Faculty of Medicine

University of Dhaka

EFFECTIVENESS OF UPPER THORACIC (T1-T4) MANIPULATION (T.M) COMBINED WITH USUAL CARE AMONG PATIENTS WITH CHRONIC MECHANICAL NECK PAIN: RANDOMIZED CONTROLLED TRIAL (RCT)

By

Mohammad Mokhlesur Rahman Siddiqui

Master of Science in Physiotherapy

Session: 2016-2017

Registration No: 1174

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Department of Physiotherapy

Bangladesh Health Professions Institute (BHPI)

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Department of Physiotherapy

Bangladesh Health Professions Institute (BHPI)

May 2018

We the undersigned certify that we have carefully read and recommended to the Faculty of Medicine, University of Dhaka, for acceptance of this thesis entitled,

"Effectiveness of Upper Thoracic (t1-t4) Manipulation (T.M) Combined with usual care among patients with chronic mechanical neck pain: Randomized Controlled Trial (RCT)", submitted by Mohammad Mokhlesur Rahman Siddiqui, for the partial fulfillment of the requirements for the degree of Master of Science in Physiotherapy.

Mohammad Anwar Hossain
Associate Professor of Physiotherapy ----------
BHPI CRP, Savar, Dhaka-1343

Firoz Ahmed Mamin
Associate Professor ----------
Department of Rehabilitation Sciences, BHPI, CRP.

Dr. Md Mahmudul Haque
Associate Professor ----------
Department of community medicine
NIPSOM, Mohakhali, Dhaka.

Md. Obaidul Hoque
Professor of physiotherapy, BHPI, CRP. ----------

Date of approval: 7th July, 2018.

=

Declaration Form

- This work has not previously been accepted in substance for any degree and is not concurrently submitted in candidature for any degree.
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List of abbreviations

BHPI	Bangladesh Health Professions Institute
BMRC	Bangladesh Medical & Research Council
CCE	Cranio-cervical Exercise
CRP	Centre for the Rehabilitation of the Paralyzed
DNF	Deep Neck Flexor
ICF	International Classification of Functioning, Disability and Health
IRB	Institutional Review Board
MMT	Manual Muscle Testing
MPQ	Mcgill Pain Questionnaire
NAGs	Natural Appophyseal Gliding
NDI	Neck Disability Index
NPDS	Neck Pain & Disability Index
NPQ	Northwick Park Neck Pain Questionnaire
NRS	Numerical Rating Scale
ROM	Range of Motion
SNAGs	Sustained Natural Appophyseal Gliding
SPSS	Statistical Package for Social Science
US	United States
VAS	Visual Analogue Scale
WHO	World Health Organization
YLDs	Years Lived with Disability

ABSTRACT

Background: Neck pain is a debilitating condition that may greatly affect quality of life. The prevalence is 0.4% to 86.8% worldwide in general population. It is more frequent in women than men and increases particularly among people of working age & over 33% of neck pain patients develop chronic in nature that means last for at least 3 months. ***Objectives:*** To determine and compare patient rated general neck pain, neck ROM, neck disability and CV angle before and after application TM combined with usual care among patients with CNP. ***Methodology:*** Classic experimental study design was used in this study. 40 patients with CNP were randomly assigned into two groups from outdoor musculo-skeletal unit, CRP-Dhaka. Among them 20 patients were assigned into trial group received TM with usual care and another 20 into control group received only usual care. Total treatment sessions were eight comprising of 2 sessions per week for 4 weeks. Single blinding procedure was used during data collection. ***Outcome measurement tools:*** Numerical pain rating scale (NPRS) was used to measure pain and universal goniometer to measure ROM, CV angle measure by tape and NDI to measure neck disability. ***Analysis of data:*** Inferential statistics such as Mann-Whitney U test, Paired t and Wilcoxon test was done using SPSS version 25. ***Results:*** Patients that received TM showed significantly greater improvement in pain intensity (P = 0.05), CV angle (P= 0.05), NDI (P= 0.000), neck flexion (P=0.05) and neck side flexion both right & left (p=0.05) than the control group immediately post-intervention. ***Conclusion:*** This study shows that TM was effective in reducing neck pain, improving dysfunction and range of motion (ROM) for patients with chronic mechanical neck pain.

Key words: Chronic neck pain, Thoracic Manipulation, and Usual care.

CHAPTER- I: INTRODUCTION

1.1. Background

Musculoskeletal disorders remain one of the important causes of activity limitation and participation restriction in daily activities. Within the musculoskeletal disorder, neck pain is increasing throughout the world (Rubinstein and Tulder, 2008). Neck pain is a debilitating condition that may greatly affect quality of life & one of the main causes for work absenteeism and visit to health care professionals (Porfirio, et al., 2015). It is more frequent in women than men and increases particularly among people of working age (Ortega, et al., 2014). Pernold (2005) reported that over 33% of neck pain patients develop chronic symptoms and the economic expense associated with chronic mechanical neck pain is very high (Enthoven, et al.,2004). Chronic neck pain is defined as pain in the neck with or without pain referred into one or both upper limbs that lasts for at least 3 months (Hoy, et al., 2014). The prevalence and burden of neck pain varies worldwide. Overall prevalence of neck pain in the general population ranges from 0.4% to 86.8% worldwide (Breivik, et al., 2013). Conversely Hoy, et al. (2014) stated that the prevalence of neck pain is increasingly yearly and creating disability globally. In addition, out of all 291 conditions studied in the Global Burden of Disease 2010 Study neck pain ranked as the 4th highest in terms of disability as measured by years lived with disability (YLDs) and 21st in terms of overall burden.

In United States of America, the annual prevalence was 41.5% in which individuals with chronic neck pain were middle-aged (mean age 48.9 years) and the majority of subjects were women (Driessen, et al., 2012) and it was the eight leading cause of disability in United States of America (Sberman, et al., 2014). In United Kingdom, the annual incidence was 34%.

Incidence of neck pain is increasing and it is estimated that up to 50% of the population experienced neck pain in last 1 year in which majority of the participants were middle age and female gender were associated with risk factors for the development and reporting of neck pain (Joslin, et al., 2014). In Australia, the prevalence of neck pain was 27.1% (Hayes, et al., 2013) whereas Hush, et al. (2009) conducted a one-year incidence proportion of neck pain in Australian office workers which estimated to be 0.49 and predictors of neck pain with moderate to large effect sizes were female gender than men. In Canada one population based cohort study (Cote, et al., 2008) showed that the annual incidence of neck pain was 14.6% and each year, 0.6% of the population developed disabling neck pain. On the other hand, another study conducted by Schopflocher, et al. (2011) showed that the prevalence of chronic neck pain was 18.9% among patients aged 18 years or older in which before 30 years predominately male suffered from neck pain with prevalence of 16.3% and after 30 years predominately more female reported neck pain compare with male with prevalence of 17.6%. In Sweden, the prevalence of neck pain was 55% in which females were more prevalent to be affected than male. Age specific statistics showed there was variation in age between male and female. Females aged between 35- 44 had a higher risk of having long and medium-term neck pain and ≥ 65 aged males had a higher risk of having long and medium term neck pain symptoms (Linder, et al., 2012).

In the terms of the region of Asia, the prevalence of neck pain demonstrated in the peak position in West and the Midwest of the Asia whereas in the South part of Asia showed relatively lower. In this area, the prevalence of neck pain varies among different age range. Age group of 45 to 64 years, 65 to 74 years, and 75 years and older had a similar prevalence of neck pain consisting of 31.1%–32.2%. In contrast,

age between 18 to 44 years showed lower prevalence that demonstrated 23.9% (Paul, 2008). In Hong Kong, the prevalence of neck pain among desk workers was 25.2% (Chiu, et al. 2012). In India, the prevalence of chronic neck pain among computer operators was found 47%. Majority of the participants were in between the age of 30-50 years. In contrast, Radhakrishnan, et al. (2015) showed that female was more commonly to develop and suffered from persistent neck pain. In Pakistan, one study (Sabeen, et al., 2013) categorized work related neck disorders among different employees and the highest prevalence was found among Pakistani computer users (72%) than bank workers (45.7%). In Sri Lanka, the prevalence was 39.64% in sewing workers in a garments factory (Jahan, et al., 2015) and no relevant study was found on neck pain prevalence among Bangladeshi people till date.

One study (Masum, et al., 2015) found that 22.22% office workers experienced neck pain on regular basis and 52.22% of the respondent sometimes. Along with considerable cost for individual and society, neck pain is a frequent source of disability causing human suffering and affecting wellbeing of individual (Bronfort, et al., 2012). Another study (Driessen, et al., 2012) stated that chronic neck pain was a financial burden for society, since these symptoms result in extended periods of sick-leave from work and high utilization of health care services. Martin, et al. (2009) in the United States (US) showed that in the period from 1997 to 2006, the US health care expenditures had increased 7% per year for persons with spinal problems. In 2007, neck problems accounted for 9% of the total US health care expenditures (Martin, et al., 2008).

Neck pain due to mechanical origin is most prevalent around the globe. Gross, et.al. (2002) mentioned that treatment of mechanical neck pain includes medication and physical therapy such as traction, massage, exercise and stretching activities, heat

treatment and other physical interventions, including spinal manipulation/mobilization. The aim of treatment is to reduce pain and to increase range of motion of the cervical spine (Hoving, et.al, 2001). The exact form of treatment is dependent on the etiology and nature of the neck pain, and all methods are not suitable for every patient. The treatment of neck pain most commonly prescribed intervention by general practitioners is rest, followed by analgesics, but neck pain is one of the most common conditions for referral to a physical therapist (Barry, 1995 and lintan, 2000). Clinicians use many different techniques to treat chronic neck pain. One of the most common conservative treatments used is Thoracic Manipulation.

Spinal manipulation is a treatment intervention practiced by a number of professions including physical therapists, who often utilize manipulation of the thoracic spine (Adams, et. al., 1998). APTA's Guide to Physical Therapist Practice (2003) has defined mobilization/manipulation as "a manual therapy technique comprised of a continuum of skilled passive movements that are applied at varying speeds and amplitudes, including a small amplitude/high velocity therapeutic movement". Health professionals describe manipulation in a variety of ways, although a recent study proposed that it should include five elements (Evans and Lucas, 2010): 1) force is applied to the recipient; 2) the line of action of this force is perpendicular to the articular surface of the affected joint; 3) the applied force creates motion at the joint; 4) this joint motion includes articular surface separation; and 5) cavitation occurs within the affected joint.

Regardless of its clinical popularity and Growing evidence has confirmed that the use of manipulation with exercise or the use of mobilization with exercise in treating neck pain has better clinical outcomes than other major and common modalities (Gross, et al., 2002; Cleland, et al., 2007).

Thoracic spine manipulation can activate descending inhibitory mechanisms resulting in hypoalgesia in distant areas which may restore normal biomechanics of the thoracic region and potentially lowering mechanical stress and increasing the distribution of joint forces in the cervical spine (Gonzalez-Iglesias, et.al., 2008).

1.2. Justification of the study

Neck pain due to mechanical origin is most prevalent around the globe. Clinicians use many different techniques to treat chronic neck pain includes medication and physical therapy such as traction, massage, exercise and stretching activities, heat treatment and other physical interventions, including spinal manipulation/mobilization. The aim of treatment is to reduce pain and to increase range of motion of the cervical spine. The exact form of treatment is dependent on the etiology and nature of the neck pain, and all methods are not suitable for every patient. The treatment of neck pain most commonly prescribed intervention by general practitioners is rest, followed by analgesics, but neck pain is one of the most common conditions for referral to a physical therapist.

Spinal manipulation is a treatment intervention practiced by a number of professions including physical therapists, who often utilize manipulation of the thoracic spine. The spine in the upper back and abdomen is known as the thoracic spine. It is one of the three major sections of the spinal column. The thoracic spine sits between the cervical spine in the neck and the lumbar spine in the lower back. Regardless of its clinical popularity and Growing evidence has confirmed that the use of manipulation with exercise or the use of Manipulation with exercise in treating neck pain has better clinical outcomes than other major and common modalities. Thoracic spine manipulation can activate descending inhibitory mechanisms resulting in hypoalgesia in distant areas which may restore normal biomechanics of the thoracic region and

potentially lowering mechanical stress and increasing the distribution of joint forces in the cervical spine.

There were numerous published articles regarding physiotherapy interventions for patients with chronic neck pain but Thoracic manipulation in prone position was not combined with usual care for chronic neck pain patients earlier by any author. In reality, this study would form a foundation to use Thoracic Manipulation along with usual care considering special dose and repetitions. However, research is essential to improve the knowledge of health professionals, as well as to develop the profession. The results of this study would guide physiotherapists to apply evidence based treatment to patients with chronic neck pain which would be beneficial for patients and develop physiotherapy profession as well.

1.3. Hypothesis

Null Hypothesis

Ho: $\mu 1 \geq \mu 2 = 0$ or $\mu 1 = \mu 2$, where the experimental group and control Group initial and final mean difference is same.

Alternative Hypothesis

Ha: $\mu 1 \leq \mu 2 \neq 0$ or $\mu 1 \neq \mu 2$, where the experimental group and control group initial and final mean difference is not same.

1.4 Objectives

1.4.1 General objective

- To identify the effectiveness of upper thoracic manipulation along with conventional physiotherapy in patients with chronic mechanical neck pain.

1.4.2 Specific Objectives

- To find out the effectiveness of T M combined with usual care in within and between groups at patient rated general pain.
- To determine the effectiveness of T M combined with usual care in within and between groups among patients with chronic neck pain at cervical range of motion.
- To ascertain the effectiveness of T M combined with usual care in within and between groups among patients with chronic neck pain at cervical spine disability.
- To demonstrate the effectiveness of TM combined with usual care in within and between groups at each components of neck disability index such as sleeping effects, pain at rest, reading newspaper, headache, travelling, concentration at work, personal car, daily work, lifting objects and recreational activities.

1.5. Operational Definition

1.5.a. Thoracic Manipulation: A manual technique comprises of a continuum of skilled passive movements including a small amplitude/high velocity therapeutic movement that is apply directly to the joint or through leverage in prone position.

1.5. b. Thoracic spine: The spine in the upper back and abdomen is known as the thoracic spine which consists of 12 vertebras. It is one of the three major sections of the spinal column. The thoracic spine sits between the cervical spine in the neck and the lumbar spine in the lower back.

1.5. c. Neck pain: This is usually associated with a long-term illness and chronic pain can be the result of damaged tissue but very often is attributable to nerve damage.

1.5. d. Chronic neck pain: Neck pain with / without unilateral or bilateral radiation in the posterior neck and/or shoulder regions and symptoms lasting more than 3 months and originated mechanically.

1.5. e. Usual care: Treatment techniques that are conventionally preferred by physiotherapist in a particular setting.

1.5. f. BMI: A standardized estimate of an individual's relative body fat calculated from his or her height or weight. The formula for calculating BMI is weight in kilogram (kg) divided by height in meter (m) squared.

CHAPTER- II: LITERATURE REVIEW

Musculoskeletal disorders are consistently threatening the quality of life by having the potential to restrict daily activities, causing absence from work and resulting in a change or discontinuation from employment. Hence disorders are expensive for society and for patients and are responsible for the highest number of healthy years (Damgaard, et al., 2013). Among those loss of days due to musculoskeletal disorders, work related pain is one of the common musculoskeletal disorders that affects millions of workers throughout the world across variant works or sectors of services (Mustafa and Sultan, 2013). Thus, pain is an unpleasant emotional state felt in the mind but identifiable as arising in a part of the body. In other word, it is a subjective sensation. Besides, pain is a defense mechanism designed to protect the subject's injured part from further damage (Wilde, et al., 2007). By any measure, pain is significantly a global health problem. Globally, it has been reported that 1 in 5 adults suffer from pain (Goldberg and McGee, 2011).

Pain in the neck is an unpleasant sensory and emotional experience in the neck area associated with actual or potential tissue damage or described in terms of such damage and it is an unspecified pain symptom (or syndrome) rather than a clinical sign. Perhaps age, culture, previous pain experiences and emotional factors such as joy, grief, fear, excitement, and the patient's beliefs and attitudes toward pain (Vaajoki, 2013). Although it is not life threatening, it can cause a sense of being unwell and substantial level of disability due to pain and neck stiffness.

This disability can affect the physical functioning of the patients leading to sickness behavior and activity restrictions. In general population, the 12-month prevalence of activity-limiting pain has been reported to vary from 1.7% to 11.5% (Leonard, et al., 2009).

Neck pain can be experienced as acute, chronic or intermittent or a combination of the three. Pain is a multivalent, dynamic and ambiguous phenomenon which is notoriously difficult to quantify. The International Association for the Study of Pain (IASP) in its classification of chronic pain defines cervical spinal pain as pain perceived anywhere in the posterior region of the cervical spine, from the superior nuchal line to the first thoracic spinous process (Misailidou, et al., 2010). The Bone and Joint Decade 2000-2010 Task Force on Neck Pain and Its Associated Disorders describes neck pain as pain the posterior neck region from the superior nuchal line to the spine of the scapula and the side region down to the superior border of the clavicle and the suprasternal notch (Sherman, et al., 2014). In addition, Ylinen (2007) defines typical characteristics of chronic neck pain with differential time duration from other types of neck pain.

Chronic neck pain is described as an often-widespread sensation with hyperalgesia in the skin, ligaments and muscles on palpation and in both passive and active movements in neck and shoulder area. Acute neck pain usually lasts less than 7 days, sub-acute neck pain lasts more than 7 days but less than 3 months, and chronic neck pain has duration of 3 months or more (Wilde, et al., 2007).

One study (Vos, 2012) showed that neck pain affects about 330 million people globally as of 2010 (4.9% of the population) whereas it is more common in women (5.7%) than men (3.9%). However, it is evident to know the estimation of acute or chronic neck pain prevalence and till date no research clearly mentioned which one is most prevalence. Nonetheless Goode, et al. (2010) stated that approximately 50–85% of individuals with neck pain do not experience complete resolution of symptoms and many of them might go on to experience chronic and impairing pain. In contrast Carroll, et al. (2008) disclaimed that neck pain either acute or chronic depending on the activity level performed by individuals. Thus, the authors concluded that twelve-

month prevalence estimates for activity-impairing neck pain range from 3.1–4.5% in the general population. The vast transformation of chronic neck pain from acute largely depends on production of neck pain through pain mechanism.

The sequence of chronic neck pain started from the mechanisms that alter the alignment of the cervical spine include pain, tightness in the soft tissues, imbalances of muscle strength as well as endurance between superficial and deep neck muscles, muscle fatigue and the cervical and thoracic curves. Changes in cervical and thoracic alignment as well as slouched posture are also known to contribute to altered alignment of the scapula. Hence, altered cervical alignment such as head protrusion is considered to be an important mechanism influencing cervical and scapular kinematics (Moayedi and Davis, 2013). Smart, et al. (2010) stated that chronic neck was introduced as a result of dysfunction of pain matrix and ectopic foci.

Hence, due to repetitive movements or neck muscles imbalance originates pain impulse that starts from the epidermal free nerve ending of the skin travelling via the first order neuron to the spinal cord and there the first order neuron bonds with the second order neuron in the substantial gelatinosa area. From here, pain impulse enters the first spinothalamic tract and then the brain stem and finally the second order neuron synapse with the third order neuron in the thalamus to create the sensation of pain. Therefore, production of chronic neck pain largely depends on predisposing or risk factors rather than limited casual factors.

The causes of chronic neck pain are broadly categorized into mechanical and pathological in which most of the patient came with mechanical neck pain (Ragonese, 2009). The mechanical causes of chronic neck pain directly include traumatic cervical injury such as whiplash injury, cervical spondylosis, osteoarthritis or rheumatoid arthritis in cervical region, strain of neck muscles, muscles imbalance between

cervical superficial and deep muscles, cervical disc bulging or herniation (Jull, et al., 2009; Sabeen, et al., 2015). However, different studies (Loose, et al., 2008; Son, et al., 2013) argued that chronic neck pain was not only confined to relative cause but also moderately depends on risk factors in which some are medical risk factors and others are work related risk factors. Medical risk factors include obesity and diabetes mellitus (Pai, et al., 2015), hypertension, sleeping posture (Peng, et al., 2015). In recent years, work load has increased among different professionals as well as students. Hence, the prevalence of work related chronic neck pain has increased among computer users, dentist, nurses, surgeons, bankers and teachers (Hagag, et al., 2011; Mustafa and Sultan, 2013).

The clinical features of neck pain exhibits in accordance with the level of involved cervical spine. Misailidou, et al. (2010) suggested that neck pain was subdivided into upper cervical spinal pain and lower cervical spinal pain, above or below an imaginary transverse line through C4. From upper cervical segments, pain can usually be referred to the head, whereas from lower cervical segments, pain can be referred to

the scapular region, anterior chest walls, shoulder, or upper limb. They also define sub occipital pain as the pain located between the superior nuchal line and C2, an area that appears to be the source of cervicogenic headache. In that aspect, the division of neck pain into sub occipital and upper and lower cervical pain may be important for clinicians and researchers in recognizing the area of the source of pain and trying to determine the possible causes. It is recognized that neck pain is a symptom following conditions in neck which are of degenerative conditions, inflammatory conditions, soft tissues injury or abnormalities of upper thoracic level. In contrast, when patho-anatomical conditions of neck pain cannot be made, Cheng, et al. (2015) recommended the term idiopathic chronic neck pain.

Guzman, et al. (2008) recommended a clinical classification of chronic neck pain in 4 grades according to severity of pain: grade I is neck pain with no signs or symptoms of major structural pathology and no or minor interference with activities of daily living, grade II is neck pain with no signs or symptoms of major structural pathology but major interference with activities of daily living, grade III is neck pain with no signs or symptoms of major structural pathology but with neurologic signs of nerve compression and grade IV is neck pain with signs of major structural pathology.

