



Faculty of Medicine
University of Dhaka

**Efficacy of Dead bug exercise along with standard physiotherapy
treatment for the conservative management of chronic low back
pain: A randomized control trial**

Submitted by:

Mohammad Borshon Khan

Bachelor of Science in Physiotherapy

DU Roll No: 1510

DU Registration No: 6266

Session: 2019-20



Bangladesh Health Professions Institute (BHPI)

Department of Physiotherapy

CRP, Savar, Dhaka-1343

Bangladesh

August 2025

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Submitted in Partial Fulfillment of the Requirements for the Degree of Bachelor of Science in Physiotherapy.



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We the undersigned certify that we have carefully read and recommended to the Faculty of Medicine, University of Dhaka, for acceptance of this thesis entitled, "Efficacy of dead bug exercise along with standard physiotherapy treatment for the conservative management of chronic low back pain: A randomized control trial". Submitted by **Mohammad Borshon Khan**, for the partial fulfillment of the requirements for the degree of Bachelor of Science in Physiotherapy (B.Sc. in PT).



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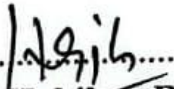
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Declaration

I hereby declare that the research work entitled “**Efficacy of Dead Bug Exercise along with Standard Physiotherapy Treatment for the Conservative Management of Chronic Low Back Pain: A Randomized Clinical Trial**” has been carried out by me as a part of my academic requirements.

This study is original and has not been submitted in any form to any other university or institution for any degree or diploma. All sources of information and data have been duly acknowledged and referenced.

I also declare that ethical approval was obtained and all participants gave informed consent before taking part in the study.

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List of Abbreviations

BHPI	Bangladesh Health Professions Institute
BMI	Body Mass Index
CBT	Cognitive Behavioral Therapy
CLBP	Chronic Low Back Pain
CRP	Center for the Rehabilitation of the Paralyzed
LBP	Low Back Pain
NIOSH	National Institute for Occupational Safety and Health
NSAIDs	Nonsteroidal Anti-Inflammatory Drugs
ODI	Oswestry Disability Index
RCT	Randomized Control Trial
UK	United Kingdom
USA	United States of America
VAS	Visual Analogue Scale
YLD	Years lived with disability

Abstract

Background: Chronic Low Back Pain (CLBP) is a prevalent condition that significantly impacts the quality of life and functional ability of affected individuals.

Objective: This randomized clinical trial aimed to assess the efficacy of incorporating the Dead Bug Exercise alongside standard physiotherapy for the conservative management of CLBP. **Methodology:** The study was conducted at the Centre for the Rehabilitation of the Paralyzed (CRP), Savar, Dhaka and involved patients with non-specific CLBP. A total of 60 participants were randomly assigned to two groups: the Experimental Group, which received the Dead Bug Exercise in addition to standard physiotherapy, and the Control Group, which received standard physiotherapy alone.

Key outcome measures included pain intensity (measured by the Visual Analog Scale (VAS)), disability level (measured by the Oswestry Disability Index (ODI)), and back muscle strength. **Result:** The results showed significant improvements in the Experimental Group, with substantial reductions in VAS and ODI scores, and enhanced back muscle power post-intervention. The Control Group also demonstrated improvements but to a lesser extent. Statistical analyses revealed that the Dead Bug Exercise, when combined with physiotherapy, provided superior outcomes in terms of pain relief, functional improvement, and muscle strength. These findings support the integration of core stabilization exercises into CLBP treatment protocols.

In conclusion, the addition of the Dead Bug Exercise to conventional physiotherapy offers an effective strategy for managing Chronic Low Back Pain and improving patient outcomes. Further studies with larger sample sizes and long-term follow-up are recommended to confirm the sustainability and generalizability of these results.

