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Effectiveness of scapulothoracic stabilization exercise along with conventional physiotherapy among patients with neck pain

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We the undersigned certify that we have carefully read and recommended to the Faculty of Medicine, University of Dhaka, for the acceptance of this dissertation entitled, **"Effectiveness of scapulothoracic stabilization exercise along with conventional physiotherapy among patients with neck pain"** submitted by **Md.Tushar Mostafiz**, for the partial fulfilment of the requirement for the degree of Bachelor of Science of Physiotherapy (BSc. PT).

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Declaration

I declare that the work presented here is my own. All sources used have been cited appropriately. Any mistakes or inaccuracies are my own. I also declare that for any publication, presentation, or dissemination of information of the study, I would be bound to take written consent from the Supervisor & Department of Physiotherapy of Bangladesh Health Professions Institute (BHPI).

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Content

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Acronyms

BHPI	Bangladesh Health Professions Institute
BMRC	Bangladesh Medical Research Council
CRP	Centre for the Rehabilitation of the Paralysed
DASH	Disabilities of the Arm, Shoulder and Hand
LT	Lower Trapezius
MCID	Minimal Clinically Important Difference
MT	Middle Trapezius
NAGS	Natural Apophyseal Glides
NDI	Neck Disability Index
NPRS	Numeric Pain Rating Scale
PT	Physiotherapy
RCT	Randomized Controlled Trial
ROM	Range of Motion
SA	Serratus Anterior
SNAGS	Sustained Natural Apophyseal Glides
SPSS	Statistical Package for the Social Sciences
UT	Upper Trapezius
VAS	Visual Analogue Scale
WHO	World Health Organization

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Abstract

Background: Neck pain is one of the most common musculoskeletal disorders on worldwide, which can lead to functional problems and a lowered quality of life. Recent research has found out that scapular thoracic dysfunction contributes to the pathophysiology of neck pain. Scapulothoracic stabilizing exercises are focused on muscle imbalances and postural deficiencies and might produce better results in comparison to traditional physiotherapeutic interventions. The aim of the study was to evaluate the effectiveness of scapulothoracic stabilization exercise along with conventional physiotherapy for patients with neck pain. **Methodology:** A randomized controlled trial (RCT) was conducted where 40 people with neck pain aged 18-65 years were randomly selected and subjected to study at the Musculoskeletal Unit of CRP, Savar. The participants were randomly divided into two groups, an experimental group which received conventional physiotherapy and scapulothoracic stabilization exercises, and the control group received conventional physiotherapy only. The intensity of pain was determined using Visual Analogue Scale (VAS), cervical Range of Motion (ROM) was monitored by the use of goniometer and functional disability was measured by the use of Neck Disability Index (NDI). The analysis of data was done by SPSS v25 and the significance level was considered $p < 0.05$. **Results:** The significant difference was found between two groups in terms of post-intervention pain intensity, ROM, and NDI progress ($p < 0.05$). Yet, the between-group analysis demonstrated that the experimental group experienced significantly better improvements in neck flexion, extension, lateral flexion, and NDI scores ($p < 0.05$), wherein the change in rotational ROM and VAS were not significantly different between groups. **Conclusion:** When used in addition to conventional physiotherapy, scapulothoracic stabilization exercises yield positive results in terms of increased functional outcomes and cervical mobility of patients with neck pain. Although both groups experienced a reduction in pain, the addition of scapulothoracic exercises offered further outcomes in disability and improvement of ROM hence its inclusion in the rehabilitation program of managing neck pains.

Keywords: *Neck pain, Scapulothoracic stabilization, Range of motion, Neck Disability Index.*

Chapter-I Introduction

1.1 Background

Neck pain exists as one of the most widespread medical conditions which generates discomfort when the cervical area begins at the upper part of the neck and continues all the way to the first thoracic vertebra's spinous process. Neck pain develops because of different medical conditions or structural or functional problems and injuries and poor posture and aging tissues of the neck. This condition produces adverse impacts on life quality that produces both disability and economic burdens worldwide (Fandim et al., 2021).

Neck pain is a widespread issue, afflicting massive segment of the populace across the world and the rate of which varies among different regions. Recent studies also have shown that neck pain not only causes disability but also creates a large public health problem. In this part, the various epidemiologic features are presented in detail of neck pain in the the wider populace. In 2020, neck discomfort impacted roughly 203 million individuals worldwide, exhibiting an age-standardized incidence prevalence of 2,450 per 100,000 population, with projections indicating a modest increase to 269 million cases by 2050 (Wu et al., 2024). The neck pain point prevalence of was 3.57% in China in 2019, is slightly higher than that in 1990 (3.53%) (Xia et al., 2024). The highest age-standardized rates for neck pain were seen in high income regions such as North America, suggesting that neck pain is a considerable burden in those regions. Pain in the neck is more frequent in females than in males, and on average, is highest between the ages of 45 and 74 (Shin et al., 2022).

Musculoskeletal condition like neck problem is a very common one amongst the people of all ages and has various causes includes bad posture, muscle strain, degenerative diseases and few other conditions. Muscle strain due to sudden movements, lifting heavy things or incorrect sleeping positions would cause acute or chronic neck pain (Binder, 2007). In addition, neck pain is caused by degenerative conditions such as cervical spondylosis and herniated discs that, when compressing and inflaming nerves, leads to neck pain (Hogg-Johnson et al., 2008). In addition, psychological causes, such as stress and anxiety, make muscle tension worsen and lasting neck discomfort

(Genebra et al., 2017). But knowing these common causes is vital in confounding ideas for therapy and prevention of neck pain.

The scapulothoracic region and the cervical spine possess interdependence between both movements and postures; that is encourage activities and motions in one area influence the other. This is a critical connection to keep the upper part of the body functioning and stable, especially during activities with the shoulder and neck. The scapulothoracic region is anatomically embraced both through the connection to and via the cervical spine, in that way the thoracic spine acts as a bridge (Ganer et al., 2016). Thoracic spine provides both stability and mobility of shoulder complex (Bogduk, 2016), and the cervical vertebrae allow head movement and load transmission. Generating evidence that has direct functional relationship between these regions (Javdaneh et al., 2021), the rehabilitation efforts focusing on scapular stabilization have shown improvements on pain of the neck and range of motion. Physiologically and clinically, thoracic spine can help alleviate symptoms of cervical spine dysfunction in practice (Ganer et al., 2016 ; Javdaneh et al., 2021).

Biomechanical interdependence and muscle imbalances are a significant cause of the development and persistence of neck pain due to scapular dysfunction. Dysfunction in scapular movement can alter neck mechanics and cause pain and disability and thus the scapula is closely related to the cervical spine. The biomechanical interdependence reflects the bound nature of scapula and the cervical spine—the scapula dysfunction to produce neck postural changes (Cagnie et al., 2014). If scapular motion becomes abnormal, or scapular dyskinesis, then strain can be put on cervical structures, leading to pain (Dabholkar and Yardi, 2015). Weakness in scapular stabilizing muscles affects this relationship, as muscles are unbalanced with less strength in scapular stabilizing muscles, there is more tension in the neck muscles leading to pain and stiffness (Kotteeswaran & Nayak, 2021).

The scapulo thoracic stabilization exercises are desinged to improve a person's ability of stability and function of scapula (shoulder blade) in relation to thoracic spine, which can significantly reduce neck pain. Therefore, these exercises work the scapular stabilizers such as the serratus anterior and trapezius to help keep the shoulders and neck properly aligned (Ganvir & Kadam, 2023). These exercises can decrease the strain On the cervical spine and can improve scapular positioning and therefore relieve pain

(Zacharakis et al., 2020). Amin et al. (2024) indicated that scapular stabilization exercises had significant effects in reducing neck pain intensity who undergone scapular stabilization exercises on top of the traditional McKenzie exercises. These exercises can be incorporated into rehabilitation of individuals experiencing persistent cervical discomfort and they improve pain and disability scores (Abbas et al., 2022 ; Edwards, 2021).

Several gaps remain to be filled in the literature currently existing in the area of exercises for treatment of neck pain. There are inconsistent methodologies and outcomes regarding various exercise modalities across various studies in which they have proved effective in reducing neck paint. Different studies have been reported using diverse intervention (stability training, yoga and resistance exercises) with no consensus on the most effective exercise type (Rasmussen-Barr et al., 2023). However, studies of the current period usually ignore the fact that reduction of pain is not the only factor but range of motion and quality of life can be other prominent factors (Mittal & Sharma, 2024). Adding these dimensions to the assessment of the impact of exercise on neck pain may yield a more holistic view of the exercise–neck pain interaction.

1.2 Rationale

Neck pain is a very common musculoskeletal condition that severely compromises daily activities as well as overall quality of life. Although traditionally, joint mobilization and strengthening of the cervical spine is the only approach taught as rehabilitation for neck pain, recent evidence indicates that scapulothoracic dysfunction may have a fundamental role in neck pain pathophysiology. Evidence of emerging clinical interest focuses on scapulothoracic stabilization exercises of the neck muscles, and specifically of the scapular muscles as providers of scapular support and mechanisms of maintaining cervical spine posture and function.

Scapulothoracic stabilization exercises work on these muscles like the serratus anterior, lower trapezius and rhomboids in order to normalize scapular position and movement patterns. Scapular stability has been associated with reduced cervical muscle overactivation, reduced cervical mechanical stress, and improved postural control. However, while some studies have explored the correlation between scapular dysfunction and cervical pain, there is limited evidence on the direct effectiveness of scapulothoracic stabilization exercises as a primary intervention for neck pain relief.

It is important to develop an evidence-based strategy that includes scapulothoracic exercises into conventional rehabilitation procedures for the treatment of neck pain provides rationale for this study. Researchers, physiotherapists, and healthcare professionals can all benefit from this study's examination of how these exercises influence muscle activation patterns, ability to function, and pain severity. Scapulothoracic stabilization exercises may provide a non-invasive, affordable, and easily accessible therapeutic option for people with neck pain if the techniques are shown to be effective. This would eventually improve patient outcomes and lessen the workload on healthcare systems specially for physiotherapist.

To the fullest of my knowledge there is no research have ever been done before upon this topic in Bangladesh. This research aims to fill the gap in existing research by evaluating the effectiveness of scapulothoracic stabilization exercises in relieving neck pain and improving function, contributing to the development of more comprehensive rehabilitation programs.

1.3 Hypothesis

Null hypothesis (H0): There is no significant difference in pain reduction, functional improvement between patients with neck pain who receive scapulothoracic stabilization exercises along with conventional physiotherapy and those who receive only conventional physiotherapy at CRP.

Ho: $\mu 1 - \mu 2 = 0$

Alternative hypothesis (Ha): There is a significant improvement in pain reduction, functional outcomes in patients with neck pain who receive scapulothoracic stabilization exercises along with conventional physiotherapy compared to those who receive only conventional physiotherapy at CRP.

Ha: $\mu 1 - \mu 2 \neq 0$

1.4 Objectives of the study

General objectives :

To evaluate the effectiveness of scapulothoracic stabilization exercises for patients with neck pain.

Specific objectives:

- To explore the baseline characteristics of neck pain patients.
- To evaluate the change in pain severity.
- To evaluate the range of motion.
- To assess the efficiency of scapulothoracic stabilization exercises on improving neck disability index score.
- To compare the effectiveness of scapulothoracic stabilization exercises with conventional physiotherapy treatment for neck pain patients.

1.5 Conceptual Framework

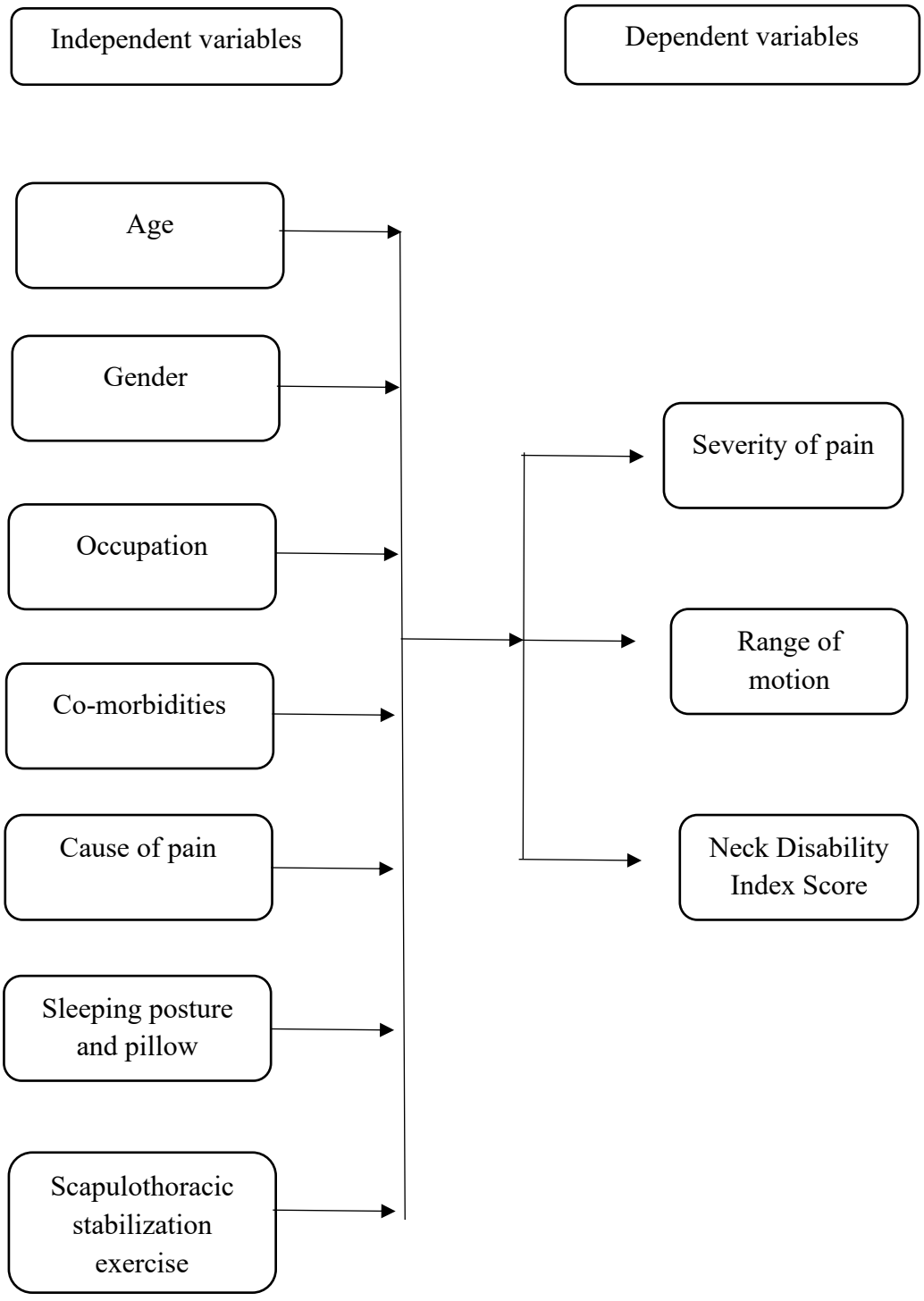


Figure-1.1: Conceptual Framework

1.6 Operational Definition

Pain:

Pain is an unpleasant sensory and emotional experience, frequently related to, or similar to, that related to, actual or potential tissue damage, and acts as a warning signal of possible danger.