Major structural pathologies include, but are not limited to, fractures, spinal cord injuries, infections, neoplasm, or systemic diseases. Including this features disco genic pain causing forward head protrusion, weakness of cervical spine muscles and imbalance in strength and endurance between cervical superficial and deep flexor muscle (O' Leary, et al., 2011). All these symptoms were described on the basis of hypo mobility of the cervical spine facet joint or intervertebral joint. Steilen, et al. (2014) argued that chronic neck occurred due to capsular laxity and instability. Chronic neck pain often reflects a state of instability in the cervical spine and is a symptom common to a number of conditions described here in, including disc herniation, cervical spondylosis and whiplash associated disorder and vertebrobasilar insufficiency. Consequently, the influence of laxity and instability caused excessive movement of the cervical vertebrae. In the upper cervical spine (C0-C2), this can cause a number of other symptoms including, but not limited to, nerve irritation and vertebrobasilar insufficiency with associated vertigo, tinnitus, dizziness, facial pain, arm pain, and migraine headaches. In the lower cervical spine (C3-C7), this can cause muscle spasms, crepitation, and/or in addition to chronic neck pain.

Another study (Childs, et al., 2008) disclaimed that chronic neck pain symptoms should be adhered with International Classification of Functioning, Disability and Health (ICF) scale. Thus, the sign and symptoms incorporating ICF reflecting as neck pain with mobility deficit, neck pain with headaches, neck pain with movement coordination impairments and neck pain with radiating pain. Despite of having such enormous features from person to person the authors finally recommended that a clear and accurate diagnosis of chronic neck pain is essential.

Diagnosis was regarded as the first tool for successful management of patient's problems (Guzman, et al., 2008). In case of chronic neck pain Mintken and Cleland (2012) stated that during history taking the duration of symptoms, behavior of pain, deformity of cervical spine and presence of neck disability was urgent to be included. In addition, McColl (2013) advised to exclude vascular headache from cervical headache which usually originated from cervical spine.

Johnson and Cordett (2014) stated that physical examination of the cervical spine infrequently contributes to general observation, palpation, active, passive, resisted movements and special test for cervical spine. General observation examining posture, symmetry, muscle bulk and previous scars should be part of the observation. Palpation of the cervical spine may elicit focal tenderness which is the appropriate clinical context may increase the clinician's suspicion for threatening pathology.

A neurological examination most commonly emphasis on any upper (example: cord compression) or lower (nerve root) motor neuron involvement and potential myotomal or dermatomal involvement to localize an anatomical level. Provocative maneuvers such as neck compression and upper limb tension tests did not have adequate sensitivity or specificity to be recommended as routine practice (Nee, et al., 2012).

In emergency case, a plain x ray of cervical spine was recommended for the early diagnosis of the source of neck pain. Conversely, Pompan (2011) stated that magnetic resonance imaging (MRI) was found highly effective for the diagnosis of neck pain. There is no urgency about the use of laboratory test for the diagnosis of mechanical chronic neck pain. However, Hooten, et al. (2013) recommended that accurate diagnosis was named as the key to make successful treatment plan for patient with chronic neck pain.

Management of chronic neck pain attributed to the causative conditions thus the principles of pharmacological and physiotherapy management varied in response to different symptoms. Southerst, et al. (2014) conducted a systematic review which focused on effectiveness of exercise for chronic neck pain patients. The authors concluded that exercise is superior to any other means for patients with chronic neck pain. The review found seven different types of exercise such as cranio-cervical flexion exercises, cervical range of motion exercises, cervical isometric strengthening exercises, cervical dynamic resistance strengthening exercises, shoulder range of motion or strengthening exercises, stretching and general exercise programs. The majority of randomized control trials (RCTs) combined different types of exercises within one exercise program.

The duration of the exercise programs ranged from 6 weeks to 12 months. In contrast Bronfort, et al. (2012) found superior effects of cervical spinal manipulation compared with medication among acute and sub-acute neck pain patients.

Exercise therapy primarily focused on neck pain patients are isometric exercise, range of motion exercise, dynamic resistance exercise, cranio-cervical exercise, upper limb strengthening exercise, neck stabilization exercise, proprioceptive exercise and neck

endurance exercise (Bertozzi, et al., 2013). Studies revealed that isometric exercise for neck muscle is performed using manual resistance or theraband. However, manual resistance varied from person to person rather rubber theraband provide good static resistance which was in similar with the outcome of study conducted by Ludvigsson, et al. (2015). Meanwhile, isometric exercises with rubber (Theraband) targeting neck flexors, extensors, and both side flexors and rotators muscles was regarded as effective treatment. Each exercise was performed 20 repetitions 3 times a week for 12 weeks (Khan, et al., 2014). In contrast, Sowmya (2014) argued that three weeks' dynamic neck strengthening exercise in cervical flexors, extensors and rotators for twelve weeks improves pain and minimizes disability. However, these exercises primarily focused on strengthening superficial neck musculature. In addition, Liyanage, et al. (2014) stated that strengthening exercise of neck muscles was effective while combining with stretching exercise of neck muscles with repetition for stretching hold for 10 seconds at a time and gradually increased to 15 to 30 seconds and continued for 3 times per day. Dusunceli, et al. (2009) argued that without stabilizing the neck it is hard to find the efficacy of stretching and strengthening exercise.

Cervical and upper limb stabilization exercise sessions included 3 times per week and exercises included 5–6 minutes jogging and 10 minutes stretching (the cervical, shoulder, chest, and scapular muscles) in the standing position and 15 minutes' isometric exercises (cervical flexion, extension, rotation and side-bending by resisting the forehead in the seated position) with a total of 30 minutes' sessions.

One randomized clinical trial (Gautam, et al., 2014) compared Maitland and Mulligan mobilization for chronic neck pain patient. In this article, Maitland mobilization was applied in grade 2 oscillatory movements for 60 seconds with 2-3 hertz. Starting with

grade 2, repetitions were subsequently increased in progressive whereas Mulligan mobilizations such as Natural Appophyseal Gliding (NAGS) were given with 2-3 hertz (for less than 6 repetition) and Sustained Natural Appophyseal Gliding (SNAGS) for 6 repetitions in 3 sets. The mobilization was repeated for less than 6 times and then movement was reassessed. Treatment was given 4 times a week for total of 30 days. In addition, Kilinc, et al. (2014) found Cyrix cervical mobilization to be effective to reduce chronic neck pain. The treatment sessions lasted for 10 minutes and scapular mobilization for 10 repetitions 10 sets was performed to patients. Another most popular type of mobilization technique was named as McKenzie mobilization. Kjellman and Oberg (2002) used McKenzie mobilization technique in repeated retraction and retraction extension. The author continued 2 sessions per week for 8 weeks with additional home exercise for patients with chronic neck pain. In contrast, manipulation has proven to improve pain and range of motion and minimize disability among patients with chronic neck pain. One systematic review by Gross, et al. (2010) found moderate quality evidence which concluded that cervical manipulation and mobilization produced similar effects on pain, function and patient satisfaction at intermediate term to follow up.

Low quality evidence suggested cervical manipulation might provide greater short term pain relief and low quality evidence also supported thoracic manipulation for pain reduction and increased function (immediate pain reduction in chronic neck pain but optimal technique and dose need to be determined). Besides Martel, et al. (2011) suggested including manipulation in cervical spine with selected criteria for patient with chronic neck pain. This ended up with inconclusive finding that was manipulation with home exercise program eventually relief pain for shorter time but additional investigation is also required to identify the best strategies for secondary

and tertiary prevention of chronic neck pain. Saha and Haque (2015) argued that manipulation for cervical spine with specific dose and repetitions found effective among patients with chronic neck pain. This study described that manipulation such as straight pull and rotation manipulation was found effective when combined with home exercises. Manipulation was done 3 to 4 times in each direction and 3-4 times per day.

Quite the opposite, Kim, et al. (2015) proved that myofascial release technique was found effective than joint mobilization where chronic neck pain was due to tightness of neck musculature. In this study, release technique was performed 2 times in a week for 20 minutes. In release technique group, myofascial release was used to treat the muscles that showed shortened and soft tissue mobilization was performed in Grade II B in accordance with Granter King Scale with active or passive stretching in order to lengthen the soft tissues. On the other hand, Kaur and Singh (2015) found muscle energy technique to be effective in reducing neck pain and reduce disability. In recent past, majority of the studies showed low quality evidence to draw conclusion to use electro physical agents for neck pain. However, one studies Kroeling, et al., (2013) conducted a systematic review to find the efficacy of electrotherapy for neck pain.

The study found very low quality evidence to determine that pulsed electromagnetic field therapy (PEMF) and repetitive magnetic stimulation (RMS) were more effective than placebo, while transcutaneous electrical nerve stimulation (TENS) showed inconsistent results. One recent study (Sharma and Patel, 2014) showed that TENS is more effective while combined with isometric neck muscle exercises. The dose of TENS was 5 HZ frequency, high pulse intensity, 300 Micro second duration and 20 minutes' duration with 4 sessions per week.

Cervical traction was found to be effective in different studies. The mechanism of relief of pain by cervical traction was the reduction of compression on the pain sensitive structure of cervical spine such as a central disc bulge or spondylotic changes in cervical spine (Umar, et al., 2012). However, Sambyal and Kumar (2013) also found effectiveness of traction for chronic neck pain patients. But it had to be under specific dose and duration. The authors recommended to apply cervical traction for 20 minutes on 7% of body weight with 7 seconds hold time and 5 seconds rest time and 4 sessions per week. In contrast, there was debate in application of cervical traction for chronic neck pain patients. In recent past Chiu, et al. (2011) used intermittent cervical traction over baseline, 6 weeks and 12 weeks' period for chronic neck pain patient and found no significant difference in VAS and Modified Northwick park neck pain questionnaires while compared with control group. Conversely Childs, et al. (2008) stated based on moderate evidence that clinicians should consider the use of mechanical intermittent cervical traction, combined with other interventions such as manual therapy and strengthening exercises for reducing pain and disability in patients with neck and neck-related arm pain.

Medication is the second choice of treatment for long time pain control. Different studies (Cho, et al., 2013; Seo, et al., 2014) suggested that allopathic medicine showed to demonstrate short term benefits and consequently can create long term systemic complications such as kidney failure or ulcer. The most common drugs in case of chronic neck pain were non-steroidal anti-inflammatory drugs, muscle relaxant, acetaminophen, anti-depressant, steroid injection and narcotics.

One study (Martel, et al., 2011) discovered home exercise program for chronic neck pain which includes general range of motion (ROM) exercises that served for warm-up and cool down purposes, followed by four stretching/mobilization and four

strengthening exercises (concentric and isometric contractions) of the cervical and upper thoracic spine, principally flexion/extension, lateral flexion and rotation of the cervical spine. Three series of each exercise were performed during a training session, with a 30 to 60 second rest period between each series. A complete training session lasted between 20 to 30 minutes.

In order to find the effectiveness of study, outcome measurement is mandatory to introduce for objective findings. The neck disability index (NDI) is a commonly used outcome measure to demonstrate the actual level of disability among patients with chronic neck pain. This consists of 10 items in which 7 items are related to activities of daily livings, 2 items related to pain and 1 item related to concentration. There are total 50 scores in this scale and each item starts with 0 and end up with 5. The highest number of score revealed to greatest disability (MacDiarmid, et al., 2009). In addition, Jun and Kim (2013) stated that the NDI has demonstrated moderate test re-test reliability (0.68). Pain intensity was measured by numerical pain rating scale (NRS) in which a segmented numeric version of the VAS demonstrated greatest intensity of pain. The common format is a horizontal bar or line. Similar to the pain VAS, the NRS is anchored by terms describing pain severity extremes. In this scale patients are asked to mark the last 24 hours of pain. The reliability of NRS is 0.95 whereas the reliability of VAS is 0.94 (Hawker, et al., 2011). Different studies (Fletcher and Bandy, 2008; Florencio, et al., 2010) suggested that Goniometer was the best tools to measure cervical range of motion (CROM). The CROM device stands out as a reliable, non-invasive and easy to use method, but it is a very expensive tool. However, the agreement between the tools was considered moderate for flexion and left rotation (0.71; 0.58) and excellent for all of the other movements (0.76-0.87). The intra examiner reliability for the CROM device was moderate for flexion and right rotation (0.70; 0.69) and excellent for all of the other movements (0.79-0.88). Tape measurement is the best procedure for CV angle.

CHAPTER–III METHODOLOGY

This thesis was designed to evaluate the efficacy of Thoracic Manipulation combined with usual care among patients with chronic neck pain. To identify the effectiveness of this treatment regime, numeric pain rating scale, goniometer, Tape measurement and neck disability index will use as measurement tools for measuring pain, range of motion, C V angle and neck disability.

3.1. Study Design

The study was a quantitative evaluation of classic experimental research design. Depoy and Gitlin (2015) stated that classic experimental research finds out the casual relationship between independent and dependent variables and infer the findings for generalization. In fact, the study was an experiment between different subject designs. Thoracic Manipulation combined with usual physiotherapy techniques applied to the treatment group and only usual physiotherapy techniques applied to the control group. A pre-test (before intervention) and post-test (after intervention) was administered with each subject of both groups to compare the effects on pain, range of motion, C V angle and neck disability.

3.2. Study Area

Musculoskeletal Outpatient Unit, Department of Physiotherapy, Centre for the Rehabilitation of the Paralyzed (CRP), Mirpur, Dhaka.

3.3. Study Period

The research was conducted in the time of October 2017 to May 2018.

3.4. Study Population

The study population was the patients diagnosed as chronic neck pain attended in the musculoskeletal outpatient unit of physiotherapy department at CRP, Mirpur, Dhaka.

3.5. Method of sample selection

3.5.1. Sampling Technique

40 participants with chronic neck pain who met the inclusion criteria selected conveniently from outpatient musculoskeletal unit of physiotherapy department of CRP, Mirpur, Dhaka. All the participants have an equal probability of assigning to any of two groups and then 20 patients were randomly assigned to trial group comprising of treatment approaches of Thoracic Manipulation combined with usual physiotherapy techniques and 20 patients to the control group treated by usual physiotherapy techniques for this study. Single blinding procedure will follow in this study. After completion of sampling technique, the researcher randomly assigned the participants into trial group and control group, because it improves internal validity of the thesis. The participants were assigned into trial and control group by using computer generated random number from 1 to 40. An initial randomization was done by computer to identify the participants of trial and control group and the first participants came out in the control group. The samples was given numerical number C_1, C_2, C_3 etc. for the control group and T_1, T_2, T_3 etc. for trial group. The random numbers of samples in the control group was 1, 2 ,3 ,9 ,10 ,12 ,14 ,15 ,16 ,17 ,18 ,20, 24 ,28 ,30,33,35,37,39,40 and trial group 4, 5, 6, 7 ,8, 11, 13, 19, 21, 22, 23, 25, 26, 27, 29,31,32,34,36,38.

3.5.2. Inclusion criteria

- **Age range between 18 to 60 years:** This age range was selected because most of the people around the age range showed most prevalent time of neck pain in their life (Chiu, et al., 2012; Gautam, et al., 2014).
- **Male and female both were included:** Both male and female were included because one study conducted by Schopflocher, et al. (2011) showed that chronic neck pain affects male before 30 years and predominately male suffered from neck pain with prevalence of 16.3% and after 30 years predominately more female reported neck pain with prevalence of 17.6%.
- **Patient suffering from neck pain for at least 3 months:** Chronic neck pain patients were included in this thesis. By definition, participants who suffered from neck pain for at least 3 months were included (Hoy, et al., 2014).
- **Patient diagnosed as nonspecific mechanical chronic neck pain:** This type of patients were included because physiotherapy favors most in terms of mechanical neck pain due to cervical spondylosis, neck muscle spasm, neck muscle imbalance and central disc bulging (El-Sodany, et al., 2014).
- **Pain NRPS rating equal or greater than 4 points & C V angle more than 8 c.m.**
- **Willingness to adhere to treatment and measurement regimes:** Included these patients because they provided written consent form and might be helpful or might not leave treatment during the study (Gautam, et al., 2014).
- **Subjects who did not receive drug or other therapies for their neck pain:** The half-lives of Diclofenac sodium, Indomethacin, Naproxen sodium, Allopurinol are 12 hours, 1-2 days, 1 hour and 2 hours. Therefore, subject

who did not take these drugs before starting of physiotherapy on the given time were included (Hinz, et al., 2008; Warden, 2010). In addition, subjects who did not receive physiotherapy previously were included as they might not show any influence of previous experience with the current physiotherapy treatment.

3.5.3. Exclusion criteria

- **Age below 18 years and above 60 years:** This age range participant was excluded as chronic neck pain due to mechanical origin is less prevalent (Ummar, et al., 2012)
- **Acute or sub-acute neck pain:** In this state of pain, cranio-cervical exercise was not recommended as it might increase irritability in cervical spine (Jull, et al., 2009).
- **Sustaining red flags of neck pain:** Subjects were excluded when they showed red flags such as weight loss, fever, malignancy, inflammatory arthritis, vascular headache, cervical cord compression, vertibro- basillary insufficiency and referred pain from myocardial ischemia (McColl, 2013).
- **Associated pathology of the upper cervical region or upper limb:** Participants were excluded if they showed any overlapping with other clinical findings as referred pain from costo-transverse joint, rotator cuff tendonitis, and cervical rib syndrome (El-Sodany, et al., 2014).
- **Participants who were unwilling to participate or continue medication for neck pain:** These types of patients were excluded as they have the chance to drop out during the itinerary of thesis or wanted to take medicine like pain killer which would actually hide the outcome of dependent variables or potentially influence the results of the study (Halvorsen, et al., 2014).

3.6. Flow chart

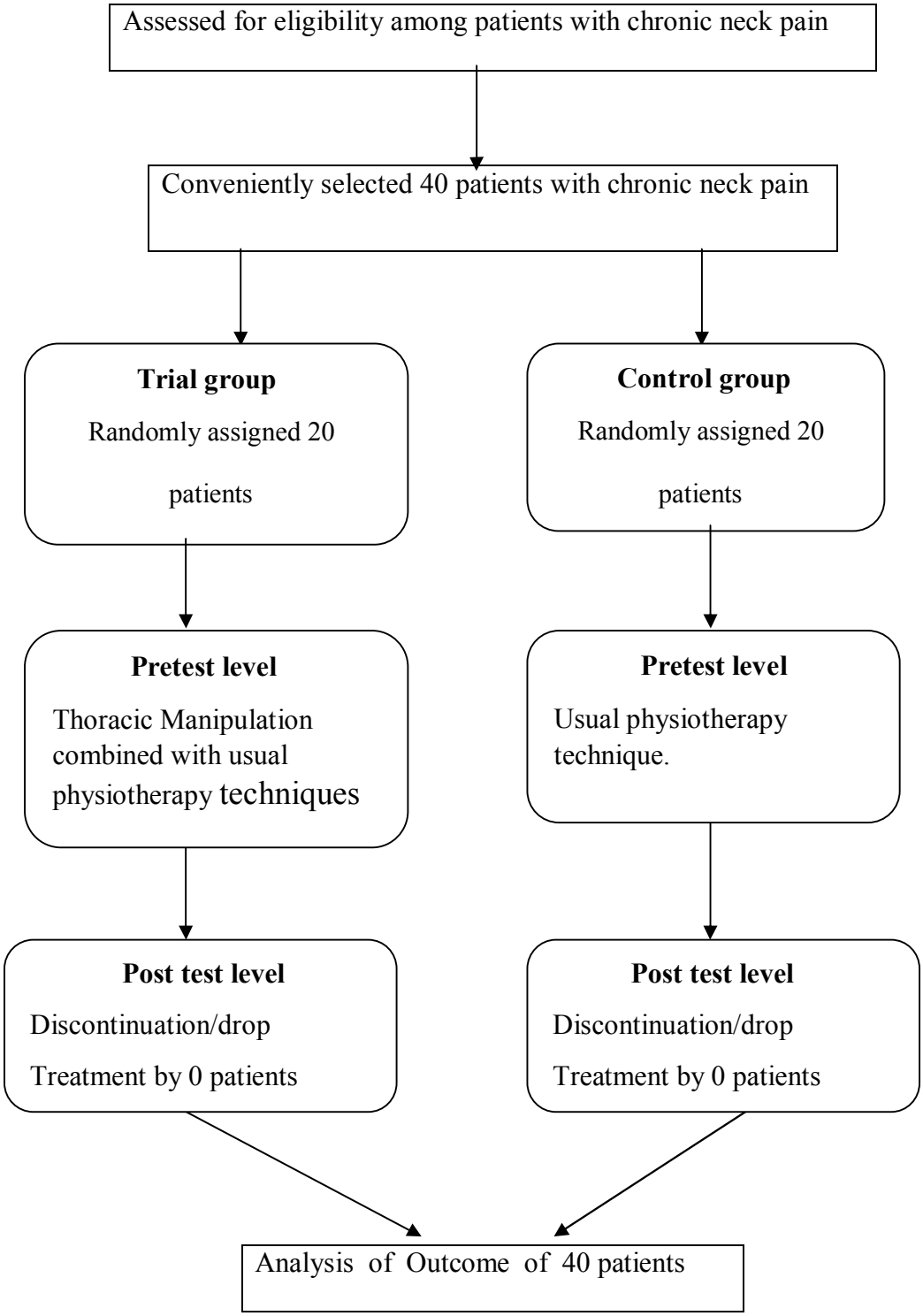

Figure 1: Flow-chart of the phases of classic experimental research

3.7. Sample Size

Sample size for this thesis was 40. Among them 20 participants were in trial group and 20 participants in control group.

