WORK RELATED DISCOMFORT AMONG AUTOMOBILE WORKERS IN BANGLADESH

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Work-Related Discomfort Among Automobile Workers In Bangladesh

Submitted by **Md. Mehedi Hassan Rokey**, for the partial fulfillment of the requirements for the degree of Bachelor of Science in Physiotherapy. (B. Sc. PT)

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DECLARATION

This work has not previously been accepted in substance for any degree and isn't concurrently submitted in candidature for any degree. This dissertation is being submitted in partial fulfillment of the requirements for the degree of B.Sc. in Physiotherapy.

I confirm that if anything identified in my work that I have done is plagiarism or any form of cheating that will directly be awarded me a fail and I am subject to disciplinary actions of authority. I confirm that the electronic copy is identical to the bound copy of the Thesis.

In case of dissemination of the findings of this project for future publication, the research supervisor will be highly concerned, it will be duly acknowledged as a graduate thesis and consent will be taken from the physiotherapy department of Saic College Of Medical Science & Technology (SCMST).

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CONTENTS

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Acronyms

B. SC.PT	: Bachelor of Science in physiotherapy
DU	: Dhaka university
GDP	: Gross domestic product
ILO	: International Labour Organization
LBP	: Low back pain
MBBS	: Bachelor of Medicine, Bachelor of Surgery
MS	: Musculoskeletal
MSDs	: Musculoskeletal disorders
NMQ	: Nordic Musculoskeletal Questionnaire
PHD	: Doctor of Philosophy
PPE	: Personal protective equipment
PT	: Physiotherapy
SCMST	: Saic college of medical science and technology
SD	: Standard Deviation
SPSS	: Statistical Package for The Social Sciences
USD	: United States Dollar
WBV	: Whole-body vibration
WMSDs	: Work-related musculoskeletal disorders

List of tables

List of figures

Abstract

Purpose: The study aimed to identify the musculoskeletal discomfort among automobile workers in Bangladesh.

Objective: This study's objective was to identify the musculoskeletal discomfort among automobile workers in Bangladesh.

Methodology: This study was performed in a cross-sectional study design. This study was conducted to identify the musculoskeletal discomfort among automobile workers in Bangladesh. This study's sample was collected through a convenience sampling procedure and the total sample was 256. The data was collected from the different areas across the Dhaka division. The data collection process was a questionnaire with a face-to-face interview. Data was analyzed with Microsoft Office, and Excel 2019 using SPSS 25 version software program and test use of study chi-square test.

Result: This study's participant means and standard deviation of participant age is Mean ±SD= 29.69±10.64; About (46.50%) automobile workers age <25 years; (35.90%) age 25-40 years; (17.60%) age >41 years. Sex of the participants (n=256) 99.61% were male and (n=1) 0.40% were female. Around (7.80%) of Automobile workers live in rural areas, (10.50%) are semi-urban and (81.60%) from urban areas. educational level among participants Primary n=154 (60,2%), Secondary n=49 (19.1%), Higher secondary n=19 (7.4%), Illiterate n=7 (2.7%), Others n=27 (10.5%).

Conclusion: From the database, it was found that 23.8% of participants had neck pain,17,2% of participants had shoulder pain, 14.8% of participants had elbow pain, 52.7% of participants had wrists/hands pain,12.90% participants had upper back pain,61.70% participants had lower back pain,4.30% participants had hip/thigh,24.60% participants had knee pain and 28.50% participants had ankle pain in last 12 months. Therefore, the most affected parts of the body were the wrists/hands, and lower back.

Keywords: *Discomfort, Automobile worker, Nordic questionnaire.*

CHAPTER –I INTRODUCTION

1.1 Background:

Work-related discomfort is a significant concern in occupational settings across the globe, including the automotive industry. It has implications for worker health, well-being, and overall job performance. In Bangladesh, as the automotive sector grows rapidly, understanding and addressing work-related discomfort among automobile workers is of utmost importance. This research aims to explore the prevalence, contributing factors, and potential interventions related to work-related discomfort among automobile workers in Bangladesh.

According to (Rahman et al., 2019), the rapid expansion of the automobile sector in Bangladesh has resulted in an increased demand for automobile workers. These workers are involved in various tasks such as vehicle assembly, parts manufacturing, repair, and maintenance. While this growth has created employment opportunities, it has also raised concerns about the potential health and well-being issues faced by these workers.

In the context of Bangladesh, several factors contribute to work-related discomfort among automobile workers. For instance, the nature of the job often involves repetitive tasks, such as assembly line work, which can lead to musculoskeletal disorders (Ahmed et al., 2017). Awkward postures during tasks, such as bending, twisting, or reaching, are also common in the automotive industry and can contribute to discomfort and increased risk of musculoskeletal injuries (Hossain et al., 2018).

Bangladesh is a developing nation and was ranked seventh in the world for having an intensive labor force in 2014, Approximately 80.27 million people are in the labor force as a whole, and 13% of them are employed in industries (Rodrigues et al., 2015). According to research, 87.4% of Malaysian auto mechanics reported having musculoskeletal problems. According to another survey, the complicated nature of their profession caused 96% of Norwegian car mechanics to experience pain, ache, or discomfort in one or more body regions in the previous 12 months (Torp et al., 2011).

An estimated 80.27 million people make up Bangladesh's labor force overall, with 13% of them working in industries. The country is a developing one and was ranked

seventh in the world in 2014 for having an intensive labor force (Rodrigues et al., 2015). Musculoskeletal issues were mentioned by 87.4% of Malaysian auto technicians, per the study. As per an additional poll, 96% of Norwegian auto mechanics reported experiencing pain, aching, or discomfort in one or more body parts during the past year, owing to the intricate nature of their occupational duties (Torp et al., 2011).

Moreover, the use of heavy machinery, tools, and exposure to noise and vibration are prevalent in automobile workplaces, which can further exacerbate work-related discomfort. High levels of noise have been associated with hearing loss among automobile workers (Rahman et al., 2020), while exposure to vibrations can lead to disorders such as Raynaud's syndrome or vibration of white fingers (Haque et al., 2016).

In addition, a lot of heavy gear, tools, and noise and vibration exposure are used in car workplaces, which can make discomfort at work even worse. While exposure to vibrations can cause conditions like Raynaud's syndrome or vibration of white fingers, high noise levels have been linked to hearing loss in automotive workers (Rahman et al., 2020).

To address work-related discomfort among automobile workers in Bangladesh, various interventions can be implemented. Ergonomic interventions, such as designing workstations and tools to reduce physical stress, have proven effective in mitigating musculoskeletal disorders (Smith et al., 2014). Training and education on proper lifting techniques, posture, and the use of personal protective equipment can also help prevent work-related discomfort (Rodrigues et al., 2015).

Workplaces in cars also frequently involve large machinery, tools, and are subjected to noise and vibration, all of which can make workers' discomfort at work worse. According to (Rahman et al., 2020), exposure to high noise levels has been linked to hearing loss in drivers, and (Haque et al., 2016) found that vibration exposure can cause conditions including Raynaud's syndrome and vibration of the fingers.

Many treatments can be used to address the discomfort that Bangladeshi autoworkers experience on the job. Musculoskeletal problems have been effectively mitigated by ergonomic interventions, such as the design of workstations and products to alleviate physical stress (Smith et al., 2014). Workplace pain can also be avoided by

receiving instruction and training on safe lifting techniques, posture, and the use of personal protection equipment (Rodrigues et al., 2015).

Psychological factors also contribute to work-related discomfort among automobile workers in Bangladesh. The demanding work environment, including tight deadlines, productivity pressures, and job insecurity, can lead to increased stress levels (Islam et al., 2018). This psychological discomfort can have detrimental effects on workers' mental health and overall well-being.

Automobile workers in Bangladesh experience discomfort related to their jobs due to psychological causes as well. Stress levels might rise as a result of the hard work environment, which includes pressure to produce, tight deadlines, and job uncertainty. The psychological discomfort that employees experience might harm their general and mental health (Islam et al., 2018).

Given the potential impact of work-related discomfort on automobile workers' health and productivity, it is essential to address these issues. Effective interventions and preventive measures can help mitigate the risks associated with work-related discomfort and improve workers' well-being.

This literature review aims to explore the work-related discomfort experienced by automobile workers in Bangladesh, focusing on the contributing factors and potential interventions. By examining existing research and studies, this review aims to provide a comprehensive understanding of the challenges faced by automobile workers and the strategies that have been developed to address work-related discomfort in this specific context (Rahman et al., 2020).

Additionally, workplaces in cars often employ a lot of heavy equipment, tools, and are subjected to noise and vibration, which can exacerbate discomfort at work. High noise levels have been connected to hearing loss in automotive workers, even though vibration exposure might produce disorders like Raynaud's syndrome or vibration of white fingers (Rahman et al., 2020).

According to the Bureau of Labor Statistics, employment for industrial machinery mechanics and garage workers is predicted to grow by 17 percent overall between 2012 and 2022 a rate faster than the average for all occupations. Workers in garages should carefully assess the risk while planning their workspace and take the potential hazards

into account. A mechanic or auto worker may be susceptible to MSDs as a result of manual labor, work-related movement and posture, and other reasons. Although there is a dearth of study on garage workers, the majority of MSD research draws comparisons with maintenance workers (Shukriah et al., 2017).

The injured workers are distributed in accordance with the injured body part in accordance with the labor technique utilized to manufacture car parts. Ninety-six (64.4%) of the workers had injuries to their hands or arms, 208 (13.6%) to their legs or feet, 145 (9.5%) to their torso, 87 (5.7%) to their faces or heads, and 73 (5.3%) to other organs. 4.8% of workers reported having shoulder injuries. Between the manufacturing of car parts and the damaged body part, there was a statistically significant difference in the distribution of injured workers. The percentage of workers with arm or hand injuries throughout the materials handling procedure ranged from 25.4% to 49.8% for leg or foot injuries (Yang et al., 2021).

The automobile industry's rigorous requirements, such as stringent deadlines, elevated production standards, and employment instability, may give rise to psychological distress among its workforce. Research has indicated a noteworthy correlation between occupational stress and psychological distress, including anxiety and depression (Islam et al., 2018). Reducing psychological pain can be achieved through fostering a supportive work environment, offering stress management programs, and improving job control.

It is critical to address these concerns because of the possible effects that discomfort at work may have on the productivity and health of automotive workers. Efficient interventions and proactive actions have the potential to reduce the likelihood of pain at work and enhance the overall health of employees.

The purpose of this study of the literature is to investigate the discomfort that Bangladeshi autoworkers face at work, with an emphasis on the solutions that could be used. This review attempts to provide a thorough overview of the difficulties experienced by vehicle workers and the solutions devised to alleviate pain associated to their jobs in this particular setting by looking at previous research and studies (Rahman et al., 2020).

1.2 Justification:

Bangladesh is a labor-intensive country. I have studied some previous research and found that there are many studies on automobile workers but fewer studies about their physical health and also there is no research about work-related discomfort among automobile workers in Bangladesh. So, I want to see work-related discomfort among automobile workers in Bangladesh.

Besides this, it will help to establish ergonomic guidelines for automobile mechanics which are mandatory for automobile mechanics. This study will also help to discover the lacking area of automobile mechanics, especially their posture before doing any activities in an automobile workshop. Besides this, it will help with professional development which is mandatory for an occupational therapist in the current situation. In the occupational therapy view, it is very important to know the ergonomic risk factors of automobile mechanics, because the physiotherapist has a major role in the ergonomics area. It will help to discover the role and importance of physiotherapy in every sector of Bangladesh.

Through this study, further researchers will able to get information about work-related discomfort as well as government, NGO and policymakers can take necessary steps to minimize the problem of automobile workers.

1.3 Research Question:

What are the work-related discomfort among automobile workers in Bangladesh?

1.4 Objective of the study:

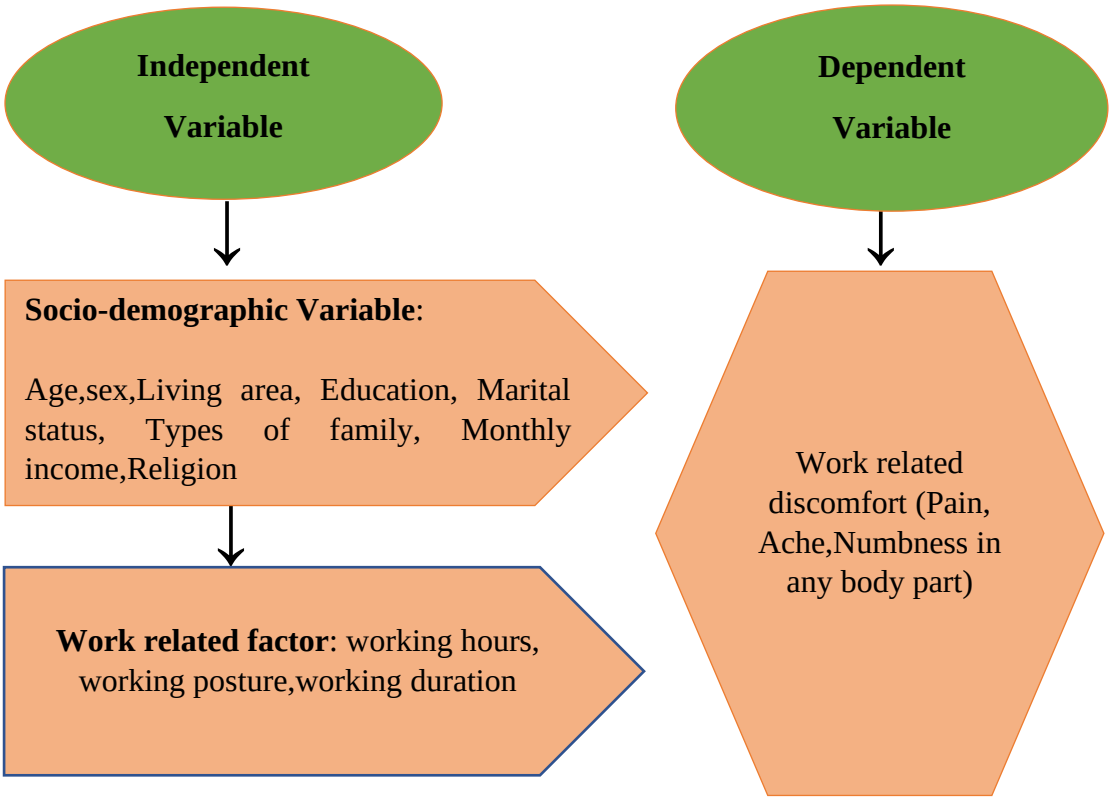
1.4.1 General objective:

- To explore musculoskeletal discomfort among automobile workers in Bangladesh.

1.4.2 Specific objective:

- To calculate the proportion of different body parts presenting musculoskeletal discomfort among automobile workers in Bangladesh using the NORDIC scale.
- To identify troubles of musculoskeletal problems among automobile workers.
- To examine the association between age and different body parts of the participants.
- To determine the association between working posture and lower back pain of the respondents.
- To explore the Socio-demographic characteristics of the study population.

1.5 Conceptual framework:



1.6: Operational definition

Automobile: An automobile is a type of road vehicle that usually has four wheels, is propelled by an electric motor or internal combustion engine, and is intended to seat a limited number of people.

Automobile worker: According to the literature, a person working in the automotive sector who is engaged in different facets of car assembly, maintenance, repair, or other related activities is referred to as an automobile worker. Workers in auto assembly lines, repair shops, manufacturing facilities for auto components, and other automotive-related businesses are included in this.

Discomfort: Discomfort, as defined by the literature, refers to a subjective feeling or sensation that is generally unpleasant, distressing, or irritating. It encompasses a range of physical or psychological sensations that may arise from various sources or conditions, including work-related factors.

Work-related discomfort: Work-related discomfort, as defined by the literature, refers to physical or psychological symptoms experienced by workers as a result of their job tasks and conditions. It encompasses a range of physical discomforts, such as musculoskeletal pain, ache fatigue, strain, or sensory impairments, as well as psychological discomforts, such as stress, anxiety, or mental health issues.

Awkward posture: Awkward postures, as defined by the literature, refer to body positions or alignments that deviate from the neutral or ergonomically optimal posture while performing work tasks. These positions typically involve excessive bending, reaching, twisting, or any other posture that puts strain or stress on the musculoskeletal system.

Static posture: Static posture, as defined by the literature, refers to the position of the body and its segments maintained for an extended period without significant movement. It involves maintaining a fixed bodily position while performing tasks or during periods of inactivity. Static postures can be seen in various occupational settings and are associated with prolonged periods of muscle activation and limited joint movement.

CHAPTER: II LITERATURE REVIEW

One of the most common causes of work-related injuries and disability in developed and developing nations is work-related musculoskeletal diseases (WMSDs). These conditions account for about half of all occupational diseases and are a significant contributor to lost productivity, rising labor expenses, and worker injuries (Matin et al., 2016; Koohpaei et al., 2017).

The World Health Organization defines musculoskeletal disorders as impairments of the muscles, tendons, nerves, or vascular system that are chronic and progressive but do not directly originate from an incident or accident. (Anghel et al., 2007; Azizi et al., 2016; Valachi and Valachi, 2013).

Around the world, work-related disease and injury continue to be the main factors increasing the expense of illness, which accounts for 2.8 trillion USD (4%) of yearly GDP. Absence, lost productivity, worker's compensation, and disruption of everyday production. These have a major impact on the working population's physical, mental, and economic elements. It has also been acknowledged as a significant issue for both rich and developing nations. Bangladesh, a developing nation, was ranked seventh in the world for having an intensive labor force in 2014, according to estimates. Approximately 80.27 million people are in the labor force as a whole, and 13% of them are employed in industries (Akter et al., 2016).

According to estimates from the International Labor Organization (ILO), approximately 2 million men and women worldwide suffer from diseases related to their jobs each year.5,480 people pass away per day. Worldwide, WMSDs are frequently cited as one of the major reasons why workers complain (Lima et al., 2011).

Industrial machinery mechanics and garage employees are expected to see a 17 percent increase in employment overall from 2012 to 2022, faster than the average for all occupations, according to the Bureau of Labor Statistics. Garage personnel should carefully consider the risk by designing their workplace, and the dangers taken into consideration. A mechanic or automobile worker may be at risk for MSDs due to work-

related posture and movement, manual labor, and other factors. There isn't much research on garage employees, but most MSD research compares them to maintenance workers (Shukriah et al., 2017).

Work-related discomfort among automobile workers in Bangladesh has been a topic of increasing concern due to the rapid growth of the automotive industry in the country. This literature review aims to explore the existing research on the factors contributing to work-related discomfort and the interventions developed to address these issues. Contributing Factors of Work-related Discomfort:

Musculoskeletal Disorders (MSDs): Musculoskeletal disorders are common among automobile workers and are often linked to repetitive tasks, awkward postures, and heavy lifting. Studies have indicated a high prevalence of MSDs among automobile workers in Bangladesh (Ahmed et al., 2017). Interventions focused on ergonomics, such as proper workstation design and lifting techniques, have shown positive effects in reducing MSDs (Hossain et al., 2018).

Repetitive tasks: Automobile workers in Bangladesh often perform repetitive tasks such as assembly line work, which can lead to musculoskeletal disorders. Studies have found a significant association between repetitive work and the prevalence of musculoskeletal symptoms among automobile workers (Ahmed et al., 2017).

Awkward postures (AP): The nature of automobile work often involves working in awkward postures, such as bending, twisting, or reaching. These postures can put a strain on the musculoskeletal system and increase the risk of discomfort and musculoskeletal injuries (Hossain et al., 2018).

Heavy lifting: Automobile workers may be required to handle heavy machinery, tools, or parts, leading to an increased risk of back pain and musculoskeletal disorders. A study conducted in Bangladesh found that heavy lifting was significantly associated with increased discomfort among automobile workers (Ahmed et al., 2017).

Noise exposure: Automobile workplaces in Bangladesh often have high noise levels, which can contribute to hearing loss and other hearing-related disorders among

workers (Rahman et al., 2020) reported a high prevalence of noise-induced hearing loss among automobile workers in Bangladesh.

Vibration exposure: Exposure to whole-body vibration or hand-arm vibration is common in automobile workplaces and can lead to disorders such as Raynaud's syndrome or vibration white finger (Haque et al., 2016) found that motorcycle mechanics, a subgroup of automobile workers, in Bangladesh, were exposed to high levels of hand-arm vibration.

Psychological Factors: The demanding nature of the automotive industry, including tight deadlines, high productivity expectations, and job insecurity, can contribute to psychological discomfort among automobile workers. Studies have reported a significant association between job stress and psychological discomfort, including anxiety and depression (Islam et al., 2018). Promoting a supportive work environment, providing stress management programs, and enhancing job control can help reduce psychological discomfort.

The focus of earlier research on work-related injuries associated with producers of automobile workers was mostly on musculoskeletal disorders and job stress (Jang et al., 2008; Yang and Cho, 2007; Mok et al., 2013); (Kim and Kim, 2014). According to (Kim et al. 2009), employees typically complain of pain in their shoulders, waist, and neck in the order. They also discovered the main risk factors Through an analysis of the characteristics of the workers, including age, gender, and job experience, three processes are identified as being unpleasant postures, managing heavyweight, and repetitive activity in descending order.

Another study found that the prevalence of self-reported WMSDs was (47.7%) overall, with a 95% confidence interval (CI) of (42.7, 53.2). handling heavier things while untrained in a trade repetitious work, exertion, and job stress were all strongly linked to the occurrence of WMSDs in people who weighed more than 20 kg. The yearly prevalence of WMSDs found in this study, at 47.7%, was lower than the annual prevalence of WMSDs reported in studies from Malaysia, India, and Bangladesh, respectively, at 87.4%, 58%, and 77% (Philip et al., 2014; Shukriah et al., 2017; Akter et al., 2016).

According to the labor procedure used to manufacture vehicle parts, the injured workers are dispersed according to the injured body part. There were 986 (64.4%) workers hurt on the arm or hand, 208 (13.6%) on the leg or foot, 145 (9.5%) on the trunk, 87 (5.7%) on the face or head, and 73 (5.3%) on the other body parts. Workers who suffered shoulder injuries (4.8%). The distribution of injured workers differed statistically significantly between the manufacturing of vehicle parts and the injured body part. In the materials handling process, the percentage of workers who had arm or hand injuries was as low as 25.4% but as high as 49.8% for leg or foot injuries (Yang et al., 2021).

Another research found that over the preceding year, 85% of workers reported experiencing pain in various body parts. The percentage of people who report having discomfort in various bodily parts is the two main body parts afflicted were the upper back and lower back. Additionally, the employee reported a significant prevalence of shoulder and knee pain. The co-morbidity of pain in various body locations was reported by 87% of the workers. Workers who reported both upper back pain and lower back pain in the same year had a considerably greater chance of suffering an occupational injury (Vyas et al., 2011).

Back discomfort has been noted as a frequent contributor to impairment among working people. Automobile workers frequently adopt unnatural back postures when performing manual tasks, which increases their risk of developing back pain from their jobs. 76.02% of people reported having back discomfort, with low back pain accounting for the majority of cases. In response to their back pain, 63.3% of the workers said they had to curtail their activity. Worker characteristics such as age (>50), daily work hours (5), lack of education above the primary level, normal weight, frequent kneeling and prolonged postures, and ignorance of ergonomics. Back pain prevalence was found to be increased by ergonomic postures. The prevalence of back discomfort among mechanics was also shown to be higher when there was a lack of job autonomy, poor task clarity, a significant physical workload, manual material handling, awkward posture, a noisy environment, vibrations, a rigid schedule, and insufficient auxiliary assistance (Abaraogu et al., 2016). According to (Aziz et al., 2014), Members of automobile workers have to move, handle, and hoist heavy tools like welding spot guns, among other difficult manual handling tasks. The lower back (75.4%), upper back (63.2%), right shoulder (61.4%), and right wrist (60%) of those production assembly

automobile workers are likely to have the highest rates of musculoskeletal discomfort. Similar studies of this type have shown a range of outcomes that compare to and diverge from the current study. The shoulder, foot, lower leg, and lower back are where Malaysian assembly line workers experience the highest prevalence of WMSDs.

According to (Zare et al., 2015) the prevalence of work-related discomfort in Shoulders (67%), elbows (53%), and wrists (47%), respectively, were the most common musculoskeletal symptoms among truck assembly plant workers for cycle time A, while shoulder (35%), elbow (33%), and wrist (47%), respectively, were the most common for cycle time B Symptoms in the wrist (40%) and overall (40%).