Neck pain:

Neck pain is a subjective discomfort or pain experienced in the cervical region. This includes the structure such as muscles, nerves, bones (vertebrae), joints, and the discs between the bones.

Acute neck pain:

Acute neck pain is sudden, sharp, or intense pain in the neck that typically lasts less than six weeks, often accompanied by stiffness and limited range of motion.

Chronic neck pain:

Chronic neck pain is defined as discomfort within or near the neck that lasts for over three months.

Range of motion:

Range of motion (ROM) refers to the degree or boundary to which a body part can be moved at a joint or a stationary point.

Neck disability:

Neck disability refers to the functional limitations and difficulties experienced by an individual due to neck pain and related conditions, impacting their daily activities and overall quality of life.

Conventional neck pain treatment:

Conventional neck pain treatment focuses on physical exercises like retraction, protrusion, retraction extension and others by therapist as well as by patients themselves in order to reduce neck pain.

Stabilization exercise:

Stabilization exercises focus on strengthening the muscles that provide support and control during movement, particularly the core and smaller stabilizing muscles, to improve joint stability and reduce the risk of injury.

Scapulothoracic stabilization exercises:

Scapulothoracic stabilization exercises are designed to strengthen the muscles that attach the scapula to the thorax and improving shoulder stability and function by restoring proper scapular movement and control.

Chapter-II Literature Review

Neck pain is defined as discomfort in the cervical area, often experienced posteriorly, with potential propagation to the head, trunk, and upper limbs. Cervical discomfort is among the most prevalent musculoskeletal disorders worldwide (Guzman et aal., 2009). In various studies there has been a significant relationship between scapulothoracic stability and neck pain and the studies have also shown that scapular stabilization leads to neck pain reduction. Studies revealed that scapulothoracic muscle weakness contributed to mechanical neck pain especially in populations with prolonged sedentary behavior such as IT professionals (Mulay et al., 2018). Several scapulothoracic stabilization interventions have been shown to reduce pain of the neck and improve the range of motion of people with neck pain, indicating that enhancing scapulothoracic stability may reduce symptomatology of neck pain (Javdaneh et al., 2021).

The biomechanical and neuromuscular impairments from poor scapulothoracic control leads to major sources of impairments predisposing to neck dysfunction. The alteration of shoulder mechanics from compromised scapular movement has an effect on neck posture and function. Several key factors underscore this relationship. It has been shown that scapular dyskinesis, which is defined as abnormal scapular movement, is associated with increased pain and dysfunction of the neck (Seok & Kim, 2020). Individuals with scapular dysfunction may also exhibit compensatory neck muscle activation and resulting overuse, strain. The trapezius muscle and the levator scapulae muscle are important to stabilize the scapulothoracic region, they can become dysfunctional and lead to poor neck support in an arm movement as a result neck pain occur (Ebaugh & Finley, 2017).

The scapula, thoracic spine, and cervical spine are biomechanically connected in numerous complicated anatomical and functional ways. The cervicothoracic junction is where the mobile, lordotic cervical spine meets the rigid, kyphotic thoracic spine, comprising the C7 and T1 vertebrae, discs, ribs, and ligaments (DiGiorgio et al., 2019). How the shoulder moves and remains stable dramatically depends on the relationship between the scapula and the thoracic spine via biomechanical ways. The scapulothoracic joint (scapula and thoracic spine) allows a wide range of shoulder

actions. The scapulo thoracic joint constitutes a functional association between the scapula and thoracic cage and not an actual anatomic joint. Shoulder elevation capability is dependent on movements like elevation, abduction and rotation of the scapula, an indispensable component of overall mobility (Seth et al. 2016).

Epidemiologically the prevalence of neck pain is diverse between populations and demographics, reflecting its dispensability as a musculoskeletal complaint. In one study, 64.6% of the subjects experienced neck pain, and it was more commonly reported by females (70.5%) and participants with higher education (Alabdulkarim et al., 2022). Research analyzing data from 1990 to 2019 indicated that the prevalence of neck pain among adolescents and young adults aged 10-24 stabilized at approximately 69,178.4 per 100,000 individuals in 2019, despite an increase in total cases (Fu et al., 2024). In patients with chronic migraine, neck pain prevalence was reported at 87% (Al-Khazali et al., 2022). A study on degenerative cervical myelopathy found that 79.2% of patients reported neck pain preoperatively (Schneider et al., 2022). Neck pain is more common in females compared to males, and on average, is highest between the ages of 45 and 74 (Shin et al., 2022). In 2020, neck discomfort impacted roughly 203 million individuals worldwide, exhibiting an age-standardized incidence rate of 2,450 per 100,000 population, with a modest rise expected to reach 269 million instances by 2050 (Wu et al., 2024). The neck pain point prevalence of was 3.57% in China in 2019, is slightly higher than that in 1990 (3.53%) (Xia et al., 2024).

Neck pain is a prevalent condition with a variety of causes, affecting a significant portion of the population. These are frequent causes of neck pain, often resulting from poor posture, overuse, or sudden movements. Degenerative changes in the cervical spine can lead to pain due to joint wear and tear and also conditions like cervical radiculopathy and central cord compression are more common in older adults, often due to degenerative changes (Spine Conditions: Cervical Spine Conditions., 2017). In addition, psychological causes, such as stress and anxiety, make muscle tension worsen and lasting neck discomfort (Genebra et al., 2017). But knowing these common causes is vital in confounding ideas for therapy and prevention of neck pain.

Scapular dyskinesis significantly contributes to chronic neck pain through its impact on posture and muscle function. Scapular dyskinesis is especially related to neck pain in those with forward head posture, given the higher frequency of SD in this group (Güler

et al., 2022). Dysfunctional scapulothoracic muscle activities related to scapular dyskinesis play a role in increasing the chance of developing neck pain (Javdaneh et al., 2021). Although weakness in the neck muscles is thought to cause fatigue and pain, there is a lack of significant differences in endurance between persons with or without neck pain (Aimi et al., 2019).

Treatment options for neck pain are traditionally diverse, including both medicines and physical as well as alternative strategies. Their goal is to alleviate pain, improve how well a person can move, and increase quality of life for those with neck pain. Paracetamol, a kind of NSAID, is often the drug of choice for treating both sudden and ongoing neck pain. In medical treatment, muscle relaxants are intended to lessen the tension in the muscles of the neck. Acupuncture is a traditional method that has shown effectiveness in pain management, although evidence varies (Isaikin et al., 2023). Conventional physiotherapy interventions consist of a series of targeted therapies. 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). Traditional physiotherapy treatment methods for neck pain encompass a variety of techniques aimed at reducing discomfort and improving functionality. These methods include manual therapy, exercise therapy, and specific rehabilitation approaches. Spinal mobilization has shown effectiveness in reducing pain and disability, particularly in acute cases. It can be used alone or as part of a multimodal treatment approach for chronic pain (Hernández et al., 2024). Kinesio Taping method combined with traditional therapy, has been shown to provide additional benefits in pain reduction (Kavlak et al., 2012). Combining physical therapy with psychological support and pharmacological interventions is recommended for optimal outcomes in managing neck pain (Isaikin et al., 2023). Another study stated that home exercise programs can also play a very important role in the condition of neck pain. The home exercise program comprises a series of wide range of motion (ROM) exercises intended for warming up and cooling off, succeeded by stretching/mobilization and strengthening exercises targeting the scapula and upper thoracic spine, primarily involving flexion/extension, lateral flexion, and rotation of the shoulder joint (Martel et al., 2011).

Manual therapy has been found to be a useful way to reduce neck pain and improve a person's range of motion. Manipulation and mobilization are two of several techniques that may lessen symptoms seen in the large proportion of the population who suffer from neck pain (Shamsi et al., 2020). Both short-term and long-term pain outcomes suggest manual therapy surpasses oral pain medications in managing pain. According to Makin et al. (2024), manual therapy is generally safer than oral medications, with fewer side effects possible. Although manual therapy is shown to help with neck pain, studies point out that its effectiveness may depend on both individual factors and which techniques are used. Effective postural correction is especially important in lessening neck pain among people who use computer or smartphone devices extensively. This method focuses on mechanistic components of discomfort by supporting matched alignment and lightening the burden on the cervical spine. Numerous studies indicate that postural correction helps improve neck pain and disability by reducing both the Neck Disability Index and craniovertebral Proper alignment of the cervical spine gained through postural correction is effective in lowering the incidence of forward head posture, often connected to neck pain. Postural correction reduces pain by promoting balance through the activation of muscles that contrast with those in use during poor posture. Postural correction is reported to have superior benefits for managing ongoing neck pain than manual therapy, according to Mittal and Sharma's 2024 study. Engaging in exercise is important for controlling neck pain, since it strengthens physical abilities, decreases pain, and raises quality of life. Data suggest that resistance training leads to important declines in both pain and disability, with mean differences of -1.27 for pain and -1.76 for disability. It was found that motor control exercise had a large effect of -2.29 in reducing pain, as measured by SMD. Pain relief was more notable with yoga compared to alternative types of exercise, as reported in Mueller et al. 2023. Jones and colleagues found, through a systematic review, that strengthening exercises contributed to reduction in VAS scores for pain and NDI scores (2024).

Scapulothoracic stabilization exercises are therapy techniques intended to strengthen and stabilize the scapulothoracic joint, an important factor in maintaining shoulder stability and posture. Usually, scapulothoracic stabilization exercises are used together with additional therapeutic interventions to optimize the outcome of rehabilitation. Scapulothoracic exercises are an important method of treating the muscle imbalances related to upper crossed syndrome and have been shown to help with neck pain and

improved thoracic movement (Ganvir & Kadam, 2023). Scapulothoracic stabilization exercises constitute an important part of therapeutic programs that optimize shoulder function, posture, and balance. Usually, such exercises include progressive resistance training, activities to sharpen scapular awareness, and drills to increase muscle stability. The scapulothoracic stabilization exercises concentrate especially on the serratus anterior (SA) and the trapezius, including the lower (LT), middle (MT), and upper (UT) regions. Scapulothoracic stabilization exercises improve the control and stability of the scapula, which plays a major role in maintaining shoulder functionality and reducing pain. These exercises improve posture by strengthening these muscles, with particular benefits for people experiencing Upper Crossed Syndrome, a postural issue caused by muscle tightness and weakness resulting in neck pain (Nitayarak & Charntaraviroj, 2021). Scapular protraction and upward rotation are greatly dependent on activation of the serratus anterior muscle. Riek et al., 2022 reported that the forward punch and dynamic hug increase serratus anterior activity more than they increase upper trapezius activation. Stabilization of the scapula is supported by the upper, middle, and lower trapezius. Training routines that target shoulder pain and scapular position often depend greatly on activation of the lower trapezius. Middle trapezius is highly engaged in a range of scapular-based exercises. According to Borms et al., (2022), prone elevation with external rotation is potent in mobilizing the lower and medial trapezius, all while minimizing activity in the upper trapezius and reducing stress on the neck, which could reduce neck pain. Some dynamic exercises in scapulothoracic stabilization organize movements that engage both serratus anterior and lower trapezius, promoting optimal shoulder mechanics and reducing neck pain and impingement risk (Riek et al., 2022). While these exercises focus on strengthening specific muscles, it is important to consider that improper execution or overemphasis on certain muscles can lead to imbalances, potentially exacerbating shoulder issues. Thus, a balanced approach is essential for effective rehabilitation.

The majority of patients presenting with neck pain have non-specific neck pain characterized by postural or mechanical symptoms. The etiological causes are inadequately comprehended and are often multifactorial, encompassing bad posture, anxiety, despair, cervical strain, and athletic or vocational endeavors. Neck discomfort following a whiplash accident falls under this type, characterized by the absence of bone damage or neurological dysfunction. When the mechanical element is prioritized,

the ailment is commonly referred to as cervical spondylosis (Ylinen, 2003). Scapulothoracic stabilization exercises play a crucial role in enhancing scapular control and reducing neck pain, particularly in individuals with conditions like mechanical neck pain. Strengthening and coordinating the muscles close to the scapula with these exercises improve posture and reduce neck pain. The literature demonstrates that after scapulothoracic stabilization interventions, individuals often have better cervical range of motion and lower pain. According to Ganvir and Kadam (2023), the inclusion of thoracic mobilization with scapular exercises demonstrates a joint effect that favors better pain reduction and greater improvement in mobility.

The management of neck pain has been studied in clinical research to see if scapulothoracic stabilization exercises are effective. The exercises concentrate on improving how the scapula functions and its stability, which consequently can reduce neck pain and increase range of motion. While these studies generally demonstrate the viability of these exercises, their effectiveness appears to differ depending on the group or setting involved. Research by Ganvir and Kadam (2023) indicates that a combination of scapular stabilization After four weeks, the intervention associated with notable increases in both neck flexion, extension, and lateral flexion range of motion. Zacharakis and colleagues (2020) reviewed five RCTs and concluded that scapulothoracic strengthening exercises tend to ease neck-related pain. It was also found that these exercises provided brief improvements in daily life activities and neck disability index results; however, the results varied, largely because of differences in exercise styles used. Edwards (2021) pointed out that well-coached exercise programs concentrated on the kinematics and stability of the scapula can contribute to reduced neck pain. Results from randomized control trials recommend including these exercises by doing them three times every week for four to six weeks. Priya's (2018) study found that scapular stabilization exercises significantly improved functional status in patients with mechanical neck pain compared to conventional physiotherapy, although there was there is no major difference in relieving pain between the two groups. Seo et al. (2019) reviewed studies on nonspecific chronic neck pain and found that scapular stabilization exercises might improve pain and dysfunction. Nevertheless, because few studies exist and there is a variation in measurement methods, the reliability of these findings is limited. In 2021, a trial conducted by Javdaneh and colleagues compared neck training with and without adding scapular stabilization. The use of both neck and scapular

exercises produced superior results for pain and motion, showing that adding scapular exercises improves the outcome of neck rehabilitation. The results of a systematic review by Zacharakis et al. (2020) comprising 329 participants from randomized controlled trials provided evidence that scapulothoracic exercises reduce neck pain and improve functional outcomes. Analyses of scapulothoracic stabilization techniques frequently rely on a number of standardized assessment instruments. Such scales are employed to evaluate different characteristics of shoulder function, pain perception, and treatment outcomes. As with the VAS, the NPRS provides a numerical measure of pain and has been used to show that SSE positively affects pain management. DASH Questionnaire and Neck disability index scale assesses the disability and functional status of the upper extremity, providing insights into the overall impact of scapulothoracic stabilization exercise on daily activities (Tang et al., 2024).

