Faculty of Medicine

University of Dhaka

Effectiveness of Muscle Energy Technique to reduce Cervicogenic Pain

Prasonjit Sarker

Bachelor of Science in Physiotherapy (B.Sc.PT)

DU Roll no: 1700

DU reg.no: 8839

Session: 2019-20

Department of Physiotherapy

SAIC College of Medical Science and Technology

Saic Tower, M - 1/6, Mirpur-14, Dhaka-1216

Bangladesh

We, the undersigned certify that we have carefully read and recommended to the Faculty of Medicine, University of Dhaka, for the acceptance of this dissertation entitled "**Effectiveness of Muscle Energy Technique to reduce Cervicogenic Pain: A Randomized Control Trial"**

Submitted by **Prasonjit Sarker**, for the partial fulfillment of the requirement for the degree of Bachelor of Science in Physiotherapy.

Md. Shahidul Islam

Associate Professor and Clinical Head

SCMST, Mirpur-14, Dhaka.

Supervisor

……

Dr. Mohammad Sohrab Hossain, PhD

Professor, Department of Physiotherapy, BHPI, CRP

Executive Director,

Center for the Rehabilitation of the Paralysed (CRP)

CRP Savar, Chapain, Savar, Dhaka- 1343

……

Zahid Bin Sultan Nahid

Assistant Professor and Head

Department of Physiotherapy

SCMST, Mirpur-14, Dhaka.

……

Dr. Abul Kasem Mohammad Enamul Haque

Principal

SCMST, Mirpur-14, Dhaka.

…….....

DECLARATION

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

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

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

Signature: **Date:** 31 August , 2025

Prasonjit Sarker

Bachelor of Science and physiotherapy (B.Sc. PT)

DU Roll no: 1700

DU Registration .no: 8839

Session: 2019-20

CONTENTS

ACKNOWLEDGEMENT

First of all, I would like to pay my gratitude to **Almighty God** who has given me the ability to complete this project in time with success. The second acknowledgement must go to my parents who have always inspired me for preparing the project properly. I am extremely grateful to my honorable and praiseworthy Supervisor Md. Shahidul Islam, Associate Professor, SAIC College of Medical Science & Technology for giving me his valuable time, his keen supervision and excellent guidance without which I could not be able to complete this project.

I am also very thankful to **Dr. Abul Kasem Mohammad Enamul Haque**, Principal, SCMST; **Zahid Bin Sultan Nahid**, Assistant professor and Head, department of Physiotherapy, SCMST; **Md. Shahidul Islam**, Associate Professor & Clinical Head Department of Physiotherapy, SCMST; **Asma Arzo**, Assistant professor, Department of Physiotherapy. **Md. Furatul Haque**, Lecturer Department of Physiotherapy, **Md. Billal Hossain,** Lecturer, Department of Physiotherapy, Saic College of Medical Science and Technology (SCMST); **Md. Forhad Hosen**, Lecturer, Department of Physiotherapy, **Shahid Afridi,** Lecturer, Department of Physiotherapy SCMST and also all of my respected teachers for helping me in this study.

I wish to thanks to all respectable Physiotherapy staff working at Pain-Paralysis Specialised & General Hospital Manikganj and Unique Pain and Paralysis Centre Mirpur for helping me in collection of my data. I wish to thank the Librarian of SCMST and his associates for their kind support to find out related books, journals and also access to internet.

Finally, I would like to thanks all the participants who willingly participated as the study population during the conduction of my study and the entire individual who were directly or indirectly involved with this study.

LIST OF TABLES

LIST OF FIGURE

ACRONYMS

AROM	Active Range of Motion
CCJ	Craniocervical Junction
CR	Cervical Radiculopathy
DM	Diabetes Mellitus
DNF	Deep Neck Flexor
HTN	Hypertension
IRM	Incomplete Rest Method
MET	Muscle Energy Technique
MRI	Magnetic Resonance Imaging
MST	Myokinetic Stretching Technique
NDI	Neck Disability Index
NPRS	Numeric Pain Rating Scale
ROM	Range of Motion
SCMST	Saic College of Medical Science and Technology
SMWAM	Spinal Movement Combined With Arm Mobilization
ULNTT	Upper Limb Neural Tension Test
IRR	Infrared Radiation
PNF	Proprioceptive Neuromuscular Facilitation
SET	Sling Exercise Training
MFR	Myofascial Release
SNAGs	Sustained Natural Apophyseal Glides
NAGs	Natural Apophyseal Glides
ICT	Ischemic Compression Technique
MTrPs	Myofascial Trigger Points
VAS	Visual Analog Scale
PPT	Pressure Pain Threshold

ABSTRACT

Introduction: Neck pain is a prevalent musculoskeletal complaint that affects a significant portion of the global population, contributing to disability, reduced quality of life, and increased healthcare burden. Conservative treatments, including physical therapy, have shown promise in managing symptoms. **Purpose:** This study investigates the effectiveness of muscle energy technique in combination with conventional physiotherapy for neck pain patients. **Objective**: The objective was to determine the effectiveness of this combined approach in reducing pain, alleviating disability and analyzing sociodemographic factors and pain-related characteristics among participants. **Methodology:** A randomized controlled trial (RCT) was conducted involving 28 participants diagnosed with neck pain. Participants were divided into two groups: one receiving muscle energy technique with physiotherapy and the other receiving only conventional physiotherapy. Interventions were administered over 10 sessions. Pain disability and range of motion were measured using the Numeric Pain Rating Scale (NPRS) and Neck Disability Index (NDI). **Analysis of Data:** Data were analyzed using SPSS version 22, with Mann Whitney U test and Wilcoxon Signed Rank tests comparing pre and post-intervention scores within and between groups. **Result:** Both groups showed significant reductions in pain and disability. Post-treatment NPRS scores in the experimental group mean difference of 2.57 ($p=0.001$) compared to the control group mean difference of 1.35 ($p=0.001$) suggesting that muscle energy technique demonstrated a greater pain-reduction impact. **Conclusion:** Muscle energy technique, combined with conventional physiotherapy, enhance outcomes in neck pain patients, offering a promising adjunct to standard care. Future studies should explore long-term effects and refine intervention protocols.

Key Words: *Neck pain, Muscle energy technique, Disability.*

CHAPTER- I INTRODUCTION

1.1. Background

Neck pain is a highly prevalent musculoskeletal disorder contributing to substantial global disability and economic burden. Recent estimates highlight that, in 2020, approximately 203 million people worldwide and 27.6 million people South Asia experienced neck pain, with prevalence rates remaining stable over the last three decades (Wu et al. 2024, p.145). Women consistently show higher prevalence rates than men, and the burden is projected to rise further with global population growth and aging—an estimated 269 million individuals are expected to be affected by 2050. These data underscore the urgent need for targeted interventions and improved strategies to address the rising burden of neck pain across populations (Wu et al. 2024, p.146).

Global burden of neck pain is a major health challenge affecting millions worldwide and is strongly linked to occupational and lifestyle factors. A recent cross-sectional study of 7,919 Bangladeshi office workers found a neck pain prevalence of 49.2%, highlighting how diverse work styles and ergonomic risks contribute to its widespread occurrence. Globally, the incidence rate in 2017 reached 3,551 cases per 100,000, leading to 806.6 years lost to disability, with nearly 23.7% of workplace musculoskeletal disorders in Bangladesh attributed to neck pain (Nafisa et al. 2025, p.10, p.13–14).

Globally, the number of adolescents and young adults affected by neck pain increased from 11,594,119 cases in 1990 to 12,880,134 in 2019. Despite this increase, the prevalence rate stabilized, dropping from 74,850.57 per 100,000 individuals in 1990 to 69,178.4 per 100,000 in 2019, with an annual decrease of –0.28%. In 2019, prevalence rates for ages 10–14, 15–19, and 20–24 were 31,624.66, 69,189.45, and 109,351.52 per 100,000 individuals, respectively. The regions with the highest prevalence rates in 2019 were Western Europe, high-income North America, and South east Asia, with rates of 1938.57, 1930.2, and 1021.37 per 100,000 individuals (Fu et al. 2025, p.514)

Neck pain is a widespread and painful musculoskeletal disorder, Chronic neck pain (CNP) represents the bulk of the public health conditions such as poor psychological health, including cognitive distress, anxiety, depressed mood , sleep disturbance resulting in loss of work output at all levels (Zibiri, Akodu & Okafor 2019, p. 1) .

Non-specific neck pain (NNP) is a symptom related to postural or mechanical cause. In most patients, neck pain can be a common cause of disability, it is associated with daily activity limitations, reduction of work productivity and decrease in quality of life. Neck pain has a socioeconomic impact because of physical and psychological symptoms that are related (Sbardella et al. 2021, p. 1).

This is considered the cornerstone of physical therapy for neck pain. It includes strength training, endurance exercises, flexibility, postural, coordination, and aerobic activities tailored to the individual's condition. Exercise aims to reduce pain, improve physical function, and prevent recurrence by addressing muscular imbalances and promoting proper biomechanics (de Zoete 2023, p. 3).

Electrical stimulation like Transcutaneous Electrical Nerve Stimulation (TENS) and low-level laser therapy may be used adjunctively to manage pain, though evidence suggests these have modest effect sizes individually (Waseem et al. 2020,p. 66).

Methods such as Muscle Energy Technique (MET), Proprioceptive Neuromuscular Facilitation (PNF), and Sling Exercise Training (SET) are increasingly integrated with traditional physical therapy for their potential benefits in improving muscle balance, posture, and neuromuscular control (Chen, Wang & Zhang 2023., 2023, p. 756).

Myofascial Release (MFR) is a non-invasive, manual therapy technique widely used in the management of chronic neck pain, a condition that significantly affects global health and daily functioning. Chronic neck pain often involves trigger points and fascial restrictions within muscles such as the trapezius and suboccipital muscles, which contribute to pain, reduced mobility, and disability(Mittal and Sharma 2024, p.49).

Mulligan's techniques, such as Sustained Natural Apophyseal Glides (SNAGs) and Natural Apophyseal Glides (NAGs), are commonly applied by physiotherapists when treating patients with non-specific neck pain (NP). However, there has been no comprehensive synthesis of their effects in neck pain (Barbosa-Silva et al. 2025, pp. 1-16) .

Neck pain is commonly unresponsive or does not fully resolve with current treatment strategies, with 37% of patients going on to experience chronic neck pain of greater than one year. Dry needling may be one intervention that could lead to improved outcomes

when used in conjunction with exercise and manual therapy (Gattie, Cleland & Snodgrass 2017, pp. 9).

MET is very effective in improving health outcomes such as pain, disability and joint function. The results showed that the combination of conventional therapy, whether it is analgesic instrumental therapy, active stretching or postural education, and MET is very effective with significantly relevant results, in accordance with the guidelines for the treatment of cervical pain that recommend a multifactorial approach in the management of problems related to this pathology (Sbardella et al. 2021, p. 12).

Muscle energy techniques (MET) were originally developed by two osteopathic physicians, Fred Mitchell, Sr. and Fred Mitchell, Jr., to treat soft tissue, mobilize joints, stretch tight muscles and fascia, reduce pain and to improve circulation and lymphatic drainage. MET are defined as a manual treatment in which a patient produces a contraction in a precisely controlled position and direction against a counterforce applied by a manual therapist (Thomas et al. 2019, p. 1).

Post-isometric relaxation, which causes a reduction in the tone of a muscle following an isometric contraction and reciprocal inhibition , which involves the reduction in tone of the antagonist muscle following the isometric contraction of the agonist muscle through inhibition of the alpha motor neuron. Post-isometric relaxation is the most frequently applied approach, while reciprocal inhibition is used when a tissue has severe limitations or has become fibrotic, as a treatment modality associated to post-isometric relaxation (Thomas et al. 2019, p. 2).

Muscle Energy Technique (MET) is effectively used for joint mobilization in patients with neck pain to enhance cervical range of motion and reduce pain. A recent randomized controlled trial found that MET combined with conventional physical therapy significantly improved neck pain, disability, and cervical range of motion compared to conventional therapy alone (Osama, Tassadaq & Malik 2020, pp. 344-347).

Muscle Energy Technique (MET) is an active manual therapy used to restore normal soft tissue function by addressing muscle shortening, joint restrictions, and associated dysfunctions. MET actively engages muscle contractions by the patient against a controlled counterforce by the therapist, which promotes normalization of soft tissue structures and improves joint mobility (Putra, Nugraha & Tianing 2020, pp. 19).

MET is an active isometric contraction method, along with application of moist heat therapy, that relaxes the muscle and restores the normal blood and lymphatic circulation by altering the interstitial pressure and trans-capillary blood flow that helps in washing out the nociceptive stimulants which relieves pain. MET with PIR helps to increase muscle flexibility due to viscoelastic changes in the muscle and reduce muscle tension (Joshi & Poojary 2022, pp. 15).

Myofascial release therapy is one of the passive therapies which would reduce the fascial tightness and bring back the normal movement in the fascia. It has played a major role on reduction of pain since it alters the matrix viscosity of the fascia and converts it from solid to liquid and removes pressure of fascia from the pain sensitive structures and causes realignment of the fascial structures (Ashok, Suganya & Arun, 2019, pp. 1-6).

One study showed that combining MET and Ischemic Compression Technique (ICT) is more effective than MET alone in reducing neck pain and muscle tenderness in male patients with upper trapezius active myofascial trigger points (MTrPs). This combination therapy provides immediate and short-term relief, establishing it as a preferred clinical treatment for such conditions. Additionally, MET plus ICT is cost-effective and practical for implementation in clinical settings (Mittal and Sharma 2024, pp.49).

The present study was undertaken to evaluate the effect of MET and static stretching to improve pain and functional disability in patients with mechanical neck pain. Both groups showed significant improvement in VAS after receiving their respective treatments. MET reduced pain perception by increasing the stretch tolerance (Phadke et al. 2016, p.7).

Recent clinical trials demonstrate that combining MET with conventional physical therapy produces superior outcomes compared to conventional therapy alone in patients with chronic mechanical neck pain. One 2025 study found that MET added to conventional physiotherapy significantly reduced pain intensity and improved cervical range of motion (ROM) across all movement directions (flexion, extension, rotation, lateral flexion) compared to conventional therapy alone (Hussain et al. 2025, p.1368).

Postural abnormalities such as forward head posture contribute significantly to chronic neck pain and disability. A 2022 randomized clinical trial assessed MET combined with posture correction exercises versus a conventional neck range of motion treatment. The combined MET and postural training group showed significantly greater reductions in

neck pain (Numerical Pain Rating Scale), improvements in neck disability (Neck Disability Index), and better posture correction (craniovertebral angle) compared to the control group (Joshi and Poojary 2022, p. 19).

There is currently no consensus on standardized treatment protocols for MET including optimal dosage, session frequency, duration, and intensity. Variations in these parameters across studies limit comparability and reproducibility of results. Most research has focused on short-term pain relief and functional outcomes. There is a need for studies with longer follow-up periods to assess sustained benefits and long-term effects of MET interventions (Tinson, Rao, and Johnson 2025, p. 12421).

MET combined with conventional physiotherapy has demonstrated significant short-term improvements in pain relief and cervical range of motion (ROM) in patients with chronic mechanical neck pain (Hussain et al. 2022,p. 1368).

Studies with follow-up periods up to 6 weeks report that reductions in pain intensity and improvements in posture and function achieved via MET are largely maintained post-treatment, demonstrating sustained clinical benefit . The mechanisms underlying sustained improvement include enhanced proprioceptive feedback, decreased muscle tension, and correction of biomechanical dysfunction, which contribute to lasting postural adaptations beyond the treatment period (Mihcioglu and Malkoc 2025, p.6).

Current clinical guidelines endorse MET as a valuable adjunct to conventional therapy in managing chronic neck pain, particularly when combined with exercises targeting postural correction and neuromuscular control .There is a call for larger, multisite randomized controlled trials with extended follow-ups to better establish the long-term efficacy and optimum treatment paradigms of MET, including investigation into its integration with other therapies like Pilates, myofascial release, and strengthening exercises (Lin et al. 2023, pp. 11-13).

