondents were underweight, 24.0% had normal (healthy) weight, 33.9% were overweight, and those with obesity were 38.5%. About 54.2% of the respondents consume alcohol, while nearly 12.0% of the respondents' smoke cigarette. Among the respondents who answered in the affirmative to the drinking of alcohol, the majority (80.68%) mentioned they drink at least once per week. The results showed that 84.9% of the respondents had a family history of low back pain.

Table 3: **Health-related Characteristics of the study population**

Variable	Categories	Frequency	Percentage
BMI	Underweight	7	3.65
	Normal	46	23.96
	Overweight	65	33.85
	Obese	74	38.54
Waist Circumference	Slim	100	52.08
	Large waist	78	40.63
	Extra-large Waist	14	7.29
Family History	No	29	15.10
	Yes	163	84.90
Smoking Status	No	169	88.02
	Yes	23	11.98
Alcohol Consumption	No	104	54.17
	Yes	88	45.83
Among the respondents who drink alcohol (n = 88).			
Alcohol consumption rate	Once	71	80.68
	Twice	15	17.05
	Thrice	2	2.27

4.4 Work-Related Characteristics of Auto Mechanics

From the results in Table 4, the work-related characteristics of the respondents indicate that 10.4% of the respondents work for less than 10 hours a day. A little over three-quarters (76.6%) of the respondents work for 10 -12hours and the remaining work for over 12hours. Nearly 85.0% of the participants stand for long hours, and 94.3% of the respondents lift objects weighing more than 50kg. Thirty-three out of 192 respondents find their work environment stressful, and the majority (66.7%) consider their work environment to be conducive. On the question of whether respondents have received education from work on body mechanics, it was realized the majority of the respondents have no education on body mechanic techniques.

Table 4: Work-Related Characteristics of the Study Population

Variable	Categories	Frequency	Percentage
Work hours per day	Less than 10hours	20	10.42
	10 – 12hours	147	76.56
	Greater than 12hours	25	13.02
Break	No	54	15.10
	Yes	138	84.90
Among the respondents who take a break at work (n = 138).			
Break hours	1hour	21	15.22
	1.5hours	43	31.16
	2hours	74	53.62
Stand for long hours	No	29	15.10
	Yes	163	84.90
Lifting weight greater than 50kg	No	11	5.73
	Yes	181	94.27
Work Environment	Stressful	33	17.19
	Conducive	128	66.67
	Excellent	31	16.15
Education on Body Mechanic	No	152	79.17
	Yes	40	20.83

4.5 Psychosocial Characteristics of Auto Mechanics

The psychosocial characteristics of the respondents are presented in table 5. From this table, 98.9% of the respondents were satisfied with their job. Again, a high proportion i.e. 99.5% of the respondents, agree that their job is able to provide their needs. Similarly, 99.0% of the respondents have control over their job. While 99% of the respondents, consider their job to be demanding, while 75.0% of the respondents receive support from their job.

Table 5: Psychosocial Characteristics of the study population

Variable	Categories	Frequency	Percentage
Job Satisfaction	No	6	3.13
	Yes	186	96.88
Job Provision	No	1	0.52
	Yes	191	99.48
Job Control	No	2	1.04
	Yes	190	98.96
Job demand	No	2	1.04
	Yes	190	98.96
Job Support	No	48	25.00
	Yes	144	75.00
Knowledge on Body Mechanics	Low	151	78.65
	High	41	21.35

4.6 Level of Knowledge of Respondents

Figure 3 presents the level of knowledge of 192 respondents on the importance of body mechanic techniques. The variable knowledge was measured as an eight-item composite variable with each item of the variable assessing respondents on body mechanic techniques. A score of one is assigned for each correct response to an item. In total, a score of eight would be given for obtaining correct responses for all items and a score of zero for an incorrect response for all items. Knowledge is categorized as "poor" if a respondent scores less than 3, "adequate" if a respondent scores between 4 and 6 and a respondent is considered to have "excellent" knowledge if the respondent obtains a score above 6. From Figure 1, 4.2% of the respondents have poor knowledge on the importance of body mechanics, 74.5% have adequate knowledge, while 21.3% have excellent knowledge.

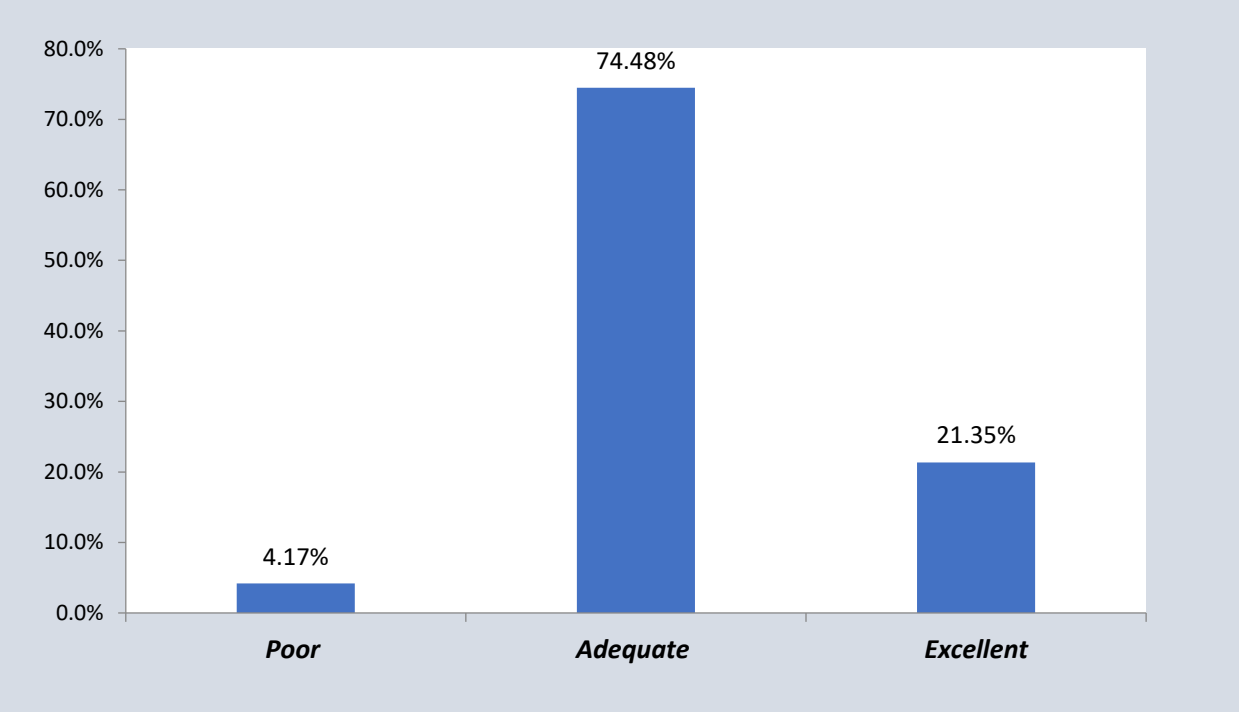


Figure 3: *Level of Knowledge of respondent on the importance of Body mechanic Technique*

4.7 Pain Intensity of Respondents Using Oswestry Disability Index

Figure 4 presents the pain intensity of respondents under the Oswestry Disability Index (ODI). The ODI scale was generated from a set of self-completed questions on ten topics regarding the respondents' assessed intensity of pain on the lifting of objects, ability to care for oneself, ability to walk, ability to sit, sexual function, ability to stand, social life, sleep quality, and ability to travel. Each topic category is followed by six (6) statements describing different likely pain scenarios the respondent might deem fit to explain his/her situation and then checks out the answer that best fits. Each question is scored on a scale of 0–5. Each section score is summed and then multiplied by two (2), and the degree of disability is expressed as a percentage. Higher ratings on the Oswestry questionnaire indicate more significant levels of perceived disability. From the Pie Chart below, 21.9% of respondents has Minimal disability, 62.0% had Moderate disability, and 9.4% had Severe disability, while 6.8% of the participants were crippled.

