PREVALENCE OF COMMON WORK RELATED MUSCULOSKELETAL DISORDERS AMONG THE DENTISTS AT TWO SELECTED DENTAL COLLEGE HOSPITALS

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Bachelor of Science in Physiotherapy (B.Sc PT)

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PREVALENCE OF COMMON WORK RELATED MUSCULOSLELETAL DISORDERS AMONG THE DENTISTS AT TWO SELECTED DENTAL COLLEGE HOSPITALS

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DECLERATION

I declare that the work presented here is my own. All source used have been cited appropriately. Any mistakes or inaccuracies are my own. I also declare that for any publication, presentation or dissemination of the study. I would be bound to take written consent from my supervisor.

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Abbreviation

BHPI:	Bangladesh Health Professions Institute.
CRP:	Centre for the Rehabilitation of the Paralyzed.
CTS:	Carpal Tunnel Syndrome.
MSD:	Musculoskeletal disorder.
PLID:	Prolapsed Lumber Intervertebral Disc.
SPSS:	Statistical Package of Social Science.
WRMD/WMSD:	Work Related Musculoskeletal Disorder.

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Abstract

Increasing evidence suggests that musculoskeletal disorders are common in workers in the health care industry. Many literatures suggest that dentists are at high risk of work related musculoskeletal disorder. So, the *objective* of this research was carried out to identify the prevalence of work related musculoskeletal disorders among dentists of Bangladesh. *Method:* The prospective quantitative research was carried out to accomplish the objective of the study. 40 participants among the dentists were selected as simple random sampling technique. The investigator used a mix of both structured and semi-structured questionnaire and participants were requested to give opinion based on the structure of the question. Data were numerically coded and put in both Excel and SPSS 16.0 version software program. Descriptive statistics was performed to obtain the result of the study. *Results:* The result of the study shows that n=32, (80.0%) participants have had Work Related Musculoskeletal Disorder (WRMD) and male shows greater prevalence n=21, (65.6%). The participants who were in between 30-37 years most commonly suffered from WRMD n=11, (34.4%). Greater prevalence of WRMD of dentists were n=9, (28.1%) who had body weight more than 75 kg. The duration of job experience have been played a vital role in development of WRMD. Dentists who had job experience in between 7-10 years n=10, (31.2%) most commonly suffered by the WRMD. Most frequent first experience of WRMD n=10, (31.2%) participants had job experience first 5 years of work. Most common symptom was pain n=20, (62.5%) and the most affected body part was neck n=18, (56.2%). N=12, 37.5% participants have repeated exposure that means participants had to perform same task repeatedly over a long period of time where as n=9, (28.2%) used to maintain awkward or cramped position. An initial diagnosis was performed among n=8, (25.0%) cases. The diagnosis of the disease reveals that positive cervical spondylosis n=6, (18.8%) and PLID n=2, (6.2%). Just n=8, (25.0%)

have taken physiotherapy treatment during their problem and n=7, (87.5%) have good improvement through Physiotherapy management. *Conclusion:* Work related musculoskeletal disorders represent a significant burden for dental profession. The high prevalence of musculoskeletal pain in the spine is a concern for the occupational health in dentists. In order to reduce spine problems, correct postural practices, relaxation interval sessions during work could be utilized. More research should now be undertaken on musculoskeletal problems in dentists, with an emphasis on larger sample sizes and response rate to be able to generalize the results and conclusions.

CHAPTER-I: INTRODUCTION

1.1Background

Prevalence of musculoskeletal disorders becomes increasingly common throughout the world during the past decades. Work related musculoskeletal disorders (WRMD) have deleterious effect that produce work related disability among the workers with considerable financial consequences due to workers compensation and medical expenses. Various work related factors have been identified as predisposing the disorders (Alexopoulos, Stathi and Charizani 2004).

Musculoskeletal disorders are the common hazard of the dental personnel. The musculoskeletal disorders are characterized by the presence of discomfort, disability or persistent pain in the joints, muscles, tendons and other soft parts. They are caused or aggravated by repeated movements and prolonged awkward or forced body postures (Samat et al. 2011).

Musculoskeletal disorders (MSD) are commonly affects the human support systems such as muscles, tendons, nerves, blood vessels, bones and joints. MSD can occur from a single event or repeated trauma. MSD are one of the most important occupational health problems for dental professionals, particularly dentists (Hayes, Cockrell and Smith 2008).

The dental professionals have high risk of neck and back problems due to the limited work area and impaired vision associated with the oral cavity. So the dentists have to assume stressful body positions to achieve good access and visibility inside the oral cavity due to these working restrictions. Moreover, dental procedures are usually long and require much more concentration during work. Pain located in the areas of the cervical and lumbar vertebrae have been stated the most common complains among the dental personnel. Generally the shape of the vertebral column, aging changes, weak muscles, postural practice, movements, lifting techniques, and mechanical stress have been identified as factors that contribute to neck and back pain (Al Wazzan et al. 2001).

Dentistry is a demanding profession requiring concentration, precision. Due to limited work area, dentists have to maintain very inflexible work posture. Usually most dentists work in a sitting position on the right side of the patient where the patient lies in a supine position and they usually have an assistant on the left side of the patient. So, studies have shown that dentists have a high risk of developing musculoskeletal disorders (Tezel et al. 2004).

Work-related musculoskeletal disorders, especially of the neck and upper extremities, are common among dentists, dental hygienists, and, to some extent, dental assistants. The disorders cause long periods of work disability and treatment is often necessary. As dental work, a vision-demanding precision task, thus it producing prolonged static work load for the neck, shoulders, and arms (Akesson et al. 1999).

Musculoskeletal disorders are common complaints that lead to a major impact on the health related quality of life as well as performance and productivity at work. Work related musculoskeletal disorders account for a large number of disabilities and worker compensation days in many countries (Wang et al. 2008).

Workload imposition is an important factor in the occurrence of musculoskeletal symptoms in general and specifically back pain among the working population .The life-time history of low back pain ranges from 51–80%. Throughout western society, low back pain among working population has increased dramatically. Studies note a higher incidence and prevalence of musculoskeletal symptoms and back pain among dentists than other occupational groups. Studies have reported a prevalence of 30 to 70 percent of musculoskeletal pain among dentists (Ratzon et al. 2000).

Most of the risk factors typically associated with musculoskeletal disorders (MSD) experienced in dentists, dental hygienists, and dental assistants, including force, repetition, and awkward and (particularly) static postures (Morse, Bruneau and Dussetschleger 2009).

Survey data on the health and function of dentists, largely from outside of the United States, showed the apprehension that dentists may be at an elevated risk of chronic injury and pain due to musculoskeletal exposures. Burke et al. reported that work

related hand problems in dentists were a primary reason for early retirement among British dentists. There have been a number of general alarms that the practice of dentistry carries high risks of disabling disease and injury and potential premature career loss due to static postures and prolonged and adverse arm and neck positions. In a study of Dutch dentists carrying disability insurance, 7% of dentists were observed to require extended sick leave, with 30% of this fraction remaining out of the workforce in excess of one year. The author estimated that at least 15% of claims were work related and concluded that 50% of dentists were likely to retire prematurely due to ill health. Several investigators have concluded that dentistry require ergonomic correction to prevent high risk of physical injury and entails exposure to physical and organizational risk factors (Cherniacka, Dussetschleger and Bjor 2008).

In developed countries, epidemiological studies have suggested that musculo-skeletal disorders are most prevalent and affect 20–40% of the adult population. The opinion, that a psychosocially and physically stressful work is a major cause of musculoskeletal disorders is supported by several studies. Occupations entailing long-standing static, monotonous, or repetitive movements (e.g., dentists, dental hygienists) are associated with development of early symptoms and disorders in the neck and shoulders. This indicates the positive effects of more movements and changes in posture at work. In the last decade's research on work-related stress and bodily tensions has been an intensive research area (Rolander and Bellner 2000).

All research studies or literature reviews, which have reported on the prevalence of musculoskeletal symptoms and or potential risk factors for this problem in dentists, literature suggests that the prevalence of general musculoskeletal pain ranges between 64% and 93%. The most prevalent regions for pain in dentists have been shown to be the back (36.3–60.1%) and neck (19.8–85%) (Hayes, Cockrell and Smith 2008).

The frequency of MSDs in the neck and shoulders has been documented in the literature (with varying consistency) among dental professionals. A 2001 review reported a range of 17–31% of general dentists and specialists with neck symptoms, based on 11 reviewed article. An updated review for neck symptoms found a range of 17–73% are dentists (Morse, Bruneau and Dussetschleger 2009).

Since the 1980's, studies have reported a high prevalence of back pain among dentists. During the survey of 432 dentists in Denmark, of them 90.4% were utilizing the sit-down operating technique, found that 60% suffered from pain in the neck and back. Another survey of 465 Toronto areas, Canadian dentists showed that 62.2% had suffered back and neck pain at sometime in their lives, while 36.3% were currently suffering from such problems. Seventy percent of dentists in this survey had never missed work because of their back problem and 62% of those who had backaches had missed less than one week. In a study in New South Wales, Australia, 59% of the dentists that participated in the study reported trunk pain during the previous month. A survey of dentists in Southern Thailand reported that 63.3% had experienced back pain. Dental auxiliaries also experience back problems (Al Wazzan et al. 2001).

1.2 Justification of the study

Prevalence of musculoskeletal disorders becomes increasingly common throughout the world during the past decades. Work-related musculoskeletal disorders are one of the most important occupational health problems for dental professionals. The disorders cause long periods of work disability and treatment is often necessary. From this study dentist will able to identify the risks that can control and review their activities. Dentists may provide proper recommendation for every single risk which will be helpful for them. Beside this it will help to established ergonomic guidelines for space, equipment, furniture and environmental conditions which are mandatory in the design of workplace. This study will also help to discover the lacking area of a dentists, especially about their posture before doing any activities. Beside this it will help to professional development which is mandatory for current situation. From this study researcher can identify the risky factors of the workplace which are harmful. So investigator can help them to teach and give proper education about the posture the condition and preventive methods. By this there will develop a good relationship with dentists and as well as other medical professionals, which is very important for MDT approach. And it will help to discover the role and importance of physiotherapy in every sector of Bangladesh.

Peter (2000) claimed that MSDs may cause a great deal of pain and suffering among afflicted workers. These are the most common lost time injuries and most costly occupational problems. Job activities that may cause MSDs span diverse workplaces and operations. MSDs may decrease productivity and the quality of products and services. Workers experiencing aches and pains on the job may not be able to do quality work.

Musculoskeletal disorders are the common hazards of the dental personnel are caused or aggravated by repeated movements and prolonged awkward or forced body postures (Samat et al. 2011).

Al Wazzan et al. (2001) claimed that common postural faults among dentists and dental auxiliaries are craning and or excessive bending and twisting of the neck, bending forward from the waist, elevation of the shoulders, and general bending or twisting of the back and neck.

1.3 Research Question

What is the prevalence of common work related musculoskeletal disorders among the dentists at two selected dental college hospitals?

1.4 Objectives of study

1.4.1 General objective

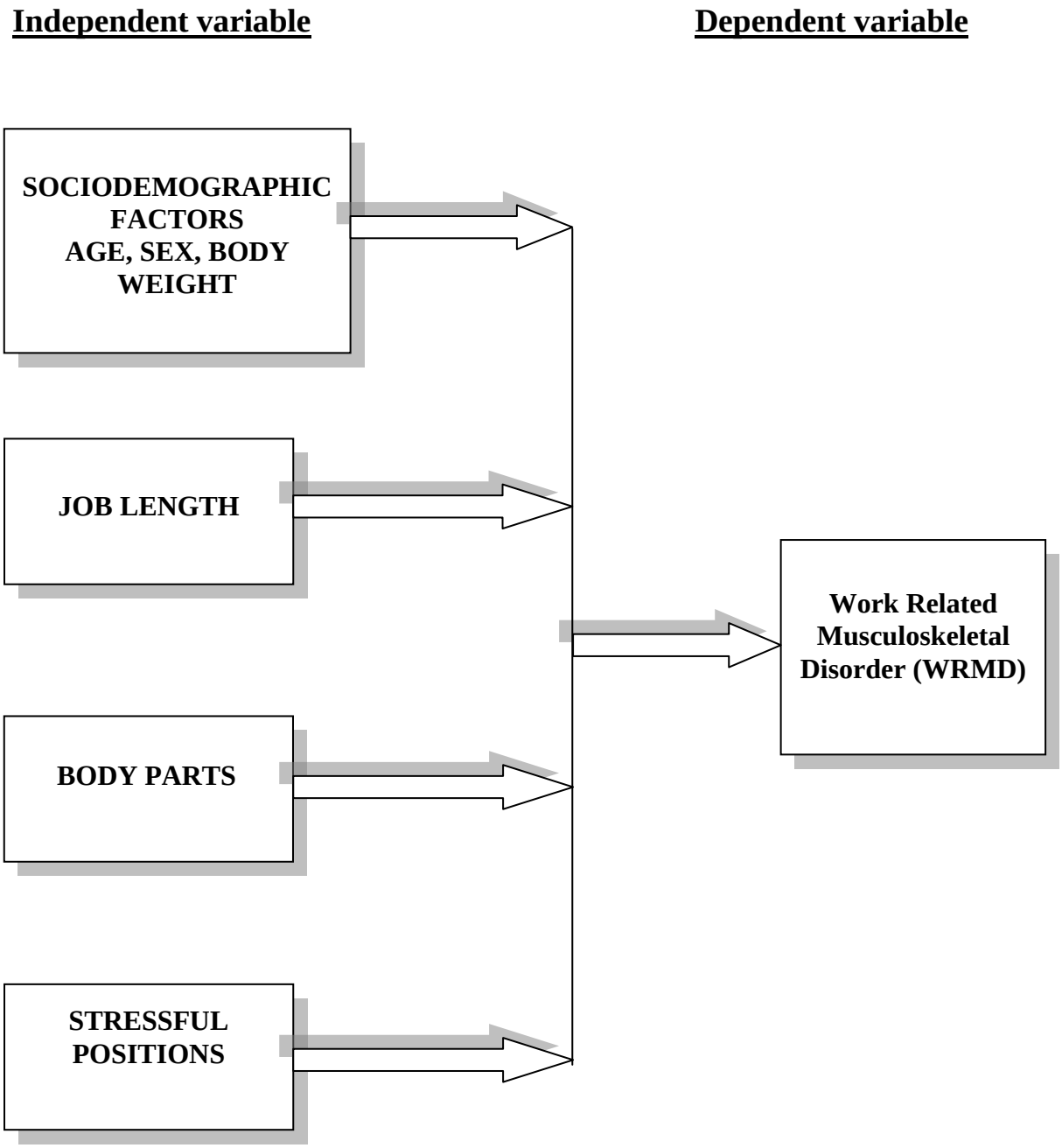
Identify the prevalence of work related musculoskeletal disorders among dentists at two selected dental college hospitals.