The prevalence of work-related discomfort among employees in Malaysian automobile manufacturing companies is highest for the neck (49.3%), followed by the hand/wrist (48.0%), shoulder (46.7%), upper back (33.6%), lower back (21.7%), knee (15.8%), thigh/hip (14.5%), elbow (8.7%), and ankle (1.3%), according to the study by (Mavis et al., 2014).

Awkward, severe, and repetitive postures have been linked to lower back pain and musculoskeletal discomfort at work (Chowdhury et al., 2012).

Static postures increase the amount of force on the muscles & require more force to do a task in addition to the force required to perform the task. The effects of maintaining the same work positions can occur in almost all joints of the body. So, the static posture has a major role in increasing the MSDs (Dul et al., 2008).

Bending or twisting while manual handling creates an awkward posture and changes the way forces are distributed in the spine(Dul et al., 2008). When the spine is in its natural position, forces are directed along the bony structure and distributed into the tissue as the spine curves. However, bending and twisting redirect the forces, placing more compressive and shear forces on the discs (Violante et al., 2000).

Interventions to Address Work-related Discomfort:

Ergonomic interventions: Implementing ergonomic measures such as adjusting workstations, providing ergonomic tools, and introducing proper lifting techniques can help reduce the risk of musculoskeletal disorders among automobile workers (Ahmed et al., 2017).

Training and education: Providing training sessions on ergonomics, proper body mechanics, and the use of personal protective equipment can enhance workers' knowledge and awareness, reducing the risk of discomfort (Hossain et al., 2018).

Personal protective equipment (PPE): The use of PPE, such as hearing protection devices and gloves, can help mitigate the negative effects of noise exposure and vibration on automobile workers (Rahman et al., 2020).

Workplace modifications: Implementing workplace modifications, such as noise control measures and vibration isolation systems, can help reduce exposure levels and minimize the risk of discomfort among automobile workers (Haque et al., 2016).

In an ergonomic or occupational health environment, standardized questionnaires for the examination of musculoskeletal symptoms are offered. The forced-choice question types can be self-administered or utilized in interviews. They focus on the symptoms that are experienced in occupational settings the most frequently. The questionnaires' dependability has been proven to be acceptable. The number of questionnaire replies reflects particular work strain characteristics. (Kilbom et al.,1987) Both a questionnaire and a structured interview can be conducted using the NMQ. However, when the questionnaire was given as part of a targeted investigation on musculoskeletal difficulties and job variables, considerably greater frequencies of musculoskeletal problems were reported than when used in conjunction with a regular general health examination (Andersson et al., 1987).

Most cross-sectional descriptive studies have used the original NMQ. (Choobineh et al., 2006; Lee et al., 2006; Smith et al., 2006). Different cross-sectional studies show that were using the NMQ questionnaire and found the frequency of MSDs in various body areas of India throughout the previous year. Lower body portions were the main impacted body parts. knees (47%), thighs/hips (26%), upper back (27%), shoulders (51%), back (43%), and neck (47%). Ankle/feet (35%) and calves (31%), two interesting findings, were found (Khan et al., 2018).

Another study found that working more than 45 hours per week was one of the risk factors for workers’ lower back pain. lower back pain was more common in people who regularly worked more than 48 hours per week, and the frequency of lower back pain decreased when working hours were reduced (Lee et al., 2018).

In automobile production, being exposed to uncomfortable back postures and hand force exertion increased the incidence of LBP at both the baseline and 1-year follow-up. Job requirements were related albeit only among employees with little job control and high stated baseline exposure to physical risk variables did incident LBP emerge. Additionally, findings that point to a possible relationship between uncomfortable postures and WBV were seen. For the group as a whole, neither psychological job demands nor job control by themselves was linked to incident LBP. Participant list Job demand was linked to a higher incidence of incident LBP during the 1-year follow-up period with high physical exposure at baseline and low job control (Vandergrift et al., 2012).

According to the survey, automobile workers have a positive attitude about job hazards. However, because the majority of them had poor habits generally, their knowledge did not transition into good practices, which resulted in work-related illnesses and accidents. During their monthly association meetings, there needs to be routine instruction on workplace risks, as well as the provision and use of PPEs, to decrease work-related illnesses and injuries. Reduced exposure to occupational risks will be greatly helped by the establishment of designated dining places (Oche et al., 2020).

In Bangladesh, there is insufficient data on the prevalence of musculoskeletal complaints and how they affect auto mechanics' quality of life. By examining posture and movement patterns, the study's findings indicate that Bangladeshi automobile workers are in danger due to the need for a less-than-ideal working environment. Thus, this study just offers a picture of the current situation; further, extensive research into the prevalence of musculoskeletal problems among car technicians is required. The findings of this study give a foundation for adapting an ergonomic strategy for auto mechanics. For auto mechanics, a systematic ergonomics strategy would enable the prevention or promotion of the management of work-related musculoskeletal complaints (Akter et al., 2016).

CHAPTER–III METHODOLOGY

3.1: Study design:

The study aims to find out work-related discomfort among automobile workers. The design of the study is a cross-sectional type of descriptive study. This design involves identifying the group of people and then collecting the information required when they use the particular service. Cross-sectional studies are thought of as providing a "snapshot" of the frequency and characteristics of a person in a population at a particular point in time. The most important advantage of a cross-sectional study is it does need not more time and is also cheap as there is no follow-up, and fewer resources are required to run the study.

3.2: Study area:

Data was collected from 22 automobile garages in different areas in Dhaka city & 6 automobile garages from Narsingdi Dhaka division.

3.3: Study population:

Automobile workers constitute the study population for the presented study.

3.4: Study period:

The duration of the study was 12 months from 1st July 2022 to 30th June 2023.

3.5: Sample size: Sample size was calculated by the following statistical formula,

$$n = \frac{z^2 Pq}{d^2}$$

Z = 1.96

P = Prevalence = 77% = 0 .77 (Tamene, A. et al., 2020)

q = 1-P

d = Confidential interval = 0.05

According to a standard formula

sample size will be, $\frac{z^2 Pq}{d^2} = [(1.96)^2 \times 0.77 \times 0.23] \div (0.05)^2 = 272.138$

As a student, it was quite difficult to collect data from a large range of samples. For this reason, the investigator collected data from 256 participants only.

3.6: Sampling technique:

A convenience sampling technique will be applied for this study.

3.7: Eligibility Criteria

3.7.1: Inclusion criteria:

1. The age group is above 18 -65 years.
2. Workers of the automobile workshop and automobile garages are involved in repairing buses, cars, and taxicabs.
3. Mental stable
4. More than 1 year experience.

3.7.2: Exclusion criteria:

1. Bus helper, bus driver
2. Automobile workshop cleaner
3. Those who are not interested.

3.8: Data collection tools and method :

Data was collected through the face to face interviews with participants. The tools that were needed for the study were a Consent paper, Nordic Musculoskeletat questionnaire, paper, pen, pencil, file, computer, and printer Method of data collection in this study data was collected by questionnaire form set on paper. The questionnaire form included both open and close-ended questions. Following that, before the data collection, informed consent was taken from the participants. Firstly, the identity of the author and the research project as well as its purpose were delivered verbally among them. Then the individual subject was selected to find out if they were interested in participating. For data collection, the Bengali type of questionnaire was delivered. On the other hand, the Bengali version of disease conditions might be helpful. After that, a date was fixed to collect the questionnaire from the recipients.

3.9: Procedure of data collection:

Several garages have been visited by the researcher himself. Before data collection, on the day of data collection. I went to the particular garages and talked to the managers of the workshops. The aims and objectives of the research were explained in detail to the managers. After obtaining verbal permission from the managers, the researcher contacted the automobile workers of the garages. A convenient sampling technique was applied to select the study subject from the garages. Before starting the interview the researcher explained the objectives of the study to the automobile worker and obtained this consent form interview. Information from the workers was collected by using the presented questionnaire. After the interview, the respondents were thanked for their co-operation .

3.10: Data analysis:

The coded data form the questionnaires were entered into the SPSS program version 25, then the data was analyzed according to the objective of the study. For the present study, descriptive analysis was carried out consisting of percentage, mean, median, mode, and standard deviation inferential statistics also done to examine the association between pain of different body parts and age. Further relevant statistical test was done to determine the association between working posture and lower back pain. Then data were analyzed by descriptive statistics and the results were shown by pie, Figure, and bar charts.

3.11: Data Management

After collection of the data from the respondents, the questionnaire was rechecked for any omission or error. Necessary corrections were made immediately. The collected data were coded accordingly for entry into SPSS.

3.12: Inform consent

For this study, a consent form was given and the purpose of the research and consent forms was explained to the subject verbally. Participants were fully voluntary and they have the right to withdraw at any time. Participants were also ensured that their confidentiality would be maintained. Information might be published in any presentations or writing but they will not be identified. The study results might not have

any direct effects on them but the members of the Physiotherapy population may be benefited from the study in the future. They would not be embarrassed by the study.

3.13: Ethical consideration:

- The investigator followed the World Health Organization (WHO) & Bangladesh Medical Research Council (BMRC) guidelines.
- The researcher took the WHO clinical trial registration.
- Approval received from the IRB of SCMST.
- Data collection permission was taken from the Head of the physiotherapy Department of SCMST.
- Confidentially maintained strictly.
- Informed consent was taken from every participants

3.14: Rigor:

During the data collection and data analysis it was always tried not to influence the process by own perspectives, values, and biases. No leading questions were asked and judgments were avoided. When conducting the study, the researcher was taken help from the supervisor when needed.

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CHAPTER-IV: RESULT

The study aimed to determine the prevalence of musculoskeletal discomfort among automobile workers in Bangladesh. The data was collected by the researcher himself. Structured questions were used with both open-ended and close-ended questions in the questionnaire. The data were analyzed with Microsoft Office Excel 2019 with SPSS 25 version software program. In this study researcher used bars, Columns, Figures, and Pie charts to show the result of the study. Because it is easier to make sense of a set of data.

4.1: Socio-demographic condition:

4.1.1: Age of the participant:

This study's participant means and standard deviation of participant age is Mean ±SD= 29.69±10.64; About (46.50%) automobile workers aged <25 years; (35.90%) aged 25-40 years; (17.60%) aged>41 years.

Table no: 01- Frequency distribution of the respondents by age

Age of the participants	Frequency (n=256)	Percent (%)	Mean ± SD
<25 years	119	46.5%	29.69 ± 10.64
25-40 years	92	35.9%	
>41 years	45	17.6%	
Total	256	100%	

4.1.2: Sex of the participants:

In this study, Sex of the participants (n=256) 99.61% were male and (n=1) 0.40% were female.

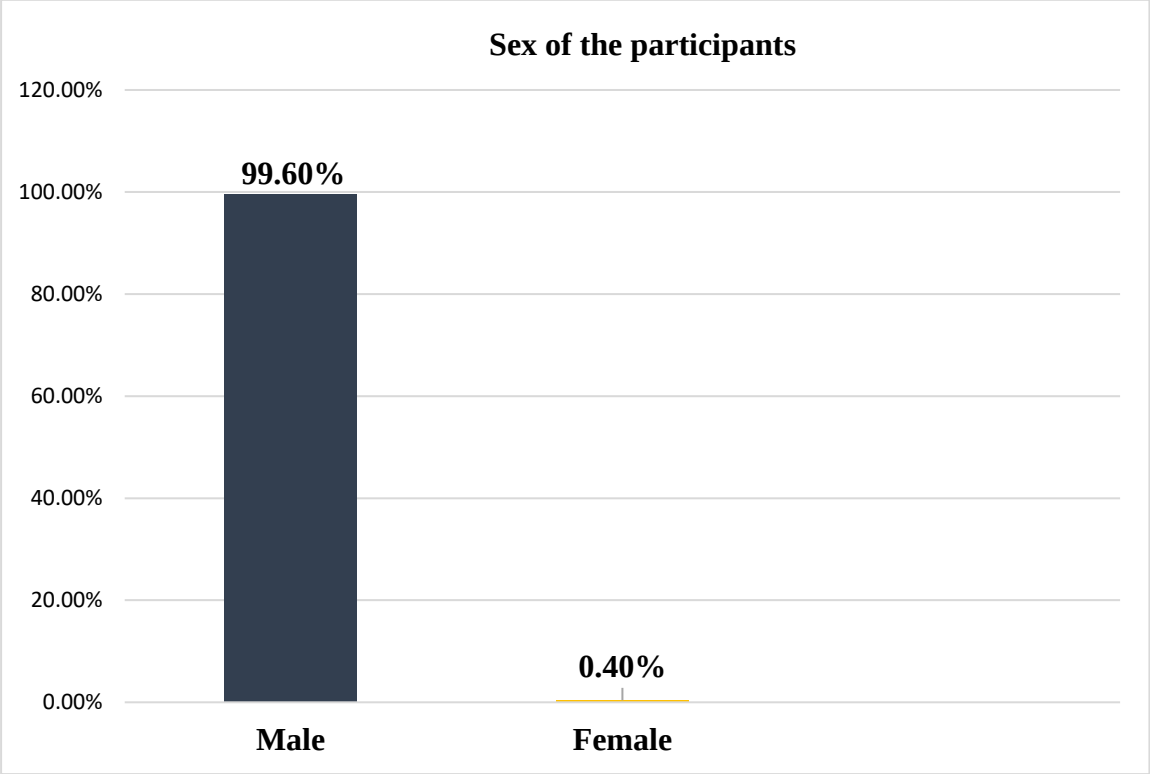

Figure No:1- Sex of the participants

4.1.3: Living area of participant:

Around (7.80%) of the Automobile workers live in rural areas, (10.50%) are semi-urban, and (81.60%) from urban areas.

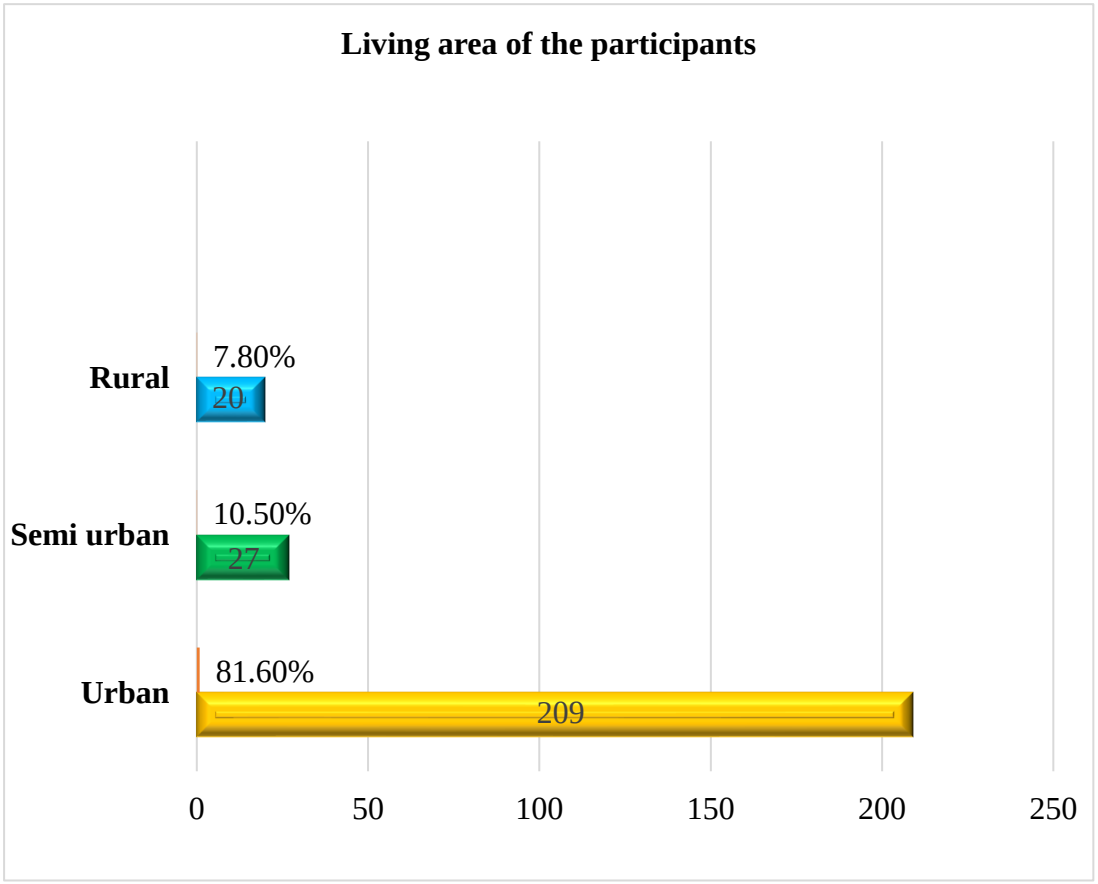

Fig no:2- The living area of participants

4.1.4: Educational level of participant:

This study shows that educational level among participants Primary n=154 (60,2%), Secondary n=49 (19.1%), Higher secondary n=19 (7.4%), Illiterate n=7 (2.7%), Others n=27 (10.5%).

Table no: 02- Frequency distribution of the respondents by educational level

The education level of the participant	Frequency (n=256)	Percent (%)
Primary	154	60.2
Secondary	49	19.1
Higher Secondary	19	7.4
Illiterate	7	2.7
Others	27	10.5

4.1.5: Family types of the participants:

The majority of them are (57.40%) extended family; and (42.60%) nuclear family.

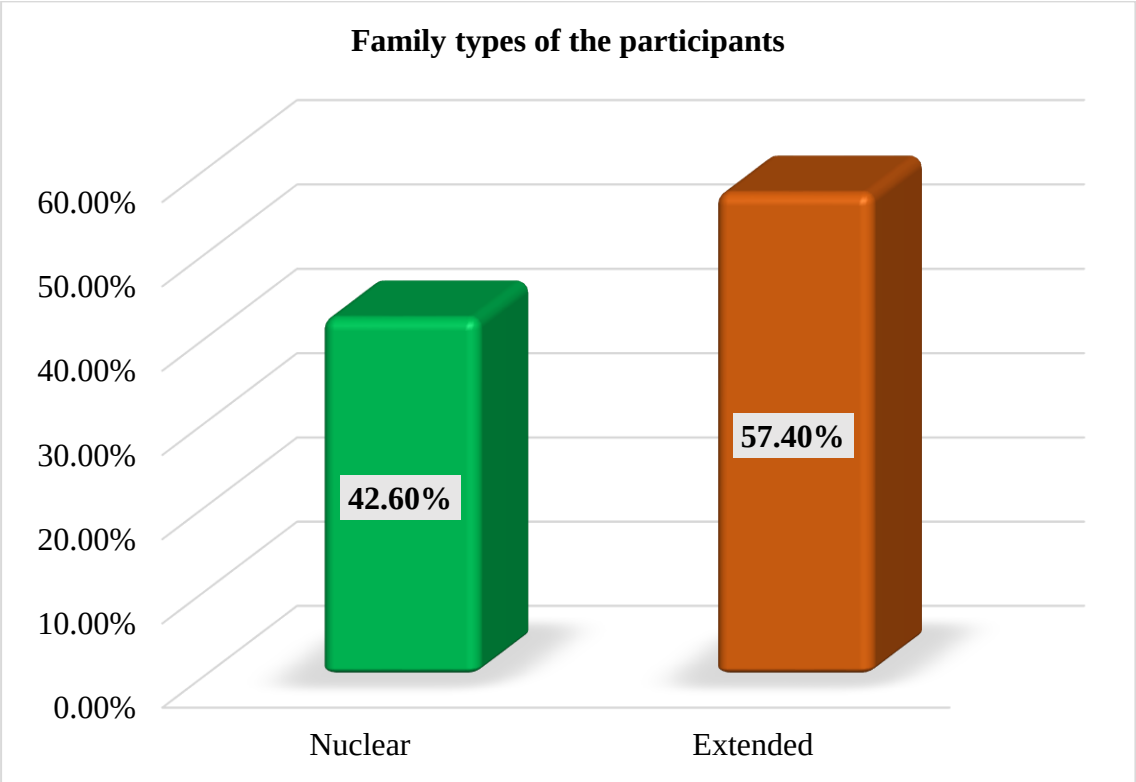

Figure No:3- Family types of the participant

4.1.6: Marital status of the participants:

A total of 256 participants were respondents. Among them 56.6% were married, 43% were unmarried and 0.40% were divorced.

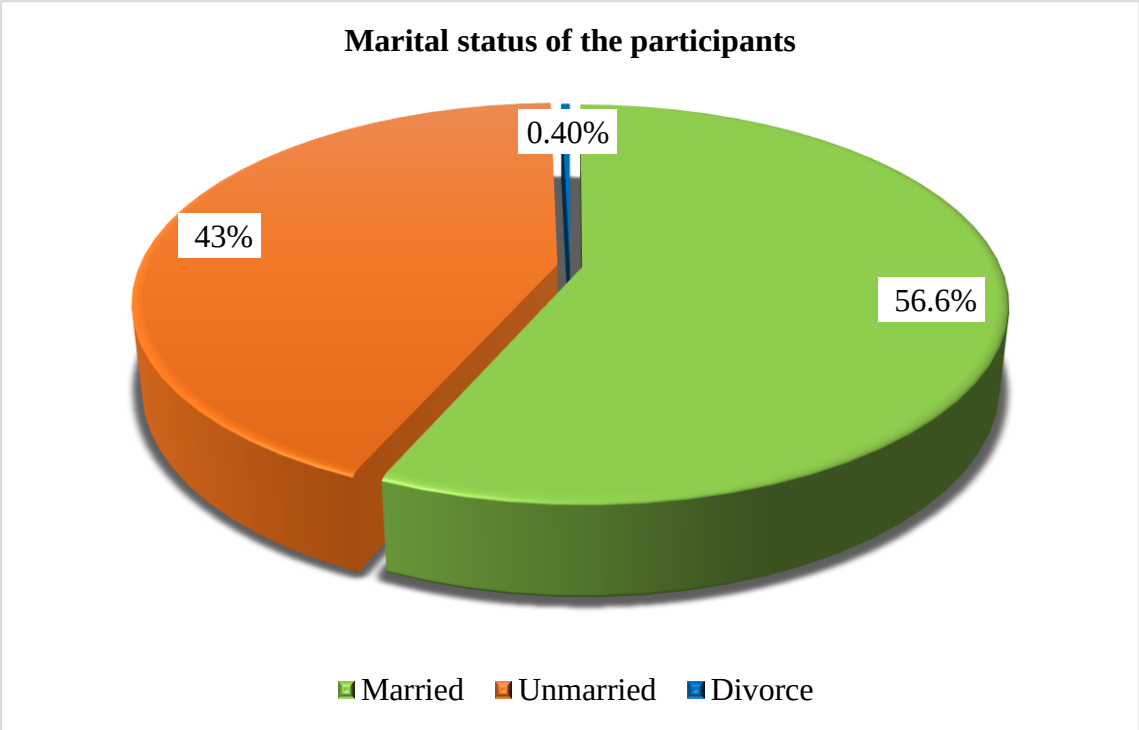

Figure No:4- Marital status of the participants

4.1.7: Monthly income of participant:

In this survey the mean and standard deviation of monthly income were Mean ±SD= 15583.98±7625.793; About this study (59.4%) monthly income less than 15000 taka; (37.5%) monthly income 15000-30000 taka; (3.1%) persons monthly income more than 31000 taka.

Table no: 03- - Frequency distribution of the respondents by monthly income

The monthly income of the participants	**Frequency (n=256)**	**Percent (%)**	**Mean ± SD**
<15000 tk	152	59.4%	15583.98±7625.793
15000-30000 tk	96	37.5%	
>30000 tk	8	3.1%	
Total	256	100%	

4.1.8: Religion of the participant:

This survey is ninety-one percent (91%) religion Islam; eight-point six percent (8.6%) Hindu; point four percent (0.4) workers Christian.