1.2 Rationale:

Muscle energy technique can be highly effective for patients with neck pain due to its multifaceted benefits. This condition often involves nerve root compression, leading to pain, weakness, and sensory changes in the upper extremities. Muscle energy technique and reduce muscle tension and pain, improve flexibility which can alleviate pressure on

the cervical spine and surrounding nerves. Additionally, isometric and isotonic techniques promotes blood flow to the affected areas, aiding in healing and reducing inflammation. It also facilitates nerve mobilization, potentially relieving symptoms and enhancing functional movement. Furthermore, regular isometric and isotonic techniques can improve posture, an essential aspect since poor posture may worsen radiculopathy symptoms.

Thus, the purpose of the researcher is to determine the effectiveness of muscle energy technique to reduce cervicogenic pain in patients. In fact, studying the effectiveness of muscle energy technique usage in physiotherapy treatment as an intervention to decrease neck pain patients would be the reason for the study. The investigator was interested to know the effectiveness of muscle energy technique in physiotherapy treatment of neck pain in this condition. In addition, this study will also be useful for the physiotherapy profession. Therefore it will be beneficial to deliver treatment to patients with neck pain.

So researcher think if the cause of neck pain is mechanical then the correction method of neck pain will be mechanical way because drugs or medicine can not correct or reduce neck pain. There is so many gaps I found from previous study about "effectiveness of muscle energy technique to reduce cervicogenic pain". So I think these study can fill these gaps & establish the new things. Then the patients with neck pain will be get better treatment & better result of neck pain. It can helps to know patients and common people about the isometric and isotonic techniques effectiveness & physiotherapist or medical practitioners can provide better treatment to the patients with neck pain.

1.3 Research question:

Is muscle energy technique effective for patients with cervicogenic pain?

1.4 Aim of the study:

The aim of the study was to investigate the effectiveness of muscle energy technique in alleviating symptoms in patients suffering from cervicogenic pain.

1.5 Objectives:

- **General objective:**
  To identify the effectiveness of muscle energy technique versus conventional physiotherapy treatment on patients with cervicogenic pain.

- **Specific objectives:**

To assess socio-demographic characteristics and pain related information of experimental and control group.

To determine the level of pain of the patients of experimental group by using NPRS before and after muscle energy technique along with conventional physiotherapy.

To determine the neck disability of the patients of experimental group by using NDI before and after muscle energy technique along with conventional physiotherapy.

To assess the level of pain of the patients of control group by using NPRS before and after conventional physiotherapy.

To assess the neck disability of the patients of control group by using NDI before and after conventional physiotherapy.

1.6 Research Hypothesis

Null hypothesis (Ho):

Ho: $\mu 1-\mu 2 = 0$ or $\mu 1 \geq \mu 2$, where the mean difference between the experimental and control groups is zero or the control group means more than the experimental group.

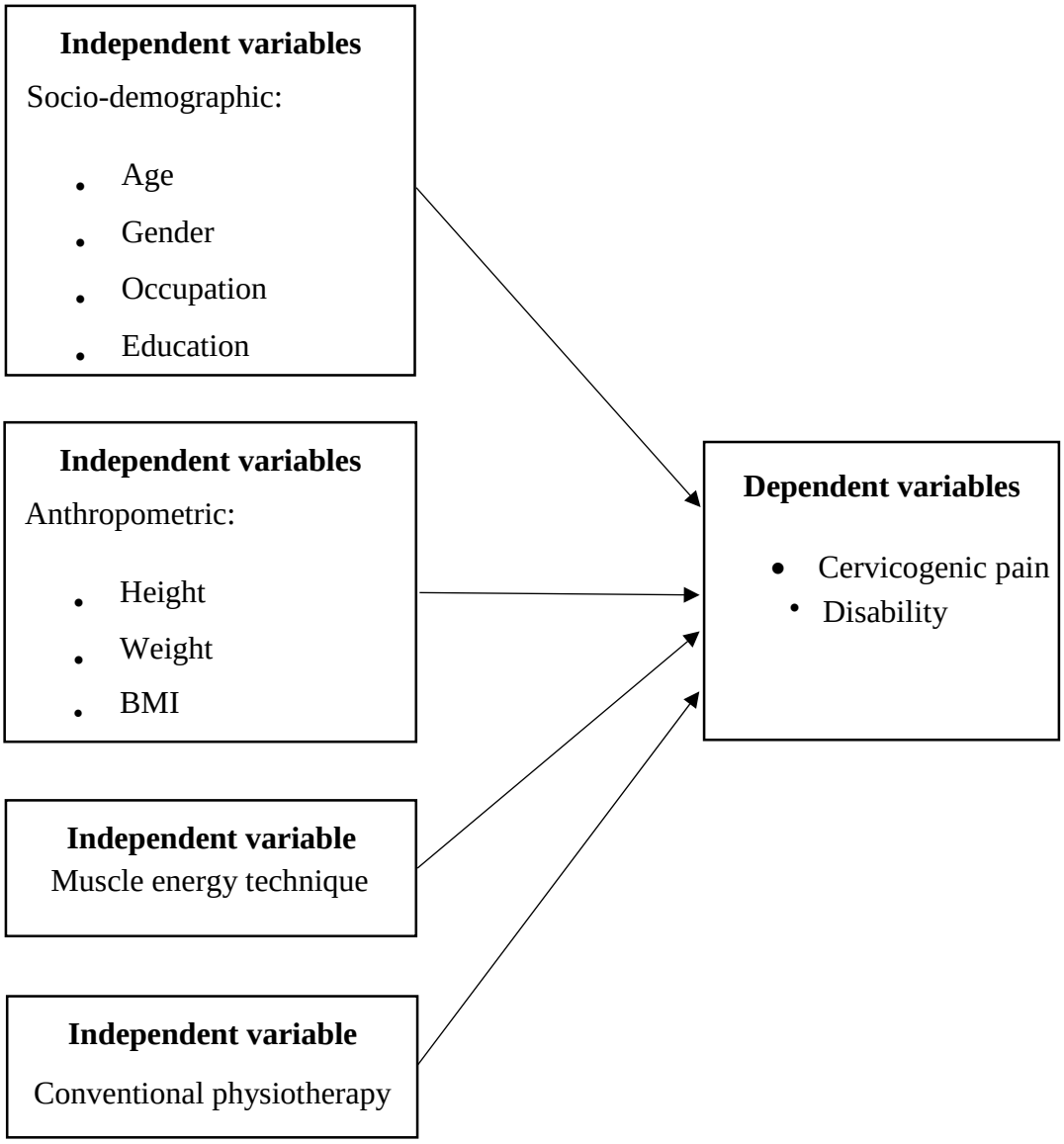
Alternative hypothesis (Ha):

Ha: $\mu 1-\mu 2 \neq 0$ or $\mu 1 \neq \mu 2$ when the average difference between the test group and the control group is different.

Here,

Ho= Null hypothesis
Ha = Alternative hypothesis
$\mu 1$ = Mean of experimental group
$\mu 2$ = Mean of control group

1.7 List of variables :



1.8 Operational definition of variables:

Cervicogenic pain: Cervicogenic Pain named as Cervical pain is the sensation of discomfort in the neck area. Cervical pain can result from disorder of any structure in the neck, including the cervical vertebrae and vertebral disc, nerve, muscles, blood vessels, esophagus, larynx, trachea, lymphatic organ, thyroid gland or parathyroid gland. Cervical pain arises from numerous different conditions and is sometimes referred as neck pain. It is a pain full condition in the cervical and remote which may be localized or referred.

Muscle energy techniques : Muscle energy techniques are a class of soft tissue osteopathic (originally) manipulation methods that incorporate precisely directed and controlled, patient initiated, isometric and/or isotonic con tractions, designed to improve musculoskeletal function and reduce pain.

Upper limb: The arm, forearm, wrist, and hand are all considered to be part of the upper limb, also referred to as the upper extremity. Stretching from the shoulder joint to the fingertips, it is a functional unit of the upper body. Together, the bones, muscles, nerves, blood vessels, and connective tissues that make up the upper limb enable a variety of functions, including gripping and object manipulation.

Pain: Pain is defined as an unpleasant sensory and emotional experience, associated with, or presumably due to, actual or potential tissue damage (IASP) is working.

Disability: Any condition which makes a person's life more or less difficult in accomplishing some or all of the activities of daily living falls under the category of disability. Cognitive, developmental, intellectual, mental, physical, sensory, or any combination of several factor, could be considered a disability.

CHAPTER- II LITERATURE REVIEW

Globally, neck pain affects approximately 203 million people as of 2020, a figure which has been fairly stable over the last 30 years. Projections estimate this number will increase to 269 million by 2050 due to aging populations worldwide (Elliott et al. 2024; Kolling Institute, 2024). Neck pain is a common musculoskeletal disorder affecting people of all ages but is particularly prevalent among adults aged 45 to 74 years (Wu et al. pp. 145–147).

Neck pain is strongly associated with varying degrees of disability, primarily impacting physical function and quality of life. Research shows there is a positive correlation between the intensity of neck pain and disability levels as measured by standard indexes such as the Neck Disability Index (NDI). This suggests that patients with higher pain intensity often report increased difficulty in performing daily activities and work-related tasks (Kapernaros et al. 2025, p.1).

High job demands, low job satisfaction, manual work, static postures, and lack of decision-making authority at work have been associated with neck pain aggravation (Kazeminasab et al. 2022, pp. 9-10).

Extended daily use of smartphones, computers, or other electronic devices with head bowed increases mechanical stress on the neck and worsens pain (Gao et al. 2023, p. 6).

Staying up late, obesity, smoking, and poor sleep quality also contribute to increases in neck pain (Gao et al. 2023, pp. 9-10).

The aging process leads to cervical spondylosis, osteoarthritis, degenerative disc disease, and spinal stenosis, which are common contributors to neck pain in older adults (Kazeminasab et al. 2022, p. 9).

Mechanical neck pain is most commonly defined as pain localized in the cervical spine or cervicothoracic junction that is elicited or worsened by cervical motion or palpation of the cervical musculature. It typically arises from the musculoskeletal structures including joints, muscles, and soft tissues of the neck (Tsegay et al. 2023, p. 597-609).

Prolonged poor posture, repetitive movements, or holding the head in static positions can cause muscle fatigue and pain (Teles et al. 2016, p. 1).

Non-specific neck pain (NSNP) refers to neck pain without a clearly identifiable specific underlying pathology or anatomical cause found in medical imaging or examinations. It is the most common type of neck pain, accounting for more than 90% of cases where no distinct patho-anatomical cause can be diagnosed (Kim and Shin 2024, pp. 1).

Cervical spine manipulation has been consistently shown to be effective in reducing mechanical neck pain, improving range of motion, and enhancing functional ability. Systematic reviews indicate that manipulation combined with exercises produces better outcomes than manipulation or exercises alone (Teles et al. 2016, p. 3).

Exercise programs focusing on strengthening, stretching, and improving posture and muscle endurance are fundamental. Techniques such as McKenzie neck exercises and contract-relax stretching have proven beneficial in reducing pain and improving neck function among patients with mechanical neck pain (Abbas et al. 2024, p. 1630).

Dry needling, involving insertion of thin needles into myofascial trigger points, has emerged as an adjunctive treatment option. Meta-analyses demonstrate DN's effectiveness in short-term pain relief and functional improvement, particularly in chronic cases, although its long-term effects require further investigation (Aleid et al. 2025, p. 4).

Combining manual therapy, dry needling, and exercise therapy often yields superior results compared to any single intervention. For example, magnetic therapy added to exercise programs has shown additional benefits in pain relief and balance in elderly patients with chronic mechanical neck pain (Almasri and Shanb 2024, pp. 7).

In middle-aged adults (e.g 35-50 years), neck pain prevalence tends to peak, likely due to cumulative occupational, lifestyle, and degenerative factors (Damm et al. 2023, p. 6)

Among adolescents and young adults, prevalence increases with age, with significantly higher rates in those aged 20-24 compared to younger groups, likely related to increased screen time, academic pressure, and lifestyle changes (Fu et al. 2025, p.521).

Older age significantly influences the prevalence of neck pain, as supported by various studies. According to a cross-sectional study by Jamal et al. (2023), the prevalence of neck pain increases with advancing age due to cumulative wear and tear on cervical

structures, including intervertebral discs, facet joints, and soft tissues. Degenerative changes such as cervical spondylosis become more common, contributing to stiffness and pain in older adults (Damm et al. 2023, p. 6).

studies show that higher BMI, especially overweight and obesity, is correlated with increased mechanical strain on cervical structures, poor posture like forward head posture, and altered neck biomechanics, which can predispose to mechanical neck pain (Kilinc & Karaduman 2021, p. 177).

Neck pain prevalence increases with factors like female sex, low income, sedentary lifestyles, repetitive movements, and presence of comorbidities. For instance, those in the 36–59-year age group had a prevalence rate near 19%, rising to 23.5% in those 60 years or older (Genebra et al. 2017, p.277).

In Bangladesh, neck pain is highly prevalent among working populations, especially office workers. A cross-sectional study of private sector employees showed a prevalence rate of 2582 per 100,000 for neck pain, making up 23.7% of workplace musculoskeletal problems (Rahman et al. 2025, p. 3). Risk factors include physical inactivity, prior neck discomfort, and age >41 years (Nafisa et al. 2025, p. 10).

Among occupational groups in Dhaka, the prevalence of neck pain is much higher. A cross-sectional study of sedentary urban workers (shopkeepers) in Dhaka found neck pain prevalence to be 48.0% over the previous month, making it the second most common musculoskeletal complaint after low back pain). The prevalence significantly correlated with age, gender, tobacco use, and obesity (Ali and Mehjabin 2023, p. 2304-2306).

In Bangladesh, Neck pain is a significant health issue in Bangladesh, particularly affecting those aged 41 years or above, with an adjusted odds ratio (AOR) of 4.435 (Nafisa et al. 2025, p. 13). It is also common among individuals with prior neck pain episodes, physical inactivity, smoking, or neck misalignment (Nafisa et al. 2025,p. 14). Sedentary behaviors and occupational postures have mixed associations, with prolonged forward neck flexion being more strongly linked to neck pain than sedentary work alone (Nafisa et al. 2025,p. 14).

This aligns with other research indicating that musculoskeletal pain including neck pain is highly prevalent among female workers due to occupational postures and prolonged

repetitive tasks. Ready-made garment (RMG) workers, predominantly female, show a high prevalence of neck pain, with 23.7% reporting recent symptoms (Hossain et al. 2018, pp. 1- 7).

South Asia,The Global Burden of Disease study indicates that in 2019, South Asia had an age-standardized incidence rate of neck pain of approximately 897 per 100,000 population, ranking it among the higher regions globally after North America and East Asia. In South Asia, data suggest that the rising incidence in neck pain may be related to occupational factors, psychological stress, and lifestyle changes associated with urbanization and technology use ((Li, Zhang & Shu 2023, pp. 1813-1818)

The diagnosis of neck pain varies widely, including non-specific mechanical neck pain, cervical spondylosis, and musculoskeletal disorders linked to occupational hazards. Non-specific neck pain dominates the diagnosis spectrum, often combined with accompanying symptoms like stiffness or shoulder pain ((Shin et al. 2022, pp. 11-13).

In India ,The overall prevalence of neck pain in Indian populations varies by setting but is commonly reported between 20% and 56%. For example, a study among medical students in Bhopal reported 56.4% neck pain prevalence, with a statistically significant higher prevalence in females compared to males (Sachdeva et al. 2022, p. 71-80).

A study among garment workers in India showed that as high as 58.24% of individuals aged 20 to 60 reported mild to severe neck pain (Ghediya 2024, p.155)

In Pakistan, Current study conducted to determine the prevalence of neck pain and disability in medical students of Sialkot. Total 465 students were included in this research. 33.8% students showed no pain, 31.2% students showed mild pain while 6.2% experienced very severe pain. In 37% responders sleep is occasionally disturbed while 39.8% have normal sleep. 44.9% students have no feeling of pins but 29.2% participants occasionally felt pins and needles. Out of 465 participants 14.2% students had pain increased during reading, 8.8% can't read for longer time. 212 students (45.59%) can work without extra pain, 124 students (26.67%) can do work but with extra pain but 28 (6.2%) cannot work at all. (Ghafoor et al. 2024, p. 17).

In the SAARC region (South Asian Association for Regional Cooperation countries), The burden of neck pain in South Asia is influenced by factors such as large population

size, occupational hazards, unhealthy lifestyle behaviors, and limited healthcare resources (Li, Zhang & Shu 2023, pp. 1811-1821).

