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NECK PAIN AND ASSOCIATED FACTORS AMONG DENTAL PRACTITIONERS IN DHAKA CITY.

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ACRONYMS

BMI	Body Mass Index
BMRC	Bangladesh Medical Research Council
ERB	Ethical Review Board
MSD	Musculoskeletal Disorders
NPRS	Numeric Pain Rating Scale
RULA	Rapid Upper Limb Diagnostic
SCMST	SAIC College of Medical Science and Technology
SD	Standard Deviation
SPSS	Statistical Package for Social Science
VAS	Visual Analog Scale
WHO	World Health Organization
WMSDs	Work related Musculoskeletal Disorders

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ABSTRACT

Background: Neck pain is one of the most common work-related musculoskeletal disorders (WMSDs) among dental practitioners worldwide, often caused by prolonged static posture, awkward positioning, and cumulative occupational strain. Although global evidence highlights its burden, limited studies have been conducted in Bangladesh.**Objective:** This study aimed to determine the neck pain among dental practitioners in Dhaka and to identify socio-demographic and occupational factors associated with its severity.**Methodology:** Across-sectionalcomperative study was conducted among 103 dental practitioners practicing in Dhaka city. Data were collected through face-to-face interviews using a pretested structured questionnaire, and pain severity was measured using the Numeric Pain Rating Scale (NPRS). Descriptive statistics summarized socio-demographic and work-related characteristics, while Chi-square tests assessed associations between independent variables and pain severity.**Results:** The mean age of participants was 33.26 ± 8.73 years. Of the respondents, 48.5% reported neck pain, with most experiencing mild (60%) to moderate (39%) pain, and only 1% reporting severe pain. Sharp pain (51%) and throbbing pain (43.1%) were the most common forms. Significant associations were observed between pain severity and age ($p = 0.001$), treatment-seeking behavior ($p = 0.001$), and restriction of movement ($p = 0.001$). Other factors, including BMI, working experience, posture, gender, daily working hours, and weekly working days, were not statistically significant.**Conclusion:** Nearly half of the dental practitioners in Dhaka city reported neck pain, confirming it as a major occupational health concern. The findings suggest that age and functional limitations are the key predictors of severity, while workload duration and ergonomic variables showed no significant association in this sample. Preventive measures, early interventions, and accessible physiotherapy services are recommended to reduce the impact of neck pain on dental professionals.

Keywords: *Neck pain, Dental practitioners, Work-related musculoskeletal disorders, Ergonomics, Bangladesh.*

CHAPTER-I INTRODUCTION

Musculoskeletal disorders (MSDs) affect approximately 1.71 billion individuals globally, according to estimates by the World Health Organization (WHO). Within the field of dentistry, MSDs particularly neck pain represent a significant occupational health concern. These conditions have long been prevalent among dental professionals. A 1990 study revealed that 72 percent of dentists experienced pain in the head, shoulders, or neck, while a more recent 2018 study reported that 58.5 percent of dentists in Western countries suffered from neck pain, 56.4 percent from lower back pain, 43.1 percent from shoulder pain, and 41.1 percent from upper back pain (Kawtharani et al. 2023,p. 22).

Dentistry demands both physical endurance and cognitive precision. Dentists must maintain proper posture for extended periods, possess fine motor skills, and adapt to various clinical environments. Failure to do so can lead to occupational injuries or disabilities. Consequently, dentists are vulnerable to a range of work related health issues, including allergies, systemic conditions, hearing loss, and MSDs (Ijaz et al. 2016,p. 90).

Despite technological advancements in dental equipment, the prevalence of MSDs among dental professionals remains high. These disorders contribute to occupational stress, absenteeism, reduced productivity, and in some cases premature retirement. The economic impact includes lost income, rehabilitation expenses, and diminished efficiency. Work related MSDs (WMSDs) are primarily caused by sustained unilateral strain on muscles and joints, high unsupported arm positions, instrument vibration, and prolonged static postures during dental procedures (Younis et al. 2022,p. 115).
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. 2021, p. 73).

The dental field is a physically and intellectually taxing one. The physical attributes include the capacity to operate for lengthy periods of time with proper posture, hearing, visual quality, manual dexterity, and good psychomotor abilities. If the dentist is unable to adapt to a specific work environment, they may get an accident or become disabled. Because of this, dentists are susceptible to occupational illnesses and accidents, such as allergies, systemic disorders, hearing loss, and musculoskeletal issues (Ijaz et al. 2016,p. 90).

Despite technological advancements in dental equipment, the prevalence of MSDs among dental professionals remains high. These disorders contribute to occupational stress, absenteeism, reduced productivity, and in some cases premature retirement. The economic impact includes lost income, rehabilitation expenses, and diminished efficiency. Work related MSDs (WMSDs) are primarily caused by sustained unilateral strain on muscles and joints, high unsupported arm positions, instrument vibration, and prolonged static postures during dental procedures (Younis et al. 2022,p. 115).
MSDs encompass a range of symptoms such as pain, weakness, fatigue, burning sensations, tingling, numbness, and paresthesia. These symptoms often result from trauma that affects the musculoskeletal, circulatory, or nervous systems. Occupational MSDs typically arise from acute injuries such as slips, falls, or collisions or chronic overuse injuries caused by repetitive motions that lead to cumulative microtraumas (Astin et al. 2024,p. 17).

Globally, MSDs are among the leading causes of chronic pain and disability. Recognizing their impact, the United Nations and WHO supported the Bone and Joint Decade (2000 - 2010). Repetitive movements and sustained awkward postures are key contributors to these disorders, which manifest as persistent pain or impairment in soft tissues. Dentists are particularly susceptible due to occupational risk factors that can lead to conditions such as tendinitis, synovitis, tenosynovitis, and bursitis (Sultana et al. 2019, p.8).Over recent decades, the global prevalence of musculoskeletal disorders (MSDs) has risen markedly, becoming a leading cause of workplace disability. These conditions carry substantial financial implications due to medical expenses and workers' compensation claims. MSDs refer to injuries or disorders affecting the human support system including muscles, ligaments, tendons, nerves, blood vessels, bones, and joints and may arise from acute incidents or cumulative stress. Common

symptoms include pain and dysfunction in the neck, back, hands, and fingers. Occupational factors can exacerbate these conditions, leading to symptoms such as weakness, paresthesia, muscle ischemia, imbalances, necrosis, reduced joint mobility, and spinal disc degeneration or herniation (Abdolalizadeh et al. 2015,p. 23).Work related musculoskeletal disorders (WMSDs) are closely tied to occupational activities and are prevalent across both sedentary and physically demanding professions. Sedentary work typically involves prolonged sitting, occasional walking or standing, and minimal lifting. Ergonomic risk factors contributing to WMSDs include poor posture, repetitive movements, and extended periods of immobility. (Chaiklieng and Suggaravetsiri 2015, p. 49).

In Saudi Arabia, the dental profession has expanded significantly, with 5946 Saudi dentists representing 32 percent of the total practicing in 2015 (Mohrej et al. 2016,p. 27). Musculoskeletal pain is a major occupational health concern in dentistry, influenced by physiological and ergonomic factors such as awkward postures, repetitive movements, prolonged use of vibrating instruments, and extended patient interactions. Additional contributors include high body mass index (BMI), long working hours, and patient volume.Lower back and neck pain are common ailments that can affect individuals across all age groups. Often progressing from acute to chronic conditions, these disorders involve complex pathophysiology and neurological components, and are among the most frequent reasons for medical consultations (Samoladas et al. 2018,p. 63).

Dentists are particularly vulnerable to MSDs due to the physical demands of their work. Symptoms such as discomfort, neuromuscular inhibition, and muscular imbalance are frequently observed. Contributing factors include repetitive and awkward postures, forceful hand movements, suboptimal equipment or workspace design, and poorly structured work schedules. The nature of dental practice requiring precise hand movements, elevated unsupported arms, and high visual acuity further increases susceptibility (Abduljabbar 2018, p. 31).The constrained working environment of dentists, including limited range of motion and narrow visual fields within the oral cavity, often necessitates uncomfortable body positions to achieve adequate access and visibility. Dental procedures are typically time intensive and require sustained concentration, leading to prolonged static postures. Even under

optimal ergonomic conditions, vertebral joints experience minimal movement, and a significant proportion of muscles remain statically contracted (Chandra et al. 2015,p.18).Occupational hazards are prevalent across many professions, particularly in healthcare. Dentists face risks such as percutaneous injuries, chemical exposure, hearing loss, and WMSDs. Musculoskeletal pain encompasses discomfort in muscles, bones, ligaments, tendons, and nerves. WMSDs are defined as injuries to these structures caused by repetitive trauma, often accompanied by pain, stiffness, swelling, redness, and weakness (Younis et al. 2022,p. 115).

Dentistry demands high levels of precision and concentration. Essential capabilities include visual acuity, hearing, depth perception, psychomotor coordination, manual dexterity, and the ability to maintain proper posture over long durations. Any decline in these abilities can impair performance and productivity. Despite technological advancements, musculoskeletal issues remain a prominent concern in modern dental practice. These disorders marked by discomfort, disability, or chronic pain in joints (Sultana et al. 2017,p. 8).

In China, the dental workforce has grown rapidly, increasing practitioners in 2000 to over 120,000 by 2013. However, occupational health concerns in Chinese dentistry have received limited attention. While WMSDs are widely reported in other countries, data on their prevalence among Chinese dentists remain scarce. A study conducted in New Zealand found that, within one year, 57 percent of dentists experienced neck pain, 54 percent reported lower back pain, and 52 percent suffered from shoulder discomfort (Feng et al. 2015,p. 7).

1.2 Justificationof thisstudy:

Although numerous studies have explored musculoskeletal disorders (MSDs) affecting dental professionals globally, there remains a notable gap in research specifically addressing the causes of neck pain among dentists in Bangladesh. Dentistry is a profession that demands intense concentration and precision during patient care. Several occupational factorssuch as sustained neck flexion, arm abduction, and static postural alignmentmay predispose dentists to neck-related musculoskeletal issues. These biomechanical stressors can lead to discomfort and chronic pain during clinical procedures.