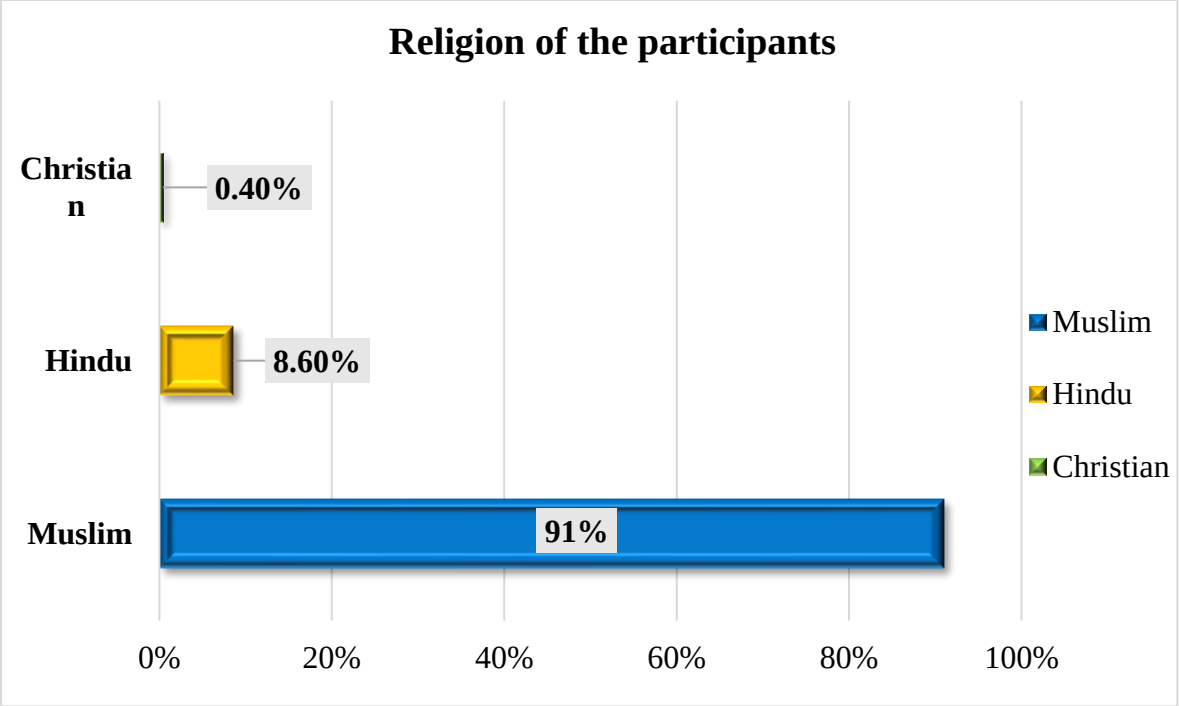

Fig no:5-Religion of the participants

4.2: Nordic musculoskeletal questioners:

4.2.1: Neck pain in last 12 months:

Among 256 participants n=60; (23.40%) participants were neck pain in the last 12 months and n=196; (76.60%) participants were no neck pain in the last 12 months.

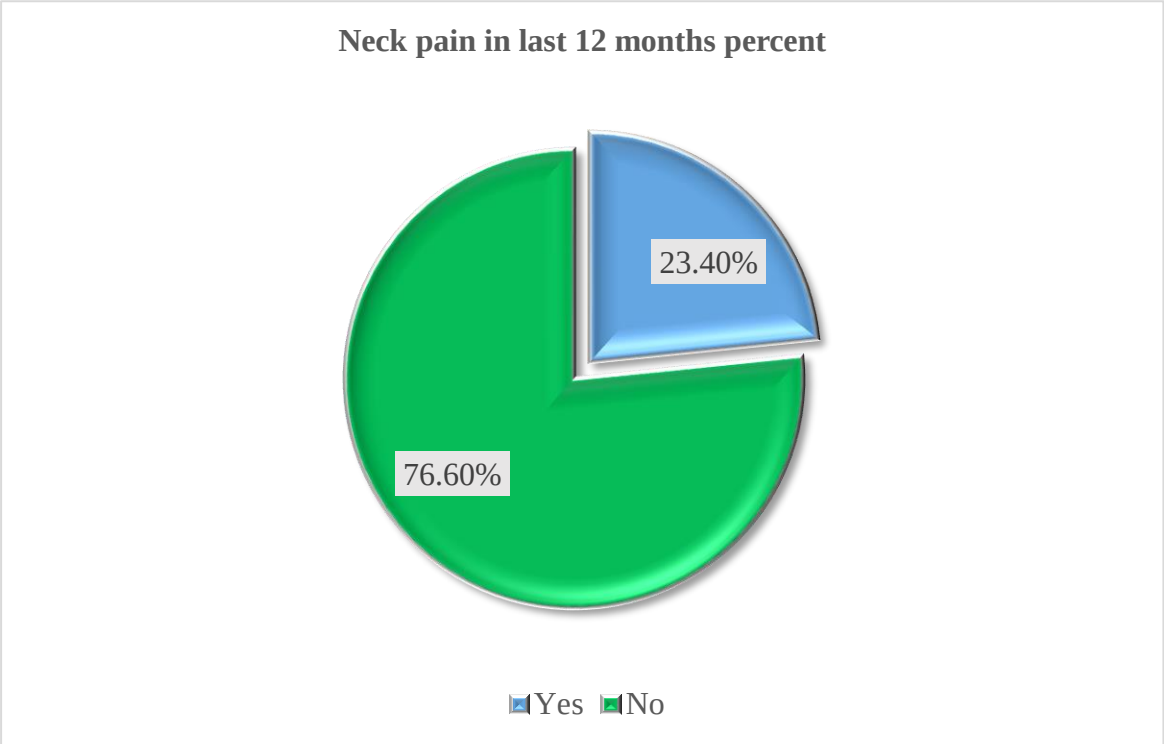

Figure No. 6- Neck pain in the last 12 months

4.2.2: Normal activities problem in last 12 months for neck pain:

Among all participants n=243; (94.90%) participants were not creating any problems in normal activities for neck pain in the last 12 months and n=13; (5.10%) participants were creating problems in normal activities for neck pain in the last 12 months.

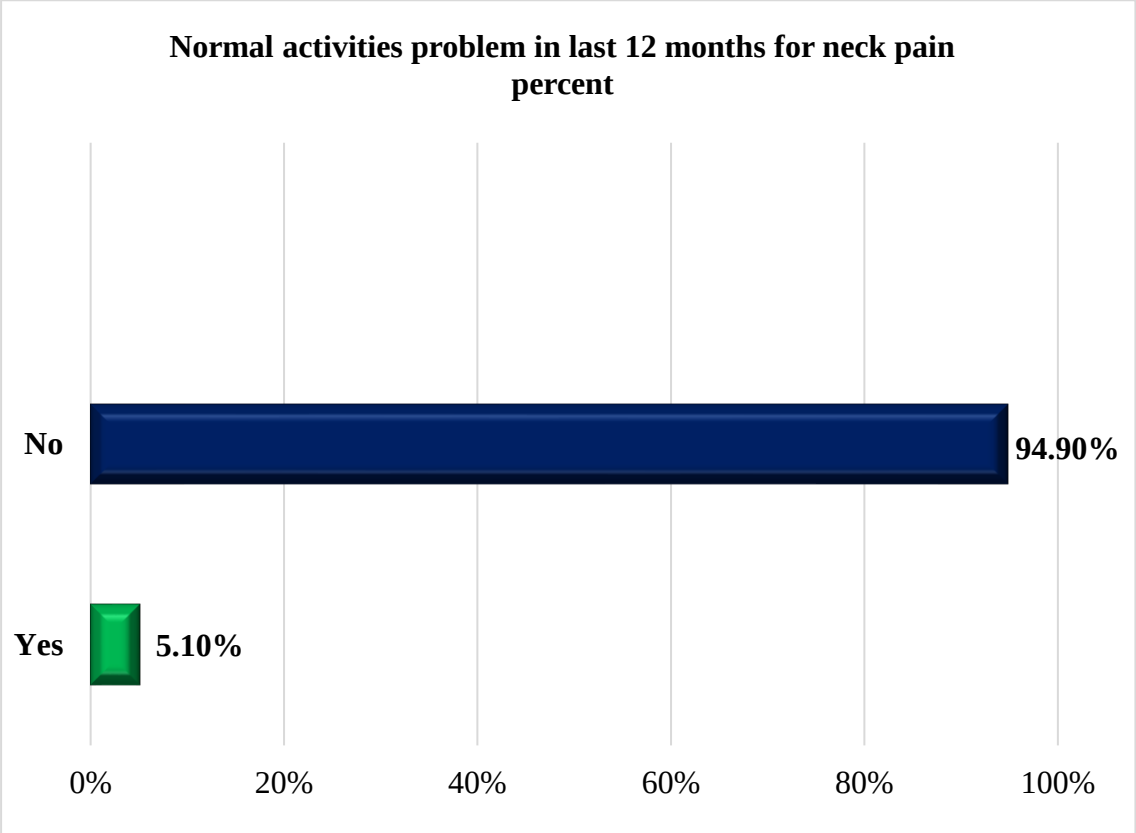

Figure No:7- Normal activities problem in last 12 months for neck pain

4.2.3: Neck pain in last 7 days:

Among all n=25; (9.8%) participants were neck pain in the last 7 days and n=231; (90.2%) participants were no neck pain in the last 7 days.

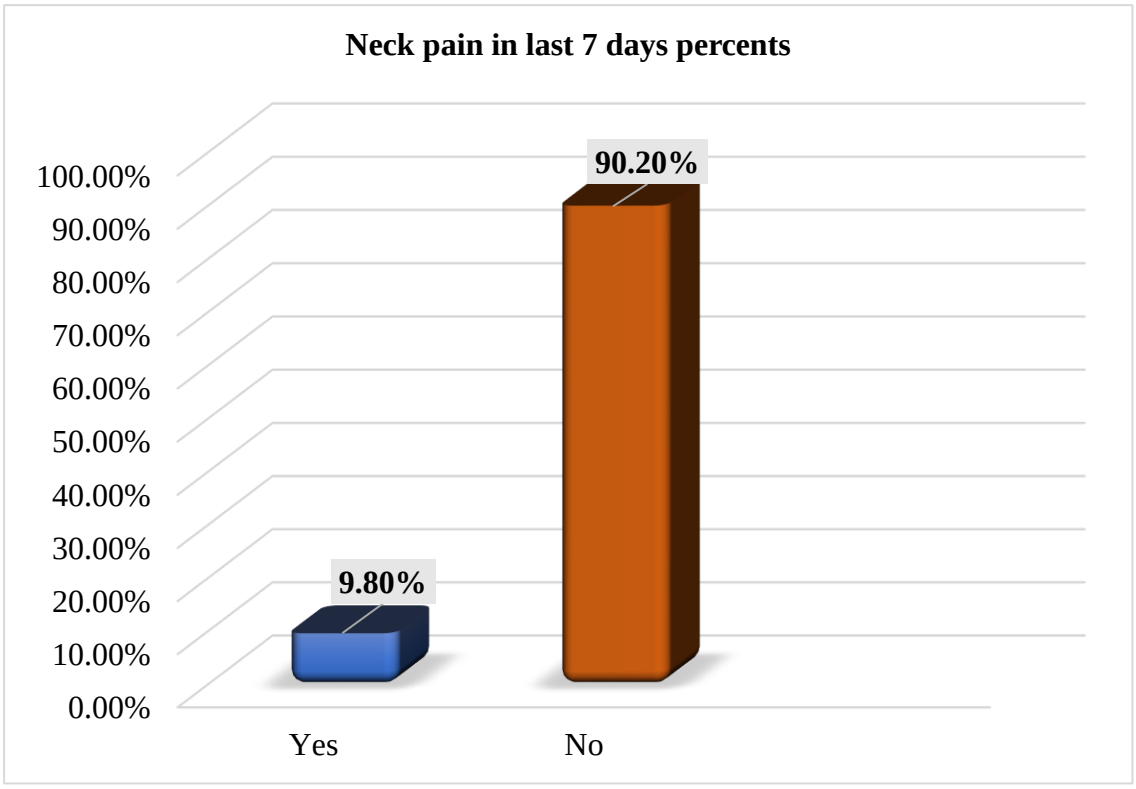

Figure No:8- Neck pain in last 7 days

4.2.4: Shoulder pain in last 12 months:

Among 256 participants n=10; (3.90%) participants had right shoulder pain, n=12; (4.70%) participants were left shoulder pain, n=22; (8.60%) participants were both shoulder pain in the last 12 months & n=212;(82.8%) participants was no shoulder pain in last 12 months.

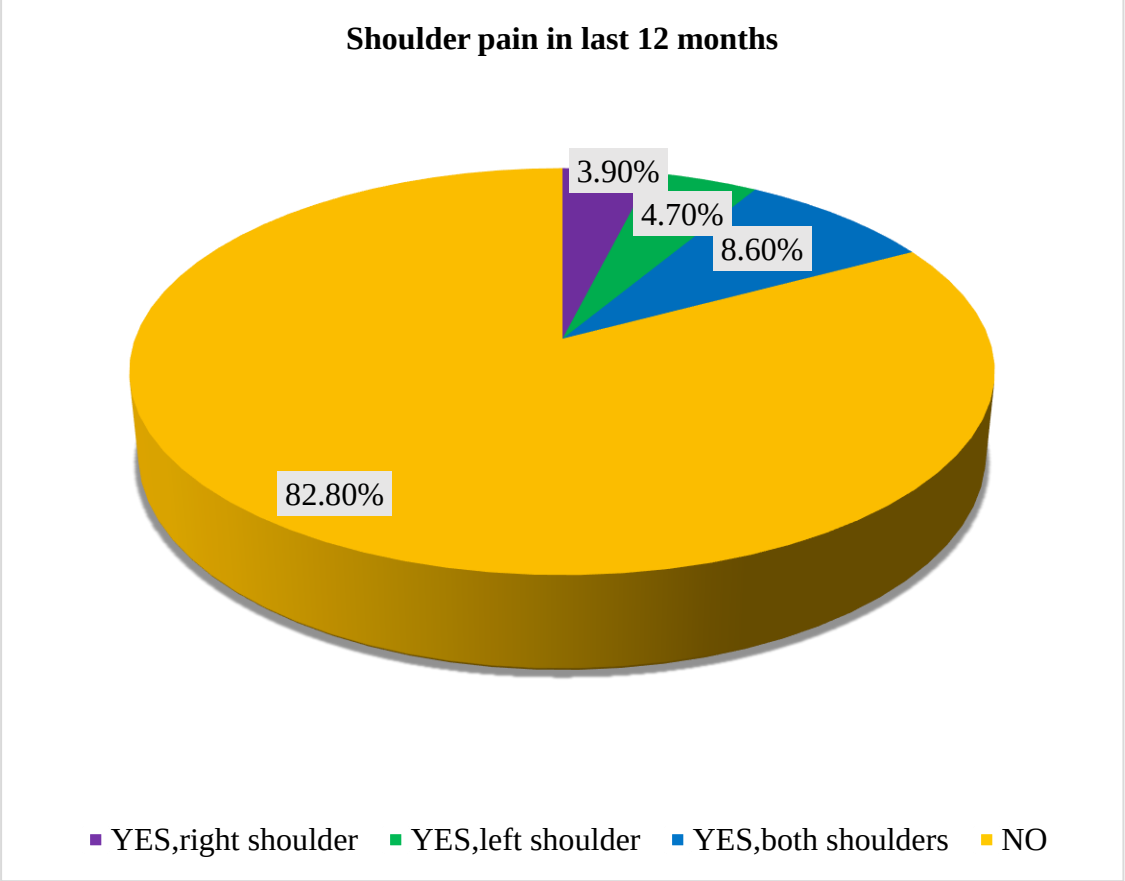

Figure No:9- Shoulder pain in the last 12 months

4.2.5: Normal activities problem in last 12 months for shoulder pain:

Among all participants n=244; (95.30%) participants did not create any problems in normal activities for shoulder pain in the last 12 months and n=12; (4.70%) participants created problems in normal activities for shoulder pain in the last 12 months.

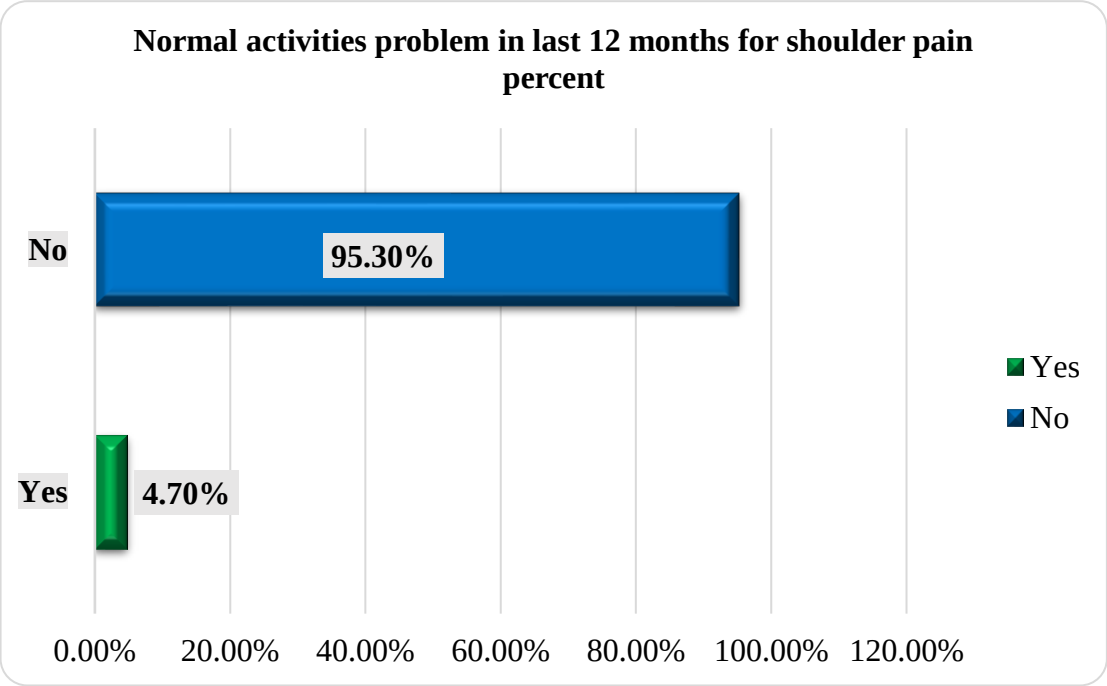

Figure No:10- Normal activities problem in last 12 months for shoulder pain

4.2.6: Shoulder pain in last 7 days:

Among all n=17; (6.60%) participants had shoulder pain in the last 7 days and n=239; (93.40%) participants had no shoulder pain in the last 7 days.

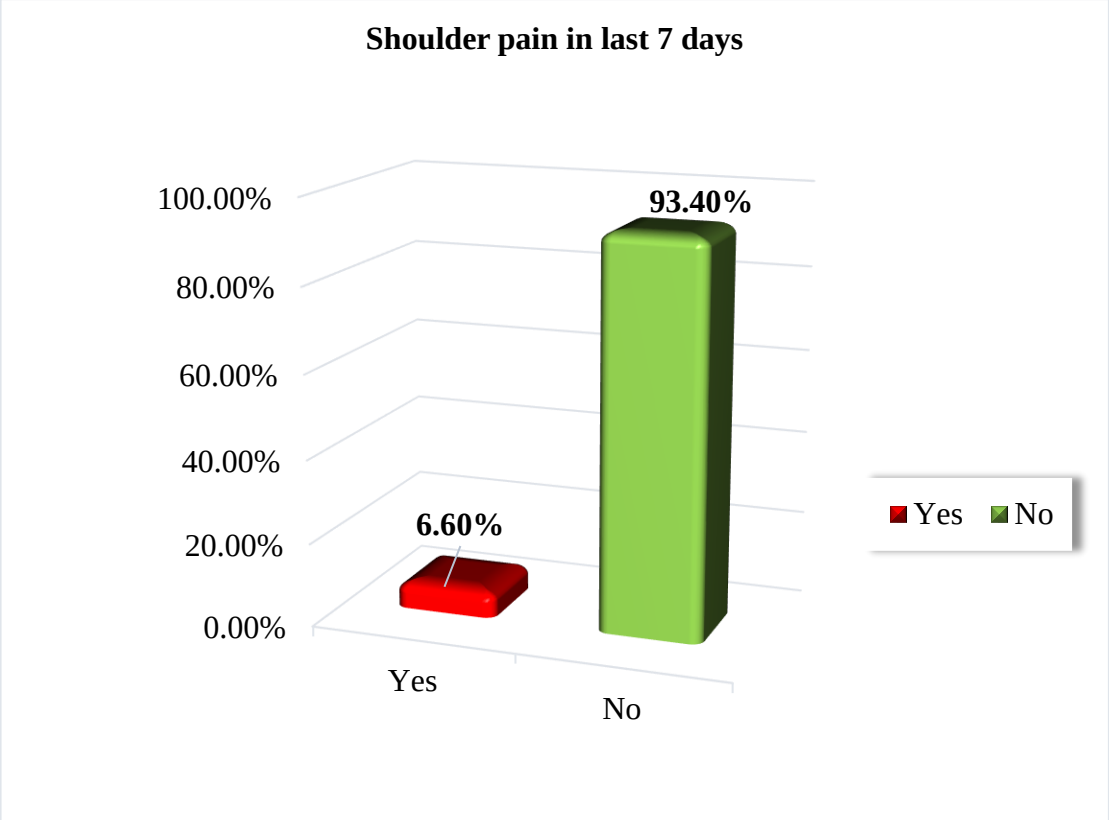

Figure No:11- Shoulder pain in last 7 days.

4.2.7: Elbow pain in last 12 months:

Among 256 participants n=17; (6.60%) participants had right elbow pain, n=6; (2.30%) participants were left elbow pain, n=15; (5.90%) participants were both elbow pain in the last 12 months & n=218;(85.20%) participants was no elbow pain in last 12 months.

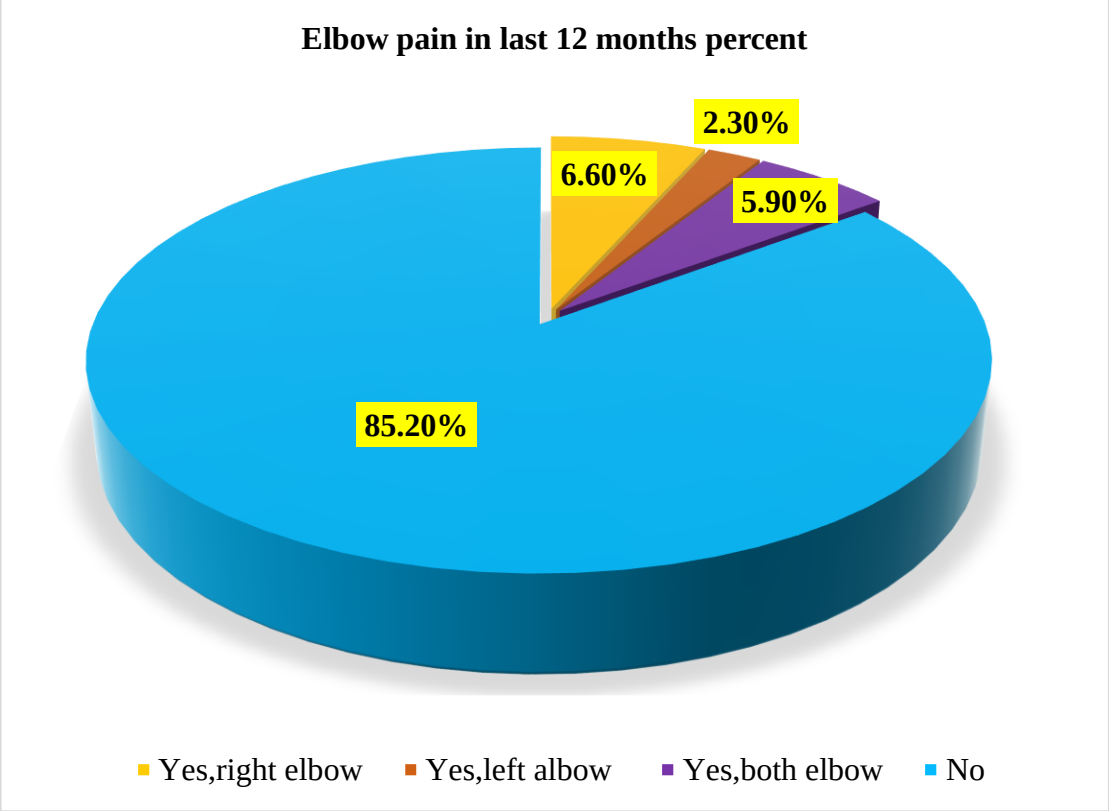

Figure No:12- Elbow pain in the last 12 months

4.2.8: Normal activities problem in last 12 months for elbow pain:

Among all participants n=16; (6.30%) participants created a problem in normal activities for elbow pain in the last 12 months and n=240; (93.80%) participants did not create problems in normal activities for elbow pain in the last 12 months.