3.8. Treatment Regime/ Intervention:

Six physiotherapists who were expert in treatment of musculoskeletal patient were involved in treatment of patients. All the physiotherapists have the experience of more than three years in the aspect of musculoskeletal physiotherapy. Among them, four were male and two were female physiotherapist. Protocol for usual physiotherapy care was obtained from head of physiotherapy department, Centre for the rehabilitation of the paralyzed (CRP) (Appendix- E). An in-service training was arranged to share the information with practical demonstration regarding Thoracic Manipulation including patient position, types of exercise, dose and repetition (Appendix- F) with usual care.

3.9. Methods of Data collection

3.9.1. Data Collection Tools

Data collection tools were data collection form, informed consent form, structured questionnaire, papers, pen, pencil, Tape and Goniometer.

3.9.2. Measurement Tools

- 10 cm numeric pain rating scale (NPRS) for measuring pain intensity in resting position. The NPRS is a verbal or written determination of a pain level on a scale from 0 to 10, in which 0 represents no pain and 10 represents excruciating pain (Hawker, et al., 2011).
- Universal Goniometer to measure range of motion in cervical spine.
- Tape for measuring C V angle of cervical spine.

- 50 points Neck disability scale to measure the disability status among patients with chronic neck pain. In case disability measurement NDI showed acceptable reliability. In addition, it has been used effectively in both clinical and research settings (Neziri, et al., 2010).

3.9.3. Data Collection Procedure

The data collection procedure was conducted through assessing the patient, initial recording, treatment and final recording. After screening at the department, patients were assessed by a graduate physiotherapist. 8 sessions of treatment was provided for each participant. Data was gathered through a pre-test, intervention and post-test and

the data was collected by using a written questionnaire form (Appendix- D) which was formulated by the researcher. Pre-test was performed before beginning the treatment and the intensity of pain was noted with numeric pain rating scale, range of motion (ROM) was measured by universal goniometer, C V angle was measured by tape and disability by Neck disability index. The same procedure was performed to take post-test at the end of 8 sessions of treatment. A data collector provided the assessment form to each subject before starting treatment and after 8 sessions of treatment and patient was instructed to put mark on the subjective portion and in objective portion like ROM, CV angle was completed by Physiotherapist.

The data collector collected the data of both trial and control group in front of the Physiotherapist in order to minimize the bias.

3.9.4. Level of Significance

In order to find out the significance of the study, the “p” value was calculated. The p values refer to the probability of the results for experimental study. The word probability refers to the accuracy of the findings. A p value is called level of significance for an experiment and a p value of <0.05 was accepted as significant

result for health service research. If the p value is equal or smaller than the significant level, the results are said to be significant (DePoy and Gitlin, 2015).

3.10. Data Analysis

Appropriate technology/software used for Statistical analysis like (SPSS) version 25 & others.

3.10.1 Statistical Test

Statistical analysis refers to the well-defined organization and interpretations of the data by systemic and mathematical procedure and rules (DePoy and Gitlin, 2015). Between groups analysis of pain, CV angle and neck disability was calculated by range of motion (ROM) by unpaired *t* test. In addition, within group analysis of ROM was carried by Paired *t* test and within group analysis of pain, CV angle and neck disability index was analyzed by Wilcoxon signed rank test (Hicks, 2009).

Paired t test

Paired t-test was used to compare difference between means of paired variables.

Selection of test of hypothesis is mean difference under t distribution.

Assumption

Paired variables

Variables were quantitative

Parent population of sample observation follows normal distribution.

Null and alternative hypothesis

Ho: $\mu 1 - \mu 2 = 0$ or $\mu 1 \geq \mu 2$; where the experimental group and control group initial and final mean difference was same.

Ha: $\mu 1 - \mu 2 \neq o$, $\mu 1 < \mu 2$; where the experimental group and control group initial and final mean difference was not same.

Here,

Ho= Null hypothesis

Ha= Alternative hypothesis

μ1= Mean difference in initial assessment

μ2= Mean difference in final assessment

Formula: test statistic t is follows:

$$\boldsymbol{t = \frac{\bar{d}}{SE(d)} = \frac{\bar{d}}{\frac{SD}{\sqrt{n}}}}$$

Where,

$\bar{d}$= mean of difference (d) between paired values,

SE ($\bar{d}$) = Standard Error of the mean difference

SD= standard deviation of the differences d and

n= number of paired observations.

Calculation of paired t value of the general pain intensity as below-

$$\mathbf{t = \frac{\bar{d}}{SE(d)} = \frac{\bar{d}}{\frac{SD}{\sqrt{n}}} = \frac{1.250}{\frac{1.164}{\sqrt{10}}} = 4.802}$$

Level of Significant

The researcher has used 5% level of significant to test the hypothesis. Calculated t value and compared with standard t value in with appropriate degrees of freedom; the null hypothesis will be rejected when observed t-value is large than the standard t-value and alternative hypothesis is accepted. On the other hand, reversed decision has taken when the calculated value of t is smaller than the standard t-value. All these decisions are taken with a prefixed level of significance (for this case this is 5%) In this way researcher had calculated paired t-value and significant level and have presented in the following tables.

Table 1: Neck disability index (initial and final paired t-test)

		TM & Conventional physiotherapy			Conventional physiotherapy	
Serial No.	Variables	t	Sig. (2-tailed)	df	t	Sig. (2-tailed)
Pair 1	Pain Intensity	4.972	.000	19	4.802	.013
Pair 2	Personal Care (washing, dressing, etc.)	7.628	.000	19	3.929	.050
Pair 3	Lifting	4.723	.022	19	4.133	.067
Pair 4	Reading	7.025	.050	19	4.034	.076
Pair 5	Headaches	9.448	.012	19	1.552	.066
Pair 6	Concentration	4.977	.098	12	5.007	.052
Pair 7	Work	6.469	.014	19	2.814	.045
Pair 8	Driving	5.483	.028	19	2.538	.035
Pair 9	Sleeping	4.972	.000	19	2.868	.044
Pair 10	Recreation	7.628	.064	19	2.482	.070

Table 2: Numeric Pain Rating scale (NPRS) (Before and after treatment Assessment-Paired t-test)

		Upper thoracic manipulation & Conventional physiotherapy			Conventional physiotherapy	
Serial No.	Variables	t	Sig. (2-tailed)	Df	t	Sig. (2-tailed)
Pair 1	How severe your neck pain in present	14.323	.001	19	7.025	.021
Pair 2	How severe your pain in sitting position of neck	14.873	.036	19	7.261	.028
Pair 3	How severe your pain in lying position of neck	14.038	.000	19	6.658	.059
Pair 4	How severe your pain is during flexion of neck	12.711	.057	19	8.291	.079
Pair 5	How severe your pain is during extension of neck	17.351	.000	19	6.915	.062
Pair 6	How severe your pain is during side flexion to right side of neck	12.226	.045	19	6.940	.049
Pair 7	How severe your pain is during side flexion to left side of neck	11.110	.067	19	9.170	.078
Pair 8	How severe your pain is during rotation to right side of neck	12.669	.043	19	7.319	.090
Pair 9	How severe your pain is during rotation to left side of neck	10.405	.030	19	9.454	.045
Pair 10	How severe is your neck pain during travelling of neck	10.559	.080	19	8.512	.170

Unrelated t test

Unrelated t test was used to compare difference between two means of independent variables. Selection of test of hypothesis was two independent mean differences under independent t distribution.

Assumption

Different and independent variables

Variables were quantitative

Normal distribution of the variables

Formula: test statistic t is follows:

$$\mathbf{t} = \frac{\bar{\mathbf{x}}_1 - \bar{\mathbf{x}}_2}{\mathbf{s}\sqrt{\frac{1}{\mathbf{n}_1} + \frac{1}{\mathbf{n}_2}}}$$

Where,

$\boldsymbol{x}\square\mathbf{1}$ = Mean of the Experimental Group,

$\boldsymbol{x}\square\mathbf{2}$ = Mean of the Control Group,

$\boldsymbol{n1}$ = Number of participants in the Experimental Group,

$\boldsymbol{n2}$ = Number of participants in the Control Group

$\boldsymbol{S}$ = Combined standard deviation of both groups

Calculation unrelated t value for general pain intensity:

Where,

$$\boldsymbol{S} = \sqrt{\frac{\sum(\bar{x}_E - x_1)^2 + \sum(x_C - x_2)^2}{n_1 + n_2 - 2}} = \sqrt{\frac{32.75 + 14.82}{20 + 20 - 2}} = \frac{47.57}{38} = 1.251$$

Here,

$\boldsymbol{x}\square\boldsymbol{E}$ = Mean of the experimental Group

$\boldsymbol{x}\square\boldsymbol{C}$ = Mean of the control group

$\boldsymbol{x}\square\mathbf{1}$ = Mean of the Experimental Group,

$\boldsymbol{x}\square\mathbf{2}$ = Mean of the Control Group,

$\boldsymbol{n1}$ = Number of participants in the Experimental Group,

$\boldsymbol{n2}$ = Number of participants in the Control Group

$$\mathbf{t} = \frac{\bar{\mathbf{x}}_1 - \bar{\mathbf{x}}_2}{\mathbf{S}\sqrt{\frac{1}{\mathbf{n}_1} + \frac{1}{\mathbf{n}_2}}} = \frac{\mathbf{3.45 - 2.56}}{\mathbf{1.251}\sqrt{\frac{1}{\mathbf{20}} + \frac{1}{\mathbf{20}}}} = \mathbf{17.231}$$

In this way researcher has calculated all the t-value and have presented in the following tables

Table 3: Unrelated t-Test (Before and After Treatment)

	Before Treatment			After Treatment		
Variables	t	Sig. (2-tailed)	Df	t	Df	Sig. (2-tailed)
How severe your neck pain in present	17.231	.674	19	9.829	19	.034
How severe your pain in sitting position of neck	17.482	.045	19	8.353	19	.092
How severe your pain in lying position of neck	18.058	.068	19	10.636	19	.051
How severe your pain is during flexion of neck	18.013	.072	19	9.239	19	.035
How severe your pain is during extension of neck	15.762	.821	19	6.824	19	.001
How severe your pain is during side flexion to right side of neck	14.233	.097	19	7.378	19	.068
How severe your pain is during side flexion to left side of neck	15.286	.432	19	8.718	19	.065
How severe your pain is during rotation to right side of neck	17.971	.097	19	7.794	19	.035
How severe your pain is during rotation to left side of neck	14.091	.025	19	5.832	19	.082
How severe is your neck pain during travelling of neck	13.702	.863	19	9.790	19	.042

3.11. Ethical Issues

The whole process of this research project was done by following the Bangladesh Medical Research Council (BMRC) guidelines and World Health Organization (WHO) Research guidelines. The proposal of the dissertation including methodology was presented to the Institutional Review Board (IRB) of Bangladesh Health Professions Institute (BHPI) (Appendix- A). Again before starting data collection, researcher obtained permission (Appendix- B) from the head of physiotherapy department to access patient data based management and allow full involvement of physiotherapist who have been working in musculoskeletal physiotherapy department, CRP, Mirpur.

The researcher strictly maintained the confidentiality regarding participant's condition and treatments. The researcher obtained consent from each participant to take part in this study. A signed informed consent form (Appendix- C) was received from each participant. The participants they decline answering any question during the study and were free to withdraw their consent and terminate participation at any time. Withdrawal of participation from the study did not affect their treatment in the physiotherapy department and they still had the chance to receive same facilities. Every subject had the opportunity to discuss their problems with the senior authority or administration of CRP and had any questioned answer to their satisfaction.

3.12. Inform consent

The researcher obtained consent to participate from every participant. A single informed consent form received from each participant. The participants informed that they have the right to meet with outdoor doctor if they think that the treatment is not enough to control the condition or if the condition become worsens. The participants also are informed that they were completely free to decline answering any question during the study and were free to withdraw their consent and terminate participation at any time. Withdrawal of participation from the study would not affect their treatment in the physiotherapy department and they would still get the same facilities.

CHAPTER –IV RESULTS

Forty patients with chronic neck pain were enrolled in the study. Twenty in the conventional physiotherapy group (control group) and twenty in the upper thoracic (T1-T4) manipulation along with conventional physiotherapy group (Trial group). This experimental study was conducted in Dhaka city in order to determine the efficacy of upper thoracic (T1-T4) manipulation along with conventional physiotherapy technique and only conventional physiotherapy in patients with chronic mechanical neck pain. A pre-tested modified interviewer administrated structured questionnaire was used to collect the information. A total of 40 patients were interviewed to collect the information. Section A contained socio-demographic related variables; section B contained disease related variables; section C contained neck pain related variables; section D contained active ROM related variables; and section E contained neck disability Index related variables. Subjects of both conventional and experimental group scored their pain on Numeric Pain Rating Scale (NPRS), Range of Motion (ROM) and disability on Neck Pain Disability Index before and after completing treatment. The data were entered and analyzed by using SPSS (Statistical Package for Social Sciences) software version 25. Significance test for difference of means were done using „Wilcoxon signed-rank test for between groups comparison and Mann-Whitney U test for within groups comparison; as well as pair t-test.

Table 4: Baseline characteristic of patients

Variables	Thoracic Manipulation(TM) Group (N = 20)		Conventional Group (N = 20)	
	Mean with (SD)	Max-min	Mean with (SD)	Max-min
Age	43.55±12.939	20-63	39.45±11.385	20-63
Weight (kg)	61.80 ±8.624	48-80	64.45±8.918	48-80
Height (cm)	163.91±16.091	134-200	160.20±6.212	134-200
BMI	21.75 ±2.881	18-32	25.00 ± 3.212	18-32

Table 4 compares the baseline characteristics of participants between Thoracic Manipulation(TM) group and Conventional group. In addition, two groups did not show significant differences at baseline regarding demographic characteristics and disease-related parameters.

In Thoracic Manipulation(TM) group, the mean age (± SD) of the participants was 43.55 (±12.939) years and in Conventional group 39.45 (±11.385) years. In addition, mean weight (± SD) in Thoracic Manipulation group was 61.80 (±8.624) kg and 64.45 (± 8.918) kg. Mean height (± SD) was 163.91 (±16.091) cm in Thoracic Manipulation group and in contrast 160.20 (± 6.212) in Conventional group participants. Mean (± SD) pretest BMI score in Thoracic Manipulation group was 21.75 (±2.881) and in contrast mean (± SD) in Conventional was 25.00 (± 3.212).

Socio-demographic characteristics of participants

Distribution of respondents by Sex (n= 40)

The table 2 shows that among the participants of conventional physiotherapy, 50% were male and 50% were female. Other hands 45% were male and 55% were female in the participants of thoracic mobilization.

The figure 2 reveals that about 50% participants were male and 50% participants were female in thoracic mobilization. Other hands 45% were male and 55% were female in the participants of conventional physiotherapy group.

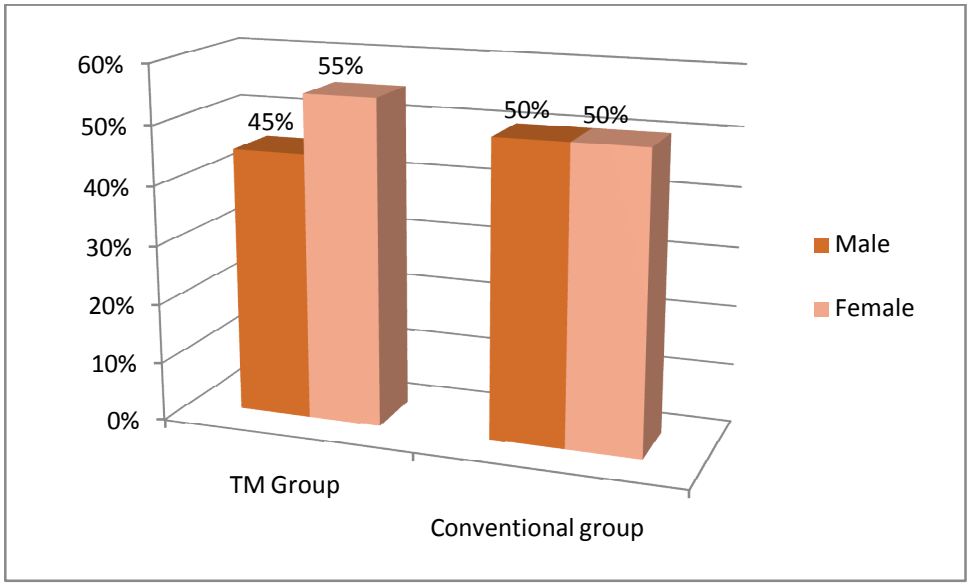

Figure 2: Distribution of participants by sex (n=40)

Distribution of participants by Educational Background (n=40)

Figure 3 found that 4% below S.S.C, 16% SSC, 8% HSC, 28% graduate, 16% post-graduate and 8% Technical education in Thoracic Manipulation group compare to conventional group 4%, 28%, 8%, 28%, 12% & 0% respectively. The figure shown that Graduate is the highest in conventional physiotherapy group (28%), moreover, the same (28%) is the highest in TM group.

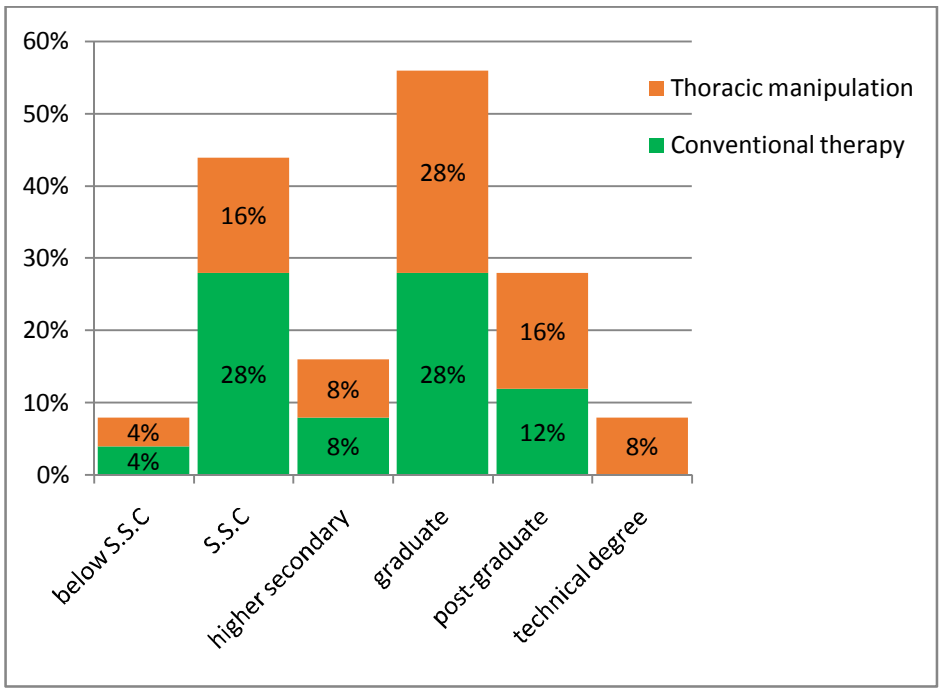

Figure 3: Distribution of participants by Educational Background (n=40)

Table 5: Distribution of participants by BMI (n=40)

BMI	Upper, thoracic Manipulation(TM) & Conventional Physiotherapy		Conventional Physiotherapy	
	Frequency	Percentage	Frequency	Percentage
Normal weight = 18.5–24.9	9	45	18	90
Overweight = 25–29.9	9	45	2	10
Obesity = BMI of 30 or greater	2	10	0	0
Mean± SD	1.65± 0.671		1.10± .308	

The table 5 reveals that the mean BMI of the participants were **1.10± .308**, with BMI range from 17 to 29. Table also reveals that, 90% of the participants were normal weight, 10% were overweight and 0% were obese persons respectively of conventional physiotherapy group compare to thoracic manipulation, the mean BMI of the participants were 1.65± 0.671, with BMI range from 19 to 31. Among them 45% of the participants were normal weights, 45% were overweight and 10% were obese persons respectively.

Table 6: Distribution of respondents by Occupation (n=40)

Occupation	Upper, thoracic Manipulation(TM) & Conventional Physiotherapy		Conventional Physiotherapy	
	Frequency	Percentage	Frequency	Percentage
Student	1	5	3	15
House Wife	8	40	6	30
Worker	1	5	1	5
Service Holder	8	40	9	45
Business	1	5	1	5
Retired Person	1	5	0	0
Total	20	100	20	100

The table 6 found that 40 of the participants were 5% student, 40% house wife, 40% Service holder, 5% business, 5% worker and only 5% were retired persons respectively of TM group compare to conventional group, 15% were student, 45% of the participants were service holder, 30% were house wife, 5% were worker, 0% were retired person and 5% were business man respectively.

Table 7: Distribution of participants by Sitting Posture (Pre Treatment) (n=40)

Sitting Posture	Upper, thoracic Manipulation(TM) & Conventional Physiotherapy		Conventional Physiotherapy	
	Frequency	Percentage	Frequency	Percentage
Good	6	30	2	10
Fair	10	50	13	65
Poor	4	20	5	25
Total	20	100	20	100

The table 7 reveals that the Sitting Posture among the participants of conventional physiotherapy, 10% was good and 65% were fair and 25% was poor. Other hands 50% were fair, 30% were good and 20% were poor in the participants of thoracic manipulation(TM) pretreatment.