However, adopting proper ergonomic practices and maintaining optimal posture may help mitigate these risks.Recent findings suggest that approximately 15% of all soft tissue complaints encountered in general medical practice are related to neck pain, which is frequently referred for physiotherapeutic intervention. Given the limited awareness among dental professionals regarding the specific risk factors contributing to neck pain, this Study aims to fill a critical knowledge gap.

The primary objective of this research is to determine the prevalence of neck pain and identify the occupational and ergonomic risk factors associated with it among dental practitioners in Bangladesh. By analyzing these contributing variables, the Study seeks to provide actionable insights that can inform preventive strategies, reduce the incidence of neck pain, and minimize the economic and physical burden resulting from prolonged exposure to ergonomic hazards. This research will be the future evidence for the dentists in Bangladesh.

1.3 ResearchQuestion:

What’s the prevalence of neck pain and the factors associatedwithit among the dental practitioners in Dhaka city?

1.4 Objectiveofthestudy:

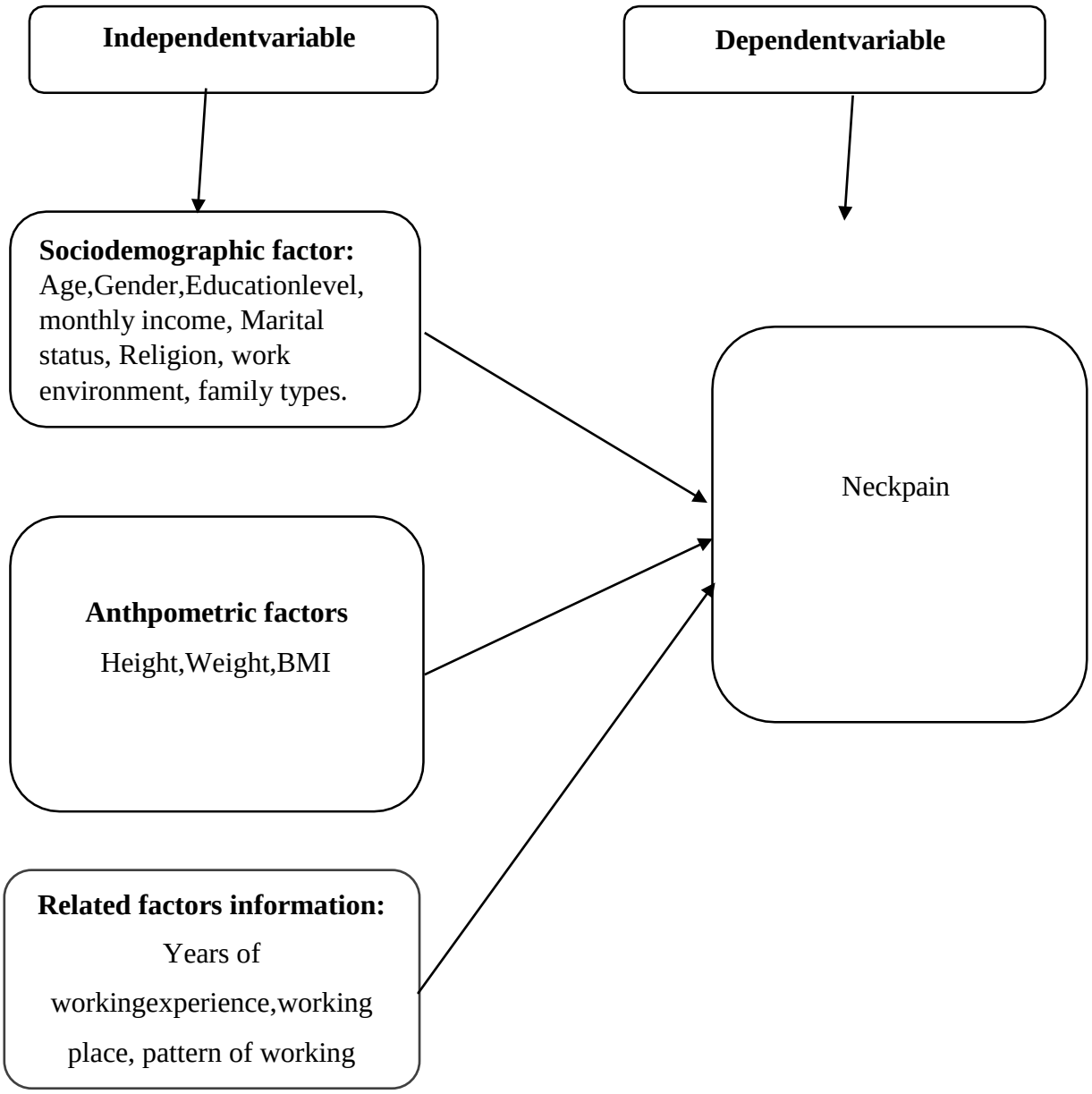
Generalobjectives:

- Toexploreneckpain andit's associated factorsamongdental practitionersinDhakacity.

Specificobjectives:

- Todescribe the socio-demographic characteristic of the participant.
- To calculate the percentage of dental practitioners having neck pain .
- To examine the association between posture and neck painamong dental practitioners in Dhaka city.
- Toassess the severityof neck painof thedentalpractitioners byusingNPRSscale.

1.5 Conceptualframework:



1.6 OperationalDefinition:

Neckpain: Neckpainisdiscomfortinanyofthestructuresintheneck.Theseinclude the muscles, nerves, bones (vertebrae), joints, and the discs between the bones.

Dentalpractitioner: Apersonwhoisqualifiedtotreatdiseasesandotherconditionsthataffectthe teeth and gums, especially the repair and extraction of teeth and the insertion of artificial ones.

NPRS Scale: The Numeric Pain RatingScale (NPRS) is a segmented numericversion of the visual analog scale (VAS) in which a respondent selects a whole number (0-10 integers) that best reflects the intensity of his/her pain.

BMI: Itis a standardized measurement of body fat based on a person's height and weight.

CHAPTER-II LITERATUREREVIEW

According to the World Health Organization (WHO), musculoskeletal disorders (MSDs) affect approximately 1.71 billion individuals worldwide, making them one of the most prevalent health concerns globally. Among dental professionals, MSDs particularly neck pain represent a significant occupational hazard. These issues have persisted over time and remain widespread. A 1990 survey revealed that 72 percent of dentists reported experiencing pain in the head, shoulders, or neck, either frequently or occasionally. More recent data from a 2018 study conducted in Western countries indicated that 58.5 percent of dental professionals experienced neck pain, 56.4 percent reported lower back pain, 43.1 percent had shoulder pain, and 41.1 percent suffered from upper back discomfort (Kawtharani et al. 2023,p.22).

MSDs are among the leading causes of chronic illness and disability, contributing to functional limitations and imposing substantial burdens on healthcare and social support systems. The musculoskeletal system comprising muscles, bones, joints, and connective tissues is structurally supported by the fascial system, which envelops and integrates skeletal components. Dysfunction within this complex network can lead to over 150 distinct pathological conditions, often manifesting as pain and temporary or permanent impairments in mobility and dexterity. These limitations significantly affect an individual's ability to work and participate in social activities (Greggi et al. 2024,p.3964).

Work related musculoskeletal disorders (WMSDs) are particularly prevalent among dental professionals and dental students, posing a serious occupational health risk. Studies indicate that up to 95.8 percent of dentists experience MSDs at some point in their careers. Alarmingly, the onset of these conditions often occurs during the early stages of professional training, with prevalence rates ranging from 44 percent to 93 percent. The nature of dental practice characterized by repetitive motions and sustained asymmetrical postures renders practitioners especially vulnerable. Among the affected regions, the neck is frequently cited as a site of significant physical strain in dentistry students (Almeida et al. 2024,p.45).

A recent meta analysis reported that dental students experience neck pain at rates ranging from 44 percent to 69 percent over a 12 month period (Almeida et al. 2024,p.45). Neck pain is a multifactorial condition influenced by an individual's functionalcapacity, physical activity level, psychological well being, and occupational habits. Notably, higher rates of neck pain have been documented in Asian populations compared to Western counterparts, suggesting that lifestyle, cultural, and ethnic factors may contribute to its prevalence. In low and middle income countries, the rising incidence of neck pain has negatively affected quality of life and placed additional strain on healthcare systems.Healthcare professionals are particularly vulnerable to neck pain throughout their careers. A comprehensive review of work related musculoskeletal disorders found that 35 to 45 percent of physicians, nurses, and midwives reported experiencing pain in the upper back, shoulders, and neck (Plaza Manzanoet al. 2024, p.1987). Musculoskeletal discomfort is one of the most significant threats to occupational health in the healthcare sector.

Dentistry, especially general practice, is among the professions with the highest risk for developing MSDs. The visual demands of dental procedures often require practitioners to maintain prolonged static postures, relying heavily on fine motor control of the hands and wrists. Additional contributing factors include inadequate lighting, age, genetic predisposition, physical fitness, and repetitive movements. The cumulative physiological stress caused by musculoskeletal pain has been associated with reduced productivity, increased absenteeism, and premature departure from the profession (Vijay and Ide 2016,p.42).

Neck pain defined as discomfort, tightness, or pain localized in the cervical region is a widespread condition. In 2017, its global prevalence reached approximately 3551.1 cases per 100000 individuals. Although neck pain often follows a benign course, its chronic nature and tendency to recur present significant challenges. In the United States alone, the estimated cost of treating lower back and neck pain reached USD 134.5 billion in 2016, underscoring its substantial economic and societal impact. The widespread occurrence of neck pain contributes to high rates of work absenteeism, thereby affecting both individual well being and broader economic productivity (Plaza Manzano et al. 2024, p.1987).

Neck pain is a widespread condition, with approximately 70 percent of individuals in the general population experiencing it at some point in their lives. Among healthcare professionals, dental practitioners report a higher prevalence of work related musculoskeletal disorders (WRMSDs) than any other specialty. Chronic neck pain often emerges early in a dentist's career and is typically the result of cumulative micro traumatic events caused by occupational stressors. These repetitive exposures hinder proper tissue recovery and may lead to more severe musculoskeletal injuries over time. Key ergonomic risk factors associated with WRMSDs include exposure to vibration, forceful exertions, non neutral postures, rapid work pace, and repetitive movements (Shinde et al. 2015,p.43).