Studies have demonstrated that providing scapulothoracic stabilization exercises can lead to significant improvements in pain reduction and functional outcomes compared to traditional neck exercises alone. The cervical spine specific movements of isometric strengthening, deep neck flexor activation, and range of motion exercises are traditional neck exercises as this would not harm any organ structures or physiological functions of the cervical spine. The purpose of these exercises is to focus directly on the muscles surrounding the cervical spine to decrease pain, improve function and return normal movement patterns (Jull et al., 2007). However, there is emerging evidence that, when included in rehabilitation programs for neck pain, scapulothoracic stabilization exercises produce superior outcomes to those exercises focusing on the cervical spine alone. Kang et al. (2018) performed a randomized controlled trial in which patients with chronic neck pain who performed scapular stabilization exercises progressively increased in pain intensity, neck disability, and also increased activation patterns of the neck muscles in comparison with the traditional neck exercises. These results were confirmed in another study by Kim and Park (2017) who observed that scapular stabilization training improved postural control as well as decreasing upper trapezius overactivity a typical side effect pattern in neck pain.

The existing studies on the effectiveness of scapulothoracic stabilization exercises for neck pain reveal several limitations that obstruct the generalization and reliability of their findings. These limitations include variability in study designs, small sample sizes, and inconsistent outcome measures across different research efforts. Using multiple

methodologies, with randomized controlled trials and quasi-experimental designs, often makes it hard to compare study outcomes directly. A lack of unified measurement methods sometimes results in differences of opinion about scapulothoracic exercises' effectiveness (Zacharakis et al., 2020). Since the exercise interventions vary widely in how much, how often, and how hard individuals exercise, the reported results are not always consistent (Priya, 2018). A range of interventions—including stability training, yoga, and resistance exercises—have been used in different studies, but no clear preference for the best type of exercise is established as yet (Rasmussen-Barr et al., 2023). A large portion of the studies considered in systematic reviews have included only a small number of participants, thereby decreasing the strength and generality of the findings (Seo et al., 2019). A number of studies have indicated encouraging results, however, because the evidence overall is moderate, further high-quality research is needed to strengthen the findings (Zhong et al., 2024).

Supporting evidence for scapulothoracic stabilization exercises needs to be strengthened, especially in their applications for neck pain and shoulder disorders. Although the existing research suggests possible advantages, it also points out major deficiencies in current knowledge that must be resolved. Because most studies are not standardized in their exercise approaches, results cannot be easily compared between different investigations (Zhong et al., 2024). Scapulothoracic exercise research needs to examine how well these approaches work for specific populations, particularly athletes and those in the military, as well as rehabilitation settings, to better grasp their particular requirements (Edwards, 2021). Assessments of the ongoing utility and durability of scapulothoracic stabilization exercises are required (Zacharakis et al., 2020). In order to obtain a complete picture of the effectiveness of such exercises, future studies ought to measure outcomes using objective and subjective methods (Zhong et al., 2024).

Even though the results are promising, additional studies are required to figure out best execution methods and determine the exercises most beneficial for long-term outcomes of neck pain. In order to improve clinical management and recovery approaches for individuals with neck pain, advanced and thorough research is needed to evaluate and compare both scapulothoracic stabilization and standard neck exercises on a large scale.

Chapter-III Methodology

3.1 Study design

A Randomized Control Trial (RCT) was utilized as the experimental design for the quantitative study in order to assess the effectiveness of scapulothoracic stabilization exercises along with conventional physiotherapy for individuals with neck discomfort. A randomized controlled trial (RCT) is a quantitative, prospective, comparison investigation performed under controlled settings. The efficacy of this treatment regimen was assessed using the Visual Analogue Scale (VAS) for pain measurement, the Universal Goniometer for range of motion assessment, and the Neck Disability Index (NDI) to evaluate the disability rate.

The study utilized a single-blind design in which the assessor was blinded. Participants were randomly assigned to the experimental group, that received scapulo-thoracic stabilization exercises, or the control group, who received conventional treatment.

A pre-test (before the intervention) and post-test (after the intervention) were conducted with each participant from both groups to evaluate balance outcomes before and after the therapy. The design was demonstrated below-

Experimental group : r O X O

Control group : r O O

3.1.1 CONSORT Flowchart of the phases of randomized controlled trial

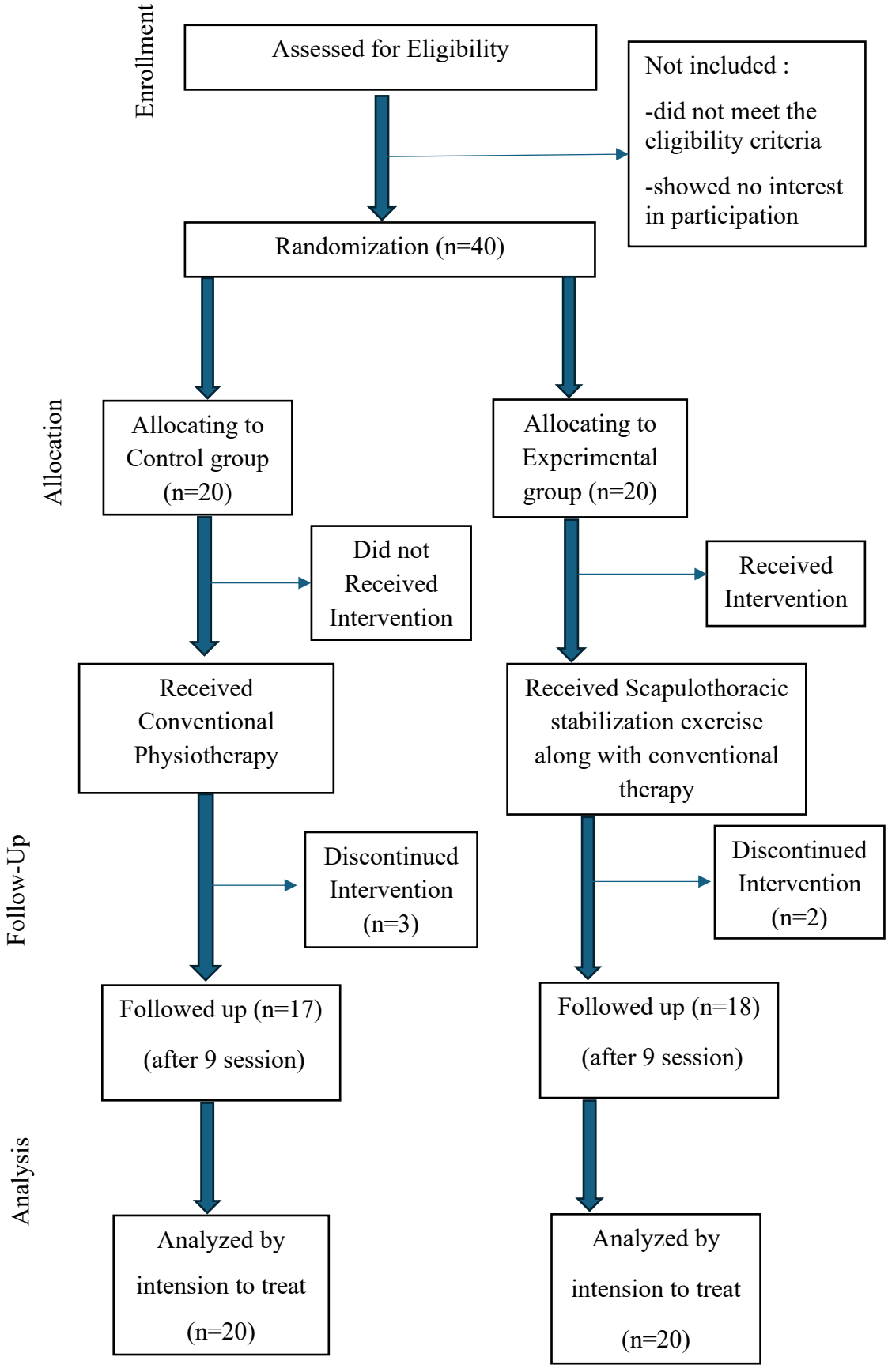


Figure 3.1: Consort flowchart of the study

3.2 Study site

Musculoskeletal unit of the Physiotherapy department of the Centre for the Rehabilitation of the Paralyzed (CRP) in Savar, Dhaka, was selected to perform the study.

3.3 Study duration

The study was conducted from 1st June 2024 to 31st May 2025, approximately 11 months, from initial recruitment through to the final dissemination of results. Data was collected over a two-month period from 1st February to 31st March.

3.4 Study population

The study populations were people who have neck pain and were taking physiotherapy service at CRP and sample population were a smaller group drawn from the larger study population, those who came to CRP to receive treatment.

3.5 Inclusion criteria

- Patients with neck pain who were taking physiotherapy services at CRP.
- Age between 18 to 65 **(Masaracchio et al., 2013)**.
- Both male and female **(Ibrahim, Hanan and Abdelsalam., 2022)**
- Carrying a baseline NDI score of no less than 20% (10 points) **(Masaracchio et al., 2013).**
- Patients who voluntarily agreed to take part in this research.

3.6 Exclusion criteria

- Neck pain has been associated with inflammatory rheumatologic disorders or malignancy.
- Prior surgical intervention concerning cervical spine and cervical spinal stenosis.
- Severe referred pain (more than 8 on a 0-to-10 visual analog scale [VAS]) within the corresponding dermatome of the upper extremities.
- Severe psychological disorder.
- Pregnancy

(Masaracchio etal.,2013).

3.7 Sample size

G*power software (Version 3.1.9.4; Germany) was used to calculate the required sample size for this investigation. The calculations depended on changes in the NDI over 4 weeks, including a standard deviation of 9.3 points (data collected from Im et al., 2015), a two-tailed test, an alpha level of 0.05, and a desired power of 80%. The projected required sample size was determined to be 20 patients per group and total 40 patients.

3.8 Sampling technique

Simple Random sampling technique was used for group allocation of this study. Subjects, who met the inclusion criteria, were taken as sample in this study. 40 patients were conveniently selected from the population. Group allocations were conducted by using computer generated random number in the process of simple random sampling technique as it improves internal validity of experimental research. In this study, 20 patients were randomized to an Experimental group receiving scapulothoracic stabilization exercises along with conventional physiotherapy, while another 20 patients received only conventional physiotherapy. So the divided number of experimental group were 2, 3, 4, 6, 7, 8, 9, 11, 13, 14, 15, 17, 21, 22, 30, 31, 33, 34, 37 & 40 and control group were 1, 5, 10, 12, 16, 18, 19, 20, 23, 24, 25, 26, 27, 28, 29, 32, 35, 36, 38 & 39.

3.9 Method of data collection

The study procedure was conducted by taking face to face interview. After taking the interview of the patient at department, the patients were assessed by a graduate qualified physiotherapist.

Data had been collected using a pre-test, intervention, and post-test utilizing a written questionnaire. A pre-test was conducted prior to the beginning of therapy, during which pain severity was assessed using the Visual Analog Scale (VAS) and the Neck Disability Index (NDI) questionnaire. A similar technique was conducted for performing the post-test following the termination of nine treatment sessions. The questionnaire for assessment was provided to each subject before beginning therapy and after 9 sessions of treatment patient was told to make mark on the line of VAS scale according to their

severity of pain. The data were gathered from both experimental and control group in the presence of a graduate certified physiotherapist in order to avoid biasness.

3.10 Data collection tools

i. Data collection form.
ii. Informed consent.
iii. Structured questionnaire (which include both open-ended and closed-ended questions).
iv. Visual Analogue Scale(VAS) – for measuring pain.
v. Neck Disability Index (NDI) questionnaire.
vi. Goniometer.
vii. Pen and pencil.

3.11 Measurement tools

3.11.1 Primary outcome measurement tool

Visual Analogue Scale (VAS): Hayes and Patterson (1921) developed the Visual Analog Scale (VAS) to evaluate pain severity in patients. It is acknowledged as the Visual Analog Scale. The scale is a 10 cm long line, either horizontal or vertical, extending from 0 to 10. A score of zero (0) indicates the absence of pain, 1-3 indicates mild discomfort, 4-6 reflects moderate pain, and 7-10 shows severe pain as reported by patients. The patient indicates a position on the line that most accurately reflects their pain level, allowing it an easily understood and effective technique for pain evaluation.

Neck disability index (NDI) scale: This questionnaire is developed according to the Neck Disability Index (NDI) for measuring pain and disability in patients with neck-related conditions. Each question has a total of 6 response options, scored from 0 to 5. Here, 0 indicates no disability and 5 indicates complete disability. Scoring intervals for interpretation as 0-4 indicates no disability, 5-14 indicates mild disability, 15-24 indicates moderate disability, 25-34 indicates severe disability and 35-50 indicates complete disability. The questionnaire consists of 10 questions, with a total possible score of 50. The higher the NDI score, the more severe the neck disability, whereas a lower NDI score indicates better neck function. A healthy individual may have an NDI score of 0.

3.11.2 Secondary outcome measurement tool

Goniometer: The utilized of a goniometer to evaluate joint range of motion, which is often employed. Double-armed goniometer, with one fixed arm and one movable arm. The pivot or axis of the movable arm is positioned directly above the center of the joint. The stationary arm is positioned in alignment with the immobile segment of the joint. The movement must then be achieved. At the end of the movement, the indicator shows the number of degrees through which the part has rotated.

3.12 Treatment regime

Treatment provider :

Graduated physiotherapist with minimum one year clinical experienced in Musculoskeletal unit PT department, CRP, Savar.