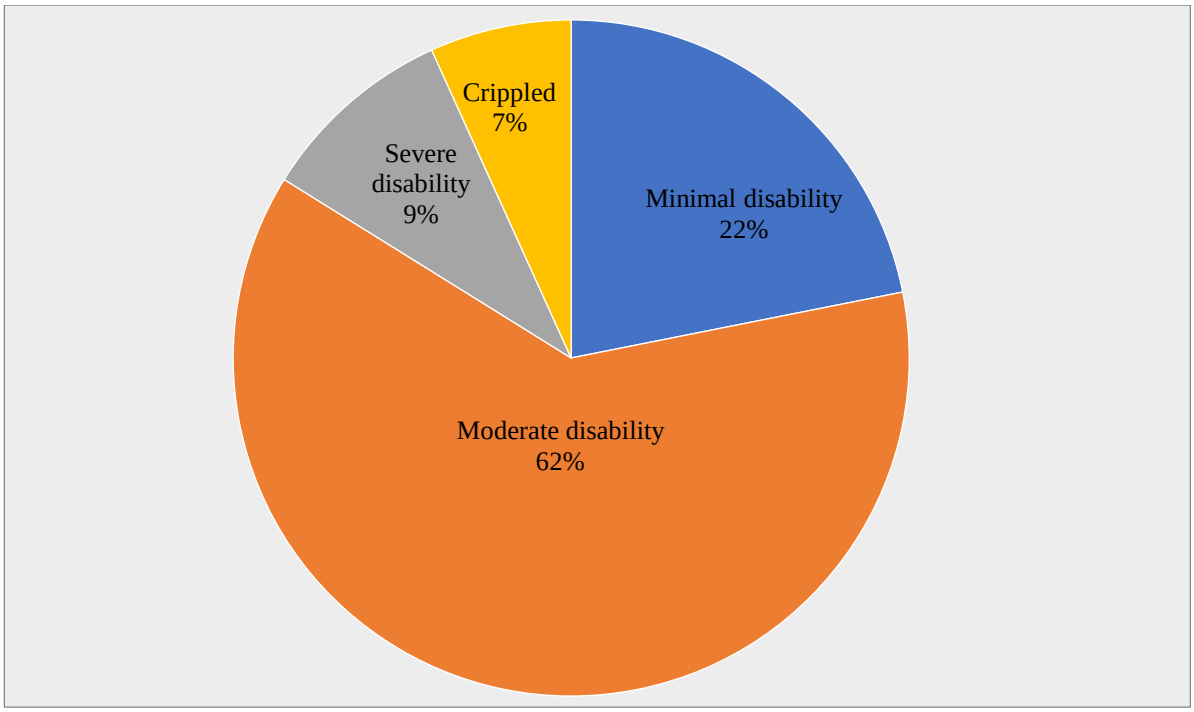


Figure 4: *Level of intensity of Low Back Pain*

4.8 Low Back Pain and Demographic Factors

Table 6 presents the results for the Fischer's exact test for the Low Back Pain on selected demographic variables. From the results, Age group was not statistically significant to the Low Back Pain. The reported Job position was also realized not to be statistically related with the Low Back Pain of the respondents. The Marital status, the Religious status of the respondents and Educational level were not associated with Low Back Pain of the respondents.

Table 6: Association between Low Back Pain and Variables

		Low Back Pain		
Variable	**Categories**	**No (n=16)**	**Yes (n=176)**	**p-value**
Age Group	Less than 20	7	73	1.00
	20 - 39	7	80	
	Greater than 39	2	23	
Position	Master	3	19	0.63
	Coworker	1	18	
	Apprentice	12	139	
Educational level	No education	2	56	0.08
	Primary	5	72	
	Secondary	8	39	
	Tertiary	1	9	
Marital Status	Married	3	45	0.576
	Single	12	125	
	Divorced	1	6	
Religion	Christian	12	137	0.791
	Muslim	3	30	
	Other	1	9	

4.9 Low Back Pain and Health-Related Factors

From table 7, Waist circumference, Family History of Low Back Pain, Smoking status, Education on body mechanics, and BMI were not statistically significant to the Low Back Pain of respondents. Alcohol consumption by respondents was identified to be statistically associated with Low Back Pain (p-value< 0.01).

Table 7: Association between Low Back Pain and selected variables

		Low Back Pain		
Variable	**Categories**	**No (n = 16)**	**Yes (n =176)**	**p-value¥**
Waist Circumference	Slim waist	8	92	0.558
	Large waist	6	72	
	Extra-large waist	2	12	
BMI	Underweight	1	6	0.060
	Normal	8	38	
	Overweight	4	61	
	obese	3	71	
Alcohol Consumption	No	15	89	**<0.01***
	Yes	1	87	
Family History	No	5	24	0.06
	Yes	11	152	
Smoking Status	No	15	154	0.402
	Yes	1	22	

4.10 Low Back Pain and Work-Related Factors

Lifting weight greater than 50kg, Standing for long hours, Break Hours, Education on body mechanics were found not to be statistically significant to having Low Back Pain. Work Environment and Work hours per day were realized to be statistically associated with having Low Back Pain (p-values<0.01, <0.02) respectively.

Table 8: Association between Low Back Pain and Variable

		Low Back Pain		
Variable	**Categories**	**No (n=16)**	**Yes (n=176)**	**p-value**
Work hours per day	Less than 10hrs	3	17	**0.02***
	10 – 12hours	8	139	
	More than 12hrs	5	20	
Break hours	1hour	1	20	0.470
	1.5hours	2	41	
	2hours	1	73	
Stand for long hours	No	2	27	0.55
	Yes	14	149	
Lifting weight greater than 50kg	No	2	9	0.23
	Yes	14	167	
Work Environment	Stressful	2	31	**0.01***
	Conducive	7	121	
	Excellent	7	24	
Education on Body Mechanic	No	14	138	0.311
	Yes	2	38	

¥: Fischer's exact test

*****: statistically significant

4.11 Low Back Pain and Psychosocial Factors

Job Satisfaction, Job Provision, Job Control and Job demand were found not to be statistically significant to having Low Back Pain. However, Job support was found to be statistically associated with having Low Back Pain (p-value<0.01). Knowledge on the importance of body mechanics was identified to be associated with the risk of developing low back pain (p-value<0.01).