Dentists spend a significant portion of their workday in static uncomfortable positions, requiring precise hand control and sustained postures to avoid procedural errors. Such conditions contribute to back pain from strained postures and neck and shoulder pain from repetitive tasks and psychological stress (Gaowgzeh et al. 2015 &Feng et al. 2015,p.6451).

Dental professionals including dentists and dental nurses must maintain high levels of technical skill while seated for extended periods. Their tasks often involve repetitive upper limb movements and forward trunk flexion to focus on intricate procedures. Following neck pain, which affects between 19.8 percent and 85.0 percent of dentists, WRMSDs are reported at rates ranging from 36.3 percent to 60.1 percent (Chaiklieng and Suggaravetsiri 2015,p.49). A US survey found that 73 percent of dentists experienced neck pain and 65 percent reported shoulder pain within the past year. Similar findings were observed among Thai dentists in government hospitals, highlighting the global nature of these occupational health concerns (Chaiklieng and Suggaravetsiri 2015,p.4900).

Dentistry demands exceptional precision and concentration. Essential capabilities include visual acuity, hearing, depth perception, psychomotor coordination, manual dexterity, and the ability to maintain ergonomic postures for prolonged periods. Any decline in these abilities can impair performance and productivity. Despite technological advancements, musculoskeletal disorders remain a major concern in modern dental practice. These conditions characterized by discomfort, disability, or

chronic pain in joints, muscles, tendons, and soft tissues are often triggered or exacerbated by repetitive movements and sustained awkward postures (Sultana et al. 2017,p.8).The productivity and well being of a society are closely tied to the health of its workforce. Adverse working conditions and environments can lead to physical ailments that diminish efficiency. A lack of education and awareness regarding occupational health is a major contributing factor. According to global assessments, approximately 150 million individuals are affected by work related health issues nearly four times the number reported two decades ago. Ergonomics, the science of optimizing human interaction with work environments, aims to prevent such disorders by identifying and mitigating occupational stressors (Aghahi et al. 2018,p.40).

Dentistry is widely recognized as a profession with a high incidence of musculoskeletal discomfort. Initially presenting as mild and often disregarded symptoms, these issues can progressively develop into chronic conditions with long term implications. General dental practice, in particular, carries elevated risk due to the repetitive nature of clinical tasks, sustained non neutral postures, and the visual precision required during procedures. Frequent upper limb movements and static positioning further contribute to the cumulative physical strain experienced by practitioners.Musculoskeletal disorders are highly prevalent among dental surgeons worldwide, with neck and back pain being the most commonly reported conditions. These disorders are primarily attributed to occupational factors such as prolonged sitting, poor posture, repetitive movements, and the use of heavy dental instruments, which collectively lead to overexertion of the lumbar and cervical spine regions. Proper posture and ergonomically designed tools and equipment are essential to mitigating these risks. Dentists are routinely exposed to biomechanical stressors, and the postures required by their profession are strongly associated with increased risk of skeletal muscle strain and injury (Alshammari and Alsubaie 2020,p.2).

Static postures maintained during dental procedures require more than half of the body’s muscles to contract continuously to counteract gravitational forces. This sustained muscular effort contributes to fatigue and discomfort, particularly in the neck and shoulders. Research has shown that dentists are prone to occupational health conditions due to prolonged static positioning, extended periods of sitting or standing, and fixed neck and shoulder alignment. Eccentric overloading of the extensor muscles

caused by repetitive movements, awkward postures, and demanding arm positions leads to microtraumas and contributes to the development of MSDs (Shinde et al. 2015, p. 43).The physiological consequences of prolonged immobility include muscle atrophy, imbalance, ischemia, and necrosis, which may result in trigger points and muscle replacement. This cascade of dysfunction leads to pain, protective muscle contractions, spinal disc degeneration, nerve compression, and ultimately chronic musculoskeletal disorders. Poor posture is a key contributor to muscle imbalance and long term injury (Atri and Nagraj 2014,p.730).

MSDs are among the most common occupational health risks for healthcare professionals, particularly dentists. Studies evaluating musculoskeletal pain among dental students have reported prevalence rates ranging from 46 percent to 71 percent in the United States, with symptoms increasing across academic years. In the United Kingdom, 54 percent of dental students reported lower back pain, while 63.5 percent of dentists in Indonesia and 92 percent of participants in a European study reported pain in the neck, shoulders, elbows, wrists, or hips (Felemban et al. 2021,p.39).

Approximately 70 percent of dental professionals experience MSDs, with significantly higher prevalence rates than the general population especially in the neck, shoulder, and back regions. Ergonomics, the scientific discipline concerned with designing and arranging tools and environments to enhance safety, mobility, and efficiency, plays a critical role in preventing these disorders. When repetitive stress and microtrauma exceed the body’s capacity for tissue repair, chronic injuries may develop, manifesting as MSD symptoms (Astin et al. 2024,p.17).

The prevalence of musculoskeletal disorders in dental professionals is consistently higher than in many other healthcare occupations. Studies have demonstrated that dentists frequently report pain in the neck, shoulders, and lower back due to the static postures and repetitive tasks inherent in their work. The static load required to maintain fixed working positions places continuous strain on spinal muscles, while repetitive fine motor tasks performed with the upper limbs further exacerbate discomfort. Dentists often perform tasks in restricted spaces with limited visibility, which encourages forward flexion of the head and trunk, amplifying cervical and lumbar stress (Rafeemanesh et al. 2013,p.2).

Work related musculoskeletal disorders develop gradually over time, arising from cumulative trauma to the musculoskeletal system. Their progression often follows a predictable path: initially presenting as mild discomfort, later intensifying into chronic pain, and eventually resulting in functional impairment. Failure to address early symptoms may lead to long term disability, absenteeism, or even premature retirement from clinical practice. The implications of WMSDs are therefore significant, both for individual practitioners and for healthcare systems that depend on their services (Sultana et al. 2017, p.8).

Global research has emphasized that MSDs are not only highly prevalent but also largely preventable through early intervention and adherence to ergonomic principles. However, despite decades of awareness, many dental professionals continue to work in suboptimal conditions. Limited training in ergonomics, insufficient emphasis during dental education, and inadequate workplace interventions contribute to the persistence of these disorders (Younis et al. 2022,p.115).

MSDs among dental practitioners also have psychosocial dimensions. Chronic pain can lead to reduced job satisfaction, increased stress levels, and burnout, further diminishing productivity and quality of care. Some practitioners experiencing long term musculoskeletal issues have been forced into early retirement, reflecting the severity of these occupational hazards. In addition, MSDs can affect the overall quality of life, restricting participation in both professional and personal activities (Reddy et al. 2015,p.42).

Although the exact relationship between body mass index (BMI) and MSDs remains debated, some studies suggest that overweight and obese individuals may face greater risk due to increased mechanical loading on joints and spinal structures. Nonetheless, recent systematic reviews have failed to confirm a consistent correlation between BMI and the odds of developing neck pain, highlighting the multifactorial nature of these disorders (Rafeemanesh et al. 2025,p.1010 &Edrees et al. 2024, P.3).

Dental procedures often require repeated and forceful use of precision tools, contributing to hand and wrist strain. The vibrations produced by high speed dental instruments further compound musculoskeletal stress. Prolonged reliance on such

equipment without ergonomic support has been associated with cumulative trauma disorders, particularly in the cervical and lumbar regions. Practitioners who fail to adopt preventive measures face heightened risk of chronic injury and long term disability (Hayes et al. 2008,p.159).A number of studies emphasize the importance of early intervention, preventive strategies, and ergonomic training to reduce the burden of MSDs among dental professionals. Introducing ergonomics into dental curricula has been strongly recommended as a proactive measure, equipping students with the knowledge and habits necessary to minimize occupational risks before they become entrenched. By addressing posture, workstation design, and tool handling techniques during training, long term health outcomes can be improved (Aghahi et al. 2018,p.40).

The adoption of ergonomically designed dental chairs, adjustable operator stools, magnification loupes, and improved lighting systems has been shown to alleviate some of the physical demands of dentistry. However, while technology plays a valuable role in reducing strain, it cannot completely eliminate the risks inherent in prolongedstatic positioning and repetitive fine motor movements. Without complementary behavioral adjustments and regular physical exercise, these technological innovations provide only partial relief (Younis et al. 2022,p.115).

Ergonomic interventions must therefore be combined with organizational and behavioral changes, such as scheduling regular breaks, alternating between patients, and incorporating stretching exercises into daily routines. Dentists who integrate these strategies report significantly lower levels of musculoskeletal discomfort compared to those who do not adopt preventive practices. Workstation assessments conducted by occupational health experts have further demonstrated the positive impact of small adjustments to chair height, patient positioning, and tool placement on reducing physical strain (Reddy et al. 2015,p.42).

The persistence of MSDs despite technological progress indicates that the problem is multifactorial, involving physical, psychological, and organizational elements. Psychological stress, for instance, has been found to exacerbate musculoskeletal pain, creating a cycle of discomfort and reduced performance. High workload, time pressure, and patient management demands further amplify the risk. In severe cases, dentists suffering from chronic pain experience diminished professional confidence

and reduced clinical precision, ultimately affecting patient care quality (Plaza Manzano et al. 2024,p.1987).

Musculoskeletal disorders represent a global health issue with particularly severe implications for dental professionals. The literature consistently demonstrates that dentists experience among the highest prevalence rates of MSDs across all healthcare occupations, particularly in the cervical and lumbar regions. While ergonomic improvements and workplace interventions have provided some relief, widespread prevalence persists, reflecting the need for comprehensive preventive strategies that integrate education, technology, and occupational health support. Long term solutions will require systemic changes at both educational and institutional levels to protect practitioners from the cumulative toll of their profession (Greggi et al. 2024,p.3964).

CHAPTER-IIIMETHODOLOGY

3.1 Study design:

Itwas a cross-sectionalcomperative study carried out with the objective of exploring neck pain and related factors of the dentists in Dhaka city(Elsayedet al. 2023, pp.7647-7650)

3.2 Studysite:

The study was carried out from 16 different private dental chambers and some dental clinics in Dhaka city.

3.3Study population:

Thedentists currentlypracticingin Dhakacityconstituted thestudypopulation forthe present research.