Occupational groups in South Asia, such as manual laborers and office workers, show high rates of musculoskeletal pain including neck pain, attributed to repetitive strain, poor posture, and ergonomic deficiencies (Mishra et al. 2025, pp.1-15).

Neck pain is common, with half of individuals expected to experience it during their lifetime, and a significant portion developing chronic symptoms, affecting about 8% of the population in Western societies. Middle-aged females with sedentary lifestyles are particularly at risk. A survey of 4,839 participants showed that 46% had constant pain lasting over two years, while 19% lost their jobs due to chronic pain, which is linked to delayed healing and higher healthcare costs (Overmann et al. 2024, p. 56).

In Indonesia, In 2019, Indonesia had an age-standardized incidence rate of neck pain of approximately 965 per 100,000 population (95% UI: 764 to 1219), ranking it second highest in Southeast Asia after the Philippines (Li, Zhang & Shu 2023, pp. 1811–1821).

The age-standardized point prevalence of neck pain in Indonesia reflects a substantial and growing burden coinciding with increasing urbanization and sedentary lifestyles (Shin et al. 2022, pp. 1-14).

Occupational exposure is a significant risk factor among Indonesian populations. For example, a cross-sectional study of motorcyclists in Jakarta found that occupation, particularly being a lecturer or educator, was associated with over 3.9 times greater odds of having neck pain compared to students. Prolonged sitting, poor posture, and workplace stress influence this risk. Sleep duration less than 7 hours per day and longer riding distances were also linked to increased neck pain among commuters. (Makkiyah et al. 2025, pp. 425-435).

In Japan, The prevalence of neck and shoulder pain (NSP), or Katakori, in Japan is reported as 48.3% in the general population, with higher rates in females compared to males. The prevalence is highest among people aged 20-50 years and declines with age (Takasawa et al. 2015, pp. 403-409)

Another study found Katakori to be the most common symptom in women (12.5%) and the second most common symptom in men (6.0%) in the Japanese census, indicating significant burden on productivity and quality of life (Takasaki 2025, p.1).

Females are more affected than males, potentially due to biological and psychosocial factors (Takasawa et al. 2015, pp. 403-409). Highest prevalence in middle-aged adults (20-50 years), with some decline in older age (Takasawa et al. 2015, pp. 403-409). Japanese individuals may attribute symptoms more to physical fatigue than mental fatigue due to cultural attitudes, which affects reporting and treatment (Takasaki 2025, p.4).

In Iran, In 2019, Iran recorded approximately 0.86 million new cases of neck pain, with an age-standardized incidence rate of 934 per 100,000 population, and the highest prevalence was observed in Tehran. The point prevalence among elderly Iranians (70+) was 8,710 per 100,000, with females having a slightly higher prevalence than males. Occupational factors, such as poor cervical posture and prolonged neck strain, as well as age, gender, obesity, low physical activity, urban living, and poor mental health, increase the risk of neck pain in the Iranian population (Khadembashiri et al. 2024, pp. 1850-1860).

In China, In 2019, China reported about 68 million people suffering from neck pain, with the national age-standardized point prevalence slightly increasing from 3.53% in 1990 to 3.57% in 2019. This prevalence is above the global average and has shown a steadily increasing trend across three decades (Xia et al. 2024, p.1-11).

Neck pain prevalence is higher in females than in males, with incidence rates in 2021 about 29.4% higher in women. The condition peaks among middle-aged adults (35–60 years), particularly affecting the working population, and is more common in females due to factors like smaller neck muscle mass, lower endurance, hormonal changes, and exposure to repetitive neck flexion activities . Stress, anxiety, and depression further exacerbate neck pain by increasing muscle tension and pain perception (Wei et al. 2025, pp. 1975-1990).

In Africa, The point prevalence of neck pain in sub-Saharan Africa ranges from 4.1% to 6.8%, with higher rates in females (6.0–6.8%) compared to males (4.1–4.7%) .

Occupational factors such as manual labor, heavy load carrying, and lack of work control, along with psychosocial factors like job strain, stress, and sleep disturbances, significantly increase the risk and intensity of neck pain .Lifestyle factors such as smoking, higher BMI, physical inactivity, and poor ergonomics further contribute to neck pain, emphasizing the need for integrative prevention and management, including ergonomic interventions and psychosocial support (Mukhtar, Ibrahim & Mohammed 2023, pp. 1-5).

The burden of neck pain in Africa is increasing, compounded by rapid population growth, aging, limited preventive strategies, and socioeconomic challenges. In 2019, the age-standardized incidence rate for neck pain in central sub-Saharan Africa was about 268 per 100,000, somewhat lower than the global average but still a major health concern due to disability impact (Li, Zhang & Shu 2023, pp. 1811-1821).

In Europe, The global age-standardized prevalence of neck pain is around 4.9%, with thMuscle energy technique e highest rates occurring in Western Europe, high-income North America, and high-income Asia Pacific regions (Shin et al. 2022, p.5).

Prolonged sitting, repetitive neck movements, poor ergonomic design, high job demands, and lack of rest breaks contribute significantly to neck pain among European workers (Rafeemanesh et al. 2025, p.14).

In USA,The annual prevalence rate of neck pain among adults in the USA exceeds 30%, with nearly 50% experiencing some degree of chronic neck pain or frequent episodes. Lifetime prevalence statistics show that between 20% and 70% of adults will experience neck pain severe enough to interfere with daily activities at some point in their lives . Anxiety, depression, low social support, and job strain significantly increase neck pain risk and persistence (Shin et al. 2022, pp. 4-6).

The age-standardized point prevalence of neck pain has remained relatively stable from 1990 to 2019, with regional variations, and the highest rates are found in high-income regions such as Western Europe, North America, and parts of Asia Pacific, typically ranging from 4% to 7% .Demographic factors, particularly age (middle to older adults) and female sex, significantly increase the risk of developing neck pain . Modifiable lifestyle factors such as physical inactivity, obesity, smoking, and poor sleep quality are also strongly associated with neck pain (Li, Zhang & Shu 2023, pp. 1811-1821).

MET involves the patient actively contracting a muscle or muscle group against a therapist's resistance in a controlled manner, usually followed by a period of relaxation and passive stretching.The technique relies on post-isometric relaxation—after a muscle contracts isometrically, it relaxes, allowing for increased stretch—and reciprocal inhibition, wherein contracting the antagonist muscle helps relax the target muscle.These mechanisms reduce muscle hypertonicity, increase joint mobility, decrease pain, and restore normal muscle length and function by influencing neurological pathways such as muscle spindle and Golgi tendon organ reflexes (Phadke et al. 2016, pp.5-8).

Studies also report that MET effectively helps reduce disability and improves functional outcomes in musculoskeletal conditions, including neck and lower back pain. Its adaptability enables application across various anatomical regions, especially the spine, shoulders, and pelvis ((Teichert et al. 2023, pp. 594-609)

Muscle Energy Techniques (MET) include Post-Isometric Relaxation, Reciprocal Inhibition, Isolytic, and Respiratory MET, which help reduce pain, lower muscle tone, improve joint mobility, and enhance functional movements after injury. They are especially effective in accelerating recovery from stiffness or tightness during post-surgical and musculoskeletal rehabilitation. MET can improve conditions such as post-surgical stiffness in the wrist, elbow, and knee, while also enhancing neuromuscular control, muscle strength, and functional performance (Faqih et al. 2019, pp. 25-33).

It was reported by Hussain et al. (2025, p. 1365-1369) that adding a single session of Muscle Energy Technique (MET) to conventional therapy significantly reduced neck pain and increased cervical ROM versus conventional therapy alone in adults with chronic non-specific neck pain.

Another study examined the effects of a 4-week MET program (3 sessions per week) on patients with COPD and chronic neck pain regarding pain intensity, importance of physical activity, self-confidence, and posture. MET led to a significant reduction in pain intensity at rest and night, with improved perception of physical activity importance, increased self-confidence in exercising, and better postural alignment compared to controls. Importantly, these effects were sustained at a 6-week follow-up, confirming the clinical relevance and durability of short-term MET benefits (Mihcioglu et al. 2025, pp. 1-9).

A study involving 60 patients with mechanical neck pain compared the effects of Muscle Energy Techniques (MET) and static stretching, both in conjunction with conventional therapy. The patients were randomly allocated to either the MET or control group, with treatment given once a day for six days. Pain intensity was measured using the Visual Analog Scale (VAS), and functional disability was assessed with the Neck Disability Index (NDI). Results showed significant improvements in both groups, but the MET group demonstrated better outcomes in terms of both pain reduction and functional improvement compared to the stretching group. Thus, MET was found to be more effective in managing mechanical neck pain (Phadke et al. 2016, pp. 5-11).

The study investigated the effectiveness of combining Muscle Energy Technique (MET) and Ischemic Compression Technique (ICT) for treating neck pain and muscle tenderness caused by active myofascial trigger points (MTrPs) in the upper trapezius muscle. A total of 60 male participants, aged 19–38, were randomly assigned to three groups. Group A received MET and ICT with conventional therapy, Group B received MET with conventional therapy, and Group C only received conventional therapy. Interventions were provided once daily for 6 days, with assessments made immediately post-treatment and after 2 weeks. The results showed significant improvements in both pain intensity (measured by VAS) and muscle tenderness (measured by PPT) for all groups. However, Group A, which received both MET and ICT, demonstrated the greatest improvements in both conditions, making the combination therapy the most effective option for managing MTrP-related neck pain and muscle tenderness (Alghadir et al. 2020, pp. 1-9).

This systematic review evaluated the efficacy of Muscle Energy Techniques (MET) in both symptomatic and asymptomatic subjects. A total of 26 studies were included, with 14 focusing on symptomatic patients and 12 on asymptomatic individuals. The review assessed outcomes such as range of motion, chronic and acute pain, and trigger points. The quality of studies was deemed "moderate to high" based on the PEDro scale. Results showed that MET effectively reduces chronic and acute pain, particularly for lower back pain, chronic neck pain, and lateral epicondylitis. MET also improves joint range of motion when functional limitations are present, although other techniques may be more suitable for treating trigger points (Thomas et al. 2019, pp. 1-18).

This 2018 randomized controlled study compared manual pressure release (MPR) and muscle energy technique (MET) for mechanical neck pain due to upper trapezius myofascial trigger points in 45 young women. Both therapies, combined with postural advice and isometric neck exercises, significantly reduced pain intensity, muscle tenderness, neck disability, and improved range of neck rotation over 15 days. No significant differences were found between MPR and MET, indicating equal efficacy. Improvements are attributed to neurological and muscular resetting effects. Future research should include larger, mixed-gender samples and longer follow-ups (Kashyap, Iqbal and Alghadir 2018, p. 3151–3160).

This 2021 systematic review analyzed 21 clinical trials involving 913 adults with non-specific acute and chronic neck pain. Muscle Energy Technique (MET) effectively reduces pain, disability, and improves cervical range of motion (ROM). MET shows comparable or superior effects to other manual therapies like ischemic compression and dry needling, especially in improving cervical mobility. Combining MET with traditional physical therapy or other manual techniques enhances outcomes (Sbardella et al. 2021, pp. 1-15).

This 2019 randomized controlled trial investigated Muscle Energy Technique (MET), Neck Stabilization Exercise (NSE), and neck care education (NCE) with infrared radiation on 35 patients with non-specific chronic neck pain. All interventions significantly improved pain, neck disability, depression, anxiety, and sleep disturbance after 8 weeks, with NSE showing superior effects on these outcomes. MET's pain reduction is attributed to post-isometric relaxation and neurological inhibition mechanisms. Improvements in psychological status and sleep were likely due to decreased pain and relaxation effects (Zibiri, Akodu and Okafor 2019, pp. 1-7).

CHAPTER-III METHODOLOGY

3.1 Study design:

The study design was a Randomized Controlled Trial (RCT). This design was best for comparing the effectiveness between muscle energy technique and conventional physiotherapy among the patients with cervicogenic pain.

3.2 Study area:

The areas of study were the Pain-Paralysis Specialised & General Hospital in Manikganj and Unique Pain and Paralysis Centre in Mirpur, Dhaka."

3.3 Study place:

The study was conducted at Saic College of Medical Science and Technology (SCMST) at Mirpur-14, Dhaka-1216.

3.4 Study period:

The duration of the study was one year from July 2024 to August 2025.

3.5 Study population:

The population of this study was patients with cervicogenic pain of Pain-Paralysis Specialised & General Hospital Manikganj and Unique Pain and Paralysis Centre at Mirpur Dhaka.

3.6 Sample size:

$$n = \frac{2\sigma^2 \left(\frac{z\alpha}{2} + z\beta\right)^2}{\Delta^2}$$

$$= \frac{2 \times 1.39 \times (1.96 + 0.84)^2}{(7.13 - 6.24)^2}$$

$$= \frac{2 \times 1.39 \times 7.84}{(0.89)^2}$$

$$= \frac{21.9}{0.79}$$

$$= 27.58$$

Here,

σ^2 = variance of the outcome measure = 1.39 (Joshi and Poojary 2022, p. 18).

Δ = mean difference 0.89 (Joshi and Poojary 2022, p. 18).

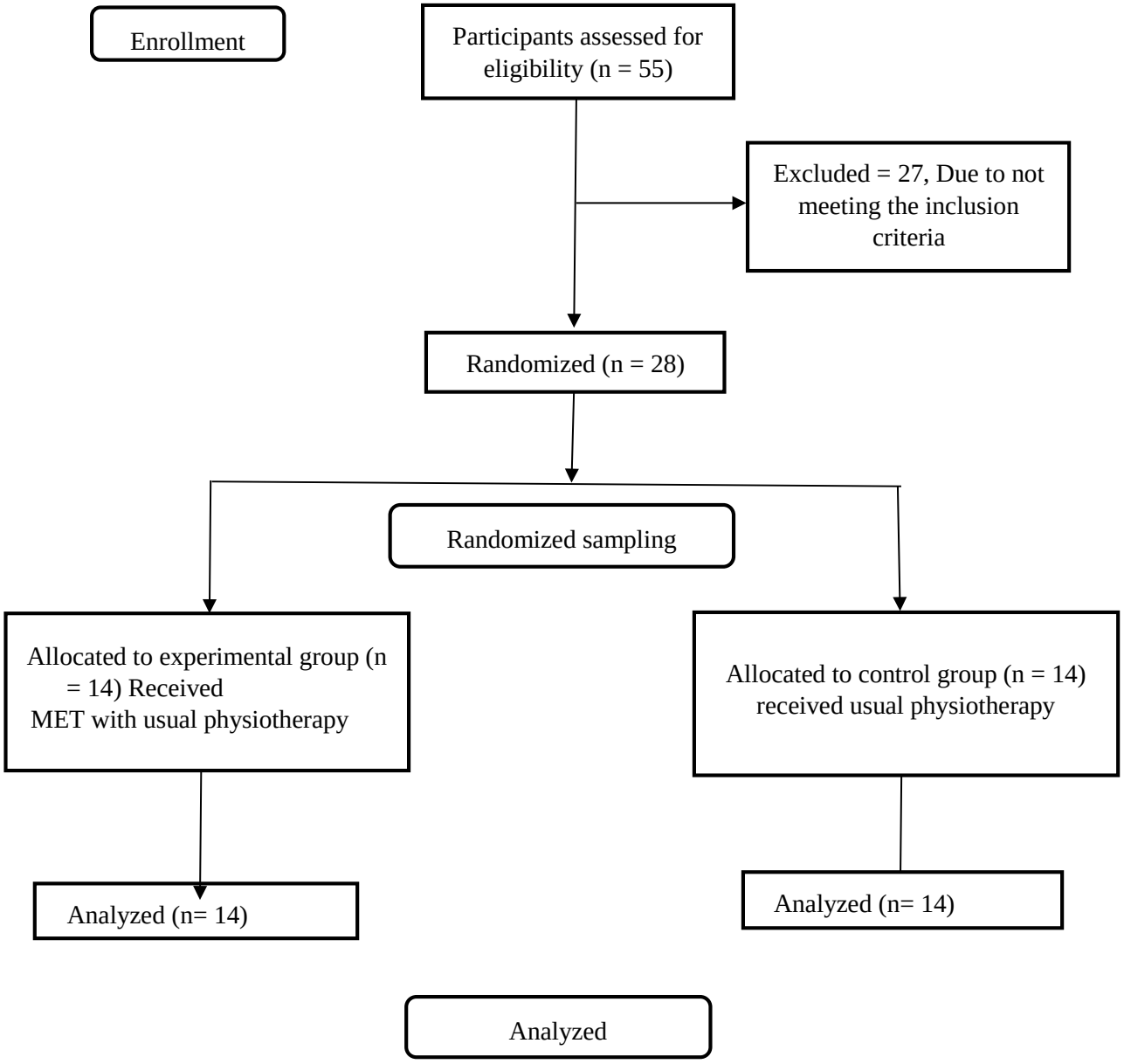
$Z\alpha/2$ = For a 5% significance level ($\alpha = 0.05$, two-tailed) = 1.96

$Z\beta = (1 - \beta)$, For 80% power ($\beta = 0.20$) = 0.84

n = Sample size (each group)

The sample size was limited to 28 participants due to constraints related to financial resources and time availability.