Table 8: Distribution of participants by Sitting Posture (Post Treatment) (n=40)

Sitting Posture	Upper, thoracic Manipulation(TM) & Conventional Physiotherapy		Conventional Physiotherapy	
	Frequency	Percentage	Frequency	Percentage
Good	6	30	2	10
Fair	10	50	13	65
Poor	4	20	5	25
Total	20	100	20	100

The table 8 reveals that the Sitting Posture among the participants of conventional physiotherapy, 10% was good and 65% were fair and 25% was poor. Other hands 50% were fair, 30% were good and 20% were poor in the participants of thoracic manipulation(TM) pretreatment.

Table 9: Distribution of participants by Standing Posture (Pre Treatment) (n=40)

Standing Posture	Upper, thoracic Manipulation(TM) & Conventional Physiotherapy		Conventional Physiotherapy	
	Frequency	Percentage	Frequency	Percentage
Good	10	50	9	45
Fair	9	45	8	40
Poor	1	5	3	15
Total	20	100	20	100

The table 9 reveals that the Standing Posture among the participants of conventional physiotherapy, 50% was good and 45% were fair and 5% was poor. Other hands 40% were fair, 45% were good and 15% were poor in the participants of TM pretreatment.

Table 10: Distribution of participants by Standing Posture (Post Treatment)

Standing Posture	Upper, thoracic Manipulation(TM) & Conventional Physiotherapy		Conventional Physiotherapy	
	Frequency	Percentage	Frequency	Percentage
Good	10	50	9	45
Fair	9	45	8	40
Poor	1	5	3	15
Total	20	100	20	100

The table 10 reveals that the Standing Posture among the participants of conventional physiotherapy, 50% was good and 45% were fair and 5% was poor. Other hands 40% were fair, 45% were good and 15% were poor in the participants of TM post treatment

Numeric pain rating scale (NPRS)

I. How severe your neck pain in present

This study found that in the How severe your neck pain in present, observed t value was 14.323 (3.100±0.968) in the experimental group at two tailed paired t test while this same variable for control group observed value was 7.025 (2.850±1.814) in within group. 5% level of significant at 19 (nineteen) degrees of freedom standard t value was 2.093 and observed t value in neck pain in present in both groups which were greater than standard t value that meant null hypothesis was rejected and alternative hypothesis was accepted in the within group. Both groups in aspect of general pain intensity were significant at 0.001% level, and 0.021% but the mean difference of the experimental group was greater than the control group mean that means TM with usual treatment for chronic neck pain patients was more effective than usual physiotherapy treatment for reducing present pain intensity.

The Unrelated/independent t test in between group at 5% level of significant and 19 degrees of freedom standard table value was 2.093 and at the same significant level and same degree of freedom observed t value was 9.829. The observed t value was greater than the table value that meant null hypothesis was rejected and alternative hypothesis was accepted which means TM with usual treatment for chronic neck pain patients was more effective than usual physiotherapy treatment in between group.

II. How severe your pain in sitting position of neck

This study found that in the How severe your neck pain in present, observed t value was14.873 (2.950±0.887) in the experimental group at two tailed paired t test while this same variable for control group observed value was 7.261 (2.850±1.755) in within group. 5% level of significant at 19 (nineteen) degrees of freedom standard t value was 2.093 and observed t value in neck pain in present in both groups which were greater than standard t value that meant null hypothesis was rejected and alternative hypothesis was accepted in the within group. Both groups in aspect of general pain in sitting position of neck were

significant at 0.036% level, and 0.028% but the mean difference of the experimental group was greater than the control group mean that means TM with usual treatment for chronic neck pain patients was more effective than usual physiotherapy treatment for reducing pain intensity in sitting position.

The Unrelated/independent t test in between group at 5% level of significant and 19 degrees of freedom standard table value was 2.093 and at the same significant level and same degree of freedom observed t value was 8.353. The observed t value was greater than the table value that meant null hypothesis was rejected and alternative hypothesis was accepted which means TM with usual treatment for chronic neck pain patients was more effective than usual physiotherapy treatment in between group.

III. How severe your pain during lying position of neck

This study found that in the How severe your neck pain in present, observed t value was 14.038 (3.450±1.099) in the experimental group at two tailed paired t test while this same variable for control group observed value was 6.658 (2.800±1.881) in within group. 5% level of significant at 19 (nineteen) degrees of freedom standard t value was 2.093 and observed t value in neck pain in present in both groups which were greater than standard t value that meant null hypothesis was rejected and alternative hypothesis was accepted in the within group. Both groups in aspect of general pain in lying position of neck were significant at 0.000% level, and 0.059% but the mean difference of the experimental group was greater than the control group mean that means TM with usual treatment for chronic neck pain patients was more effective than usual physiotherapy treatment for reducing present pain intensity in lying position.

The Unrelated/independent t test in between group at 5% level of significant and 19 degrees of freedom standard table value was 2.093 and at the same significant level and same degree of freedom observed t value was 10.636. The observed t value was greater than the table value that meant null hypothesis was rejected and alternative hypothesis was accepted which

means TM with usual treatment for chronic neck pain patients was more effective than usual physiotherapy treatment in between groups.

IV. How severe your pain is during flexion of neck

This study found that in the How severe your neck pain in present, observed t value was 12.711 (3.700 ±1.302) in the experimental group at two tailed paired t test while this same variable for control group observed value was 8.291(3.300 ±1.780) in within group. 5% level of significant at 19 (nineteen) degrees of freedom standard t value was and observed t value in neck pain in present in both groups which were greater than standard t value that meant null hypothesis was rejected and alternative hypothesis was accepted in the within group. Both groups in aspect of general pain during flexion of neck were significant at 0.57% level, and 0.079% but the mean difference of the experimental group was greater than the control group mean that means TM with usual treatment for chronic neck pain patients was more effective than usual physiotherapy treatment for reducing pain intensity during flexion.

The Unrelated/independent t test in between group at 5% level of significant and 19 degrees of freedom standard table value was 2.093 and at the same significant level and same degree of freedom observed t value was 9.239. The observed t value was greater than the table value that meant null hypothesis was rejected and alternative hypothesis was accepted which means TM with usual treatment for chronic neck pain patients was more effective than usual physiotherapy treatment in between groups.

V. How severe your pain is during extension of neck

This study found that in the How severe your neck pain in present, observed t value was 17.351 (3.750±1.302) in the experimental group at two tailed paired t test while this same variable for control group observed value was 6.915(3.750 ±2.425) in within group. 5% level of significant at 19 (nineteen) degrees of freedom standard t value was 2.093 and observed t value in neck pain in present in both groups which were greater than standard t value that meant null hypothesis was rejected and alternative hypothesis was accepted in the within

group. Both groups in aspect of general pain during extension of neck were significant at 0. 000% level and 0.062% but the mean difference of the experimental group was greater than the control group mean that means TM with usual treatment for chronic neck pain patients was more effective than usual physiotherapy treatment for reducing in pain intensity during extension.

The Unrelated/independent t test in between group at 5% level of significant and 19 degrees of freedom standard table value was 2.093 and at the same significant level and same degree of freedom observed t value was 6.824. The observed t value was greater than the table value that meant null hypothesis was rejected and alternative hypothesis was accepted which means TM with usual treatment for chronic neck pain patients was more effective than usual physiotherapy treatment in between groups.

VI. How severe your pain is during side flexion to right side of neck

This study found that in the How severe your neck pain in present, observed t value was 12.226 (3.750 ±1.372) in the experimental group at two tailed paired t test while this same variable for control group observed value was 6.940(3.350±2.159) in within group. 5% level of significant at 19 (nineteen) degrees of freedom standard t value was 2.093 and observed t value in neck pain in present in both groups which were greater than standard t value that meant null hypothesis was rejected and alternative hypothesis was accepted in the within group. Both groups in aspect of general pain in side flexion to right side of neck were significant at 0.045% level, and 0.049 % but the mean difference of the experimental group was greater than the control group mean that means TM with usual treatment for chronic neck pain patients was more effective than usual physiotherapy treatment for reducing pain intensity in side flexion to right.

The Unrelated/independent t test in between group at 5% level of significant and 19 degrees of freedom standard table value was 2.093 and at the same significant level and same degree of freedom observed t value was 7.378. The observed t value was greater than the table value

that meant null hypothesis was rejected and alternative hypothesis was accepted which means TM with usual treatment for chronic neck pain patients was more effective than usual physiotherapy treatment in between groups.

VII. How severe your pain is during side flexion to left side of neck

This study found that in the How severe your neck pain in present, observed t value was 10.405 (3.500±1.504) in the experimental group at two tailed paired t test while this same variable for control group observed value was 9.454(3.700 ±1.750) in within group. 5% level of significant at 19 (nineteen) degrees of freedom standard t value was 2.093 and observed t value in neck pain in present in both groups which were greater than standard t value that meant null hypothesis was rejected and alternative hypothesis was accepted in the within group. Both groups in aspect of general pain during side flexion to left side of neck were significant at 0.067 % level, and 0.078% but the mean difference of the experimental group was greater than the control group mean that means TM with usual treatment for chronic neck pain patients was more effective than usual physiotherapy treatment for reducing pain intensity in side flexion to left.

The Unrelated/independent t test in between group at 5% level of significant and 19 degrees of freedom standard table value was 2.093 and at the same significant level and same degree of freedom observed t value was 8.718. The observed t value was greater than the table value that meant null hypothesis was rejected and alternative hypothesis was accepted which means TM with usual treatment for chronic neck pain patients was more effective than usual physiotherapy treatment in between groups.

VIII. How severe your pain is during rotation to right side of neck

This study found that in the How severe your neck pain in present, observed t value was 12.669(4.100 ±1.447) in the experimental group at two tailed paired t test while this same variable for control group observed value was 7.319(3.750±2.291) in within group. 5% level of significant at 19 (nineteen) degrees of freedom standard t value was 2.093 and observed t

value in neck pain in present in both groups which were greater than standard t value that meant null hypothesis was rejected and alternative hypothesis was accepted in the within group. Both groups in aspect of general pain during rotation to right side of neck were significant at 0.043% level, and 0.090% but the mean difference of the experimental group was greater than the control group mean that means TM with usual treatment for chronic neck pain patients was more effective than usual physiotherapy treatment for reducing pain intensity in rotation to right of neck.

The Unrelated/independent t test in between group at 5% level of significant and 19 degrees of freedom standard table value was 2.093 and at the same significant level and same degree of freedom observed t value was 7.794. The observed t value was greater than the table value that meant null hypothesis was rejected and alternative hypothesis was accepted which means TM with usual treatment for chronic neck pain patients was more effective than usual physiotherapy treatment in between groups.

IX. How severe your pain is during rotation to left side of neck

This study found that in the How severe your neck pain in present, observed t value was 10.405 (3.500±1.504) in the experimental group at two tailed paired t test while this same variable for control group observed value was 9.454(3.700 ±1.750) in within group. 5% level of significant at 19 (nineteen) degrees of freedom standard t value was 2.093 and observed t value in neck pain in present in both groups which were greater than standard t value that meant null hypothesis was rejected and alternative hypothesis was accepted in the within group. Both groups in aspect of general pain during rotation to left side of neck were significant at 0.030% level, and 0.045% but the mean difference of the experimental group was greater than the control group mean that means TM with usual treatment for chronic neck pain patients was more effective than usual physiotherapy treatment for reducing pain intensity in rotation to left.

The Unrelated/independent t test in between group at 5% level of significant and 19 degrees of freedom standard table value was 2.093 and at the same significant level and same degree of freedom observed t value was 5.832. The observed t value was greater than the table value that meant null hypothesis was rejected and alternative hypothesis was accepted which means TM with usual treatment for chronic neck pain patients was more effective than usual physiotherapy treatment in between groups.

X. How severe is your neck pain during travelling of neck

This study found that in the How severe your neck pain in present, observed t value was 10.559 (3.550 ±1.504) in the experimental group at two tailed paired t test while this same variable for control group observed value was 8.512(3.750 ±1.970) in within group. 5% level of significant at 19 (nineteen) degrees of freedom standard t value was 2.093 and observed t value in neck pain in present in both groups which were greater than standard t value that

meant null hypothesis was rejected and alternative hypothesis was accepted in the within group. Both groups in aspect of general pain in sitting position of neck were significant at

0.080% level, and 0.170% but the mean difference of the experimental group was greater than the control group mean that means TM with usual treatment for chronic neck pain patients was more effective than usual physiotherapy treatment for reducing pain intensity in travelling.

The Unrelated/independent t test in between group at 5% level of significant and 19 degrees of freedom standard table value was 2.093 and at the same significant level and same degree of freedom observed t value was 9.790. The observed t value was greater than the table value that meant null hypothesis was rejected and alternative hypothesis was accepted which means TM with usual treatment for chronic neck pain patients was more effective than usual physiotherapy treatment in between groups.

Distribution of participants by Neck Pain Disability Index (pretreatment) (n=40)

Neck Pain Disability Index 0-50. 5% were 21-40, 50% were 61-80 and 45% were 41-60 scale pretreatment. The mean Neck Pain Disability Index were **2.45 ± 0.605** of thoracic manipulation group compare to conventional physiotherapy, 50% were 21-40, 5% were 61-80 and 45% were 41-60 above scale pretreatment. The mean Neck Pain Disability Index was **2.55 ± 0.605.**

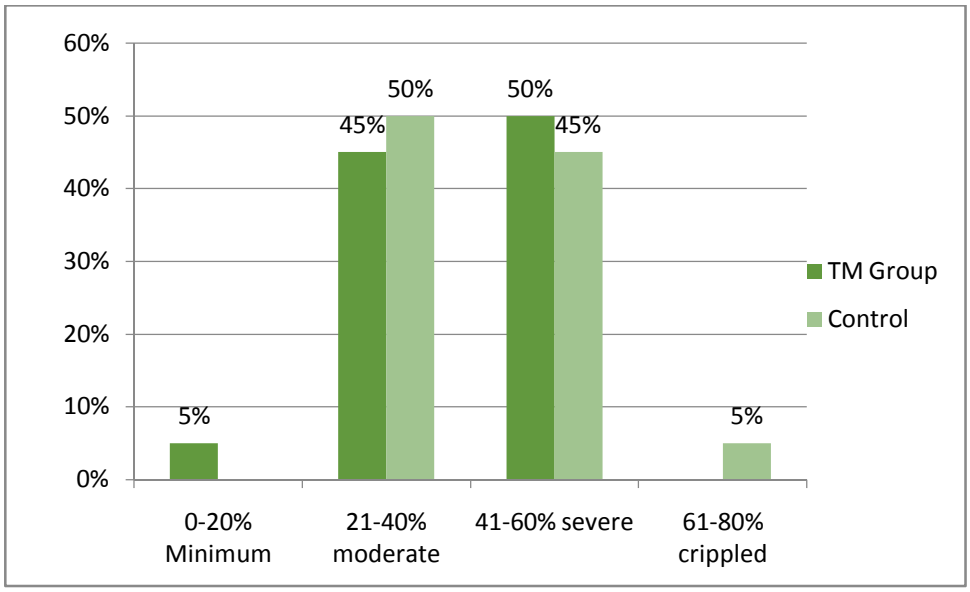

Fig 4: Distribution of participants by Neck Pain Disability Index (pretreatment) (n=4)

Distribution of participants by Neck Pain Disability Index (post treatment) (n=40)

Neck Pain Disability Index 0-50., 80% were 0-20, 010% were 21-40, and 10% were 41-60 scale pretreatment. The mean Neck Pain Disability Index were **1.30 ± 0.657** conventional physiotherapy compare to thoracic manipulation ,85% were 0-20, 15% were 21-40 and above scale post treatment. The mean Neck Pain Disability Index was 1.16 ± **0.336**.

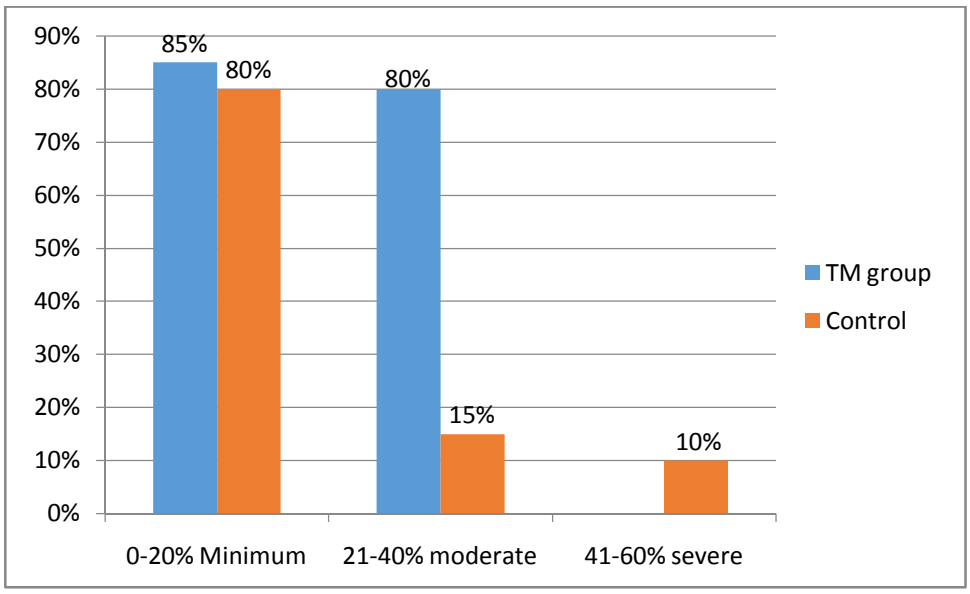

Fig 5: Distribution of participants by Neck Pain Disability Index (post treatment) (n=40)

Table 11: Change in active ROM in extension of neck within Conventional group

AROM in Extension - AROM in Extension	N	Mean rank	Sum of Ranks	Test statistics (Wilcoxon signed-rank test)	
				Based on negative ranks Z	P
Negative Ranks	0	.00	.00	-3.838	.000
Positive Ranks	19	10.00	190.00		
Ties	1				
Total	20				

Table 11 described the grade on the comparison of participant's pre and post active ROM in extension of neck score. The table's legend showed that any participants did not have decreased active ROM in extension of neck after application of usual care. In addition, 19 participants had higher active ROM in extension of neck deficit score before application of usual care compare with after application of usual care. Besides, 1 participant had equal amount of active ROM in extension of neck before and after treatment in control group.

By examining the final test statistics portion of table by Wilcoxon signed-rank test it was discovered that the conventional group for 4 weeks, twice weekly conventional physiotherapy treatment course showed a statistically significant change in active ROM in extension of neck among individuals with chronic neck pain (Z= -3.838, p= .000).

Table: 12 Change in active ROM in extension of neck within Thoracic Manipulation group

AROM in Extension- AROM in Extension	N	Mean rank	Sum of Ranks	Test statistics (Wilcoxon signed-rank test)	
				Based on negative ranks Z	P
Negative Ranks	1	4.00	4.00	-3.568	.000
Positive Ranks	17	9.82	167.00		
Ties	2				
Total	20				

Table 12 described the grade on the comparison of participants' pre and post active ROM in extension of neck score. The table's legend showed that 1 participant did not have decreased active ROM in extension of neck after application of TM combined with usual care. In addition, 17 participants had active ROM in extension of neck deficit score before application of TM combined with usual care compare with after application of TM combined with usual care. Besides, 2 participants had equal amount of active ROM in extension of neck before and after treatment in trial group.

By examining the final test statistics portion of table by Wilcoxon signed-rank test it was discovered that the trial group for 4 weeks, twice weekly TM exercise combined with usual care treatment course showed a statistically significant change in active ROM in extension in individuals with chronic neck pain ($Z= -3.568$, $p= 0.000$).

Table: 13 Change in active ROM of right side flexion of neck within Conventional group

AROM of right side flexion-AROM of right side flexion	N	Mean rank	Sum of Ranks	Test statistics (Wilcoxon signed-rank test)	
				Based on negative ranks Z	P
Negative Ranks	1	2.50	2.50	-3.747	.000
Positive Ranks	18	10.42	187.50		
Ties	1				
Total	20				

Table 13 described the grade on the comparison of participant's pre and post active ROM of right side flexion of neck score. The table's legend showed that 1 participant did not have decreased active ROM of right side flexion of neck after application of usual care. In addition, 18 participants had higher active ROM of right side flexion of neck deficit score before application of usual care compare with after application of usual care. Besides, 1 participant had equal amount of active ROM of right side flexion of neck before and after treatment in control group.

By examining the final test statistics portion of table by Wilcoxon signed-rank test it was discovered that the conventional group for 4 weeks, twice weekly conventional physiotherapy treatment course showed a statistically significant change in active ROM of right side flexion among individuals with chronic neck pain ($Z= -3.747$, $p= .000$).

Table: 14 Change in active ROM of right side flexion of neck within Thoracic Manipulation group

AROM of right side flexion - AROM of right side flexion	N	Mean rank	Sum of Ranks	Test statistics (Wilcoxon signed-rank test)	
				Based on negative ranks Z	P
Negative Ranks	0	.00	.00	-3.676	.000
Positive Ranks	17	9.00	153.00		
Ties	3				
Total	20				

Table 14 described the grade on the comparison of participants'pre and post active ROM of right side flexion of neck score. The table's legend showed that any participants did not have decreased active ROM of right side flexion of neck after application of TM combined with usual care. In addition, 17 participants had higher active ROM of right side flexion of neck deficit score before application of TM combined with usual care compare with after application of TM combined with usual care. Besides, 3 participants had equal amount of active ROM of right side flexion of neck before and after treatment in trial group.

By examining the final test statistics portion of table by Wilcoxon signed-rank test it was discovered that the trial group for 4 weeks, twice weekly TM exercise combined with usual care treatment course showed a statistically significant change in active ROM of right side flexion in individuals with chronic neck pain (Z= -3.676, p= 0.000).