3.4Samplesize:

Thesamplesizeforthepresentstudywillbecalculatedbythefollowingstatical formula.

$$n = \frac{z^2 p(1-p)}{d^2}$$

Here,

n=Requiredsample size.

z=confidencelevel at95%(Standard value of 1.96).

p=*p* is theprevalencetaken as85% or 0.85(Choet al., 2016).

d=marginoferrorat5% (Standardvalueof 0.05).

$$n = \frac{z^2 p(1-p)}{d^2}$$

$$n = \frac{(1.96)^2 \times 0.85(1-0.85)}{(0.05)^2}$$

$$= \frac{3.84 \times 0.85 \times 0.15}{0{,}0025}$$

$$= \frac{0.4896}{0.0025}$$

$$= 196$$

So, samplesize196.

So,theresearcheraimstofocushisstudyby196samplefollowingthecalculationaboveinitially.

3.5 SamplingTechnique:

Conveniencesamplingtechniquewasappliedto selecttheparticipantsfromthestudy population.

3.6 Methodof data collection:

Datawascollected fromthedentistsbyface-to-faceformal interview.

3.7 Instrumentsofdatacollection-

A pre-tested structured questionnaire was used as an instrument of data collection for the present study. Both open and close ended questions were included in the questionnaire. The questionnaire had three parts. Part A contained questions on socio-demographic characteristics. Part B included questions on work related information. Part C contained questions on neck pain related questions.

NPRSscalewas usedtoassessthelevel ofpain ofthe participants.

3.8Data CollectionTools:

Forcollectingdatasomeothermaterialswerealsousedtheseare:

Weightmachineand

Measuringtape

3.9 InclusionCriteria:

- ✓ Dentists (male &female) currentlypracticingin Dhaka city.
- ✓ Willingnesstoparticipate.

3.10Exclusioncriteria:

- ✓ History of neck surgery
- ✓ Patients who are not interested

3.11 Datacollectionprocedure:

Atfirst,researchertookpermissionfromtheDentist.Beforecollectingdata,the objectives of this study and purpose were explained to all participants. All the participantsweregivenconsentformfortakingpermissionfromthemtoparticipatein this study and they were given opportunity to ask any type of study related questions. Everyinterviewlasted10-15minutes.Eachdatawascollectedcarefullyand

confidentialitywasmaintained.Aftersuccessfullycollectingdata,researcherleavesthe participants by giving thanks to all to be a part of study willingly.

3.12 Data analysis:

The data were analyzed using the Statistical Package for the Social Sciences (SPSS) program. Descriptive statistics, such as frequency, distribution, range, mean, and percentage were performed. For inferential statistics the relationship between independent and dependent variables were analyzed accordingly.

3.13 Ethicalconsideration:

The Research proposal was submitted to the Ethical Review Board (ERB) of SCMST and approval was obtained from the Board.The investigator obtained written permission from ethical review board (SCMST).BangladeshMedicalResearchCouncil(BMRC)andWorldHealthOrganization(WHO) guideline also were followed to conduct the study.Ethical review board informed by written document about aims and objectives of the study and that the Participation of the study was not harmful.Theclientsname,addressandpersonalinformationwaskeptconfidentialbythe investigator and the data were not shared with others.

CHAPTER- IV RESULTS

This was a descriptive type of cross-sectional study carried out with the objective of exploring neck pain and related factors among the dentist in Dhaka city. Data were collected from 103 participants by using a pretested questionnaire. Data were numerically coded and captured in Microsoft Excel and calculated by SPSS 27.0 version software program as mean, SD and percentage and presented by tables with description.

Part-A :SocioDemographic profile

Tableno.1:Frequency distributionoftherespondentsbyage.

Age category of the participant		
Class	**Frequency**	**Percent**
21-30 years	46	44.7
31-40 years	32	31.1
≥ 41years	25	24.3
Total	103	100.0

Mean =33.26, SD =± 8.73

Regarding frequency distribution of the respondents by age, it was found that 46 (44.7%)participantsbelongedtotheagegroup21–30years.Itwasalsofoundthat32 (31.1%) respondents were in the age group of 31 – 40 years and the number of more than 41 year is 25 which take the percentage 24.3. (Table no. 1).

Fig.no. 1: Frequency distributionoftherespondentsbyage.

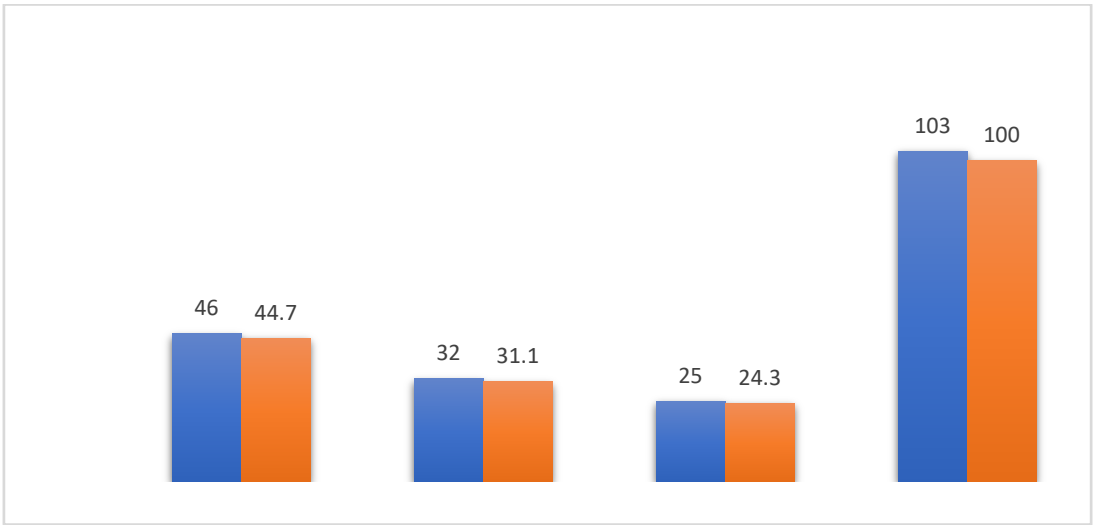


Fig.1: Regarding frequency distribution of the respondents bar graph by age, it was found that 46 (44.7%) participants belonged to the age group 21 – 30 years. It was also found that 32 (31.1%) respondents were in the age group of 31 – 40 years and the number of more than 41 year is 25 which take the percentage 24.3.

Table no. 2: Frequency distribution of the respondents by gender.

Gender	Frequency	
	N	%
Male	71	68.9
Female	32	31.1
Total	103	100.0

The study revealed that 71 (68.9%) participants were male and 32 (31.1) respondents were female (Table no.2).

Fig.no. 2: Frequency distribution of the respondents by gender.

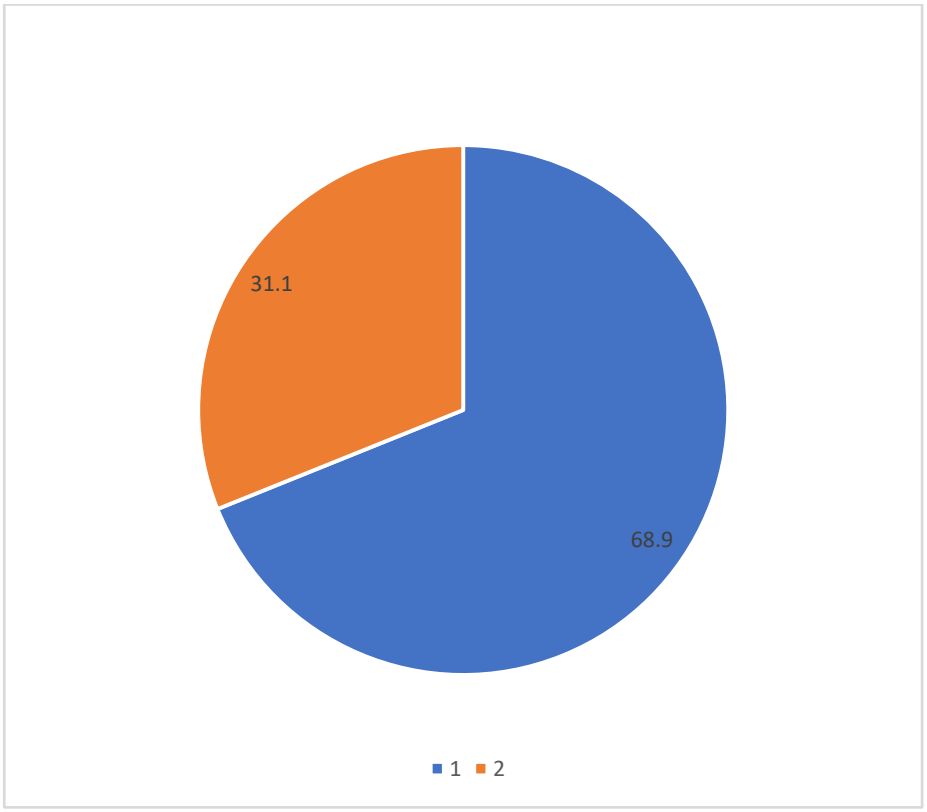


Fig.2: The pie chart revealed that (68.9%) participants were male and (31.1) respondents were female.

Tableno.3:Frequency distributionoftherespondentsbyeducation.

Education	Frequency	
	N	%
BDS	58	56.3
BScin dental	13	12.6
Diplomain dental	32	31.1
Total	103	100.0

About frequency distribution of the respondents by education, it was found that 58 (56.3%) participants has BDS degree. We can see that 13(12.6%) participantshas BScdegree. We also see that 32 (31.1%) participants has diploma in dental degree (Table no.3).

Tableno.4:Frequency distributionoftherespondentsbymaritalstatus.

Marital status	Frequency	
	N	%
Married	57	55.3
Unmarried	34	33.0
Separated	12	11.7
Total	103	100.0

We found that 57 (55.3%) participants are married and 34 (33.0%) respondents are unmarried. We can see that 12 (11.7%) respondents are separated from the spouse (Table no.4).

Tableno.5:Frequency distributionoftherespondentsbymonthlyincome

Monthly income (BDT)	Frequency	
	N	%
0-50000	38	37
>50000-100000	36	35
>100000-150000	28	27
>150000	1	1
Total	103	100

About monthly income of the participants, it was found that 38 (37%) participants hasmonthly income BDT(0-50000),36(35%) participants has monthly income (>50000-100000), 28 (27%) has (>100000-150000) & 1(1%) has monthly income BDT more than 15000. (Table no.5).