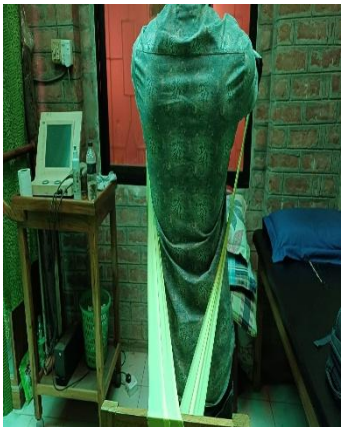
For control group: Conventional physiotherapy for neck pain patients at CRP.

- **Mckenzie Principle :**
  - Extension principle:
  - Retraction exercise
  - Retraction with extension
  - Retraction extension with extension
  - Traction retraction extension with rotation
  - Extension mobilization
  - Sustain extension with pillow support
- **Lateral Principle:**
  - Lateral flexion
  - Rotation
- **Stretching exercise**
- **Soft tissue release**
- **Isometric exercise**
- **Strengthening exercise**
- **Mulligan approach:**
  - NAGS
  - SNAGS
- **Maintain proper positioning and home advice**

For experimental group : Following exercises along with conventional physiotherapy.

Exercise name	**Description and Doses**	**Figure**
1.Scapula orientation exercise	Scapula orientation exercise is the preparatory step for performing the scapulothoracic stabilization exercise. It is important for the patient to understand the movement of the scapula. 1. Frist seated on a stool with the feet supported and spine in a neutral position. 2. Gentle pressure on the acromion to encourage upward rotation. 3. The hands placed along the line of the pectoralis minor and moving the coracoid process away from the hand and the movement of scapular retraction occur. 4. Repeat the process for both scapulae. 5. The patients were asked to maintain the positions and contractions during the exercises. 6. A maximum of 5 minutes needed for the procedure.	

2. Scapular adduction and shoulder external rotation	Scapula adduction and shoulder external rotation is the first exercise of scapulothoracic stabilization exercise. 1. This exercise is performed with a 200cm long precut section of Thera-band of yellow or red color. 2. Stand tall with feet hip width apart. 3. Bend elbow 90 degree by sides and hold the Thera-band slightly narrower than shoulder width. 4. Rotate arms outward and squeezing the shoulder blades together. Exhale during scapular retraction. 5. Return to the starting position with control. Inhale during returning to the starting position. 6. The holding time is 6-10sec. 7. Perform 10 repetitions.	
3. Bilateral shoulder extension with scapular retraction	1. Hold the end of the Thera-band at hip height with the elbow straight and the palms facing inwards. 2. Start just in front of the body and pull the arm backwards keeping the elbow straight and squeezing the shoulder blades together. 3. Return to the starting position. 4. The holding time is 6-10seconds. 5. Perform 10 repetition.	

4. Eccentric scapular retraction	1. Hold the end of the Thera-band at hip height with the elbow straight and the palms facing inwards. 2. Start from the back of the body and pull the arm forward keeping the elbow straight. 3. Return to the starting position. 4. The holding time is 6-10seconds. 5. Perform 10 repetition.	
5. Brugger's exercise	1. Begin sitting or standing with an elastic exercise band wrapped and secured around your palms. 2. Begin with arms at side, elbows bent, forearm's pointing forward. 3. Move hands apart from each other to maximally stretch the band while simultaneously rotating palms out, straightening the arms, and pinching the shoulder blades together as the hands move behind the hips. 4. Return to the start position. 5. The holding time is 6-10seconds. 6. Perform 10 repetition.	 

6. Forward punch or scapular protraction	1. Begin sitting or standing by wrapped the Thera-band around behind the body at chest level. 2. Elbows are straight and palms facing inwards. 3. Punch forward and keep the elbow straight and shoulder 90 degree flexed. 4. Return to the starting position. 5. The holding time is 6-10 seconds. 6. Perform 10 repetition.	
7. Dynamic hug exercise	1. Begin the Thera-band wrapped around upper back and holding each end of Thera-band with hands. 2. Abduct the shoulder about 60 degrees and bend the elbow about 45 degrees. 3. Keeping the shoulder elevated and push the arms forward and inwards as giving a hug. 4. When the elbow is straight and the hands touch each other. Hold it for 6-10 seconds. 5. Slowly return to starting position. 6. Perform 10 repetition.	

Table 3.1: Treatment protocol for experimental group

3.13 Data analysis

Data was calculated and analyzed by statistical package for social science (SPSS) version 25 and Microsoft word was presented the tables for both demographic questionnaire and group differences. The alpha was set at 0.05. Intension-to-treat analysis was performed. The last observation carried out forward (LOCF) method was used to handle missing data. NDI scores were calculated based on the number of items answered. If a participant answered at least 8 out of the 10 items, an adjusted score was calculated by dividing the sum of the answered items by the maximum possible score for those items and multiplying by 100 to express it as a percentage. Participants with fewer than 8 answered items were excluded from analysis, in line with standard NDI scoring guidelines. Normality of data was assessed using Shapiro-Wilk test. The baseline characteristics of both groups were compared with independent sample t test. The socio-demographic information of both groups were compared with independent sample t test, or Chi- square test, depending on whether the criteria for statistics were fulfilled. The paired t-test and independent t-test were selected for data that followed a normal distribution (ROM, NDI) to analyze pre and post intervention changes in each group and between group effects. When data showed non-normal distribution (VAS) both Wilcoxon signed-rank and Mann- Whitney U were properly employed respectively for within groups and between group analysis.

3.14 Ethical consideration

The research proposal, including the methodology, received approval from the Institutional Review Board (IRB) and got approval from the relevant ethical committee of the Bangladesh Health Professions Institute (BHPI). The entire procedure of this study work followed by the rules established by the Bangladesh Medical research Council (BMRC) and the World Health Organization (WHO). Prior to starting data collection, the researcher secured approval from the relevant authorities in the clinical setting to ensure participant safety and received a witness from the authority to verify the data collected. The researcher carefully maintained the privacy of the participants' conditions and treatments.

3.15 Informed consent

Informed permission from each participant was obtained by the researcher. A sign informed consent form was obtained from each participant. The participants were informed of their right to get consultation from an outside physician should they find the therapy insufficient for managing their medical issues or if their medical condition worsens. The participants were notified that they might refuse to answer any question during the study and might cancel their consent and discontinue participation at any time. Withdrawal from the research should not affect their treatment in the physiotherapy department, and they should continue to get the same services. Each participant had the opportunity to express their concerns to those in higher authority or administration of CRP and got satisfactory responses to their inquiry.

In this study, total 40 patients who have neck pain were selected as sample from the Musculoskeletal outpatient unit of Center for Rehabilitation of Paralyzed (CRP),Savar ,Dhaka to measure the effectiveness of scapulothoracic stabilization exercise along with conventional physiotherapy among patients with neck pain.

4.1. Baseline characteristics

Table-4.1: Baseline characteristics

Variables	Experiment group	Control group	p-value
Age, mean(SD), years	37.05 (± 9.88)	38.55 (± 13.24)	0.687[a]
Height (meter), mean (SD)	1.6615 (± 0.89)	1.6325 (±0.10)	0.315[a]
Weight (KG), mean (SD)	64.25 (±7.12)	61.45 (±6.94)	0.216[a]
BMI (KG/m^2), mean(SD)	23.26(±1.74)	23.09(±2.37)	0.799[a]
Pain intensity(VAS), mean(SD)	6.72(±0.734)	6.93(±0.742)	0.374[a]
NDI score (%), mean(SD)	45.55(±6.264)	42.44(±7.265)	0.143[a]

[a], independent t-test

The table above shows the descriptive data for the experimental group and control group at the beginning of the study. The table presents the following data for each group: age, height, weight, BMI, pain intensity(VAS), NDI score. The experiment group had a mean age of 37.05 years, while the control group had a mean of 38.55 years with p=0.687. The age of the control group was little higher but there was no Statistically significant difference between age at baseline. This table also showed the mean height for experiment groups 1.6615 meters and for control group 1.6325 meters with p=0.315. The height of the experimental group was slightly higher than the control group though there was no statistically significant difference between height. This table also shows the data of experimental groups mean weight 64.25kg and control group mean weight 61.45kg with p=0.216. Though the weight of the experimental groups was a bit higher than the control group but there was not a statistically significant difference between the weight of both groups. This table also presented the mean BMI of experimental group 23.26 kg/m^2 and control group 23.09 kg/m^2 with the p=0.799. Thats

showed that there was no statistically significant difference between BMI. This table also presented that experimental group had a mean VAS of 6.72, while the control group had a mean VAS of 6.93 with p=0.374. That's showed there was slightly increased VAS in control group than experimental group, though there was statistically no significant difference between the groups VAS score at baseline. The table above also showed the mean NDI score at baseline for experimental group 45.55% and for control group 42.44% with p=0.143. The experimental group had a little more percentage of NDI score than control group but there is no statistically significant difference between the group.

4.2. Analysis of Socio-demographic information

Table-4.2: Socio-demographic information

Variable	Experiment group	Control group	p-value
Gender (%)	Male= 13 (65%) Female= 7 (35%)	Male= 12 (60%) Female= 8 (40%)	0.744[b]
Marital status(%)	Unmarried =3 (15%) Married =17(85%) Divorced =0(0%) Widowed =0(0%)	Unmarried =5 (25%) Married =15(75%) Divorced =0(0%) Widowed =0(0%)	0.429[b]
Occupation (%)	Housewife =4 (20%) Farmer =2 (10%) Garments workers =1 (5%) Driver =1 (5%) Day Laborer =1 (5%) Service Holder =1 (5%) Businessman =3 (15%) Retired =1 (5%) Student =4 (20%) Others =2 (10%)	Housewife =7 (35%) Farmer =0 (0%) Garments workers =0 (0%) Driver =0 (0%) Day Laborer =0 (0%) Service Holder =2 (10%) Businessman =3 (15%) Retired =2 (10%) Student =5 (25%) Others =1 (5%)	0.644[b]
Education (%)	Illiterate=1 (5%) Primary=5 (25%) Secondary=6(30%) Higher Secondary=5 (25%) Graduate=3 (15%) Post-graduate=0 (0%)	Illiterate=2 (10%) Primary=3 (15%) Secondary=8(40%) Higher Secondary=4 (20%) Graduate=3 (15%) Post-graduate=0 (0%)	0.873[b]
Pillow, median(IQR)	1.00(1-1)	1.00(1-1)	------
Sleeping posture (%)	Supine lying =11 (55%) Prone lying =3 (15%) Side lying- right =4 (20%) Side lying- left =2 (10%)	Supine lying =7 (35%) Prone lying =2 (10%) Side lying- right =5 (25%) Side lying- left =6 (30%)	0.362[b]

[b], Chi-square test

The table compares the socio-demographic characteristics of individuals in experimental groups with whom were in the control group. The variables considered as socio-demographic were gender, marital status, occupation, education, pillow number and sleeping posture. In both groups, the gender distribution shows a higher proportion of males than females, with 65% in experimental group and 60% in control group. In experimental group 85% and in control group 75% had marital status of being married and in experiment group 15% and in control group 25% were unmarried. In both groups most of the female persons were housewife with 20% in experimental group and 35% in control group. Also, in both groups male persons are holding the occupation of business with 15% in the experimental group and 15% in the control group. 30% participants in the experimental group and 40% participants in the control group had attained at least secondary school education. The table shows that both experimental and control group consist of same number of pillows with the median of 1.00(IQR:1-1). A significant number of participants had sleeping posture of supine lying, with 55% in the experiment group and 35% participants in the control group.

4.3. Analysis of Visual Analogue Scale (VAS)

Table-4.3: Wilcoxon test within group analysis of pain by Visual Analogue Scale

Group	Action	Pre median(IQR)	Post median(IQR)	Z	p-value
Experiment group	Pain intensity (VAS)	6.60 (7.050-6.225)	1.90 (2.825-1.325)	-3.727	0.000*
Control group	Pain intensity (VAS)	6.90 (7.200-6.500)	2.75 (3.450-2.225)	-3.626	0.000*

***, significant value**

Table-4.3. Wilcoxon test within group analysis of pain by Visual Analogue Scale

The table presents the within group calculated results of the Wilcoxon test for pain intensity measured by VAS. This table showed that the median score of pain intensity was significantly reduced after treatment from 6.60(IQR: 7.050-6.225) to 1.90 (IQR: 2.825-1.325). This change was statistically significant (Z=-3.727, p=0.000) that showing considerable reduction in pain intensity after the scapulothoracic stabilization exercise along with conventional physiotherapy. The table also showed that the control group median score of pain intensity was reduced from 6.90 (IQR: 7.200-6.500) to 2.75 (IQR: 3.450-2.225) after treatment. This decreased score was also statistically significant (Z=-3.626, p=0.000) that recommended the control group treatment was also effective in reducing pain.

4.4. Analysis of Visual Analogue Scale(VAS)

Table-4.4: Mann- Whitney U test between group analysis of pain by Visual Analogue Scale

Variable	Group	Action	Median (IQR)	Mann-Whitney U score	Z	p-value
Between group analysis	Experimental group	Pain intensity (VAS)	4.70 (5.22-4.5)	155.50	-1.207	0.227
	Control group	Pain intensity (VAS)	4.45 (4.90-3.55)			

Table-4.4. Mann- Whitney U test between group analysis of pain by Visual Analogue Scale

The table displayed the between group analysis of pain measured by VAS. Both the experimental and control group indicate significant reduction in neck pain intensity measured by VAS after the intervention. The median reduction in pain of the experimental group was 4.70(IQR: 5.22-4.5) and in control group the median reduction was 4.45 (IQR: 4.90-3.55). Though the experimental group displayed a slightly greater improvement. The improvement difference is not statistically significant defined by the Mann-Whitney U test (U=155.50, Z=-1.207, P=0.227). Both interventions were effective in reducing pain intensity (VAS) but the experiment group intervention did not provide a significant pain reduction compared to the control group intervention.