Table 9: Association between Low Back Pain and Variable

		Low Back Pain		
Variable	**Categories**	**No (n=16)**	**Yes (n=176)**	**p-value**
Job Satisfaction	No	0	6	0.589
	Yes	16	170	
Job Provision	No	0	1	0.917
	Yes	16	175	
Job Control	No	0	2	0.840
	Yes	16	174	
Job demand	No	0	2	0.840
	Yes	16	174	
Job Support	No	14	34	**<0.01***
	Yes	2	142	
Knowledge	Low	3	148	**<0.01***
	High	13	28	

4.12 Factors Influencing Low Back Pain

Table 10 presents the results for the Logistic regression between Low Back Pain and the factors influencing it. The multiple logistic regression results show that variables such as Alcohol consumption, Work hours per day, Body Mass Index and Work environment were not statistically associated with having Low Back Pain. However, Job Support was statistically significant (AOR=17.34; 95%CI=1.10 – 273.16). Having high knowledge was significantly associated with low back pain (AOR=0.06; 95%CI=0.01 – 0.48). Being an apprentice was statistically identified to be associated with low back pain (AOR=0.13; 95%CI=0.04 – 0.86).

Table 10: Strength of association between Low Back Pain and Variables

Variable	Categories	COR	95%CI	AOR	95%CI
Alcohol consumption	No	Ref		Ref	
	Yes	14.66	1.90 – 113.41	1.53	0.09 – 26.56
Work hours per day	Less than 10	Ref		Ref	
	10 – 12	3.07	0.74 – 12.68	0.65	0.07 – 5.95
	More than 12	0.71	0.15 – 3.40	1.15	0.11 – 11.83
Work Environment	Stressful	Ref		Ref	
	Conducive	1.12	0.22 – 5.64	2.38	0.24– 23.31
	Excellent	0.22	0.04 – 1.16	2.98	0.24 – 37.50
Job Support	No	Ref		Ref	
	Yes	29.24	6.34 – 134.76	**17.34***	**1.10 – 273.16**
Knowledge	Low	Ref		Ref	
	High	0.04	0.01 – 0.16	**0.06***	**0.01 – 0.48**
BMI	Underweight	Ref		Ref	
	Normal	0.79	0.08 – 7.51	0.16	0.01- 2.81
	Overweight	2.54	0.24 – 26.55	0.17	0.01- 3.34
	Obese	3.94	0.35 – 43.99	0.18	0.01 – 4.66
Position	Master	Ref		Ref	
	Coworker	2.84	0.27- 29.90	4.30	0.34 – 55.19
	Apprentice	1.83	0.47 – 7.08	**0.13***	**0.04 – 0.86**

CHAPTER FIVE

5.0 DISCUSSION

5.1Introduction

Universally, work-related illness and injury continue to be of great concern because it is the principal cause of surge in work productivity. It is estimated to cost nearly 2.8 trillion USD (4%) of annual GDP due to sickness absence, lost workday, worker's compensation and daily production interruption (Akter *et al.,* 2016). Amongst this work-related illness and injuries, musculoskeletal pain is rife. It is projected to constitute about 32% of the work-related injuries (Alrashed, 2016). Musculoskeletal pain affects most body parts of the individual. It may affect the neck, shoulders, back, thighs, elbow, wrists or even the legs. Leading amongst these is the low back pain. The low back pain is almost ubiquitous amongst all classes of professionals.

5.2 Demographic characteristics of Auto mechanics at Korle Gonno and Mamprobi

This study included 192 Auto mechanics working within Korle Gonno and Mamprobi, communities. Among this number, 41.7% of the Auto mechanics were less than 20 years, whiles 45.3% of them were between the ages of 20 to 39 years. The remaining proportion of Auto mechanics were 40 years and older. Considering the job position, nearly, 80% of the Mechanics at Korle Gonno and Mamprobi were Apprentices, 11.5% of them formed the Masters group, and the remaining 9.9% were Coworkers. The distribution of Auto mechanics according to their level of education revealed that 30.2% of them had no formal education, 40.1% had up to primary education, 24.5% had a secondary level of education and about 5.2% had tertiary education. Auto mechanics who were married made up 25.0% of the Mechanics while the majority, i.e. 71.4% reported were single. A small percentage of the Auto mechanics were divorced, and they constituted 3.27% of the auto mechanics studied.

Cognizance of the religious background of the Mechanics, it was observed from the data that, most of the Mechanics were Christians. They made up 77.6% of the Mechanics at Korle Gonno and Mamprobi communities. Considering the religious status, 17.2% of the participants were Muslims, while the remaining proportion formed other religions.

5.3 Prevalence of low back pain amongst Auto mechanics at Korle Gonno and Mamprobi

The prevalence of low back pain amongst Auto mechanic at the Korle Gonno and Mamprobi communities was found to be 92.06% (Table 2). This prevalence is high compared to the global estimation of 70 to 85% (Tinitali *et al.,* 2019). This prevalence is, again higher compared to a similar study conducted in Malaysia. It was realized that the prevalence of low back pain amongst Auto mechanics was 87.4% (Nasaruddin *et al*., 2014). It can be concluded that the prevalence of low back pain amongst the Auto mechanics working at the Korle Gonno and Mamprobi communities is higher and of great public health concern. This is because the Auto mechanic profession forms one of the highest risk professions for work-related musculoskeletal disorders (Tamene *et al.,* 2020). Another reason for the high prevalence of low back pain is the repetitive nature of most of their tasks, e.g. body positions especially bending to be in an awkward position for long periods. Upon a critical look at the nature of work of the Mechanics at Korle Gonno and Mamprobi, one would realize that these Mechanics undergo rigorous, laborious activities. These include lifting of heavy objects, carrying, pounding among others. Most of these activities are done with human strengths without mechanical aids and this exerts enormous strain on the muscles of these workers.

5.4 Level of pain intensity of respondents using Oswestry disability index

The Global Burden of Disease Study informed that amongst 310 conditions, back pain ranked highest in terms of its dilapidating effect and overall load (Ludwig *et al.,* 2017). Hence, this study

sought to assess the disability level of the low back pain amongst Auto mechanics using the Oswestry Disability Index. The Oswestry Disability score obtained for Auto mechanics working at Korle Gonno and Mamprobi revealed that 22% of the Auto mechanics had a minimal disability from the lower back pain, and the majority, i.e. 62% had a moderate disability. In comparison, 9% of the mechanics had a severe disability, and the remaining 7% were crippled as a result of their low back pain (Figure 3). A similar study assessing the level of pain intensity amongst patients was done in Slovenia and according to the disability, the patients were assigned to the following five groups were observed according to the level of their disability: minimal disability (39.0%), moderate disability (22.7%), severe disability (14.9), crippled (2.8%), and bedbound (0.7%).