Table: 15 Change in active ROM of left side flexion of neck within Conventional group

AROM in rotation to right - AROM in rotation to right side	N	Mean rank	Sum of Ranks	Test statistics (Wilcoxon signed-rank test)	
				Based on negative ranks Z	P
Negative Ranks	1	3.00	3.00	-3.605	.000
Positive Ranks	17	9.88	168.00		
Ties	2				
Total	20				

Table 15 described the grade on the comparison of participant's pre and post active ROM of left side flexion of neck score. The table's legend showed that 1 participant did not have decreased active ROM of left side flexion of neck after application of usual care. In addition, 17 participants had higher active ROM of left side flexion of neck deficit score before application of usual care compare with after application of usual care. Besides, 2 participants had equal amount of active ROM of left side flexion of neck before and after treatment in control group.

By examining the final test statistics portion of table by Wilcoxon signed-rank test it was discovered that the conventional group for 4 weeks, twice weekly conventional physiotherapy treatment course showed a statistically significant change in active ROM of left side flexion of neck among individuals with chronic neck pain ($Z = -3.605$, $p = .000$).

Table: 16 Change in active ROM of left side flexion of neck within Thoracic Manipulation group

AROM in rotation to right side - AROM in rotation to right side	N	Mean rank	Sum of Ranks	Test statistics (Wilcoxon signed-rank test)	
				Based on negative ranks Z	P
Negative Ranks	0	.00	.00	-3.655	.000
Positive Ranks	17	9.00	153.00		
Ties	3				
Total	20				

Table 16 described the grade on the comparison of participants'pre and post active ROM of left side flexion of neck score. The table's legend showed that any participants did not have decreased active ROM of left side flexion of neck after application of TM combined with usual care. In addition, 17 participants had higher active ROM of left side flexion of neck deficit score before application of TM combined with usual care compare with after application of TM combined with usual care. Besides, 3 participants had equal amount of active ROM of left side flexion of neck before and after treatment in trial group.

By examining the final test statistics portion of table by Wilcoxon signed-rank test it was discovered that the trial group for 4 weeks, twice weekly TM exercise combined with usual care treatment course showed a statistically significant change in active ROM of left side flexion in individuals with chronic neck pain ($Z= -3.655$, $p= 0.000$).

Table: 17 Change in active ROM in rotation to right side of neck within Conventional group

AROM in rotation to right side - AROM in rotation to right	N	Mean rank	Sum of Ranks	Test statistics (Wilcoxon signed-rank test)	
				Based on negative ranks Z	P
Negative Ranks	1	3.00	3.00	-3.605	.000
Positive Ranks	17	9.88	168.00		
Ties	2				
Total	20				

Table 17 described the grade on the comparison of participant's pre and post active ROM in rotation to right side of neck score. The table's legend showed that 1 participant did not have decreased active ROM in rotation to right side of neck after application of usual care. In addition, 17 participants had higher active ROM in rotation to right side of neck deficit score before application of usual care compare with after application of usual care. Besides, 2 participants had equal amount of active ROM in rotation to right side of neck before and after treatment in control group.

By examining the final test statistics portion of table by Wilcoxon signed-rank test it was discovered that the conventional group for 4 weeks, twice weekly conventional physiotherapy treatment course showed a statistically significant change in active ROM in rotation to right side among individuals with chronic neck pain ($Z= -3.605$, $p= .000$).

Table: 18 Change in active ROM in rotation to right side of neck within Thoracic Manipulation group

AROM rotation to right side - AROM rotation to right side	N	Mean rank	Sum of Ranks	Test statistics (Wilcoxon signed-rank test)	
				Based on negative ranks Z	P
Negative Ranks	0	.00	.00	-3.771	.000
Positive Ranks	18	9.50	171.00		
Ties	2				
Total	20				

Table 18 described the grade on the comparison of participants'pre and post active ROM in rotation to right side of neck score. The table's legend showed that any participants did not have decreased active ROM in rotation to right side of neck after application of TM combined with usual care. In addition, 18 participants had active ROM in rotation to right side of neck deficit score before application of TM combined with usual care compare with after application of TM combined with usual care. Besides, 2 participants had equal amount of active ROM in rotation to right side of neck before and after treatment in trial group.

By examining the final test statistics portion of table by Wilcoxon signed-rank test it was discovered that the trial group for 4 weeks, twice weekly TM exercise combined with usual care treatment course showed a statistically significant change in active ROM in rotation to right side in individuals with chronic neck pain ($Z= -3.771$, $p= 0.000$).

Table: 19 Change in active ROM in rotation to left side of neck within Conventional group

AROM rotation to left side - AROM rotation to left side	N	Mean rank	Sum of Ranks	Test statistics (Wilcoxon signed-rank test)	
				Based on negative ranks Z	P
Negative Ranks	1	.00	.00	-3.745	.000
Positive Ranks	18	9.50	171.00		
Ties	2				
Total	20				

Table 19 described the grade on the comparison of participant's pre and post active ROM in rotation to left side of neck score. The table's legend showed that 1 participant did not have decreased active ROM in rotation to left side of neck after application of usual care. In addition, 18 participants had higher active ROM in rotation to left side of neck deficit score before application of usual care compare with after application of usual care. Besides, 2 participants had equal amount of active ROM in rotation to left side of neck before and after treatment in control group.

By examining the final test statistics portion of table by Wilcoxon signed-rank test it was discovered that the conventional group for 4 weeks, twice weekly conventional physiotherapy treatment course showed a statistically significant change in active ROM in rotation to left side among individuals with chronic neck pain ($Z= -3.745$, $p= .000$).

Table: 20 Change in active ROM in rotation to left side of neck within Conventional group

AROM rotation to left side - AROM rotation to left side	N	Mean rank	Sum of Ranks	Test statistics (Wilcoxon signed-rank test)	
				Based on negative ranks Z	P
Negative Ranks	0	.00	.00	-3.643	.000
Positive Ranks	17	9.00	153.00		
Ties	3				
Total	20				

Table 20 described the grade on the comparison of participants'pre and post active ROM in rotation to left side of neck score. The table's legend showed that any participants did not have decreased active ROM in rotation to left side of neck after application of TM combined with usual care. In addition, 17 participants had higher active ROM in rotation to left side of neck deficit score before application of TM combined with usual care compare with after application of TM combined with usual care. Besides, 3 participants had equal amount of active ROM in rotation to left side of neck before and after treatment in trial group.

By examining the final test statistics portion of table by Wilcoxon signed-rank test it was discovered that the trial group for 4 weeks, twice weekly TM exercise combined with usual care treatment course showed a statistically significant change in active ROM in rotation to left side in individuals with chronic neck pain ($Z= -3.643$, $p= 0.000$).

Table: 21 CV Angle (Initial and Final Paired t-test)

		Thoracic Manipulation Group			Conventional Group	
S/N	Variables	t	Sig. (2-tailed)	Df	t	Sig. (2-tailed)
Pair 1	CV Angle	5.812	.000	19	6.474	.000

Table: 22. CV Angle within Conventional Physiotherapy group

Cranio-cervical angle (CV angle)	N	Mean rank	Sum of Ranks	Test statistics (Wilcoxon signed-rank test)	
				Based on negative ranks Z	P
Negative Ranks	18	9.50	171.00	-3.784	.000
Positive Ranks	0	.00	.00		
Ties	2				
Total	20				

Table 22 described the grade on the comparison of participant's pre and post Cranio-cervical angle score. The table's legend showed that any participants did not have decreased cranio-cervical angle after application of usual care. In addition, 18 participants had higher cranio-cervical angle deficit score before application of usual care compare with after application of usual care. Besides, 2 participants had equal amount of Cranio-cervical angle before and after treatment in control group.

By examining the final test statistics portion of table by Wilcoxon signed-rank test it was discovered that the conventional group for 4 weeks, twice weekly conventional physiotherapy treatment course showed a statistically significant change in Cranio-cervical angle among individuals with chronic neck pain (Z= -3.784, p= .000).

Table: 23 CV Angle within Thoracic Manipulation Physiotherapy group

(CV angle) –(CV angle)	N	Mean rank	Sum of Ranks	Test statistics (Wilcoxon signed-rank test)	
				Based on negative ranks Z	P
Negative Ranks	16	9.94	159.00	-3.209	.001
Positive Ranks	2	6.00	12.00		
Ties	2				
Total	20				

Table 23 described the grade on the comparison of participants'pre and post cranio-cervical angle score. The table's legend showed that any participants did not have decreased cranio-cervical angle after application of TM combined with usual care. In addition, 16 participants had higher cranio-cervical angle deficit score before application of TM combined with usual care compare with after application of TM combined with usual care. Besides, 4 participants had equal amount of cranio-cervical angle before and after treatment in trial group. By examining the final test statistics portion of table by Wilcoxon signed-rank test it was discovered that the trial group for 4 weeks, twice weekly TM exercise combined with usual care treatment course showed a statistically significant change in cranio-cervical angle in individuals with chronic neck pain ($Z= -3.209$, $p= 0.001$).

CHAPTER-V DISCUSSION

Patients in the present study came from one of the largest typical physiotherapy outpatient departments in Dhaka, thus the population should be a reasonably representative sample of patients with chronic mechanical neck pain. In addition, their displayed pain intensity and disability were comparable to those of typical patients with chronic mechanical neck problems listed in many previous studies (Ylinen et al., 2003; Chiu et al., 2005).

The present study found almost similar characteristics on baseline in age, gender duration of neck pain, mean weight, mean height, body mass index (BMI) and neck disability index (NDI) pretest score between both groups of participants. De Boer, et al. (2015) stated that similarities in baseline characteristics between both groups confirmed successful randomization. In addition, it was also proved that both the groups recorded in dependent variables were equal at pretest and there was hardly any influence on post test scores.

In this chapter the results are discussed in relation to the aim and objectives of the study, as well as relevant literature. The analysis of the study sample reveals that males (47.5%) & females (52.5%) were almost equal treated during the study period. The average age of the sample was 42 years, indicates that most of the affected persons were of working age. The mean age (39.45 ± 11.385) of the participants of Thoracic Manipulation group were less than Conventional (43.55 ± 12.939) group which could be an influencing factor for better improvement in Thoracic manipulation group in comparing to conventional group. Among 20 participants in Thoracic Manipulation group found that 4% below S.S.C, 16% SSC, 8% HSC, 28% graduate, 16% psot-graduate and 8% Technical education compare to conventional group 4%, 28%, 8%, 28%, 12% & 0% respectively. In terms of BMI, majority of the participants

in the trial group were normal weight (45%) followed by overweight (45%), obese 10% and in contrast control group had 90% normal weight and overweight 10% participants and 0% obese participants. Gupta, et al. (2013) found significant association between age, BMI and level of physical work, and neck pain significantly.

Occupation is very important variable to be considered not only in research process, but also in daily practice as it can influence decision making in the management options mention in many studies: Chiu, et al., (2006); Tseng et al., (2005) and Côté et al., (2003). The participants of the present study were 5% student, 40% house wife, 40% Service holder, 5% business, 5% worker and only 5% were retired persons respectively of TM group compare to conventional group, 15% were student, 45% of the participants were service holder, 30% were house wife, 5% were worker, 0% were retired person and 5% were business man respectively. In here, the similar characteristic in sense of occupation in both group. So there is no confounding factor to influence the result.

Different studies found (Gupta, et al., 2013; Sambyal and Kumar, 2013) conventional physiotherapy as an effective treatment for patients with chronic neck pain. In contrast, few numbers of studies (Ferreira, et al., 2013; Lau, et al., 2011; Cleland, J.A et.al., 2010 and Fernandes-de-las-penas et al.,2009) established Thoracic manipulation was an effective treatment to reduce pain and improve ROM among patients with chronic neck pain. The current study demonstrated that Thoracic Manipulation combined with usual care showed significant effects on neck pain, ROM, C V angle and NDI score. The exercise program was carried out for 8 sessions in both groups. However, Thoracic manipulation combined with usual care shown effective than usual care and statistical test was conducted between the groups to identify which intervention was more effective than others. Data was also analyzed within trial and control group and found both trial and control had reduced pain,

improved ROM, muscle strength and NDI scores but in most of the variables trial group outcomes were highly significant.

Pain Related Variables, Pain intensity was measured using the Numerical Pain Rating Scale. Both groups showed improvement in NPRS after completion of a 4-week intervention. In addition, the improvement shown (reduction in NPRS) in the TM group was better than the reduction in NPRS in the control group throughout the entire study period. It is important to note that between-group differences for pain achieved by the thoracic spine manipulation group in this present study was not only statistically significant but also clinically meaningful as the improvement (P=0.05). Though Change in severity of neck pain in sitting position, Left side flexion, flexion of neck is not statistically significant (P=0.50) but in sitting, side flexion as well as pain in rest is statistically significant (P=0.05) and in lying & Extension of neck is highly significant (P=0.000).

In a prospective study on the efficacy of different treatments for chronic mechanical neck pain patients (Muller and Giles, 2005), results showed that TM significantly decreased mean NPRS from6 to 2.3 (reduction of 3.7) whereas the present study showed an average reduction of 3.1 in NPRS. However, the total treatment sessions were 9 weeks as compared with only 4 weeks in the current study. In an RCT study comparing the short-term effect of a single TM and mobilization in patients with neck pain by Cleland et al. (2007a, b), the results showed similar findings as the present study with a significantly greater reduction in NPRS by TM than mobilization 2-4 days after the intervention.

Ferreira et al (2013) on upper thoracic spine (T1–T4) by using thrust Manipulation with regard to reduction of pain and disability in patients with neck pain. Outcomes measured by a visual analog scale (VAS) for pain. According to Cleland, et al. 2005 and Fernandes-de-las-penas et al. 2009, the VAS is a reliable and valid instrument to

assess pain intensity. Each individual underwent five sessions of thoracic spine thrust manipulation in 15 days' treatment period. Data analysis involved the Student's t-test. Despite the result approximately 65% reduction in pain between the first and final scores demonstrate that high speed, low-amplitude thrust manipulation of the upper thoracic spine (T1 to T4) is an effective treatment for reduction of neck pain.

The results revealed significant pain reduction in the neck pain for the patients who received TM group. These patients showed decreases in neck pain on the Numeric Pain Rating Scale which can be regarded as a clinically relevant change (Khan, et al., 2015; Kovacs, et al., 2008).

In this study both group showed significant improvement in Neck Pain Disability Index (NDI). In case of conventional group significant change in pain intensity, personal care, headache and work but steel there is some sever disability is present in some area like lifting, sleeping as well as driving. But in case of pain intensity, personal care, lifting, sleeping, headache, driving as well as work significantly change in TM group. It revealed that the Thoracic Manipulation is effective to minimize crippled disability. Current study results also revealed that TM significantly decreased mean NDI from 2.45 to 1.16 (reduction of 1.29) compare to 2.55 to 1.30 (reduction of 1.25) conventional physiotherapy. On upper thoracic spine (T1–T4) by using thrust manipulation with regard to reduction of disability in patients with neck pain (Ferreira et al., 2013). Outcomes measured by using the Neck Disability Index (NDI) and NDI is the most widely used condition-specific disability scale for patients with neck pain and consists of 10 items addressing different aspects of function, each scored from 0 to 5, with a maximum score of 50 points (Cleland, J.A et.al.2010 and Fernandes-de-las-penas et al. 2009), Data analysis involved the Student's t-test. Despite the result approximately 54.5% of the reduction in disability between the first and final scores

demonstrates that high speed, low-amplitude thrust manipulation of the upper thoracic spine (T1 to T4) is an effective treatment for reduction of neck disability.

Kwan-Woo Lee and Won-Ho Kim (2015) conducted a study which was a randomized, assessor-blind controlled trial with a pretest-posttest control group design. Fifty-one eligible Patients (with chronic neck pain for at least 3 months, a neck disability index score >20% and age between 18 - 60 years were randomly allocated. At the end of 10-weeks intervention measure the outcome of NDI was decreased (76.0%). Cleland et al (2010) reported that patients with mechanical neck pain who received thoracic spine manipulation along with exercises they got significantly greater improvement in cervical disability. So, Thoracic spine manipulation is an intervention which often used by physiotherapists in the treatment of neck pain.

Almost the similar significant positive results found in double blind study in case of Craniovertebral angle (CV angle), neck pain, neck disability and neck mobility by Lau, et al (2011). In this study, Researchers took 120 patients of chronic Neck pain (pain more than 3 months) with aged between 18 and 55 years after considering all red flags and randomly allocated into two groups. Doses were twice per week for 8 sessions with the aim was to assess the effectiveness of thoracic manipulation (TM . By using Numeric Pain Rating Scale (NPRS), Neck disability (Northwick Park Neck Disability Ques- NPQ), measures the outcome. Patients that received TM showed significantly greater improvement in neck disability (p=0.018), than the control group immediately post-intervention.

The results of the present study reported that the combination of thoracic manipulation along with conventional physiotherapy is more useful than conventional physiotherapy patients with chronic mechanical neck pain in NDI. These results are in agreement with the work done by Donald, et al., (2006) in which he did a study on 31

patients with cervical pain who received a non-surgical approach which included manipulation, mobilization and exercise therapy. Disability was measured using the Bournemouth Disability Questionnaire. The mean percentage of improvement in the Bournemouth Disability Questionnaire score was 78%. The significant improvement due to thoracic mobilization can be due to following explanation. It is hypothesized that these therapeutic movements can have a positive impact on symptoms by improving intraneural circulation, axoplasmic flow and neural connective tissue viscoelasticity (Butler, 2000).

In cervical range of motion (ROM) variable, Flexion, Extension, side flexion as well as rotation increased in both groups immediately after 8 sessions of treatment and control group was statistically significant at both within and between 0.001 and .005 levels. ROM was significantly greater immediately post-treatment in the TM group. A case study on the effect of TM on neck pain and ROM (Fernandez-de-las-Penas et al., 2007) showed there was a significant decrease in neck pain and a trend toward an increase in cervical ROM after a single TM. In a randomized controlled trial on the treatment of mechanical neck disorders, cervical ROM improvement was better immediately following a single high velocity, low-amplitude manipulation than following regular physiotherapy treatment (Martinez-Segura et al., 2006). Yet both studies were only evaluating the immediate effect (with 48 h) and there was no comparison with a control. Extension, both groups showed improvement in within group extension was statistically significant .000 but the improvement was not statistically significant at 3.40 in between levels in thoracic mobilization & conventional physiotherapy group respectively.

Right side flexion (RSF), both groups showed improvement in right side flexion, the improvement is statistically significant at both within and between group 0.001 & 0.05 levels in thoracic manipulation & conventional physiotherapy group

respectively. These finding were similar to the study carried out by Cleland, et al. 2005; Richard et al., 2008; Pratik, et al., 2014. Left side flexion (LSF), both groups showed improvement in left side flexion, the improvement is statistically significant at 0.05 & 0.001 level in thoracic manipulation & conventional physiotherapy group respectively. Right rotation both groups showed improvement in right rotation, the improvement is statistically significant at 0.000 & 0.001 levels in thoracic mobilization & conventional physiotherapy group respectively. There was not statistically significant at 1.00 levels between groups. These finding were similar to the study carried out by Cleland, et al., 2005; Richard, et al., (2008); Pratik, et al., 2014. Left rotation both groups showed improvement in left rotation, the improvement is statistically significant within at 0.01 & 0.001 level in thoracic mobilization & conventional physiotherapy group respectively. There was not statistically significant at 2.1 levels between groups. These finding were similar to the study carried out by Cleland, et al., 2005; Pratik, et al., 2014; Richard, et al., (2008). More importantly, the significant improvement in cervical ROM after TM in the present study gives good support to the biomechanical implications associated with thoracic spine manipulation in patients with neck pain.

A Recent study by Suvarnnato, T, et al. (2013) with the purpose to investigate the effectiveness of thoracic manipulation and mobilization on chronic neck pain. In this study researcher use 39 chronic neck pain patients with unilateral or bilateral pain in the posterior neck and/or shoulder regions and symptoms lasting more than 3 months.

Among them 29 were females and rest of male with age between 18-60yrs excluded those who has diagnosis of cervical radiculopathy or myelopathy with previous history of cervical and thoracic spine fracture and/or dislocation as well as history of surgery, osteoporosis, spinal infection and pregnancy. Participants were

randomly assigned to single level (T6-T7) Thoracic Manipulation, single level Thoracic Mobilization (T6-T7), or a control group. The cervical range of motion (CROM) and pain ratings (using a visual analog scale: VAS) were measured before, immediately after and at a 24-hour follow-up. And their findings were Thoracic manipulation significantly decreased VAS pain ratings and increased CROM in all directions in immediate and 24hour follow-ups. The thoracic mobilization group significantly increased in CROM in most directions at immediate follow-up and right and left rotational directions at the 24-hour follow-up. Comparisons between groups revealed the CROM for the manipulation group to increase significantly more than for control subjects in most directions at immediate follow-up and flexion, left lateral flexion and left rotation at the 24-hour follow-up. So, the findings of this study indicate patients with chronic neck pain immediately experienced a significant decrease in pain and at rest after receiving thoracic manipulation and mobilization as well as an increase in CROM.

Our results suggest that TM could help restore normal biomechanics to the cervical-thoracic motion segment, leading to a decrease in more importantly; the significant improvement in cervical ROM after TM in the present study gives good support to the biomechanical implications associated with thoracic spine manipulation in patients with neck pain. Our results suggest that TM could help restore normal biomechanics to the cervical-thoracic motion segment, leading to a decrease in mechanical stress to the cervical spine and thus improve neck pain. Changes mechanical stress to the cervical spine and thus improve neck pain.