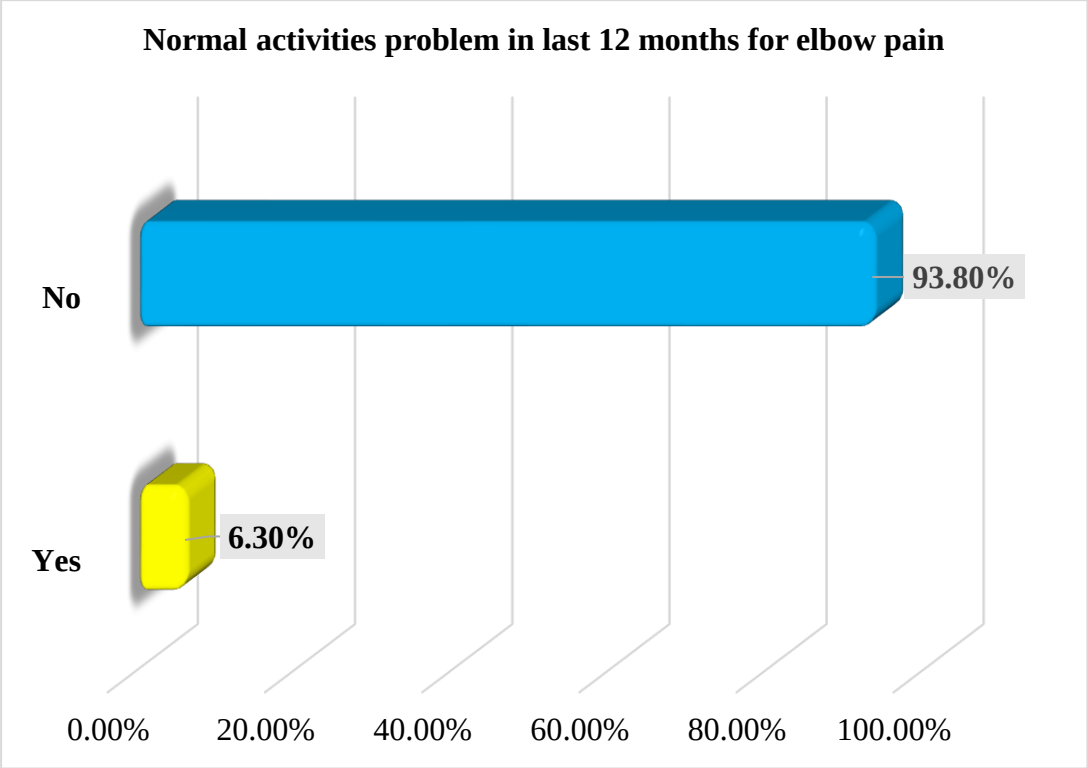

Figure No:13- Normal activities problem in last 12 months for elbow pain

4.2.9: Elbow pain in last 7 days:

Among all n=14;(5.50%) participants had elbow pain in the last 7 days and n=242; (94.50%) participants had no elbow pain in the last 7 days.

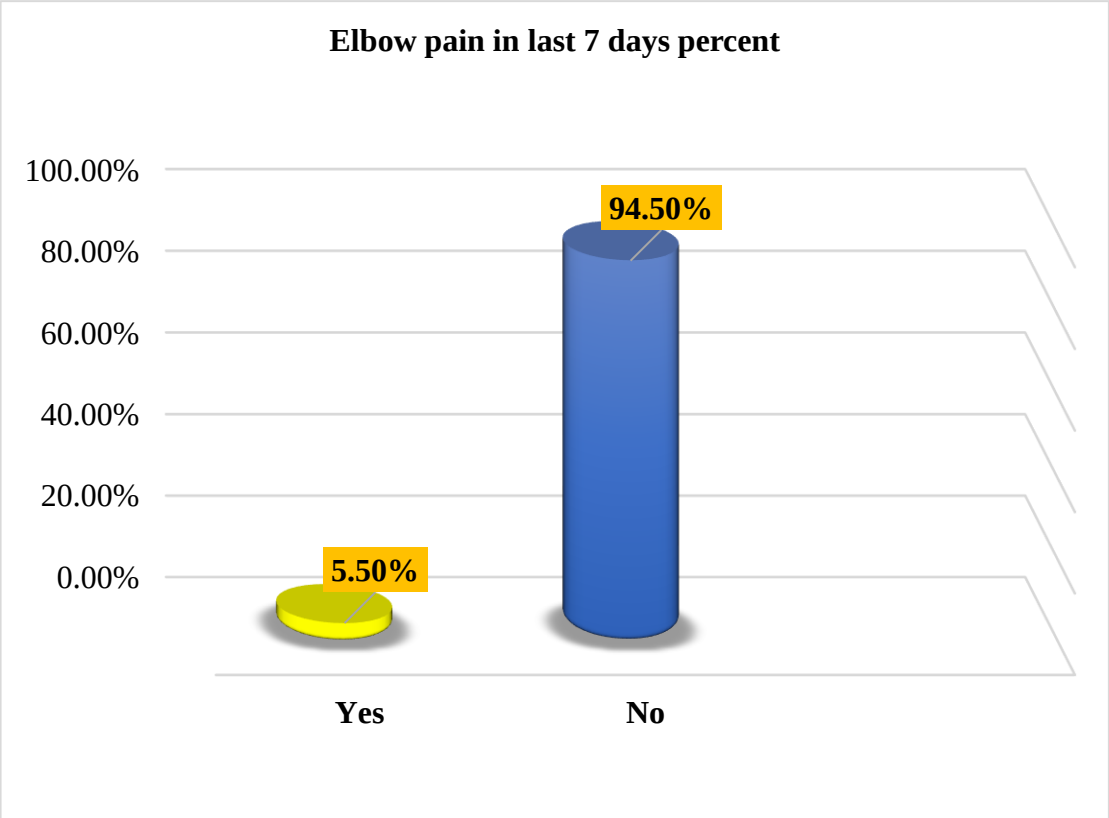

Figure No:14- Elbow pain in last 7 days.

4.2.10: Wrists/hands pain in last 12 months:

Among 256 participants n=34; (13.30%) participants were right wrists/hands pain, n=28; (10.90%) participants were left wrists/hands pain, n=73; (28.50%) participants were both elbow pain in the last 12 months & n=121; (47.30%) participants was no elbow pain in last 12 months.

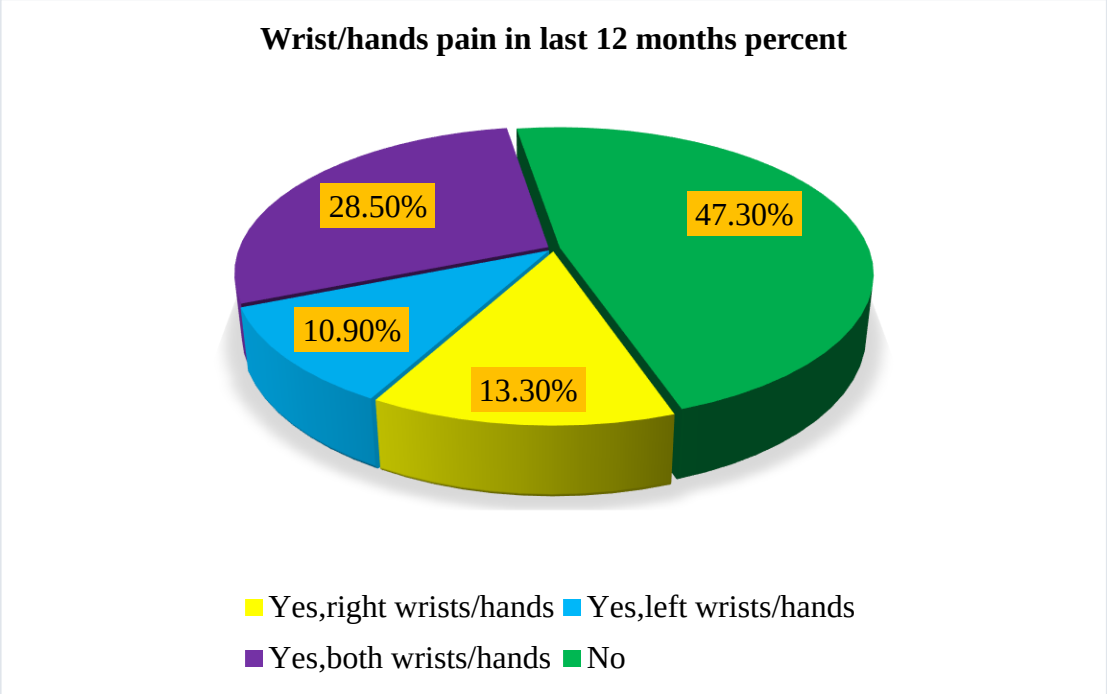

Figure No:15- Wrists/hands pain in the last 12 months

4.2.11: Normal activities problem in last 12 months for wrists/hands pain:

Among all participants n=32; (12.50%) participants created a problem in normal activities for wrist/hand pain in the last 12 months and n=224; (87.50%) participants did not create problems in normal activities for wrist/hand pain in the last 12 months.

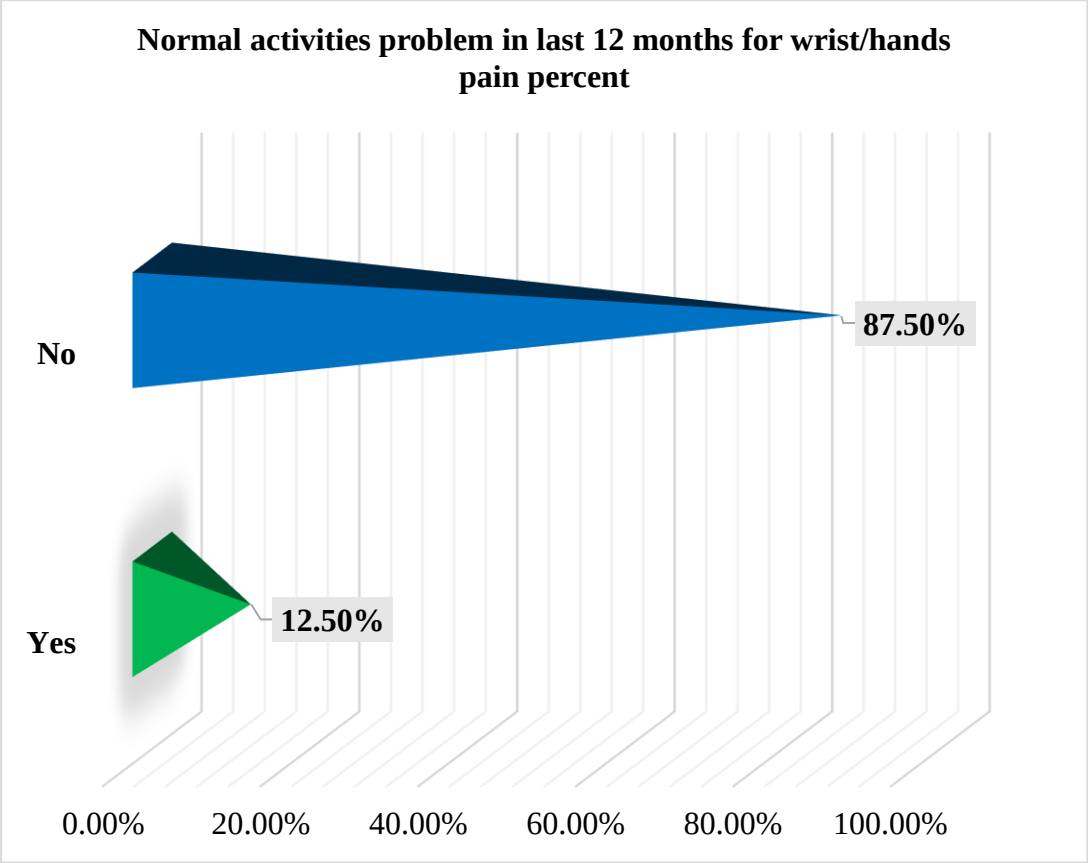

Figure No:16- Normal activities problem in last 12 months for wrists/hands pain

4.2.12: Wrists/hands pain in last 7 days:

Among all n=61; (23.80%) participants were wrist/hands pain in the last 7 days and n=195; (76.20%) participants were no wrist/hands pain in the last 7 days.

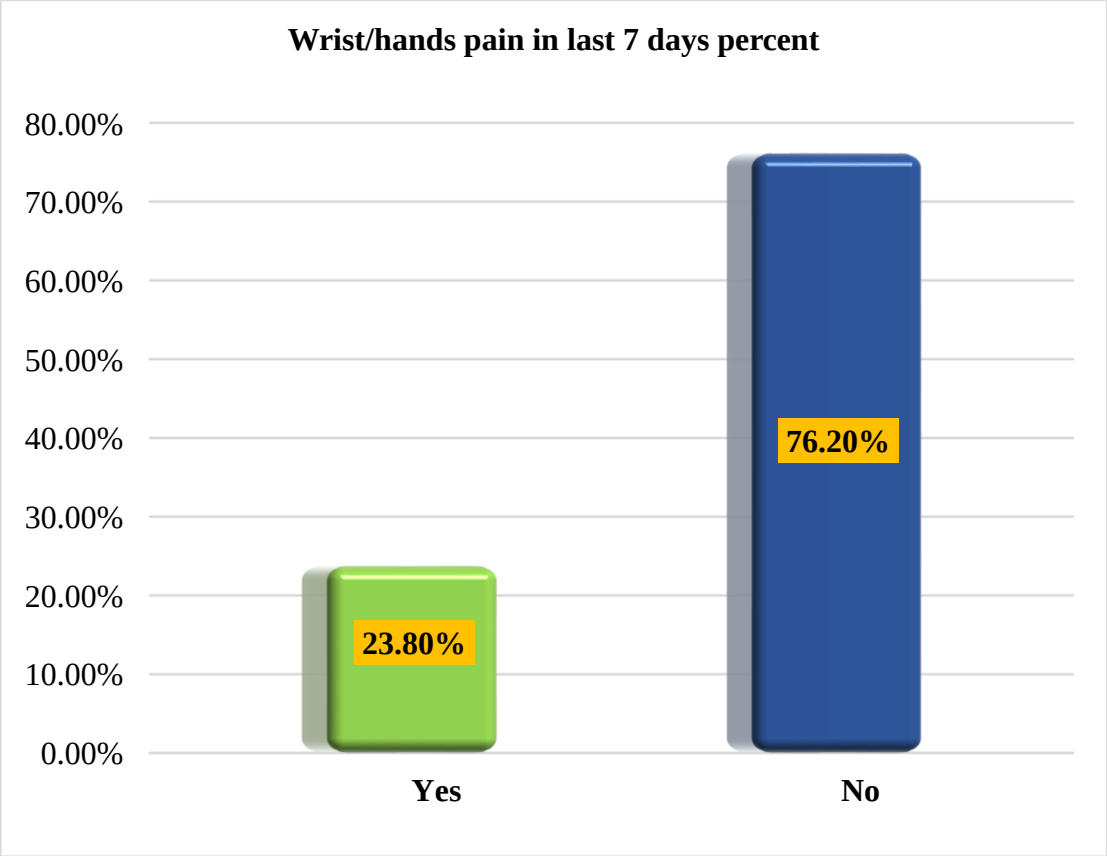

Figure No:17- Wrist/hand pain in last 7 days.

4.2.13: Upper back pain in last 12 months:

Among 256 participants n=33; (12.90%) participants were upper back pain in the last 12 months and n=223; (87.10%) participants was no upper back pain in the last 12 months.

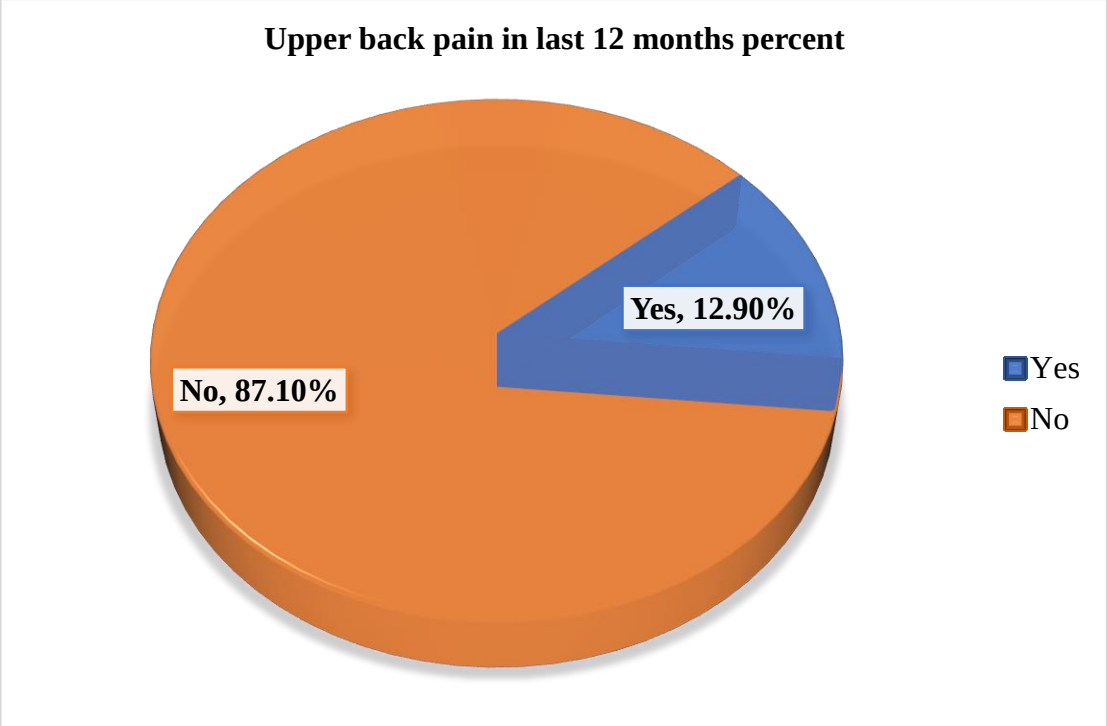

Figure No:18- upper back pain in the last 12 months

4.2.14: Normal activities problem in last 12 months for upper back pain:

Among all participants n=11; (4.30%) participants were creating problems in normal activities for upper back pain in the last 12 months and n=234; (91.40%) participants were not creating problems in normal activities for upper back pain in the last 12 months.

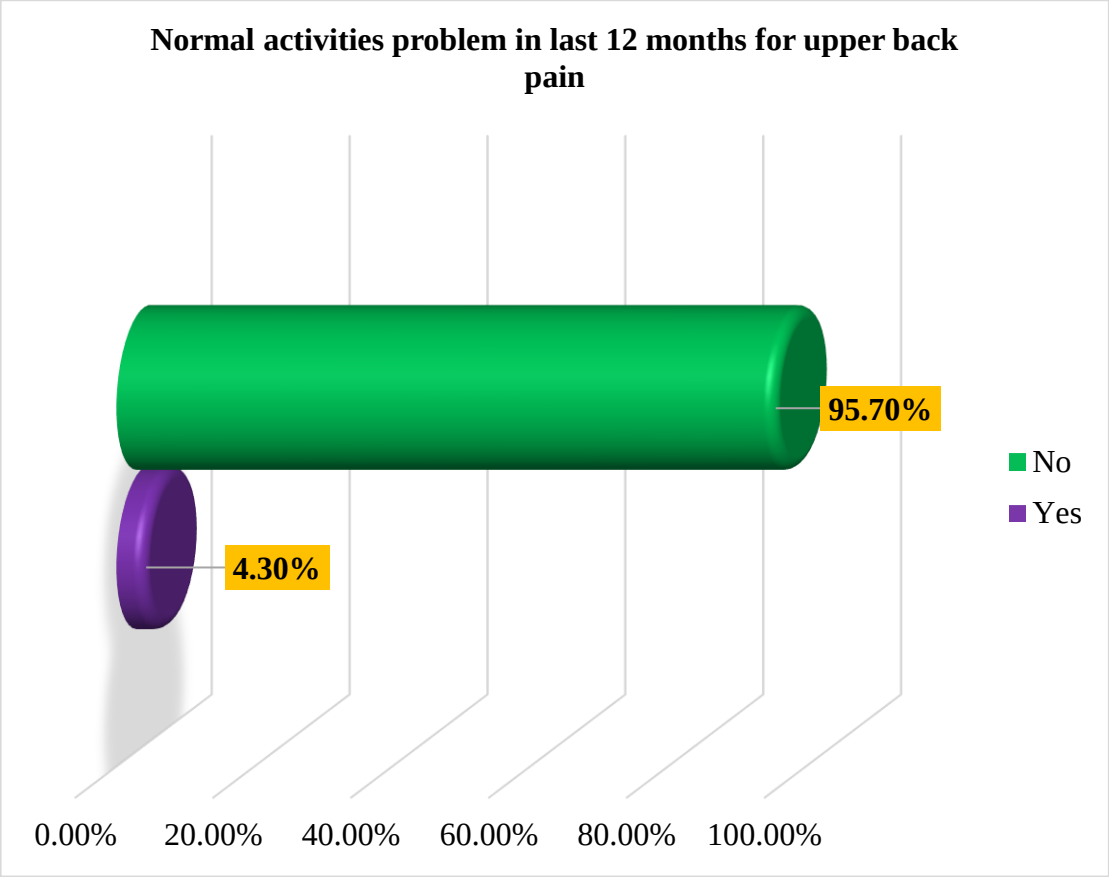

Figure No:19- Normal activities problem in last 12 months for upper back pain

4.2.15: Upper back pain in last 7 days:

Among all n=22; (8.60%) participants were upper back pain in the last 7 days and n=234; (91.40%) participants were no upper back pain in the last 7 days.

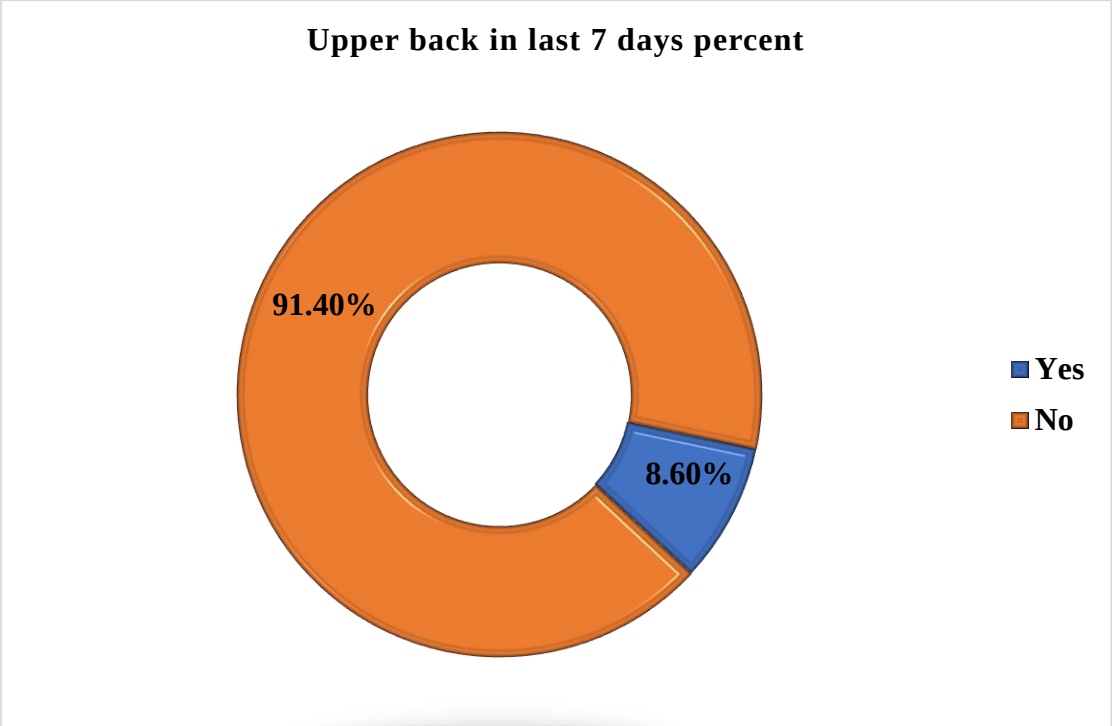

Figure No:20- Upper back pain in last 7 days.

4.2.16: Low back pain in last 12 months:

Among 256 participants n=158; (61.70%) participants had lower back pain in the last 12 months and n=98; (38.30%) participants had no lower back pain in the last 12 months.