1.4.2 Specific objectives

1. To estimate the prevalence of musculoskeletal disorders among the dentists.
2. To identify the influencing demographic factors for such exposure group in relation to age, sex, weight and job length.

1.5 List of Variables

Conceptual Framework



1.6 Operational definition

Work related musculoskeletal disorder

Work-related musculoskeletal disorders (WRMD) are the disorders of muscles, tendons, ligaments and nerves that develops due to work related factors such as repetitive work or activities with awkward postures with symptoms of pain, aches, parasthesias, tingling , numbness and stiffness etc. Some examples of musculoskeletal disorders include back pain, neck pain, carpal tunnel syndrome, tendonitis and tenosynovitis etc.

Dentists

A person who is qualified to treat the disease and condition that affect the mouth, jaws, teeth, gums etc.

CHAPTER- II: LITERATURE REVIEW

Musculoskeletal disorders (MSDs)

Musculoskeletal injuries affect muscles, tendons, ligaments and nerves. These injuries can develop when the same muscles are used repeatedly or for a long time without taking time to rest. The chance of getting this type of injury increases if the force exerted is high and or the job required an awkward postures. Some examples of musculoskeletal disorders include back pain, neck pain, carpal tunnel syndrome, tendonitis and tenosynovitis (Department of Labor & Bureau of Labor Statistics 1992).

Other expressions used to describe MSDs include Repetitive Strain Injuries (RSIs), Work related musculoskeletal disorder (WRMD, Cumulative Trauma Disorders, Overuse Injuries, Repetitive Motion Disorders) (Peter 2000).

Musculoskeletal disorders are sometimes called ergonomic injuries and illnesses. Ergonomics is the study of the worker's interaction with tools, equipment, environment, jobs, tasks, work methods, work rates, and other systems. The federal Bureau of Labor Statistics (BLS) has defined musculoskeletal disorders (MSDs) as injuries and disorders to muscles, nerves, tendons, ligaments, joints, cartilage, and spinal discs. MSDs do not include injuries resulting from slips, trips, falls, or similar accidents. Examples of MSDs include many kinds of sprain and strain, carpal tunnel syndrome, tendinitis, sciatica, and low back pain. MSDs result from bodily reactions due to bending, climbing, crawling, reaching, or twisting, and from overexertion and repetitive motion (Maier & Ross-Mota 2000).

Medical terms used to describe MSDs to various parts of the body include low back pain, tendinitis, bursitis, carpal tunnel syndrome, epicondylitis, trigger finger, thoracic outlet syndrome, carpet layers knee and degenerative disc disease (Peter 2000).

Work-related musculoskeletal disorders

Work-related musculoskeletal disorders (WMSDs) are a group of painful disorders of muscles, tendons, and nerves. Work activities which are frequent and repetitive, or activities with awkward postures cause these disorders which may be painful during work or at rest (Canadian Centre for Occupational Health and Safety 2005).

Work-related musculoskeletal disorders (WMSD) are syndromes characterized by discomfort, impairment, disability, or persistent pains in joints, muscles, tendons or other soft tissues. They are the most common self-reported, work-related illness in many workplaces (Putz-Anderson 1988).

Factors that contribute to WRMD

Four different groups of factors may potentially contribute to MSDs:

--Physical or biomechanical work-related factors

--Organizational or psychosocial work-related factors

--Individual or personal factors

--Factors relating to social content (European Agency for Safety and Health at Work 1993).

Physical factors

Applying manual force loads the muscles and tendons of the arms .Repetitive work using the same muscles and tendons may be responsible for fatigue and injuries. In awkward postures the joints are more susceptible to injuries and the muscles have less capacity for exerting force. Expose the hands to vibration and contribute to potential disruption to the blood circulation in the fingers and to the nerves of the hand and arm. Workers who have long-term static postures this type of repeated static posture can give rise to injuries, particularly when repeated for months or years. Prolonged standing may result in fatigue and discomfort in the legs. It can lead to the development of musculoskeletal disorders (e.g. painful feet and other foot problems) and varicose veins. Prolonged sitting requires the muscles to hold the trunk, neck and shoulders in a fixed position. This squeezes the blood vessels in the muscles, reducing the blood supply. An insufficient blood supply accelerates fatigue and makes the muscles prone to injury. Manual handling refers to the transfer, pushing, pulling and carrying of loads by one or more employees (European Agency for Safety and Health at Work 1993).

Organizational and psychosocial factors

Daily exposure to physical risk factors and insufficient rest or recovery time are among the principal organizational factors that can lead to MSDs**.**

Mental strain can cause muscular tension, and increase existing physical strain. Work conditions that may increase mental strain include Psychologically demanding activities, in which the workers are exposed to high levels of work stress, work pressure and mental demands, as a consequence for example of tight deadlines and low levels of autonomy and Activities in which there is little support from colleagues, supervisors and managers (European Agency for Safety and Health at Work 1993).

Individual factors

Individuals differ in their susceptibility to MSDs. Factors such as prior medical history, physical capacity and age are very important. Obesity, pregnancy, rheumatoid arthritis, acute trauma and endocrinological disorders are other examples of individual non-occupational factors that may affect the occurrence of MSDs (European Agency for Safety and Health at Work 1993).

Factors relating to social context

Social context provides some important non-work risk factors relating to MSDs. Some types of sport, leisure activities and housekeeping work at home can all increase susceptibility to MSDs. The relation between work activities and a particular musculoskeletal disorder is multi-factorial. This means that when different physical factors are present, coexisting with organizational factors (and also individual and social factors), a work situation may arise in which there is a high risk of developing MSDs (European Agency for Safety and Health at Work 1993).

Duration to develop WRMD

This is difficult to predict to measure the time to develop a WRMD. An employee may notice symptoms such as muscle, joint or tendon soreness within the first several weeks of a new job. Workers with pre- existing medical problems may be at higher risk of developing symptoms those healthy workers. Some disorders may take several years before symptoms are identified. Some employees may never develop a WRMD (Department of labor and industries 1997).

The length of daily working hours as a risk factor for the development of musculoskeletal complains was studied, it was found that some sample worked 8 hours/ day and few were worked 5 hours/ day. Working part time was shown to postpone the occurrence of sick leave due to musculoskeletal disorders by approximately half a year, there was no lasting effect on the reduction in working hours on sick leave due to shoulder- neck complaints, but a reduction in low back complaints was identified. It is suggested that any reorganization of work activities to counteract musculoskeletal injuries from repetitive work should aim to break up the muscular activity patterns over time periods considerably shorter than the 5 hours working /day of the part time workers in the present study (Meligrsted & Westgaard 1991).

Characteristics of WMSDs

Work related musculoskeletal injuries can take different forms. The onset and development these injuries of is still not well known. Many theories some complementary and other contradictory have attempted to explain the phenomenon and it is clear that the issue is still not fully understood. Despite the diversity of applications and mechanism involved, WMSDs show a certain number of similar characteristics (Simoneau, St-vincent & chicoine 1996).

WMSDs result from overuse

Although the onset mechanisms are not clearly established, it is generally agreed that the injuries result from overuse, beyond the body's recovery capacity. WMSDs occur because a structure is abused repetitively and is made to endure a work load that it cannot tolerate without negative consequences (Simoneau, St-vincent & chicoine 1996).

WMSDs develop gradually

WMSDs develop over time the process evolves gradually with repeated overuse with and insufficient recovery. The process may vary from well set in surreptitiously, with no apparent symptoms only to one day appear suddenly and develop rapidly. More often slight discomfort are felt, which worsen gradually until they lead to work stoppage. The disorder can only take few days to develop. But more often it stretches, out for weeks, months and even years (Simoneau, St-vincent & chicoine 1996).

WMSDs prevention can be very effective

WMSDs do not constitute a disease that can be contracted, but a process that develops over time. As WMSDs develop gradually therefore action can be taken before the process gets too far. If the overuse is stopped in time, the body can recover and the aliment can recede without leaving any trace. Complete recovery can possible, and prevention can be termed effective if it occurs early (Simoneau, St-vincent & chicoine 1996).

WMSDs have multiple causes

The starting point of WMSDs is overuse. But this overload generally steams from a combination of factors and not from one single cause. Be it repetition, posture or effort, no single risk factor is essential in and of itself. A very demanding effort made in a particularly bad posture can suffice to create musculoskeletal problems, even if the rate of repetition is very low. Conversely a less demanding tasks performed in a more or less adequate posture can cause damage if it is repeated thousands of times per day. Because of this multiple causes, prevention must often rely on a combination of solutions based on a good knowledge of the situation. And because the situation can be so diverse, a universal solution is also impossible (Simoneau, St-vincent & chicoine 1996).

Individual Factors Associated with Work-Related Musculoskeletal Disorders (MSDs)

Age

The prevalence of MSDs increases as people enter their working years. By the age of 35, most people have had their first episode of back pain. Musculoskeletal impairments are among the most prevalent and symptomatic health problems of middle and old age (Bruce & Bernard 1997).

Gender

Some studies have found a higher prevalence of some MSDs in wom. A male to female ratio of 1:3 was described for carpal tunnel syndrome (CTS) in a population study in which occupation was not evaluated (Bruce & Bernard 1997).

Smoking

Several papers have presented evidence that a positive smoking history is associated with low back pain, sciatica, or intervertebral herniated disc (Bruce & Bernard 1997).

Strength

Some epidemiologic support exists for the relationship between back injury and a mismatch of physical strength and job tasks (Bruce & Bernard 1997).

Anthropometry

Weight, height, body mass index (BMI), and obesity have all been identified in studies as potential risk factors for certain MSDs, especially CTS and lumbar disc herniation (Bruce & Bernard 1997).

Physical capacity

Presence of systemic illness like

Diabetes Mellitus**,** thyroid problems**,** kidney problems (Renal insufficiency, failure, stones, etc.), arthritis, high blood pressure, gout**,** Reynaud's phenomenon (European Agency for Safety and Health at Work 1993).

Sign and symptoms of MSD:

Pain, numbness, tingling, burning, cramping, stiffness, decreased range of motion, deformity, decreased grip strength and loss of muscle function (Office ergonomics n.d.).

What are the symptoms of Work related musculoskeletal disorder

According to Work-related Musculoskeletal Disorders (2005)-

Pain is the most common symptom associated with WMSDs. In some cases there may be joint stiffness, muscle tightness, redness and swelling of the affected area. Some workers may also experience sensations of "pins and needles," numbness, skin color changes, and decreased sweating of the hands.

WMSD may progress in stages from mild to severe.

Early stage: Aching and tiredness of the affected limb occur during the work shift but disappear at night and during days off work. No reduction of work performance. **Intermediate stage**: Aching and tiredness occur early in the work shift and persist at night. Reduced capacity for repetitive works.

Late stage: Aching, fatigue, and weakness persist at rest. Inability to sleep and to perform light duties.

Not everyone goes through these stages in the same way. In fact, it may be difficult to say exactly when one stage ends and the next begins. The first pain is a signal that the muscles and tendons should rest and recover. Otherwise, an injury can become longstanding, and sometimes, irreversible. The earlier people recognize symptoms, the quicker they should respond to them.

Commonly affected area and structure of work related musculoskeletal disorder

Shoulder Musculoskeletal Disorders: Evidence for Work-Related

Shoulder MSDs and their relationship to work risk factors have been reviewed by several authors attributed a majority of shoulder problems occurring in a variety of occupations to workplace exposure. (Kuorinka and Forcier 1995) looked specifically at shoulder tendinitis and stated that the epidemiologic literature is “most convincing” regarding work-relatedness, especially showing an increased risk for overhead and repetitive work.

Shoulder as work activities that involved cyclical flexion, extension, abduction, or rotation of the shoulder joint. Repetitiveness was defined in four different ways by observed the frequency of movements past pre-defined angles of shoulder flexion or abduction, number of pieces handled per time unit, short cycle time/repeated tasks within cycle and a descriptive characterization of repetitive work or repetitive arm movements.

Some of the studies that examined repetition as a risk factor for shoulder MSDs had several concurrent or interacting physical work load factors (Sakakibara et al. 1987).

Studies that examined force or forceful work or heavy loads to the shoulder, or described exposure as strenuous work involving the shoulder abduction, flexion, extension, or rotation that could generate loads to the shoulder region were also included (Toomingas 1992).