Table no.6: Frequency distribution of the respondents by BMI.

BMIGroup	Frequency	
	N	%
Normalweight (18.50– 24.99)	43	41.7
Overweight (25.0-29.9)	51	49.5
Obesity (>30)	9	8.7
Total	103	100.0

In BMI, we found that 43 (41.7%) participants are normal weighted and51 (49.5%) participants are over weighted, 9 (8.7) participants are suffering from obesity.(Table no.6).

Fig.no. 3:Frequency distribution of the respondents by BMI.

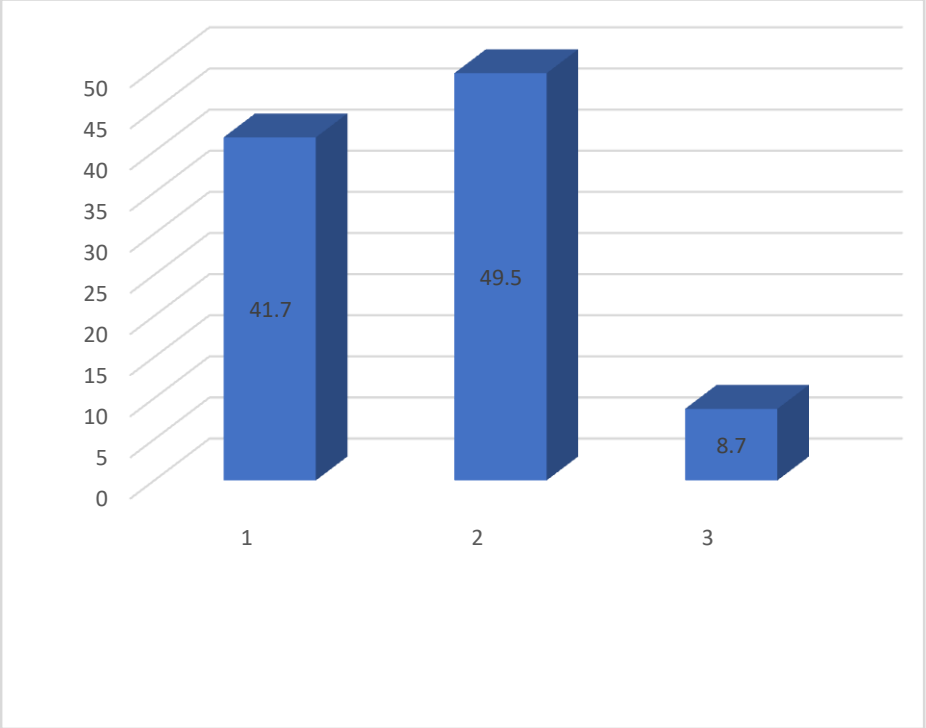


Fig.3: In the bar graph, we found that 43 (41.7%) participants are normal weighted and 51 (49.5%) participants are over weighted, 9 (8.7) participants are suffering from obesity.

Part-B:Work related information

Tableno.7:Frequency distributionoftherespondentsbyworkingexperience

Working experiencein years	Frequency	
	N	%
1-5	16	15.5
6-10	39	37.9
11-15	20	19.4
>15	28	27.2
Total	103	100.0

Regardingfrequencydistributionoftherespondentsbyworkingexperience, foundthat16(15.5%)participantshas(1–5)yearsofexperience, 39 (37.9%) has (6-10) years, 20 (19.4%) has (11-15) years and28(27.2%) has the working experience of (>15) years.(Tableno.7).

Table no. 8: Frequency distribution of the respondents by maintaining body position during working time

Positionduring working time	Frequency	
	N	%
Standing	29	28.2
Sittingup straight	73	70.9
Forwardbending	1	1.0
Total	103	100.0

About position during working time, it revealed that 73 (70.9%) participants' positionwassittingupstraight.Italsofoundthatthepositionduringworkingtime 29 (28.2%) participants was standing& 1(1.0) forward bending position. (Table no. 8).

Fig.no. 4: Frequency distribution of the respondents by maintaining body position during working time

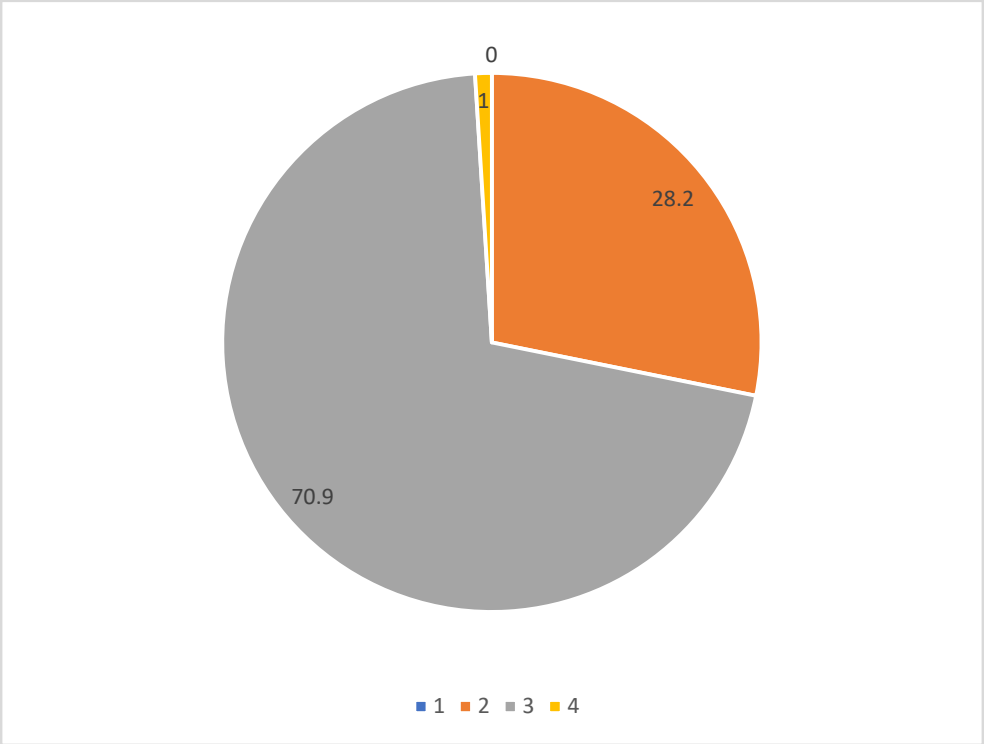


Fig.4: This pie chart is about position during working time, it revealed that (70.9%) participants' position was sitting up straight. It also found that the position during working time (28.2%) participants was standing & (1.0) forward bending position

Table no. 9: Frequency distribution of the respondents by duration of daily work.

Durationofworking per day in hours	Frequency	
	N	%
3 to 6h/ day	56	54.4
Morethan 6 h /day	47	45.6
Total	103	100.0

Thestudyrevealedthat56(54.4%)participantshavetoworkfor3to6hours.Itwasalso foundthat 47 (45.6%) respondents have to work morethan 6 hours daily(Table no. 9).

Table no. 10: Frequency distribution of the respondents by working days during the week.

Numberof workingdays per week	Frequency	
	N	%
3 to 5 days/week	29	28.2
Morethan 5days/week	74	71.8
Total	103	100.0

About numberof workingdays, it was foundthat 29 (28.2%)participants have to work 3 to 5 days per week and 74 (71.8%) participants have to work for more than 5 days per week (Table no.10).

Table. no. 11: Frequency distribution of the respondents by work related information

Information	Frequency	
	Yes	No
	N (%)	N (%)
Protectiveequipment during work	103(100)	……
Positionlongerthan40min	92(89.3)	11 (10.7)
Transferanyheavyobjects	2(1.9)	101 (98.1)
Properbodyposition	103 (100)	……
Knowingwork related ergonomics	102(99.0)	1(1.0)

ThisStudyshowedthatalltheparticipantsusedprotectiveequipment'sduringwork. It was also found that 92(89.3)participants could maintain position longer than 40 minutes. It was reported that all the participants maintained proper body position and knew the work-related ergonomics (Table no.11).

Part-C:Neckpainrelatedinformation

Tableno.12:Frequencydistributionoftherespondentsbyhavingof neckpain.

Presenceof neck pain	Frequency	
	N	%
Yes	50	48.5
No	53	51.5
Total	103	100.0

Regarding frequency distribution of the respondents by presence of neck pain, it was found that 50 (48.5%) participants had neck pain and 53 (51.5%) participants had not neck pain (Table no. 12).

Fig.no. 5:Frequencydistributionoftherespondentsbyhavingofneckpain.

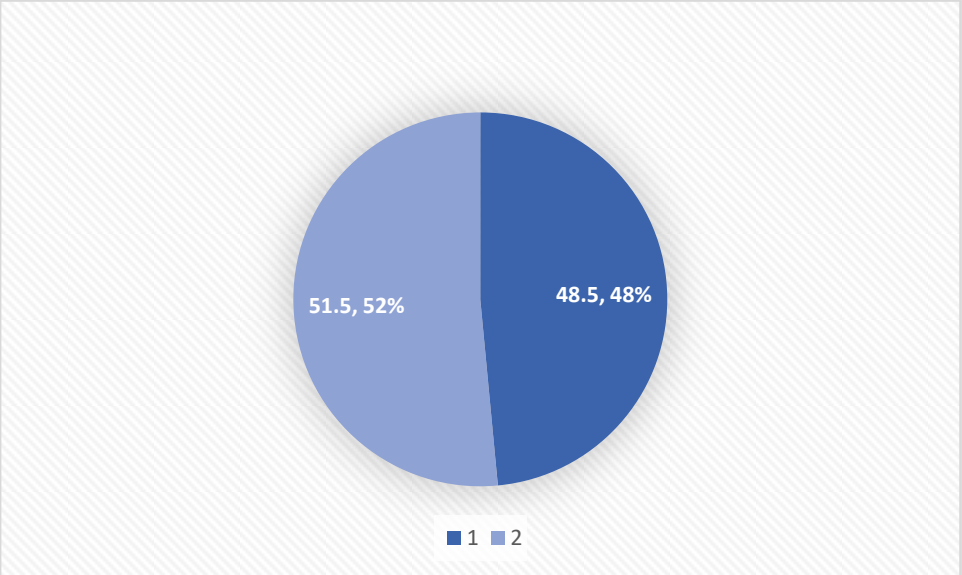


Fig.5: This pie chart is about frequency distribution of the respondents by presence of neck pain, it was found that (48.5%) participants had neck pain and (51.5%) participants had not neck pain.