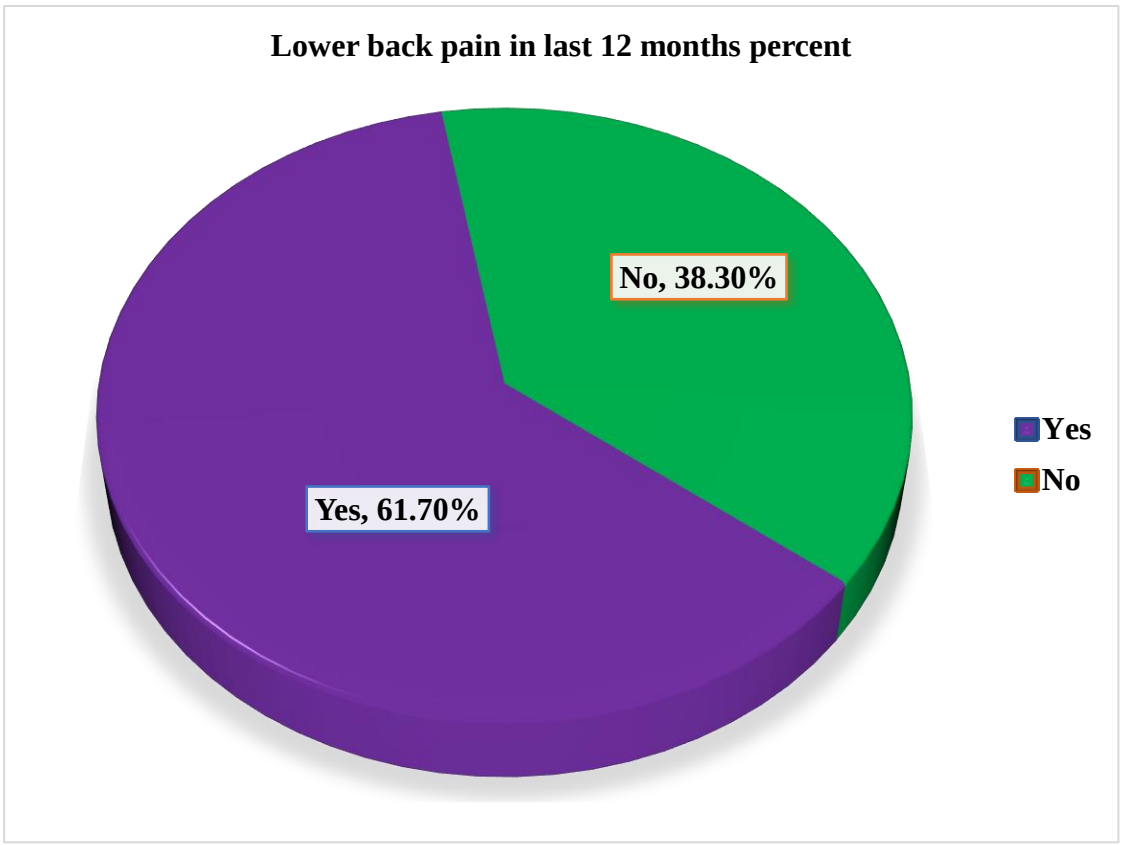

Figure No:21- Lower back pain in the last 12 months

4.2.17: Normal activities problem in last 12 months for lower back pain:

Among all participants n=51; (19.90%) participants were creating problems in normal activities for lower back pain in the last 12 months and n=205; (80.10%) participants were not creating problems in normal activities for lower back pain in the last 12 months.

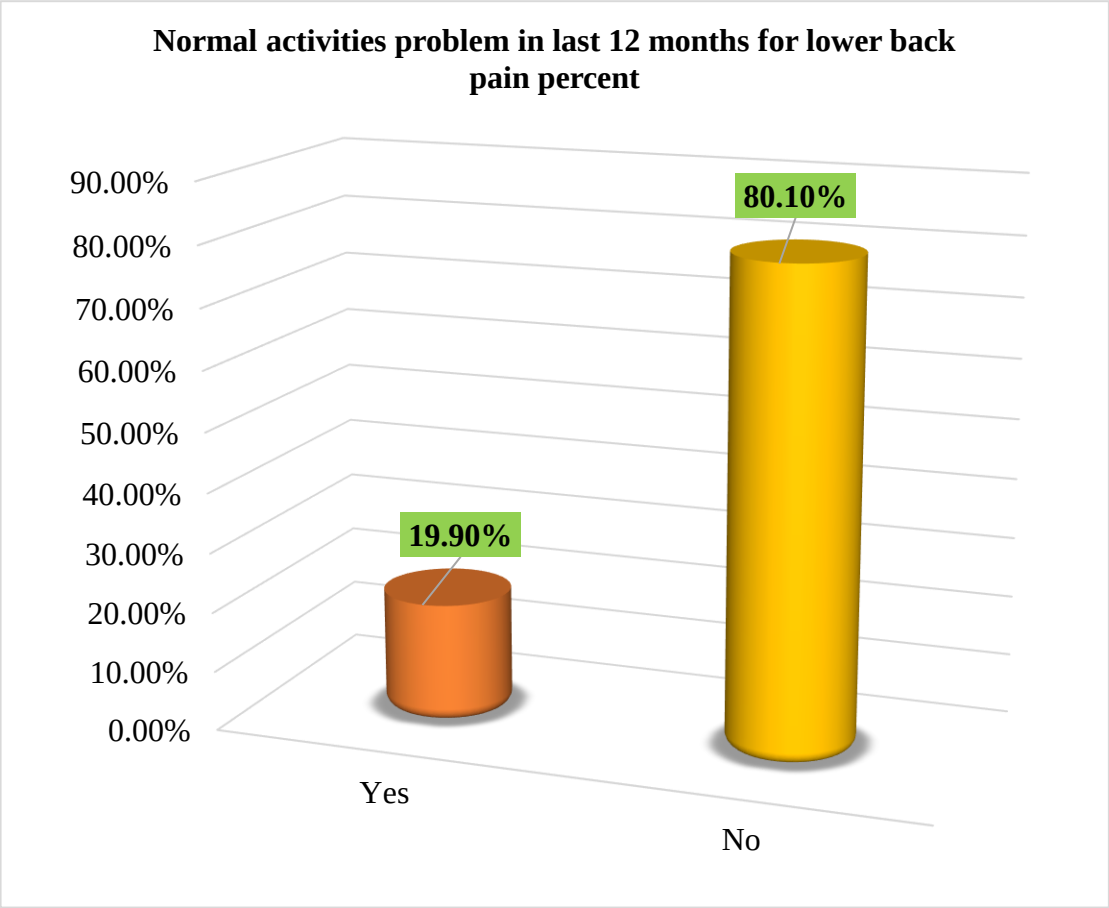

Figure No:22- Normal activities problem in last 12 months for Lower back pain.

4.2.18: Lower back pain in last 7 days:

Among all n=106; (41.40%) of participants were lower back pain in the last 7 days and n=150; (58.60%) of participants were no lower back pain in the last 7 days.

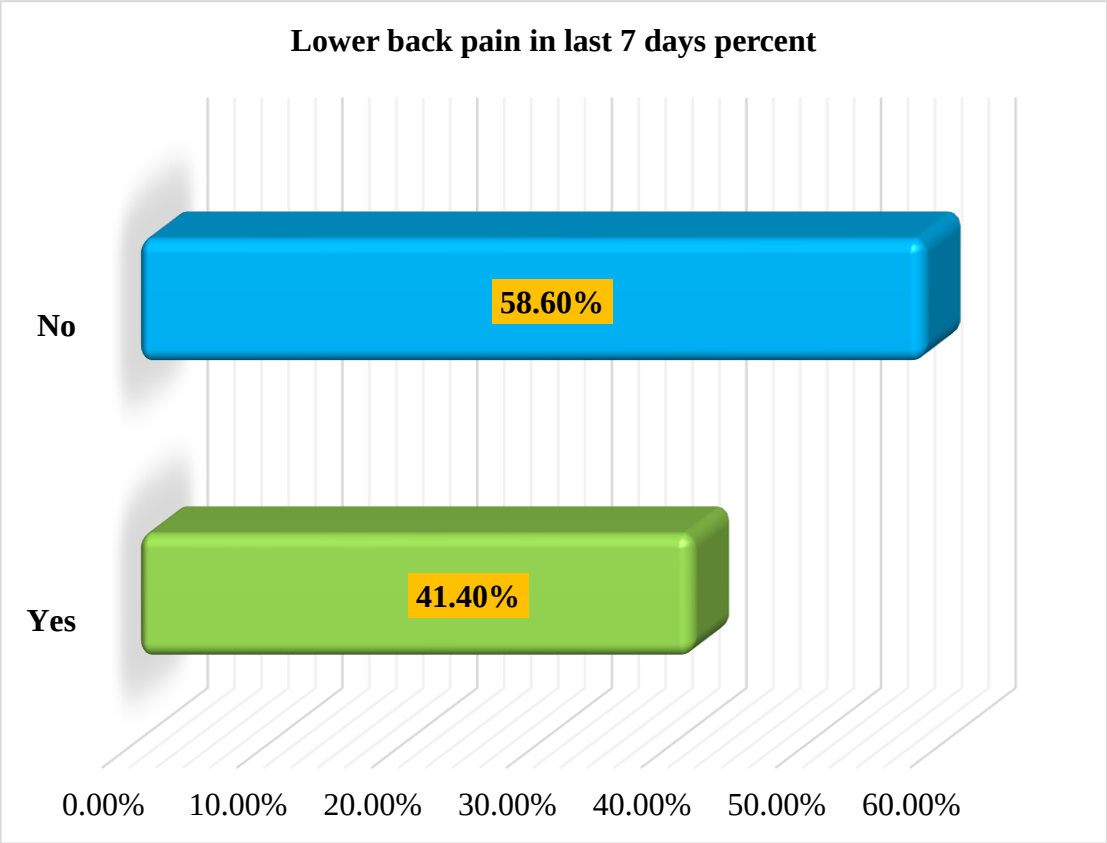

Figure No:23- Lower back pain in last 7 days.

4.2.19: One or both hips/thigh pain in the last 12 months:

Among 256 participants n=11; (4.30%) participants were one or both hips/thigh pain in the last 12 months and n=245; (95.70%) participants were no one or both hips/thigh pain in the last 12 months.

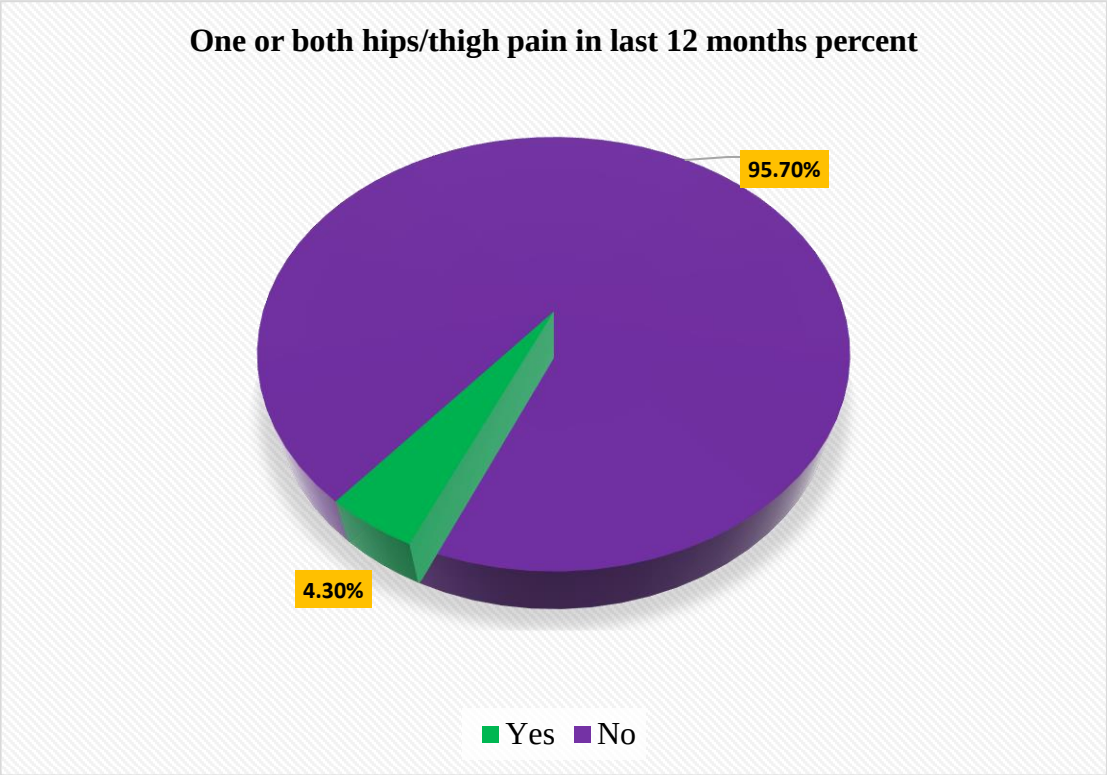

Figure No:24- one or both hips/thigh pain in the last 12 months.

4.2.20: Normal activities problem in last 12 months for one or both hips/thigh pain:

Among all participants n=4; (1.60%) participants were creating problems in normal activities for one or both hips/thigh pain in the last 12 months and n=252; (98.40%) participants were not creating problems in normal activities for one or both hips/thigh pain in last 12 months.

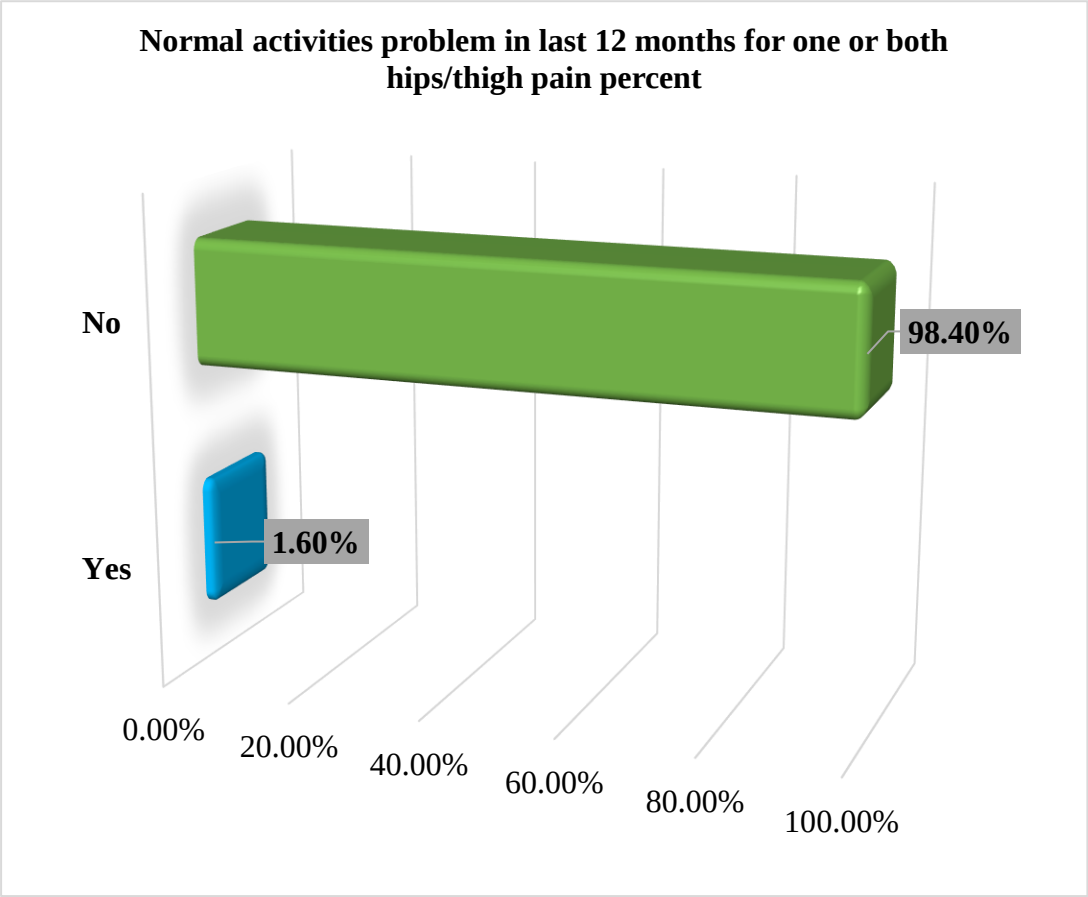

Figure No:25- Normal activities problem in last 12 months for one or both hips/thigh pain.

4.2.21: One or both hips/thigh pain in the last 7 days:

Among all n=5; (2.00%) participants had one or both hips/thigh pain in the last 7 days and n=251; (98.00%) participants had no one or both hips/thigh pain in the last 7 days.

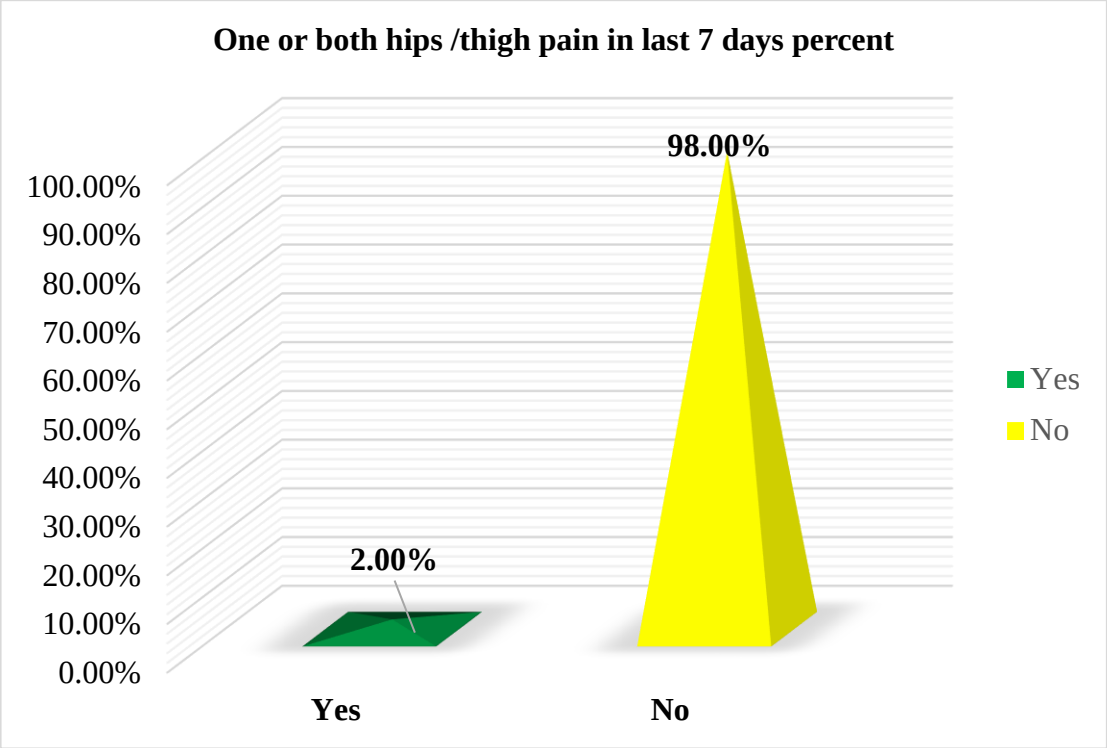

Figure No:26- one or both hips/thigh pain in the last 7 days.

4.2.22: One or both knees pain in last 12 months:

Among 256 participants n=63; (24.60%) participants were one or both knees pain in the last 12 months and n=193; (75.40%) participants were no one or both knees pain in the last 12 months.

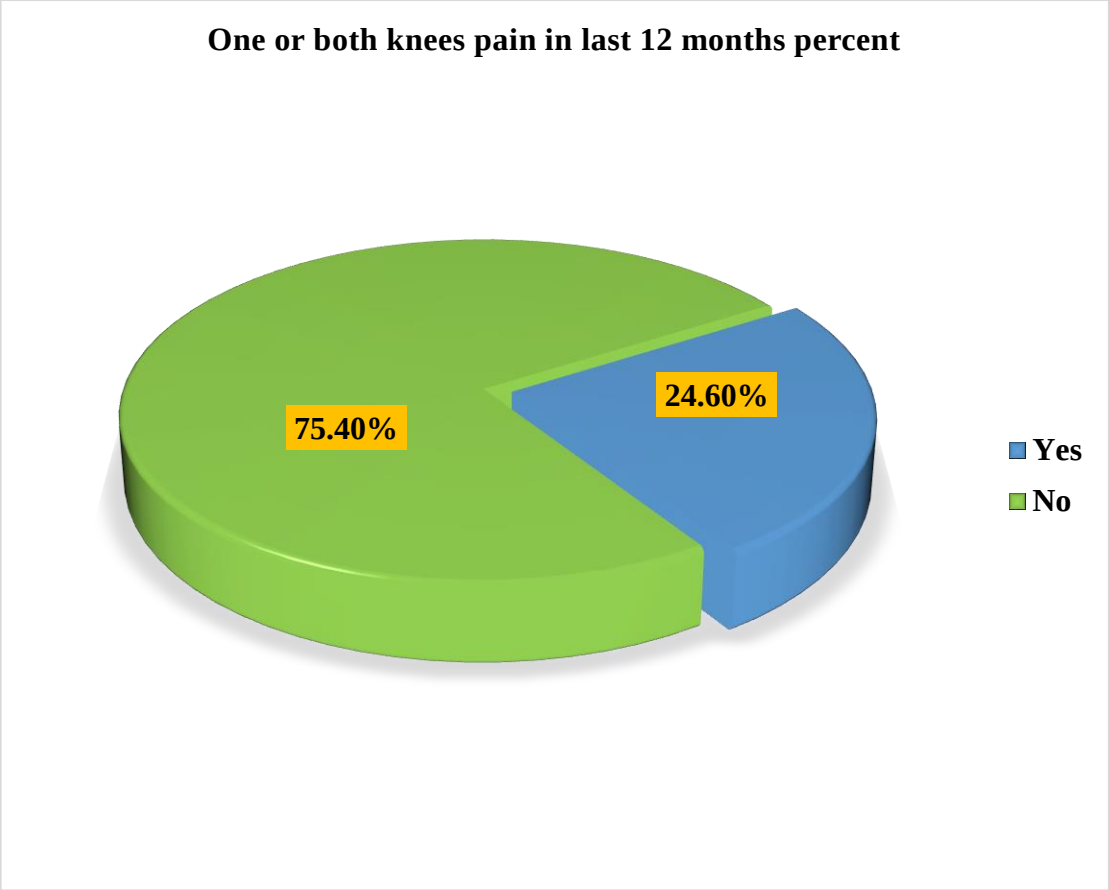

Figure No:27- one or both knees pain in the last 12 months.

4.2.23: Normal activities problem in last 12 months for One or both knees pain:

Among all participants n=4; (1.60%) participants were creating problems in normal activities for one or both knee pain in the last 12 months and n=252; (98.40%) participants were not creating problems in normal activities for one or both knee pain in last 12 months.

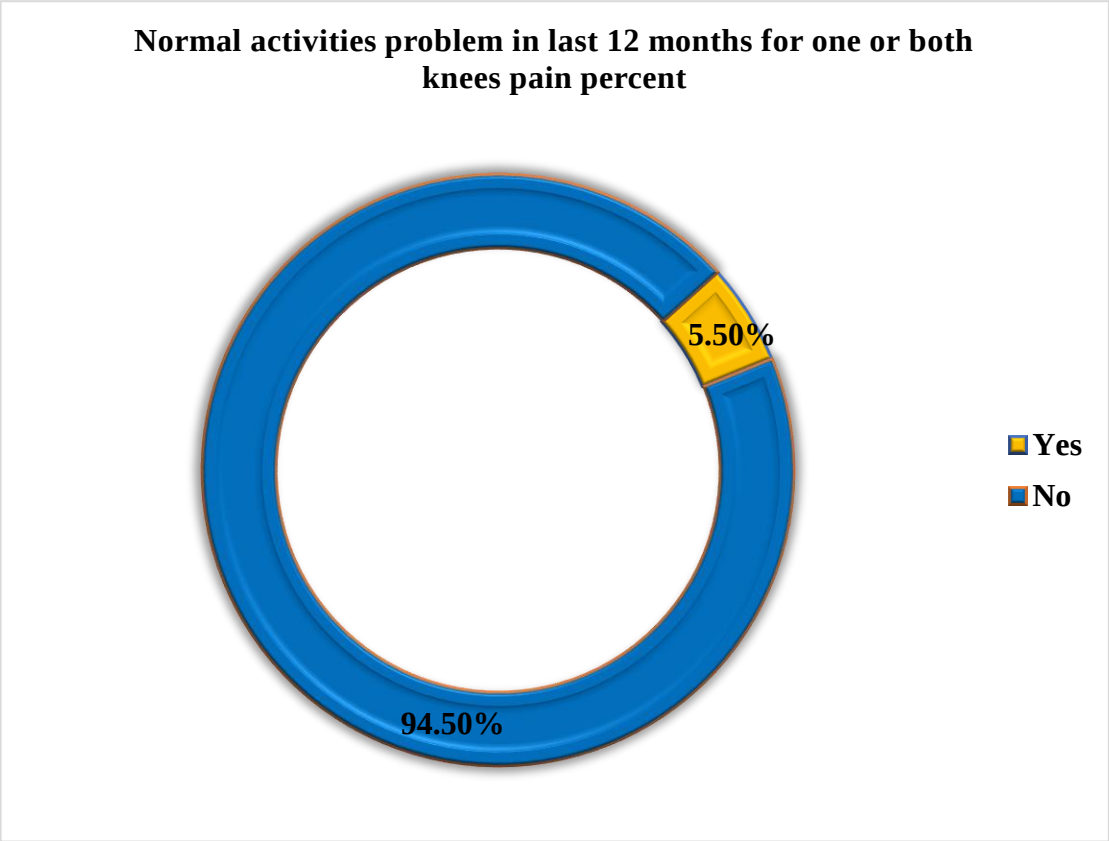

Figure No:28- Normal activities problem in last 12 months for one or both knees pain.