It would be realized from the current study that the proportion of Auto mechanics with a minimal disability was lower compared to Klemenc-Ketis' study (Klemenc-Ketis, 2011). However, the proportion of respondents with moderate disability in this study was twice that of Klemenc-Keti's. This indicates that most of the Auto mechanics in the Korle Gonno and Mamprobi communities were experiencing some limitations as a result of their low back pain. This could impact their work rate and hence their work output. Another consequence of this is that it may overall, have an impact on the quality of life of the individual both at work and away from work. Mobility impairment has been established to be a leading consequence of low back pain. In addition, depression and anxiety have also been implications of poorly managed back pains (Ludwig *et al.,* 2017). It is therefore imperative that Auto mechanics with moderate and severe disability be closely monitored for signs of depression or anxiety while managing their back pain.

5.5 Level of Knowledge of Auto mechanics on the importance of body mechanic techniques

Knowledge on body mechanics has been established to be essential in reducing the risk of developing musculoskeletal pains (Al Eisa and Al-Abbad, 2013). Having enough knowledge on

body mechanic techniques and its importance cannot be over emphasized. This research established that 1.2% of the Auto mechanics at the Korle Gonno and Mamprobi communities had poor knowledge of the importance of body mechanic techniques. However, nearly a third of a quarter had adequate knowledge of body mechanic techniques while 21.4% had excellent knowledge on the importance of body mechanic techniques. Comparing these findings to those of a study conducted by Vidya *et al.,(2014)* amongst nurses in Mangalore in 2014, it was realised that most of the Auto mechanics in our study had some form of knowledge about the importance of body mechanic techniques. A look at the findings of the study revealed that 43.33% had good knowledge 43.33% had average knowledge and 13.34% had poor knowledge on body mechanics, and only 43.34% performed body mechanics techniques satisfactorily. Though the proportion of respondents in our study who had excellent knowledge on the importance of body mechanic techniques was less compared to those in the study by Vidya *et al.,(2014)*, it is critical to note that the respondents in that study were nurses and thus may have been taught during training or practice. Therefore, the proportion would be higher than in our study. Nonetheless, a more significant proportion of Auto mechanics had adequate knowledge and that would inure? be to the benefit of Auto mechanics at reducing their risk of developing musculoskeletal pain. This is because they would observe the appropriate ways of body posture when they go about their daily duties.

Since the proportion of Auto mechanics with excellent knowledge was few, it is expected that focus should be drawn towards interventions that would increase the knowledge of Auto mechanics on body mechanic techniques. Some suggested interventions include constant education through media, face-to-face discussions and seminars. The education should not only target the body mechanic techniques; it should cover the scope of the impact of not observing body

mechanic techniques on the quality of life of an individual. Auto mechanics may also be made to take examinations on some body mechanic techniques they need to observe in order to prevent musculoskeletal pain. These examinations may be part of their annual registration with their various unions.

5.6 Behaviors contributing to low back pain amongst the Auto mechanics

Certain behaviors have been known to impact on the risk of developing musculoskeletal pain. This study assessed a plethora of these behaviors that may be accounting for the high prevalence of low back pain amongst the Auto mechanics working at Korle Gonno and Mamprobi. Lifestyle modification could be targeted at reducing musculoskeletal pain, such as low back pain as suggested by several research findings (Yang and Haldeman, 2016). It is, therefore, necessary to take a critical look at the lifestyle characteristics of the Auto mechanics. These behaviors may be work-related or even health-related.

Some studies have identified smoking as a contributor to low back pain. A study by Petre *et al.*, (2015) on the impact of smoking on chronification of low back pain, realised that compared to non-smoking participants, participants who smoked had a greater connection between the nucleus accumbens and the medial prefrontal cortex, thereby increasing their risk of chronic back pain. The authors was concluded from the study that smoking behaviour has a direct impact on the risk of developing low backache (Green *et al.,* 2016). Results from this study, however, suggest that less than 12% of the Auto mechanics were smokers. This is encouraging. Nonetheless, intervention strategies should be targeted at reducing the proportion of smokers further. Auto mechanics who smoke should be made to understand the imports of smoking on their risk of developing musculoskeletal pain and its subsequent negative effects on the quality of life of an individual.

Many people tend to consume alcohol to numb their pain or help them relax their muscles. Moderate alcohol consumption is believed to relax muscles and reduce pain through its central nervous system effects. Nonetheless, it has been established that excess alcohol consumption increases the constriction of blood vessels, thereby worsening any existing pain (Gorman *et al.,* 1987). Some postulations are that the dehydrating effect of alcohol increases the friction between intra-vertebrae discs leading to back pain. It is also known that ethanol potentiates nociceptor responses thereby increasing sensitivity to pain (Trevisani *et al*, 2002). From this study, 45.8% of Auto mechanics consume alcohol. Amongst this proportion of Auto mechanics, 80.7% consume alcohol averagely once daily, 17.1% consume alcohol twice daily while the remaining proportion consumes alcohol thrice daily.

Weight lifting has been recommended in the physiotherapy management of back pain when incorporated in a routine exercise. (Coenen *et al.,* 2014). It was observed in a study carried out by Welch *et al., (2015)* that there was a substantial reduction in fat permeation at the L3L4 and L4L5 levels and increase in lumbar extension time to exhaustion of 18% when free base weight lift is incorporated in exercise (Welch *et al.,* 2015). Excess weight exerts lots of strain of the body muscles and impacts of the pressure on the vertebra discs leading to an increase in low back pain. Hence, lifting of heavier weights could lead to backache. With Auto mechanics, there is an increased likelihood of lifting heavy objects. The study sought to assess the proportion of Auto mechanics who lift weights heavier than 50kg. It was realized that the proportion of Auto mechanics who lift weights heavier than 50kg was 94%. This proportion is very huge. It could possibly account for the enormous proportion of Auto mechanics developing low back pain. As observed by Toraman *et al*., (2014), failure to observe proper body mechanic behaviours increased the risk of low back pain amongst workers at a car maunfacturing unit. Toraman opined that these

behaviours are modifiable yet may pose threatnening costs if they are not targetted for interventions.

The habit of standing for long hours also exerts pressure on the spinal cord leading to low back pain (Andersen *et al.,* 2007). The proportion of Auto mechanics who stand for long hours was 84%. This work-related habit has been known to increase low back pain and therefore, may be accounting for the high prevalence of low back pain. Auto mechanics should be educated to understand that they are required to balance between standing and sitting. Therefore, the habit of standing for long hours could have dire consequences for their health.

5.7 Factors influencing the risk of developing low back pain amongst Auto mechanics

Several studies have identified factors that may influence low back pain (Choobineh *et al.,* 2016; Piranveyseh *et al.,* 2016). These factors have been categorized as work-related factors, psychosocial factors and demographic factors.

5.7.1 Demographic factors

According to Akter *et al., (*2016) socio-demographic and physical risk factors were significantly linked to reported musculoskeletal symptoms. Farrokhi *et al*., (2017), identified that the Prevalence of LBP had been reported to be positively corelated to the age of an individual (up to 65), with inception usually happening in the third decade of life. This shows that age could influence one's risk of developing low back pain. This assertion is contrary to this study's findings. From the findings of this study, the age of Auto mechanics in Korle Gonno and Mamprobi did not influence their risk of developing low back pain. Unlike a study by Farrokhi *et al.*, (2017) which found that being married may influence one's risk of developing low back pain compared to being single or divorced., This study's findings indicated that marital status did not influence the odds of

developing low back pain amongst Auto mechanics working in Korle Gonno and Mamprobi communities. Other demographic factors, such as level of education, did not influence the risk of developing low backache amongst Auto mechanics.