Tableno.13:Frequencydistributionoftherespondentsbyduration ofpain.

Durationof pain	Frequency	
	N	%
1-10 months	30	60
11-20 months	19	38
More than 20 months	1	2.0
Total	50	100.0

About duration of pain, it was revealed that 30 (60%) participants have pain for (1-10) months, 19 (38%) of participants has pain for (11-20) months & 1 (2.0%) participants have more than 20 months of paining duration. (Table no. 13).

Tableno.14:Frequencydistributionoftherespondentsbyseverity ofpain.

Severityof pain	Frequency	
	N	%
Mild	30	60
Moderate	18	39
Severe	2	1.0
Total	50	100.0

Aboutseverity of pain, it was revealed that 30 (60%) participants have mild pain, 18 (39%) of participants have moderate pain &2 (1.0%) participants have severe pain. (Table no. 14).

Tableno.15:Frequency distributionoftherespondentsbykindof pain.

kindof pain	Frequency	
	N	%
Sharping	26	51.0
Burning	2	3.9
Throbbing	21	43.1
Stabbing	1	2.0
Total	50	100.0

About frequency distribution of the respondents by kind of pain, it was found that 26 (51.0%) respondents had sharping nature of pain. It was also found that 21 (43.1%) respondents had throbbing pain, 2 (3.9%) burning pain, 1(2.0%) stabbing pain.
(Table no. 15).

Tableno.16: Frequencydistributionof therespondentsbytreatmentforthispain.

Treatmentfor this pain	Frequency	
	N	%
Yes	32	64
No	18	36
Total	50	100.0

The study showed that 32 (64%) participants took treatment for pain and 18 (36%) participants did not go for any type of treatment (Table no.16).

Tableno.17:Frequencydistributionoftherespondentsbyhavetakentypeof treatment

Type of treatment	Frequency	
	N	%
Medication	20	40
Physiotherapy	2	4
Both	11	22
Surgery	2	4
Others	15	30
Total	50	100.0

Regarding type of treatment taken by the participants, it was revealed that 20 (40%) participants took medication for pain. 2 (4%) took physiotherapy, It was also found that 11 (22%) participants took both medication and physiotherapy (Table no. 17).

Fig.no. 6: Frequencydistributionoftherespondentsbyhavetakentype of treatment.

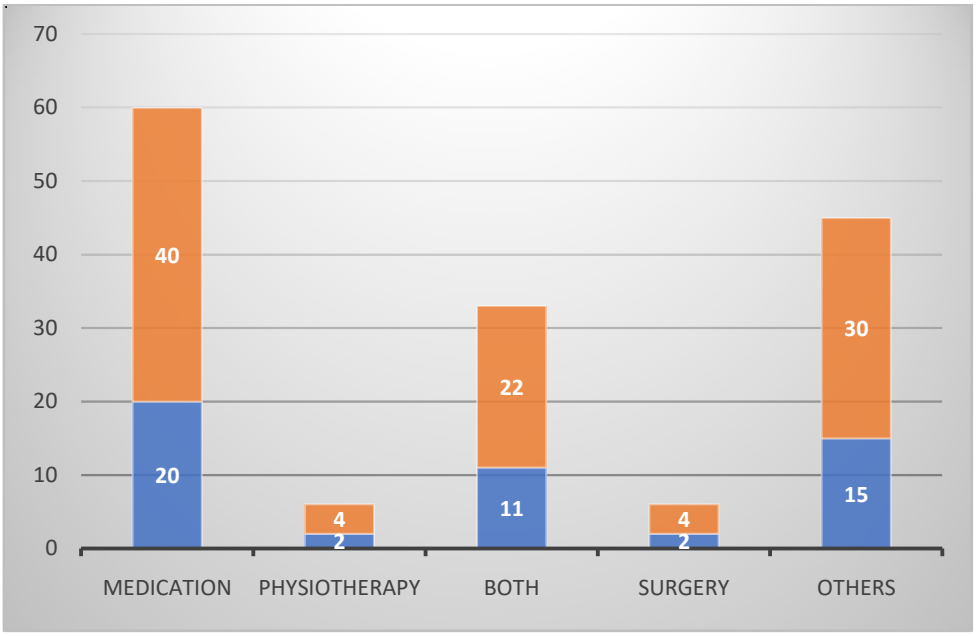


Fig.6: In this bar graph, Regarding type of treatment taken by the participants, it was revealed that 20 (40%) participants took medication for pain. 2 (4%) took physiotherapy, It was also found that 11 (22%) participants took both medication and physiotherapy.

Tableno.18:Frequencydistributionoftherespondentsbyrestrictionof movement.

Restrictionof movement	Frequency	
	N	%
Yes	7	14
No	43	86
Total	50	100.0

Outof50participants,43(86%)respondentstoldthattheyhadnorestriction of movement and 7 (14%) participants had movement restriction (Table no. 18).

Table no 19: Association between posture (position) and neck pain among dental practitionres :

Position during working time	Test	Test value	p value
Standing	Chi-Square	x^2=1.31	0.25
Sitting up straight	Chi-Square	x^2=0.36	0.50
Forward bending	Chi-Square	x^2=1.04	0.35
Position vs pain (In total)	Chi-Square	x^2=2.728	0.256

- The test shows not significant relationship between working position and neck pain (p = 0.256,x^2=2.728).
- Forward bending and standing contributed morechi-square value compared to sitting, but still none reached significance.

Table no 20: Association between independent variable with dependent variable:

Independent variable	**Test**	**Test value**	***p* value**
Age vs severityofpain	Chi-Square	x^2=33.359	0.001
Gender vs severityofpain	Chi-Square	x^2=3.291	0.349
BMI vs severityofpain	Chi-Square	x^2=7.906	0.245
Workingexperiencevs severityofpain	Chi-Square	x^2=9.103	0.428
Position vs severity of pain	Chi-Square	x^2=8.625	0.196
Working hourduringtheday vs severityofpain	Chi-Square	x^2=5.859	0.119
Workingdaysduringtheweekvs severityofpain	Chi-Square	x^2=1.256	0.740
Treatmentvs severityofpain	Chi-Square	x^2=131.691	0.001
RestrictionofMovement vs severity of pain	Chi-Square	x^2=131.288	0.001

Table 20. showed that only age, treatment-seeking behavior, and restriction of movement were significantly associated with neck pain severity, while BMI, posture, work experience, gender, and workload factors were not. This highlights the importance of age-related risk and timely intervention in managing musculoskeletal problems.

CHAPTER–VDISCUSSION AND LIMITATIONS

5.1 : Discussion

The findings presented in Table 20 indicate that only a few variables were statistically associated with the severity of neck pain among dental practitioners. Age was found to be a highly significant factor ($\chi^2 = 33.36$, $p = 0.001$), suggesting that neck pain becomes more pronounced with increasing age and cumulative years of occupational strain. This is consistent with international studies, where older dentists were reported to suffer higher levels of chronic musculoskeletal disorders due to prolonged static postures and cumulative biomechanical stress across their careers (Reddy et al. 2015, pp. 42; Kawtharani et al. 2023,pp. 22).

Similarly, both treatment-seeking behavior ($\chi^2 = 131.69$, $p = 0.001$) and restriction of movement ($\chi^2 = 131.29$, $p = 0.001$) were highly significant. This underscores that pain severity was not only a subjective complaint but also directly associated with functional limitations and the need for medical or physiotherapeutic intervention. Comparable findings were reported by (Chandra et al. 2015, pp. 18) and (Alshammari et al. 2020,pp. 2), who observed that dentists experiencing severe pain were more likely to seek medical treatment, and that restriction of neck mobility often accompanied advanced musculoskeletal symptoms.

In contrast, gender ($\chi^2 = 3.29$, $p = 0.349$), BMI ($\chi^2 = 7.91$, $p = 0.245$), working experience ($\chi^2 = 9.10$, $p = 0.428$), posture during work ($\chi^2 = 8.63$, $p = 0.196$), working hours per day ($\chi^2 = 5.86$, $p = 0.119$), and working days per week ($\chi^2 = 1.26$, $p = 0.740$) were not statistically significant. This differs from several published reports that highlight BMI, posture, and workload as influential risk factors (Feng et al. 2014, pp. 7; Younis et al. 2022,pp. 115; Samoladas et al. 2018, pp. 63). However, the lack of significance in this study may be attributed to the relatively small sample size ($n = 103$), uniformity in ergonomic practices among respondents, and possible underreporting of poor posture due to social desirability bias.

Importantly, recent evidence also suggests that BMI is not consistently associated with neck pain among dentists. A systematic review and meta analysis by (Rafeemanesh et al. 2025, pp. 1010) found no significant association between

dentists' BMI and the odds of neck pain (OR = 0.9; 95% CI: 0.5-1.4), despite nearly half of the study populations being classified as overweight. Similarly, a cross sectional study of German dental practitioners (Edrees et al. 2024,pp. 3) showed that while posture and ergonomics contribute to discomfort, BMI did not independently predict neck pain severity. These findings support the non significant association observed in the present study and highlight variability across different populations and contexts.

Overall, the results of this study emphasize that although factors such as BMI, posture, and workload are often discussed in the literature, in this particular population the most important determinants of neck pain severity were age, functional restriction, and treatment needs. This underscores the importance of early preventive strategies targeted at younger practitioners, coupled with timely intervention when symptoms progress to functional disability.

5.2: Limitation

The study was conducted with a relatively small sample size of 103 participants using a convenient sampling method from different private dental clinics in Dhaka city. Therefore, the findings cannot be generalized to all dental professionals in Bangladesh. In addition, self-reported posture and ergonomic behavior may have introduced response bias. Further well-planned research with a larger and more diverse sample, and objective ergonomic assessments, is recommended to establish stronger evidence

CHAPTER–VICONCLUSION AND RECOMMENDATION S

6.1: Conclusion

The present study iscross-sectionalcomperativestudy carried out to determine the prevalence of neck pain and associated factors among dentists working in different private dental clinics in Dhaka city. Data were collected from a purposively selected sample of 103 dentists through face-to-face formal interviews using a pre-tested questionnaire. Analysis of the data was carried out by SPSS version 27.0.