3.7 CONSORT (Consolidated Standards of Reporting Trials) flow chart:



3.8 Sampling technique:

Convenience sampling technique was adopted to select the patients with cervicogenic pain from Pain-Paralysis Specialised & General Hospital Manikganj and Unique Pain and Paralysis Centre at Mirpur Dhaka. Then screening of the patients was done on basis of inclusion criteria. The patients were included who met the inclusion criteria. Thereafter, Simple random sampling technique was used to allocate the participants into experimental and control group.

3.9 Eligibility criteria:

3.9.1 Inclusion criteria:

- Age range 20-60 years (Joshi and Poojary 2022).
- Both gender of male and female (Joshi and Poojary 2022).
- Patient with confirmed diagnosed cervicogenic pain.

3.9.2 Exclusion criteria:

- Patients with recent surgery. (Phadke et al.2016).
- Mental unstable patients.
- Patients who are not interested.
- Patients with severe pathological condition. (Phadke et al.2016).

3.10 Methods of data collection:

3.10.1 Technique of data collection:

Face to face formal interview technique was used to collect data from the selected patients with cervicogenic pain.

3.10.2 Instrument of data collection:

The pretested structured questionnaire was used as an instrument of data collection. The questionnaire had parts. The first part contained questions on patient identification. The second part included questions on sociodemographic information. The third part contained questions on assessment related variables. The fourth part contained questions on pain related variables. The fifth part contained neck disability index related variables.

3.11 Tools for data collection:

In this particular study weight machine, height measure tape used.

3.12 Procedure of data collection:

Out of the 55 patients, 55 cases of neck pain were selected from from Pain-Paralysis Specialised & General Hospital Manikganj and Unique Pain and Paralysis Centre at Mirpur Dhaka. Patients were screened and thus 27 patients were excluded on basis of exclusion criteria. The 28 patients were allocated by randomization to experimental and control groups thereafter. Muscle energy technique done in the experimental group and usual physiotherapy was done in the control group. 14 patients were in the experimental group and 14 patients in the control group. Ten sessions of treatment were completed in both groups. The number of experimental and control group participants eventually comes to 14. Pain and disability were collected. This information has been viewed as pretest data. For the present intervention both experimental groups were muscle energy technique and conventional physiotherapy. Conventional physiotherapy was given for control group only. Both groups received similar 10 sessions. NPRS was used for collecting information about pain and NDI for disability after the completion of the intervention. Post test data of 28 neck pain patients have been regarded as information after the intervention. The researcher thanked the participants after the interview.

3.13 Intervention: (Yadav & Goyal 2015, p. 52)

Control group (Received 2 weeks and 10 sessions of conventional physiotherapy)	Experimental group (Received 2 weeks and 10 sessions of muscle energy technique with conventional physiotherapy)
• Cervical retraction in lying or sitting. (Dose: Hold 3–5 seconds per repetition, Repetitions: 10–15 per session, Duration: 5–10 minutes/session, Frequency: 2–3 sessions/day).	• Muscle Energy Technique (MET): (Dose: Isometric and isotonic contractions, Repetitions: 5 per muscle group, held 5 seconds each, Frequency: 3–4 times/week for 2 weeks, Outcome: Pain reduction, improved ROM, decreased disability)
• Myofascial release. (Dose: Minimum 90 seconds pressure per muscle, Duration: 15–25 minutes/session, Frequency: 2–3 times/week).	
• Upper Cervical Manual Traction**:** (Dose: 5–10 minutes/session, Frequency: 2–3 times/week, Position: Supine).	
• Infrared Radiation Therapy (IRR): (Dose: 10–15 minutes/session, Frequency: 3–5 times/week)	• Cervical retraction in lying or sitting. (Dose: Hold 3–5 seconds per repetition, Repetitions: 10–15 per session, Duration: 5–10 minutes/session, Frequency: 2–3 sessions/day).
	• Myofascial release. (Dose: Minimum 90 seconds pressure per muscle, Duration: 15–25 minutes/session, Frequency: 2–3 times/week).

	• Upper Cervical Manual Traction**:** (Dose: 10–20 minutes/session, Frequency: 2–3 times/week, Position: Supine). • Infrared Radiation Therapy (IRR): (Dose: 10–15 minutes/session, Frequency: 3–5 times/week)

3.14 Management of data:

At the end of each day, the collected questionnaires were checked for any errors or inconsistencies. The necessary corrections were made. The recorded data were coded accordingly into the SPSS-22 version of the program.

3.15 Data analysis:

The descriptive analysis was used to analyze the sociodemographic variables by the SPSS version 22. To determine pre test and post test intervention between groups, Mann Whitney U test was used and to assess pre test and post test intervention within the group Wilcoxon Signed Rank test was used. The bar diagram and chart use Microsoft Excel 2016.

3.16 Ethical consideration:

- The research proposal was submitted to the Ethical Review Board (EBR) of SAIC College of Medical Science and Technology (SCMST) and approval was obtained from the Board.
- Bangladesh Medical Research Council (BMRC) and World Health Organization (WHO) guideline also were followed to conduct the study.
- The aims and objectives of the research were explained to every participant before interview and asked for their response. The respondents who gave informed verbal consent included in the study.
- Some physical examination was applied to the participants for the present study. The participant was also informed of his/her right to discontinue at any point of interview.
- The name, address, and personal information of the participants were kept confidential by the investigator.

CHAPTER- IV RESULT

In this study the researcher used comparison of baseline characteristics, frequency and description of the variables to present the result of the study.

4.1 Comparison of baseline characteristics of Experimental Group (CMG) and Control Group (CPG):

Variable		Control	Experimental	*P*
Age		42.71± 11.84	46.00± 9.88	0.462
Gender n (%):	Male	7 (50.0%)	13 (92.9%)	.014
	Female	7 (50.0%)	1 (7.1%)	
Occupation n (%):	Housewife	3 (21.4%)	0 (0%)	.004
	Service holder	8 (57.1%)	5(35.7%)	
	Business	1 (7.1%)	5(35.7%)	
	Worker	1 (7.1%)	0 (0%)	
	Student	1(7.1%)	0 (0%)	
	Others	1(7.1%)	4 (28.6%)	
Education n (%):	Primary	1 (7.1%)	2 (14.3%)	.311
	Secondary	1 (7.1%)	1 (7.1%)	
	Higher Secondary	3 (21.4%)	2 (14.3%)	
	Honors	4 (28.6%)	8 (57.1%)	
	Masters	5 (35.7%)	1 (7.1%)	
	Others	0 (0%)	0(.0)	
Co-morbidities n (%):	Diabetes mellitus	3 (21.4%)	1 (7.1%)	.204
	Hypertension	2 (14.3%)	1 (7.1%)	
	Asthma	1 (7.1%)	2 (14.3%)	
	Multiple	4 (28.6%)	3 (21.4%)	
	None	4 (28.6%)	7(50.0%)	
BMI		25.91± 5.18	23.38± 3.50	.175

NPRS pre-score	3.43± 1.01	4.50± 1.09	.011
NDI pre-score	25.29± 5.1841	35.14± 15.34	.102

Comparison of average age between control and experimental groups showed no significant difference (p=0.462). Gender distribution differed significantly, with a higher percentage of males in the experimental group (92.9%) compared to control group (50%) (p=0.014). Occupational backgrounds varied significantly between groups (p=0.004), with more business and service holders in the experimental group. Educational qualifications showed no significant difference between groups (p=0.311).Presence of co-morbid conditions such as diabetes, hypertension, and asthma was comparable and statistically non-significant (p=0.204).BMI was slightly higher in the control group but without significant difference (p=0.175).NPRS pre-treatment scores were significantly higher in the experimental group (p=0.011).Neck Disability Index (NDI) pre-scores showed no statistically significant difference (p=0.102), though somewhat higher disability was noted in the experimental group. Overall, baseline comparability was established, but significant differences in gender, occupation, and pain intensity must be considered when interpreting outcomes.

4.2 Frequency distribution of participants:

4.2.1 Marital Status of Participants:

The distribution of marital status among the participants is notably skewed; the significant majority are married, with 26 out of 28 participants (92.9%) identifying as married. Only 2 participants (7.1%) are unmarried. This strong concentration of married individuals could potentially influence the study's findings, as their experiences and perspectives may differ from those of unmarried participants. As a result, the outcomes of this research are likely to be more representative of married individuals. For more generalizable results, future studies should consider including a more balanced representation of both married and unmarried participants.

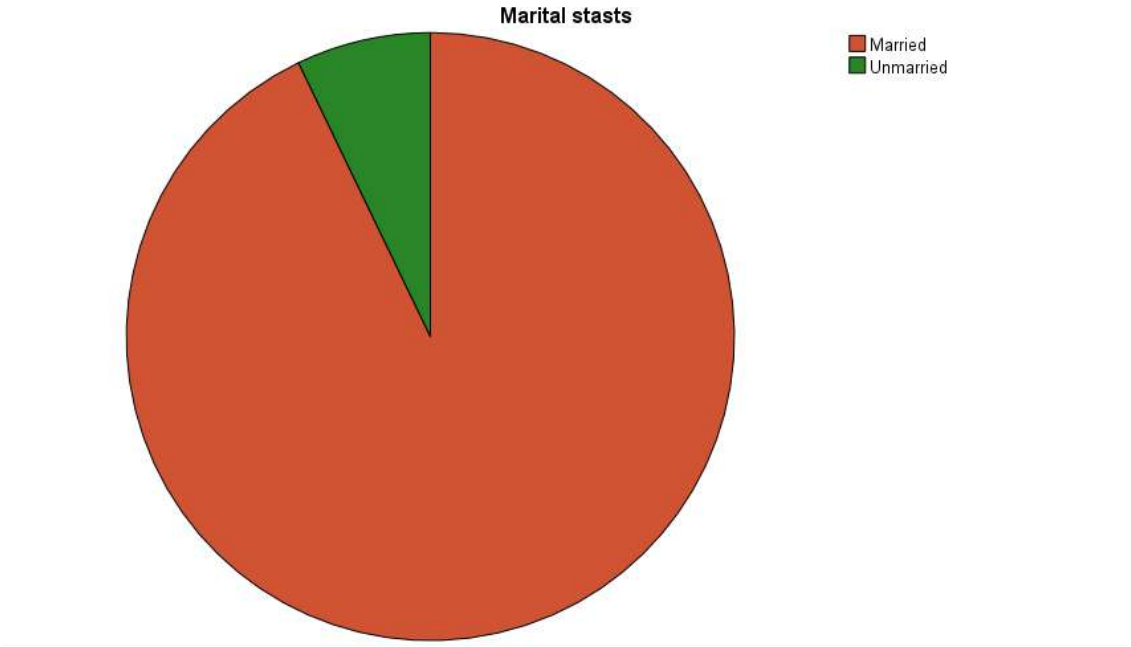


Figure no 2: Marital Status of the Participants

4.2.2 Family Type of Participants:

The sample includes participants from both nuclear and joint family types, with a slightly higher proportion belonging to nuclear families (15 out of 28 participants, or 53.6%) compared to joint families (13 out of 28 participants, or 46.4%). This distribution reflects a relatively balanced representation of family structures, allowing for meaningful examination of how family type might influence the study outcomes. Nonetheless, since nuclear families have a slight majority, the findings may somewhat reflect characteristics and perspectives more typical of nuclear family settings.

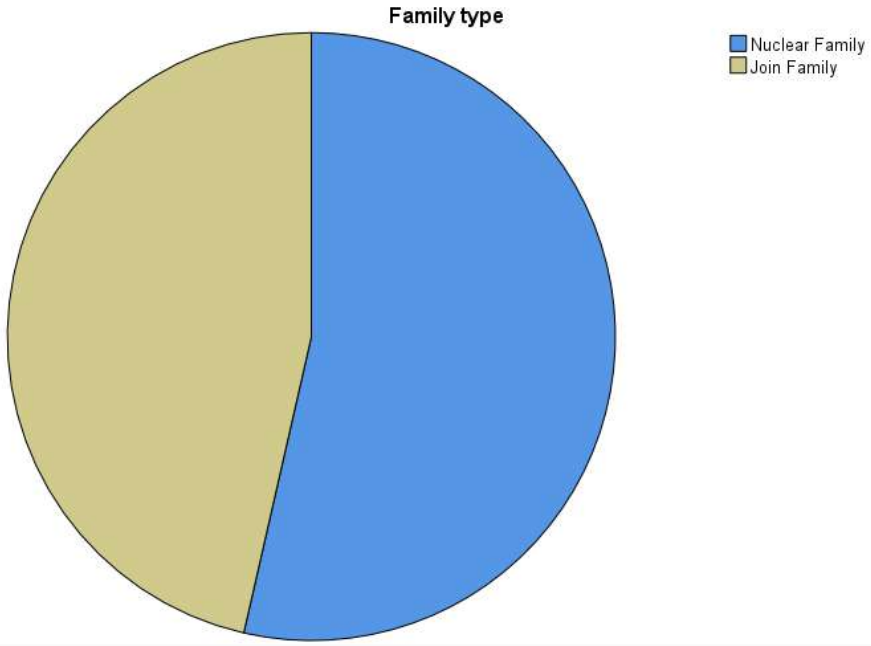


Figure no 3: Family Type of Participants

4.2.3 Causes of Pain:

The majority of participants identify their neck pain as being caused by bad sleeping posture (11 participants, 39.3%) and bad working posture (10 participants, 35.7%), together accounting for over 75% of the reported causes. Following these, trauma (4 participants, 14.3%) and lifting heavy weights (3 participants, 10.7%) are cited less frequently.

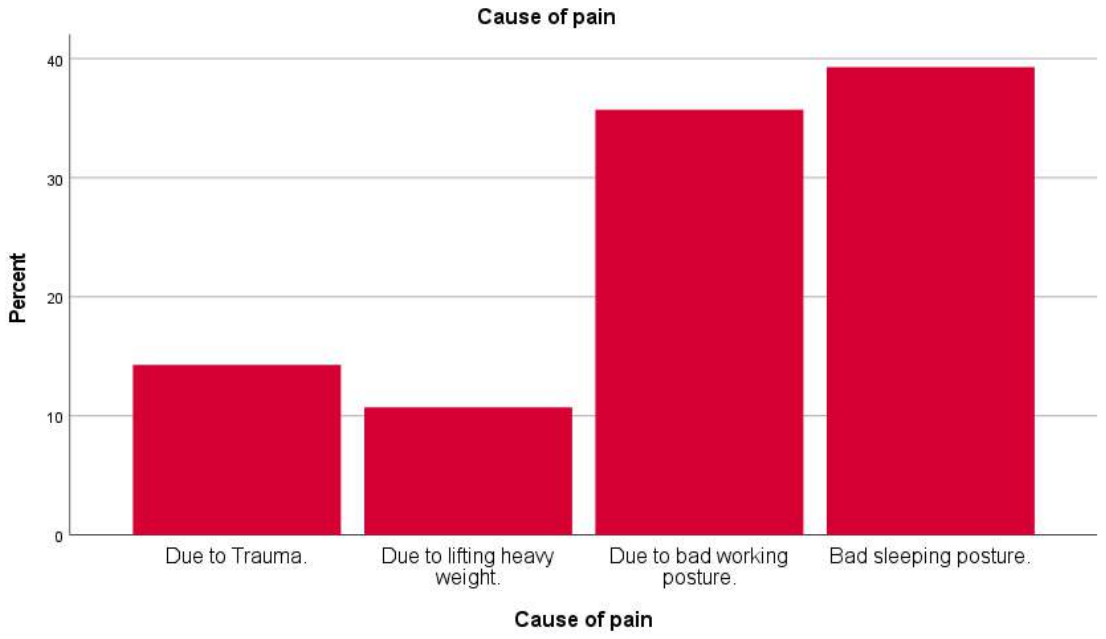


Figure no 5: Causes of Pain

4.2.4 Living area of Participants:

A majority of participants in this study are from urban areas, with 22 individuals (78.6%) residing in urban settings, compared to only 6 participants (21.4%) from rural areas. This urban-dominated distribution suggests that the findings may be more reflective of urban populations' experiences or characteristics, potentially limiting the generalizability to rural settings. Future studies with a more balanced rural-urban sample could provide deeper insights into any differences between these populations.