From the findings, one characteristic of Auto mechanics that influences their risk of developing musculoskeletal pain is the position of the Auto mechanic at the work place. It was realized from the study that Auto mechanics who were Apprentices had a reduced chance of developing or having low back pain compared to Auto mechanics who were Masters. From the results in Table 9, it was realized that Apprentices had 87% reduced odds of developing or having musculoskeletal pain compared to Masters. This is because the apprentices were younger and inexperienced compared to their Masters. They were relatively young and now starting to work as Auto mechanics and were therefore less exposed to the rigorous activities of the job. The masters, on the other hand, had been working for several years and might have undergone strenuous duties, which increase their risk of developing back pain. For an intervention to reduce musculoskeletal pain, it would be therefore important and cost-effective to target the Masters than the apprentices.

5.7.2 Health-related factors

The study's findings indicate that alcohol consumption amongst auto mechanics working at Korle Gonno and Mamprobi did not influence their risk of developing low back pain. This is contrary to major findings that indicated that alcohol consumption influences one's risk of developing low back pain. This disparity may be explained by other research findings that explain that occasional consumption of copious amounts of alcohol could exert slight analgesic effects while frequent consumption of alcohol leads to potentiation on nociceptors. Therefore, this explains why, in this study, alcohol consumption is not influencing low back pain.

Some studies have suggested that obese persons are more likely to develop musculoskeletal pain (Yang *et al.*, 2017). This observation has been attributed to fat disposition, reduced muscle integrity and increased body weight that exerts pressure on the skeletal system, most importantly, the spine. These factors increase the risk of developing musculoskeletal pain. However, from the study, the body mass index of the Auto mechanics did not influence their risk of developing low backache. This is because while obesity may increase risk, it could be confounded by other factors such as regular exercise, which could reduce muscle strain and hence reduce low back pain. A critical look at the work of the Auto mechanics shows that the routine of these professionals is full of activities such as lifting, pounding, squatting etc. and these activities could relax muscle strain and hence reduce the risk of developing low back pain.

Some authors such as Petre *et al.*, (2015) and Green *et al.*, (2016) have identified smoking as a contributor to low back pain. Nonetheless, results from this study showed that amongst Auto mechanics working at Korle Gonno and Mamprobi, smoking status did not influence their risk of developing low back pain. Again, other health-related factors, such as family history, did not influence one's risk of developing back pain.

5.7.3 Work-related factors

Every work is associated with its own hazard. It is of great interest to identify factors associated with an occupation and its resulting occupational hazard. It is an established fact that low back pain is an occupational hazard associated with workers of the automobile industry. These hazards do not happen by themselves but are however influenced by the activities relating to the line of job. We, therefore, sought to find out through this study, some work-related factors that could influence the risk of an increased prevalence of musculoskeletal pain amongst Auto mechanics. Some studies have also identified some of these factors that are associated with developing

musculoskeletal pain. For example, Sazarina *et al.,* (2014) established that amongst automobile workers, frequent standing increases the prevalence of low back pain experienced by the automobile workers for the past 12 months compared to those who do not stand frequently. This may be so because the habit of standing for long hours also exerts pressure on the spinal cord leading to low back pain (Andersen *et al.*, 2007).

Conversely from our findings, the standing for long hours did not influence the risk of an Auto mechanic developing low back pain. This may be so because once the standing posture is appropriate, there is reduced stress on the spine of an individual thus, the prevalence of low back pain decreases. This means that observing proper body mechanic techniques could decrease one's risk of developing musculoskeletal pain.

The number of working hours has been found to impact the risk of developing musculoskeletal pain. A study by Ezzatvar *et al.*, (2019) identified that persons who work for over 45hours per week were 1.7times more likely to experience musculoskeletal pains compared to persons who work for less than 35 hours per day. With this study, it was determined that working for long hours did not influence the risk of an Auto mechanic developing low back pain. Thus, our findings are contrary to that of (Ezzatvar *et al.*, 2019).

2.5.4 Psychosocial factors

The job demand has been established to influence the prevalence of back pain amongst workers. A study by Wami *et al.,* (2019) assessing factors that influence the risk of low back pain amongst low wage workers determined that job demand exacts both physical and psychological toll on the workers thereby increasing low back pain risk. Though the work of Auto mechanics is demanding, our study findings indicated that this did not influence their risk of developing low back pain as observed in other studies such as the study by(Wami *et al.,* 2019). This is because, besides the

factor of job demand, other factors such as job satisfaction and job support may influence the risk of developing back pain. Hence, if an individual is satisfied and has adequate support from their occupation, they may not consider their work to be demanding. It was realized from our study that job support tends to influence low back pain amongst auto mechanics. From Table 9, auto mechanics who received adequate support at work were 17.3times more likely to develop low back pain compared to participants who do not receive support at work.

A study done in Spain on the relevance of body mechanic checklist tool revealed that with the addition of knowledge of good body mechanic techniques, musculoskeletal injuries reduced and the practices of body mechanic techniques amongst the respondents increased (Akhtar *et al.*, 2017). Our findings are consistent with the findings of (Akhtar *et al.*, 2017). In our study findings, it was realised that having high levels of knowledge on the importance of body mechanic techniques decreased the auto mechanic's risk of developing low back pain by 94% compared to having a low level of knowledge on body mechanic techniques. In other words, auto mechanics with high levels of knowledge on the importance of body mechanic techniques are 17times more likely to have low back pain compared to auto mechanics with poor knowledge. Once the uto mechanic has adequate knowledge of the importance of body mechanic techniques, they would observe these techniques at work. These techniques have been established to reduce musculoskeletal pains. Hence efforts should be made to increase the knowledge of auto mechanics on body mechanic techniques. By so doing the level of low back may be reduced by 94%.

CHAPTER SIX

6.0 CONCLUSION AND RECOMMENDATIONS

6.1 Conclusions

It was realized from this study that the prevalence of low backache amongst Auto mechanics working at Korle Gonno and Mamprobi communities was high. The prevalence was 92.06%.

From this study, the level of pain intensity of Auto mechanics working at Korle Gonno and Mamprobi communities using the Oswestry Disability Score revealed that 22% of the Auto mechanics had minimal disability from the lower back pain, the majority, i.e. 62% had moderate disability while 9% of the mechanics had a severe disability and the remaining 7% were crippled as a result of their low back pain.

The level of knowledge of Auto mechanics indicated that 1.2% of the Auto mechanics at the Korle Gonno and Mamprobi communities had poor knowledge of the importance of body techniques. However, nearly a third of a quarter had adequate knowledge of body techniques while 21.4% had excellent knowledge on the importance of body mechanic techniques.