In this thesis, half of the participants (50%) performed their activities of daily livings in neck forward bending position. Therefore, the cranio-cervical angle becomes abnormal. This ultimately predisposed neck pain. In this study reveals that the thoracic manipulation group average CV Angle was 12.75 during pretest and 8.9 at

posttest and difference between the post test and pretest averages, 3.85. On the other hand, and average of pretest and posttest CV Angle were 12.1 and 8.2, difference between the post test and pretest averages, 3.9 in conventional group. And also it is show positive change as well as pair t-test significant in between group and Wilcoxon signed rank test also significant in within group (P=000). So, the best of the author's knowledge, the current study is the first to investigate the effect of TM on the CV angle. This study provides evidence that TM could lead to an improvement in head posture as a result of the significant increase in the CV angle. Won-Gyu and Duk-Hyun (2009) found positive correlation between active cervical ROM and cranio-cervical angle in flexion.

Almost the similar significant positive results found in double blind study in case of Craniovertebral angle (CV angle), neck pain, neck disability and neck mobility by Lau, et al (2011) In this study, Researchers took 120 patients of chronic Neck pain (pain more than 3 months) with aged between 18 and 55 years after considering all red flags and randomly allocated into two groups: experimental group which received TM..These outcome measures were assessed immediately after 8 sessions of treatment, 3-months and 6-month follow-up. Patients that received TM showed significantly greater improvement in CV angle (p=0.049).

Limitation

Despite of the effectiveness of Thoracic Manipulation combined with usual care on dependent variables in this study, there were some limitations. The main limitation was unable to develop a sampling frame to which the study lacks external validity. As samples were collected only from CRP- Mirpur, it could not represent the wider chronic neck pain population and the study lacks in generalize ability of results to wider population. In addition, the study was conducted with 40 patients of chronic neck pain, which was a very small size of samples in compare with the real world prevalence. Data were collected only two times during study and it created study limitation as it lacks follow up daily or weekly basis changes in dependent variables. The study did not offer any follow up for participants which was essential component to find out effectiveness of treatment for longer period of time. However, participants were only blinded and it lacks the absolute minimization of physiotherapist's bias during delivering treatment.

CHAPTER-VI CONCLUSION & RECOMANDATION

Chronic neck pain regarded as the source of impairments within the structure of cervical spine. This ultimately resulted in activity limitation and participation restriction in daily activity as well as social gatherings. Therefore, appropriate measurement tools were selected to find out the status of cervical pain, range of motion and neck disability. However, the current study has proved that thoracic manipulation combined with usual care was more effective than only usual care among patients with chronic neck pain. In clinical practice, physiotherapists preferred to apply manual therapy, exercise therapy, electrotherapy and formal education program. But in the long run, there has been a chance of recurrence of neck symptoms if the alignment acting on cervical spine are not conditioned properly.

The outcome of this study would denote physiotherapists to imply thoracic manipulation for selected chronic neck pain patients in their clinical practice. Conversely, the aim and objectives of this study has been fulfilled and the null hypothesis was rejected favoring the thoracic manipulation combined with usual care for chronic neck pain patients. Chronic neck pain not only affects the bodily system but also the entire personnel daily activities. Thus, International Classification of Functioning, Disability and Health (ICF) core sets could be applied with this finding from thesis in future time.

A double blinded randomized control trial is recommended in future with large sample size. Since thoracic manipulation has been practicing by physiotherapist in limiting manner outside of this study setting, the outcomes of thesis would help practitioners outside the study setting to formulate a management guideline to treat patients with chronic neck pain.

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Appendix-A Permission Letter

Permission Letter

Date: January 11, 2018

Head

Department of Physiotherapy

Centre for the Rehabilitation of the Paralaysed (CRP)

Chapain, Savar, Dhaka-1343.

Through: Coordinator, M.Sc. in Physiotherapy Program, BHPI, Savar, Dhaka.

Subject: **Prayer for permission to collect data in order to conduct a thesis**.

Sir

With due respect, I am Mohammad Mokhlesur Rahman Siddiqui, a student of Part-II M.Sc. in Physiotherapy Program at Bangladesh Health Profession Institute (BHPI). As per course curriculum, I shall have to complete a thesis. In this respect, my thesis title is "The effectiveness of upper Thoracic (T1-T4) Manipulation along with Conventional Physiotherapy in Patients with Chronic Mechanical Neck Pain". In this thesis, my participants will be patients who are suffering from chronic neck pain. I strongly believe, Outdoor Musculo-skeletal unit of physiotherapy department in CRP, Mirpur is the best place to collect data from participants. In addition, data collector would be graduate physiotherapists who are currently working in this unit. In order to materialization of the thesis, I need your kind permission to collect data and cooperation from those physiotherapists.

May I therefore, hope that you would be kind enough to give me permission for data collection and oblige thereby.

Sincerely Yours

11.1.18

Mohammad Mokhlesur Rahman Siddiqui

Student of Part-II MSc. in Physiotherapy Program

BHPI, CRP, Savar, Dhaka-1343.

Session: 2016-2017.

Approved
Please contact with
Incharge, PT Dept, CRP-Mirpur
as a commitment of data
collection process.

Mohammad Anwar Hossain
Associate Professor & Head
Physiotherapy Dept., CRP
CRP-Chapain, Savar, Dhaka-1343

Date: 10/01/ 2018

The Chairman
Institutional Review Board (IRB)
Bangladesh Health Professions Institute (BHPI)
CRP-Savar, Dhaka-1343, Bangladesh

Subject: **Application for review and ethical approval.**

Sir,

With due respect I would like to draw your kind attention that I am a student of M.Sc. in Physiotherapy program at Bangladesh Health Professions Institute (BHPI)- an academic institute of CRP under Faculty of Medicine of University of Dhaka (DU). This is a 2-year full-time course. I have to conduct a thesis entitled, "THE EFFECTIVENESS OF UPPER THORACIC (T1-T4) MANIPULATION ON PATIENTS WITH CHRONIC MECHANICAL NECK PAIN: RANDOMIZED CLINICAL TRIAL (RCT)" under honorable supervisor, Mohammad Anwar Hossian, Associate Prof. & Head of Physiotherapy Department, CRP, Savar, Dhaka-1343. The purpose of the study is to determine and compare the effectiveness of Thoracic Manipulation(TM) Combined with usual care among patients with chronic neck pain.The study involves use of a Structure questionnaire. There is no likelihood of any harm to the participants and / or participation in the study may benefit the participants or other stakeholders. Related information will be collected from the patients' guide books. Data collectors will receive informed consents from all participants. Any data collected will be kept confidential.

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

Sincerely,

Mohammad Mokhlesur Rahman Siddiqui
Student of M.Sc. in Physiotherapy (MPT)
BHPI, CRP, Savar, Dhaka-1343, Bangladesh

Recommendation from the thesis supervisor:

Mohammad Anwar Hossain
Associate Prof. & Head of physiotherapy Dept,
CRP, Savar, Dhaka-1343.

Attachment: Thesis Proposal including measurement tools and process and procedure for maintaining confidentiality, Questionnaire (English and Bengali version), Information sheet & consent

Appendix-B Consent Form (Bangla & English)

PARTICIPANT ID

BANGLADESH HEALTH PROFESSIONS INSTITUTE

SAVAR, DHAKA

Assalamualykum/ Namaskar,
I am Md. Mokhlesur Rahman Siddiqui, student of MSc. in Physiotherapy at Bangladesh Health Professions Institute (BHPI), CRP. I shall have to conduct a research and it is a part of my academic activity. The participants are requested to participate in the study after reading the following.
My research title is **"The Effectiveness of Upper Thoracic (T1-T4) Manipulation Along withConventional Physiotherapy in Patients with Chronic Mechanical Neck Pain" of Dhaka City in Bangladesh.''** Through this experimental research, I will test the hypothesis on "The effectiveness of upper Thoracic (T1-T4) Manipulation along with conventional physiotherapy in Patients with Chronic Mechanical Neck Pain: randomized clinical trial (RCT)" of Dhaka City in Bangladesh. The objective of my study is to identify the efficacy of Thoracic Mobilization to improve Chronic Mechanical Radiating Neck Pain.
To fulfill my research project, I need to collect data. Considering the area of my research, you would be an eligible participant of the study. Therefore, I want to meet you a few couple of session, during your regular therapy as well as you are requested to follow up visit after 2months from discharge date. The exercises that will be given are pain free and safe for you. I would like to inform you that are a purely academic study and obtained data will not be used for any other purpose. I assure that all data will be kept confidential. Your participation will be voluntary. You will have the right to withdraw consent and discontinue participation at any time of the experiment.If you have any query, please feel free to share the study with your participate. You will be treated with neural tissue mobilization along with existing treatment of Musculoskeletal Unit at CRP in patients with chronic mechanical radiating neck pain. thoracic mobilization is very safe noninvasive maneuver which will cause no any harm to you.

Signature of interviewer _____Date ...../...../.....

I ---------- have read and understood the contents of the form. I agree to participate in the research without any force.

Participant's Signature..... ..… Date...../...../.....

Signature of the witness ……Date...../...../.....

Supervisor Signature ……

সম্মতিফরম

বাংলাদেশহেলথ প্রফেশনাল ইনস্টিটিউট ,সাভার ,ঢাকা

আসসালামুআলাইকুম/নমস্কার

আমি মো মোখলেসুর রহমান সিদ্দিকী,বাংলাদেশ স্বাস্থ্য প্রফেসনাল ইনস্টিটিউট(বিএইচপিআই) সিআরপিএর ফিজিওথেরাপি বিভাগেরএমএসসির ছাত্র।এটি আমার একটি গবেষণা কার্যক্রম এবং আমার একাডেমিক কার্যকলাপের একটি অংশ।এই গবেষণায়অংশগ্রহণকারীদের নিম্নলিখিত অংশ পড়ার পরে অধ্যয়নঅংশগ্রহণের জন্য অনুরোধ করা হয়।
আমার গবেষণা শিরোনাম হল বাংলাদেশে ঢাকা শহরেরদীর্ঘস্থায়ী ঘাড়ে ব্যাথায় আক্রান্ত রোগীদের মধ্যেপ্রচলিত শারীরিকথেরাপির পাশাপাশি উচ্চতরথোরাসিক (টি১-টি.৪)ম্যানিপুলেশন এর কার্যকারিতা এই পরীক্ষামূলক গবেষণার মাধ্যমে প্রচলিত ফিজিওথেরাপি সহআপার থোরাসিক (টি১টি ৪ ম্যানিপুলেশন ইন ক্রনিক মেকানিক্যাল নেক পেইন সনাক্ত হবে।
আমারগবেষণার উদ্দেশ্য ক্রনিক মেকানিক্যাল রেডিয়েটিং নেক পেইন উন্নত করার জন্যথোরাসিকম্যানিপুলেশন এর কার্যকারিতা সনাক্ত করা।
আমার গবেষণা প্রকল্প পূরণ করতে আমাকে তথ্যসংগ্রহ করতে হবে।
আমার গবেষণা এলাকা বিবেচনা করে আপনি গবেষণায় একটিযোগ্য অংশগ্রহণকারী
অতএব আপনার কয়েকটি নিয়মিত থেরাপির পাশাপাশি,আপনার চিকি□সা শুরুর তারিখ থেকে ২মাস পরে আবার ফলোয়াপ ভিজিটে আসার করার জন্য অনুরোধ করা হল
আপনাকে ব্যায়াম দেওয়া হবে তা সম্পূর্ণ ব্যথামুক্ত এবং নিরাপদ।আমি আপনাদেরকে জানাতে চাইযে একটি বিশুদ্ধরূপে একাডেমিক গবেষণা এবং প্রাপ্ত তথ্য অন্য কোন উদ্দেশ্যেব্যবহার করা হবে না।আমি নিশ্চিত যে সব তথ্য গোপন রাখা হবে।আপনার অংশগ্রহণ স্বেচ্ছাসেবী হবে।
আপনার কাছে অনুমতিরসম্মতি প্রত্যাহার করার এবং অংশগ্রহণের যেকোনো সময় বন্ধ করারঅধিকারথাকবে।যদি আপনার কোনও জিজ্ঞাসা থাকে তবেনির্দ্বিধায় প্রশ্ন করতে পারেন।
আপনাকে সিআরপি মাস্কুলস্কেলেটাল ইউনিট এ ক্রনিক যান্ত্রিক বিকিরনের মাধ্যমে বর্তমান চিকিৎসা প্রনালি বরাবর স্নায়ু টিস্যু সংহতির সঙ্গে চিকিৎসা করা হবে।তোরণ সংমিশ্রণ খুবই নিরাপদ যা কোনও ক্ষতির কারণ হবে না।

সাক্ষাৎকারগ্রহণকারীর স্বাক্ষর ..... তারিখ.....

আমি.....উপরের সম্পূর্ণ বিবরণ বিস্তারিত পড়ে সেচ্ছায় এই গবেষণায় অংশগ্রহণের সম্মতি প্রদান করলাম।

অংশগ্রহনকারির স্বাক্ষর .....তারিখ.....

Appendix –C Questionnaire (Bangla & English)

TITLE: The Effectiveness of Upper Thoracic (T1-T4) Manipulation Along With Conventional Physiotherapy in Patients with Chronic Mechanical Neck Pain" Of Dhaka City in Bangladesh.

Name of interviewer.....

Date of interview ……. /…… . . . /…….. Time of interview……

Participant's information

Participant

ID/CODE.....

Address……

Contact No……...……

Section A: Socio-Demographic Characteristics Related Variables

SL NO.	QUESTION	RESPONSES
1	Age	…….Year
2	Sex	1=Male 2=Female ☐
3	Religion	1=Islam 2=Hindu ☐ 3=Buddhism 4=Christianity
4	Marital Status	1=Married 2=Unmarried 3=Divorcer/ Separated ☐ 4=Widow

		5=Discard
5	Educational Background	1= Illiterate 2= Primary 3= Below S.S.C 4= S.S.C 5= Higher Secondary 6= Graduate 7= Post-Graduate 8= Technical Degree 9= Other ……..(Specify)
6	Monthly Family Income	……Taka
7	Family Type	1=Nuclear Family 2=Extended Family
8	How Many Family Members You Have?	……..
9	Height	……C.M.
10	Body Weight	……Kg
11	BMI	…… BMI
12	Occupation	1=Student 2=Housewife 3=Worker 4=Service Holder 5=Business 6=Retired Person

Section B: Assessment Related Variables

SL NO.	QUESTION	RESPONSES
13	Spine Curvature Disorder (Cervical Spine)	1=No 2=Kyphosis 3=Scoliosis 4=Lordosis ☐
14	Sitting Posture	1=Good 2=Fair 3=Poor ☐
15	Standing Posture	1=Good 2=Fair 3=Poor ☐
16	Area Of Pain	1=Below Shoulder 2=Below Elbow 3=Below Wrist 4= Hand 5=Finger 6=Scapula Zone ☐
17	Affected Limb	1=Right Upper Limb 2=Left Upper Limb ☐
18	Duration Of Pain Since Last Episode	…….Month/Year
19	Muscle Wasting	1=No Muscle Wasting 2=Trapezius Muscle 3=Rhomboids Muscle 4=Deltoid Muscle ☐
20	Relieving Factors	1=Rest In Sitting

		2=Rest In Lying 3=Activity Modification 4=Positioning
21	Aggravating Factors	1=Activities With Movement 2=Loading Activities
22	Duration Of Symptoms	1=Intermittent 2=Constant
23	Nature Of Pain Site/ Spread	1=Up To Shoulder 2=Up To Elbow 3= Up To Wrist 4=Up To Hand 5=Up To Finger
24	Induce Pain In Movement	1=Flexion 2=Extension 3=Side Flexion 4=Side Rotation 5=Retraction Movement
25	Onset Of Pain	1=Sudden 2=Gradual
26	Symptoms At Onset	1=Head 2=Neck 3=Scapula Zone 4=Arm 5=Forearm
27	Constant Symptoms	1=Neck 2=Arm

		3=Forearm ☐ 4=Head 5=Scapula Zone
28	Intermittent Symptoms	1=Neck 2=Arm 3=Forearm 4=Headache ☐ 5=Total Upper Extremity
29	No Pain At The Time Of	1=Am 2=As The Day Progress 3=Pm ☐ 4=When Still 5=On The Move
30	Sleeping Surface	1=Firm 2=Soft ☐ 3=Sag Drop
31	Number Of Pillow Use	……
32	Severity Of Pain In Numerical Pain Rating Scale (NPRS)	1=No Pain 2=1-3 (Mild Pain) 3=4-6(Moderate) ☐ 4=7-9(Severe Pain) 5=10(Worst Pain)

Pre-test

Section C: Neck Pain Related Variables

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

33. How severe is your neck pain present?

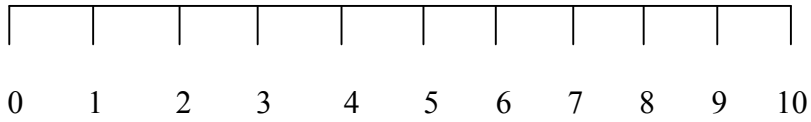

Fig. 6.6: Zero (0) means no pain and Ten (10) means extreme pain

34. How severe your pain in sitting position of neck?

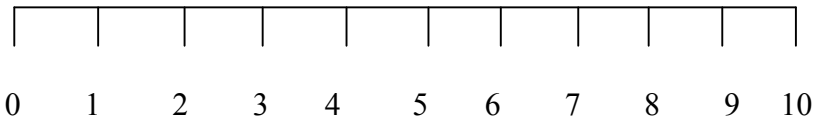

Fig. Zero (0) means no pain and Ten (10) means extreme pain

35. How severe your pain in lying position of neck?

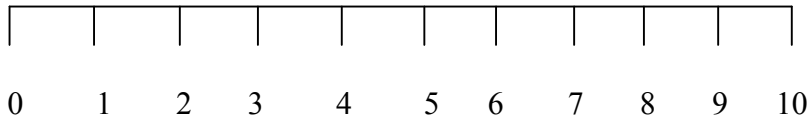

Fig. Zero (0) means no pain and Ten (10) means extreme pain

36. How severe your pain is during flexion of neck?

Fig. Zero (0) means no pain and Ten (10) means worst pain

37. How severe your pain is during extension of neck?

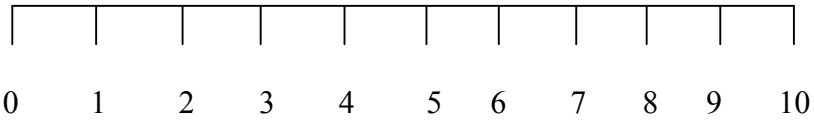

Fig. Zero (0) means no pain and Ten (10) means worst pain

38. How severe your pain is during side flexion to right side of neck?

Fig. Zero (0) means no pain and Ten (10) means worst pain

39. How severe your pain is during side flexion to left side of neck?

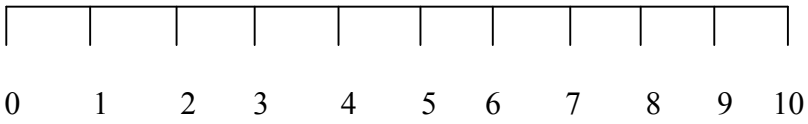

Fig. Zero (0) means no pain and Ten (10) means worst pain

40. How severe your pain is during rotation to right side of neck?

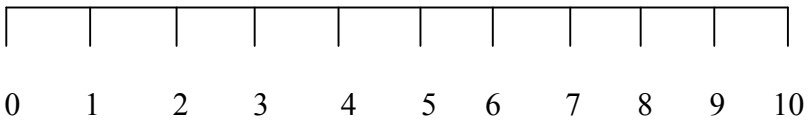

Fig. Zero (0) means no pain and Ten (10) means worst pain

41. How severe your pain is during rotation to left side of neck?

Fig. Zero (0) means no pain and Ten (10) means worst pain

42. How severe is your neck pain during travelling of neck?

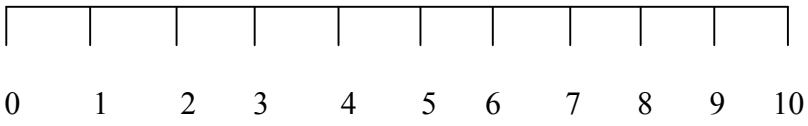

Fig: Zero (0) means no pain and Ten (10) means worst pain

Section - D: Active ROM (Range of Motion) related variables

43. Active ROM of in Flexion of neck

Pre- treatment ... ... Degrees

44. Active of ROM in Extension of neck

Pre- treatment ... ... Degrees

45. Active ROM of right side flexion of neck

Pre- treatment ... ... Degrees

46. Active ROM of left side flexion of neck

Pre- treatment ... ... Degrees

47. Active ROM in rotation to right side of neck

Pre- treatment ... ... Degrees

48. Active ROM of rotation to left side of neck

Pre- treatment ... ... Degrees

49. Distance of cranio-cervical angle (CV angle)

Pre treatment... ... ... .cm

Section E: Neck Disability Index (NDI) Related Variables

SL NO	QUESTIONS	RESPONSES
50	Oswestry neck pain disability index (before treatment)	……
51	Disability	1=(0-20%) Minimal Disability 2=(21-40%) Moderate Disability 3=(41-60%) Severe Disability 4=(61-80%) Crippled Disability 5=(81-100%) Bed Bound Disability In Percent= (Total Score)/ 50* 100

Score SECTION 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.

Score SECTION 2 – Personal Care (washing, dressing, etc.)

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

Score SECTION 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 cannot lift or carry anything at all.

Score SECTION 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.

Score SECTION 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.

Score SECTION 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.

Score SETION 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

Score SECTION 8 – Driving

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.