4.5. Analysis of Range of Motions (ROM)

Table-4.5: Paired sample t-test within group analysis of Range of Motion (ROM)

Group	ROM	Pre mean(SD)	Post mean(SD)	t-value	p-value
Experimental group	Neck flexion	29.35(±3.801)	35.15(±3.675)	-11.023	0.000*
	Neck extension	28.40(±4.978)	34.40(±4.828)	-9.413	0.000*
	Neck side flexion right side	29.95(±2.665)	36.20(±2.042)	-11.030	0.000*
	Neck side flexion left side	30.15(±2.560)	36.65(±2.059)	-10.987	0.000*
	Neck rotation right side	37.95(±2.704)	45.60(±3.952)	-11.419	0.000*
	Neck rotation left side	39.40(±2.415)	46.45(±3.395)	-10.573	0.000*
Control group	Neck flexion	27.90(±3.523)	31.35(±3.183)	-7.667	0.000*
	Neck extension	27.25(±3.972)	30.45(±3.720)	-6.140	0.000*
	Neck side flexion right side	28.70(±3.526)	32.20(±3.806)	-6.418	0.000*
	Neck side flexion left side	28.35(±3.774)	30.90(±3.553)	-7.105	0.000*
	Neck rotation right side	37.40(±2.542)	43.60(±4.903)	-5.667	0.001*
	Neck rotation left side	37.85(±2.641)	44.40(±4.321)	-6.816	0.000*

***, significant value**

Table-4.5: Paired sample t-test within group analysis of Range of Motion (ROM)

The table demonstrates the difference between pre-test and post-test results following standard treatment. The result presents a considerable improvement in neck flexion ROM (p=0.000) following conventional therapy, with an 80% confidence interval. Furthermore, the extension ROM shows a substantial improvement (p=0.000) following conventional therapy group. The table above also shows the difference between the pre-test and post-test outcomes of neck right side flexion and it

improvement (p=0.000) and left side flexion improvement (p=0.000) after implementation of conventional physiotherapy. The table also demonstrates a considerable improvement in neck right side rotation (p=0.001) following conventional physiotherapy. Furthermore, the table also presents the improvement of neck left side rotation ROM improvement (p=0.000) following conventional physiotherapy. The table results indicate a significant improvement (p=0.000) in neck flexion ROM after implementation of scapulothoracic stabilization exercise. This table also demonstrates the improvement of neck extension ROM (p=0.000) following the scapulothoracic stabilization exercise. The table also shows the improvement in both neck right side flexion and neck left side flexion (P=0.000) following the implementation of the scapulothoracic stabilization exercise. Furthermore, this table presents the improvement of neck right side rotation ROM (p=0.000) after the scapulothoracic stabilization exercise. The table also demonstrates the improvement of neck left side rotation ROM (p=0.000) following the scapulothoracic stabilization exercise.

4.6. Analysis of Range of Motions (ROM)

Table-4.6: Independent t-test between group analysis of Range of Motion (ROM)

Group	ROM	df	t-value	p-value
Between groups	Neck flexion	**38**	3.394	0.002*
	Neck extension	**38**	3.829	0.000*
	Neck side flexion right side	**38**	3.625	0.001*
	Neck side flexion left side	**38**	5.708	0.000*
	Neck rotation right side	**38**	1.132	0.265
	Neck rotation left side	**38**	0.427	0.671

***, significant value**

Table-4.6: Independent t-test between group analysis of Range of Motion (ROM)

The following table presents the outcomes of the between group analysis comparing the range of motion(ROM) of neck. The table explores the outcomes of independent sample t-test. This test results indicate a statistically significant difference between the groups in neck flexion range of motion (ROM) (p=0.002). Furthermore, between the groups there were statistically significant differences (p=0.000) after the intervention sessions. This table also presents the outcomes of neck right side flexion ROM between the group and there was statistically significant difference between the group (P=0.001). This table results also demonstrate the outcomes of neck left side flexion ROM between the groups and that was statistically significant (P=0.000). The table indicates no statistically significant difference between the groups in neck right side rotation ROM with p=0.265. Furthermore, the table presents the outcomes of the neck left side rotation range of motion (ROM) and there was statistically no significant difference between both groups. Both the groups improve the neck right side rotation and left side rotation range of motion but there is no significant difference between the groups.

4.7: Analysis of Neck Disability Index (NDI)

Table-4.7: Paired sample t-test within group analysis of Neck Disability Index (NDI)

Group	Action	Pre mean(SD)	Post mean(SD)	t-value	p-value
Experiment group	Neck Disability Index	45.56(±6.26)	34.111(±7.26)	10.550	0.000*
Control group	Neck Disability Index	42.34(±7.26)	33.722(±5.54)	7.131	0.000*

***, significant value**

Table-4.7. Paired sample t-test within group analysis of Neck Disability Index (NDI)

The table displays the within-group functional disability level as assessed by NDI scale. The table explores the outcomes of the paired sample t-test. Here the NDI score is measured in percentages. In the experimental group, the mean NDI score decreased significantly from 45.56±6.26% before the treatment to 34.111±7.26% after the treatment. The test results indicate that the change was statistically significant (t=10.550, p=0.000), that indicate that there was significant improvement in neck disability score related to neck pain after the scapulothoracic stabilization exercise with conventional physiotherapy. The data also indicate that the control group also showed a statistically significant reduction in the NDI score. It was reduced from 42.34±7.26% pre-treatment to 33.722±5.54% post-treatment (t=7.131, p=0.000).

4.8: Analysis of Neck Disability Index (NDI)

Table-4.8: Independent t-test between group analysis of Neck Disability Index(NDI)

Variable	Group	Action	Mean(SD)	t-value	p-value
Between group analysis	Experimental group	Neck Disability Index	11.44(±4.851)	2.035	0.049*
	Control group	Neck Disability Index	8.22(±5.156)		

***, significant value**

Table-4.8. Independent t-test between group analysis of Neck Disability Index (NDI)

The table displays between group functional disability levels as assessed by NDI scale. The table discusses the outcomes of the independent t-test. The test result showed the mean change in NDI score from pre-intervention to post intervention was 11.44±4.851% for experimental group and 8.22±5.156% for control group. The independent t-test also showed a statistically significant difference between the experimental and control group (t=2.035, p=0.049), that specifying the experimental group have shown significant improvement in neck disability score compared to the control group.

Chapter-V Discussion

This study aimed to investigate the effectiveness of scapulothoracic stabilization exercises along with conventional physiotherapy for patients suffering from neck pain. A total of 40 participants were divided equally into experimental and control groups and were assessed using Visual Analogue Scale (VAS) for pain, range of motion (ROM) measurements, and the Neck Disability Index (NDI). The results from both within-group and between-group analyses provide valuable insights into the efficacy of scapulothoracic stabilization in clinical management of neck pain.

Both groups demonstrated statistically significant reductions in pain intensity (VAS), disability (NDI) and improve neck range of motion (ROM), dpost-intervention. In comparative analysis, the experimental group, which underwent scapulothoracic stabilization exercises along with conventional therapy, showed substantial enhancements in range of motion (especially in flexion, extension, and lateral flexion) and in disability levels (NDI); however, no statistically significant difference showed up in pain intensity (VAS).

Researcher had used total 40 participants for two individual group for applying treatment with an age range between 18-65 yeras. One related study included 36 patients with a mean age of 41 years, ranging from 25 to 57 years suffering from persistent neck pain and scapular dyskinesis, grouped into three different treatment groups (Özdemir et al., 2021). Another study include total 102 patients with the age range between 18 to 65 (Celenay, Akbayrak and Kaya, 2016). This randomized controlled trial included 55 participants with chronic neck pain, randomized to three separate therapy groups (Abdel-aziem et al., 2022). Another study involved 30 patients aged between 30 and 50 years divided into two groups for intervention (Abbas et al., 2022).

My study summarized the gender demographics, from 40 participants the majority of accounting for 65% (n=13) male and 35% (n=7) female in experiment group and 60% (n=12) male and 40% (n=8) female in control group. Among the sample the majority portions of both experimental and control group are respectively 80% and 70%. And the maximum number of people were educated up-to secondary level with 30% in the experiment group and 40% in the control group. Furthermore, most of the people of this

research prefer supine lying position as their primary sleeping posture with the 55% in the experiment group and 35% in the control group. This study presented the baseline value of BMI for both experimental and control group that showed that the baseline value was nearly similar and didn't affect the post-test outcome during the intervention period. The experiment group had a mean BMI of 23.26 kg/m^2 while the control group had mean BMI of 23.09 kg/m^2 and that was statistically not significant (p=0.799).

The study showed within-group data revealed a substantial reduction in pain intensity in both experimental and control groups (p=0.000). The experimental group displayed a slightly higher median reduction in pain (4.70 compared to 4.45), although the between groups difference was not statistically significant (p=0.227). This indicates that although scapulothoracic stabilization may aid in reducing pain, its additional benefit compared to conventional therapy alone is insufficient for achieving statistical significance in pain reduction.

This study demonstrated that the range of motion results were significantly better for the experimental group, displaying significant differences between groups in neck flexion (p=0.002), extension (p=0.000), and lateral flexions (right p=0.001, left p=0.000). However, no significant change showed up in the rotational range of motion. The data indicate that scapulothoracic stabilization exercises significantly improve functional mobility of the cervical spine, especially in the sagittal and frontal planes. These motions are heavily dependent on scapular and thoracic mechanics than on transverse plane movements such as rotation.

The most convincing proof of effectiveness has been found in the NDI results. Both groups showed significant improvement (p=0.000), although the experimental group demonstrated a significantly greater enhancement in disability scores than the control group (mean difference = 11.44% vs 8.22%; p=0.049). The NDI includes not just pain and mobility as well as overall functional capability, including the ability to work, read, drive, and participate in recreational activities. The results indicated that scapulothoracic stability could enhance overall functional outcomes by improving postural control and muscle endurance in the scapular and cervical areas, consequently reducing strain on cervical structures.

Patients who received stabilization exercises combined with manual therapy experienced greater improvements in night pain, as measured by the visual analog scale

(VAS). The between-group difference was approximately 1.1 cm on the VAS, favoring the combined treatment group. Rotation ROM improvement was significantly greater in the group receiving manual therapy along with stabilization exercises. Specifically, right rotation increased by about 4.3°, and left rotation by about 5.0° compared to the stabilization-only group, with these differences being statistically significant. The combined treatment group showed a greater reduction in disability, with an average improvement of 2.2 points on the NDI, which exceeds the minimal clinically important difference (MCID) of 7 points. The improvement in the stabilization-only group was 5.4 points, which did not reach the MCID. The between-group difference was statistically significant, favoring the combined therapy (Celenay, Akbayrak and Kaya, 2016).

Both the scapulothoracic stabilization exercise therapy and physical therapy groups experienced a significant reduction in shoulder pain after the intervention period (6 weeks). There was no statistically significant difference between the two groups in pain reduction, indicating that both treatments were equally effective in alleviating pain associated with STS. The study demonstrated significant improvements in neck ROM, particularly in flexion , extension and lateral movement within both groups post-intervention. Notably, the experimental group showed greater enhancement in neck range of motion (ROM) compared to the physical therapy group, with statistical significance ($p=0.024$, $p=0.001$). This suggests that scapular stabilization exercises can more effectively improve shoulder mobility. And they didn't calculate the NDI score for measuring the disability. They estimated that improving the posture mean improving functional ability (Moezy et al., 2014).

The present findings are consistent with several previous studies that support the role of scapular stabilization in reducing pain intensity (VAS). A study conducted by Abbas et al., (2022) involving chronic neck pain patients also reported significant improvements in pain within the group receiving scapulothoracic stabilization exercises, compared to their baseline measurements. This study demonstrated that scapulothoracic stabilization in addition to conventional physiotherapy significantly improved in cervical range of motion after treatment. Furthermore, this study showed that the control group with conventional physiotherapy and the experiment group with scapulothoracic stabilization exercise in addition to conventional therapy both group experienced significant reduction in disability measured by NDI scale.

The study conducted by IM et al. (2015) reports that after the 4-week scapular stabilization exercise program, participants experienced significant improvements in pain levels, range of motion (ROM), and NDI scores. Pain (VAS score) significantly decreased from 6.3 ± 1.7 pre-test to 3.1 ± 1.1 post-test in the experimental group, indicating reduced neck pain. Range of Motion of rotational movement increased from 38.8° ± 2.5 to 49.3° ± 4.9, reflecting an improved head posture. The neck disability index (NDI) score decreased from 14.4 ± 8.1 pre-test to 7.9 ± 3.1 post-test, signifying reduced activity limitations related to neck pain.

The study reports that the addition of stabilization exercises to the standard McKenzie protocol led to a significant reduction in neck pain intensity, with a mean difference of -1.2 points on a 0–10 scale at 6 weeks, indicating clinically meaningful pain relief. Regarding range of motion (ROM), the combined treatment improved cervical movements more than McKenzie exercises alone, particularly in flexion, extension, and lateral bending, although the extension movement did not show a significant difference. As for neck disability, measured by the Neck Disability Index (NDI), both groups showed improvements, but the combined therapy group experienced a greater reduction in disability scores, highlighting enhanced functional outcomes with the addition of stabilization exercises (Amin, Mohamed and ElMeligie, 2024).

These findings support the addition of scapulothoracic stabilization exercises to conventional physiotherapy, particularly in enhancing neck mobility and functional outcomes. The results demonstrated that earlier research related to the treatment of neck pain through the achievement of scapulothoracic stabilization. Finding of this research showed similarity with some previous research findings and this research also explore findings that was not found in some research previously after providing the scapulothoracic stabilization exercise. The overall result of providing scapulothoracic stabilization exercise in neck pain patients showed greater improvement.

Limitation

The study had noticeable limitations. The study had just 40 individuals while 20 individuals for each group, that limiting the generalization of the findings. An expanded sample size would improve statistical power and make group analysis easier. Researcher explore the outcome of scapulothoracic stabilization exercise after 9 sessions, the intervention period was short to observe long-term effects in symptoms.

Such long-term study would reveal any adverse impacts caused by the treatment to facilitate more informed therapeutic choices. Data was collected only from the clinical setting of CRP Savar, which can limit the external validity of the research. Different setting and population might provide different response. Treatment sessions were occasionally disrupted by public holidays and sometimes the absence of recruited physiotherapists during data collection, which might impact the results. No study has been conducted in this area in Bangladesh. This study discovered a lack of relevant information concerning neck pain patients and specific treatment methods appropriate for Bangladesh.