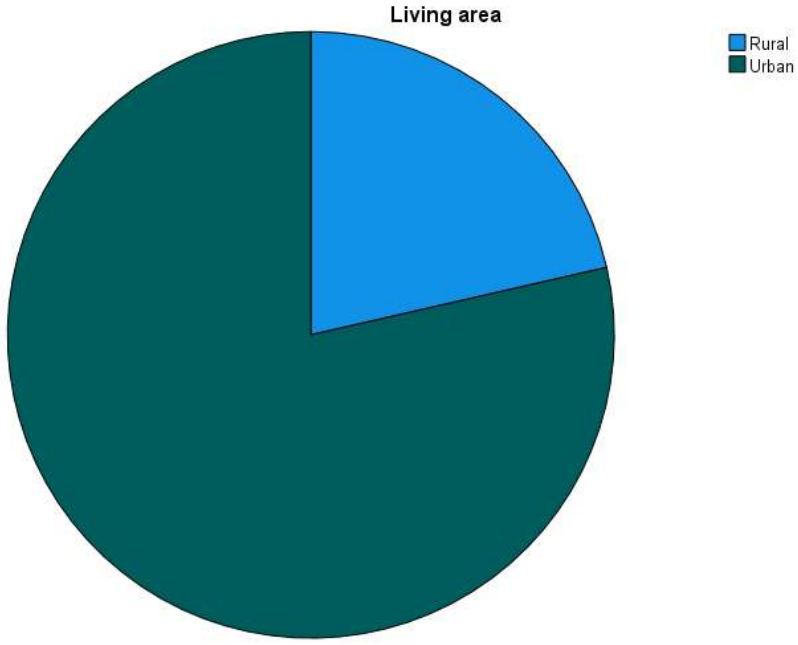


Figure no 4: Living area of Participants

4.2.5 Duration of Symptoms:

The data on symptom duration show that a majority of participants, 19 individuals (67.9%), experience constant symptoms, while 9 participants (32.1%) report intermittent symptoms. This indicates that persistent, ongoing pain is more common in this sample than fluctuating or episodic pain.

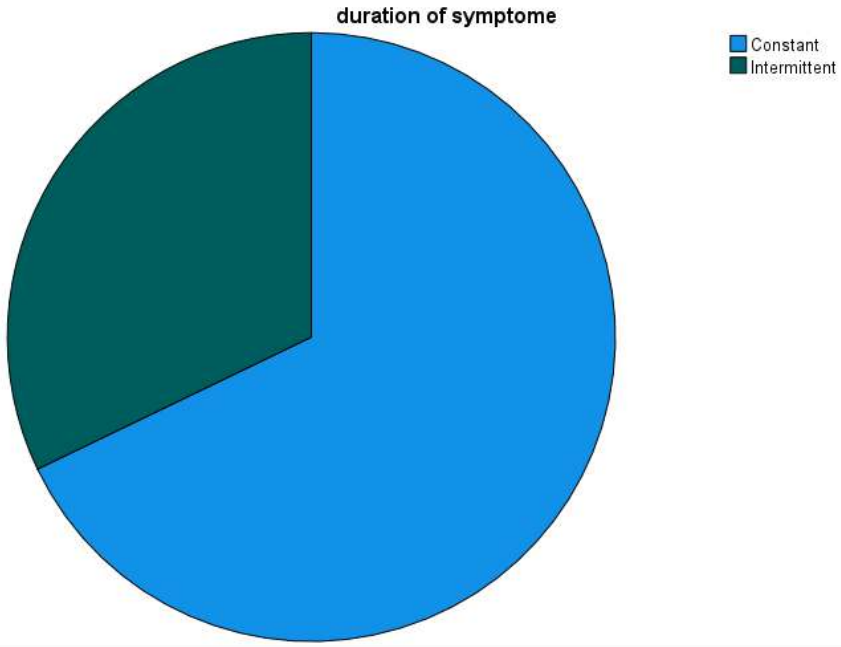


Figure no 6: Duration of Symptoms

4.2.7 Site of pain Spread:

The nature of pain data reveals varied patterns of pain radiation among participants. Most commonly, neck pain radiates up to the shoulder, reported by 11 participants (39.3%). Pain extending to the elbow and finger was each reported by 7 participants (25.0%), indicating a significant portion experience pain radiating deeper into the arm. Only 2 participants (7.1%) experience pain up to the hand, and just 1 participant (3.6%) reported pain extending as far as the wrist.

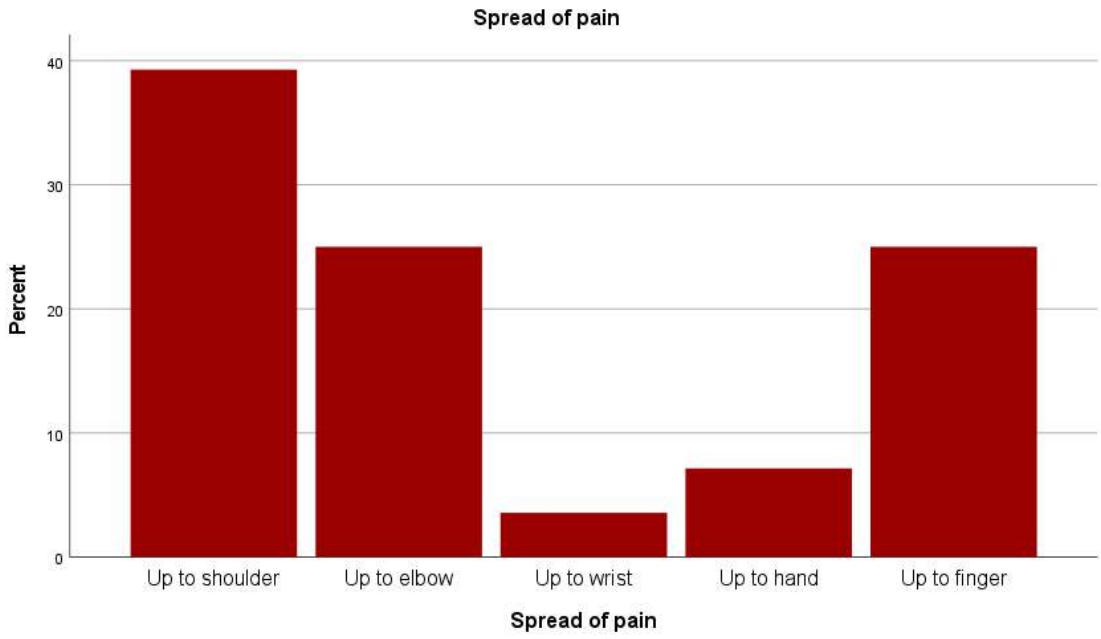


Figure no 8: Site of Pain Spread

4.3 Total score of the participants in NPRS (Pre and Post test):

Control group				Experimental group			
Variable	**Pre**	**Post**	**Difference**	**Variable**	**Pre**	**Post**	**Difference**
C1	3	2	1	E1	5	3	2
C2	4	3	1	E2	5	2	3
C3	3	1	2	E3	3	1	2
C4	4	3	1	E4	5	2	3
C5	4	2	2	E5	5	3	2
C6	3	3	0	E6	2	0	2
C7	3	0	3	E7	6	2	4
C8	3	1	2	E8	5	2	3
C9	3	2	1	E9	4	1	3
C10	1	0	1	E10	4	3	1
C11	5	3	2	E11	6	3	3
C12	4	3	1	E12	4	1	3
C13	5	4	1	E13	5	2	3
C14	3	2	1	E14	4	2	2
Total	**52**	**29**	**20**	**Total**	**63**	**29**	**36**
Mean	**3.43**	**2.07**	**1.35**	**Mean**	**4.50**	**1.93**	**2.57**

The experimental group has a total pre test score of 63 and the total post intervention score was 29 decreasing from 63 to 29, which equaled 36 points of reduction. In this group, the truck received an average decrease of mean NPRS of 2.57 from 4.50 to 1.93. Similarly in the control group, the pre test total score was 52 and dropped down to 29 post intervention, total reduction is 20 points. The score for the control group meaned 3.43 points at baseline and decreased to 2.07 with an average difference of 1.35.

However, these results imply that it reduced pain in both groups as determined in the NPRS, although the experimental group (2.57) had slightly less mean reduction (1.35). Such an effect upon the experimental group would be more pronounced, presumptively.

4.4 Difference between-group analysis for total NPRS:

Difference between Numeric Pain Rating Scale	**Category of participants**	**N**	**Mean Rank**	**Sum of Ranks**	**Mann Whitney U score**	***P***
	Experimental	14	19.54	273.50	**27.500**	.001
	Control	14	9.46	132.50		
	Total	28				

The between-group analysis of the Numeric Pain Rating Scale (NPRS) scores for the experimental and control groups after the intervention. The statistical analysis was conducted using the Mann-Whitney U test, involving 14 participants in each group (total N = 28). The experimental group (received Muscle Energy Technique with conventional physiotherapy) had a mean rank of 19.54 and a sum of ranks of 273.50. The control group (received only conventional physiotherapy) had a mean rank of 9.46 and a sum of ranks of 132.50. The Mann-Whitney U score was 27.500, and the p-value was 0.001.

The significantly higher mean rank and sum of ranks in the experimental group, along with a p-value of 0.001 (which is less than 0.05), indicate a statistically significant difference between the groups. This means the reduction in pain (as measured by the NPRS) was significantly greater in the experimental group than in the control group.

4.5 Difference within group of NPRS for experimental group:

Pretest - Posttest NPRS scores	N	Means Rank	Sum of Ranks	Wilcoxon signed rank test based on Z rank	*P*-Value
Negative Ranks	0	.00	.00	-3.359	0.001
Positive Ranks	14	7.50	105.00		
Ties	0				
Total	14				

To compare the pre-test and post-test NPRS (Numeric Pain Rating Scale) scores within the experimental group, the Wilcoxon Signed Rank Test was conducted. Out of 14 participants, all showed a reduction in their NPRS scores after the intervention with Muscle Energy Technique (MET), as indicated by 14 positive ranks, with a mean rank of 7.50 and a sum of ranks of 105.00. Notably, there were no negative ranks or ties, meaning every participant experienced a decrease in pain intensity post-intervention.The test statistic (Z) was -3.359, and the corresponding p-value was 0.001. Since the p-value is well below the significance threshold of 0.05, this finding is statistically significant. Therefore, we can reject the null hypothesis and accept the alternative hypothesis, concluding that the application of MET led to a significant reduction in neck pain among participants in the experimental group. These results demonstrate the strong effectiveness of Muscle Energy Technique in reducing cervicogenic neck pain in this study population.

4.6 Difference within group of NPRS for control group:

Posttest-Pretest NPRS scores	N	Means Rank	Sum of Ranks	Wilcoxon signed rank test based on Z rank	*P*-Value
Negative Ranks	0	.00	.00	-3.359	0.001
Positive Ranks	13	7.00	91.00		
Ties	1				
Total	14				

To determine if there was a significant difference in NPRS (Numeric Pain Rating Scale) scores within the control group between pre-test and post-test, the Wilcoxon Signed Rank Test was conducted. Among the 14 participants, 13 showed a decrease in their NPRS scores after receiving conventional physiotherapy (indicated by 13 positive ranks), while 1 participant had no change (tie), and none showed an increase (0 negative ranks). The mean rank of positive differences was 7.00, and the sum of their ranks was 91.00. The test statistic (Z) was -3.359 and the corresponding p-value was 0.001. Since the p-value is less than the significance threshold of 0.05, the result is statistically significant. Thus, the null hypothesis is rejected and it can be concluded that there was a significant reduction in neck pain intensity following the intervention in the control group. This indicates that conventional physiotherapy alone effectively reduced NPRS scores among the study participants.

4.7 Total score of the participants in NDI (Pre and Post test):

Control group				Experimental group			
Variable	**Pre**	**Post**	**Difference**	**Variable**	**Pre**	**Post**	**Difference**
C1	24%	18%	6%	E1	38%	28%	10%
C2	30%	12%	18%	E2	8%	00%	8%
C3	42%	22%	20%	E3	26%	10%	16%
C4	28%	18%	10%	E4	26%	20%	6%
C5	8%	8%	00%	E5	12%	6%	6%
C6	14%	10%	4%	E6	24%	8%	16%
C7	10%	2%	8%	E7	50%	24%	26%
C8	10%	8%	2%	E8	50%	32%	18%
C9	36%	24%	12%	E9	32%	16%	16%
C10	8%	6%	2%	E10	26%	14%	12%
C11	18%	14%	4%	E11	48%	22%	26%
C12	26%	24%	2%	E12	44%	10%	34%
C13	52%	46%	6%	E13	54%	22%	32%
C14	48%	44%	4%	E14	54%	44%	10%
Total	**354%**	**256%**	**98%**	**Total**	**540%**	**256%**	**266%**
Mean	**25.29%**	**18.29%**	**7%**	**Mean**	**35.14%**	**18.29%**	**16.85%**

In this table, the pre- and post-test Neck Disability Index (NDI) scores are presented for both experimental and control groups, alongside their differences. In the experimental group, the total pre-test NDI score was 540%, which decreased to 256% after the intervention, yielding an overall reduction of 266%. The mean NDI score for this group dropped from 35.14% to 18.29%, resulting in a mean reduction of 16.85%. In contrast, the control group had a total pre-test score of 354%, which declined to 256% post-

intervention—an overall reduction of 98%. The mean NDI score in the control group decreased from 25.29% to 18.29%, giving an average reduction of 7%.

These results indicate that while both groups showed improvements in disability levels as measured by the NDI, the experimental group achieved a notably greater reduction in both total and mean scores compared to the control group. This suggests that the intervention applied in the experimental group was more effective in improving functional outcomes than conventional physiotherapy alone, highlighting the additional benefit of adding Muscle Energy Technique to the treatment protocol.

4.8 Difference between group analysis for total NDI:

Difference between Neck Disability Index	**Category of participants**	**N**	**Mean Rank**	**Sum of Ranks**	**Mann Whitney U score**	***P***
	Experimental	14	19.11	267.50	33.500	0.003
	Control	14	9.89	138.50		
	Total	28				

The Mann-Whitney U test was conducted to evaluate the differences in Neck Disability Index (NDI) score reductions between the experimental and control groups. The experimental group had a mean rank of 19.11 with a sum of ranks of 267.50, whereas the control group had a mean rank of 9.89 with a sum of ranks of 138.50. The Mann-Whitney U statistic was 33.50 with a p-value of 0.003.

These results indicate a statistically significant difference between the two groups ($p < 0.05$), demonstrating that the experimental group experienced a significantly greater reduction in NDI scores compared to the control group. This suggests that the intervention involving Muscle Energy Technique in addition to conventional physiotherapy produced superior improvements in functional disability related to neck pain compared to conventional therapy alone.

4.9 Difference within group of NDI for experimental group:

Pretest - Posttest NDI scores	**N**	**Means Rank**	**Sum of Ranks**	**Wilcoxon signed rank test based on Z rank**	***P*-Value**
Negative Ranks	0	.00	.00	-3.301	0.001
Positive Ranks	14	7.50	105.00		
Ties	0				
Total	14				

The experimental group comparison of Neck Disability Index (NDI) scores between pre-test and post-test was conducted using the Wilcoxon Signed Rank Test. All 14 participants showed a decrease in their NDI scores following the intervention, as indicated by 14 positive ranks with a mean rank of 7.50 and a sum of ranks of 105.00. There were no negative ranks or ties, demonstrating that no participant had equal or higher scores post-intervention.

The Z statistic was -3.301, and the associated p-value was 0.001. Since the p-value is less than 0.05, this result is statistically significant, allowing rejection of the null hypothesis. These findings confirm that the experimental group experienced a significant reduction in neck disability following the application of the Muscle Energy Technique combined with conventional physiotherapy.