4.2.24: One or both knees pain in last 7 days:

Among all n=20; (7.80%) participants were one or both knees pain in the last 7 days and n=235; (92.20%) participants were no one or both knees pain in the last 7 days.

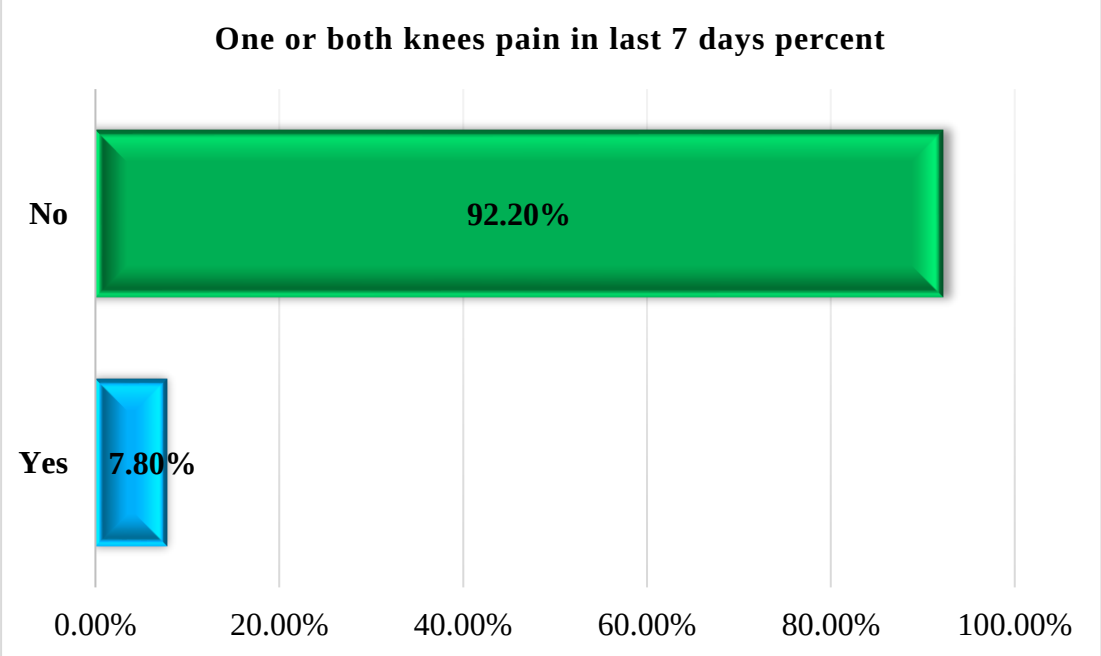

Figure No:29- one or both knees pain in last 7 days.

4.2.25: One or both ankles/feet pain in last 12 months:

Among 256 participants n=73; (28.50%) participants were one or both ankles/feet pain in the last 12 months and n=183; (71.50%) participants were no one or both ankles/feet pain in the last 12 months.

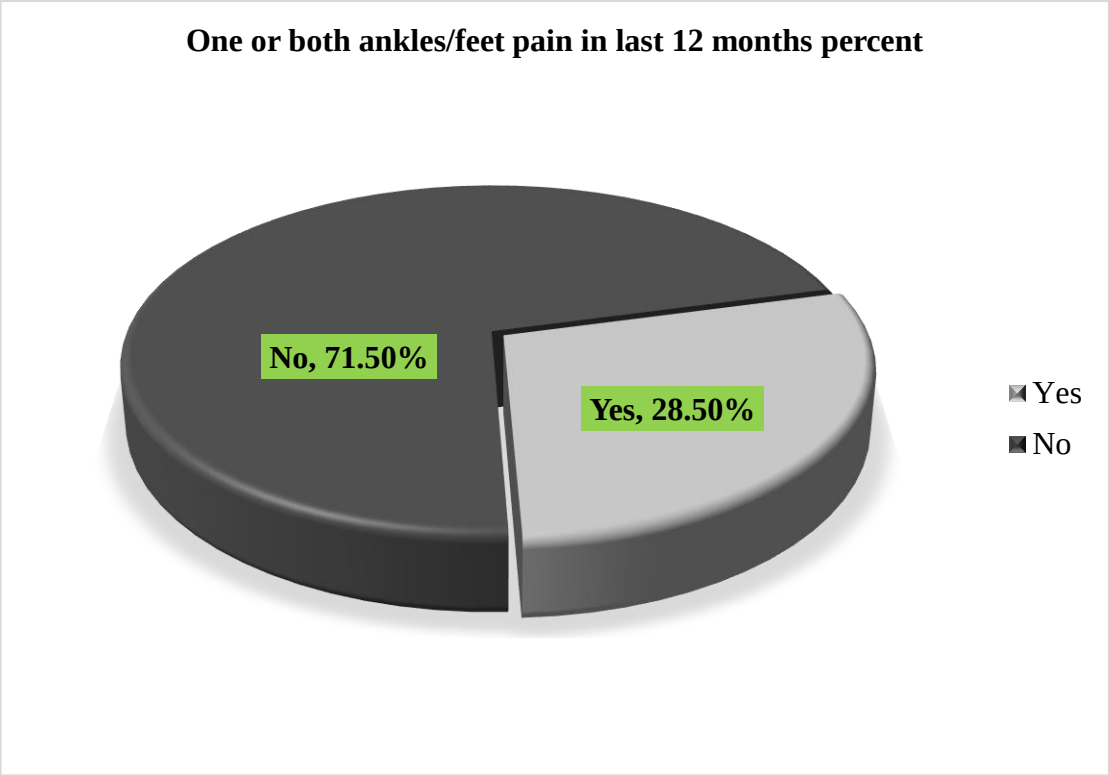

Figure No:30- one or both ankles/feet pain in the last 12 months

4.2.26: Normal activities problem in last 12 months for One or both ankles/feet pain:

Among all participants n=16; (6.30%) participants were creating problems in normal activities for one or both ankles/feet pain in the last 12 months and n=240; (93.70%) participants were not creating problems in normal activities for one or both ankles/feet pain in last 12 months.

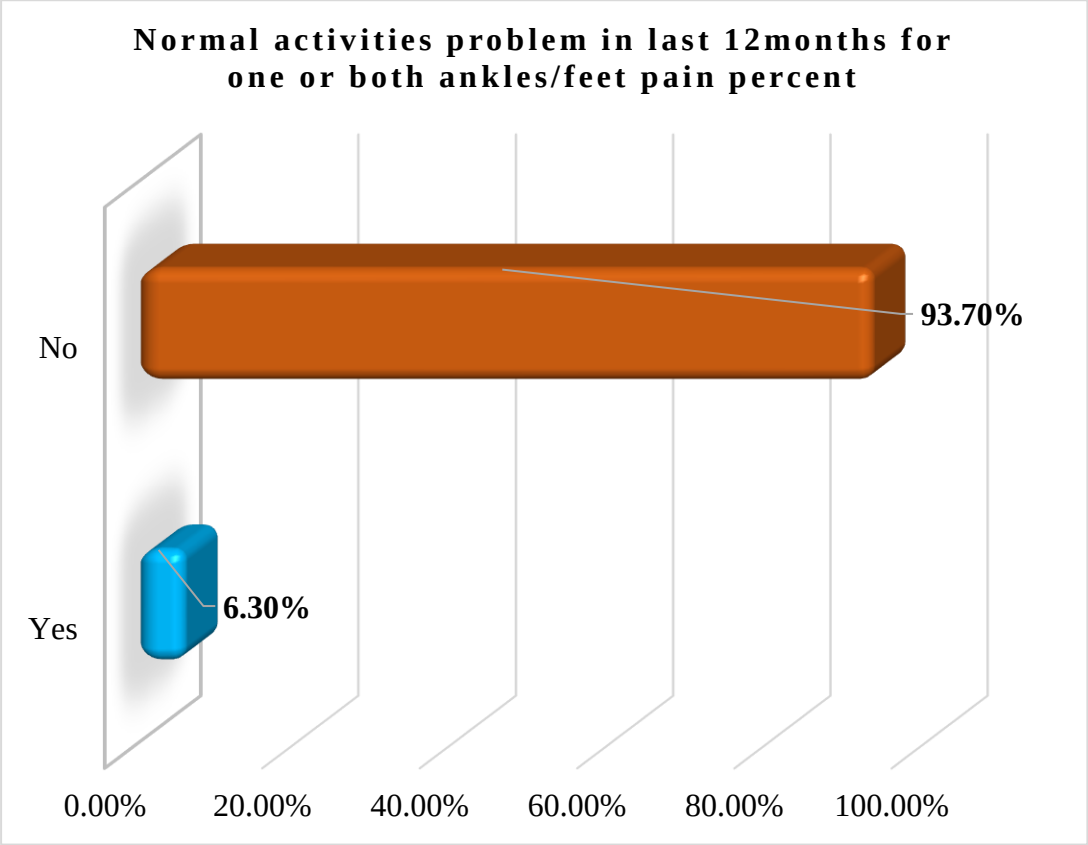

Figure No:31- Normal activities problem in last 12 months for one or both ankles/feet pain.

4.2.27: One or both ankles/feet pain in last 7 days:

Among all n=31; (12.810%) participants had one or both ankles/feet pain in the last 7 days and n=235; (92.20%) participants were no one or both ankles/feet pain in the last 7 days.

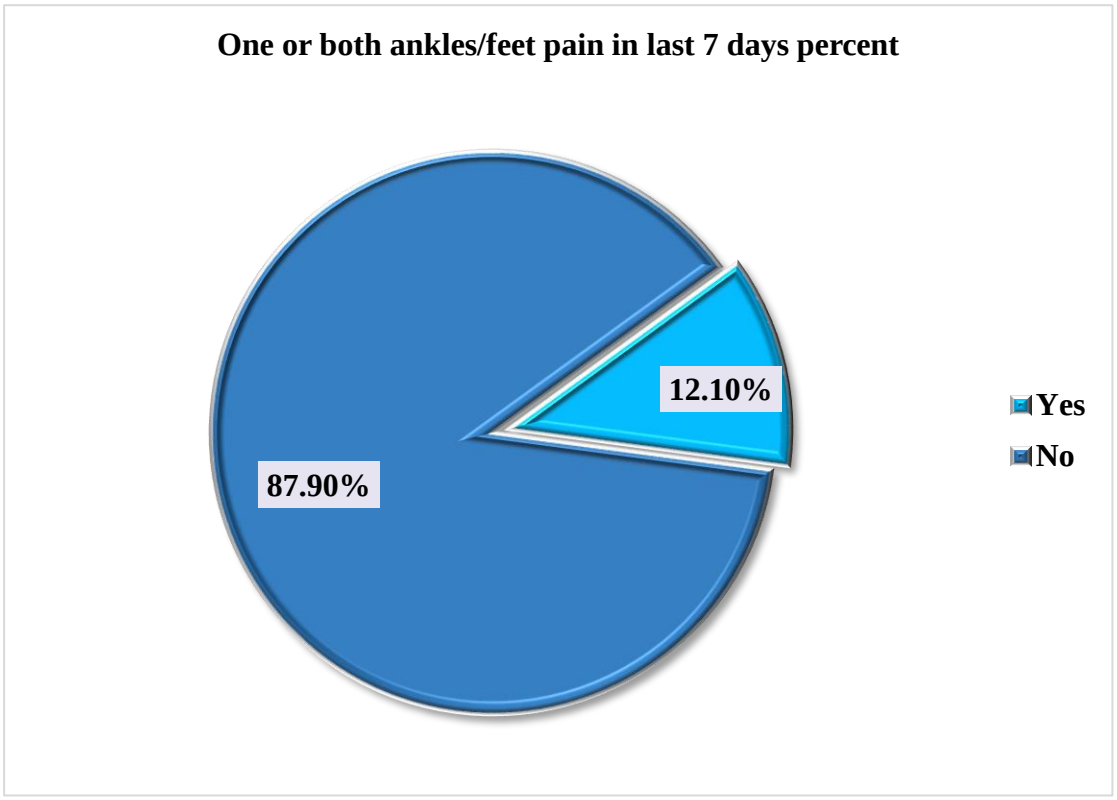

Figure No:32- one or both ankles/feet pain in last 7 days.

4.3: Work-related information:

4.3.1: Working experience of the participants:

In this survey around n=184, (71.90%) participants experienced work of more than 4 years, n=52; (20.30%) participants experienced 1-4 years of work, n=20; (7.80%) participants experienced less than 1 year in work.

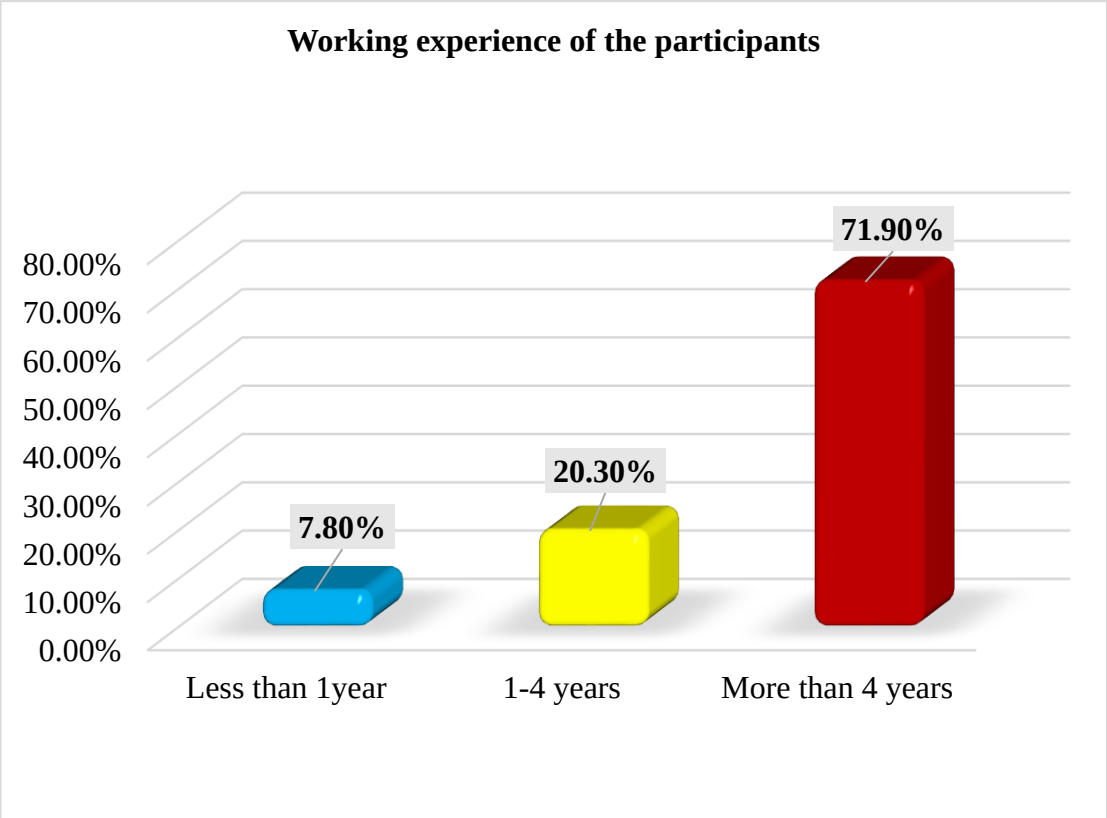

Figure No:33- Working experience of the participants

4.3.2: Daily working time of the participants:

This study showed that about n=12; (4.70%) people worked 8 hours, n=222; (86.70%) participants were working more than 8 hours, another n=22; (8.60%) participants worked less than 8 hours in a day.

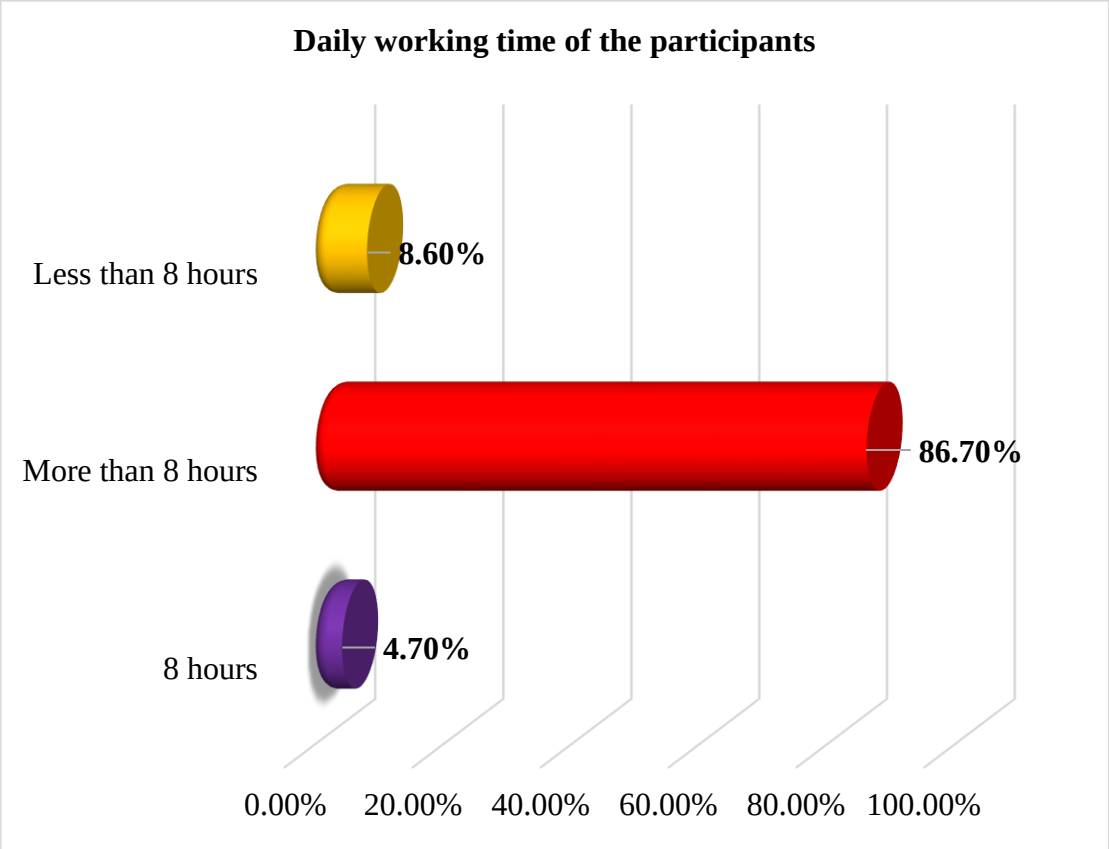

Figure No:34- Daily working time of the participants

4.3.3: Feelings of the Participants During Work:

Here the pie chart result found that 170 participants (66.40%) felt exhausted, 31 participants (21.50%) felt irritated, and 55 participants (12.10%) had no response.

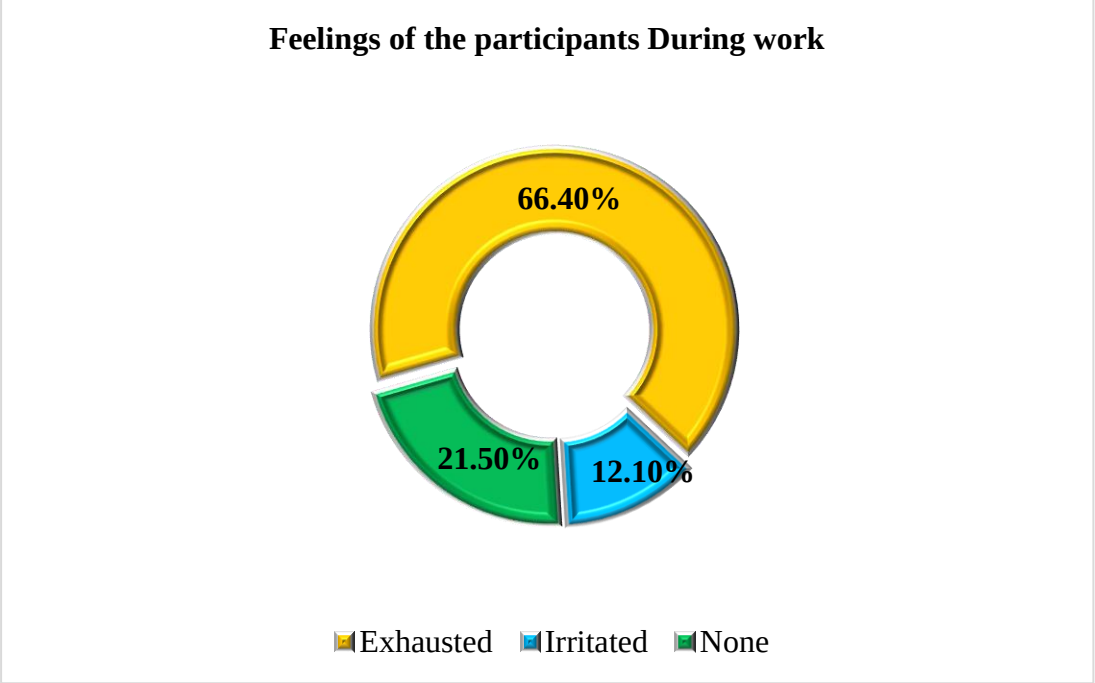

Figure No:35- Feelings of the Participants During Work

4.3.4: Rest in the workplace of the participants:

This survey shows that rest in the workplace n=118; (46.10%) of the participants responded with yes and another n=138; (53.90%) of the participants responded with no.

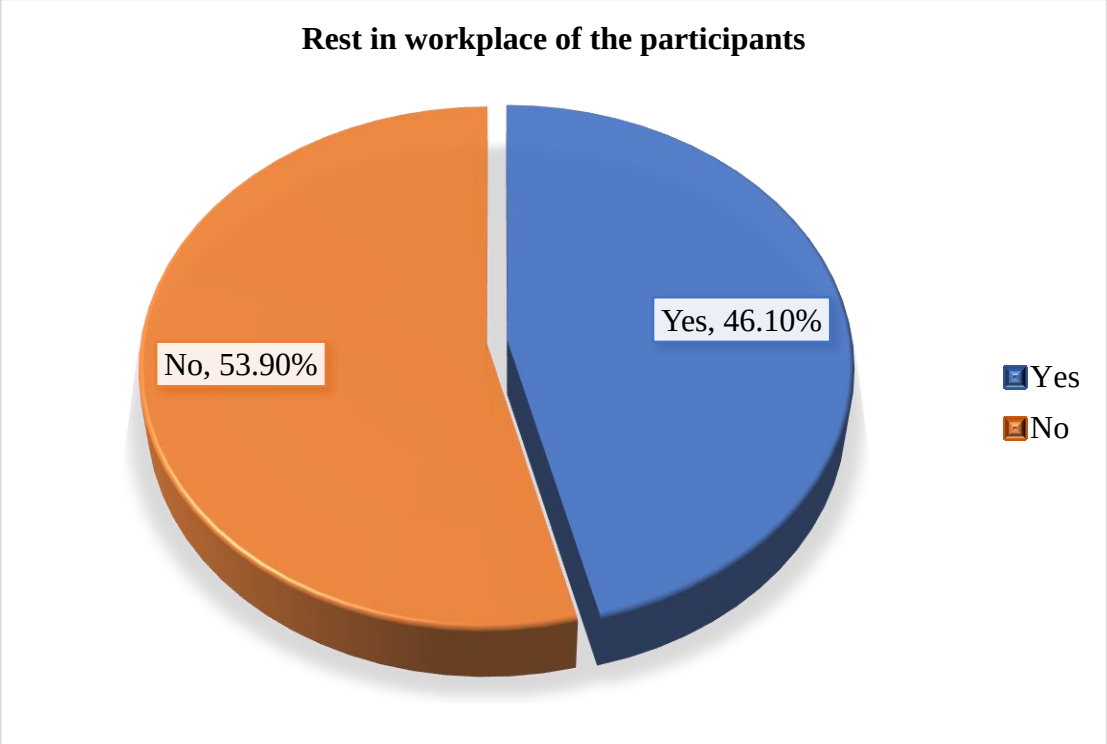

Figure No:36-**:** Rest in the workplace of the participants

4.3.5: Smoking habits of the participants:

In this column, it was found that around n=169; (66.00%) people had a habit of smoking, and n=87; (34.00%) people had no habit of smoking.