Key Words: *Dead-Bug Exercise, Chronic Low Back Pain, Oswestry Disability Scale, Back Muscle Strength Measurement Scale.*

1.1 Background

Chronic low back pain (CLBP) is a significant global health issue, with varying prevalence rates across different regions and populations. The prevalence of CLBP is influenced by numerous factors, including demographic, socioeconomic, and lifestyle variables. A systematic review of global studies reported that the prevalence of CLBP varies widely, with estimates ranging from 3.9% to 20.3% in different populations. The prevalence tends to increase with age, particularly from the third decade of life onwards, and is generally higher in women than in men (Meucci et al., 2015).

Another review highlighted that low back pain, including CLBP, is a major issue worldwide, with a point prevalence of approximately 11.9% and a one-month prevalence of 23.2% (Hoy et al., 2012).

In Sub-Saharan Africa, the prevalence of CLBP among the general population ranges from 18.1% to 28.2%, with higher rates observed in specific occupational groups (30.1% to 55.5%) (Kahere et al., 2022). A study in Benin found a CLBP prevalence of 35.5%, with higher rates in rural areas (40.2%) compared to urban areas (30.68%) (Kossi et al., 2022).

In Singapore, the prevalence of CLBP was reported at 8.1% among adults, with significant impacts on physical function, mental health, and quality of life (Ge et al., 2022). In the United States of America (USA), back disorders impact over 600,000 workers yearly and are estimated to cost \$50 billion, according to the National Institute for Occupational Safety and Health (NIOSH). Over the next few decades, as the average lifespan of the working rises and healthcare expenses grow, back injuries and disorders are predicted to become more common and to have a greater economic impact on the workforce (Burton. Et al., 2006).

Years lived with disability (YLDs) attributed to LBP increased during that time, according to a 2020 study that estimated the global burden of LBP between 1990 and 2017. The study found that YLDs were 42.5 million in 1990 and increased to 64.9 million by 52.7% in 2017 (Wu. Et al., 2020). In 2020, 619 million individuals worldwide suffered from low back pain (LBP). It is projected that by 2050, the number

of cases will rise to 843 million, primarily due to ageing and population growth. The biggest number of instances of LBP occur between the ages of 50 and 55, however the prevalence rises with age up to 80 years. LBP affects women more frequently. Approximately 90% of cases of LBP appear as non-specific LBP.

According to a current study, back discomfort made 63.56% of complainers less active at work and 62.9% less active at leisure. In addition, 7.7% of complainers had to change the nature of their jobs. These findings, which are supported by a World Health Organization report, demonstrate a large burden and detrimental impact of back pain among teachers, which may affect work performance. The main contributor to the global burden of musculoskeletal disorders is low back pain, which accounts for 7.4% of all years lived with disability (YLDs) globally (Williams, et al., 2018).

Chronic low back pain is defined as pain localized between the 12th rib and the inferior gluteal fold that persists for more than 12 weeks (Kültür & Özkan, 2024). It is characterized by a variety of pain sensations, including aching, burning, stabbing, or tingling, and can range from mild to severe in intensity (Tulder et al., 2009). The condition is often described as "non-specific," meaning it is not attributable to a specific underlying pathology such as a tumor or infection.

Chronic low back pain (CLBP) is a prevalent condition with multifactorial causes and risk factors that span biological, psychological, and social domains. It is a significant health issue, affecting a substantial portion of the population and leading to disability and economic burden. Understanding the common causes and risk factors associated with CLBP is crucial for prevention and management strategies.

Older age is consistently associated with an increased risk of CLBP. Women are more frequently affected than men, possibly due to differences in body composition and hormonal factors. Obesity is a significant risk factor for CLBP, with higher BMI correlating with increased pain severity and disability. Overweight and obesity contribute to mechanical stress on the spine (Zheng et al., 2025).

There is evidence suggesting a genetic predisposition to CLBP, although specific genetic markers are not well-defined (Lionel, 2013).

Psychological conditions such as depression and anxiety are strongly associated with CLBP. These conditions can exacerbate pain perception and contribute to chronicity. Fear of pain and catastrophic thinking about pain can also lead to avoidance behaviors, which may worsen the condition and hinder recovery (Zheng et al., 2025).