Demographic characteristics such as Age, Educational level, Marital status and Years of experience of Auto mechanics did not influence their risk of developing musculoskeletal low back pain. Demographic factor such as the Position of an Auto mechanic at work was found to influence the risk of developing low back pain. Health-related factors such as Smoking status, Alcohol consumption, Body mass index did not also influence the risk of developing low back pain. Work-related factors such as Standing for long hours, lifting weights heavier than 50kg, and Work environment did not influence the risk of developing low back pain. Psychosocial factors such as Job satisfaction, Job demand, and Job Control were found not to influence the prevalence of low

back pain amongst Auto mechanics working at Korle Gonno and Mamprobi communities. However, Job support was found to influence low back pain.

6.2 Recommendations

6.2.1 For Public Health

The proportion of Auto mechanics with low back pain was high and should be of public health interest. Efforts should be put in place by the Municipal/Metropolitan Health Directorate at reducing this prevalence since low back pain affects the quality of life of an individual. This may include offering health symposia to educate the populace.

Public intervention may be rolled out by the Workers' Union in collaboration with the Health Directorate to address occupational hazards; these interventions should target factors such as increasing the knowledge of Auto mechanics on the importance of body mechanic techniques. Also, Masters within the automobile professions should often be targeted for regular assessments of musculoskeletal pain than apprentices and coworkers.

6.2.2 For Research

Though low backaches are known as the most prevalent form of musculoskeletal pain, Auto mechanics are susceptible to other forms of musculoskeletal pain. Thus, further research adapting a qualitative approach should be carried out to shed more light on the prevalence and risk factors for other forms of musculoskeletal pain amongst Auto mechanics working at Korle Gonno and Mamprobi communities.

6.2.3 For Policy

The Occupational Health and Safety Policy should be amended to include the need for workers, especially Auto mechanics, to enroll for body mechanic technique courses in order to be offered certificates as professionals.

REFERENCES

Ahenkorah, J. *et al.* (2019) 'Chronic low back pain beliefs and management practices in Africa : Time for a rethink ?', (July), pp. 1–6. doi: 10.1002/msc.1424.

Ahmad, A. and Alvi, R. (2017) 'Musculoskeletal disorders and risk factors of workers in Indian mining industry: a cross-sectional study', *International Journal of Perceptions in Public Health*, 1(4), pp. 241–248.

Akhtar, S. *et al.* (2017) 'Assessing the knowledge and practices of body mechanic technique among nurses at Punjab institute of cardiology Lahore', *Saudi Journal of Medical and Pharmaceutical Sciences*, 3(6A), pp. 545–555. doi: 10.21276/sjmps.

Akter, S. *et al.* (2016) 'Musculoskeletal symptoms and physical risk factors among automobile mechanics in Dhaka, Bangladesh', *South East Asia Journal Of Public Health*, 6(1), pp. 8–13. doi: 10.3329/seajph.v6i1.30338.

Alrashed, W. A. (2016) 'Ergonomics and work-related musculoskeletal disorders in ophthalmic practice', *Imam Journal of Applied Sciences*, 1, pp. 48–63. Available at: www.e-ijas.org.

Andersen, J. H., Haahr, J. P. and Frost, P. (2007) 'Risk factors for more severe regional musculoskeletal symptoms: a two-year prospective study of a general working population.', *Arthritis Rheumatol.*, 56, pp. 1355–1364.

Baker, D. (2016) 'Low Back Pain Prevalence and Related Workplace Psychosocial Risk Factors : A Study Using Data From the 2010 National Health Interview Survey', *Journal of Manipulative and Physiological Therapeutics*. doi: 10.1016/j.jmpt.2016.07.004.

Barkhordari, A., Poorabdian, S. and Khoobi, K. (2017) 'The study of changes in the serial peak flowmetery test in workers of car painting workshops, Kurdistan', *Kurdistan university med sci*, 15, pp. 73–80.

Bento, P. T. F. *et al.* (2019) 'Low back pain in adolescents and association with sociodemographic factors , electronic devices , physical activity and mental health ☙', *Jornal de Pediatria*, (xx). doi: 10.1016/j.jped.2019.07.008.

Carlton, R. (1987) 'The effects of body mechanics instruction on work performance, American journal of occupational therapy', 41, pp. 16-20.

Choobineh, A. *et al.* (2016) 'Prevalence of Work-related Musculoskeletal Symptoms among Iranian Workforce and Job Groups.', *International Journal of Prevention Medicine*, 7, p. 130.

Coenen, P. *et al.* (2014) 'The effect of lifting during work on low back pain: a health impact assessment based on a meta-analysis', *Occupation Environment Medicine*. doi: 10.1136/oemed-2014-102346.

Da, N. *et al.* (2010) *Factors Related to Musculoskeletal Disorders in Nursing Workers 1 Fatores associados aos distúrbios musculoesqueléticos em trabalhadoras de enfermagem*.

Delitto, A. *et al.* (2016) 'Low Back Pain: Clinical Practice Guidelines Linked to the International Classification of Functioning, Disability, and Health from the Orthopaedic Section of the American Physical Therapy Association Anthony', *journal of Orthopedic sports and physiotherapy*, 42(4). doi: 10.2519/jospt.2012.42.4.A1.Low.

Eatough, E., Way, J. and Chang, C. (2012) 'Understanding the link between psychosocial work

stressors and work-related musculoskeletal complaints', *Appl Ergon*, 43(5), pp. 55–63.

Al Eisa, E. and Al-Abbad, H. (2013) 'Occupational back pain among rehabilitation nurses in Saudi Arabia: The influence of knowledge and awareness', *Workplace health & safety*, 61(9), pp. 401–407.

Ezzatvar, Y. *et al.* (2019) 'Professional experience , work setting , work posture and workload influence the risk for musculoskeletal pain among physical therapists : a cross - sectional study', *International Archives of Occupational and Environmental Health*, (0123456789). doi: 10.1007/s00420-019-01468-7.

Fairbank, J. *et al.* (2000) 'Oswestry Low Back Pain Disability Questionnaire', *Physical Therapy*, 25(2000), pp. 1–3.

Farrokhi, S. *et al.* (2017) 'Biopsychosocial Risk Factors Associated with Chronic Low Back Pain after Lower Limb Amputation', *Medical Hypotheses*. doi: 10.1016/j.mehy.2017.07.030.

Fernández, J., Jameson, R. and Brito, A. (2014) '[Musculoskeletal pain in Venezuelan oil tanker crews].', *Investigacion clinica*, 55(2), pp. 107–18.

Flower, A. *et al.* (1981) 'An occupational therapy program for chronic back pain, American journal of occupational therapy', 35, pp. 243-248.

Gorman, D. *et al.* (1987) 'Relationship between alcohol abuse and low back pain.', *Alcohol Alcohol*, 22(1), p. 61-63.

Grabovac, I. and Ernst, T. (2019) 'Association between low back pain and various everyday performances Activities of daily living , ability to work and sexual function'. doi:

10.1007/s00508-019-01542-7.

Green, B. N. *et al.* (2016) ‘Association Between Smoking and Back Pain in a Cross Section of Adult Americans’, *Cureus*, 8(9). doi: 10.7759/cureus.806.

Han, S. . *et al.* (2009) ‘Symptom Prevalence of Musculoskeletal Disorders and the Effects of Prior Acute Injury among Aging Male Steelworkers’, *Journal Occupational Health*, 51.