4.10 Difference within group of NDI for control group:

Pretest - Posttest NDI scores	**N**	**Means Rank**	**Sum of Ranks**	**Wilcoxon signed rank test based on Z rank**	***P*-Value**
Negative Ranks	0	.00	.00	-3.189	0.001
Positive Ranks	13	7.00	91.00		
Ties	1				
Total	14				

The Wilcoxon Signed Rank Test was used to examine changes in Neck Disability Index (NDI) scores between the pre-test and post-test periods within the control group. Among the 14 participants, 13 showed a decrease in their NDI scores post-intervention, as indicated by 13 positive ranks with a mean rank of 7.00 and a sum of ranks of 91.00. One participant showed no change (tie), and there were no negative ranks.

The test statistic (Z) was -3.189, and the p-value was 0.001. Since the p-value is less than 0.05, this decrease in NDI scores is statistically significant, leading to the rejection of the null hypothesis. These results indicate that the control group experienced a significant reduction in neck disability following conventional physiotherapy.

CHAPTER- VI DISCUSSION

This study evaluated the effectiveness of the Muscle Energy Technique (MET) in reducing neck pain compared to standard therapy. The results demonstrated a significant improvement in pain relief and functional ability among the participants who received MET, showing moderate effect sizes indicating an advantage over conventional treatments. These findings align with previous research supporting the beneficial role of MET in managing neck pain by improving muscle function and reducing discomfort.

The NPRS scores decreased significantly in both the intervention and control groups after treatment. However, the MET group showed a slightly higher mean reduction of 2.07 compared to 1.93 in the control group, indicating a greater effectiveness of the Muscle Energy Technique in reducing neck pain. These findings are further supported by previous studies emphasizing the role of MET in improving pain and functional outcomes in patients with neck pain. The neurophysiological mechanism behind MET, including post-isometric relaxation and stimulation of mechanoreceptors, contributes to muscle relaxation and pain relief, validating its clinical use for neck pain management.

Joshi and Poojary (2022, pp. 19) investigated the effect of Muscle Energy Technique (MET) combined with posture correction exercises showed significant decreases in Numerical Pain Rating Scale (NPRS) scores after treatment, but the MET group demonstrated a significantly greater reduction in neck pain scores (7.12 to 2.28) compared to the control group (6.24 to 3.52), with a statistically significant between-group difference (mean reduction 4.87 vs. 2.72; $p \leq .001$).

It is important to note that the non-significant difference in NPRS scores between groups ($p > 0.05$) may indicate some overlap in benefits provided by general rehabilitation approaches. The benefits of multimodal approaches to symptoms, including general physiotherapy treatment. Specific elements of the Muscle Energy

Technique stretching protocols may require optimization to maximize their effectiveness in reducing neck pain in future studies.

The Neck Disability Index (NDI) scores demonstrated a significant improvement in the experimental group, with a reduction of 16.85%, compared to a 7% reduction in the control group. This substantial difference in outcomes ($p < 0.003$) highlights the significant effect of the Muscle Energy Technique intervention in reducing functional limitations associated with neck pain.

The Neck Disability Index (NDI) scores' significant improvement following Muscle Energy Technique (MET) intervention is well-supported by recent studies. Joshi et al. (2022) conducted a randomized clinical trial involving patients with non-specific chronic neck pain and forward head posture. Their findings demonstrated a significantly greater reduction in NDI scores in the MET group (a 20.17 decrease) compared to the control group receiving conventional neck range of motion treatment. The study attributed these improvements to MET's neurophysiological mechanisms, including post-isometric relaxation and stimulation of muscle and joint mechanoreceptors, resulting in pain reduction and enhanced function (Joshi et al. 2022, p. 7). The statistical significance reported was $p < 0.001$, which supports the clinical relevance of MET for reducing functional limitations (Joshi et al. 2022, p. 19).

The physiological rationale behind MET's effectiveness includes enhanced muscle relaxation through post-isometric relaxation, improved proprioceptive input, and correction of biomechanical dysfunctions which collectively contribute to pain relief and functional improvements.

Several limitations are considered offsetting the promising results. For example, the total sample size is limited, $n = 28$, which limits the generalizability of results and thus the comparably meager or lack of significance of some tests. Larger samples would be needed for these future studies if subgroup-specific analyses are to be conducted.

Another limitation involves the short follow-up duration of the study. While the immediate post intervention improvements are realized, the long-term sustainability of such benefits is not clear.

These findings hold significant clinical implications. The substantial improvements observed in the Neck Disability Index (NDI) and Numeric Pain Rating Scale (NPRS) among participants in the experimental group highlight the potential of Muscle

Energy Technique as a valuable adjunct to standard care for neck pain. This suggests that targeted interventions such as the Muscle Energy Technique, when incorporated into rehabilitation protocols, may provide enhanced pain relief and improve functional recovery for patients suffering from neck pain.

These findings do indeed have great implications for clinical practice. The large reduction in both pain and disability, and gain in range of motion, underlines the potential of this intervention to improve both short-term pain relief and long-term functional outcomes of people suffering from neck pain. Clinicians should, therefore, consider the use of similar interventions within their practices, especially for those patients with pain conditions since such methods address the issues of pain management chronic and functional restoration of the neck.

Findings indicated that such exercises, focusing on postural correction, flexibility, strengthening, and nerve mobilization, may be very effective in the management and functional improvement of the neck pain condition. This is especially pertinent to a population of patients that have failed more traditional treatments, including pharmacological interventions or passive modalities of heat or cold therapy.

However, a number of limitations need to be declared, including the relatively small sample size and the absence of long-term follow-up with regard to assessing the sustainability of improvements. Future studies should be directed at larger cohorts, including longitudinal assessments, to further validate the present findings. Moreover, integration of biomechanical analysis may provide deeper insight into the mechanisms underlying the observed benefits.

Despite these limitations, the results strongly support the inclusion of Muscle Energy Technique stretching protocols in neck pain rehabilitation to achieve optimal therapeutic outcomes.

Limitations of the Study:

1. The generalizability of the result was quite difficult due to the small sample size.

2. The research only showed the pain, disability, and range of motion. It was needed to show the other variables, such as quality of life, and psychological status.

3. No follow-up study was included, it was quite important to take a follow-up session. The follow-up of the participants could not be done due to a shortage of time.

4. The researcher collected data from only two rehabilitation centers, but the samples should be collected from a large area.

CHAPTER- VII CONCLUSION AND RECOMMENDATION

Conclusion:

The implication of this study would be that useful insight could be gained into how muscle energy technique may contribute to the rehabilitation of neck pain. Both pain and disability measures improved significant and furthermore, improvement was better for the experimental group than for the control group. In both groups, reductions of pain and disability occurred, but the experimental group had a greater mean reduction in pain scores and more disabled conditions reduced. Thus, specific, rather than general, methods of rehabilitation can provide addition (compared to general methods of rehabilitation) regarding release from pain and functional ability in patients with neck pain.

The large improvements in the experimental group, especially in the Neck Disability Index score, suggest that muscle energy technique has the potential to reduce functional limitations commonly associated with neck pain. It appears that this intervention may affect specific musculoskeletal and neurological impairments in these patients, thus improving functional recovery.

Recommendation:

The results are promising, but there are some limitations that must be drawn from this study: small sample size; and no long term follow-up. Further research with larger cohorts and longer observation periods is indicated to confirm the sustainability of benefits in these limitations.

Thus, there lies a great promise from exercises of muscle energy technique in the neck pain for Clinicians may consider providing such specific intervention as useful adjuvants in the standard treatment of neck pain. It has been suggested to confirm the overall efficacy for such techniques in future course with bigger sample size and longer term follow up.

REFERENCES

Abbas, M, Qamar, S, Habib, M, Hanif, M, Masood, S & Usman, H 2024, 'A study to compare the effectiveness of McKenzie neck exercise and contract relax stretching in mechanical neck pain', *Journal of Human Reproductive Sciences*, vol. 4, no. 2, pp. 1629-1633.

Aleid, AM, Aljabr, AA, Aldanyowi, SN, AlAidarous, HA, Aleid, ZM, Alharthi, AS, Alsubaie, MN, AlOraini, LI, Almoslem, AR & Al Mutair, A 2025, 'Dry needling for mechanical neck pain: A systematic review and meta-analysis of randomized controlled trials', *Surgical Neurology International*, vol. 16, pp. 1-8.

Alghadir, AH, Iqbal, A, Anwer, S, Iqbal, ZA & Ahmed, H 2020, 'Efficacy of combination therapies on neck pain and muscle tenderness in male patients with upper trapezius active myofascial trigger points', *BioMed Research International*, 2020, pp. 1-9.

Ali, M & Mehjabin, T 2023, 'Prevalence and predictors of neck pain among Bangladeshi community dwellers during COVID-19 pandemic: analysis of a matched case-control data', *Annals of Medicine & Surgery*, vol. 85, pp. 2304-2312.

Almasri, RMA & Shanb, AA 2024, 'Effectiveness of magnetic therapy versus exercise in elderly patients with chronic mechanical neck pain: A randomized clinical trial', *Electronic Journal of General Medicine*, vol. 21, no. 1, pp. 1-10.

Ashok, A, Suganya, M & Arun, B 2019, 'Comparison of myofascial release, muscle energy technique and cervical manual therapy in postural neck pain', *Asian Journal of Orthopaedic Research*, vol. 2, no. 2, pp. 1-6.

Barbosa-Silva, J, Luc, A, Oliveira-Souza, AIS de, de Abreu, RM, Cipriano, J, de Schaetzen, M, Pitance, L & Armijo-Olivo, S 2025, 'The effectiveness of Mulligan's techniques in non-specific neck pain: A systematic review and meta-analysis', *Physiotherapy Research International*, vol. 30, pp. 1-16.

Chen, Q, Wang, Z & Zhang, S 2023, 'Exploring the latest advancements in physical therapy techniques for treating cervical spondylosis patients: A narrative review', *Biomolecules and Biomedicine*, vol. 23, no. 5, pp. 752-759.

Damm, H, Jonsson, A, Rosengren, BE, Jehpsson, L, Ohlsson, C, Ribom, E, Mellstrom, D & Karlsson, MK 2023, 'Prevalence and morbidity of neck pain: a cross-sectional study of 3000 elderly men', *Journal of Orthopaedic Surgery and Research*, vol. 18, no. 36, pp. 1-9.

de Zoete, RMJ 2023, 'Exercise therapy for chronic neck pain: Tailoring person-centred approaches within contemporary management', *Journal of Clinical Medicine*, vol. 12, no. 22, pp. 1-14.

Faqih, AI, Bedekar, N, Shyam, A & Sancheti, P 2019, 'Effects of muscle energy technique on pain, range of motion and function in patients with post-surgical elbow stiffness: A randomized controlled trial', *Hong Kong Physiotherapy Journal*, vol. 39, no. 1, pp. 25-33.

Fu, F, Liu, B, Gu, H, Chen, L, Chen, X, Xie, J & Ye, H 2025, 'Temporal trends in neck pain prevalence among adolescents and young adults aged 10–24 from 1990 to 2019', *Archives of Medical Science*, vol. 21, no. 2, pp. 514-525.

Gao, Y, Chen, Z, Chen, S, Wang, S & Lin, J 2023, 'Risk factors for neck pain in college students: a systematic review and meta-analysis', *BMC Public Health*, vol. 23, pp. 1-13.

Gattie, ER, Cleland, JA & Snodgrass, SJ 2017, 'Dry needling for patients with neck pain: Protocol of a randomized clinical trial', *JMIR Research Protocols*, vol. 6, no. 11, pp. 1-14.

Genebra, CVDS, Maciel, NM, Bento, TPF, Simeao, SFAP & De Vitta, A 2017, 'Prevalence and factors associated with neck pain: a population-based study', *Brazilian Journal of Physical Therapy*, vol. 21, no. 4, pp. 274-280.

Ghafoor, S, Faiz, R, Ayesha, , Pervaiz, A, Yousaf, A, Basit, H, Arshad, A, Ghias, S & Khalid, A 2024, 'Prevalence of neck pain and disability in medical students of Sialkot', *Pakistan BioMedical Journal*, vol. 7, no. 3, pp. 16-20.

Ghediya, AK 2024, 'Prevalence of mechanical neck pain in garment workers in Ahmedabad - an observational study', *International Journal of Health Sciences and Research*, vol. 14, no. 6, pp. 151-155.

Hossain, MD, Aftab, A, Al Imam, MH, Mahmud, I, Chowdhury, IA, Kabir, RI & Sarker, M 2018, 'Prevalence of work related musculoskeletal disorders (WMSDs) and ergonomic risk assessment among readymade garment workers of Bangladesh: A cross sectional study', *PLoS ONE*, vol. 13, no. 7, pp. 1-18.

Hussain, G, Arsh, A, Rehman, F & Khan, S 2025, 'Immediate effects of muscle energy technique on pain and range of motion in patients with chronic non-specific neck pain: A randomized controlled trial', *Pakistan Journal of Medical Sciences*, vol. 41, no. 5, pp. 1365-1369.

Joshi, R & Poojary, N 2022, 'The effect of muscle energy technique and posture correction exercises on pain and function in patients with non-specific chronic neck pain having forward head posture—a randomized controlled trial', *International Journal of Therapeutic Massage and Bodywork*, vol. 15, no. 2, pp. 14-21.

Kapernaros, ED, Moutzouri, M, Krekoukias, G, Chrysagis, N & Koumantakis, GA 2025, 'Predictive factors of initial pain and disability in patients presenting with neck pain for rehabilitation', *Cureus*, vol. 17, no. 7, pp. 1-23.

Kashyap, R, Iqbal, A & Alghadir, AH 2018, 'Controlled intervention to compare the efficacies of manual pressure release and the muscle energy technique for treating mechanical neck pain due to upper trapezius trigger points', *Journal of Pain Research*, vol. 11, pp. 3151-3160.

Kazeminasab, S, Nejadghaderi, SA, Amiri, P, Pourfathi, H, Araj-Khodaei, M, Sullman, MJM, Kolahi, AA & Safiri, S 2022, 'Neck pain: global epidemiology, trends and risk factors', *BMC Musculoskeletal Disorders*, vol. 23, no. 1, pp. 1-13.

Khadembashiri, MM, Khadembashiri, MA, Khonji, MS, Ahadi, T, Forogh, B, Mirdamadi, N, Ahmadi, M, Bagherzadeh Cham, M, Soleymanzadeh, H & Raissi, G 2024, 'The epidemiology of neck and low back pain in Iran: a national and sub-national analysis from 1990 to 2019', *Annals of Medicine & Surgery*, vol. 86, pp. 1850–1860.

Kilinc, HE & Karaduman, AA 2021, 'Investigation of relationship between body mass index and neck biomechanics in healthy young adults: A cross-sectional study in a single center', *Turkish Journal of Diabetes and Obesity*, vol. 2, pp. 173-179.

Kim, WD & Shin, D 2024, 'Physical factors associated with non-specific neck pain: correlations among pain, disability, posture, endurance, and compensatory movement', *Medical Science Monitor*, vol. 30, pp. 1-8.

Li, Y, Zhang, S & Shu, P 2023, 'Global burden of neck pain in 204 countries from 1990–2019', *Archives of Medical Science*, vol. 19, no. 6, pp. 1811–1821.

Lin, LH, Lin, TY, Chang, KV, Wu, WT & Özçakar, L 2023, 'Muscle energy technique to reduce pain and disability in cases of non-specific neck pain: A systematic review and meta-analysis of randomized controlled trials', *Heliyon*, vol. 9, pp. 1-15.

Makkiyah, FA, Natashia, K, Kristanti, M & Purwaningti, DA 2025, 'Associated factors with neck pain among productive adult motorcyclists in metropolitan university settings: A cross-sectional study', *Journal of Korean Neurosurgical Society*, vol. 68, no. 4, pp. 425-435.

Mihcioglu, S & Malkoc, M 2025, 'Effect of muscle energy technique on pain, importance of physical activity, self-confidence, and posture in COPD patients with chronic neck pain: An experimental randomized controlled study', *Medicine*, vol. 104, no. 25, pp. 1-9.

Mishra, SD, Avinash, G, Kundu, MG, Verma, J, Sheth, A & Dutta, A 2025, 'Work-related musculoskeletal disorders among various occupational workers in India: a systematic review and meta-analysis', *Journal of Occupational Health*, vol. 67, no. 1, pp. 1-15.