Score SECTION 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).

Score SECTION 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.

Total score = SUM (points for all 10 findings)

Disability in percent = (total score) / 50 * 100

Interpretation: Minimum score: 0 with a minimum disability of 0%

Maximum score: 50 with maximal disability of 100%

Disability	Disability	Comment
0 – 20%	Minimal	The patient can cope with most living activities. Usually no treatment is indicated apart from advice on lifting sitting and exercise.
21 – 40%	Moderate	The patient experiences more pain and difficulty with sitting lifting and standing. Travel and social life are more difficult and they may be disabled from work. The patient can usually be managed by conservative means.
41 – 60%	Severe	Pain remains the main problem in this group but activities of daily living are affected. These patients require a detailed investigation.
61 – 80%	Crippled	Pain impinges on all aspects of the patient's life. Positive intervention is required.
81 – 100%	Bed Bound	Need to exclude exaggeration or malingering.

Thanks for your participation

…….

Signature of the interviewer

Post-test

Participant's information

Participant

ID/CODE.....

Address……

Contact No……..……

Section C: Neck Pain Related Variables

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

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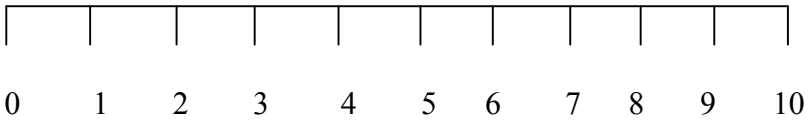

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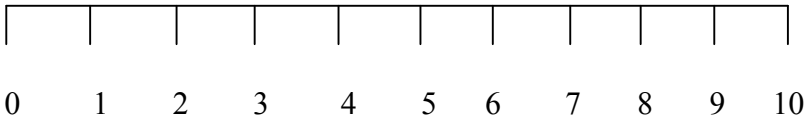

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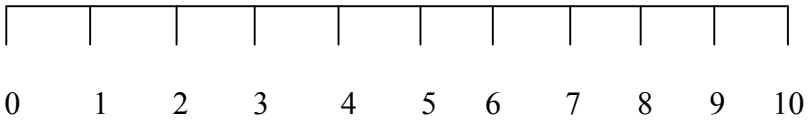

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Post-test:

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Post- treatment ... ... Degrees

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Post- treatment ... ... Degrees

46. Active ROM of left side flexion of neck

Post- treatment ... ... Degrees

47. Active ROM in rotation to right side of neck

Post- treatment ... ... Degrees

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Post- treatment ... ... Degrees

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Interpretation: Minimum score: 0 with a minimum disability of 0%

Maximum score: 50 with maximal disability of 100

অংশগ্রহনকারির তথ্য

অংশগ্রহনকারির ক্রমিক নং.....

ঠিকানা.....

ফোন নং.....

সেকশন এ : সামাজিক-ডেমোগ্রাফিক বৈশিষ্ট্য সম্পর্কিত ভেরিয়েবল

ক্রমিক নং	**প্রশ্ন**	**উত্তর**
১	বয়স	.....বছর
২	লিঙ্গ	১= পুরুষ ২=মহিলা
৩	ধর্ম	১=ইসলাম ২=হিন্দু ৩= বৌদ্ধ ৪= খ্রিস্টান
৪	বৈবাহিক অবস্থা	১= বিবাহিত ২= অবিবাহিত ৩= ডিভোর্সি ৪= বিধবা ৫=বাতিল করতে চান
৫	শিক্ষাগত যোগ্যতা	১= অশিক্ষিত ২= প্রাইমারী ৩=এস।এস।সি এর নিচে ৪= এস।এস।সি পাশ ৫= এইচ এস সি পাশ ৬= গ্র্যাজুয়েট ৭= পোস্ট- গ্র্যাজুয়েট ৮= টেকনিক্যাল ডিগ্রি ৯= অন্যান্য .....(উল্লেখ করুন)
৬	মাসিক পারিবারিক আয়	.....টাকা
৭	পরিবারের ধরন	১= একক পরিবার ২= যৌথ পরিবার
৮	পরিবারের সদস্য সংখ্যা	……..
৯	উচ্চতা	.....সে।মি।
১০	ওজন	……Kg .....।।কে। জি।
১১	বি এম আই	..... বি এম আই
১২	পেশা	১= ছাত্র ২= গৃহিণী ৩= কর্মজীবী ৪= চাকুরীজীবী ৫= ব্যবসায়ী ৬= রিটায়ার্ড

সেকশন বি : অ্যাসেসমেন্ট সম্পর্কিত ভেরিয়েবল

ক্রমিক নং	প্রশ্ন	উত্তর
১৩	মেরুদণ্ডের ভঙ্গি-সংক্রান্ত জটিলতা	১= কোন সমস্যা নেই ২= মেরুদণ্ড পিছনের দিকে বেকে যাওয়া ৩= স্কলিওসিস ৮=মেরুদণ্ড সামনের দিকে বেকে যাওয়া
১৪	বসার অঙ্গবিন্যাস	১= ভাল ২= মোটামুটি ৩= খারাপ
১৫	দাঁড়ানোর অঙ্গবিন্যাস	১= ভাল ২= মোটামুটি ৩=খারাপ
১৬	ব্যাথার এলাকা	১= কাঁধের নিচে ২= বাহুর নিচে ৪= কবজির নিচে ৪= হাত ৫= আঙ্গুল ৬= কাঁধের পিছনে
১৭	আক্রান্ত অঙ্গ	১= ডানহাত ২= বামহাত
১৮	ব্যাথার স্থিতিকাল	.....মাস/বছর
১৯	মাংসপেশি নাশ	১= কোন মাংসপেশির নাশ না হওয়া ২= ট্র্যাপিজিয়াস ৩= রমবয়ডাস ৪= ডেলটয়েড
২০	কি করলে আরাম অনুভুত হয়	১= বসলে ২= শুলে ৩= কাজের ধরন পরিবর্তন করলে ৪= অবস্থান পরিবর্তনে
২১	কি করলে বেড়ে যায়	১= হাঁটাচলা করলে ২= ওজন বহন করলে
২২	উপসর্গের স্থায়িত্ব	১= কিছু সময় পরপর ২= বিরতিহিন
২৩	ব্যাথার ধরন	১= কাঁধ পর্যন্ত ২= কনুই পর্যন্ত ৩= কবজি পর্যন্ত ৪= হাত পর্যন্ত ৫= আঙ্গুল পর্যন্ত
২৪	কোন ধরনের নড়াচড়া করলে ব্যথা অনুভুত হয়	১= সামনে ঝুঁকলে ২= পেছনে ঝুঁকলে ৩=পাশে কাত করলে ৪= পাশে ঘুরলে ৫= সামনে-পেছনে গেলে
২৫	কখন শুরু হয়	১= হঠা ২= ধীরে ধীরে
২৬	কোথায় শুরু হয়	১= মাথা ২= ঘাড় ৩= কাঁধের পিছনে ৪= বাহুতে ৫= হাতে
২৭	সর্বক্ষণ ব্যথার স্থান	১= ঘাড় ২= বাহু ৩= হাত ৪= মাথা ৫= কাঁধের পিছনে
২৮	থেমে থেমে হওয়া ব্যাথার স্থান	১= ঘাড় ২= বাহু ৩= হাত ৪= মাথাব্যাথা ৫= মাথা থেকে হাত পর্যন্ত

২৯	ব্যাথামুক্ত সময়	১= সকাল ২= দিন বাড়লে ৩= রাত ৪= স্থির থাকলে ৫= নড়াচড়া করলে
৩০	ঘুমানোর স্থান	১= শক্ত ২= নরম ৩= স্যাগ ড্রপ
৩১	কয়টি বালিশ ব্যবহার করেন	.....
৩২	১-১০ এর মধ্যে নির্ণয় করুন	১= ব্যথাবিহীন।।) ২= ১-৩(সামান্য ব্যথা) ৩=৪-৬(মধ্যমমানের ব্যথা) ৪= ৭-৯(তীব্র ব্যথা) ৫= ১০(অসহনীয় ব্যথা)

প্রি -টেস্ট সেকশন সিঃ ঘাড় ব্যথা সম্পর্কিত ভেরিয়েবল

০-১০ নিউমেরিক পেইন রেটিং স্কেল যেখানে ০ বলতে ব্যথামুক্ত অবস্থা এবং ১০ বলতে অসহনীয় ব্যথা কে বোঝানো হচ্ছে।

৩৩। এই মুহূর্তে আপনার ঘাড় ব্যথা কতটুকু?

০ ১ ২ ৩ ৪ ৫ ৬ ৭ ৮ ৯ ১০

চিত্রঃ ০ মানে ব্যথামুক্ত এবং ১০ মানে অসহনীয় ব্যথা

৩৪। বসে থাকলে কি পরিমান ব্যথা থাকে?

০ ১ ২ ৩ ৪ ৫ ৬ ৭ ৮ ৯ ১০

চিত্রঃ ০ মানে ব্যথামুক্ত এবং ১০ মানে অসহনীয় ব্যথা

৩৫। শুয়ে থাকলে ঘাড়ে কি পরিমান ব্যথা থাকে?

০ ১ ২ ৩ ৪ ৫ ৬ ৭ ৮ ৯ ১০

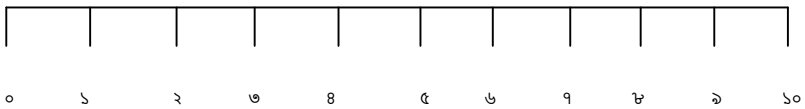
চিত্রঃ ০ মানে ব্যথামুক্ত এবং ১০ মানে অসহনীয় ব্যথা

৩৬। সামনের দিকে ঝুঁকলে কি পরিমান ব্যথা থাকে ?

০ ১ ২ ৩ ৪ ৫ ৬ ৭ ৮ ৯ ১০

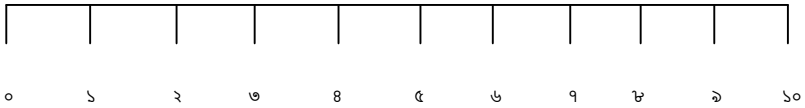
চিত্রঃ ০ মানে ব্যথামুক্ত এবং ১০ মানে অসহনীয় ব্যথা

৩৭। পিছনে ঝুঁকলে কি পরিমান ব্যথা থাকে?



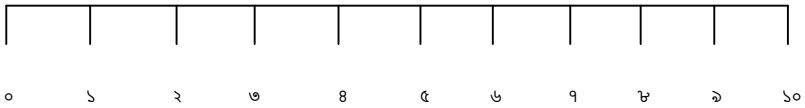
চিত্রঃ ০ মানে ব্যথামুক্ত এবং ১০ মানে অসহনীয় ব্যথা

৩৮। ডানদিকে কাত করলে কি পরিমান ব্যথা থাকে?



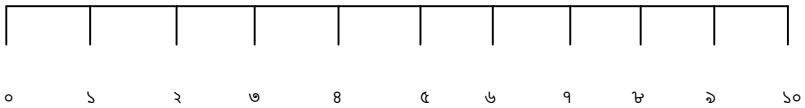
চিত্রঃ ০ মানে ব্যথামুক্ত এবং ১০ মানে অসহনীয় ব্যথা

৩৯। বামদিকে কাত করলে কি পরিমান ব্যথা থাকে ?



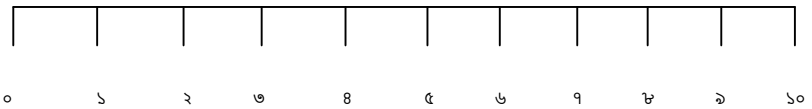
চিত্রঃ ০ মানে ব্যথামুক্ত এবং ১০ মানে অসহনীয় ব্যথা

৪০। ডানদিকে ঘুরলে কি পরিমান ব্যাথা থাকে?



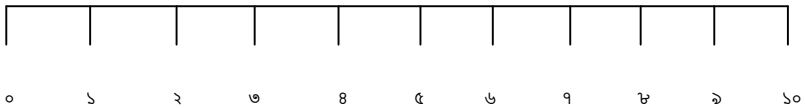
চিত্রঃ ০ মানে ব্যথামুক্ত এবং ১০ মানে অসহনীয় ব্যথা

৪১। বামদিকে ঘুরলে কি পরিমান ব্যথা থাকে?



চিত্রঃ ০ মানে ব্যথামুক্ত এবং ১০ মানে অসহনীয় ব্যথা

৪২। ভ্রমন করার সময় আপনার ঘাড়ে কি পরিমান ব্যথা থাকে?



চিত্রঃ ০ মানে ব্যথামুক্ত এবং ১০ মানে অসহনীয় ব্যথা

সেকশন- ডিঃ একটিভ রেঞ্জ অভ মোশন সম্পর্কিত ভেরিয়েবল

৪৩। একটিভ রেঞ্জ অভ মোশন ইন নেক ফ্লেকশন

প্রি-ট্রিটমেন্ট.....ডিগ্রি

৪৪। একটিভ রেঞ্জ অভ মোশন ইন নেক এক্সটেনশন

প্রি-ট্রিটমেন্ট.....ডিগ্রি

৪৫। একটিভ রেঞ্জ অভ মোশন ইন নেক রাইট সাইড ফ্লেকশন

প্রি-ট্রিটমেন্ট.....ডিগ্রি

৪৬। একটিভ রেঞ্জ অভ মোশন ইন নেক লেফট সাইড ফ্লেকশন

প্রি-ট্রিটমেন্ট.....ডিগ্রি

৪৭। একটিভ রেঞ্জ অভ মোশন ইন নেক রাইট সাইড রোটেশন

প্রি-ট্রিটমেন্ট.....ডিগ্রি

৪৮। একটিভ রেঞ্জ অভ মোশন ইন নেক লেফট সাইড রোটেশন

প্রি-ট্রিটমেন্ট.....ডিগ্রি

৪৯। ক্রানিয়-সারভিকাল এঙ্গেল এর মধ্যে দূরত্ব

প্রি-ট্রিটমেন্ট.....সে। মি।

সেকশন-ই : ঘাড়ে অক্ষমতাসংক্রান্ত ভেরিয়েবল

ক্রমিক নং	প্রশ্ন	উত্তর
৫০	ওয়েস্ট্রি নেক পেইন ডিজএবিলিটি ইনডেক্স (চিকিসার আগে)	.....
৫১	অক্ষমতা	১= (০-২০%) ন্যূনতম অক্ষমতা ২= (২১-৪০%) মোটামুটি অক্ষমতা ৩= (৪১-৬০%) গুরুতর অক্ষমতা ৪= (৬১-৮০%) পঙ্গুত্ব ৫= (৮১-১০০%) বিছানায় আবদ্ধ শতকরা অক্ষমতা =যোগফল /৫০*১০০

স্কোর সেকশন ১- ব্যথার তীব্রতা

০= এই মুহূর্তে কোন ব্যথা নেই

১= খুব সামান্য ব্যথা আছে

২= মধ্যম মানের ব্যথা

৩= মোটামুটি তীব্র ব্যথা

৪= খুব তীব্র ব্যথা

৬= অসহনীয় পর্যায়ের ব্যথা

স্কোর সেকশন ২- নিজস্ব যত্ন (পরিস্কার, পোশাক পরিধান ইত্যাদি)

০= কোন রকম অতিরিক্ত ব্যথা ছাড়াই সব কাজ করতে পারছি

১= খুব সামান্য পরিমান ব্যথা নিয়ে কাজ করছি

২= ব্যথা আছে, ধীরগতি ও সাবধানতা অবলম্বন করতে হচ্ছে

৩= সাহায্য দরকার হচ্ছে কিন্তু মোটামুটি একাই পারছি

৪= নিজের প্রায় সব কাজগুলো করতে অন্য কার সাহায্যের দরকার হচ্ছে

৫= পোশাক পরিধান করতে পারছি না, পরিস্কার করতে কষ্ট হচ্ছে এবং বিছানা থেকে উঠতে পারছি না

স্কোর সেকশন ৩- ভারী জিনিস তোলা

০= কোন রকম ব্যথা ছাড়াই ভারী জিনিস তুলতে পারছি

১= তুলতে পারছি কিন্তু ব্যথা হচ্ছে

২= মাটি থেকে ভারী কিছু তুলতে কষ্ট হচ্ছে কিন্তু সুবিধাজনক অবস্থানে থাকলে পারছি। যেমনঃ টেবিল থেকে

৩= মাটি থেকে ভারী কিছু তুলতে কষ্ট হচ্ছে কিন্তু সুবিধাজনক অবস্থানে থাকলে হালকা থেকে মধ্যম ভারী ওজন তুলতে পারছি।

৪= খুব হালকা ওজন তুলতে পারছি।

৫= কিছুই তুলতে পারছি না।

স্কোর সেকশন ৪- পড়া

০= কোন রকম ব্যথা ছাড়াই যতক্ষন খুশি পড়তে পারছি।

১= খুব সামান্য ব্যথা নিয়ে যতক্ষন খুশি পড়তে পারছি।

২= মোটামুটি ব্যথা নিয়ে যতক্ষন খুশি পড়তে পারছি।

৩= মধ্যম মানের ব্যথার কারনে স্বাধীনভাবে পড়তে পারছি না।

৪= তীব্র ব্যথার কারণে সবসময় পড়তে পারছি না।

৫= কোনভাবেই পড়তে পারছি না।

স্কোর সেকশন ৫- মাথাব্যথা

০= কোন মাথা ব্যথা নেই।

১= কখনো কখনো খুব সামান্য মাথাব্যথা হয়।

২= কখনো কখনো মোটামুটি মাথাব্যথা হয়।

৩= প্রায়শই মোটামুটি মাথাব্যথা হয়।

৪= প্রায়ই তীব্র মাথাব্যথা হয়।

৫= প্রায় সবসময় মাথাব্যথা থাকে

স্কোর অধ্যায় ৬ – মনোযোগ

০ = আমি কোন সমস্যাছাড়াই সম্পূর্ণ মনোযোগ নিবদ্ধ করতে পারি।

১ = আমি সামান্য অসুবিধা হয়, যখনআমি সম্পূর্ণ মনোযোগ নিবদ্ধ করতে চেষ্টা করি।

২ = আমি যখন মনোযোগ দিতে চেষ্টা করি তখন আমার মনোযোগের পর্যাপ্ত অসুবিধাআছে।

৩ = আমি মনোযোগ দেওয়ার সময় অনেকসমস্যা আছে।

৪ = আমার মনোনিবেশ করতে অসুবিধা হচ্ছে।

৫ = আমি সব সময়ে মনোনিবেশ করতে পারিনা।

স্কোর অধ্যায় ৭ - কাজ

০ = আমি যতটা করতে চাই তত বেশি কাজ করতে পারি।

১ = আমিশুধুমাত্র আমার স্বাভাবিক কাজ করতে পারেন, কিন্তু আর না

২ = আমিআমার স্বাভাবিক কাজ অধিকাংশ করতে পারেন, কিন্তু আর না

৩ = আমি আমার স্বাভাবিক কাজ করতে পারি না।

৪ = আমি কমই কোন কাজ করতে পারি।

৫ = আমি কোনও কাজ করতে পারি না

স্কোর অধ্যায় ৮ - ড্রাইভিং

০ = আমি কোনও ঘাড় ব্যথা ছাড়া ড্রাইভ করতে পারি।

১ = আমিদীর্ঘ সময় ঘাড় সামান্য ব্যথাসহ ড্রাইভ করতেপারি।

২ = যতক্ষণ খুশি আমার ঘাড়ে মাঝারি ব্যথাসহ আমি ড্রাইভ করতে পারি।

৩ = আমারঘাড়ে মাঝারি ব্যথার কারণে যতক্ষণ চাই ততক্ষণ পর্যন্ত আমি ড্রাইভ করতেপারি না।

৪ = আমার ঘাড়ে গুরুতরব্যথার কারণে আমি খুব কমই চালাতে পারি।

৫ = আমিসব সময়ে আমার গাড়ি চালাতে পারি না।

স্কোর অধ্যায় ৯ - ঘুম

০ = আমার কোন ঘুম নেই

১ = আমার ঘুম একটু বিরক্ত)1 ঘন্টা কম হঠা(।

২ = আমার ঘুম হালকাভাবে উদ্বিগ্ন)1-2 ঘন্টা নিদ্রাচ্ছন্ন(।

৩ = আমার ঘুম স্বাভাবিকভাবে বিরক্ত (2-5 ঘন্টা নিদ্রাচ্ছন্ন(।

৪ = আমার ঘুমভেঙ্গে যায়)3-5 ঘন্টা হঠা(।

৫ = আমার ঘুম ভেঙ্গেযায়)5-7 ঘন্টা নিদ্রাভঙ্গ (

স্কোর অধ্যায় ১০ - বিনোদন

০ = আমি সব সময়ে আমার ঘাড়ব্যথা সঙ্গে সব বিনোদন কার্যকলাপ নিয়োজিত করতে সক্ষম।

১ = আমি আমার ঘাড় মধ্যে কিছুব্যথা সঙ্গে আমার সব বিনোদন কার্যক্রম নিয়োজিত করতেসক্ষম।

২ = আমি সর্বাধিক যোগদান করতেসক্ষম, কিন্তু ব্যথা মধ্যে কারণ আমার স্বাভাবিক চিত্তবিনোদন কার্যক্রম সবনা

৩ = আমি আমার ঘাড়ে ব্যথা কারণেআমার স্বাভাবিক চিত্তবিনোদন কার্যক্রম কয়েক নিযুক্ত করতেসক্ষম।

৪ = আমার ঘাড়ে বেদনার কারণে আমিকোনও বিনোদনমূলক কাজ করতে পারি না।

৫ = আমি কোনও চিত্তবিনোদনকার্যক্রম সব সময়ে করতে পারি না।

মোট স্কোর = (সমস্ত 10 ফলাফলের জন্য পয়েন্ট(
শতাংশে অক্ষমতা =) মোট স্কোর/(৫০*১০০
ব্যাখ্যা :নূন্যতম স্কোর :0% ন্যূনতম অক্ষমতা সহ,

সর্বাধিকস্কোর:

অক্ষমতা	অক্ষমতা	মন্তব্য
০-২০%	নূন্যতম	নূন্যতম রোগীর অধিকাংশ জীবিত কার্যক্রমের সাথে মোকাবিলা করতে পারে।চিকিৎসার বসা এবং উপদেশ উদ্ধরণ থেকে পৃথক পৃথক হয়
২১-৪০%	মাঝারি	রোগী বেঁচে থাকা এবং উত্তোলনের সাথে অসুবিধা বোধ করেনএবং দাঁড়িয়েভ্রমণ এবং সামাজিক জীবন আরো কঠিন এবং তারা হতে পারে কর্ম থেকে অক্ষম করা।রোগী সাধারণত দ্বারা পরিচালিত হতে পারে রক্ষণশীল উপায়ে।
৪১-৬০%	তীব্র	এই গ্রুপে প্রধান সমস্যা ব্যথা কিন্তু দৈনিক কার্যক্রম জীবিত ক্ষতিগ্রস্ত হয়।এই রোগীদের একটি বিস্তারিত তদন্ত প্রয়োজন।
৬০-৮১%	পঙ্গুত্ব	রোগীর জীবনের সকল দিকের উপর ব্যথা অনুভূত হয় ধনাত্মকহস্তক্ষেপ প্রয়োজন।
৮১-১০০%	বিছানায় আবদ্ধ	অত্যাচারবাদ দেওয়া প্রয়োজন।

অংশগ্রহনের জন্য ধন্যবাদ

.....