Ibrahim, R. A. E. and Elsaay, O. E. A. E. (2016) ‘The Effect of Body Mechanics Training Program for Intensive Care Nurses in Reducing Low Back Pain’, *OSR Journal of Nursing and Health Science*, 4(5), pp. 81–96. doi: 10.9790/1959-04548196.

Isci, F. and Esin, M. (2009) ‘Evaluation of occupational health nursing interventions using Omaha scheme in a company, Dokuz Eylul University, Turkey’.

Johanning, E. (2000) ‘Elaborates that vibration increases the risk of MSDs in heavy equipment operators’, *American Journal of Industrial Medicine*, 37, pp. 94–107.

Kebede, A. *et al.* (2019) ‘Low Back Pain and Associated Factors among Primary School Teachers in Mekele City , North Ethiopia : A Cross-Sectional Study’, 2019.

Klemenc-Ketis, Z. (2011) ‘DISABILITY IN PATIENTS WITH CHRONIC NON-SPECIFIC LOW BACK PAIN: VALIDATION OF THE SLOVENE VERSION OF THE OSWESTRY DISABILITY INDEX’, *Zdrav Var*. doi: 10.2478/v10152-010-0031-8.

Ludwig, C. *et al.* (2017) ‘The impact of low back pain on health-related quality of life in old age: results from a survey of a large sample of Swiss elders living in the community’, *European Spine Journal*. doi: 10.1007/s00586-017-5427-6.

Mohammadi, S. *et al.* (2012) ‘Surveying ergonomic factors of back pain in primary school children, Razi, Tehran’, *Medicine Science*, 19, pp. 1–11.

Mwilila, M. C. (2008) ‘Work-related low back pain among clinical nurses in Tanzania’, pp. 84–89.

Nasaruddin, A., Tamrin, S. and Karuppiah, K. (2014) ‘The Prevalence of Musculoskeletal Disorder and the Association with Risk Factors among Auto Repair Mechanics in Klang Valley, Malaysia.’, *Iranian Journal Public Health*, 43(3), pp. 34–41.

NIH (2013) ‘Using Alcohol to Relieve Your Pain: What Are the Risks?’, *National Institute on Alcohol Abuse and Alcoholism*, 301.443.38. Available at: www.niaaa.nih.gov.

Øiestad, B. E. *et al.* (2019) ‘Risk factors for epidsodes of back pain in emerging adults. A systematic review’, *EJP*. doi: 10.1002/ejp.1474.

Petre, B. *et al.* (2015) ‘Smoking Increases Risk of Pain Chronification Through Shared Corticostriatal Circuitry’, *Hum Brain Mapp*, 36(2), pp. 683–694. doi: 10.1002/hbm.22656.

Piranveyseh, P. *et al.* (2016) ‘Association between psychosocial, organizational and personal factors and prevalence of musculoskeletal disorders in office workers’, *International Journal on Occupational Safety Ergonomics*, 22(2), pp. 267–273.

Sazarina, N. *et al.* (2014) ‘PHYSICAL ACTIVITY AND LOW BACK PAIN AMONG AUTOMOTIVE INDUSTRY WORKERS IN SELANGOR.’, *Malaysian Journal of Public Health Medicine*, 14(2), pp. 34–44.

Schwertner, D. S. *et al.* (2019) ‘Prevalence of low back pain in young Brazilians and associated

factors : Sex , physical activity , sedentary behavior , sleep un co rre ct pr oo er un co rre ct ed pr oo', *Journal of Back and Musculoskeletal Rehabilitation*, 1, pp. 1–12. doi: 10.3233/BMR-170821.

Smedley, J., Finlay, D. and Sadhra, S. (2014) *Oxford handbook of occupational health, Oxford Medical Publication 2nd Edition.*

Stock, S. *et al.* (2005) *Work-related Musculoskeletal Disorders Guide and Tools for Modified Work.*

Tamene, A. *et al.* (2020) 'Musculoskeletal Disorders and Associated Factors among Vehicle Repair Workers in Hawassa City, Southern Ethiopia', *Journal of Environmental and Public Health*, p. 11. doi: 10.1155/2020/9472357.

Tinitali, S. *et al.* (2019) 'Sitting Posture During Occupational Driving Causes Low Back Pain ; Evidence-Based Position or Dogma ? A Systematic Review'. doi: 10.1177/0018720819871730.

Toraman, A., Ardahan, M. and Balyaci, O. (2014) 'The effect of body mechanic behaviours on the low back pain, Department of public health faculty of nursing Ege University, Bornova, Izmir Turkey.'

Trevisani, M., Smart, D., Gunthorpe, M. et al. (2002) 'Ethanol elicits and potentiates nociceptor responses via the vanilloid receptor-1.', *Nat Neurosci*, 5, pp. 546–551. doi: https://doi.org/10.1038/nn0602-852.

Vidya, V. P. *et al.* (2014) 'THE KNOWLEDGE AND PRACTICE OF BODY MECHANICS AMONG STAFF NURSES: DESCRIPTIVE CORRELATIONAL STUDY', *American*

International Journal of Research in Humanities, Arts and Social Sciences, 8(2), pp. 124–126.

Wami, S. D. *et al.* (2019) 'Work-related risk factors and the prevalence of low back pain among low wage workers : results from a cross-sectional study', pp. 1–9.

Wassell, J. *et al.* (2000) 'A prospective study of back belts for prevention of back pain and injury.', *JAMA.*, 284(21), pp. 2727-2732. doi: doi:10.1001/jama.284.21.2727.

Welch, N. *et al.* (2015) 'The effects of a free-weight-based resistance training intervention on pain, squat biomechanics and MRI-defined lumbar fat infiltration and functional cross-sectional area in those with chronic low back', *BMJ Open Sport & Exercise Medicine*, 1(e000050). doi: doi: 10.1136/bmjsem-2015-000050,.

WHO (2001) 'A manual for primary health care workers, World health organization, Geneva, Switzerland.', *Occupational health*.

Widanarko, B. *et al.* (2014) 'The combined effect of physical, psychosocial/organisational and/or environmental risk factors on the presence of work-related musculoskeletal symptoms and its consequences', *Applied Ergonomics*, 45(6), pp. 1610–1621. doi: 10.1016/J.APERGO.2014.05.018.

Widanarko, B. *et al.* (2015) 'Interaction between physical and psychosocial work risk factors for low back symptoms and its consequences amongst Indonesian coal mining workers'. doi: 10.1016/j.apergo.2014.07.016.

Yang, H. and Haldeman, S. (2016) 'Behavior-related Factors Associated with Low Back Pain in the US Adult Population', *SPINE An International Journal for the study of the spine Publish*.

doi: 10.1097/BRS.0000000000001665.

Yang, H. and Haldeman, S. (2017) ‘Behavior-related Factors Associated with Low Back Pain in the US Adult Population’, *SPINE An International Journal for the study of the spine Publish*. doi: 10.1097/BRS.0000000000001665.