Mittal, S & Sharma, S 2024, 'Effect of myofascial release and muscle energy technique on patients with chronic neck pain: a scoping review', *Physical Activity and Nutrition*, vol. 28, no. 1, pp. 45-51.

Mukhtar, NB, Ibrahim, AA & Mohammed, J 2023, 'Prevalence of neck pain and its associated factors in Africa: a systematic review and meta-analysis protocol', *BMJ Open*, vol. 13, no. 9, pp. 1–5.

Nafisa, HT-Z, Islam, S, Eva, II, Rimti, FH, Rimu, FH, Siam, NH, Azim, A, Pasha, N, Mahmud, F, Karim, O, Ahona, FL & Ahmed, S 2025, 'Prevalence and risk factors of neck pain: a cross-sectional screening-based study of 7,919 Bangladeshi workers', *European Journal of Medical Health Sciences*, vol. 7, no. 3, pp. 10–16.

Osama, M, Tassadaq, N & Malik, RJ 2020, 'Effect of muscle energy techniques and facet joint mobilization on spinal curvature in patients with mechanical neck pain: A pilot study', *Journal of the Pakistan Medical Association*, vol. 70, no. 2, pp. 344-347.

Overmann, L, Schleip, R, Anheyer, D & Michalak, J 2024, 'Effectiveness of myofascial release for adults with chronic neck pain: a meta-analysis', *Physiotherapy*, vol. 123, pp. 56–68.

Phadke, A, Bedekar, N, Shyam, A & Sancheti, P 2016, 'Effect of muscle energy technique and static stretching on pain and functional disability in patients with mechanical neck pain: A randomized controlled trial', *Hong Kong Physiotherapy Journal*, vol. 35, pp. 5–11.

Putra, IPM, Nugraha, MHS & Tianing, NW 2020, 'Combined Deep Transverse Friction and Muscle Energy Technique on Mechanical Neck Pain: Article Review', *Physical Therapy Journal of Indonesia*, vol. 1, no. 1, pp. 17-22.

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 Joint Surgery*, vol. 13, no. 6, pp. 307-322.

Sachdeva, A, Athavale, A, Gupta, S & Tiwari, P 2022, 'A study on neck pain and low back pain among the undergraduate students of a medical college in Bhopal, India', *Journal of Community Health Research*, vol. 11, no. 2, pp. 70–81.

Sbardella, S, La Russa, C, Bernetti, A, Mangone, M, Guarnera, A, Pezzi, L, Paoloni, M, Agostini, F, Santilli, V, Saggini, R & Paolucci, T 2021, 'Muscle Energy Technique in the rehabilitative treatment for acute and chronic non-specific neck pain: A systematic review', *Healthcare*, vol. 9, no. 6, pp. 1-15.

Shin, DW, Shin, JI, Koyanagi, A, Jacob, L, Smith, L, Lee, H, Chang, Y & Song, TJ 2022, 'Global, regional, and national neck pain burden in the general population, 1990–2019: An analysis of the global burden of disease study 2019', *Frontiers in Neurology*, vol. 13, article 955367, pp. 1-14.

Takasaki, H 2025, 'The Katakori disability index has cross-cultural validity for disability due to stiff neck/shoulder across Japan, the US, and Singapore', *Scientific Reports*, vol. 15, no. 1, pp. 1-7.

Takasawa, E, Yamamoto, A, Kobayashi, T, Tajika, T, Shitara, H, Ichinose, T, Mieda, T, Iizuka, Y, Iizuka, H & Takagishi, K 2015, 'Characteristics of neck and shoulder pain in the Japanese general population', *Journal of Orthopaedic Science*, vol. 20, no. 2, pp. 403-409.

Teichert, F, Karner, V, Doeding, R, Saueressig, T, Owen, PJ & Belavy, DL 2023, 'Effectiveness of exercise interventions for preventing neck pain: a systematic review with meta-analysis of randomized controlled trials', *Journal of Orthopaedic & Sports Physical Therapy*, vol. 53, no. 10, pp. 594–609.

Teles, JCMA, Oliveira, DN, Mota, AVS, Gomes, PXL & Santos-Júnior, FFU 2016, 'Effect of manipulative treatment in patients with mechanical neck pain: a systematic review', *Manual Therapy, Posturology & Rehabilitation Journal*, vol. 14, pp. 1-7.

Thomas, E, Cavallaro, AR, Mani, D, Bianco, A & Palma, A 2019, 'The efficacy of muscle energy techniques in symptomatic and asymptomatic subjects: a systematic review', *Chiropractic & Manual Therapies*, vol. 27, pp. 1-18.

Tinson, S, Rao, NR & Johnson, AC 2025, 'Effectiveness of Muscle Energy Technique in Non-Specific Neck Pain in Adults – A Literature Review', *International Journal of Research Publication and Reviews*, vol. 6, no. 6, pp. 12419-12422.

Tsegay, GS, Gebregergs, GB, Weleslassie, GG & Tekle Hailemariam, T 2023, 'Effectiveness of thoracic spine manipulation on the management of neck pain: A systematic review and meta-analysis of randomized control trials', *Journal of Pain Research*, vol. 16, pp. 597-609.

Yadav, H & Goyal, M 2015, ‘Efficacy of muscle energy technique and deep neck flexors training in mechanical neck pain – A randomized clinical trial’, *International Journal of Therapies and Rehabilitation Research*, vol. 4, no. 1, pp. 52-66.

Waseem, I, Tanveer, F & Fatima, A 2020, 'Can addition of low level laser therapy to conventional physical therapy be beneficial for management of pain and cervical range of motion in patients with trigger point of upper trapezius?', Anaesthesia, Pain & Intensive Care, vol. 24, no. 1, pp. 64-68.

Wei, J, Yang, K, Xue, J, Luo, M, Peng, W, Yin, X, Sun, W, Gao, C, Teng, G, Yin, H & Feng, M 2025, 'Disease burden of neck pain in China from 1990 to 2021 and its prediction for 2042: The Global Burden Study', *Journal of Pain Research*, pp. 1975-1990.

Wu, AM, Cross, M, Cousin, E, March, LM, Walton, DM, Ferreira, ML, Kandel, H, Woolf, AD, Dreinhoefer, KE, Elliott, JM et al. 2024, 'Global, regional, and national burden of neck pain, 1990–2020, and projections to 2050: a systematic analysis of the Global Burden of Disease Study 2021', *The Lancet Rheumatology*, vol. 6, no. 3, pp. 142–155.

Xia, W, Liu, J, Liu, C, Xu, S, Wang, K, Zhu, Z, Wang, W, Wang, H, Liu, H & Zhou, M 2024, 'Burden of neck pain in general population of China, 1990–2019: An analysis for the Global Burden of Disease Study 2019', *Journal of Global Health*, vol. 14, pp. 1-11.

Zibiri, RA, Akodu, AK & Okafor, UA 2019, 'Effects of Muscle Energy Technique and Neck Stabilization Exercises on Pain, Psychological Status, and Sleep Disturbance in Patients with Non-Specific Chronic Neck Pain', *Middle East Journal of Rehabilitation Health Studies*, vol. 6, no. 2, pp. 1-7.

APPENDIX- A

SCMST-BPT/IRB/...03-1925/07

To
Prasonjit Sarker
4th Year Student of B.Sc. in Physiotherapy
Session: 2019-20, Registration No: 8839
SAIC College of Medical Science & Technology (SCMST)
Mirpur-14, Dhaka-1216, Bangladesh

Subject: Approval of the thesis proposal **"Effectiveness of Muscle Energy Technique to Reduce Cervicogenic Pain"** by ethics committee.

Dear Prasonjit Sarker
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 level of Effectiveness of Muscle Energy Technique to Reduce Cervicogenic Pain. Data will be collected by close 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

Appendix-B

SAIC COLLEGE OF MEDICAL SCIENCE AND TECHNOLOGY

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

Date: 15/04/2025

Ref :

Date : .....

To
The Managing Director
Pain-Paralysis Specialised & General Hospital
Manikganj, Bangladesh

Subject: **Prayer for permission to collect data from Pain-Paralysis Specialised & General Hospital, Manikganj to conduct a research project.**

Sir,

With due respect and humble submission to state that I am a student of B.Sc. in Physiotherapy at SAIC College of Medical Science and Technology (SCMST). As a part of our course curriculum, we have to conduct a research project for the partial fulfillment of the requirement for the degree of B.Sc. in Physiotherapy. My research title is "Effectiveness of Muscle Energy Technique to Reduce Cervicogenic pain". The aim of the study is to investigate the effectiveness of muscle energy technique in alleviating symptoms in patients suffering from cervicogenic pain. This is an experimental study under the supervisor Md. Shahidul Islam, Assistant Professor and Clinical head of SCMST. I have chosen the Pain-Paralysis Specialised & General Hospital at Manikganj, Bangladesh to collect data from patients with Cervicogenic pain.

So, I, therefore, pray and hope that you would be kind enough to give permission for data collection that will help me to complete my study.

Yours Faithfully
Prasonjit Sarker
B.Sc. in Physiotherapy (4th Year)
Session: 2019-2020
SCMST, Mirpur-14, Dhaka-1216, Bangladesh.

Permitted
16.04.25

4th June 2025

To

The Chairman,

Unique Pain and Paralysis Centre (UPPC),

Mirpur-11, Dhaka,

Subject: Prayer for permission to collect data from the Unique Pain and Paralysis Centre (UPPC) to conduct a research project.

Sir,

With due respect and humble submission to state that I am a student of B.Sc. in Physiotherapy at SAIC College of Medical Science and Technology (SCMST). As a part of our course curriculum, we have to conduct a research project for the partial fulfillment of the requirement for the degree of B.Sc. in Physiotherapy. My research title is **"Effectiveness of Muscle Energy Technique to Reduce Cervicogenic Pain"** and the aim of the study is to identify the effectiveness of muscle energy technique to reduce cervicogenic pain. This is a randomized control trial under the supervision of Dr. Shahidul Islam, PT, Associate Professor SAIC College of Medical Science & Technology (SCMST). I have chosen the Unique Pain and Paralysis Centre (UPPC) as a site of data collection.

So, I, therefore, pray and hope that you would be kind enough to give permission for data collection that will help me to complete my study.

Yours Faithfully

Prasonjit Sarker

Student of B.Sc. in Physiotherapy

Session: 2019 -2020

Reg No: 8839

SAIC College of Medical Science and Technology (SCMST)

Mirpur-14, Dhaka 1216, Bangladesh.

Appendix-C

Questionnaire Bangla and English

সম্মতি পত্র
আসসালামু আলাইকুম,
আমি প্রসনজিৎ সরকার, ঢাকা বিশ্ববিদ্যালয়ের চিকিৎসা অনুষদের অধীনে সাইক কলেজ অব মেডিকেল সায়েন্স অ্যান্ড টেকনোলজি (এসসিএমএসটি) এর বিএসসি ফিজিওথেরাপির চতুর্থ পেশাদারের শিক্ষার্থী। আমার স্নাতক ডিগ্রি অর্জনের জন্য আমাকে একটি গবেষণা প্রকল্প পরিচালনা করতে হবে এবং এটি আমার অধ্যয়নের একটি অংশ। আমার গবেষণার শিরোনাম "সার্ভিকোজেনিক ব্যথা কমাতে মাসেল এনার্জি টেকনিকের কার্যকারিতা""। আমার গবেষণা প্রকল্পটি পূরণ করার জন্য আপনার সার্ভিকোজেনিক ব্যথা, ব্যক্তিগত ও অন্যান্য তথ্য সংগ্রহ করতে হবে। সুতরাং, আপনি এই গবেষণায় একজন সম্মানিত অংশগ্রহণকারী হতে পারেন এবং কথোপকথনের সময়টি দুই বার করে ১৫-২০ মিনিট হবে। আমি আপনাকে জানাতে চাই যে এটি একটি সম্পূর্ণরূপে একাডেমিক গবেষণা ও এটি অন্য কোনও উদ্দেশ্যে ব্যবহার করা হবে না। আমি আপনাকে আশ্বাস দিচ্ছি যে সমস্ত তথ্য গোপন রাখা হবে। আপনার অংশগ্রহণ ঐচ্ছিক হবে। এই গবেষণা থেকে আপনি যে কোনো সময় আপনার সম্মতি ও অংশগ্রহণ প্রত্যাহার করতে প্রবেন। আপনার যদি কোন প্রশ্ন পছন্দ না হয় সেক্ষেত্রে আপনি প্রশ্ন প্রত্যাখান করার অধিকার রাখেন।

গবেষণা সম্পর্কে আপনার যদি কোনও প্রশ্ন থাকে তাহলে আপনি আমার সুপারভাইজার ডাঃ শহীদুল ইসলাম, পিটি
সহযোগী অধ্যাপক ,সাইক কলেজ অফ মেডিকেল সায়েন্স অ্যান্ড টেকনোলজি এর সাথে যোগাযোগ করতে পারেন। শুরু করার আগে আপনার কি কোন প্রশ্ন আছে?

সুতরাং, আমি সাক্ষাত্কারটি চালিয়ে যেতে পারি?

হ্যাঁ না

অংশগ্রহণকারীর স্বাক্ষর
…….
তারিখ…….

সাক্ষীর স্বাক্ষর
…….
তারিখ…….

গবেষকের স্বাক্ষর,

……

তারিখ…….

শিরোনামঃ "সার্ভিকোজেনিক ব্যথা কমাতে মাসেল এনার্জি টেকনিকের কার্যকারিতা"

প্রশ্নাবলী (বাংলা সংস্করণ)

পর্ব ১ - (রোগীর শনাক্তকরণ)

নং	প্রশ্ন	উত্তর
১.১	তারিখ:	
১.২	রোগীর নাম:	
১.৩	রোগীর আইডি:	
১.৪	ঠিকানা:-	০. বাড়ি নাম্বার ১. গ্রাম: ২. ডাকঘর: ৩. থানা: ৪. জেলা:
১.৫	ফোন নাম্বার:	

পর্ব - ২ (সামাজিক জনতাত্ত্বিক তথ্যাবলী)

নং	**প্রশ্ন**	**উত্তর**
২.১	বয়স:	বছর
২.২	লিঙ্গ:	০. পুরুষ ১. মহিলা
২ .৩	ধর্ম	০. ইসলাম ১. হিন্দু ২. অন্যান্য
২.৪	বৈবাহিক অবস্থা:	০. বিবাহিত ১. অবিবাহিত

২.৫	পরিবারের ধরণ:	০. একক পরিবার ১. যৌথ পরিবার
২.৬	বাসস্থানের ধরণ:	০. গ্রাম ১. শহর
২.৭	শিক্ষাগত যোগ্যতা:	০. নিরক্ষর ১. প্রাথমিক ২. মাধ্যমিক ৩. উচ্চ মাধ্যমিক ৪. স্নাতক ৫. স্নাতকোত্তর ৬. অন্যান্য
২.৮	পেশা:	০. ছাত্র ১. গৃহিণী ২. কর্মী ৩. চাকরিজীবি ৪. ব্যাবসা ৫. অন্যান্য
২.৯	মাসিক আয়:	
২.১০	উচ্চতা:	
২.১১	ওজন:	
২.১২	বি.এমআই	
২.১৩	অন্যান্য রোগ	০. ডায়বেটিস ১. উচ্চ রক্তচাপ ২. হাপানী ৩. হাড় ক্ষয় ৪. ডিস্কে বয়সজনিত সমস্যা ৫. অন্যান্য

পর্ব ৩- (এসেসমেন্ট সম্পর্কিত ভেরিয়েবল)

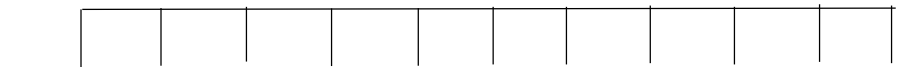
নং	প্রশ্ন	উত্তর	প্রি টেস্ট	পোস্ট টেস্ট
৩ .১	ব্যাথার কারন সম্পরকে আপনি কি মনে করেন?	০. আঘাতের কারনে ১. ভারি ওজন বহনের কারনে ২. কাজের সময়ে শরিরের সঠিক অবস্থান না রাখার জন্য ৩. কাশি অথবা হাঁচি ৪. ঘুমানর সময় শরিরের সঠিক অবস্থান না রাখার জন্য		
৩ .২	ব্যাথার স্থিতিকাল	..... মাস/ বছর		
৩ .৩	কোথায় শুরু হয়	০. মাথা ১. ঘাড় ২. কাঁধের পেছনে ৩. বাহুতে ৪. হাতে		
৩ .৪	উপসর্গের স্থায়িত্ব	০. কিছু সময় পরপর ১. বিরতিহিন		
৩ .৫	ব্যাথা রেডিয়েট করে	০. ডান হাতে ১. বাম হাতে ২. উভয় হাতে		

৩ .৬	ব্যাথার ধরন	০. কাঁধ পর্যন্ত ১. কনুই পর্যন্ত ২. কব্জি পর্যন্ত ৩. হাত পর্যন্ত ৪. আঙ্গুল পর্যন্ত		

পর্ব-৪ (ব্যাথা সম্পর্কিত ভেরিয়েবল)

৪.১ এই মুহূর্তে আপনার ব্যাথা কতটুকু?