For the shoulder, a relaxed, neutral posture is one in which the arm hangs straight down by the side of the upper body. In one study, postures in which the included angle was equal to or greater than 45 degrees required substantial supraspinatus muscle activity, while deltoid muscle activity underwent a pronounced increase as the angle of shoulder flexion or abduction increased from 45 to 90 degrees (Herberts et al. 1984). As the arm is elevated, the space between the humeral head and the acromion narrows such that mechanical pressure on the supraspinatus tendon is greatest between 60 and 120 degrees of arm elevation (Levitz and Iannotti 1995). While there is a continuum of severity from an included angle of 30 degrees to a maximally abducted arm, postures with shoulder abduction or flexion past 60 degrees are considered awkward posture. In compare, when a joint is in an awkward posture, the muscles have less strength. So if they have to produce the same amount of force, the muscles will be working closer to their maximum level. Fatigue will occur more quickly, And an awkward posture lead to MSD (National institute of public safety and health 1997).

Elbow Musculoskeletal Disorders: Evidence for Work-Related

There is a relation between physical factor of repetition and elbow MSDs. Studies usually defined repetition, or repetitive work, for the elbow as work activities that involved cyclical flexion and extension of the elbow or cyclical pronation, supination, extension, and flexion of the wrist that generates loads to the elbow/forearm region. For review it is included in a study that is examined force or forceful work or heavy loads to the elbow or described exposure as strenuous work involving the forearm extensors or flexors, which could generate loads to the elbow/forearm region (Mintz & Fraga 1973).

Studies that addressed posture or examined workers in those activities or occupations that require repeated pronation and supination, flexion/ extension of the wrist, either singly or in combination with extension and flexion of the elbow have chance to being attacked by MSDs (Mintz & Fraga 1973).

Studies that addressed posture or examined workers in those activities or occupations that require repeated pronation and supination, flexion/ extension of the wrist, either singly or in combination with extension and flexion of the elbow have chance to being attacked by MSDs (National institute of public safety and health 1997).

Wrist Musculoskeletal Disorders: Evidence for Work-Related

Cyclical or repetitive work activities that involved either repetitive hand/finger or wrist movements such as hand gripping or wrist extension/flexion, ulnar/radial deviation, and supination or pronation may cause the MSDs. (Stevens et al. 1992).

Repetitive work is frequently performed in combination with external forces, and much of the epidemiologic literature has combined these two factors when determining association with CTS. There is evidence that force alone is associated with CTS. There is strong evidence that a combination of forceful hand/wrist exertion and repetitiveness are associated with CTS (Moore 1992).

Nineteen studies reported on the results of the association between repetition and CTS. Several studies quantitatively measured or observed and categorized repetitive hand and wrist movements in terms of: a) the frequency or duration of tasks pertaining to the hand/wrist, b) the ratio of work-time to recovery time, c) the percentage of the workday spent on repetitive activities, or d) the quantity of work performed in a given time (National institute of public safety and health, 1997).

Neck Musculoskeletal Disorders: Evidence for Work-Related

Studies generally address repetition as cyclical work activities that involved either: repetitive neck movements or repeated arm or shoulder motions that generate loads to the neck area (e.g., trapezius muscle). Most of the studies that examined repetition or repetitive work as a potential risk factor for neck or neck MSDs (Buckle et al. 2002).

Force or forceful work or heavy loads to the neck and neck/shoulder, or described exposure as strenuous work involving the upper extremity that generates loads to the trapezius muscles. Most of the studies that examined force or forceful work as a risk factor for neck/shoulder had several concurrent or interacting physical work load factors.

Neck or head postures, adverse or extreme head or neck postures, or static postures of the head and/or neck can caused work related musculoskeletal disorder (Moore 1992).

Back Musculoskeletal Disorders: Evidence for Work-Related

Heavy physical work has been defined as work that has high energy demands or requires some measure of physical strength. Some biomechanical studies interpret heavy work as jobs that impose large compressive forces on the spine (Marras et al.

1995). Heavy physical work appeared to include other potential risk factors for back disorder, particularly lifting and awkward postures.

Lifting is defined as moving or bringing something from a lower level to a higher one. The concept encompasses stresses resulting from work done in transferring objects from one plane to another as well as the effects of varying techniques of patient handling and transfer. Forceful movements include movement of objects in other ways, such as pulling, pushing, or other efforts. Several studies included in this review used indices of physical workload that combined lifting/forceful movements with other work-related risk factors (particularly heavy physical work and awkward postures). Some studies had definitions for lifting which include criteria for number of lifts per day or average amount of weight lifted (Nathan 1992).

Bending is defined as flexion of the trunk, usually in the forward or lateral direction. Twisting refers to trunk rotation or torsion. Awkward postures include non-neutral trunk postures (related to bending and twisting) in extreme positions or at extreme angles. Risk is likely related to speed or changes and degree or deviation from non-neutral position (Pope et al. 1984).

Static work postures include isometric positions where very little movement occurs, along with cramped or inactive postures that cause static loading on the muscles. In the studies reviewed, these included prolonged standing or sitting and sedentary work. In many cases, the exposure was defined subjectively and/or in combination with other work-related risk factors (National institute of public safety and health 1997).

Knee Musculoskeletal Disorder

Different studies show about 50% of workers have been or will be affected by knee pains and complaints will be more frequent as the population ages and careers will be longer. The increase in prevalence depends on mechanical or morphological causes as well as psychosocial state and work organization. Lesions of the meniscus, well known for a long time, seem to be stable in the statistics of Social Security as well as the hygroma; the use of knee-pads (overalls with built-in cushions) is strongly recommended while working in kneeling or squatting position. The squatting or kneeling position extended for longer than one hour a day, often recovering from these two positions (more than 30 times a day), lifting or carrying heavy loads, often climbing (around 30 times per day) stairs or ladders. These gestures and postures are unavoidable in some jobs; in those cases, advices given by the specialist of

occupational medicine and the ergonomist may improve or alter the habits of the worker or of his entire team (Part 2009).

Ankle and Foot Musculoskeletal disorder

Foot pain is very common, especially in women, owing to inappropriate footwear. Overuse, repetitive strain and minor, easily forgettable injuries may result in chronic foot and ankle pain (Balint et al. 2003).

Common work related musculoskeletal disorder

Tendinitis

Inflammation or irritation of a tendon, from repeated stressful movement's .Occurs most often in the flexor and extensor tendons of the fingers, thumb, forearm, elbow, shoulder or wrist (Bellingar n.d.).

Carpal Tunnel syndrome

Compression of the median nerve in the carpal tunnel of the wrist is caused by repeated bending and twisting of the wrist, especially when force is applied (Bellingar n.d.).

Tensoynovitis

Inflammation of tendons and/or tendon sheaths because of repetitive movements, often non-strenuous (Safety & Health Assessment & Research for Prevention 2001).

Tension neck syndrome

Irritation of the levator scapulae and trapezium, all muscles of the neck. Causes tightening of the muscles in the neck. Neck stiffness as well as headaches also presents. Headaches are often described as a pressure sensation around the head. Pain may build and intensify at the end of day (Safety & Health Assessment & Research for Prevention 2001).

Trigger finger

Inflammation of tendons and/or tendon sheaths of the fingers. Due to repetitive movements and griping too long, too tightly, or too frequently. Characterized by inability to move fingers smoothly, with or without pain (United Food and Commercial Workers International Union 2008).

Bursitis

Inflammation of the bursa (sack-like cavity) between skin and bone, or bone and tendon. Can occur at the knee, elbow, or shoulder due to kneeling, pressure at the elbow repetitive shoulder movements. Characterized by pain and swelling at the site of the injury (Safety & Health Assessment & Research for Prevention 2001).

Myofascial pain in the neck and upper back

Heavy feeling, aching pain, stiffness in upper back and neck, due to overhead activity of arms in extended position (Safety & Health Assessment & Research for Prevention 2001).

Cubital Tunnel Syndrome (Elbow/Ring and Little Fingers)

Compression of the ulnar nerve below the notch of the elbow. Often occurs in combination with medial epicondylitis. Excessive flexion of the elbow creating tension on the nerve (Bellingar n.d.).

De Quervain's Disease

De Quervain's disease is one of the most common tendon disorders of the hand. It develops when the tendons on the side of the wrist and at the base of the thumb become irritated from repetitive bending of the wrist. DeQuervain's Disease can usually be diagnosed by using a simple test this involves closing the fist around the thumb and bending the wrist towards the little finger. A person with this disorder will feel acute pain or tensing of the tendons on the side of the wrist (Safety & Health Assessment & Research for Prevention 2001).

Rotator cuff tendonitis

Rotator cuff tendinitis is the most common tendon disorder of the shoulder. Shoulder pain, Stiffness and also problem in reaching behind on upper back (Safety & Health Assessment & Research for Prevention 2001).

Thoracic Outlet Syndrome

This term issued to describe the condition caused by the pinching or squeezing of the nerves and blood vessels between the neck and shoulder. This can happen when work tasks require frequent reaching above the shoulder (Safety & Health Assessment & Research for Prevention 2001).

Chronic low back pain

Pain in the low back, often referring into the hip, buttock or one leg. The cause may be muscle strains or trigger points, instability due to weak postural muscles, hypomobile spinal facet joints, or degeneration or herniation of spinal disks (Quittan 2002).

Role of physiotherapy to decrease work related musculoskeletal disorder

Physical therapy can reduce the recurrence of back pain and neck-shoulder Pain. In order to be effective, however, the exercise should include vigorous exercise. And be repeated at least three times a week (Podniece 2008).

Physical Therapist assesses an individual's physical ability to do a specific job or activity and aids in developing a safe return to work program (Occupational health solution 2008).

All exercises should be performed slowly and comfortably to avoid injury. When performing strengthening and flexibility exercises, remember to breathe naturally and do NOT hold your breath; exhale during exertion and inhale during relaxation.

A program of strengthening, stretching, and aerobic exercises will improve your overall fitness level. Research has shown that people who are physically fit are more resistant to back injuries and pain and recover quicker when they do have injuries than those who are less physically fit (Spineuniverse 2011).

Strengthening Exercise

Strengthening exercises help increase muscle tone and improve the quality of muscles. Muscle strength and endurance provide energy and a feeling of wellness to help you perform daily, routine activities.

Adequate core strength that comes from abdominal and back muscles helps stabilize the spine, allows proper spinal movement, and makes it easier to maintain correct posture. Strong hip and leg muscles are important to perform proper lifting techniques and body mechanics (Spineuniverse 2011).

Stretching/Flexibility Exercise

Flexibility is the ability to move arms and legs through their full range of motion. Stretching will help improve your flexibility.

Adequate flexibility of tissues around the spine and pelvis allows full, normal spinal movement, prevents abnormal force on the joints and decreases the possibility of injury. Stretching also prepares muscles for activity; stretching should be done both before and after each vigorous workout to prevent muscle strain and soreness and to help avoid injuries.

When performing flexibility exercises, stretch as far as you can and hold the stretch for 10 seconds and then ease back. Each stretching exercise should be performed slowly in both directions, with no sudden jerking or bouncing. Bouncing is more likely to injure or strain a muscle or joint (Spineuniverse 2011).

Patient education - Ergonomic recommendations for minimizing the risks of back injuries focus on improving working posture and equipment design. These include:

Change Posture - Alternate between sitting and standing to reduce postural fatigue and maximize postural variety, which helps to reduce static muscle fatigue.

Use Support - When sitting or standing, don’t lean forwards or stoop in an unsupported posture for prolonged periods. If you are sitting, sit up straight or recline slightly in a chair with good back support, and use a good footrest if necessary. If you are standing for prolonged periods try to find something to help you lean against.

Safe reaching - Avoid having to reach awkwardly to equipment and work close to the patient. Keep the items used most frequently within a distance of about 20 inches (50 cm). Use assistants to help move equipment into this zone.

Maintain Neutral Postures- The optimal design of work provides tasks that can be per formed while maintaining a neutral range of postures. A neutral range of postures is not just one posture or position of a joint, but includes a range of postures where the muscles are at or near their resting length, and the joint is naturally aligned. Neutral ranges of postures are usually the most comfortable positions for our joints and can reduce the risk of injury (Ergonomics 2007).

Use Comfortable Equipment - Use equipment that isn't too heavy, that can be used without awkward upper body posture and that feels comfortable to use. Ergonomically designed equipment helps to minimize stresses on the upper extremities and the back.

Manage Time - Avoid long appointments where possible, or intersperse these with frequent short rest breaks in which you change posture and relax the upper extremities (Alan 2008).

If your job involves spending long periods of time sitting, focus on correcting postural imbalances. Sit straighter, gently draw those shoulders back, stand up and walk around more and seek advice on work ergonomics.

Stretch your tight neck, shoulder, chest, lower back and leg (hip flexor and hamstring) muscles.

Strengthen the weakened middle and lower trapezius and activate deep abdominal muscles.

Avoid traditional sit-ups, as they may shorten hip flexors and perpetuate postural problems.

Weight training should focus on balance and symmetry. Left to right, front to back and upper body to lower body, deep and superficial. Our body is made up of many tissues which act synergistically to balance us. Don't worsen this by strengthening already shorted muscles, such as the pectorals, possibly making lengthened muscles, like trapezoids, weaker (Heath and Matthew 2007).

CHAPTER-III: METHODOLOGY

3.1 Study design

This study aimed to find out the work related musculoskeletal disorders among the dentists. For this reason a quantitative research model in the form of a cross-sectional type survey in design is used. Cross-sectional study is selected because in this way it is possible to identifying a defined population at a particular point in time (Survey - method).Through the cross-sectional study easily comparing results among those of different ages, gender, or ethnicity. In other hand Quantitative research method helps to use a large number of participants and therefore collect the data objectively through this way data was reduced to numbers for statistical analysis in order to draw conclusion (Hicks 2000).