Chapter-VI Conclusion and Recommendation

The objective of this study was to assess the effectiveness of scapulothoracic stabilization exercise, a therapeutic approach that aims to reduce pain and neck disability and improve the neck range of motion. This study found that experimental groups with scapulothoracic stabilization along with conventional therapy and control groups with conventional therapy only, both groups treatment was effective in reduction neck pain and neck disability and improved neck range of motion. However, there was no significant difference in pain reduction and neck rotation range of motion between the groups, while the experiment group showed greater improvement in neck flexion, extension and lateral flexion range of motion and reducing neck disability than control group. Though there is no statistically significant difference in pain reduction between the groups, the experimental group showed slightly better median improvement, this suggested that scapulothoracic stabilization exercise might show some extra benefits but it was not sufficient enough alone for great reduction in pain. This result also showed that beyond pain and range of motion the addition of scapulothoracic stabilization exercise with conventional therapy might lead to a significant improvement in functional ability. In addition, the findings of this study are consistence to previous studies where there were positive outcomes in pain, ROM and disability after scapulothoracic stabilization exercise. But findings varied among studies, for example, outcomes such as pain scores or unmeasured variables like posture, recommend the need of further investigation. This result showed that adding scapulothoracic stabilization exercises with conventional therapy can make neck treatment more effective. This treatment approach may help the patients to return to their daily activities faster and with less discomfort in the neck. Though the results are promising, this study has some limitations. However, the sample size was small, limiting generalizability of the findings. In addition, the intervention was of short duration, and the long term outcomes were not assessed. In addition, demographic factors BMI and education level were captured but the impact of psychosocial factors was not considered. There were limitations in this research which must be addressed in future work. This research found that scapulothoracic stabilization exercises along with conventional physiotherapy improved movement and reduced disability in patients experiencing neck pain. Consequently, physiotherapists are recommended to incorporate these exercises into the common treatment program for patients with bad

posture, weak shoulder muscles, and stiffness in the area of the upper back and neck. Also taught the patients good posture as a part of a pain management, and how it can affect neck pain. Further research should involve larger sample sizes, blinding of both participants and physiotherapist, multi-center trials, and longer follow-up periods to determine the sustainability of the observed improvements. Psychological and other dimensions of neck pain should also be studied and scapulothoracic stabilization exercises seen in the effects on these areas. Furthermore, these exercises could be combined with other evidence–based interventions, including ergonomic modifications, to improve outcomes.

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Appendix

Appendix-1: IRB Application letter

Date: 29 September,2024

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 B.Sc. in Physiotherapy at Bangladesh Health Professions Institute (BHPI). I would like to conduct a dissertation titled, **"Effectiveness of scapulothoracic stabilization exercise along with conventional physiotherapy among patients with neck pain"** with myself, as the principal author and Professor Dr. Md. Sohrab Hossain, PhD, Executive director, CRP, Savar as my thesis supervisor. The purpose of the study is to evaluate the effectiveness of scapulothoracic stabilization exercise among patients with neck pain.

Visual Analog Scale(VAS), Goniometer, Neck Disability Index(NDI) Questionnaire will be used in the study that will take about 20 to 30 minutes for measurement of the pain intensity, range of motion and neck disability of patients with neck pain. Other related information will be collected from self-structured questionnaire. Data collectors will receive informed consents from all participants. Any data collected will be kept confidential.

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

Sincerely yours,

Tushar Mostafiz.
.....

Md.Tushar Mostafiz
4th Professional year B. Sc in Physiotherapy
Roll:12 Session:2019-2020, Student ID:112190497
BHPI, CRP/CRP, Savar, Dhaka-1343, Bangladesh

Recommendation from the thesis supervisor:

.....

Professor Dr. Md. Sohrab Hossain, PhD
Executive Director
CRP, Savar, Dhaka-1343, Bangladesh.

Appendix-2: IRB approval letter

বাংলাদেশ হেলথ্ প্রফেশন্স ইনস্টিটিউট (বিএইচপিআই)
Bangladesh Health Professions Institute (BHPI)
(The Academic Institute of CRP)

Ref: CRP-BHPI/IRB/12/2024/1019 Date: 15/12/2024

To
Md.Tushar Mostafiz
4th Professional Year B. Sc. in Physiotherapy
Session: 2019-2020, Student ID: 112190497
BHPI, CRP, Savar, Dhaka-1343,Bangladesh.

Subject: Approval of the thesis proposal "Effectiveness of scapulothoracic stabilization exercise along with conventional physiotherapy among patients with neck pain" by ethics committee.

Dear Md.Tushar Mostafiz,
Congratulations.
The Institutional Review Board (IRB) of BHPI has reviewed and discussed your application to conduct the above-mentioned dissertation, with yourself, as the principal author and Professor Dr. Md. Sohrab Hossain, Executive Director, CRP, Savar as thesis supervisor. The Following documents have been reviewed and approved:

Sl. No.	Name of the Documents
1	Dissertation/thesis/research Proposal
2	Questionnaire (English)
3	Information sheet & consent form.

The purpose of the study is to evaluate the effectiveness of scapulothoracic stabilization exercise among patients with neck pain. The study involves use of a **VAS, Goniometer, NDI Questionnaire** to identify the effectiveness of scapulothoracic stabilization exercise among patients with neck pain that may take 20 to 30 minutes to answer the questionnaire and there is no likelihood of any harm to the participants. The members of the Ethics committee have approved the study to be conducted in the presented form at the meeting held at **9 AM on 15 July, 2024 at BHPI (44th IRB Meeting).**

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

Best regards,

Muhammad Millat Hossain,
Associate professor & Course Coordinator, MRS
Member Secretary, Institutional Review Board (IRB)
BHPI, CRP, Savar, Dhaka-1343, Bangladesh.

সিআরপি-চাপাইন, সাভার, ঢাকা-১৩৪৩, বাংলাদেশ। ফোন: +৮৮ ০২ ২২৪৪৪৫৪৬৪-৫, +৮৮ ০২ ২২৪৪৪১৪০৪, মোবাইল: +৮৮ ০১৭৩০ ০৫৯৬৪৭
CRP-Chapain, Savar, Dhaka-1343, Bangladesh. Tel: +88 02 224445464-5, +88 02 224441404, Mobile: +88 01730059647
E-mail : principal-bhpi@crp-bangladesh.org, Web: bhpi.edu.bd

Appendix-3: Data collection permission letter

Permission Letter

Date: 31/12/2024

Head

Department of Physiotherapy

Centre for the Rehabilitation of the Paralyzed (CRP)

Chapain, Savar, Dhaka-1343

Through: Head, Department of Physiotherapy, BHPI.

Subject: Prayer for seeking permission to collect data for conducting research project.

Sir,

With due respect and humble submission to state that I am Md.Tushar Mostafiz, a student of 4th year B.Sc. in physiotherapy at Bangladesh Health Professions Institute (BHPI). The Ethical committee has approved my research project entitled: **"Effectiveness of scapulo-thoracic stabilization exercise along with conventional physiotherapy among patients with neck pain"** under the supervision of Professor Dr. Md. Sohrab Hossain, PhD, Executive director, CRP. I want to collect data for my research project from the Department of Physiotherapy at CRP. So, I need permission for data collection from the Musculoskeletal Unit of Physiotherapy Department at CRP-Savar, Dhaka-1343. I would like to assure that anything of the study will not be harmful for the participants and the Department itself.

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

Dept of Physiotherapy may please support my student to collect data.

Yours faithfully,

Md.Tushar Mostafiz

4th Year B.Sc. in Physiotherapy

Class Roll: 12; Session: 2019-20

Bangladesh Health Professions Institute (BHPI)

(An academic Institution of CRP)

CRP-Chapain, Savar, Dhaka-1343.

Forwarded
31/12/2024

Dr. Shazal Kumar Das, PhD
Assistant Professor and Head
Department of Physiotherapy
BHPI, CRP, Savar, Dhaka-1343.

Approved
21/1/25

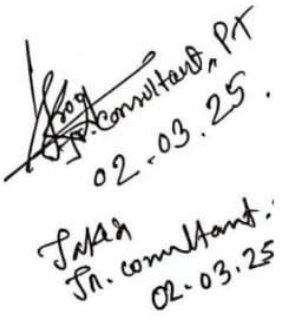
Prof. Dr. Mohammad Anwar Hossain, PhD
Professor Physiotherapy Department BHPI
Senior Consultant & Head
Physiotherapy Department
CRP, Savar, Dhaka-1343

Appendix-4 : Conventional physiotherapy treatment

Title: Effectiveness of scapulothoracic stabilization exercise along with conventional physiotherapy among patients with neck pain.

Conventional Physiotherapy treatment for neck pain patients:

- **McKenzie Principle:**
  - Extension Principle:
    - Retraction exercise
    - Retraction with extension
    - Retraction extension with rotation
    - Traction retraction extension with rotation
    - Extension mobilization.
    - Sustain extension with pillow support
  - Lateral Principle:
    - Lateral flexion
    - Rotation
- Stretching exercise
- Soft tissue release
- Isometric exercise
- Strengthening exercise
- **Mulligan approach:**
  - NAGS
  - SNAGS
- Maintain proper positioning and home advice.



Appendix-5: Information and consent form (English)

Consent form

Assalamualaikum,

I am **Md.Tushar Mostafiz**, student of 4th professional B.Sc. in physiotherapy at Bangladesh Health Professions Institute (BHPI). I am conducting this study for my Bachelor research project entitled "**Effectiveness of scapulothoracic stabilization exercise along with conventional physiotherapy among patients with neck pain**". I would like to ask you some personal and other neck pain related questions. This will take approximately 20 minutes.

I would like to inform you that this is purely academic study and will not be used for any other purpose. All information provided by you will be kept confidential and in the event of any report or publication it will be ensured that the source of information remains anonymous. Your participation in this study is voluntary and you may withdraw yourself at any time during this study without any negative consequences. You also have the right not to answer a particular question that you don't like or do not want to answer during an interview.

If you have any queries ssabout the study, you may contact the researcher Md.Tushar Mostafiz and/or supervisor Professor Dr. Md. Sohrab Hossain, PhD, Executive Director, CRP, Savar, Dhaka-1343.

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

Signature of the participant & Date_____

Signature of the researcher & Date_____

Appendix-6: Information and consent form (Bangla)

সম্মতি-পত্র

আসসালামুয়ালাইকুম,

আমি মোঃ তুষার মোস্তাফিজ, বাংলাদেশ হেলথ প্রফেশনস ইনস্টিটিউটে (বিএইচপিআই) এর ৪র্থ বর্ষের বি.এস.সি ইন ফিজিওথেরাপি এর ছাত্র। আমি আমার ব্যাচেলর ডিগ্রি এর জন্য গবেষণা করছি যার শিরোনাম "ঘাড়ের ব্যথা রোগীদের মধ্যে প্রচলিত ফিজিওথেরাপির সাথে স্ক্যাপুলো-থোরাসিক স্টেবিলাইজেশন ব্যায়ামের কার্যকারিতা"। আমি আপনাকে কিছু ব্যক্তিগত এবং ঘাড়ের ব্যথা সম্পর্কিত প্রশ্ন জিজ্ঞাসা করতে চাই। এটি প্রায় ২০ মিনিট সময় নেবে।

আমি আপনাকে জানাতে চাই যে এটি সম্পূর্ণরূপে একাডেমিক অধ্যয়ন এবং অন্য কোন উদ্দেশ্যে ব্যবহার করা হবে না। আপনার দ্বারা প্রদত্ত সমস্ত তথ্য গোপন রাখা হবে এবং কোনো প্রতিবেদন বা প্রকাশের ক্ষেত্রে এটি নিশ্চিত করা হবে যে অংশগ্রহণকারীর পরিচয় গোপন থাকবে। এই অধ্যয়নে আপনার অংশগ্রহণ স্বেচ্ছায় এবং আপনি এই অধ্যয়ন চলাকালীন যেকোনো সময় কোনো নেতিবাচক পরিণতি ছাড়াই নিজেকে প্রত্যাহার করতে পারেন। একটি সাক্ষাত্কারের সময় আপনি পছন্দ করেন না বা উত্তর দিতে চান না এমন একটি নির্দিষ্ট প্রশ্নের উত্তর না দেওয়ার অধিকারও আপনার রয়েছে।

অধ্যয়ন সম্পর্কে আপনার কোন প্রশ্ন থাকলে, আপনি গবেষক মোঃ তুষার মোস্তাফিজ এবং/অথবা আমার সুপারভাইজার অধ্যাপক ডঃ মোঃ সোহরাব হোসেন, পিএইচডি, নির্বাহী পরিচালক, সিআরপি, সাভার, ঢাকা-১৩৪৩-এর সাথে যোগাযোগ করতে পারেন।

তাহলে, ইন্টারভিউ নিয়ে এগিয়ে যেতে আমি কি আপনার সম্মতি পেতে পারি?হ্যাঁ___, না___

অংশগ্রহণকারীর স্বাক্ষর এবং তারিখ_____

গবেষকের স্বাক্ষর এবং তারিখ_____

Appendix- 7: Questionnaire (English)

Personal information

Patients name:	
Patients ID:	
Address:	
Phone No.:	
Name of Interviewer:	
Interview Date:	

Answer every question by marking the tick (✓) mark. If there is any confusion between more than one answer, please give the best answer that you think.

Part-1: Socio Demonological Information

Serial no	Question	Response
1.1	Age	_____ years
1.2	Gender	○ Male ○ Female
1.3	Height	_____ meter
1.4	Weight	_____ kg
1.3	Marital status	○ Unmarried ○ Married ○ Divorced ○ Widowed
1.4	Educational status	○ Illiterate ○ Primary level ○ SSC ○ HSC ○ Graduation ○ Post graduation
1.5	Living area	○ Urban ○ Semi-urban ○ Rural

1.6	Occupation	○ Housewife ○ Farmer ○ Garments workers ○ Driver ○ Day Laborer ○ Service Holder ○ Businessman ○ Retired ○ Student ○ Others

Part-2: Medical information

Serial no	Question	Response
2.1	Co-morbidities	○ Diabetes mellitus ○ Hypertension ○ Heart disease ○ Asthma ○ Others.....
2.2	How many pillows do you use at the time of sleeping?	_____
2.3	In which posture do you prefer to sleep?	○ Supine lying ○ Prone lying ○ Side lying- right ○ Side lying- left

Part-3: Pain related information

Serial no	Question	Response
3.1	Cause of neck pain	○ Arthritis ○ Disc degeneration ○ Narrowing of spinal canal ○ Inflammation of muscle ○ Injury ○ Postural ○ No apparent reason

3.2	Which of your body area exhibit dominate pain?	○ Neck pain ○ Neck pain radiate to right shoulder ○ Neck pain radiate to left shoulder
3.3	At when your pain gets more worse?	○ At morning ○ As the day progress ○ At evening ○ At night

Pre-test data:

Part-4:Assessment of pain intensity by Visual Analog Scale:

Serial no	Question
4.1	0 10 _____

Part-5:Messurment of range of motion by Goniometer:

Serial no	Question	Response
5.1	Available range of motion at cervical spine (in degree):	○ Flexion_____ ○ Extension_____ ○ Side flexion (Right)_____ ○ Side flexion (Left)_____ ○ Rotation (Right)_____ ○ Rotation (Left)_____

Part-6:Neck Disability Index related information

(This questionnaire has been designed to give us information as to how your neck pain has affected your ability to manage in everyday life). Each section of Neck Disability Index (NDI) consists of lowest 0 point and highest 5 points. Total Score= 50 (Obtained Score……)