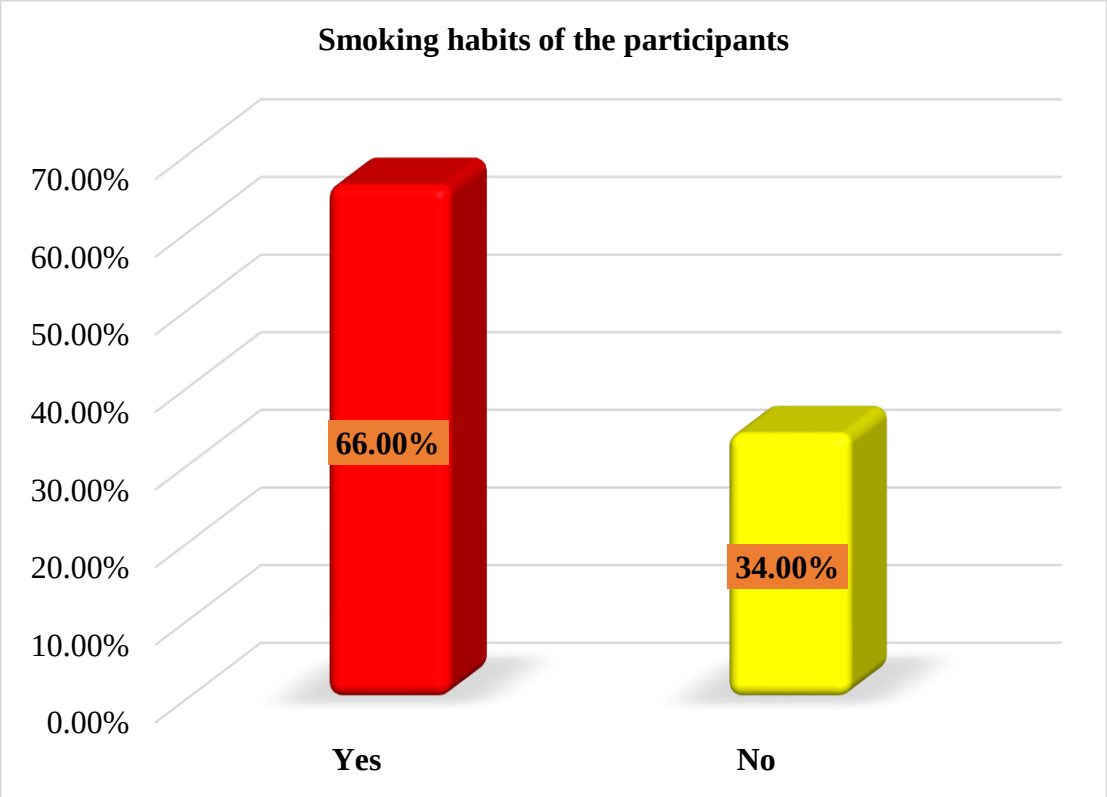

Figure No:37- Smoking habits of the participants

4.3.6: Posture of the participants in the workplace:

This study found that n=70; (27.3%) of participants were working in a standing position and n=76; (29.7%) of respondents were in ground sitting, n=102; (39.8%) claimed work in forward bending, n=8; (3.1%) were in lying on the ground.

Table 4: Posture of the participants in the workplace

Variable	Frequency	Percent (%)
Standing	70	27.3%
Ground sitting	76	29.7%
Forward bending	102	39.8%
Lying on the ground	8	3,1%
Total	256	100%

4.3.7: Need to transfer heavy objects of the participants:

Around n=209; (81.60%) participants were needed to transfer heavy objects and n=47; (18.40%) participants were no need to transfer heavy objects.

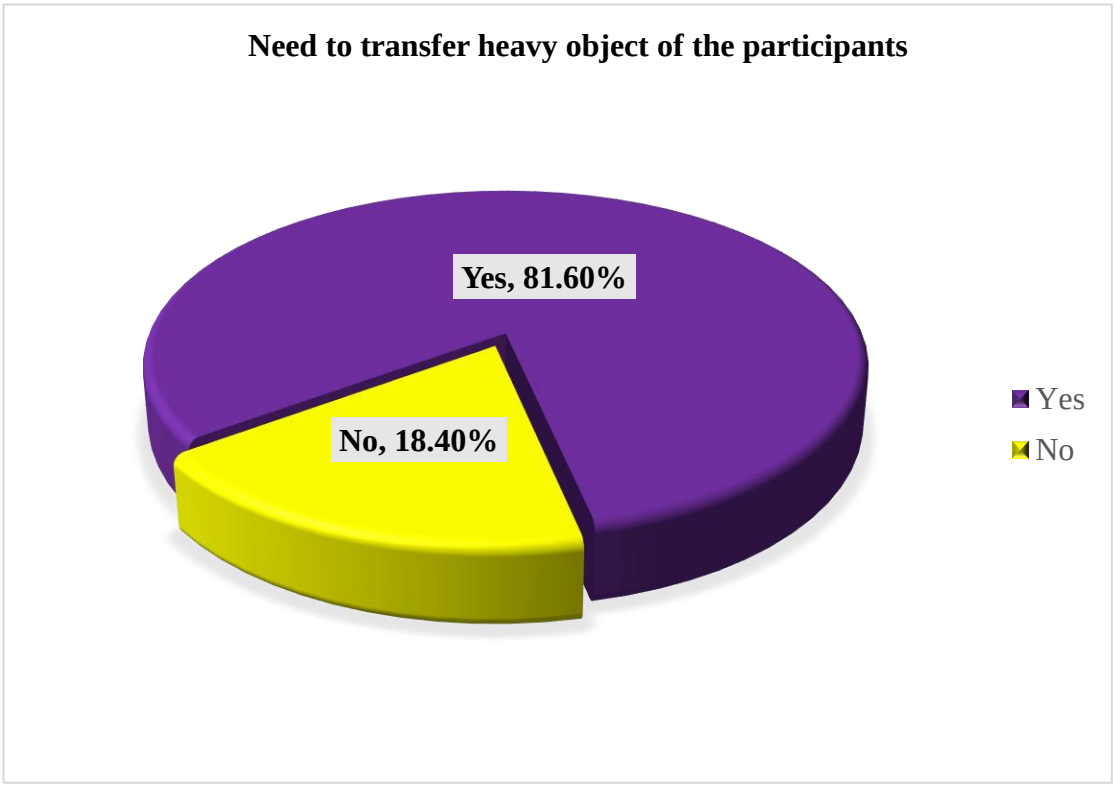

Figure No:38- Need to transfer heavy objects of the participants

4.3.8: Weight of the heavy objects:

This survey shows that around 1% of participants had to carry <5 kg weight of the objects,14.10% of participants had to carry 5-10kg weight of the object and 67.20% of participants had to carry >10kg weight of objects for their work.

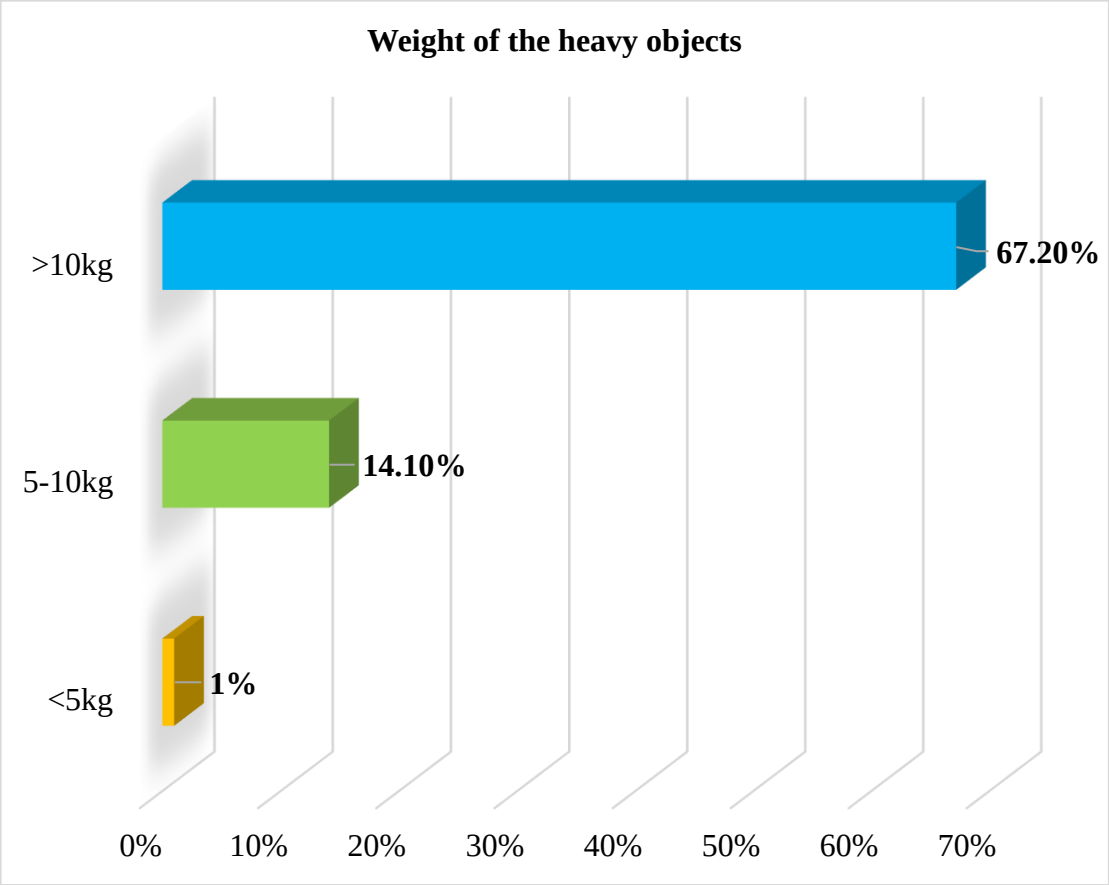

Figure No:39- Weight of the heavy object

4.4: Association

4.4.1: Association between age and pain on different body parts in the last 12 months:

This table shows that the association between age and pain on different body parts in the last 12 months, is significantly associated where p= 0.058>0.05, Non-significant, p=.224>0.05, p=.899>0.05, p=.184>0.05, p=0.504>0.05, p=0.023>0.05, p=0.246>0.05, p=0.526>0.05, p=0.446>0.05 and chi value is 2.995,2.212,8.819,12.199,1.369,7.517,2.801,1.286,1.641.

Table no.5: Association between age and pain on different body parts in the last 12 months

Association between age and pain on different body parts in the last 12 months								
			Neck pain in the last 12 months				Chi value	P value
			Yes	No	Total			
Age of the participants	<25 years	N	25	94	119		2.995	.224
		%	21%	79%	100%			
	25-40 years	N	20	72	92			
		%	21.7%	78.3%	100%			
	>41 years	N	15	30	45			
		%	33.3%	66.7%	100%			
Total		N	60	196	256			
		%	23.4%	76.6%	100%			
			Shoulder pain in the last 12 months				Chi value	P value
			Yes, right shoulder	Yes, left shoulder	Yes, both shoulder	No	Total		
			5	5	12	97	119		

Age of the participants	<25 years	N						2.212	.899
		%	4.2%	4.2%	10.1%	81.5%	100%		
	25-40 years	N	3	5	5	79	92		
		%	3.3%	5.4%	5.4%	85.9%	100%		
	>41 years	N	2	2	5	36	45		
		%	4.4%	4.4%	11.1%	80.0%	100%		
Total		N	10	12	22	212	256		
		%	3.9%	4.7%	8.6%	82.8%	100%		

			Elbow pain in the last 12 months					Chi value	P value
			Yes, right Elbow	Yes, left Elbow	Yes, both Elbow	No	Total		
Age of the participants	<25 years	N	8	4	6	101	119	8.819	.184
		%	6.7%	3.4%	5.0%	84.9%	100%		
	25-40 years	N	6	0	9	77	92		
		%	6.5%	0.0%	9.8%	83.7%	100%		
	>41 years	N	3	2	0	40	45		
		%	6.7%	4.4%	0.0%	88.9%	100%		
Total		N	17	6	15	218	256		
		%	6.6%	2.3%	5.9%	85.2%	100%		

			Wrist pain in the last 12 months					Chi value	P value
			Yes, right Wrist	Yes, left Wrist	Yes, both Wrist	No	Total		
Age of the	<25 years	N	17	10	43	49	119		
		%	14.3%	8.4%	36.1%	41.2 %	100%		

partici pants	25-40 years	N	13	10	24	45	92	12.199	.058
		%	14.1%	10.9%	26.1%	48.9 %	100%		
	>41 years	N	4	8	6	27	45		
		%	8.9%	17.8%	13.3%	60%	100%		
Total		N	34	28	73	121	256		
		%	13.3%	10.9%	28.5%	47.3 %	100%		

			Upper back pain in the last 12 months			Chi value	P value
			Yes	No	Total		
Age of the partici pants	<25 years	N	13	106	119	1.369	.504
		%	10.9%	89.1%	100%		
	25-40 years	N	12	80	92		
		%	13.0%	87%	100%		
	>41 years	N	8	37	45		
		%	17.8%	82.2%	100%		
Total		N	33	223	256		
		%	12.9%	87.1%	100%		

			Lower back pain in the last 12 months			Chi value	P value
			Yes	No	Total		
Age of the partici pants	<25 years	N	65	54	119	7.517	.023
		%	54.6%	45.4%	100%		
	25-40 years	N	58	34	92		
		%	63.0%	37%	100%		
	>41 years	N	35	10	45		
		%	77.8%	22.2%	100%		
Total		N	158	98	256		

		%	61.7%	38.3%	100%		
			Hip/thigh pain in the last 12 months			Chi value	P value
			Yes	No	Total		
Age of the participants	<25 years	N	4	115	119	2.801	.246
		%	3.4%	96.6%	100%		
	25-40 years	N	3	89	92		
		%	3.3%	96.7%	100%		
	>41 years	N	4	41	45		
		%	8.9%	91.1%	100%		
		N	11	245	256		
		%	4.3%	95.7%	100%		
			knee pain in the last 12 months			Chi value	P value
			Yes	No	Total		
Age of the participants	<25 years	N	27	92	119	1.286	.526
		%	22.7%	77.3%	100%		
	25-40 years	N	22	70	92		
		%	23.9%	76.1%	100%		
	>41 years	N	14	31	45		
		%	31.1%	68.9%	100%		
Total		N	63	193	256		
		%	24.6%	75.4%	100%		
			Ankle/foot pain in the last 12 months			Chi value	P value
			Yes	No	Total		
Age of the participants	<25 years	N	38	81	119		
		%	31.9%	68.1%	100%		

	25-40 years	N	22	70	92	1.641	.440
		%	23.9%	76.1%	100%		
	>41 years	N	13	32	45		
		%	28.9%	71.1%	100%		
Total		N	73	183	256		
		%	28.5%	71.5%	100%		

4.4.2: Association between working posture and lower back pain in the last 12 months:

This table shows that the association between working posture and lower back pain in the last 12 months, is Non-significant where p=0.123>0.05 and the Chi value is 5.579

Table no.6: Association between working posture and lower back pain in the last 12 months

Association between working posture and lower back pain in the last 12 months							
			lower back pain in the last 12 months of the participants				
			YES	NO	Total	Chi value	P value
Working posture of the participants	Standing	N	39	31	70	5.779	.123
		%	55.7%	44.3%	100.0%		
	Ground sitting	N	43	33	76		
		%	56.6%	43.4%	100.0%		
	Forward bending	N	72	30	102		
		%	70.6%	29.4%	100.0%		
	Lying on the ground	N	4	4	8		
		%	50.0%	50.0%	100.0%		
Total		N	158	98	256		
		%	61.7%	38.3%	100.0%		

CHAPTER: V DISCUSSION

This study aims to provide a comprehensive survey of work-related discomfort among automobile workers in Bangladesh. This study's participant means and standard deviation of participant age where are Mean ±SD=29.69±10.64; About Forty-six-point five zero percent (46.50%) automobile workers age <25 years; Thirty-five-point nine zero percent (35.90%) age 25-40 years and seventeen-point six zero percent (17.60%) age >41 years. Another similar study found that their mean and SD were 30.76±11.83 years (Vyas et al., 2011).

This study shows that according to gender there was a total of 256 participants (n= 255) 99.60% were male, and (n=1) 0.40% were female. The greater number of participants were males rather than females because of the fewer opportunities for females in the automobile workshop, jobs, and culture. Another survey also shows that there was a total of 344 participants among which n=340 (98.8%) are male and n=4 (1.2%) are female (Tamene et al., 2020).

This survey shows that around seven-point eight-zero percent (7.80%) of automobile, Workers living in a rural area, Ten-point five zero percent (10.50%) are from semi-urban and eighty-one-point six zero percent (81.60%) from urban areas. In this study of participants educational level two-point, seven percent (2.7%) were illiterate, sixty-point two percent (60.2%) are primary education; Nineteen-point one percent (19.1%) are secondary education; seven-point four percent (7.24%); are higher secondary level and ten point five (10.5) are others education level. Another study among automobile workers finds out their educational level is 8% illiterate, primary education 40%, and secondary 52% (Akter et al., 2016).

This study finds that A total of 256 participants were respondents. Among them 56.6% were married, 43% were unmarried and 0.40% were divorced. Another study also shows that there was a total of 333 participants among which n=288 (88%) are married and n=40 (12%) are unmarried (Mok et al. 2013).

This survey finds that the mean and standard deviation of monthly income were Mean ±SD=15583.98±7625.793; About this study (59.5%) monthly income less than

15000 taka; (37.5%) monthly income 15000-30000 taka; (3.1%) persons monthly income more than 30000 taka. A similar in Southern Ethiopia explored that the majority of the study population about (27.6%) had a monthly income of less than 2500 ETH. BR;57.0% are 2500-5000 ETH. BR;9.6% are 5001-7500 ETH. BR and more than >7500 ETH. BR (Tamene et al., 2020).

According to this study, participants had reported 23.40% neck pain or discomfort; 3.90% right shoulder pain or discomfort, 4.70% left shoulder pain or discomfort, 8.60% both shoulder pain or discomfort, 6.60% right elbow pain or discomfort, 2.30% left elbow pain or discomfort, 5.90% both elbow pain, 13.30% right wrists/hands pain or discomfort, 10.90% left wrists/hands pain or discomfort,28.50% both Wrists/hands pain or discomfort, 12.90% upper back pain or discomfort,61.70% participants were lower back pain or discomfort,4.30% one or both hips/thigh pain or discomfort, 24.60% one or both knees pain or discomfort,28.50% one or both ankles/feet pain or discomfort in the last 12 months.

Another similar study discovered that in the last 12 months, individuals experienced 39.4% neck pain or discomfort, 17.2% right shoulder pain or discomfort,7.1% left shoulder pain, 18.2% both shoulder pain or discomfort, 9.1% right elbow pain or discomfort,1% left elbow pain or discomfort, 6.1% both elbow pain or discomfort,17.2% right wrists/hands pain or discomfort,5.1% left wrists/hands pain or discomfort,32.2% both wrists/hands pain or discomfort,62.6% upper back pain or discomfort, 64.6% lower back pain or discomfort,17.2% one or both hips/thigh pain or discomfort,49.5% one or both knees pain or discomfort,27.3% one or both ankles/feet pain or discomfort (Moradi et al., 2017).

According to this study, participants had 9.8% neck discomfort, 6.60% shoulder pain, 5.50% elbow pain, 23.80% wrist/hands pain, 8.60% upper back pain, 41.40% lower back pain, 2.00% one or both hips/thigh pain, 7.80% one or both knee pain, and 12.10% one or both ankles/feet pain in the previous 7 days. Another study discovered that in the preceding 7 days, individuals experienced 5.5% neck pain, 34.5% shoulder discomfort, 1.8% elbow pain, 7.3% wrist/hands pain, 0.0% upper back pain, 12.70%

lower back pain, 1.80% one or both hips/thigh pain, 9.10% one or both knee pain, and 7.30% one or both ankles/feet pain (Lim, et al., 2021).

Participants in this study reported difficulties with normal activities due to 5.10% neck discomfort, 4.70% shoulder pain, 6.30% elbow pain, 12.50% wrist/hand pain, 4.30% upper back pain, and 19.90% lower back pain. In the last 12 months, 1.60% of people experienced hip/thigh pain, 1.60% experienced knee pain, and 6.30% experienced ankle/foot discomfort. Another similar study reported in the last 12 months difficulties with normal activities due to 9.10% neck pain, 5.10% shoulder pain, 1.0 % elbow pain, 5% wrist/hand pain, 27.30% upper back pain, and 30.30% lower back pain. 4% one or both hips/thigh pain, 11.1% one or both knee pain, and 11.1% one or both ankles/feet discomfort (Moradi et al., 2017).

In this study, approximately 71.90% of participants had worked for more than 4 years, 20.30% had worked for 1-4 years, and 7.80% had worked for less than 1 year. Another study discovered that 61% of participants had worked for more than 6 years, 23% had worked for 4-6 years, and 16% had worked for 1-3 years (Akter,et al., 2016).

According to the findings of this survey, about 4.70% of participants worked 8 hours, 86.70% worked more than 8 hours, and 8.60% worked less than 8 hours every day. According to this other poll, 4.70% of individuals worked 6 hours, 32.8% worked 6-8 hours, and 62.6% worked more than 8 hours (Afolabi, F.J. et al., 2021).

This survey discovered that 27.3% of participants were working in a standing position, 29.7% were sitting on the ground, 39.8% were forward bending, and 3.1% were laying on the ground. Another research revealed that 37.2% of participants worked while standing, 4.4% when sitting on the ground, 29.9% while forward bending, 14.2% while lying on the ground, and 14.2% while kneeling (Mulugeta, H.et al., 2021)

In this survey found that among 256 participants in last 12 months there were 58.8% (70) participants had wrists/hands pain among <25 years,51.1% (47) participants had wrists/hands pain in between 25-40 years, 40% (18) had a response with wrists/hands pain >41 years, p-value 0.058≤0.05.54.6% (65) participants had lower back pain among <25 years,63% (58) participants had lower back pain in between 25-40 years,77.8% (35) had response with lower back pain >41 years, p-value 0.023<0.05. 21% (25) participants had neck pain among <25 years,21.7% (20) participants had neck pain between 25-40 years, and 33.3% (15) had a response with neck pain >41 years, p-

value 0.224>0.05. 18.5% (22) participants had shoulder pain among <25 years,14.1% (13) participants had shoulder pain between 25-40 years, and 19.9% (9) had a response with shoulder pain >41 years, p-value 0.899>0.05. 15.1% (18) participants had elbow pain among <25 years,16.3% (15) participants had elbow pain between 25-40 years, and 11.1% (5) had a response with elbow pain >41 years, p-value 0.184>0.05. 10.9% (13) participants had upper back pain among <25 years,13.0% (12) participants had upper back pain between 25-40 years,17.8% (8) had a response with upper back pain >41 years, p-value 0.504>0.05. 3.4% (4) participants had hip/thigh pain among <25 years,3.3% (3) participants had hip/thigh pain in between 25-40 years,8.9% (4) had response with hip/thigh pain >41 years, p-value 0.246>0.05; 22.7% (27) participants had knee pain among <25 years,23.9% (22) participants had knee pain in between 25-40 years,31.1% (14) had response with knee pain >41 years, p-value 0.526>0.05; 31.9% (38) participants had ankle/feet pain among <25 years,23.9% (22) participants had ankle/feet pain in between 25-40 years,28.9% (13) had response with ankle/feet pain >41 years, p-value 0.440>0.05. There was no correlation of age with neck, shoulder, elbow, upper back, hip/thigh, knee, ankle/feet pain because their p-value was more than 0.05. There was a correlation between age with wrists/hands and lower back pain because their p-value was less than 0.05.