3.2 Study sites

The sites of my study are some selected hospital which is-

- Pioneer dental college hospitals
- Chittagong dental college hospitals

3.3 Study area

Musculoskeletal Conditions of the dentists.

3.4 Study population and sampling

Bailey (1997) claimed that a population is the total group or set of events to which hypothesis apply. The population shares a specific set of characteristics or criteria that have been established by the investigator. The criteria of study population are determined from a literature review and the goals for the study. All dentists of Bangladesh were considered as the study population. Bailey (1997) claimed that a sample is a subset of the population that has been selected to participate in the project. Sample should represent the population as closely as possible. For survey research, it is better to get as many subjects as possible with the consideration of the size of the ideal population (Bowling 1997). 40 samples were selected randomly from the

population for this study from Pioneer dental college hospitals and Chittagong dental college hospitals.

3.4.1 Sampling procedure of the study

Finding the appropriate number and type of people to take part in the study is called sampling (Hicks 2000). The researcher use simple random sampling procedure to collect the samples. Simple random sampling is a type of probability sampling in which the researcher consciously selects each and every number of the population has equal opportunity to be in the sample.

3.4.1 Inclusion criteria of the study

- Both male and female dentists will be selected- In this study, the investigator wanted to explore work related musculoskeletal disorders among the dentists.
- Subjects were selected from any private and government hospitals-Because this study focused on work related musculoskeletal disorders among the dentists.
- All age group are selected- as there is objective of the study to explore the relationship between age and work related musculoskeletal disorders, so samples are selected from all age group.
- Subject who are willing to participate in the study- Otherwise they will not give exact information that is helpful to the study.

3.4.2 Exclusion criteria of the study

Subjects who had major accident or major surgery in any part of the body-any major surgery or accident may caused pain or any discomfort in any part of the body which may not be WMRD. This can mislead the result of the study.

3.5 Sample size

Sampling procedure for cross sectional study done by following equation-

$$n = \left\{\frac{Z(1-\frac{\alpha}{2})}{d}\right\}^2 \times pq$$

Here,

$Z(1-\frac{\alpha}{2})$= 1.96

P= *0.78*

q= 1-p

d= 0.05

So the researcher aimed to focus his study by 263 samples following the calculation above initially. But as the study was done as a part of fourth professional academic research project and there were some limitations, so the researcher had to limit with 40 dentists as sample for this study.

3.6 Data collection method and tools

Data was collected through the face to face interview with participants and the researcher. Data was analyzed Microsoft office Excel 2007 using a SPSS 16 version software program. The tools that needed for the study were- Consent paper, questionnaire, paper, pen, file, calculator, computer, and printer.

In this study data were collected by both structured and semi structured mixed type questionnaire. Mixed type questionnaire include both open and close ended questions. Following that the investigator was gone to dentists to take permission if they are interested in this study or not. Firstly, the investigator introduced him and the research project as well its purpose. Then investigator met with individual subject to find out if they were interested in participating. For data collection, the investigator used only English type of questionnaire but easiest wording. On the other hand the Bengali version about disease condition might be difficult to understand than English. After that a date was fixed by the researcher to collect the questionnaire from the recipients.

3.7 Data analysis

The result of this survey was consisted of quantitative data. The collected data was illustrated with bar graphs. By this survey a lot of information was collected. All these results gave a basic idea about the work related musculoskeletal disorders among the dentists in Bangladesh. The results were calculated in percentages and descriptive statistics were presented, other statistical tests could not be used, as samples were small in number. Generally descriptive statistics are often used in conjunction

with survey methods. However the three most commonly used form of descriptive are: Measure of central tendency and Measure of dispersion, bar graph, histogram, pie chart and frequency polygon (Hicks 2000).

3.8 Informed Consent

The aims and objectives of this study should be informed to the subjects verbally.
The researcher gave the consent form to the subject and explained them. The subjects had the rights to withdraw themselves from the research at any times. It should be assured the participant that her name or address would not be used. The information of the subjects might be published in any normal presentation or seminar or writing but they would not be identified. The participant will also be informed or given notice that the research result would not be harmful for them. It would be kept confidential. The researcher is to ensuring the confidentiality of participants' information, sharing information only with the research supervisor. At any time the researcher will be available to answer any additional questions in regard to the study.

3.9 Ethical consideration

- The researcher has permission from the research supervisor, physiotherapy Department.
- The study was followed by WHO and BMRC guidelines.
- All the participants and authority will be informed about the purpose of the study, the process of the study and their written consent will be obtained.
- All the interviews will be taken in a confidential to maximize the participant's comfort and feelings of security.
- The researcher is to ensuring the confidentiality of participants' information, sharing information only with the research supervisor.

3.10Limitations

Though the expected sample size was 263 for this study but due to resource constrain researcher could manage just 40 samples which is very small to generalize the result for the wider population of the dentists. There are a no literatures about work related musculoskeletal disorders among the dentists in the perspective of Bangladesh so it is difficult to compare the study with the other research. The researcher was able to

collect data only from 2 selected dental colleges for a short period of time which will affect the result of the study to generalize for wider population. The questionnaire was developed only through searching sufficient literature but considering the context of the demography of the population a pilot study would substantial before developing questionnaire.

CHAPTER-IV: RESULT

The aim of my research is to explore the prevalence of work related musculoskeletal disorders among the dentists. Data were numerically coded and captured in Microsoft Excel to show the result, using an SPSS 16.0 version software program for analyze the data as descriptive statistics. The investigator collected the descriptive data and calculated as descriptive statistics as percentages and presented by using both pie and bar charts. 40 participants were chosen to estimate the prevalence of work related musculoskeletal disorders among the dentists.

Prevalence of WRMD

Analysis demonstrated that n=32, (80.00%) participants out of 40 participants have suffered from work related musculoskeletal disorder (WRMD). (Figure 1)

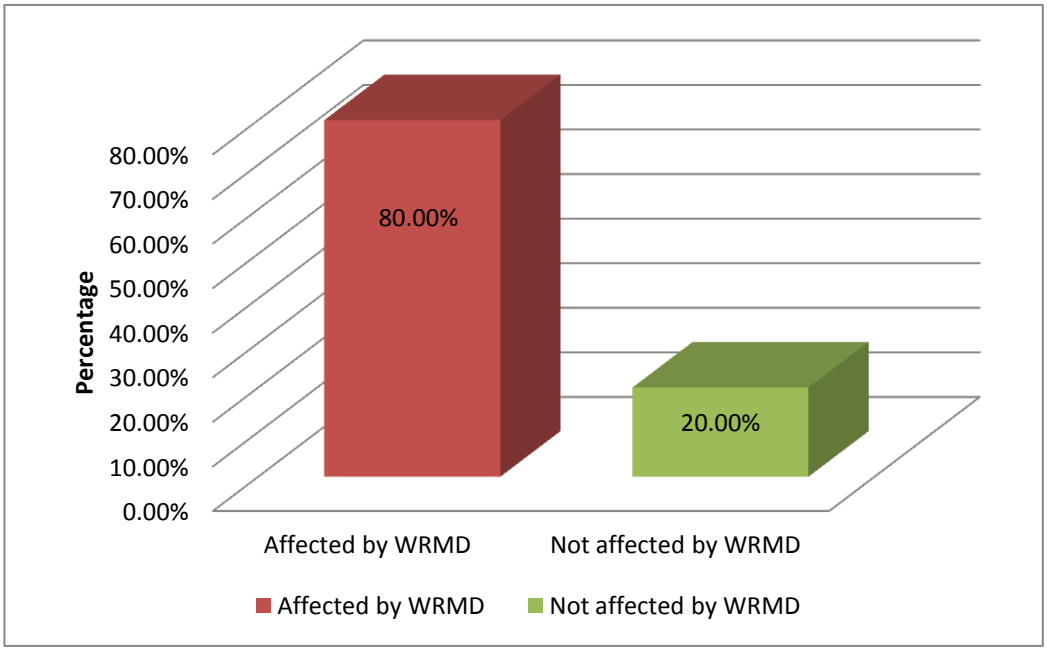


Figure 1: Prevalence of WRMD

Male and female ratio

Analysis showed that among the 40 participants 26 were male and 14 were female. And among the 32 participants who were suffered from WRMD n=21, (65.6%) were male and n=11, (34.4%) were female. (Figure 2)

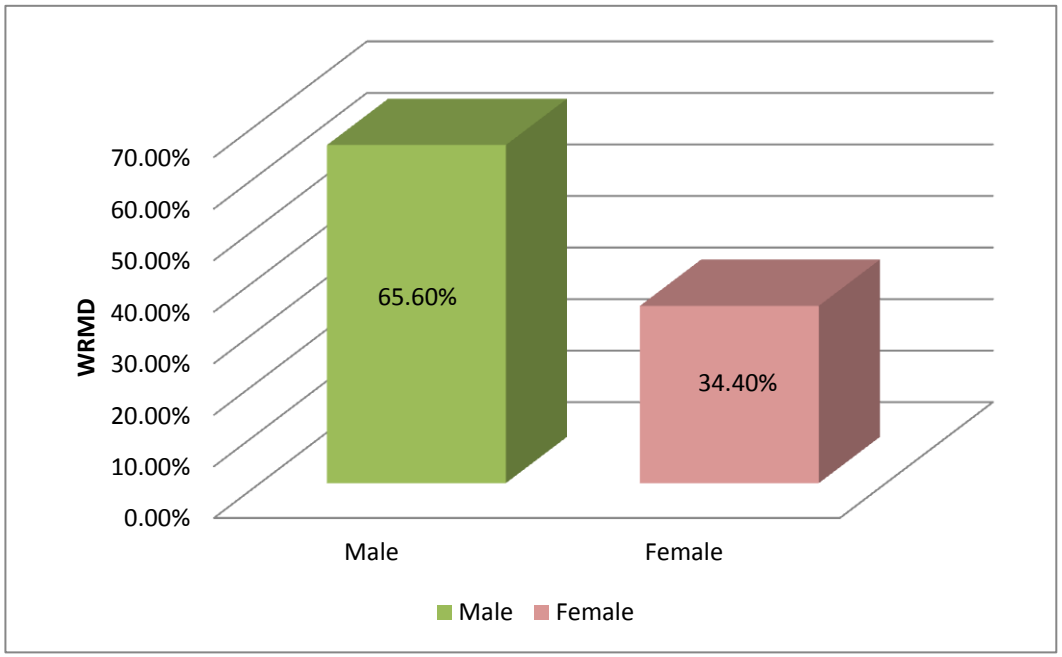


Figure 2: Male and female ratio

Age & WRMD relationship

Analysis reveals that among the 32 participants who have suffered from WRMD lowest age were 24 years and highest age was 61 years. Their mean age was 32.62 (SD ± 8.347) years and mean age of the unaffected group were 27.37 years (SD ± 4.241). Frequency of WRMD were n=6, (18.8%) participants in between 24-25 years, n=6, (18.8%) participants in between 26-29 years, n=11, (34.4%) participants in between 30-37 years and n=9, (28.1%) participants more than 38 years. (Figure 3)

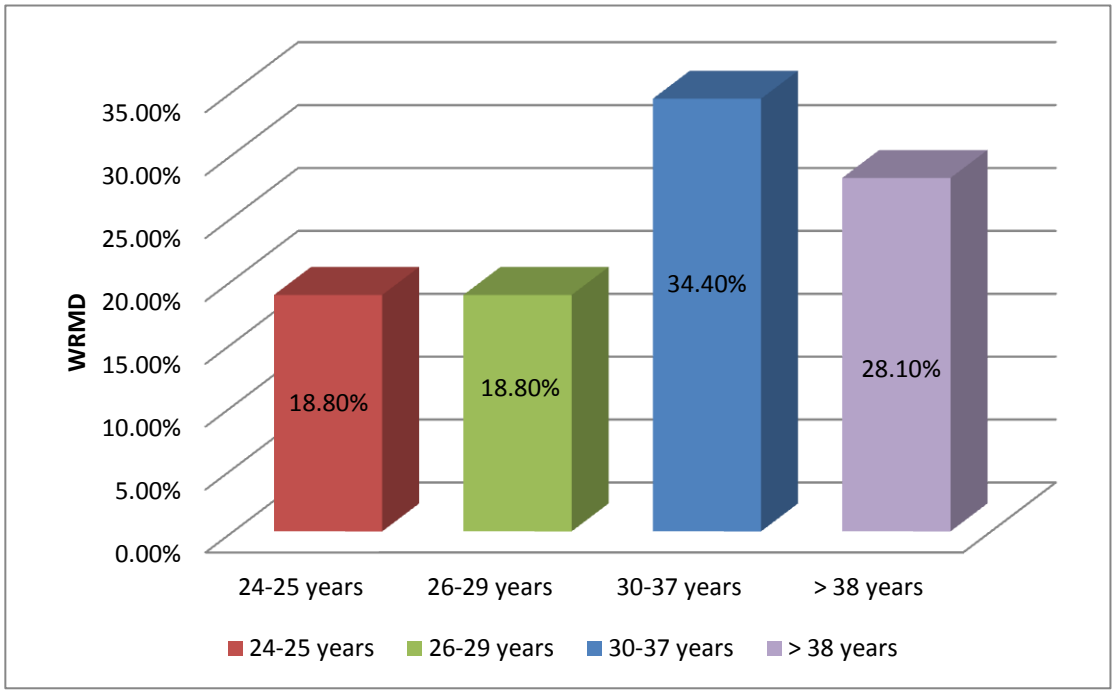


Figure 3: Age & WRMD relationship

Weight & WRMD relationship

Outcome demonstrated that among the participants the lowest weight was 54 kg and the highest weight was 103 kg. Mean weight of the affected group was 67.65 kg (SD ± 11.178) and the unaffected group was 65.12 kg (SD ± 7.180). Analysis showed that 32 participants out of 40 participants who have suffered from WRMD n=7, (21.9%) participants were in between 50kg – 59kg, n=8, (25.0%) were in between 60kg -65 kg, n=8, (25.0%) were in between 66 kg -74 kg and n=9, (28.1%) were more than 75 kg. (Figure 4)