০-১০ নিউমেরিক পেইন রেটিং স্কেল যেখানে বলতে ব্যাথামুক্ত অবস্থা এবং ১০ বলতে অসহনীয় ব্যাথাকে বুঝানো হচ্ছে।



এনপিআরএস ফলাফল

প্রি-টেস্ট	পোস্ট-টেস্ট

পর্ব-৬ (ঘাড়ে অক্ষমতা সংক্রান্ত ভেরিয়েবল)

নং	প্রশ্ন	প্রি টেস্ট	পোস্ট টেস্ট
৬ .১	**ব্যাথার তীব্রতা** ০. এই মুহূর্তে কোন ব্যাথা নেই। ১. এই মুহূর্তে খুব সামান্য ব্যাথা আছে। ২. এই মুহূর্তে মধ্যম মানের ব্যাথা আছে। ৩. এই মুহূর্তে মুটামুটি তীব্র ব্যাথা আছে। ৪. খুব তীব্র মানের ব্যাথা আছে। ৫. অসহনীয় পর্যায়ের ব্যাথা আছে।		

৬ .২	**নিজের যত্ন** ০ . কোন রকম অতিরিক্ত ব্যাথা ছাড়াই সব কাজ করতে পারছি। ১. খুব সামান্য পরিমাণ ব্যাথা নিয়ে সব কাজ করতে পারছি। ২. ব্যাথা আছে, ধীর গতি ও সাবধানতা অবলম্বন করতে হচ্ছে। ৩. সাহায্য দরকার হচ্ছে কিন্তু মোটামুটি একাই পারছি। ৪. নিজের প্রায় সব কাজগুলো করতে অন্য কারো সাহায্যের দরকার হচ্ছে। ৫. একা পোশাক পরিধান করতে পারছিনা, পরিষ্কার করতে কষ্ট হচ্ছে, বিছানা থেকে উঠতে পারছিনা।		
৬ .৩	**ভারী জিনিস তোলা**		

	০ . কোন রকম ব্যাথা ছাড়াই ভারী জিনিস তুলতে পারছি। ১. ভারী জিনিস তুলতে পারছি কিন্তু ব্যাথা হচ্ছে। ২. মাটি থেকে ভারি জিনিস তুলতে কষ্ট হচ্ছে কিন্তু সুবিধা জনক অবস্থানে থাকলে পারছি। যেমনঃ টেবিল থেকে। ৩. মাটি থেকে ভারী জিনিস তুলতে কষ্ট হচ্ছে কিন্তু সুবিধাজনক অবস্থানে থাকলে হালকা থেকে ভারী ওজন তুলতে পারছি। ৪. খুব হালকা ওজন তুলতে পারছি। ৫. কিছুই তুলতে পারছি না।		
৬ .৪	**পড়াশোনা** ০. কোন রকম ব্যাথা ছাড়াই যতক্ষন খুশি পড়তে পারছি। ১. খুব সামান্য ব্যাথা নিয়ে যতক্ষন খুশি পড়তে পারছি। ২. মোটামুটি ব্যাথা নিয়ে যতক্ষন খুশি পড়তে পারছি। ৩. মধ্যম মানের ব্যাথার কারণে স্বাধীন ভাবে পড়তে পারছি না। ৪. তীব্র ব্যাথার কারণে সবসময় পড়তে পারছিনা। ৫. কোন ভাবেই পড়তে পারছিনা।		

৬ .৫	**মাথা ব্যাথা** ০. কোন মাথা ব্যাথা নেই। ১. কখনো কখনো খুব সামান্য মাথা ব্যাথা হয়। ২. কখনো কখনো মোটামুটি মাথা ব্যাথা হয়। ৩. প্রায়শই মটামুটি মাথা ব্যাথা হয়। ৪. প্রায়ই তীব্র মাথা ব্যাথা হয়। ৫. প্রায় সবসময় মাথা ব্যাথা থাকে।		
৬ .৬	**মনোযোগ** ০. আমি কোন সমস্যা ছাড়াই সম্পূর্ণ মনোযোগ নিবদ্ধ করতে পারি। ১. যখন আমি সম্পূর্ণ মনোযোগ দিতে চেষ্টা করি তখন সামান্য অসুবিধা হয়। ২. আমি যখন মনোযোগ দিতে চেষ্টা করি তখন আমার মনোযোগের পর্যাপ্ত অসুবিধা হয়। ৩. আমি মনোযোগ দেওয়ার সময় অনেক সমস্যা হয়। ৪. আমি যখন মনোযোগ দিতে চাই তখন অনেক সমস্যা হচ্ছে। ৫. আমি কখনোই মনোনিবেশ করতে পারছিনা।		
৬ .৭	**কাজ**		

	০. আমি যতক্ষন চাই কাজ করতে পারি। ১. আমি স্বাভাবিক সব কাজ করতে পারি কিন্তু এর বেশি কিছু না। ২. আমি প্রায় সব নিজের স্বাভাবিক কাজ করতে পারি কিন্তু এর বেশি কিছু না। ৩. আমি আমার স্বাভাবিক কাজ করতে পারছি না। ৪. আমি খুব কমই কাজ করতে পারি। ৫. আমি কোন কাজই করতে পারছিনা।		

৬ .৮	**ড্রাইভিং/ভ্রমণ** ০. আমি কোন ঘাড় ব্যাথা ছাড়াই ড্রাইভ করতে পারি। ১. আমি সামান্য ব্যাথা নিয়ে যতক্ষন চাই ড্রাইভিং করতে পারি। ২. আমি মাঝারি ব্যাথা নিয়ে যতক্ষন চাই ড্রাইভিং করতে পারি। ৩. আমার ঘাড়ে মাঝারি ব্যাথার কারণে যতক্ষন আমি যতক্ষন চাই ড্রাইভিং করতে পারিনা। ৪. আমার ঘাড়ে অনেক বেশি ব্যাথার কারণে আমি খুব কমই গাড়ি চালাতে পারি। ৫. আমি কোন সময়ই গাড়ি চালাতে পারিনা।		
৬ .৯	**ঘুম** ০. আমার ঘুমে কোন অসুবিধা নেই। ১. আমার ঘুমে খুব কম সময়ই সমস্যা হয় (১ ঘন্টার কম ঘুমহীন)। ২. আমার ঘুমে কম সমস্যা হয় (১-২ ঘন্টা ঘুমহীন)। ৩. আমার ঘুমে মাঝারি ধরনের সমস্যা হয় (২-৫ ঘন্টা ঘুমহীন)। ৪. আমার ঘুমে বেশি সমস্যা হয় (৩-৫ ঘন্টা ঘুমহীন)। ৫. আমার সম্পূর্ণ ভাবে ঘুমাতে সমস্যা হয় (৫-৭ ঘন্টা ঘুমহীন)।		
৬ .১০	**বিনোদন** ০. আমি কোন রকম ঘাড় ব্যাখা ছাড়াই সব ধরনের বিনোদন মূলক কাজে অংশ গ্রহণ করতে পারি। ১. আমি আমার ঘাড়ে কিছু ব্যাথা নিয়ে সব ধরণের বিনোদন মূলক কাজে অংশগ্রহণ করতে পারি। ২. আমি আমার ঘাড় ব্যাথার কারণে বেশিরভাগ বিনোদন মূলক কাজে অংশগ্রহণ করতে পারিনা। ৩. আমি ঘাড় ব্যাথার কারণে অল্প কিছু স্বাভাবিক বিনোদন মূলক কাজ করতে পারি না। ৪. আমি আমার ঘাড়ে ব্যাথার কারণে খুব কমই বিনদনমূলক কাজে অংশ গ্রহণ করতে পারি। ৫. আমি কোন বিনোদনমূলক কাজে অংশগ্রহণ করতে পারিনা।		

ঘাড়ে অক্ষমতা সংক্রান্ত ফলাফল

Inform Consent

Assalamualaikum,

I am Prasonjit Sarker, 4th Professional, B.Sc. in Physiotherapy student at Saic College of Medical Science and Technology (SCMST) under the Faculty of Medicine, University of Dhaka. To obtain my Bachelor degree, I have to conduct a research project and it is a part of my study. My research title is "EFFECTIVENESS of MUSCLE ENERGY TECHNIQUE to Reduce CERVICOGENIC PAIN: A Randomized Control Trial". I would like to know about some personal & other related questions about your cervicogenic pain to fulfill my research project I need to collect data. So, you can be a respected participant in this research and the conversation time will be two times 15-20 minutes. I would like to inform you that this is a purely academic study and will not to be used for any other purposes. I assure you that all data will be kept confidential. Your participation will be voluntary. You may have the right to withdraw consent and discontinue participation at any time from this study. You also have the right to reject a particular question that you don't like. If you have any queries about the study, you may contact with my supervisor Supervisor Md. Shahidul Islam, Associate Professor , SAIC College of Medical Science & Technology. Do you have any questions before I start? So, I can proceed with the interview.

Yes ☐ No ☐

Signature of the participant…… Date……..

Signature of the witness……. Date……..

Signature of the researcher…….

Date……

Title: EFFECTIVENESS of MUSCLE ENERGY TECHNIQUE to Reduce CERVICOGENIC PAIN.

Questionnaire (English Version)

Part 1- Patient's Identification

No.	Questions	Response
1.1	Date:	
1.2	Patients name:	
1.3	Patients ID:	
1.4	Address:	0. House no: 1. Village: 2. P.O: 3. P.S: 4. District:
1.5	Contact Number	

Part 2- Patient's Socio-demographic information

No.	Questions	Response
2.1	Age:	Year
2.2	Gender:	0. Male 1. Female
2.3	Religion:	0. Islam 1. Hindu 2. Others
2.4	Marital status:	0. Married 1. Unmarried
2.5	Family type:	0. Nuclear Family 1. Join Family
2.6	Living area	0. Rural

		1. Urban
2.7	Educational qualification:	0. Illiterate 1. Primary 2. Secondary 3. Higher secondary 4. Honors 5. Masters 6. Others
2.8	Occupation**:**	0. Student 1. Housewife 2. Worker 3. Service holder 4. Business **5.** Others
2.8	Monthly income:	
2.9	Height:	
2.11	Weight:	
2.12	BMI:	
2.13	Co-morbidities:	0. Diabetes mellitus 1. Hypertension 2. Asthma 3. Osteoporosis 4. Disk degeneration 5. Others

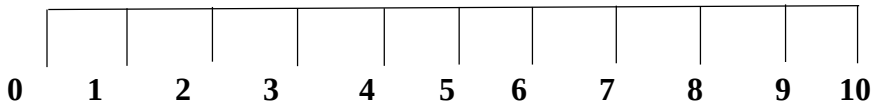
Part 3- (Assessment Related Variables)

No.	Questions	Response	Pre Test	Post Test
3.1	What do you think about the cause of your pain?	0. Due to Trauma. Due 1. to lifting heavy weight. 2. Due to bad working posture. 3. Coughing or sneezing. 4. Bad sleeping posture. 5. Others.		
3.2	Duration of pain since the last episode	Month/Year		
3.3	Symptoms at Onset	0. Head 1. Neck 2. Scapula zone 3. Arm 4. Forearm		
3.4	Duration of symptoms	0. Constant 1. Intermittent		
3.6	Nature of pain site/spread	0. Up to shoulder 1. Up to elbow 2. Up to wrist 3. Up to hand 4. Up to finger		

Part 4- Pain related Variables

4.1 How severe is your pain present?

0-10 Numeric Pain Rating Scale (NPRS) where "0" means no pain and "10" means worst pain.



NPRS Interpretation

Pre-Test	**Post-Test**

Part-6 (Neck Disability Index related variables)

No	**Questions**	**Pre-test**	**Post-test**
6.1	**Pain Intensity** 0. I have no pain at the moment. 1. The pain is very mild at the moment. 2. The pain is moderate at the moment. 3. The pain is fairly severe at the moment. 4. The pain is very severe at the moment. 5. The pain is the worst imaginable at the moment.		
6.2	**Personal Care** 0. I can look after myself without causing extra pain. 1. I can look after myself normally but it causes extra pain. 2. It is painful to look after myself and I am slow and careful. 3. I need some help but manage most of my personal care. 4. I need help every day in most aspects of self-care. 5. I do not get dressed, wash with difficulty and stay in bed		

6.3	**Lifting** 0. I can lift heavy weights without extra pain. 1. I can lift heavy weights but it gives extra pain. 2. Pain prevents me from lifting heavy objects off the floor, but. I can manage if they are conveniently positioned, e.g. on a table. 3. Pain prevents me from lifting heavy weights but I can manage light to medium weights if they are conveniently positioned. 4. I can lift very light weights. 5. I can not lift or carry anything at all.		
6.4	**Reading** 0 . I can read as much as I want with no pain in my neck. 1. I can read as much as I want with slight pain in my neck. 2. I can read as much as I want with moderate pain in my neck.		

	3. I cannot read as much as I want because of moderate pain in my neck. 4. I can hardly read at all because of severe pain in my neck. 5. I cannot read at all.		
6.5	**Headaches** 0. I have no headaches at all. 1. I have slight headaches which come infrequently. 2. I have moderate headaches which come infrequently. 3. I have moderate headaches which come frequently. 4. I have severe headaches which come frequently. 5. I have headaches almost all the time.		

6.6	**Concentration** 0. I can concentrate fully when I want to with no difficulty. 1. I can concentrate fully when I want to with slight difficulty. 2. I have a fair degree of difficulty in concentrating when I want to. 3. I have a lot of difficulty in concentrating when I want to. 4. I have a great deal of difficulty in concentrating when I want to. 5. I cannot concentrate at all.		
6.7	**Work** 0. I can do as much work as I want to. 1. I can only do my usual work, but no more. 2. I can do most of my usual work, but no more. 3. I cannot do my usual work. 4. I can hardly do any work at all. 5. I cannot do any work at all.		
6.8	**Driving/Traveling** 0. I can drive without any neck pain. 1. I can drive as long as I want with slight pain in my neck.		
	2. I can drive as long as I want with moderate pain in my neck. 3. I cannot drive as long as I want because of moderate pain in my neck. 4. I can hardly drive at all because of severe pain in my neck. 5. I cannot drive my car at all.		

6.9	**Sleeping** 0. I have no trouble sleeping. 1. My sleep is slightly disturbed (less than 1 hr. sleepless). 2. My sleep is mildly disturbed (1-2 hrs. sleepless). 3. My sleep is moderately disturbed (2-5 hrs. sleepless). 4. My sleep is greatly disturbed (3-5hrs. sleepless). 5. My sleep is completely disturbed (5-7 hrs. sleepless).		
6.10	**Recreation** 0. I am able to engage in all my recreation activities with no neck pain at all. 1. I am able to engage in all my recreation activities with some pain in my neck. 2. I am able to engage in most, but not all of my usual recreation activities because of pain in my neck. 3. I am able to engage in a few of my usual recreation activities because of pain in my neck. 4. I can hardly do any recreation activities because of pain in my neck. 5. I cannot do any recreation activities at all		

Neck Disability Index Interpretation

Appendix-D

Gant Chart

Activities/ months	Aug 24	Sept 24	Oct 24	Nov 24	Dec 24	Jan 25	Feb 25	Mar 25	April 25	May 25	Jun 25	July 25
Proposal presentation												
Introduction												
Literature review												
Methodology												
Data collection												
Data Analysis												
Result												
1st progress presentation												
Discussion												
Conclusion And Recommendation												
2nd progress presentation												
Communication with supervisor												
Final submission												