Lower levels of education and socioeconomic status are linked to higher prevalence of CLBP, possibly due to limited access to healthcare and health education (Lionel & Lanka, 2014).

Lack of physical exercise and poor posture are significant risk factors for CLBP. Sedentary lifestyles and prolonged sitting can contribute to the development and persistence of back pain. Also jobs that involve heavy lifting, repetitive movements or prolonged sitting are associated with a higher risk of developing CLBP (Özen, 2021). Smoking has been identified as a risk factor, potentially due to its effects on blood flow and tissue health. Alcohol use is also associated with CLBP, although the relationship is complex and may involve lifestyle factors (Zheng et al., 2025)

A history of back injury or trauma is a predictor of CLBP, as it may lead to structural changes in the spine. Spinal conditions such as intervertebral disc degeneration, spinal stenosis and spondylolisthesis are common causes of CLBP. These conditions can lead to mechanical instability and pain (Park, 2007).

Chronic low back pain (CLBP) significantly impacts individuals' daily lives and overall well-being, affecting physical, mental, and social aspects. It is a prevalent condition that not only causes physical discomfort but also leads to substantial limitations in daily activities, work productivity, and social interactions. The burden of CLBP extends beyond the individual, affecting economic productivity and healthcare systems globally.

Treatment options for CLBP are diverse, ranging from noninvasive therapies to pharmacological interventions. The effectiveness of these treatments varies, with some showing strong evidence of efficacy while others are less supported by research.

Inconsistent exercise has been connected in several studies to low back discomfort. In fact, some study did not conclusively show a link between irregular exercise and low back pain after conducting a logistic regression, which is consistent with the findings of the Zamri and Yue study. (Zamri, 2020 & Yue, 2012)

Exercise therapy, particularly when supervised by a physical therapist, is one of the most effective noninvasive treatments for CLBP. It is often part of a multidisciplinary approach that includes biopsychosocial rehabilitation. Acupuncture has also shown moderate efficacy in reducing pain and improving function in CLBP patients (Wellington, 2014).

Cognitive Behavioral Therapy (CBT) is effective for both short- and long-term improvement in pain and function. It is often used in conjunction with other therapies.

Programs that combine physical therapy, psychological support and education are effective for improving pain and function in the short to intermediate term (Flynn, 2020).

Nonsteroidal Anti-Inflammatory Drugs (NSAIDs) are commonly used as a first-line treatment for CLBP due to their effectiveness in pain relief. However, their use must be balanced against potential adverse effects. Muscle Relaxants and Analgesics can also provide short-term relief but are often used in combination with other therapies to enhance overall treatment efficacy. While opioids like tramadol and oxycodone are effective for pain relief, their use is generally reserved for cases where other treatments have failed due to the risk of dependency and other side effects (Peck et al., 2021).

Some studies also suggest that a combination of physical therapy, ozone and intravenous injections can be effective, though more research is needed to confirm these findings (Eloy et al., 2019). Low-Level Laser Therapy and Ultrasound modalities may offer short-term pain relief but their long-term efficacy is not well established (Flynn, 2020).

The primary contributing element to persistent low back pain is strength and endurance in the lower back region. There are various methods for building up the muscles in the low back. Though there aren't many research that concentrate on lumbar stabilization exercises, strength and endurance have been shown to be beneficial in CLBP sufferers. (Akila, et al., 2024).

Physiotherapy is considered a primary treatment for chronic low back pain (CLBP) due to its multifaceted approach that addresses both physical and psychosocial aspects of the condition. Chronic low back pain is a prevalent issue that significantly impacts individuals' quality of life and contributes to substantial socioeconomic costs. Physiotherapy offers a non-pharmacological, evidence-based treatment option that focuses on improving function, reducing pain, and enhancing patients' ability to participate in daily activities. This approach is supported by various studies and guidelines that emphasize the importance of active treatment strategies over passive ones.