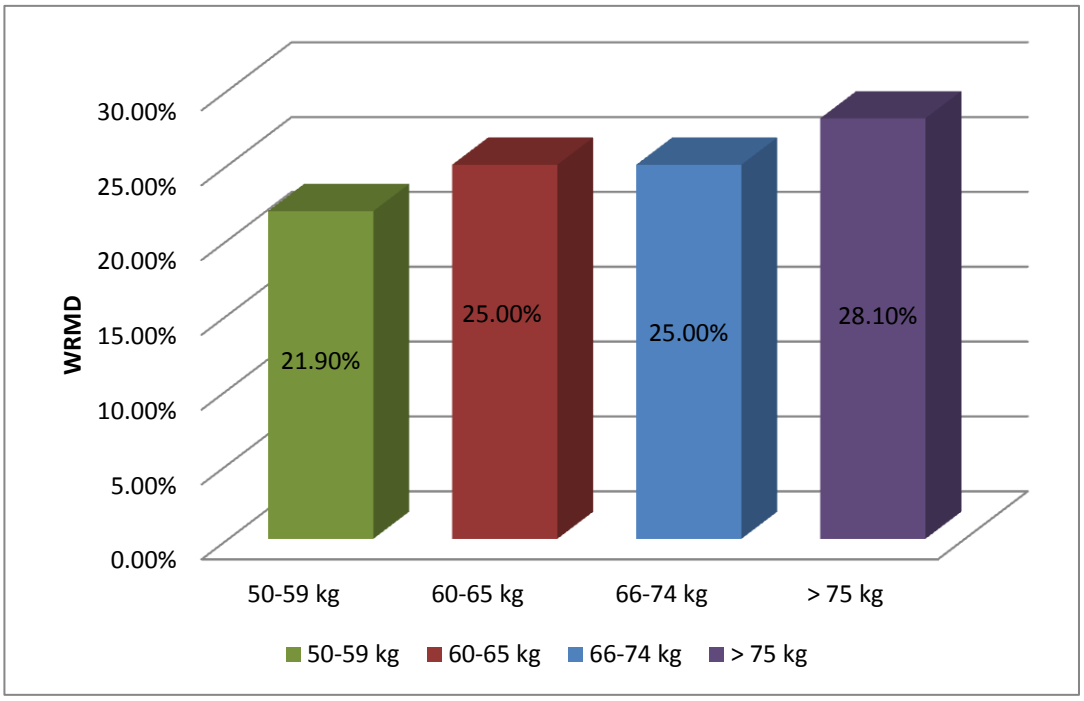


Figure 4: Weight & WRMD relationship

Job experience & WRMD

Outcome reveals that among the 32 participants out of 40 participants n=7, (21.9%) participants had job experience 1 year, n=7, (21.9%) participants 2-6 years, n=10, (31.2%) participants 7-10 years, n=8, (25.0%) were more than 11 years. Their mean job experiences were 7.58 years (SD ± 7.585). Mean job experience of the unaffected group was 3.25 years (SD ± 2.712). So most dentists suffered from WRMD were in between (7-10) years and more than 11 years. (Figure 5)

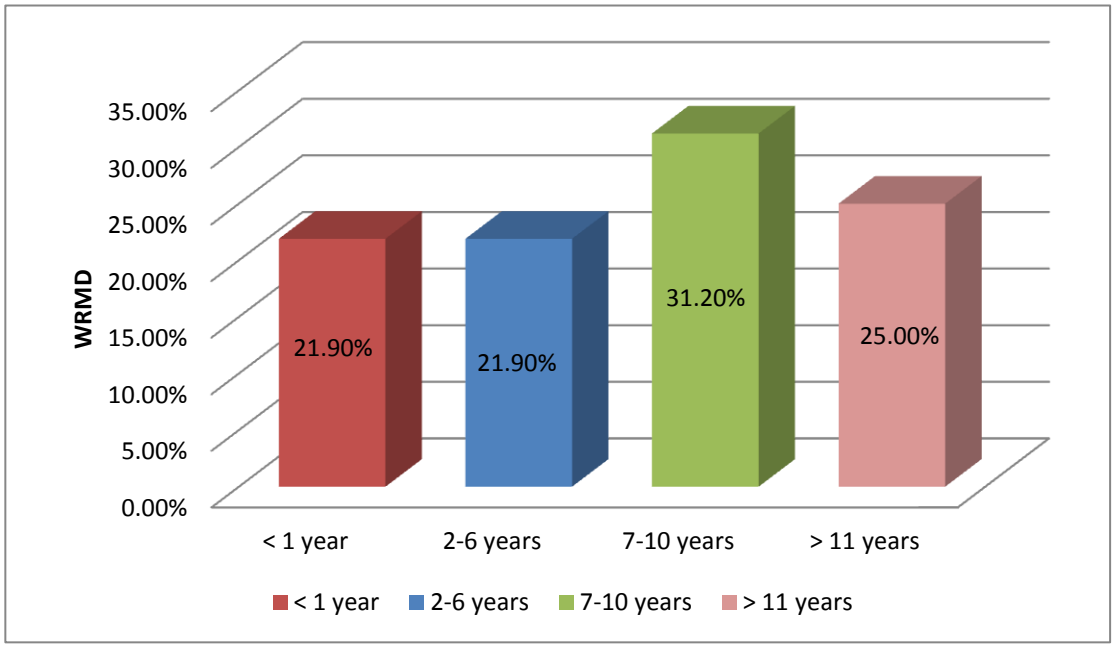


Figure 5: Job experience & WRMD relationship

First experience of WRMD

Analysis showed that among the 32 participants out of 40 participants who suffered from WRMD n=9, (28.1%) participants felt their WRMD in the first year of work, n=10, (31.2%) participants felt from first 5 years of work, n=4, (12.5%) participants felt in the 6-10 years of work and n=1, (3.1%) participant felt in more than15 years of job length. (Figure 6)

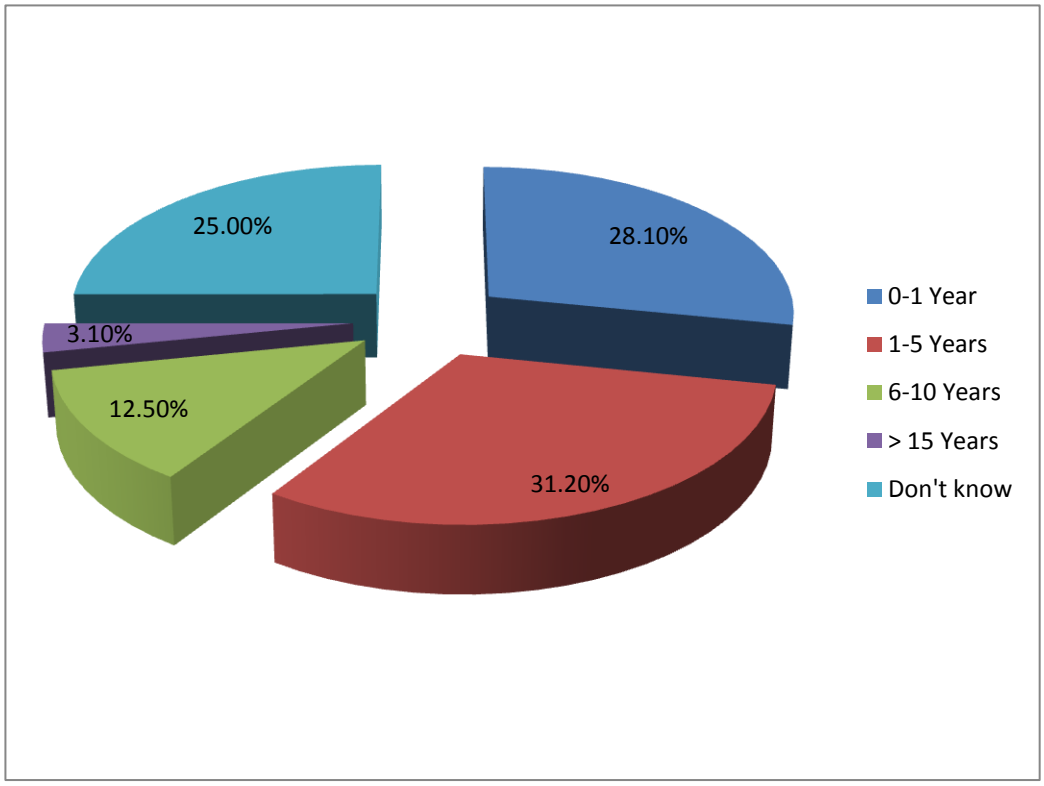


Figure 6: First experience of WRMD

Symptoms

Analysis demonstrated that 32 participants out of 40 participants who suffered from WRMD n=3, (9.4%) participants suffered from aching, n=5, (15.6%) participants have cramp, n=2, (6.2%) have numbness, n=1, (3.1%) has tingling, n=20, (62.5%) have pain, n=1, (3.1%) has stiffness. So most dentists suffered from WRMD symptoms was pain. (Figure 7)

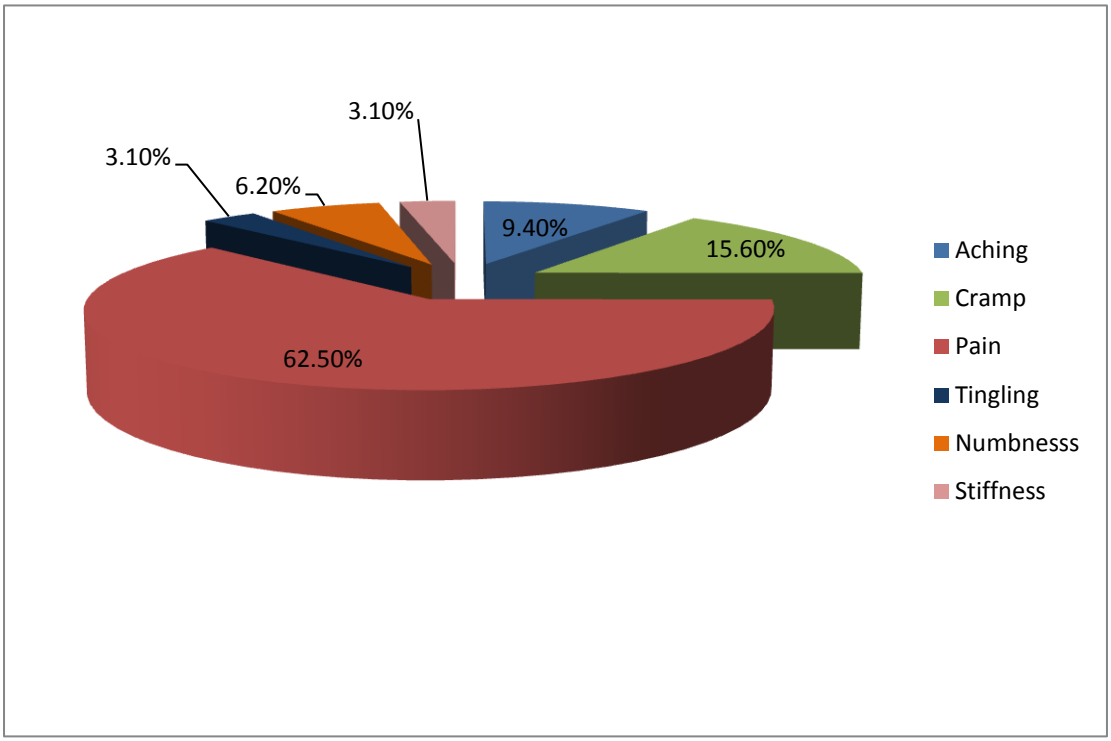


Figure 7: Symptoms of WRMD

Affected body parts

After analysis researcher found that among the 32 participants who suffered from WRMD most affected body parts were neck in n=7, (21.9%) participants, upper back in n=1, (3.1%) participant and lower back in n=12, (37.5%) participants, neck and shoulders n=5, (15.6%) participants, neck and low back in n=5, (15.6%) participants, neck and upper back n=1, (3.1%) participant. (Figure 8)