A total of 76.02% (520) mechanics reported having at least one episode of lower back discomfort in the previous 12 months, with the age limit highest in the 50-59 age group and lowest in the 20-age group. There was a correlation between age and lower back discomfort since their p-value (0.014) was less than 0.05, but no correlation between age and the rest of the body areas because their p-value was more than 0.05 (Abaraogu et al., 2016).

This survey found that among 256 participants in the last 12 months, there were 55.7% (39) participants had low back pain in standing posture,56.6% (43) participants had low back pain in-ground sitting,70.6% (72) participants had low back pain among forward bending,50.0% (4) participants had low back pain among lying on the ground, p-value 0.123>0.05. There was no correlation between working posture with lower back pain because their p-value was more than 0.05.

This survey shows that a total of 256 participants were (n=169) 66.0% of automobile worker has a smoking habit and (n=87) 34.0% of automobile worker have no smoking habit. Other study result shows that out of 292 participants (n=130)44.5% of automobile worker have a smoking habit and (n=153) 52.4% of automobile worker have no smoking habit. (Monaco, M.G.L. et al., 2019).

CHAPTER – VI LIMITATIONS

The study should be considered in light of the following limitations: As a student, this study was conducted by my fund, so there might be some limitations to the financial aspect of this study. The findings of the study were not generalized to the wider population. The most easily accessible participants were collected from the different areas at Dhaka division and it does not cover all the automobile worker population. This small number of samples is not enough to generalize the result. This took less time to carry out this study and this calculated sample could not be taken. In the study, data was collected from six districts of the country. If the investigator had more time larger data could be collected from different parts of the Dhaka division. If it could, it may make the result more valid and reliable. This study does not respondent the whole population in-country. Few researchers have done this before on this topic area. So, there was little evidence to support the result of the study.

This research is a part of my academic study purpose and I am not an expert on statistical analysis. As it was a new topic area it was difficult to collect appropriate information about the topic area, especially from the perspective of Bangladesh. The interview scheduled survey and interviewing skills were not adequate to get deeper information from the participants, as it was the first attempt by the researcher.

CHAPTER: VII CONCLUSION AND RECOMMENDATION

7.1: Conclusion

This study aims to provide a comprehensive survey of the work-related discomfort among the automobile workers people in Bangladesh. This study focused on musculoskeletal problem symptoms in the automobile workers themselves. Musculoskeletal disorders have a great impact causing severe long-term pain, and physical disability and giving rise to huge costs for society. The investigator used a questionnaire. Each Participant was given a questionnaire to identify the work-related musculoskeletal problem among them. From the database, it was found that 23.8% of participants had neck pain,17,2% of participants had shoulder pain, 14.8% of participants had elbow pain, 52.7% of participants had wrists/hands pain,12.90% of participants had upper back pain,61.70% participants had lower back pain,4.30% participants had hip/thigh,24.60% participants had knee pain and 28.50% participants had ankle pain in last 12 months. Therefore, the most affected parts of the body were the wrists/hands, and lower back. In addition, since this sample size was small, to generate adequate evidence to support decision-making processes at the national level, there should be more studies on automobile workers in Bangladesh. Appropriate, adequate, and timely information is needed to build awareness among them.

7.2: Recommendations

The purpose of the study was to estimate the work-related musculoskeletal problems among automobile workers in Bangladesh. In this study researcher only took the automobile worker participants from the Dhaka division to show the ratio of the musculoskeletal problem among automobile worker people. However, due to time limitations, the investigator was not able to gather a huge number of participants and this result cannot be generalized all over Bangladesh. So, for further study, it is strongly recommended to increase the sample size to generalize the result to all of the automobile workers in Bangladesh. This study can be considered as a groundwork for the physiotherapy service provision for automobile workers with symptoms they usually suffer. Proper physiotherapy can reduce symptoms and prevent post-complications. There are few studies on the automobile worker. These cannot cover all aspects of the vast area. So, it is recommended that the next generation of physiotherapy members continue to study this area as well as different areas such as common musculoskeletal problems, the effectiveness of physiotherapy for postural pain, and common physiotherapeutic intervention to reduce complications. The Government and NGOs should be aware of the automobile workers' effectiveness of physiotherapy and should take the necessary steps.

Reference

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Appendix - A

Institutional Review Board (IRB) Permission Letter

SAIC COLLEGE OF MEDICAL SCIENCE AND TECHNOLOGY
Approved by Ministry of Health and Family Welfare
Affiliated with Dhaka University

Ref : *Date :* .....

Ref.No: *SCMST/PT/ERB-2017-18/1-2023/46*

3rd January'2023

To

Md. Mehedi Hassan Rokey

4th Professional B.Sc. in Physiotherapy

Saic College of Medical Science and Technology (SCMST)

Mirpur-14, Dhaka-1216.

Sub: Permission to collect data

Dear Rokey,

Ethical review board (ERB) of SCMST pleased to inform you that your proposal has been reviewed by ERB of SCMST and we are giving you the permission to conduct study entitled "Work related discomfort among automobile workers in Bangladesh" and for successful completion of this study you can start data collection from now.

Wishing you all the best.

Thanking You,

11.01.'23
Head of ERB
Ethical Review Board
Saic College of Medical Science and Technology

11.01.23
Principal
Saic College of Medical Science and Technology
Mirpur-14, Dhaka-1216

Address: Saic Tower, M-1/6, Mirpur-14, Dhaka-1216.Mobile:01936005804
E-mail: simt140@gmail.com, Web:www.saicmedical.edu.bd

Appendix - B

Permission letter for data collection

SAIC COLLEGE OF MEDICAL SCIENCE AND TECHNOLOGY

Approved by Ministry of Health and Family Welfare
Affiliated with Dhaka University

Ref :
Ref.No: *SCMST/PT/ERB-2017-18/1-2023/46* *Date :* .....

16th January'2023

To

Manager

Arya Motors

Mirpur-10, Dhaka-1216.

Sub: Permission to collect data.

Dear Sir/Mam,

Ethical review board (ERB) of SCMST pleased to inform you that Mehedi Hasan of final year B.Sc. in Physiotherapy student from Saic College of Medical Science and Technology doing a thesis entitle of "Work related discomfort among automobile workers in Bangladesh" which has been reviewed by ERB of SCMST and we are giving permission to him to conduct this study. His data collection area is within Dhaka, so he wants to take data from your department.

I hope you will give kind permission to collect data to complete his study successfully and oblige thereby.

Thanking You,

Head of ERB
Ethical Review Board
Saic College of Medical Science and Technology

16.02.23
Principal
Saic College of Medical Science and Technology
Mirpur-14, Dhaka-1216

16.02.2023

Address: Saic Tower, M-1/6, Mirpur-14, Dhaka-1206. Mobile: 01936005804
E-mail: simt140@gmail.com, Web:www.saicmedical.edu.bd

APPENDIX -C

Consent form (Bangla) সম্মতিপত্র

উত্তর দাতার আইডি নাম্বার | | | |

প্রিয় অংশগ্রহনকারী

আমি মো: মেহেদী হাসান রকি সাইক কলেজ অব মেডিকেল সায়েন্স এন্ড টেকনোলজি এর বিএসসি ইন ফিজিওথেরাপী বিভাগের একজন ছাত্র। আমার বিএসসি ইন ফিজিওথেরাপী ডিগ্রি সম্পন্ন করতে গবেষণার অংশ হিসেবে বাংলাদেশে অটোমোবাইল শ্রমিকদের মধ্যে কাজ সংক্রান্ত অস্বস্তি শিরোনামে একটি গবেষণার কাজ করছি। এখানে আপনার সামাজিক-জনতাত্তিক তথ্য এবং পেশীবহুল সমস্যা সম্পর্কিত কিছু প্রশ্ন দেয়া আছে যা আপনাক পুরন করতে হবে। আপনার নিজের দ্বারা দেয়া এই সাক্ষাতকার দিতে ১৫-২০ মিনিট সময় লাগবে। এখানে প্রশ্নাবলীর একটা তালিকা দেয়া আছে এবং আপনাকে প্রত্যেকটি প্রশ্নের উত্তর দিতে হবে ।এই গবেষণায় প্রাপ্ত তথ্য শুধু মাত্র শিক্ষা ক্ষেত্রে ব্যবহার করা হবে এবং অংশগ্রহণকারীর ব্যক্তিগত তথ্য সম্পূর্ণ গোপনীয়তার মধ্যে থাকবে, অন্য কোথাও প্রকাশ করা হবে না। গবেষণা চলাকালীন সময়ে অংশগ্রহনকারী কোনরকম দ্বিধা বা ঝুকি ছাড়াই যেকোনো সময় এটাকে বাদ দিতে পারবেন। আপনার একান্ত সহযোগীতা কামনা করছি।

অংশগ্রহনকারীর ঘোষনা

আমাকে এই গবেষণার জন্য আমন্ত্রন জানানো হয়েছে এবং সম্পূর্ণ প্রশ্ন গুলো পড়ে বুঝানো হয়েছে এবং আমি কোন ধরনের দ্বিধা ছাড়াই উত্তর দিয়েছি। আমি লক্ষ্য করেছি এই গবেষণায় আমার অংশগ্রহন সম্পূর্ণ স্বেচছায় এবং কোন রকম ঝুকি ছাড়াই আমি যেকোনো সময় এটাকে বাদ দিতে পারব। আমি এই গবেষণায় অংশগ্রহণে সম্পূর্ণ সম্মতি জ্ঞাপন করছি।

অংশগ্রহনকারীর নাম : .....

স্বাক্ষর / টিপসই এবং তারিখ.....

স্বাক্ষীর স্বাক্ষর.....

Consent form (English)

Respondent ID no

Dear participant.

I am Md. Mehedi Hassan rokey student of the B.sc in physiotherapy program in the Department of Physiotherapy at SAIC College of Medical Science and Technology affiliated with the University of Dhaka conducting the study entitled **Work related Discomfort among Automobile workers in Bangladesh** as a part of my thesis work for the partial fulfillment of Bachelor degree. There is a list of questions you need to fill up which include socio-demographic and musculoskeletal problems. For spending your time to participate in this self-administered interview which will take around 15-20 minutes. There is a list of questionnaires and you need to fill up each answer. The information gained from this questionnaire will be used for academic purposes and will be kept confidential. Your participation in this study is voluntary and you have the right to withdraw from the interview without any clarification at any moment. You can ask any question to the researcher regarding the study to meet up with your quarry. Looking forward to your kind cooperation.

Declaration of the participant

I have been answered in this survey. The foregoing information has been read to me and that has been answered to my satisfaction. I have noticed that my participation in this study is voluntary and I have the right to withdraw from the interview at any clarification. I give my consent voluntarily to be a participant in this study.

Respondent name: ……

Signature/ Fingerprint: and date: …… ……

Witness signature…….

APPENDIX –D

প্রশ্নাবলী (বাংলা)

শিরোনাম

বাংলাদেশে অটোমোবাইল শ্রমিকদের মধ্যে কাজ সংক্রান্ত অস্বস্তি

কোড: তারিখ:

অংশগ্রহণকারীর নাম:.....

ঠিকানা:.....

মোবাইল নাম্বার:.....

অধ্যায়ঃ ১- সামাজিক জনতাত্ত্বিক তথ্য

প্রশ্ন নং	প্রশ্ন	উত্তর
১।	আপনার বয়স কত?.....।	
২।	আপনার লিঙ্গ কি? ১। ছেলে ২। মেয়ে ৩। অন্যান্য	

৩।	আপনি কোথায় বাস করেন? ১। শহর ২। উপশহর ৩। গ্রাম	
৪।	আপনার শিক্ষাগত যোগ্যতা কি? ১। প্রাথমিক ২। মাধ্যমিক ৩। উচ্চ মাধ্যমিক ৪। অশিক্ষিত ৫। অন্যান্য	

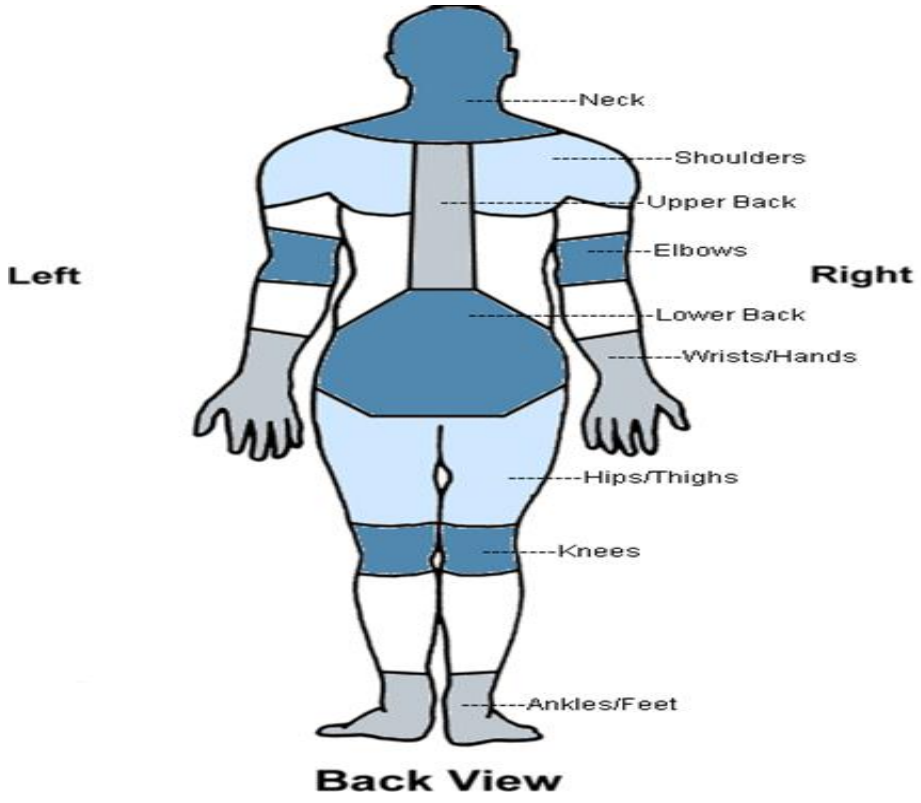
৫।	আপনি কোন ধরনের পরিবারে বাস করেন? ১। একক ২। যৌথ ৩। অন্যান্য	
৬।	আপনার বৈবাহিক অবস্থা কি? ১। বিবাহিত ২। অবিবাহিত ৩। তালাকপ্রাপ্ত ৪। বিধবা	

৭।	আপনার মাসিক আয় কত?.....	
৮।	আপনার ধর্ম কি? ১। মুসলিম ২। হিন্দু ৩। বৌদ্ধ ৪। খ্রিস্টান ৫। অন্যান্য	

অধ্যায়ঃ ২-মাংসপেশীর অস্বস্তি সম্পর্কিত তথ্য(নর্ডিক প্রশ্নাবলীর উপর ভিত্তি করে kournika et al.1987)

প্রত্যেককে উত্তর দিতে হবে	**যারা সমস্যায় পড়েছেন তাদের উত্তর দিতে হবে**	
গত ১২ মাসে আপনার কি এই ধরনের সমস্যা (যেমন- ব্যথা, অস্বস্তি, অসাড়তা) হয়েছে?	গত 12 মাসে উল্লেখিত সমস্যাগুলোর জন্য আপনার দৈনন্দিন কার্যকলাপে(যেমন- চাকরি,বাসার কাজ) কোন প্রকার বাধাগ্রস্ত হয়েছেন কি?	গত 7 দিনের মধ্যে এই ধরনের সমস্যা আর হয়েছে?
ঘাড় □ না □ হ্যাঁ	□ না □ হ্যাঁ	□ না □ হ্যাঁ
কাঁধ □ না □ হ্যাঁ, ডান **কাঁধ** □ হ্যাঁ, বাম **কাঁধ** □ হ্যাঁ, উভয় **কাঁধ**	□ না □ হ্যাঁ	□ না □ হ্যাঁ
কনুই □ না □ হ্যাঁ, ডান **কনুই** □ হ্যাঁ, বাম **কনুই** □ হ্যাঁ, উভয় **কনুই**	□ না □ হ্যাঁ	□ না □ হ্যাঁ

কব্জি / হাত □ না □হ্যাঁ, ডান **কব্জি / হাত** □হ্যাঁ, বাম **কব্জি / হাত** □হ্যাঁ, উভয় **কব্জি / হাত**	□ না □ হ্যাঁ	□ না □ হ্যাঁ
উপরের দিকে পিছনে □ হ্যাঁ না	□ না □ হ্যাঁ	□ না □ হ্যাঁ
নিচের দিকে পিছনে □ না □ হ্যাঁ	□ না □ হ্যাঁ	□ না □ হ্যাঁ
এক বা উভয় নিতম্ব/উরু □ না □ হ্যাঁ	□ না □ হ্যাঁ	□ না □ হ্যাঁ



এক বা উভয় হাঁটু □ না □ হ্যাঁ	□ না □ হ্যাঁ	□ না □ হ্যাঁ
এক বা উভয় গোড়ালি/পা □ না □ হ্যাঁ	□ না □ হ্যাঁ	□ না □ হ্যাঁ

অধ্যায়ঃ ৩- পেশা সম্পর্কিত তথ্য

প্রশ্ন নং	প্রশ্ন	উত্তর
১।	আপনি কত বছর ধরে এই পেশায় আছেন? ১। ১-৬ মাস ২। ৬-১২ মাস ৩। ১-৩ বছর ৪। ৩ বছরের অধিক	
২।	আপনি কতক্ষণ কাজ করেন? ১। ৮ ঘন্টা ২। > ৮ ঘন্টা ৩। < ৮ ঘন্টা	
৩।	কাজ করার সময় আপনি কেমন অনুভব করেন?১ ১। ক্লান্ত ২। দুর্বল ৩। বিরক্ত ৪। কোনটিই নয়	
৪।	আপনি কি আপনার কর্মস্থলে বিশ্রাম নেন? ১। হ্যাঁ ২। না	
৫।	আপনি কি ধুমপান করেন?	

	১। হ্যাঁ ২। না	
৬।	আপনি একবারে কোন পদে কাজ করেন? ১। দাড়িয়ে ২।নিচে বসে ৩। সামনের দিকে ঝুঁকে ৪। বসে সামনের দিকে ঝুঁকে	
৭।	আপনার কি কোন ভারী বস্তু স্থানান্তর করতে হয়? ১। হ্যাঁ ২। না য়দি উত্তর হ্যাঁ হয় ,তাহলে পরবর্তী প্রশ্নের উত্তর দিন-	
৮।	সেইটা কত? ১। ৫-১০ কেজি ২। >১০ কেজি	

QUESTIONNAIRE (English)

Title

Work-related discomfort among automobile workers in Bangladesh

Date:

Code No: | | | |

Participant name: .....

Address: .....

Mobile No…….....

Section: 1. Sociodemographic information.

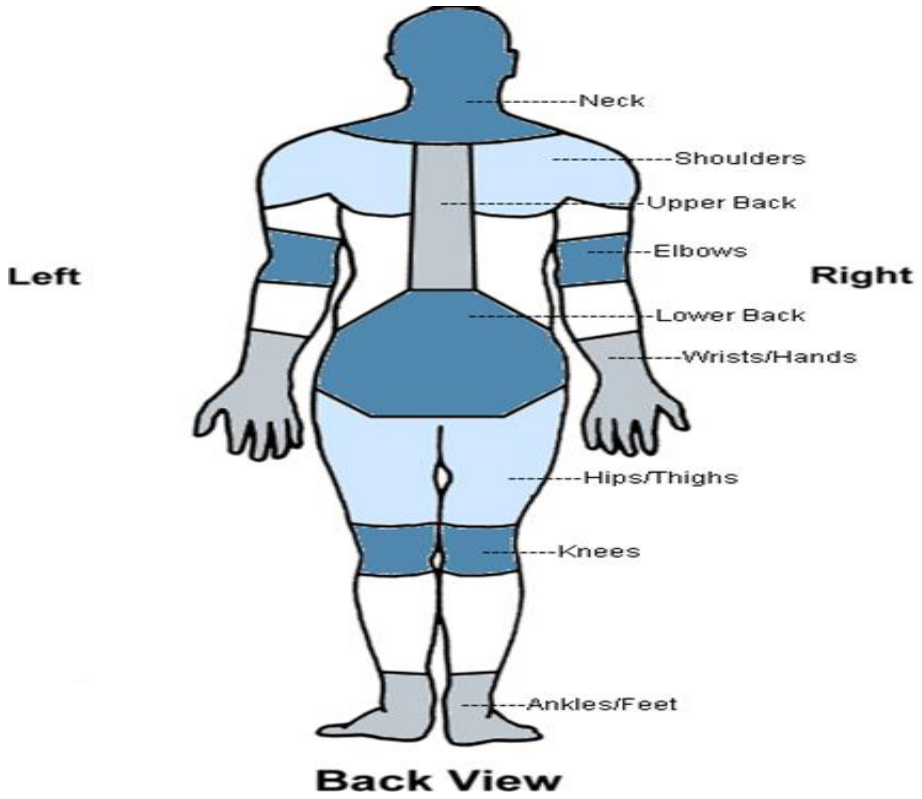
Q.No.	Question	Ans.
1.	What is your age?	
2.	What is your gender? 1. Male 2. Female 3. Others	
3.	Where do you live? ..... 1. Urban 2. Semi-urban 3. Rural	
4.	What is your education level? 1. Primary 3. Higher secondary 5. Others 2. Secondary 4. Illiterate	

5.	What types of your family? 1. Nuclear 2. Extended 3. Others	

6.	What is your marital status? 1. Married 2. Unmarried 3. Divorce 4. widow	
7.	What about your monthly income? ……..	
8.	What is your religion? 1. Muslim 2. Hindu 3. Buddhist 4. Christian 5. Others	

Section:2. Musculoskeletal discomfort-related information (based on Nordic Questionnaire (kourinka et al.1987))

To be answered by everyone	**To be answered by those who have had trouble**	
Have you at any time during **the last 12 months** had trouble (ache, pain, discomfort, numbness) in:	Have you at any time during the **last 12 months been prevented from doing your normal work** (at home or away from home) because of the trouble?	Have you had trouble at any time during **the last 7 days?**
Neck □ No □ Yes	□ No □ Yes	□ No □ Yes
Shoulders □ No □ Yes, right shoulder □ Yes, left shoulder □ Yes, both shoulders	□ No □ Yes	□ No □ Yes
Elbows □ No □ Yes, right elbow □ Yes, left elbow □ Yes, both elbows	□ No □ Yes	□ No □ Yes
Wrists/Hands □ No □ Yes, right wrist/hand □ Yes, left wrist/hand □ Yes, both wrists/hands	□ No □ Yes	□ No □ Yes
Upper Back □ No □ Yes	□ No □ Yes	□ No □ Yes

Lower Back (small of back) □ No □ Yes	□ No □ Yes	□ No □ Yes
One or Both Hips/Thighs □ No □ Yes	□ No □ Yes	□ No □ Yes
		
One or Both Knees □ No □ Yes	□ No □ Yes	□ No □ Yes
One or Both Ankles/Feet □ No □ Yes	□ No □ Yes	□ No □ Yes

Section:3 Work related information

Q.No.	Questions	Ans.
1.	How many years have you been in this profession? 1. 1-6 months 2. 6-12 months 3. 1-3 year 4. More than 3 years	
2.	How long do you work? 1. 8 Hours 2. >8 Hours 3. <8 Hours	
3.	How do you feel while working? 1. Exhausted 2. Weak 3. Irritated 4. None	
4.	Do you take a rest in your workplace? 1. Yes 2. No	
5.	Do you smoke? 1. Yes 2. No	
6.	Which position do you work at once? 1. Standing 2. Ground sitting 3. Forward bending 4. Slouched sitting 5. Lying on the ground	
7.	Do you transfer any heavy objects? 1. Yes 2. No	

	If yes answer the next question no. 8	
8.	How much? 1. 5-10kg 2. 10-15kg 3. 15-20kg 4. >20kg	

APPENDIX –E **Gant Chart**

Activities / Month	July 22	Aug 22	Sep 22	Oct 22	Nov 22	Dec 22	Jan 23	Feb 23	Mar 23	Apr 23	May 23	Jun 23
Proposal Presentation												
Introduction												
Literature review												
Methodology												
Data collection												
Data analysis												
Result												
1st Progress Presentation												
Discussion												
Conclusion & recommendation												
2nd Progress Presentation												
Communication with supervision												
Final Submission												