Serial no	Question	Response
6.1	Pain Intensity	○ I have no pain at the moment ○ The pain is very mild at the moment ○ The pain is moderate at the moment ○ The pain is fairly severe at the moment ○ The pain is very severe at the moment ○ The pain is the worst imaginable at the moment
6.2	Personal Care (Washing, Dressing, etc.)	○ I can look after myself normally without causing extra pain ○ I can look after myself normally but it causes extra pain ○ It is painful to look after myself and I am slow and careful ○ I need some help but can manage most of my personal care ○ I need help every day in most aspects of self-care ○ I do not get dressed, I wash with difficulty and stay in bed
6.3	Lifting	○ I can lift heavy weights without extra pain ○ I can lift heavy weights but it gives extra pain ○ Pain prevents me lifting heavy weights off the floor, but I can manage if they are conveniently placed. ○ Pain prevents me from lifting heavy weights but I can manage light to medium weights if they are conveniently positioned ○ I can only lift very light weights

		○ I cannot lift or carry anything
6.4	Reading	○ I can read as much as I want to with no pain in my neck ○ I can read as much as I want to with slight pain in my neck ○ I can read as much as I want with moderate pain in my neck ○ I can't read as much as I want because of moderate pain in my neck ○ I can hardly read at all because of severe pain in my neck ○ I cannot read at all
6.5	Headaches	○ I have no headaches at all ○ I have slight headaches, which come infrequently ○ I have moderate headaches, which come infrequently ○ I have moderate headaches, which come frequently ○ I have severe headaches, which come frequently ○ I have headaches almost all the time
6.6	Concentration	○ I can concentrate fully when I want to with no difficulty ○ I can concentrate fully when I want to with slight difficulty ○ I have a fair degree of difficulty in concentrating when I want to ○ I have a lot of difficulty in concentrating when I want to ○ I have a great deal of difficulty in concentrating when I want to ○ I cannot concentrate at all

6.7	Work	○ I can do as much work as I want to ○ I can only do my usual work, but no more ○ I can do most of my usual work, but no more ○ I cannot do my usual work ○ I can hardly do any work at all ○ I can't do any work at all
6.8	Driving	○ I can drive my car without any neck pain ○ I can drive my car as long as I want with slight pain in my neck ○ I can drive my car as long as I want with moderate pain in my neck ○ I can't drive my car as long as I want because of moderate pain in my neck ○ I can hardly drive at all because of severe pain in my neck ○ I can't drive my car at all
6.9	Sleeping	○ I have no trouble sleeping ○ My sleep is slightly disturbed (less than 1 hr sleepless) ○ My sleep is mildly disturbed (1-2 hrs sleepless) ○ My sleep is moderately disturbed (2-3 hrs sleepless) ○ My sleep is greatly disturbed (3-5 hrs sleepless) ○ My sleep is completely disturbed (5-7 hrs sleepless)

6.10	Recreation	○ I am able to engage in all my recreation activities with no neck pain at all ○ I am able to engage in all my recreation activities, with some pain in my neck ○ I am able to engage in most, but not all of my usual recreation activities because of pain in my neck ○ I am able to engage in a few of my usual recreation activities because of pain in my neck ○ I can hardly do any recreation activities because of pain in my neck ○ I can't do any recreation activities at all

Post-test data:

Part-1:Assessment of pain intensity by Visual Analog Scale:

Serial no	Question
1.1	0 10 _____

Part-2:Messurment of range of motion by Goniometer

Serial no	Question	Response
2.1	Available range of motion at cervical spine (in degree):	○ Flexion_____ ○ Extension_____ ○ Side flexion (Right)_____ ○ Side flexion (Left)_____ ○ Rotation (Right)_____ ○ Rotation (Left)_____

Part-3:Neck Disability Index related information

(This questionnaire has been designed to give us information as to how your neck pain has affected your ability to manage in everyday life). Each section of Neck Disability Index (NDI) consists of lowest 0 point and highest 5 points. Total Score= 50 (Obtained Score……)

Serial no	Question	Response
3.1	Pain Intensity	○ I have no pain at the moment ○ The pain is very mild at the moment ○ The pain is moderate at the moment ○ The pain is fairly severe at the moment ○ The pain is very severe at the moment ○ The pain is the worst imaginable at the moment

3.2	Personal Care (Washing, Dressing, etc.)	○ I can look after myself normally without causing extra pain ○ I can look after myself normally but it causes extra pain ○ It is painful to look after myself and I am slow and careful ○ I need some help but can manage most of my personal care ○ I need help every day in most aspects of self-care ○ I do not get dressed, I wash with difficulty and stay in bed
3.3	Lifting	○ I can lift heavy weights without extra pain ○ I can lift heavy weights but it gives extra pain ○ Pain prevents me lifting heavy weights off the floor, but I can manage if they are conveniently placed. ○ Pain prevents me from lifting heavy weights but I can manage light to medium weights if they are conveniently positioned ○ I can only lift very light weights ○ I cannot lift or carry anything
3.4	Reading	○ I can read as much as I want to with no pain in my neck ○ I can read as much as I want to with slight pain in my neck ○ I can read as much as I want with moderate pain in my neck ○ I can't read as much as I want because of moderate pain in my neck

		○ I can hardly read at all because of severe pain in my neck ○ I cannot read at all
3.5	Headaches	○ I have no headaches at all ○ I have slight headaches, which come infrequently ○ I have moderate headaches, which come infrequently ○ I have moderate headaches, which come frequently ○ I have severe headaches, which come frequently ○ I have headaches almost all the time
3.6	Concentration	○ I can concentrate fully when I want to with no difficulty ○ I can concentrate fully when I want to with slight difficulty ○ I have a fair degree of difficulty in concentrating when I want to ○ I have a lot of difficulty in concentrating when I want to ○ I have a great deal of difficulty in concentrating when I want to ○ I cannot concentrate at all
3.7	Work	○ I can do as much work as I want to ○ I can only do my usual work, but no more ○ I can do most of my usual work, but no more ○ I cannot do my usual work ○ I can hardly do any work at all ○ I can’t do any work at all

3.8	Driving	○ I can drive my car without any neck pain ○ I can drive my car as long as I want with slight pain in my neck ○ I can drive my car as long as I want with moderate pain in my neck ○ I can't drive my car as long as I want because of moderate pain in my neck ○ I can hardly drive at all because of severe pain in my neck ○ I can't drive my car at all
3.9	Sleeping	○ I have no trouble sleeping ○ My sleep is slightly disturbed (less than 1 hr sleepless) ○ My sleep is mildly disturbed (1-2 hrs sleepless) ○ My sleep is moderately disturbed (2-3 hrs sleepless) ○ My sleep is greatly disturbed (3-5 hrs sleepless) ○ My sleep is completely disturbed (5-7 hrs sleepless)

3.10	Recreation	○ I am able to engage in all my recreation activities with no neck pain at all ○ I am able to engage in all my recreation activities, with some pain in my neck ○ I am able to engage in most, but not all of my usual recreation activities because of pain in my neck ○ I am able to engage in a few of my usual recreation activities because of pain in my neck ○ I can hardly do any recreation activities because of pain in my neck ○ I can't do any recreation activities at all

Appendix-8: Questionnaire (Bangla)

ব্যক্তিগত তথ্য

রোগীর নাম:	
রোগীর আইডি:	
ঠিকানা:	
ফোন নাম্বার:	
সাক্ষাৎকার গ্রহণকারীর নাম:	
সাক্ষাৎকারের তারিখ:	

টিক (✓) চিহ্ন দিয়ে প্রতিটি প্রশ্নের উত্তর দিন। একাধিক উত্তরের মধ্যে কোনো বিভ্রান্তি থাকলে, অনুগ্রহ করে আপনার যেটা সেরা মনে হয় সেই উত্তরটি দিন।

অংশ-১ঃ সামাজিক-জনসংখ্যা সম্পর্কিত তথ্য

ক্রমিক নং	প্রশ্নাবলী	প্রতিক্রিয়া
১.১	বয়স	_____ বছর
১.২	লিঙ্গ	○ পুরুষ ○ মহিলা
১.৩	উচ্চতা	_____ মিটার
১.৪	ওজন	_____ কেজি
১.৩	বৈবাহিক অবস্থা	○ অবিবাহিত ○ বিবাহিত ○ তালাকপ্রাপ্ত ○ বিধবা
১.৪	শিক্ষাগত যোগ্যতা	○ অশিক্ষিত ○ প্রাথমিক ○ মাধ্যমিক ○ উচ্চ মাধ্যমিক ○ স্নাতক ○ স্নাতকোত্তর
১.৫	বসবাসের স্থান	○ শহর ○ মফঃস্বল ○ গ্রাম

১.৬	পেশা	○ গৃহিণী ○ কৃষক ○ গার্মেন্টস কর্মী ○ ড্রাইভার ○ দিন মজুর ○ সার্ভিস হোল্ডার ○ ব্যবসায়ী ○ অবসর প্রাপ্ত ○ শিক্ষার্থী ○ অন্যান্য

অংশ- ২ঃ চিকিৎসা সম্পর্কিত তথ্য

ক্রমিক নং	প্রশ্নাবলী	প্রতিক্রিয়া
২.১	সহ-অসুস্থতা	○ ডায়াবেটিস মেলাইটাস ○ উচ্চ রক্তচাপ ○ হৃদরোগ ○ হাঁপানি ○ অন্যান্য_____
২.২	ঘুমানোর সময় আপনি কয়টি বালিশ ব্যবহার করেন?	_____
২.৩	আপনি কোন ভঙ্গিতে ঘুমাতে পছন্দ করেন?	○ সুপাইন পজিশন ○ প্রবণ অবস্থান ○ ডান পাশ হয়ে ○ বাম পাশ হয়ে

অংশ-৩ঃ ব্যথা সম্পর্কিত তথ্য

ক্রমিক নং	প্রশ্নাবলী	প্রতিক্রিয়া
৩.১	ব্যথার কারণ	○ আর্থ্রাইটিস ○ ডিস্কের অবক্ষয় ○ মেরুদন্ডের ক্যানেল সরু হয়ে যাওয়া ○ মাংসপেশীর প্রদাহ ○ আঘাত ○ অঙ্গবিন্যাস ○ কোন আপাত কারণ নেই

৩.২	আপনার শরীরের কোন অংশে ব্যথা প্রবল?	○ ঘাড় ব্যথা ○ ঘাড়ের ব্যথা ডান কাঁধে ছড়িয়ে পড়ে ○ ঘাড়ের ব্যথা বাম কাঁধে ছড়িয়ে পড়ে
৩.৩	কখন আপনার ব্যথা আরও খারাপ হয়?	○ সকালে ○ দিনের অগ্রগতি সাথে ○ সন্ধ্যায় ○ রাতে

প্রাক-পরীক্ষার তথ্য:

অংশ-৪ঃ ভিজ্যুয়াল অ্যানালগ স্কেল দ্বারা ব্যথার তীব্রতার মূল্যায়ন:

ক্রমিক নং	প্রশ্নাবলী
৪.১	0 10 _____

অংশ-৫ঃ গনিওমিটার দ্বারা রেঞ্জ অফ মোশন পরিমাপ:

ক্রমিক নং	প্রশ্নাবলী	প্রতিক্রিয়া
৫.১	সার্ভিকাল মেরুদণ্ডে রেঞ্জ অফ মোশন (ডিগ্রীতে):	○ ফ্লেক্সন _____ ○ এক্সটেনশন_____ ○ পার্শ্ব ফ্লেক্সন (ডানদিকে)_____ ○ পার্শ্ব ফ্লেক্সন (বাম)_____ ○ ঘূর্ণন(ডান)_____ ○ ঘূর্ণন (বাম)_____

অংশ-৬ঃ ঘাড়ের অক্ষমতা সূচক সম্পর্কিত তথ্য

(আপনার ঘাড়ের ব্যথা দৈনন্দিন জীবনে পরিচালনা করার ক্ষমতাকে কীভাবে প্রভাবিত করেছে সে সম্পর্কে আমাদের তথ্য দেওয়ার জন্য এই প্রশ্নপত্রটি ডিজাইন করা হয়েছে)। নেক ডিসেবিলিটি ইনডেক্স (NDI) এর প্রতিটি বিভাগে সর্বনিম্ন 0 পয়েন্ট এবং সর্বোচ্চ 5 পয়েন্ট থাকে। মোট স্কোর = ৫০ (প্রাপ্ত স্কোর……)

ক্রমিক নং	প্রশ্নাবলী	প্রতিক্রিয়া
৬.১	ব্যথার তীব্রতা	○ এই মুহূর্তে আমার কোন ব্যথা নেই ○ এই মুহূর্তে ব্যথা খুবই হালকা ○ এই মুহূর্তে ব্যথা মাঝারি ○ এই মুহুর্তে ব্যথা মোটামুটি তীব্র ○ এই মুহূর্তে ব্যথা খুব তীব্র ○ ব্যথা এই মুহূর্তে সবচেয়ে খারাপ কল্পনা করা যায়
৬.২	ব্যক্তিগত যত্ন (ধোয়া, ড্রেসিং, ইত্যাদি)	○ আমি অতিরিক্ত ব্যথা না করেই নিজের যত্ন নিতে পারি ○ আমি সাধারণত নিজের যত্ন নিতে পারি কিন্তু এতে অতিরিক্ত ব্যথা হয় ○ নিজেকে দেখাশোনা করা বেদনাদায়ক এবং আমি ধীরগতির এবং সতর্কতা অবলম্বন করি ○ আমার কিছু সাহায্য দরকার কিন্তু আমার ব্যক্তিগত যত্নের বেশিরভাগই পরিচালনা করতে পারি ○ স্ব-যত্নের বেশিরভাগ ক্ষেত্রে আমার প্রতিদিন সাহায্যের প্রয়োজন ○ আমি জামাকাপড় পরতে পারি না , আমি কষ্ট করে ধোওয়ার কাজ করি, বিছানায় থাকি