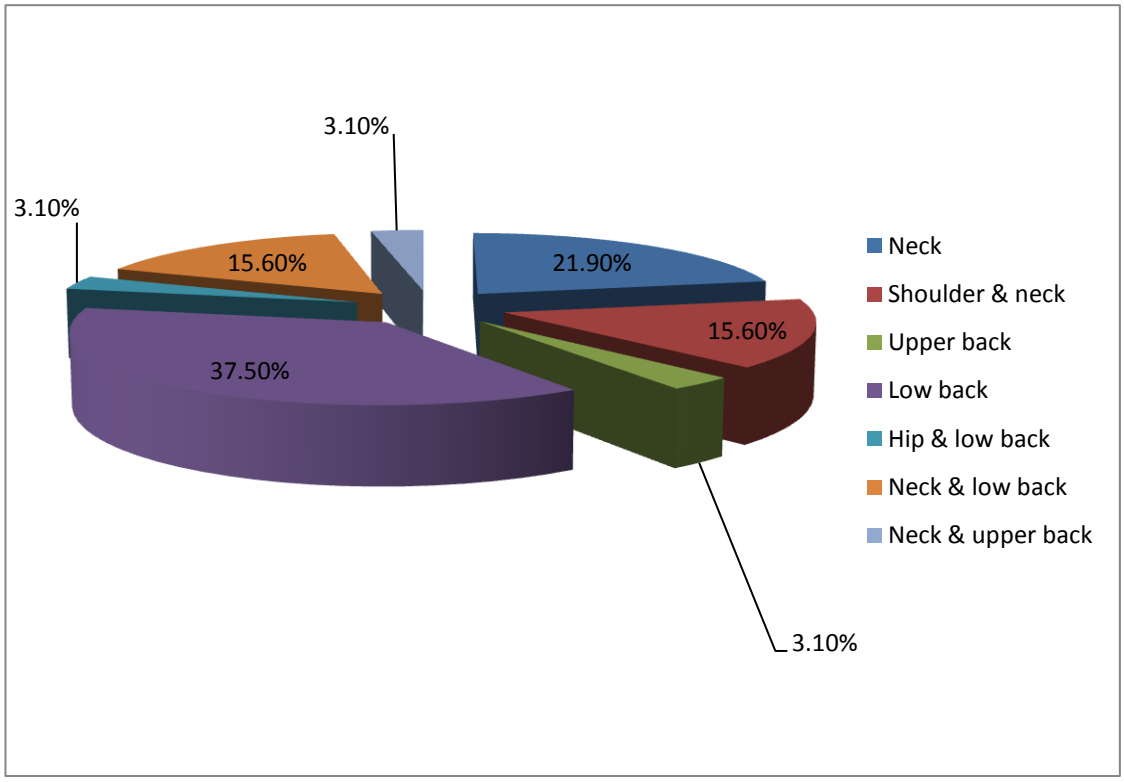


Figure 8: Affected body parts

Stressful positions

Analysis showed that among the 32 participants who had suffered from WRMD stressful positions were performing same task over and over for n=6, (18.8%) participants, working in awkward and cramped position for n=9, (28.2%) participants, working in the same position for long periods for n=12, (37.5%) participants, bending or twisting back or neck in an awkward way for n=4, (12.5%) participants, not enough rest during the day for n=1, (3.1%) participant . So most common risk factors were working in same position for a long period: (37.5%) and working in awkward or cramped position: (28.2%). (Figure 9)

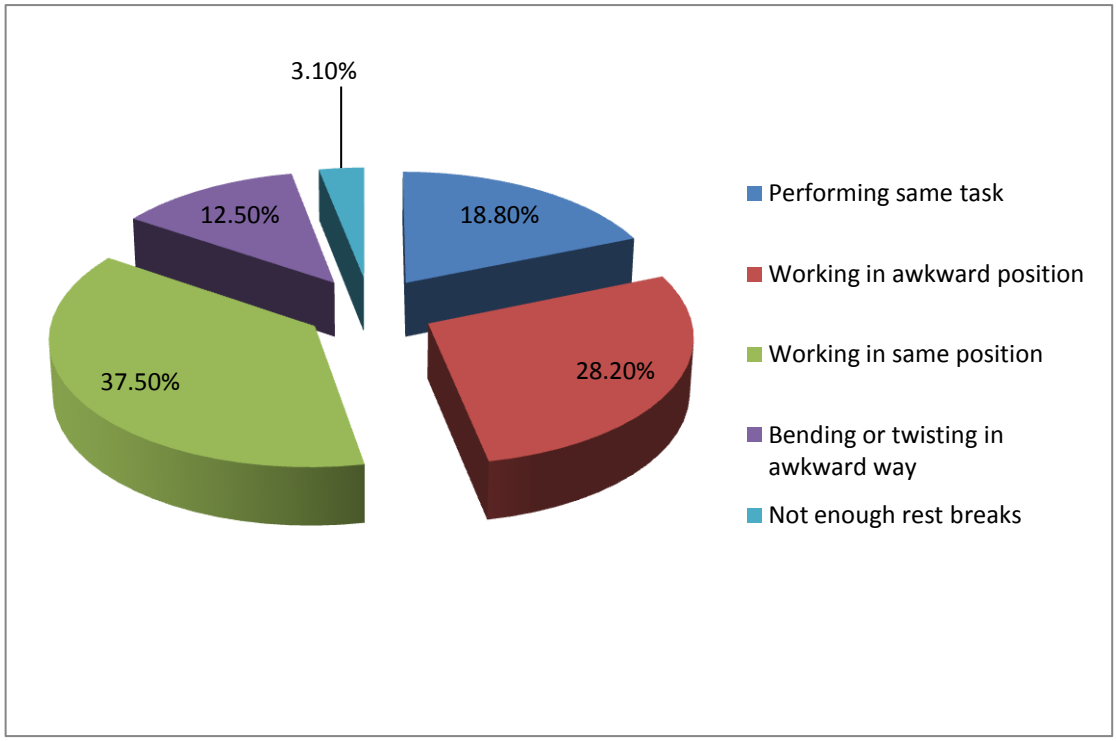


Figure 9: Stressful positions of WRMD

Severity of symptoms

Analysis demonstrated that n=14 (43.8%) participants have mild symptoms and n=18, (56.2%) participants have moderate symptoms out of 32 participants. (Figure 10)

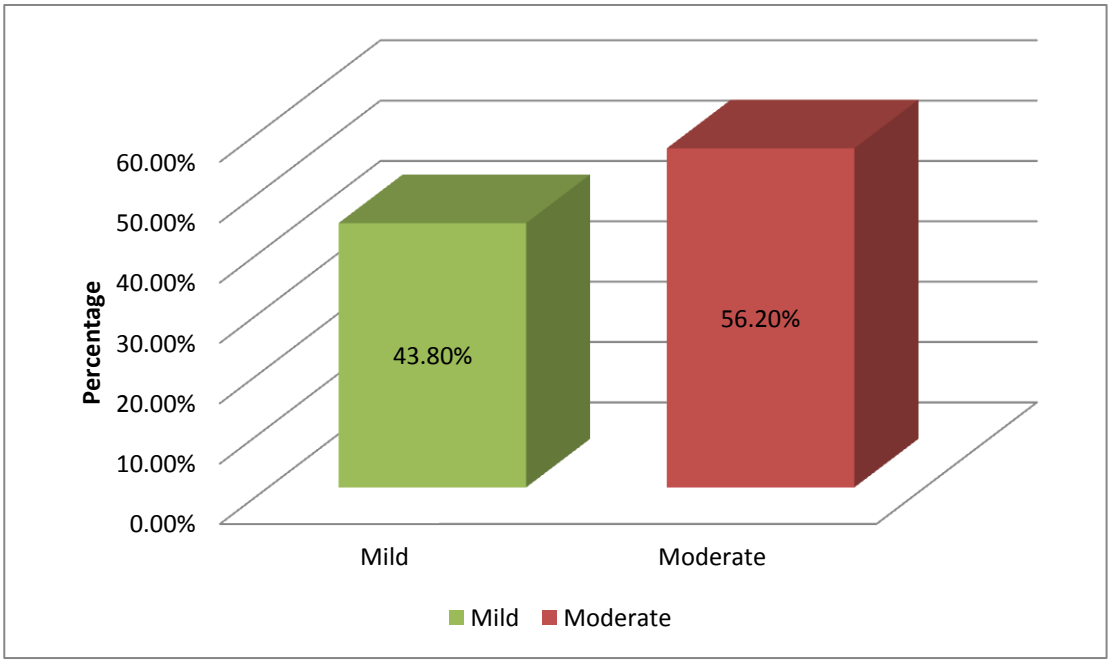


Figure 10: Severity of symptoms

Work interruption

Analysis showed that n=7, (21.9%) participants out of 32 participants had work interruption due to WRMD. (Figure 11)

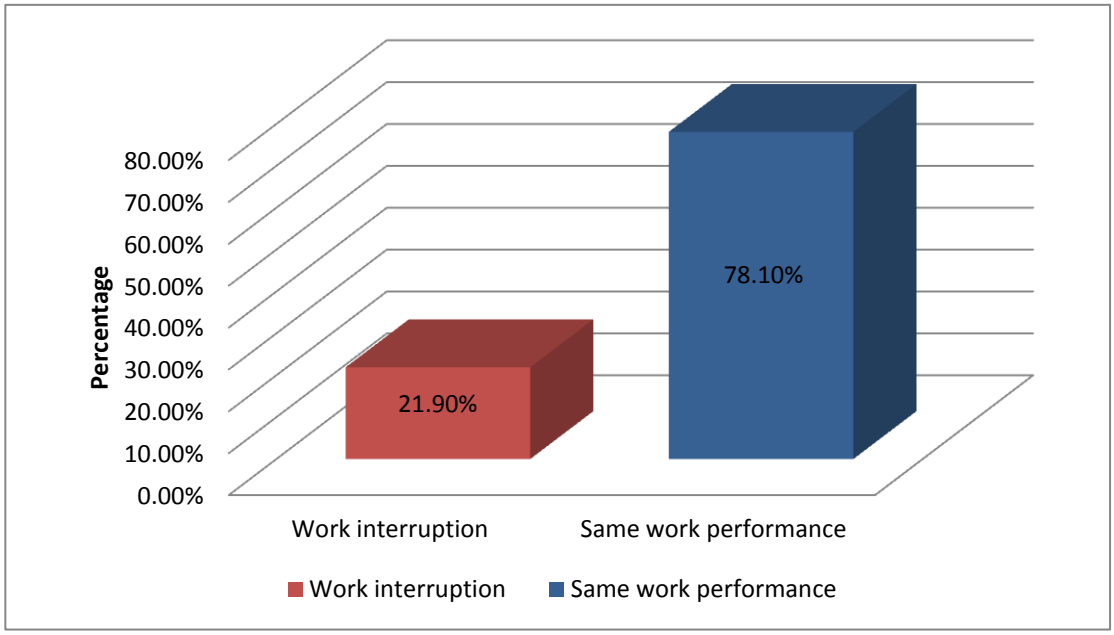


Figure 11: Work interruption

Reduce work performance

Outcome reveals that n=17 (53.1%) participants out of 32 participants working performance had reduced due to WRMD. (Figure 12)

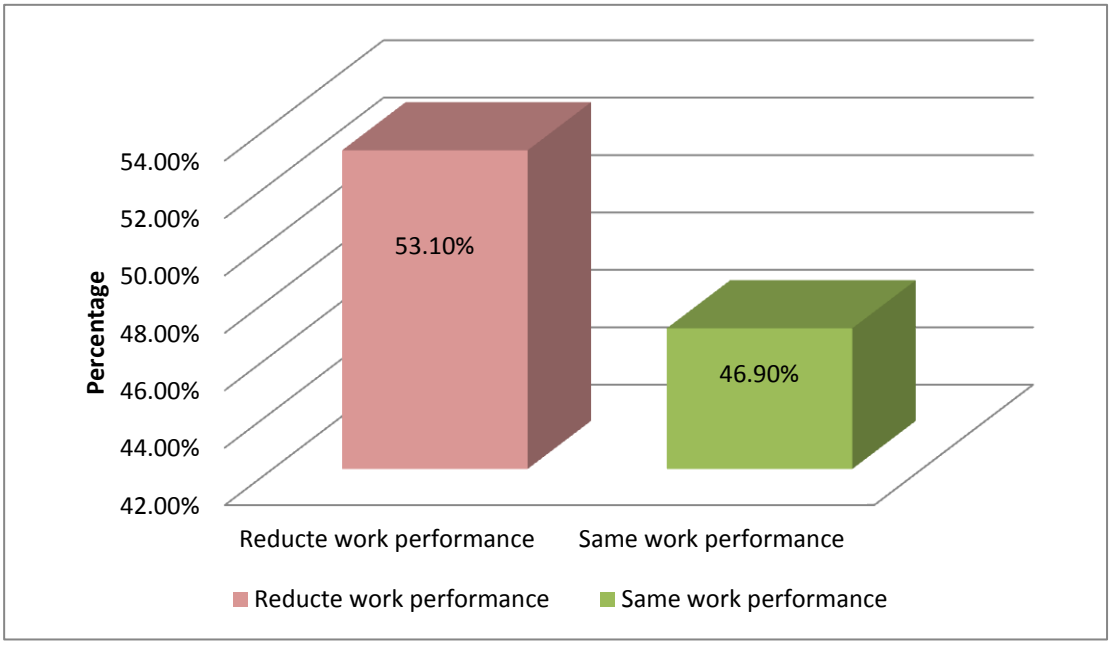


Figure 12: Reduce work performance

Diagnosis of condition

Analysis demonstrated that n=8, (25.0%) participants out of 32 participants had diagnosed their condition. (Figure 13)