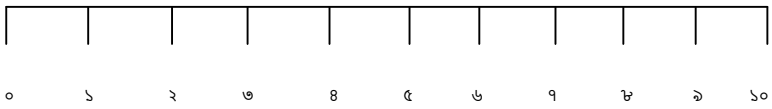
সাক্ষাৎকারগ্রহণকারীর স্বাক্ষর

পোস্ট -টেস্ট

সেকশন সিঃ ঘাড় ব্যথা সম্পর্কিত ভেরিয়েবল

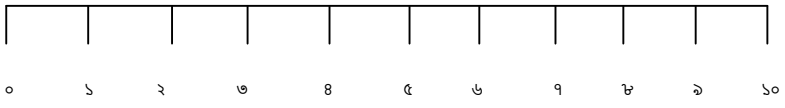
০-১০ নিউমেরিক পেইন রেটিং স্কেল যেখানে ০ বলতে ব্যথামুক্ত অবস্থা এবং ১০ বলতে অসহনীয় ব্যথা কে বোঝানো হচ্ছে।

৩৩। এই মুহূর্তে আপনার ঘাড় ব্যথা কতটুকু?



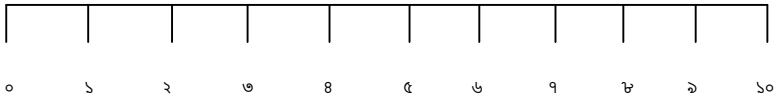
চিত্রঃ ০ মানে ব্যথামুক্ত এবং ১০ মানে অসহনীয় ব্যথা

৩৪। বসে থাকলে কি পরিমান ব্যথা থাকে?



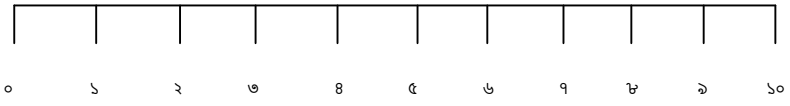
চিত্রঃ ০ মানে ব্যথামুক্ত এবং ১০ মানে অসহনীয় ব্যথা

৩৫। শুয়ে থাকলে ঘাড়ে কি পরিমান ব্যথা থাকে?



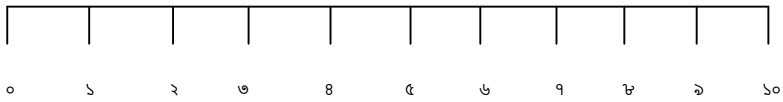
চিত্রঃ ০ মানে ব্যথামুক্ত এবং ১০ মানে অসহনীয় ব্যথা

৩৬। সামনের দিকে ঝুঁকলে কি পরিমান ব্যথা থাকে ?



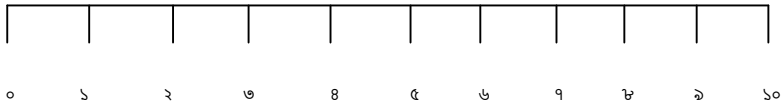
চিত্রঃ ০ মানে ব্যথামুক্ত এবং ১০ মানে অসহনীয় ব্যথা

৩৭। পিছনে ঝুঁকলে কি পরিমান ব্যথা থাকে?



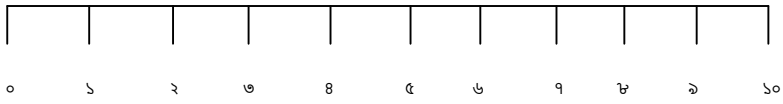
চিত্রঃ ০ মানে ব্যথামুক্ত এবং ১০ মানে অসহনীয় ব্যথা

৩৮। ডানদিকে কাত করলে কি পরিমান ব্যথা থাকে?



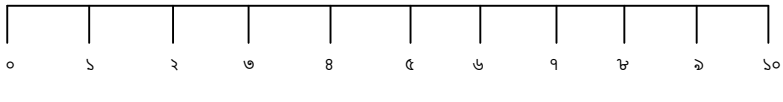
চিত্রঃ ০ মানে ব্যথামুক্ত এবং ১০ মানে অসহনীয় ব্যথা

৩৯। বামদিকে কাত করলে কি পরিমান ব্যথা থাকে ?



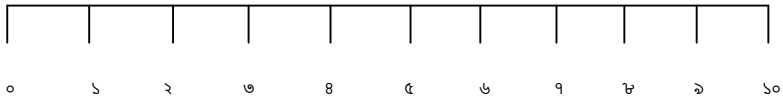
চিত্রঃ ০ মানে ব্যথামুক্ত এবং ১০ মানে অসহনীয় ব্যথা

৪০। ডানদিকে ঘুরলে কি পরিমান ব্যাথা থাকে?



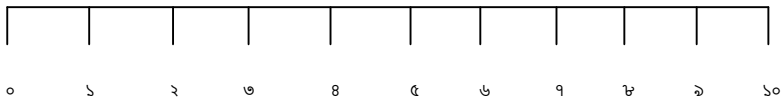
চিত্রঃ ০ মানে ব্যথামুক্ত এবং ১০ মানে অসহনীয় ব্যথা

৪১। বামদিকে ঘুরলে কি পরিমান ব্যথা থাকে?



চিত্রঃ ০ মানে ব্যথামুক্ত এবং ১০ মানে অসহনীয় ব্যথা

৪২। ভ্রমন করার সময় আপনার ঘাড়ে কি পরিমান ব্যথা থাকে?



চিত্রঃ ০ মানে ব্যথামুক্ত এবং ১০ মানে অসহনীয় ব্যথা

সেকশন- ডিঃ একটিভ রেঞ্জ অভ মোশন সম্পর্কিত ভেরিয়েবল

৪৩। একটিভ রেঞ্জ অভ মোশন ইন নেক ফ্লেকশন

পোস্ট-ট্রিটমেন্ট.....ডিগ্রি

৪৪। একটিভ রেঞ্জ অভ মোশন ইন নেক এক্সটেনশন

পোস্ট-ট্রিটমেন্ট.....ডিগ্রি

৪৫। একটিভ রেঞ্জ অভ মোশন ইন নেক রাইট সাইড ফ্লেকশন

পোস্ট-ট্রিটমেন্ট.....ডিগ্রি

৪৬। একটিভ রেঞ্জ অভ মোশন ইন নেক লেফট সাইড ফ্লেকশন

পোস্ট-ট্রিটমেন্ট.....ডিগ্রি

৪৭। একটিভ রেঞ্জ অভ মোশন ইন নেক রাইট সাইড রোটেশন

পোস্ট-ট্রিটমেন্ট.....ডিগ্রি

৪৮। একটিভ রেঞ্জ অভ মোশন ইন নেক লেফট সাইড রোটেশন

পোস্ট-ট্রিটমেন্ট.....ডিগ্রি

৪৯। ক্রানিয়-সারভিকাল এঙ্গেল এর মধ্যে দূরত্ব

পোস্ট-ট্রিটমেন্ট.....সে। মি।

সেকশন-ই : ঘাড়ে অক্ষমতা সংক্রান্ত ভেরিয়েবল

ক্রমিক নং	**প্রশ্ন**	**উত্তর**
৫০	ওয়েস্ট্রি নেক পেইন ডিজএবিলিটি ইনডেক্স (চিকিৎসার পরে)	.....
৫১	অক্ষমতা	১= (০-২০%) ন্যূনতমঅক্ষমতা ২= (২১-৪০%) মোটামুটিঅক্ষমতা ৩= (৪১-৬০%) গুরুতরঅক্ষমতা ৪= (৬১-৮০%) পঙ্গুত্ব ৫= (৮১-১০০%) বিছানায়আবদ্ধ শতকরা অক্ষমতা =যোগফল/ ৫০*১০০

স্কোর সেকশন ১- ব্যথার তীব্রতা

০= এই মুহূর্তে কোন ব্যথা নেই
১= খুব সামান্য ব্যথা আছে
২= মধ্যম মানের ব্যথা
৩= মোটামুটি তীব্র ব্যথা
৪= খুব তীব্র ব্যথা
৫= অসহনীয় পর্যায়ের ব্যথা

স্কোর সেকশন ২- নিজস্ব যত্ন (পরিস্কার, পোশাক পরিধান ইত্যাদি)

০= কোন রকম অতিরিক্ত ব্যথা ছাড়াই সব কাজ করতে পারছি
১= খুব সামান্য পরিমান ব্যথা নিয়ে কাজ করছি
২= ব্যথা আছে, ধীরগতি ও সাবধানতা অবলম্বন করতে হচ্ছে
৩= সাহায্য দরকার হচ্ছে কিন্তু মোটামুটি একাই পারছি
৪=নিজের প্রায় সব কাজগুলো করতে অন্য কার সাহায্যের দরকার হচ্ছে
৫= পোশাক পরিধান করতে পারছি না, পরিস্কার করতে কষ্ট হচ্ছে এবং বিছানা থেকে উঠতে পারছি না

স্কোর সেকশন ৩- ভারী জিনিস তোলা

০= কোন রকম ব্যথা ছাড়াই ভারী জিনিস তুলতে পারছি
১= তুলতে পারছি কিন্তু ব্যথা হচ্ছে
২= মাটি থেকে ভারী কিছু তুলতে কষ্ট হচ্ছে কিন্তু সুবিধাজনক অবস্থানে থাকলে পারছি। যেমনঃ টেবিল থেকে
৩= মাটি থেকে ভারী কিছু তুলতে কষ্ট হচ্ছে কিন্তু সুবিধাজনক অবস্থানে থাকলে হালকা থেকে মধ্যম ভারী ওজন তুলতে পারছি।
৪= খুব হালকা ওজন তুলতে পারছি।
৫= কিছুই তুলতে পারছি না।

স্কোর সেকশন ৪- পড়া

০= কোন রকম ব্যথা ছাড়াই যতক্ষন খুশি পড়তে পারছি।
১= খুব সামান্য ব্যথা নিয়ে যতক্ষন খুশি পড়তে পারছি।
২= মোটামুটি ব্যথা নিয়ে যতক্ষন খুশি পড়তে পারছি।
৩= মধ্যম মানের ব্যথার কারনে স্বাধীনভাবে পড়তে পারছি না।
৪= তীব্র ব্যথার কারণে সবসময় পড়তে পারছি না।
৫= কোনভাবেই পড়তে পারছি না।

স্কোর সেকশন ৫ -মাথাব্যথা

০= কোন মাথা ব্যথা নেই।
১= কখনো কখনো খুব সামান্য মাথাব্যথা হয়।
২= কখনো কখনো মোটামুটি মাথাব্যথা হয়।
৩= প্রায়শই মোটামুটি মাথাব্যথা হয়।
৪= প্রায়ই তীব্র মাথাব্যথা হয়।
৫= প্রায় সবসময় মাথাব্যথা থাকে

স্কোর অধ্যায় ৬ — মনোযোগ

০ = আমি কোন সমস্যাছাড়াই সম্পূর্ণ মনোযোগ নিবদ্ধ করতে পারি।
১ = আমি সামান্য অসুবিধা হয়, যখনআমি সম্পূর্ণ মনোযোগ নিবদ্ধ করতে চেষ্টা করি।
২ = আমি যখন মনোযোগ দিতে চেষ্টা করি তখন আমার মনোযোগের পর্যাপ্ত অসুবিধাআছে।
৩ = আমি মনোযোগ দেওয়ার সময় অনেকসমস্যা আছে।
৪ = আমার মনোনিবেশ করতে অসুবিধা হচ্ছে।
৫ = আমি সব সময়ে মনোনিবেশ করতে পারিনা।

স্কোর অধ্যায় ৭ - কাজ

০ = আমি যতটা করতে চাই তত বেশি কাজ করতে পারি।
১ = আমিশুধুমাত্র আমার স্বাভাবিক কাজ করতে পারেন, কিন্তু আর না
২ = আমিআমার স্বাভাবিক কাজ অধিকাংশ করতে পারেন, কিন্তু আর না
৩ = আমি আমার স্বাভাবিক কাজ করতে পারি না।

৪ = আমি কমই কোন কাজ করতে পারি।

৫ = আমি কোনও কাজ করতে পারি না

স্কোর অধ্যায় ৮- ড্রাইভিং

০ = আমি কোনও ঘাড় ব্যথা ছাড়া ড্রাইভ করতে পারি।

১ = আমিদীর্ঘ সময় ঘাড় সামান্য ব্যথাসহ ড্রাইভ করতেপারি।

২ = যতক্ষণ খুশি আমার ঘাড়ে মাঝারি ব্যথাসহ আমি ড্রাইভ করতে পারি।

৩ = আমারঘাড়ে মাঝারি ব্যথার কারণে যতক্ষণ চাই ততক্ষণ পর্যন্ত আমি ড্রাইভ করতেপারি না।

৪ = আমার ঘাড়ে গুরুতরব্যথার কারণে আমি খুব কমই চালাতে পারি।

৫ = আমিসব সময়ে আমার গাড়ি চালাতে পারি না।

স্কোর অধ্যায় ৯ - ঘুম

০ = আমার কোন ঘুম নেই

১ = আমার ঘুম একটু বিরক্ত)1 ঘন্টা কম হঠা(।

২ = আমার ঘুম হালকাভাবে উদ্বিগ্ন)1-2 ঘন্টা নিদ্রাচ্ছন্ন(।

৩ = আমার ঘুম স্বাভাবিকভাবে বিরক্ত (2-5 ঘন্টা নিদ্রাচ্ছন্ন(।

৪ = আমার ঘুমভেঙ্গে যায়)3-5 ঘন্টা হঠা(।

৫ = আমার ঘুম ভেঙ্গেযায়)5-7 ঘন্টা নিদ্রাভঙ্গ (

স্কোর অধ্যায় ১০ - বিনোদন

০ = আমি সব সময়ে আমার ঘাড়ব্যথা সঙ্গে সব বিনোদন কার্যকলাপ নিয়োজিত করতে সক্ষম।

১ = আমি আমার ঘাড় মধ্যে কিছুব্যথা সঙ্গে আমার সব বিনোদন কার্যক্রম নিয়োজিত করতেসক্ষম।

২ = আমি সর্বাধিক যোগদান করতেসক্ষম, কিন্তু ব্যথা মধ্যে কারণ আমার স্বাভাবিক চিত্তবিনোদন কার্যক্রম সবনা

৩ = আমি আমার ঘাড়ে ব্যথা কারণেআমার স্বাভাবিক চিত্তবিনোদন কার্যক্রম কয়েক নিযুক্ত করতেসক্ষম।

৪ = আমার ঘাড়ে বেদনার কারণে আমিকোনও বিনোদনমূলক কাজ করতে পারি না।

৫ = আমি কোনও চিত্তবিনোদনকার্যক্রম সব সময়ে করতে পারি না।

মোট স্কোর = (সমস্ত 10 ফলাফলের জন্য পয়েন্ট)

শতাংশে অক্ষমতা (= মোট স্কোর)/৫০*১০০

ব্যাখ্যা: নূন্যতম স্কোর: 0% ন্যূনতম অক্ষমতা সহ,

সর্বাধিকস্কোর

অক্ষমতা	অক্ষমতা	মন্তব্য
০-২০%	নূন্যতম	নূন্যতম রোগীর অধিকাংশ জীবিত কার্যক্রমের সাথে মোকাবিলা করতে পারে।চিকিৎসার বসা এবং উপদেশ উদ্ধরণ থেকে পৃথক পৃথক হয়
২১-৪০%	মাঝারি	রোগী বেঁচে থাকা এবং উত্তোলনের সাথে অসুবিধা বোধ করেন এবং দাঁড়িয়েভ্রমণ এবং সামাজিক জীবন আরো কঠিন এবং তারা হতে পারে কর্ম থেকে অক্ষম করা।রোগী সাধারণত দ্বারা পরিচালিত হতে পারে রক্ষণশীল উপায়ে।
৪১-৬০%	তীব্র	এই গ্রুপে প্রধান সমস্যা ব্যথা কিন্তু দৈনিক কার্যক্রম জীবিত ক্ষতিগ্রস্ত হয়।এই রোগীদের একটি বিস্তারিত তদন্ত প্রয়োজন।
৬০-৮১%	পঙ্গুত্ব	রোগীর জীবনের সকল দিকের উপর ব্যথা অনুভূত হয় ধনাত্মক হস্তক্ষেপ প্রয়োজন।
৮১-১০০%	বিছানায় আবদ্ধ	অত্যাচার বাদ দেওয়া প্রয়োজন।

অংশগ্রহনের জন্য ধন্যবাদ

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সাক্ষাৎকারগ্রহণকারীর স্বাক্ষর

ppendix-D Treatment Protocol

CRP
Centre for the Rehabilitation of the Paralysed

Centre for the Rehabilitation of the Paralysed (CRP)
Department of Physiotherapy
Head Office: CRP- Savar, CRP- Chapain, Savar Dhaka-1343, Bangladesh
Tel: +880 02 7745464-5, Fax: 7745069, E-mail: contact@crp-bangladesh.org, www. crp-bangladesh.org

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Physiotherapy department of the centre for the rehabilitation of the paralysed (CRP) most commonly uses latest McKenzie institution assessment for mechanical spinal problems. Conversely, most commonly prescribed and used treatment concepts are McKenzie, Cyriax, Maitland and Mulligan.

Usual physiotherapy treatment for chronic neck pain patient

1. Manual therapy

- McKenzie mobilization

  I. Repeated retraction in lying(RRIL)
  II. Repeated retraction in sitting (RRIS)
  III. Repeated retraction with overpressure(RR with overpressure)
  IV. Retraction with extension and rotation (RER)
  V. Repeated right side flexion(RSF)
  VI. Repeated right side flexion with overpressure(RRSF with overpressure)
  VII. Repeated left side flexion(RLSF)
  VIII. Repeated left side flexion with overpressure(RLSF with overpressure)
  IX. Rotation mobilization in lying or sitting(RM in lying or sitting)
  X. Others McKenzie directional preference techniques

- Cyriax manipulation

  I. Straight pull or rotation manipulation
  II. DTFM in triggered soft tissue

- Maitland mobilization

  I. p/a unilateral mobilization
  II. p/a central mobilization

- Mulligan mobilization

  I. Sustained natural appophyseal gliding(SNAGS)
  II. Reverse sustained natural appophyseal gliding(Reverse SNAGS)
  III. Natural appophyseal gliding(NAGS)

- Neural mobilization

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Ref: *Date:*

I. Median nerve: shoulder-depression and abduction 10degree. Elbow and wrist is in extension.
II. Radial nerve: shoulder-depression and abduction 10 to 90 degree. Elbow and wrist is in flexion.
III. Ulnar nerve: shoulder-depression and abduction 10 to 90 degree. Elbow is in flexion wrist is in extension and radial deviation
IV. In each movements of supine contra lateral side flexion is to be done.

2. **Exercise therapy:**

- Active cervical range of motion exercises of cervical
- Stretching exercise
- Isometric neck muscles exercise

3. **Electrotherapy:** physiotherapist most commonly prefers manual therapy for patient with neck pain but in case of needs they use selective electrotherapeutic modalities based on patients requirement.

- Infra-red radiation over the back of neck for 10-15minutes.
- Cervical mechanical traction: intermittent mode with 7% of total body weight for 15 minutes. Upper limit of weight maximum 13kg and lower limit of weight 5kg. Force time 5minutes with 1minutes rest.
- Transcutaneous electrical nerve stimulation(TENSE) over the greatest intensity of pain with frequency of 5hz, intensity burst mode and pulse duration 300micro for 20 minutes.

4. **Patient education and home advice:**

- Counseling patient about the condition, avoiding the predisposing factors and home exercise including aerobic exercise, stretching exercise, retraction exercise and isometric exercise.

23/04/18

Mohammad Anwar Hossian
Head of Physiotherapy Department
CRP, Savar, Dhaka-1343.