Regarding distribution of the respondents by age, the study showed that 44.7% of participants were in the age group of 21-30 years and 31.1% belonged to the age group of 31- 40 years. The study revealed that 68.9% of participants were male and 31.1% were female. About education, it was found that 56.3% of participants had a BDS degree, while 31.1% had a diploma in dental technology. Regarding religion, 88.3% of the participants were Muslims and 10.7% were Hindus. The study also showed that 55.3% of participants were married and 33% were unmarried. Concerning monthly income, 37% of participants had an income of BDT 0-50,000, while 27% earned between BDT 100,000-150,000. Regarding nutritional status, assessed on the basis of BMI, 49.5% of participants were overweight and 41.7% had normal weight.

In terms of work profile, 15.5% of participants had 1-5 years of experience and 37.9% had 6-10 years. Regarding working position, 70.9% of participants reported sitting up straight during work, while 28.2% worked in a standing position. The study revealed that 54.4% of participants worked 3-6 hours daily and 45.6% worked more than 6 hours. About working days per week, 28.2% of participants worked 3-5 days and 71.8% worked more than 5 days weekly. Almost all participants reported awareness of ergonomics and use of protective equipment.

With respect to neck pain, 48.5% of participants reported experiencing pain, with 60% having mild pain and 39% moderate pain. The most common types of pain were sharp (51%) and throbbing (43.1%). About 64% of participants sought treatment, mainly through medication (40%) or a combination of medication and physiotherapy (22%). Restriction of movement was reported by 14% of participants.

The analysis of associations (Table 20) showed that age was significantly associated

with the severity of neck pain (p = 0.001), indicating that pain increases with advancing age. Treatment-seeking behavior (p = 0.001) and restriction of movement (p = 0.001) were also highly significant, reflecting that pain severity directly affected functional limitations and the need for intervention. On the other hand, gender, BMI, working experience, posture, daily working hours, and weekly working days were not found to be significantly associated with neck pain in this study.

The results indicate that although almost half of the participants experienced neck pain, the most important determinants of severity were age, functional restriction, and the tendency to seek treatment. Factors such as BMI, posture, and workload did not show significant associations, which may be due to sample size limitations or similarities in work practices among respondents. Nevertheless, the findings emphasize the need for early preventive measures, ergonomic awareness, and timely physiotherapy or medical care to mitigate the impact of neck pain on dental professionals.

6.2: Recommendation

1. The study showed that almost half of the participants (48.5%) reported neck pain, with the majority experiencing mild to moderate symptoms. Preventive strategies should therefore be introduced early in the professional life of dentists, particularly targeting younger practitioners to reduce the likelihood of progression to severe or chronic pain in later years.
2. Age was found to be significantly associated with pain severity. This indicates that older practitioners are at greater risk of experiencing functional disability. Continuous professional development programs should incorporate ergonomics training, stretching exercises, and physiotherapy guidelines tailored to age-related changes, ensuring long-term occupational health.
3. Treatment-seeking behavior and restriction of movement were highly significant factors. Dentists with severe pain often required medical or physiotherapy intervention and reported functional limitations. Therefore, accessible physiotherapy services and regular health screening should be promoted among dental professionals. Early diagnosis and timely management would prevent chronic disability and help practitioners maintain their professional performance.
4. Although factors such as BMI, posture, working experience, and daily/weekly working hours were not statistically significant in this study, international literature continues to highlight their possible contribution to musculoskeletal problems. Dentists should still be encouraged to maintain a healthy body weight, adopt proper posture, and regulate working hours as part of good occupational practice. These measures may reduce long-term risks even if their direct association was not established in the present research.
5. Future research should be conducted with a larger, statistically representative sample size to confirm these findings and to explore the occupational and lifestyle variables that may not have shown significance in this study. Longitudinal research designs are recommended to capture cumulative effects over time.

CHAPTER–VIIREFERENCES

- Abdolalizadeh, M &Jahanimoghadam, F, 2015, 'Musculoskeletal disorders in dental practitioners and ergonomic strategies', *Anatomical Sciences Journal*, vol. 12, no. 4, pp. 161-166.
- Abduljabbar, TA, 2018, 'Musculoskeletal disorders among dentists in Saudi Arabia', *Pakistan Oral & Dental Journal*, vol. 28, no. 1, pp. 135-144.
- Aghahi, RH, Darabi, R &Hashemipour, MA, 2018, 'Neck, back, and shoulder pains and ergonomic factors among dental students', *Journal of Education and Health Promotion*, vol. 7, no. 1, p. 40.
- Al-Emara, Z, Karaharju-Suvanto, T, Furu, P &Furu, H, 2024, 'Musculoskeletal disorders and work ability among dentists and dental students in Finland', *Work*, vol. 78, no. 1, pp. 73-81.
- Alhakami, AM, Madkhli, A, Ghareeb, M, Faqih, A, Abu-Shamla, I, Batt, T, Refaei, F, Sahely, A, Qassim, B, Shami, AM &Alhazmi, AH, 2022, 'The prevalence and associated factors of neck pain among Ministry of Health office workers in Saudi Arabia: a cross-sectional study', *Healthcare*, vol. 10, no. 7, p. 1320.
- Almeida, MB, Moreira, M, Moleirinho-Alves, P & Oliveira, R, 2024, 'Neck strength variations in dental students with and without neck pain: a longitudinal study', *Applied Sciences*, vol. 14, no. 18, p. 8205.
- Al-Mohrej, OA, AlShaalan, NS, Al-Bani, WM, Masuadi, EM &Almodaimegh, HS, 2016, 'Prevalence of musculoskeletal pain of the neck, upper extremities and lower back among dental practitioners working in Riyadh, Saudi Arabia: a cross-sectional study', *BMJ Open*, vol. 6, no. 6, p. 100.
- Alshammari, F &Alsubaie, GF, 2020, 'Prevalence of back and neck pain amongst dentists in Saudi Arabia', *Journal of Advanced Medical and Dental Sciences Research*, vol. 8, no. 4, pp. 1-2.
- Astin, BS, Nuzum, FM, DiMassa, AJ &Mickel, AK, 2024, 'Risk factors and prevalence of occupational musculoskeletal pain among endodontists in the United States', *Journal of Endodontics*, vol. 50, no. 1, pp. 17-21.

- Chaiklieng, S &Suggaravetsiri, P, 2015, 'Ergonomics risk and neck shoulder back pain among dental professionals', Procedia Manufacturing, vol. 3, pp. 49-57.
- Chandra, S, Shahi, AK & Bhargava, R, 2015, 'Prevalence of neck and lower back pain among dentists from three dental colleges in Patna City: a questionnaire study', *International Journal of Scientific Study*, vol. 3, no. 8, pp. 71-76.
- Felemban, RA, Sofi, RA, Alhebshi, SA, Alharbi, SG, Farsi, NJ, Abduljabbar, FH & Farsi, JM, 2021, 'Prevalence and predictors of musculoskeletal pain among undergraduate students at a dental school in Saudi Arabia', *Clinical, Cosmetic and Investigational Dentistry*, vol. 13, pp. 39-46.
- Feng, B, Liang, QI, Wang, Y, Andersen, LL & Szeto, G, 2015, 'Prevalence of work related musculoskeletal symptoms of the neck and upper extremity among dentists in China', *BMJ Open*, vol. 4, no. 12, p. 64.
- Gandhi, NV, Patel, K, Patel, C & Joshi, H, 2024, 'To find out the prevalence of neck pain among students of computer science department', *International Journal of Health Sciences and Research*, vol. 14, no. 2, pp. 55-61.
- Gaowgzeh, RA, Chevidikunnan, MF, Al Saif, A, El-Gendy, S, Karrouf, G & Al Senany, S, 2015, 'Prevalence of and risk factors for low back pain among dentists', *Journal of Physical Therapy Science*, vol. 27, no. 9, pp. 2803-2806.
- Greggi, C, Visconti, VV, Albanese, M, Gasperini, B, Chiavoghilefu, A, Prezioso, C, Persechino, B, Iavicoli, S, Gasbarra, E, Iundusi, R & Tarantino, U, 2024, 'Work related musculoskeletal disorders: a systematic review and meta-analysis', *Journal of Clinical Medicine*, vol. 13, no. 13, p. 3964.
- Gul, MM, Asad, M, Akhtar, MW, Alam, MM, Shahbaz, M, Gulzar, A & Burhan, M, 2024, 'Prevalence of neck pain and associated disabilities among students who use computers', *Journal of Health and Rehabilitation Research*, vol. 4, no. 2, pp. 603-607.
- Hayes, MJ, Cockrell, D & Smith, DR, 2009, 'A systematic review of musculoskeletal disorders among dental professionals', *International Journal of Dental Hygiene*, vol. 7, pp. 159-165.

- Elsayed, AE, Youssef, EF, Kaddah, AF &Makary, MZA, 2023, 'Relationship between forward head posture, neck pain, and disability among dentists with mechanical neck pain', *The Egyptian Journal of Hospital Medicine*, vol. 93, October, pp. 7647-7650.
- Ijaz, A, Khan, I, Ahmed, A & Sadiq, S, 2016, 'Frequency of neck pain among dentists', *Pakistan Orthodontic Journal*, vol. 8, no. 2, pp. 89-93.
- Kawtharani, AA, Chemeisani, A, Salman, F, Younes, AH &Msheik, A, 2023, 'Neck and musculoskeletal pain among dentists: a review of the literature', *Cureus*, vol. 15, no. 1, pp. 22.
- Ohlendorf, D, Naser, A, Haas, Y, Haenel, J, Fraeulin, L, Holzgreve, F, Erbe, C, Betz, W, Wanke, EM, Brueggmann, D &Nienhaus, A, 2020, 'Prevalence of musculoskeletal disorders among dentists and dental students in Germany', *International Journal of Environmental Research and Public Health*, vol. 17, no. 23, p. 8740.
- Ratzon, N, Yaros, T, Mizlik, A &Kanner, T, 2000, 'Musculoskeletal symptoms among dentists in relation to work posture', *British Medical Journal*, vol. 15, pp. 153-158.
- Rafeemanesh, E, Omidi-Kashani, F, Chamani, A &Allahdad, S, 2025, 'Occupational and non-occupational risk factors for neck pain in dentists: a systematic review and meta-analysis', *Archives of Bone and Joint Surgery*, vol. 13, no. 6, pp. 307-322.
- Reddy, V, Bennadi, D, Satish, G & Kura, U, 2015, 'Occupational hazards among dentists: a descriptive study', *Journal of Oral Hygiene and Health*, vol. 3, no. 185, pp. 1-5.
- Samat, AR, Shafei, MN, Yaacob, NA &Yusoff, A, 2021, 'Prevalence and associated factors of back pain among dental personnel in North-Eastern State of Malaysia', *International Journal of Collaborative Research on Internal Medicine & Public Health*, vol. 3, no. 7.
- Samoladas, E, Barmpagianni, C, Papadopoulos, DV &Gelalis, ID, 2018, 'Lower back and neck pain among dentistry students: a cross-sectional study in dentistry students in Northern Greece', *European Journal of Orthopaedic Surgery & Traumatology*, vol. 28, pp. 1261-1267.