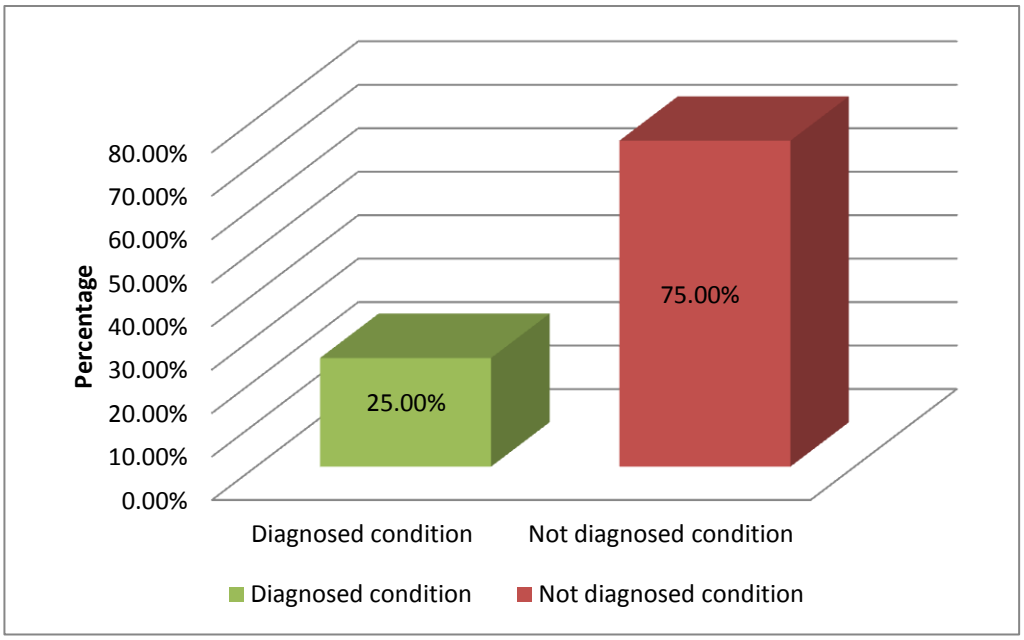


Figure 13: Diagnosis of condition

Disease condition

Analysis showed that among the 8 participants who diagnosed their condition n=6, (18.8%) were suffered from cervical spondylosis and n=2, (6.2%) suffered from prolapsed lumber intervertebral disc (PLID). (Figure 14)

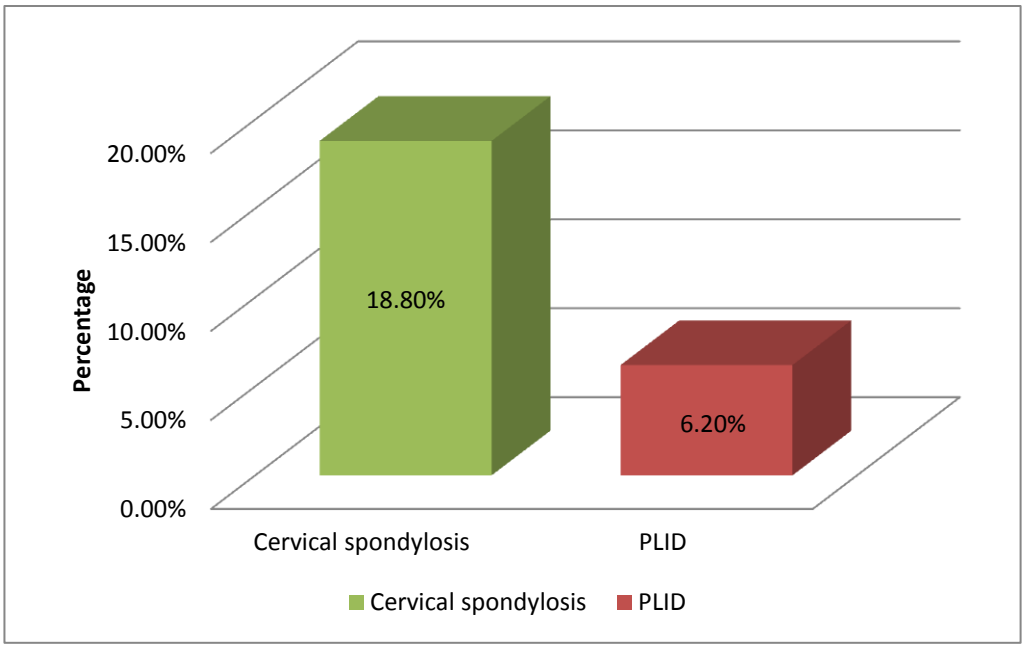


Figure 14: Disease condition

Receiving physiotherapy treatment

Analysis showed that among the 32 participants who have suffered from WRMD only n=8, (25.0%) participants have taken physiotherapy treatment for their condition. (Figure 15)

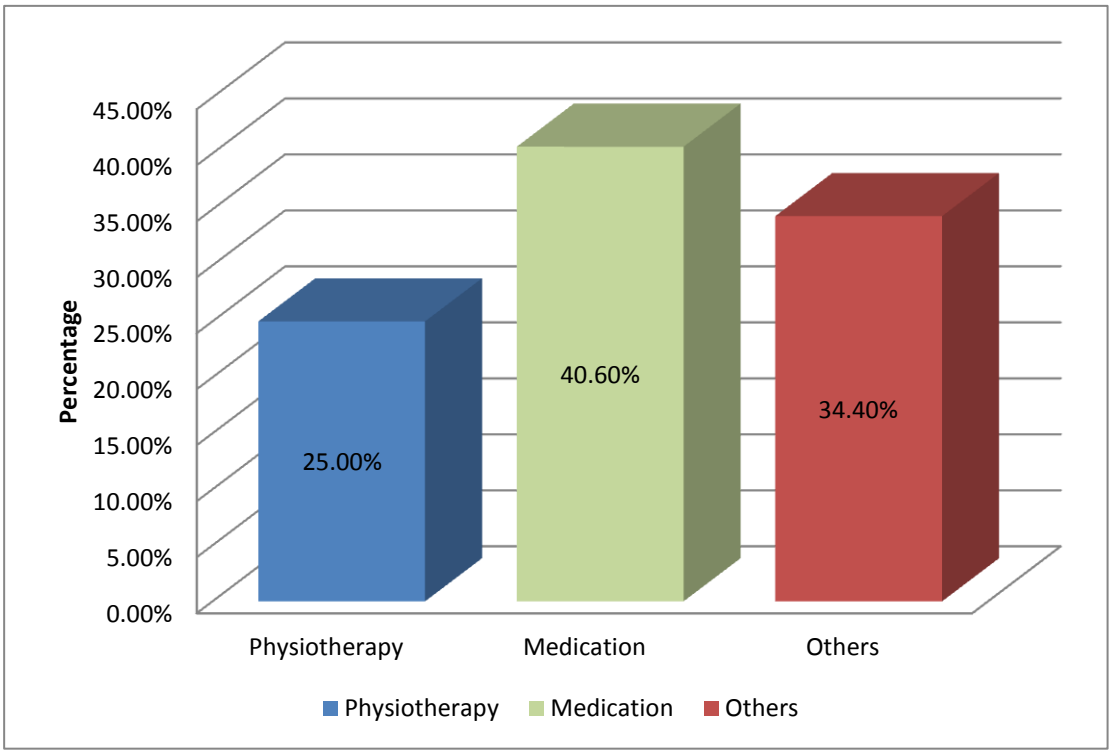


Figure 15: Receiving physiotherapy treatment

Treatment result

Among the 8 participants who have taken physiotherapy for their condition all of the participants have a good prognosis. The percentages of prognosis were improved in n=7, (87.5%), no result in n=1, 12.5% participants. (Figure 16)

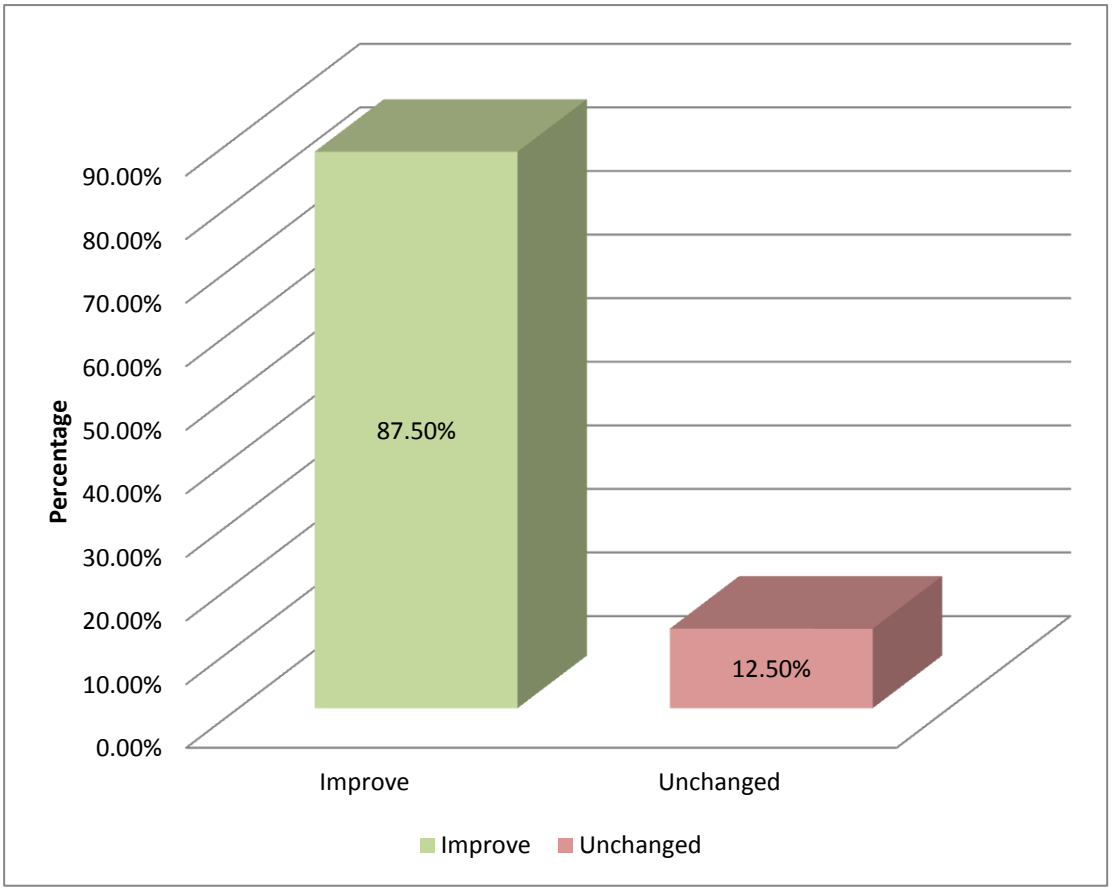


Figure 16: Treatment result

Hypothesis

Researcher had tried to focus association between age and WRMD, gender and WRMD, body weight and WRMD, job experience and WRMD. But the analysis did not show any significance among the variables. So the researcher failed to generate any hypothesis.

CHAPTER-V: DISCUSSION

This study examined the prevalence of work related musculoskeletal disorder (WRMD) among the dentists. This study found that more than three fourth (80%) suffered from WRMD. This result is comparable to Acharya et al. in 2010 at Nepal that (87.4%) reported having at least one MSD symptoms in the past 12 months. Hayes, Cockrell & Smith (2008) found that 64% dentists in had experienced New South Wales, Australia had experienced some type of pain in the last month. This result is comparable to study of dentists in southern Thailand 78% reported musculoskeletal pain in the previous 12-months period in a study of occupational health problems and a study of female dental personnel also found that 78% experienced musculoskeletal pain.

Near about two third (65.6%) male participants showed greater prevalence of WRMD. Literature says that men are more vulnerable to WRMD than female. In a research project that was published at 2009 by Adegoke et al. showed that 63.5% male and 36.5% female were suffered from WRMD at Nigeria. The statistics by Health and safety executive (2008) showed that male are more vulnerable to WRMD than and statistics is 2900 male in every 100000 males and 2400 females in every 100000 females. Female gender appears to be positively correlated with severity of musculoskeletal pain. This study is different from the study of T. Morse et al. at 2008 that in Thai female dentists experienced on average a higher pain severity in the shoulder region than their male counterparts. This is supported by the findings in a study of dentists from New South Wales, Australia where dentists who rated their pain severity at the highest ranking were more likely to be female.

Most frequent age ranges of participants (34.4%) have suffered from WRMD in between 30-37 years followed by (28.1%) participants more than 38 years. (Lotters et al. 2003) showed that 22% people in < 35 years old were affected by WRMD, in between 35-45 years 30% people were suffered from WRMD and in > 45 years old 48% people were suffered from WRMD. A statistics by (Health and safety executive, 2008) showed that the people in between 55-64 years are more suffered by WRMD. According to (Al Wazzan et al. 2001) among the dental team members, neck pain

increased with age. Younger dentists and dental auxiliaries suffered more from back pain more than their older counterparts, but these differences were not statistically significant.

Greater prevalence of WRMD for body weight 9 (28.1%) were more than 75 kg , followed by 8 (25.0%) were in between 60kg -65 kg, 8 (25.0%) were in between 66 kg -74 kg and 7 (21.9%) participants were in between 50kg – 59kg. A cross sectional study in Norway showed that obesity is associated with low back pain. It is also more common in males between the ages of 35 and 55 years old (Samat et al. 2007). European health and safety agency (2003) showed that obesity is one of the individual's risk factor for WRMD. Bork et al. (1996) suggested that prevalence of WRMD is related with body weight when treating a patient.