Ye, S. *et al.* (2017) ‘Risk factors of non-specific neck pain and low back pain in computer- using office workers in China : a cross- sectional study’, pp. 9–11. doi: 10.1136/bmjopen-2016-014914.

QUESTIONNAIRE

ASSESSMENT OF KNOWLEDGE, ATTITUDES, AND PRACTICES OF AUTO-MECHANICS ON BODY MECHANIC TECHNIQUES AND ITS HEALTH IMPLICATIONS IN KORLE GONO AND MAMPROBI COMMUNITIES.

My name is ……. from the Ensign College of Public Health, Kpong. I am asking for your help in carrying out an important scientific study. This study will give us information on knowledge, attitudes, and practices of auto-mechanics on body mechanic techniques and its health implications (lower back pain). Your participation is very important to the success of the study. All information that you give us will be treated with care and confidentiality.

Background Characteristics

1. Age: …… (years)
2. Position at work. [ ] Master [ ] Coworker [ ] Apprentice
3. Level of education [ ] No education [ ] Primary [ ] Secondary [ ] Tertiary
4. Years of Practice: ……..
5. Marital Status: [ ] Married [ ] Single [ ] Divorced
6. Religion: [ ] Christian [ ] Moslem [ ] Other

Individual factors

7. Height.....
8. Weight.....
9. Waist circumference.....
10. Have you ever had backache lasting more than 2weeks before? [] Yes [ ] No
11. Do you have any family members with chronic backache? [] Yes [ ] No
12. Do you consume alcohol? [] Yes [ ] No

13. If yes how often in a week do you drink.....

14. Do you smoke? [] Yes [ ] No

15. How often do you have sex

Work-related factors

16. When do you come to work? .....

17. When do you normally close from work? .....

18. How many times do you go for a break? [] Yes [ ] No

19. How long is a break session? .....

20. Do you stand for long hours? .....

21. Do you lift objects heavier than 50kg? [] Yes [ ] No

22. Have you had any education or training on body mechanics [] Yes [ ] No

Psychosocial factors

23. Are you satisfied with your work as an auto mechanic? [] Yes [ ] No

24. Is the job able to provide your financial needs? [] Yes [ ] No

25. How would you describe your work environment?

26. Are items well placed around the working area? [] Yes [ ] No

27. Do you feel you are in control and in charge of your work? [] Yes [ ] No

28. Is your job as an auto mechanic very demanding? [] Yes [ ] No

29. Do you get support for the work you do? [] Yes [ ] No

Knowledge on Body mechanics

30. The importance of using good body mechanics is to prevent:

    a. Musculoskeletal injury

    b. Abdominal injury

c. Chest injury

d. Head injury

31. When lifting an object, the auto mechanic should:

a. Feet together for a wide base of support

b. Hold the object away from the body

c. Use jerky movements

d. Bend hip/knees and get close to the object

32. When lifting an object:

a. Keep the object close to the body

b. Bend at waist

c. Keep legs straight

d. Hold the object away

33. When lifting, avoid……. body

a. Hip bending

b. Holding the object close to

c. Turning and pivoting

d. Waist bending

34. All of these are included in the proper lifting technique except

a. Bend your knees

b. Bend at the waist

c. Hug the object close to you

d. Tuck and tighten your abdomen

35. What part(s) of the body can be bent when lifting engine or heavy object?

a. Legs and hips only

b. Legs only

c. Back and hips only

d. Back and legs only

36. The BEST option for moving a heavy object is:

a. Pick it up solo

b. Wait for someone else to do it

c. Pull/Push It

d. Lay on your back and push with your legs

37. When an employee's feet are planted, which part of their body should never be twisted?

a. The hips

b. The neck

c. The legs and arms

d. The back

Oswestry Low Back Pain Disability Questionnaire

This questionnaire has been designed to give us information as to how your back or leg pain is affecting your ability to manage in everyday life. Please answer by checking ONE box in each section for the statement, which best applies to you. We realize you may consider that two or more statements in any one section apply but please just shade out the spot that indicates the statement, which most clearly describes your problem.

Section 1 – Pain intensity

□ I have no pain at the moment

□ The pain is very mild at the moment

□ The pain is moderate at the moment

□ The pain is fairly severe at the moment

□ The pain is very severe at the moment

□ The pain is the worst imaginable at the moment

Section 2 – Personal care (washing, dressing etc)

□ I can look after myself normally without causing extra pain

□ I can look after myself normally but it causes extra pain

□ It is painful to look after myself and I am slow and careful

□ I need some help but manage most of my personal care

□ I need help every day in most aspects of self-care

□ I do not get dressed, I wash with difficulty and stay in bed

Section 3 – Lifting

□ I can lift heavy weights without extra pain

□ I can lift heavy weights but it gives extra pain

□ Pain prevents me from lifting heavy weights off the floor, but I can manage if they are conveniently placed eg. on a table

□ Pain prevents me from lifting heavy weights, but I can manage light to medium weights if they are conveniently positioned

□ I can lift very light weights

□ I cannot lift or carry anything at all

Section 4 – Walking*

□ Pain does not prevent me walking any distance

□ Pain prevents me from walking more than 1mile

□ Pain prevents me from walking more than ½ mile

□ Pain prevents me from walking more than 100yards

□ I can only walk using a stick or crutches

□ I am in bed most of the time

Section 5 – Sitting

□ I can sit in any chair as long as I like

□ I can only sit in my favourite chair as long as I like

□ Pain prevents me from sitting for more than one hour

□ Pain prevents me from sitting for more than 30 minutes

□ Pain prevents me from sitting for more than 10 minutes

□ Pain prevents me from sitting at all

Section 6 – Standing

□ I can stand as long as I want without extra pain

□ I can stand as long as I want but it gives me extra pain

□ Pain prevents me from standing for more than 1 hour

□ Pain prevents me from standing for more than 30 minutes

□ Pain prevents me from standing for more than 10 minutes

□ Pain prevents me from standing at all

Section 7 – Sleeping

□ My sleep is never disturbed by pain

□ My sleep is occasionally disturbed by pain

□ Because of pain, I have less than 6 hours of sleep

□ Because of pain, I have less than 4 hours of sleep

□ Because of pain, I have less than 2 hours of sleep

□ Pain prevents me from sleeping at all

Section 8 – Sex life (if applicable)

□ My sex life is normal and causes no extra pain

□ My sex life is normal but causes some extra pain

□ My sex life is nearly normal but is very painful

□ My sex life is severely restricted by pain

□ My sex life is nearly absent because of pain

□ Pain prevents any sex life at all

Section 9 – Social life

□ My social life is normal and gives me no extra pain

□ My social life is normal but increases the degree of pain

□ Pain has no significant effect on my social life apart from limiting my more energetic interests, e.g., sport

□ Pain has restricted my social life, and I do not go out as often

□ Pain has restricted my social life to my home

□ I have no social life because of pain

Section 10 – Travelling

□ I can travel anywhere without pain

□ I can travel anywhere but it gives me extra pain

□ Pain is bad but I manage journeys over two hours

□ Pain restricts me to journeys of less than one hour

□ Pain restricts me to short necessary journeys under 30 minutes

□ Pain prevents me from travelling except to receive treatment