৬.৩	উত্তোলন	○ আমি অতিরিক্ত ব্যথা ছাড়াই ভারী ওজন তুলতে পারি ○ আমি ভারী ওজন তুলতে পারি কিন্তু এটি অতিরিক্ত ব্যথা দেয় ○ ব্যথা আমাকে মেঝে থেকে ভারী ওজন তুলতে বাধা দেয়, তবে সেগুলি সুবিধাজনকভাবে রাখা হলে আমি পরিচালনা করতে পারি। ○ ব্যথা আমাকে ভারী ওজন তুলতে বাধা দেয় তবে আমি হালকা থেকে মাঝারি ওজন পরিচালনা করতে পারি যদি সেগুলি সুবিধামত অবস্থানে থাকে ○ আমি শুধুমাত্র খুব হালকা ওজন তুলতে পারি ○ আমি কিছু তুলতে বা বহন করতে পারি না
৬.৪	পড়ালেখা	○ আমি আমার ঘাড়ে ব্যথা ছাড়াই যতটা চাই ততটা পড়তে পারি ○ আমার ঘাড়ে সামান্য ব্যথা হলেও আমি যতটা চাই ততটা পড়তে পারি ○ আমি আমার ঘাড়ে মাঝারি ব্যথা নিয়ে যত খুশি পড়তে পারি ○ আমার ঘাড়ে মাঝারি ব্যথার কারণে আমি যতটা চাই ততটা পড়তে পারি না ○ আমার ঘাড়ে প্রচণ্ড ব্যথার কারণে আমি খুব কমই পড়তে পারি ○ আমি মোটেই পড়তে পারি না
৬.৫	মাথাব্যথা	○ আমার কোনো মাথাব্যথা নেই ○ আমার সামান্য মাথাব্যথা আছে, যা প্রায়ই আসে ○ আমার মাঝারি মাথাব্যথা আছে, যা খুব কমই আসে

		○ আমার মাঝারি মাথাব্যথা আছে, যা ঘন ঘন আসে ○ আমার প্রচণ্ড মাথাব্যথা আছে, যা ঘন ঘন আসে ○ আমার প্রায় সব সময় মাথাব্যথা থাকে
৬.৬	মনোযোগ	○ আমি যখন চাই তখন কোনো অসুবিধা ছাড়াই আমি পুরোপুরি মনোনিবেশ করতে পারি ○ আমি সামান্য অসুবিধার সাথে যখন চাই তখন আমি পুরোপুরি মনোনিবেশ করতে পারি ○ যখন আমি চাই তখন মনোযোগ দিতে আমার যথেষ্ট অসুবিধা হয় ○ আমি যখন চাই তখন মনোযোগ দিতে আমার বেশ কিছুটা অসুবিধা হয় ○ আমি যখন চাই তখন মনোযোগ দিতে আমার অনেক বেশি অসুবিধা হয় ○ আমি মোটেই মনোনিবেশ করতে পারি না
৬.৭	কাজ	○ আমি যত কাজ করতে চাই ততটা করতে পারি ○ আমি শুধুমাত্র আমার স্বাভাবিক কাজ করতে পারি, কিন্তু আর কিছু না ○ আমি আমার স্বাভাবিক কাজ বেশিরভাগই করতে পারি, কিন্তু আর না ○ আমি আমার স্বাভাবিক কাজ করতে পারি না ○ আমি খুব কমই কোনো কাজ করতে পারি ○ আমি কোনো কাজই করতে পারি না

৬.৮	ড্রাইভিং	○ আমি ঘাড়ের ব্যথা ছাড়াই আমার গাড়ি চালাতে পারি ○ আমি যতক্ষণ চাই ততক্ষণ আমার ঘাড়ে সামান্য ব্যথা নিয়ে গাড়ি চালাতে পারি ○ আমার ঘাড়ে মাঝারি ব্যথা নিয়ে আমি যতক্ষণ চাই ততক্ষণ আমার গাড়ি চালাতে পারি ○ আমার ঘাড়ে মাঝারি ব্যথার কারণে আমি যতক্ষণ চাই ততক্ষণ আমার গাড়ি চালাতে পারি না ○ আমার ঘাড়ে তীব্র ব্যথার কারণে আমি খুব কমই গাড়ি চালাতে পারি ○ আমি আমার গাড়ি মোটেও চালাতে পারি না
৬.৯	ঘুমানো	○ আমার ঘুমাতে সমস্যা হয় না ○ আমার ঘুম কিছুটা ব্যাহত হয়েছে (১ ঘণ্টার কম ঘুমহীন) ○ আমার ঘুম হালকাভাবে ব্যাহত হয় (১-২ ঘন্টা ঘুমহীন) ○ আমার ঘুম মাঝারিভাবে ব্যাহত (২-৩ ঘন্টা ঘুমহীন) ○ আমার ঘুম খুব ব্যাহত হয় (৩-৫ ঘন্টা ঘুমহীন) ○ আমার ঘুম সম্পূর্ণভাবে ব্যাহত (৫-৭ ঘন্টা ঘুমহীন)

৬.১০	বিনোদন	○ আমি ঘাড় ব্যথা ছাড়াই আমার সমস্ত বিনোদনমূলক ক্রিয়াকলাপে নিযুক্ত থাকতে পারি ○ আমি আমার ঘাড়ে কিছুটা ব্যথা সহ আমার সমস্ত বিনোদনমূলক ক্রিয়াকলাপে নিযুক্ত থাকতে পারি ○ আমি বেশিরভাগ ক্ষেত্রেই নিযুক্ত হতে পারি, কিন্তু আমার ঘাড়ের ব্যথার কারণে আমার স্বাভাবিক বিনোদনমূলক ক্রিয়াকলাপগুলিতে নয় ○ আমার ঘাড়ে ব্যথার কারণে আমি আমার কিছু স্বাভাবিক বিনোদনমূলক কার্যকলাপে নিযুক্ত হতে পারি ○ আমার ঘাড়ে ব্যথার কারণে আমি খুব কমই কোনো বিনোদনমূলক কাজ করতে পারি ○ আমি কোনো বিনোদনমূলক কাজ করতে পারি না

পোস্ট-পরীক্ষার তথ্য:

অংশ- ১ ঃ ভিজ্যুয়াল অ্যানালগ স্কেল দ্বারা ব্যথার তীব্রতার মূল্যায়ন:

ক্রমিক নং	প্রশ্নাবলী
১.১	0 10 _____

অংশ- ২ ঃ গনিওমিটার দ্বারা রেঞ্জ অফ মোশন পরিমাপ:

ক্রমিক নং	প্রশ্নাবলী	প্রতিক্রিয়া
২.১	সার্ভিকাল মেরুদণ্ডে রেঞ্জ অফ মোশন (ডিগ্রীতে):	○ ফ্লেক্সন _____ ○ এক্সটেনশন_____ ○ পার্শ্ব ফ্লেক্সন (ডানদিকে)_____ ○ পার্শ্ব ফ্লেক্সন (বাম)_____ ○ ঘূর্ণন(ডান)_____ ○ ঘূর্ণন (বাম)_____

অংশ- ৩ঃ ঘাড়ের অক্ষমতা সূচক সম্পর্কিত তথ্য

(আপনার ঘাড়ের ব্যথা দৈনন্দিন জীবনে পরিচালনা করার ক্ষমতাকে কীভাবে প্রভাবিত করেছে সে সম্পর্কে আমাদের তথ্য দেওয়ার জন্য এই প্রশ্নপত্রটি ডিজাইন করা হয়েছে)। নেক ডিসেবিলিটি ইনডেক্স (NDI) এর প্রতিটি বিভাগে সর্বনিম্ন 0 পয়েন্ট এবং সর্বোচ্চ 5 পয়েন্ট থাকে। মোট স্কোর = ৫০ (প্রাপ্ত স্কোর……)

ক্রমিক নং	প্রশ্নাবলী	প্রতিক্রিয়া
৩.১	ব্যথার তীব্রতা	○ এই মুহূর্তে আমার কোন ব্যথা নেই ○ এই মুহূর্তে ব্যথা খুবই হালকা ○ এই মুহূর্তে ব্যথা মাঝারি ○ এই মুহুর্তে ব্যথা মোটামুটি তীব্র ○ এই মুহূর্তে ব্যথা খুব তীব্র ○ ব্যথা এই মুহূর্তে সবচেয়ে খারাপ কল্পনা করা যায়

৩.২	ব্যক্তিগত যত্ন (ধোয়া, ড্রেসিং, ইত্যাদি)	○ আমি অতিরিক্ত ব্যথা না করেই নিজের যত্ন নিতে পারি ○ আমি সাধারণত নিজের যত্ন নিতে পারি কিন্তু এতে অতিরিক্ত ব্যথা হয় ○ নিজেকে দেখাশোনা করা বেদনাদায়ক এবং আমি ধীরগতির এবং সতর্কতা অবলম্বন করি ○ আমার কিছু সাহায্য দরকার কিন্তু আমার ব্যক্তিগত যত্নের বেশিরভাগই পরিচালনা করতে পারি ○ স্ব-যত্নের বেশিরভাগ ক্ষেত্রে আমার প্রতিদিন সাহায্যের প্রয়োজন ○ আমি জামাকাপড় পরতে পারি না , আমি কষ্ট করে ধোওয়ার কাজ করি, বিছানায় থাকি
৩.৩	উত্তোলন	○ আমি অতিরিক্ত ব্যথা ছাড়াই ভারী ওজন তুলতে পারি ○ আমি ভারী ওজন তুলতে পারি কিন্তু এটি অতিরিক্ত ব্যথা দেয় ○ ব্যথা আমাকে মেঝে থেকে ভারী ওজন তুলতে বাধা দেয়, তবে সেগুলি সুবিধাজনকভাবে রাখা হলে আমি পরিচালনা করতে পারি। ○ ব্যথা আমাকে ভারী ওজন তুলতে বাধা দেয় তবে আমি হালকা থেকে মাঝারি ওজন পরিচালনা করতে পারি যদি সেগুলি সুবিধামত অবস্থানে থাকে ○ আমি শুধুমাত্র খুব হালকা ওজন তুলতে পারি ○ আমি কিছু তুলতে বা বহন করতে পারি না

৩.৪	পড়ালেখা	○ আমি আমার ঘাড়ে ব্যথা ছাড়াই যতটা চাই ততটা পড়তে পারি ○ আমার ঘাড়ে সামান্য ব্যথা হলেও আমি যতটা চাই ততটা পড়তে পারি ○ আমি আমার ঘাড়ে মাঝারি ব্যথা নিয়ে যত খুশি পড়তে পারি ○ আমার ঘাড়ে মাঝারি ব্যথার কারণে আমি যতটা চাই ততটা পড়তে পারি না ○ আমার ঘাড়ে প্রচণ্ড ব্যথার কারণে আমি খুব কমই পড়তে পারি ○ আমি মোটেই পড়তে পারি না
৩.৫	মাথাব্যথা	○ আমার কোনো মাথাব্যথা নেই ○ আমার সামান্য মাথাব্যথা আছে, যা প্রায়ই আসে ○ আমার মাঝারি মাথাব্যথা আছে, যা খুব কমই আসে ○ আমার মাঝারি মাথাব্যথা আছে, যা ঘন ঘন আসে ○ আমার প্রচণ্ড মাথাব্যথা আছে, যা ঘন ঘন আসে ○ আমার প্রায় সব সময় মাথাব্যথা থাকে
৩.৬	মনোযোগ	○ আমি যখন চাই তখন কোনো অসুবিধা ছাড়াই আমি পুরোপুরি মনোনিবেশ করতে পারি ○ আমি সামান্য অসুবিধার সাথে যখন চাই তখন আমি পুরোপুরি মনোনিবেশ করতে পারি ○ যখন আমি চাই তখন মনোযোগ দিতে আমার যথেষ্ট অসুবিধা হয় ○ আমি যখন চাই তখন মনোযোগ দিতে আমার বেশ কিছুটা অসুবিধা হয়

		○ আমি যখন চাই তখন মনোযোগ দিতে আমার অনেক বেশি অসুবিধা হয় ○ আমি মোটেই মনোনিবেশ করতে পারি না
৩.৭	কাজ	○ আমি যত কাজ করতে চাই ততটা করতে পারি ○ আমি শুধুমাত্র আমার স্বাভাবিক কাজ করতে পারি, কিন্তু আর কিছু না ○ আমি আমার স্বাভাবিক কাজ বেশিরভাগই করতে পারি, কিন্তু আর না ○ আমি আমার স্বাভাবিক কাজ করতে পারি না ○ আমি খুব কমই কোনো কাজ করতে পারি ○ আমি কোনো কাজই করতে পারি না
৩.৮	ড্রাইভিং	○ আমি ঘাড়ের ব্যথা ছাড়াই আমার গাড়ি চালাতে পারি ○ আমি যতক্ষণ চাই ততক্ষণ আমার ঘাড়ে সামান্য ব্যথা নিয়ে গাড়ি চালাতে পারি ○ আমার ঘাড়ে মাঝারি ব্যথা নিয়ে আমি যতক্ষণ চাই ততক্ষণ আমার গাড়ি চালাতে পারি ○ আমার ঘাড়ে মাঝারি ব্যথার কারণে আমি যতক্ষণ চাই ততক্ষণ আমার গাড়ি চালাতে পারি না ○ আমার ঘাড়ে তীব্র ব্যথার কারণে আমি খুব কমই গাড়ি চালাতে পারি ○ আমি আমার গাড়ি মোটেও চালাতে পারি না

৩.৯	ঘুমানো	○ আমার ঘুমাতে সমস্যা হয় না ○ আমার ঘুম কিছুটা ব্যাহত হয়েছে (১ ঘণ্টার কম ঘুমহীন) ○ আমার ঘুম হালকাভাবে ব্যাহত হয় (১-২ ঘন্টা ঘুমহীন) ○ আমার ঘুম মাঝারিভাবে ব্যাহত (২-৩ ঘন্টা ঘুমহীন) ○ আমার ঘুম খুব ব্যাহত হয় (৩-৫ ঘন্টা ঘুমহীন) ○ আমার ঘুম সম্পূর্ণভাবে ব্যাহত (৫-৭ ঘন্টা ঘুমহীন)
৩ .১০	বিনোদন	○ আমি ঘাড় ব্যথা ছাড়াই আমার সমস্ত বিনোদনমূলক ক্রিয়াকলাপে নিযুক্ত থাকতে পারি ○ আমি আমার ঘাড়ে কিছুটা ব্যথা সহ আমার সমস্ত বিনোদনমূলক ক্রিয়াকলাপে নিযুক্ত থাকতে পারি ○ আমি বেশিরভাগ ক্ষেত্রেই নিযুক্ত হতে পারি, কিন্তু আমার ঘাড়ের ব্যথার কারণে আমার স্বাভাবিক বিনোদনমূলক ক্রিয়াকলাপগুলিতে নয় ○ আমার ঘাড়ে ব্যথার কারণে আমি আমার কিছু স্বাভাবিক বিনোদনমূলক কার্যকলাপে নিযুক্ত হতে পারি ○ আমার ঘাড়ে ব্যথার কারণে আমি খুব কমই কোনো বিনোদনমূলক কাজ করতে পারি ○ আমি কোনো বিনোদনমূলক কাজ করতে পারি না