Musculoskeletal pain has been found to be a major health problem for dental practitioners and most affected body parts were neck in 7 (21.9%) participants, neck and shoulders 5 (15.6%) participants, neck and low back 5 (15.6%) participants, neck and upper back 1 (3.1%) participant, upper back in 1 (3.1%) participant and lower back in 12 (37.5%) participants. Several studies have reported about prevalence of musculoskeletal disorders (MSD) amongst dentists. In a survey of Danish dentists for example, 50% and 65% reported a one year prevalence of low back pain and neck/shoulder pain, respectively. A survey of dentists in Israel, similarly reported that 55% and 38% of them had experienced musculoskeletal symptoms in the lower back and neck, respectively. A study from New South Wales (NSW), Australia, found an even higher prevalence of MSD among dentists, with 82% reporting at least one musculoskeletal symptom in the past month and 64% reporting backache during the previous month. Similarly, a 12 month period prevalence of 54% for low back pain was recently reported amongst dentists in Queensland, Australia. A Saudi study, however, reported a slightly higher rate of MSD among their subjects (74%). The 12 month period-prevalence of neck-related pain among Queensland dentists (58%), was similar to that reported by dentists in many other countries, such as Denmark (65%) and Saudi Arabia (65%), but higher than a survey of Israeli dentists (38%). (Leggat et al. 2007)

More than one third (37.5%) of the participants who suffered from WRMD common stressful positions were working in same position for a long period followed by working in awkward or cramped position (28.1%). Babatunde (2008) showed in his research that among the all risk factor performing excessive surgery in one day (83.5%), working in same position for long period (71.3%), performing manual techniques (67.8%), working in awkward or cramped position (64.6%), bending or twisting back in awkward way (62.6%), not having enough rest break during the day (61.7%), continuing to work when injured (52.2%), performing same task over (52.2%) and inadequate training in injury prevention (29.6%). Palmer (2007) claimed that repetitive work, static loading are responsible for most of the WRMD. **Warren (2005) found in his research** the common risk factors were performing the same tasks over and over, working in the same position for long periods' and performing excessive surgery of patients in 1 day. The biomechanical risk factors in dental practice associated with musculoskeletal injuries have been identified as high prehension forces during instrumentation, repetitive use of small muscle groups, awkward and static postures, vibration from ultrasonic instruments and dental hand pieces, ill-fitting glove, and limited time for recovery (Finsen et al. 1998). A positive relationship between fixed postures and musculoskeletal disorders (including pain, weakness, and paraesthesia) has been documented for a number of occupations (Akesson et al. 2000).

Near about one fourth (21.9%) 7 of the participants had work interruption due to WRMD. Al wazzan et al. found in his research at Riyadh in 2001 that only 21.62% missed work due to neck pain and only 24.66% due to back pain. Leggat and Smith surveyed 285 Australian dentists more than one third (37.5%) requiring medical care for musculoskeletal disorder and 9% requiring extended leave from practice. Alexopoulos et al. also found a high prevalence of MSD problems that required medical attention or leave that is 10% of dentists for low back pain, 4% for hand or wrist and 3% for shoulder pain in Greek dentists in Thessaloniki. (Cherniacka, Dussetschleger and Bjor 2008)

Just only one fourth 8 (25.0%) participants who have suffered from WRMD have taken physiotherapy treatment for their condition. Leggat et al. (2007) said that 38% dentists seeking medical attention for MSD in the Queensland, which were very

similar (37%) dental personnel in Saudi Arabia. Alexopoulos, Stathi & Charizani (2004) found that one hundred thirty six dentists sought for medical care from orthopedists (60% in cases of back and shoulder complaints and 50% for neck and hand/wrist complaints) followed by physical therapists. On the other hand, they visited less than two times for any problem an orthopedist while they visited more than six times a physical therapist (10 times for shoulder complaints). In total they paid more than 800 visits mainly in physical therapists (503) and orthopedists (272).

CHAPTER-VI: CONCLUSION & RECOMMENDATION

6.1 Conclusion

Work related musculoskeletal disorders have great impact causing severe long term pain, physical disability and give rise to huge costs for the society. In the work place, the health care professionals are vulnerable to sustaining musculoskeletal disorders during the course of their work routine. For the fulfillment of this study the investigator used a quantitative research model in the form of a prospective type survey. Conveniently 40 participants among the dentists were collected from 2 dental college hospitals. The investigator used a questionnaire. Each Participant was given a questionnaire to identify the work related musculoskeletal disorders among them. And from the documents of the patients the researcher forms a data base for the total sample included in the study. From the data base, it was found that n=32**,** (80.0%) participants have had Work Related Musculoskeletal Disorder (WRMD) and male shows greater prevalence n=21%, (65.6%). The participants who were in between 30-37 years most commonly suffered from WRMD n=11, (34.4%). Greater prevalence of WRMD of dentists n=9, (28.1%) who had body weight more than 75 kg. The duration of job experience have been played a vital role in development of WRMD. Dentists who had job experience 7-10 years n=10, (31.2%) most commonly suffered by the WRMD. Most frequent first experience of WRMD n=10, (31.2%) participants had job experience first 5 years of work. Most common symptom was pain n=20, (62.5%) and the most affected body part was neck n=18, (56.2%). N=12, 37.5% participants have repeated exposure that means participants had to perform same task repeatedly over a long period of time where as n=9, (28.2%) used to maintain awkward or cramped position. An initial diagnosis was performed among n=8, (25.0%) cases. The diagnosis of the disease reveals that positive cervical spondylosis n=6, (18.8%) participants and PLID n=2, (6.2%) participants. Just n=8, (25.0%) have taken physiotherapy treatment during their problem and n=7, (87.5%) have good improvement through Physiotherapy management. In conclusion, work related musculoskeletal disorders represent a significant burden for dental profession. The high prevalence of musculoskeletal pain in the spine is a concern for the occupational health in dentists.

6.2 Recommendation

A recommendation evolves out of the context in which the study was conducted. The purpose of the study was to estimate the work related musculoskeletal disorders among the dentists. Though the research has some limitations but researcher identified some further step that might be taken for the better accomplishment of further research. For the ensuring of the generalization of the research it is recommended to investigate large sample. In this study researcher only took the dentists from 2 dental medical colleges to show the ratio of WRMD among the dentists and the possible risk factor for the WRMD according to participants view. But due to time limitation the investigator was not able to gather huge amount of participants and for this result cannot be generalized in all over the Bangladesh. So for further study it is strongly recommended to increase sample size to generalize the result in all of the dentists in Bangladesh. Beside this in this study the ratio of male and female participants were unequal. So it is recommended for further study to take the participants equally for comparison of gender and work related musculoskeletal disorders.

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APPENDIX-I

Consent Form

Research Title: "Prevalence of common work related musculoskeletal disorders among the dentists at selected dental college hospitals".

Dear Sir,

I am student of 4th year, B. Sc in physiotherapy at Bangladesh Health Professions Institute (BHPI) under medicine faculty of the Dhaka University, doing a research which is part of course curriculum. The aim of this study is to find out the prevalence of common work related musculoskeletal disorders (WRMD) among the dentists. The objectives of this study is to establish the prevalence of musculoskeletal disorder, the exposure group in relation to age, sex, weight, body fitness and job experience, the working area which causes more work related musculoskeletal disorder, first experience of WRMD, the presenting complains, the most affected body parts, risk factors that are considered as a problem and identify the necessity of physiotherapy treatment towards dentists.

The participation must be voluntary. You have the right to withdraw consent and discontinue participation at any time. You might be benefited or not, but in future may benefit and would not harmful. I am assuring you to give accurate information ensure confidentiality and will not personally identify this research. This project is only for the development of the profession. If you have any query about the study or your right as a participant, you may contact with, researcher Faruq Ibn Sadeq and/ or Md. Nasirul Islam, Assistant professor ,BHPI, CRP,Savar, Dhaka-1343.

I (participant) have read and understand the contents of the form. I agree to participant in the research without any force.

Do you have any questions before I start?

So may I have your consent to proceed with the interview?

Name of the participant: Signed: Date:

APPENDIX-II

Questionnaire to identify prevalence of common work related musculoskeletal disorders among the dentists.

Part- A: Personal details:

1. Name :
2. Age (as at last birthday) : _____
3. Weight (kg) : _____
4. Gender:

1. Male	2. Female

5. Job experience: _____

Part-B: Symptoms and risk identification

6. Have you ever experienced work-related musculoskeletal disorders in any part of your body?

1.Yes	2.No

7. What is the severity of your pain?

1. Mild	2. Moderate	3. Severe

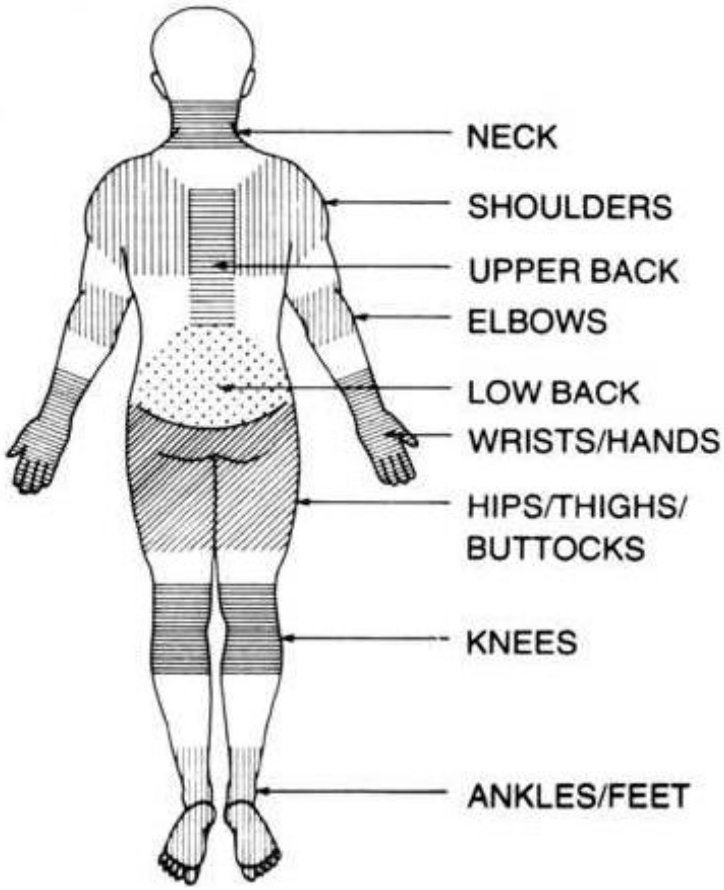
8. When did you first experience this work-related musculoskeletal disorder?

1. 0-1 year	2. 1-5 years	3. 5-15 years	4. >15 years	5. Don't know

9. What words best describe your symptoms? (Please give a tick on your answer)

1.Aching	2.Cramp	3.Pain	4.Tingling	5.Numbness	6.Stiffness

And please fill the body chart correctly:



10. Did you stay away from work because of pain?

1.Yes	2.No

11. Had your working performance reduced due to pain?

1.Yes	2.No

12. This list describes factors that could contribute to work related musculoskeletal disorder. In your opinion, how have the following factors contributed to your work related musculoskeletal disorder? (Please give a tick on your answer)

1. Performing the same task over and over	2. Working in awkward or cramped positions	3. Working in the same position for long periods
4.Repetitive movements of upper limb	5. Bending or twisting your neck in an awkward way	6. Not enough rest breaks during the day
7. Continuing to work when injured or hurt	8. Work scheduling (over time, irregular shift, length of workday)	9. Inadequate training in injury prevention

13. Describe any factor at work that seems to make your symptoms worse:

14. Had you referred to the physician or other health professional due to pain?

1.Yes	2.No

15. Have you ever diagnosed your condition?

1.Yes	2.No

16. If yes, what was the diagnosis?

_____

17. What kind of treatment did you receive?

1. Medication	2. Physiotherapy	3.Surgery	4. Others

18. If yes. Then what was the result?

1. Improve	2. Worse	3. Unchanged

Thank you sir for your assistance…..

APPENDIX-III

বাংলাদেশ হেলথ প্রফেশন্স ইনস্টিটিউট (বিএইচপিআই)
BANGLADESH HEALTH PROFESSIONS INSTITUTE (BHPI)
(The Academic Institute of CRP)

Ref: সিআরপি-বিএইচপিআই/ ৪৮৬১/০৯/১১ Date : ১৫.০৯.২০১১

বরাবর
অধ্যক্ষ
চট্টগ্রাম মেডিক্যাল কলেজ হাসপাতাল
চট্টগ্রাম।

বিষয় ঃ রিসার্চ প্রজেক্ট (dissertation) এর জন্য আপনার প্রতিষ্ঠান সফর ও তথ্য সংগ্রহ প্রসঙ্গে।

জনাব,

আপনার সদয় অবগতির জন্য জানাচ্ছি যে, পক্ষাঘাতগ্রস্থদের পুনর্বাসন কেন্দ্রে-সিআরপি'র প্রতিষ্ঠান বাংলাদেশ হেলথ্ প্রফেশনস্ ইনষ্টিটিউট (বিএইচপিআই) ঢাকা বিশ্ববিদ্যালয় অনুমোদিত বিএসসি ইন ফিজিওথেরাপী কোর্স পরিচালনা করে আসছে। উক্ত কোর্সের ছাত্রছাত্রীদের কোর্স কারিকুলামের অংশ হিসাবে বিভিন্ন বিষয়ের উপর রিসার্চ ও কোর্সওয়ার্ক করা বাধ্যতামুলক।

বিএইচপিআই'র ৪র্থ বর্ষ বিএসসি ইন ফিজিওথেরাপী কোর্সের ছাত্র ফারুক ইব্নে সাদেক তার রিসার্চ সংক্রান্ত কাজের তথ্য সংগ্রহের জন্য আপনার সুবিধামত সময়ে আপনার প্রতিষ্ঠানে সফর করতে আগ্রহী। তার রিসার্চ শিরোনাম "Prevalence of work related musculoskeletal disorder among the dentists at selected dental college hospitals."

তাই তাকে আপনার প্রতিষ্ঠান সফর এবং প্রয়োজনীয় তথ্য প্রদান সহ সার্বিক সহযোগীতা প্রদানের জন্য অনুরোধ করছি।

ধন্যবাদান্তে

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APPENDIX-IV

Logical framework

	May-June	July-August	Sep-Oct	Nov-Dec	January	February
Proposal submission	√					
Introduction and literature review	√					
Data collection		√				
Data analysis			√			
Result and discussion				√		
1st submission					√	
2nd submission						√
Final submission						√