- Shaik, S, Rao, S, Husain, A &D'sa, J, 2011, 'Work related musculoskeletal disorders among dental surgeons: a pilot study', *Contemporary Clinical Dentistry*, vol. 2, no. 4, pp. 308-312.
- Shinde, V &Desousa, SPRNA, 2015, 'Neck pain amongst dentists in Mumbai: an exploratory study', *Journal of Research and Advancement in Dentistry*, vol. 5, no. 4, pp. 43-46.
- Sultana, N, Mian, MAH &Rubby, MG, 2019, 'Risk and exposure of musculoskeletal disorders among dental surgeons working in Dhaka City', *Hindu*, vol. 7, pp. 8-11.
- Sultana, N, Mian, MAH, Rubby, MG &Banik, PC, 2017, 'Musculoskeletal disorders in dentists: a systematic review', *Update Dental College Journal*, vol. 7, no. 2, pp. 38-42.
- Van Gorp, B, Lesnak, J, Fleagle, T, Hulshizer, K, Nielsen-Wise, A, Kestel, L, Vance, C &Sluka, KA, 2024, 'Categories of the patient-specific functional scale activities in chronic neck pain and their relationship to the neck disability index', *Rehabilitation Research and Practice*, vol. 2024, no. 1, pp.92.
- Vijay,S& Ide, M, 2016, 'Musculoskeletal neck and back pain in undergraduate dental students at a UK dental schoola cross-sectional study', *British Dental Journal*, vol. 221, no. 5, pp. 241-245.
- Younis, U, Shakoor, A, Chaudhary, FA, Din, SU, Sajjad, S, Younis, M, Javed, MQ &Alam, MK, 2022, 'Work related musculoskeletal disorders and their associated risk factors among Pakistani dental practitioners: a cross-sectional study', *BioMed Research International*, vol. 2022, no. 1, pp. 40-71.

Appendix – A

Consent form (English)

Responded ID NO: | | | |

Dear participant,

I am Radia Akter. I am student of B.Sc. in physiotherapy program in the Department of physiotherapy, Saic college of Medical Science and Technology (SCMST) which is affiliated Dhaka university. I am conducting the study entitled "Association Between Posture and Neck Pain among Dental Practitioners in Dhaka City" as a part of my thesis work for the partial fulfillment of B.Sc. in physiotherapy degree. There are the lists of question you need to fill-up which is include socio- demographic, information related, disease related and treatment related questions. For spending your time to participate in this self –administered interview which will take around 7-10 minutes. There is list of questionnaires and you need to fill up each answer. The information gained from this questionnaire will be used to academic purposes and will be kept confidential. Your participation in this study is totally voluntarily 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 your quarry. Looking confidential. Your participation in this study is totally voluntarily and 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 your quarry. Looking forward your kind cooperation.

Declaration of the participant,

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

Responded name: Witness name

Mobile number: Signature and date

Appendix – B

QUESTIONNAIRE(ENGLISH)

Association Between Posture and Neck Pain among Dental Practitioners in Dhaka City.

Date:

Name of respondent:

Address:

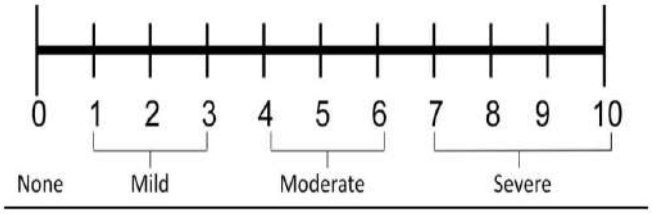
Part A: Socio Demographic Related Question:

Q NO	Question	Response	code
1	How old are you?	Years	
2	Gender of Participant	1.Male 2.Female 3.Others	
3	Educational level	1.BDS 2.B.Sc.in dental 3.Diploma in dental	
4	What is your religion?	1.Islam 2.Hindu 3.Buddhist 4.Christian	
5	Marital status	1.Married 2.Unmarried 3.Divorce 4.Separate	
6	What is your monthly income (BDT)	……Tk	
7	Height……Feet Weight……...kg		
8	BMI		

Part B: Work related information

Q No	Questions	Response	Code
8	How many years of working experience in dentistry?	……years	
9	Which position do you maintain during working time?	1.Standing 2.Sitting up straight 3.Forward bending 4.Backward 5.Slouched	
10	What is the length of working time during the day(h)?	……hours	
11	How many working days during the week?	……..day	
12	Do you use protective days equipment during work?	1.Yes 2.No	
13	Does it often happen that you work in the same position longer than 40 minutes?	1.Yes 2.No	
14	Do you need to transfer any heavy objects?	1.Yes 2.No	
15	Are you trying to work in a proper body position?	1.Yes 2.No	
16	Do you know about correct your work related ergonomics?	1.Yes 2.No	

Part C: Neck pain related Questions:

Q No	Questions	Response	Code
17	Do you have pain in your neck?	1.Yes 2.No	
18	Duration of pain?	……month	
19	Severity of pain? (According to NPRS scale)  Ref: McCaffery, M., Beebe, A., et al. (1989). Pain: Clinical manual for nursing practice, Mosby St. Louis, MO	1.Mild 2.Moderate 3.Severe	
20	What kind of pain do you feel	1.Sharping 2.Burning 3.Throbbing 4.Stabbing 5.Electric	
21	Do you have taken any treatment for this pain?	1.Yes 2.No	
22	What type of treatment you have taken?	1.Medication 2.Physiotherapy 3.Both 4.Surgery 5.Others	
23	Restriction of movement?	1.Yes 2.NO	

Appendix-C

SCMST-BPT/IRB/.03-10/25/34

To
Radia Akter
4th Year Student of B.Sc. in Physiotherapy
Session: 2019-20, Registration No: 8785
SAIC College of Medical Science & Technology (SCMST)
Mirpur-14, Dhaka-1216, Bangladesh

Subject: Approval of the thesis proposal **"Relationship between Posture and Neck Pain among Dental Practitioner in Dhaka City"** by ethics committee.

Dear Radia Akter
Congratulations.
The Institutional Review Board (IRB) of SCMST has reviewed and discussed your application to Conduct the above-mentioned dissertation, with yourself, as the principal investigator. The Following documents have been reviewed and approved:

Sr. No.	Name of the Documents
1	Dissertation Proposal
2	Questionnaire (English version)
3	Information sheet & consent form.

The purpose of the study to assess the Relationship between Posture and Neck Pain among Dental Practitioner in Dhaka City. Data will be collected by both ended questioners that may take 30 to 40 minutes to fill in the questionnaire and there is no likelihood of any harm to the participants. The members of the Ethics committee have approved the study to be conducted in the presented form at the meeting held at 09.00 AM on 04th September 2024 at SCMST.

The institutional Ethics committee expects to be informed about the progress of the study, any changes occurring during the study, any revision in the protocol and patient information or informed consent and ask to be provided a copy of the final report. This Ethics committee is working accordance to Nuremberg Code 1947, World Medical Association Declaration of Helsinki, 1964 - 2013 and other applicable regulation.

Best regards,
04.09.24.
Dr. Abul Kasem Mohammad Enamul Haque
Principal, SCMST &Chairman, Institutional Review Board (IRB)
SAIC College of Medical Science & Technology (SCMST)
Mirpur-14, Dhaka-1216, Bangladesh

Date: 03/09/2024

To

The Chairman,
Institutional Review Board (IRB)
SAIC College of Medical Science & Technology (SCMST)
Mirpur-14, Dhaka-1216.

Subject: Application for review and ethical approval.

Dear Sir,

With due respect, I am Radia Akter, student of 4th year B.Sc. in Physiotherapy Program at SAIC College of Medical Science & Technology (SCMST), affiliated by the University of Dhaka. As per the course curriculum, I have to conduct a research project that entitled "Relationship between Posture and Neck Pain among Dental Practitioner in Dhaka City" under the supervisor Md.Forhad Hossain, Lecturer of Department of Physiotherapy of SCMST.

The purpose of the study is assessing the Relationship between Posture and Neck Pain among Dental Practitioner in Dhaka City. Data will be collected by both ended questioners that may take 30 to 40 minutes to fill in the questionnaire and there is no likelihood of any harm to the participants. Data collectors will receive informed consent from all participants: any data collected will be kept confidential.

Therefore, I look forward to having your kind approval for the thesis proposal and to start data collection. I can also assure you that I will maintain all the requirements for study.

Sincerely,

Radia

Radia Akter
Student of 4th Year B.Sc. in Physiotherapy
Session: 2019-20 Reg: 8785
SCMST, Mirpur-14, Dhaka-1216, Bangladesh

APPENDIX- D

Gant Chart

Activates/ month	Jun 24	July 24	Aug 24	Sep 24	Oct 24	Nov 24	Dec 24	Jan 25	Feb 25	Mar 25	Apr 25	May 25	June 25	July 25
Proposal presentation														
Introduction														
Literature review														
Methodology														
Data collation														
Data Analysis														
Results														
1st progress presentation														
Discussion														
Conclusion &Recomendation														
2nd progress presentaion														
Comunication with supervisor														
Final submission														