Physiotherapy for CLBP involves a combination of educational, physical, manual, and movement therapy measures. This multidimensional approach is crucial in addressing the complex nature of CLBP, which often involves both physical and psychosocial factors. The treatment aims to improve general physical activity and promote

participation in social and work contexts, which are more important than mere pain relief (Bachmann & Oesch, 2013).

A systematic review highlights the effectiveness of physiotherapy interventions in managing CLBP, particularly when addressing psychosocial risk factors, known as "yellow flags," which predict disability and delayed return to work (Kieran, 2018).

Numerous studies have demonstrated the efficacy of physiotherapy in reducing pain and disability associated with CLBP. For instance, a retrospective study found significant improvements in patients' conditions after 10 sessions of physical therapy (Gashi et al., 2019).

A Bayesian network meta-analysis involving over 12,000 patients confirmed that physiotherapy programs effectively reduce pain and improve function in CLBP patients (Baroncini et al., 2024).

Guidelines from various countries, including Denmark, the USA, and the UK, recommend exercise as a first-line treatment for CLBP, either alone or in combination with other non-pharmacological therapies (Shipton, 2018).

Active treatment strategies, such as exercise and patient education, are associated with decreased disability and improved outcomes. In contrast, passive methods like rest and medication are linked to worsening disability and are not recommended (Luomajoki et al., 2023).

Common physiotherapy modalities include general exercises, spinal mobilization, myofascial release, and education, which are selected based on clinical experience and evidence from literature (Naidoo, 2012).

Physiotherapy encourages a patient-centered approach, emphasizing the restoration of normal movement and function. This approach makes patients active participants in their rehabilitation, which can lead to better adherence and outcomes (Berger, 2007).

Physiotherapy is also a cost-effective treatment option, reducing the need for more expensive interventions and minimizing work absenteeism and social support costs (Naidoo, 2012).

Exercises for trunk stabilization are sometimes performed in conjunction with other techniques, such as bracing or hollowing the abdomen. The former concentrates on the contraction of particular muscles, including the internal oblique and transversus abdominis (TrA). (LM), which pulls the navel toward the lumbar spine, and lumbar multifidus (IO). In contrast, when performing bracing exercises, one must push their

abdomen outward and use all of the core muscles (Iliocostalis lumborum- IL; Rectus abdominis-RA; External oblique-EO) concurrently. (Barnett, et al., 2003)

By strengthening the transverse abdominis in particular, which provides stability to the lower back, preventing excessive strain, and promoting proper spinal alignment, the dead bug exercise can effectively relieve chronic low back pain. In other words, by maintaining a neutral spine position during the exercise, it helps reduce pressure on the lower back.

The Dead Bug exercise is a core-strengthening exercise that primarily targets the abdominal muscles, including the rectus abdominis and external obliques, while promoting lumbopelvic stability. It is performed in a supine position, where the individual mimics the movement of a "dead bug" by alternately extending and retracting the arms and legs while maintaining a stable core. This exercise is particularly beneficial for enhancing core strength, which is crucial for athletic performance and injury prevention. It is effective in improving dynamic balance and agility, as demonstrated in studies involving athletes, and is also used in rehabilitation settings to alleviate lower back pain and improve trunk stability. The Dead Bug exercise activates key core muscles, including the rectus abdominis, external obliques, and erector spinae, which are essential for maintaining stability and transferring forces through the kinetic chain (Soyuer & Koku, 2024).

Electromyographic studies have shown that exercises like the Dead Bug, which involve horizontal positioning, effectively engage the core muscles, although they may not activate as many muscles as vertical exercises like squats (Rogan et al., 2014).

In a study involving adolescent badminton players, the Dead Bug exercise significantly improved dynamic balance and agility, as measured by the Star Excursion Balance Test and the Illinois Agility Test. This highlights its role in enhancing athletic performance by strengthening the core muscles (Kad & Jeswani, 2024).

The exercise's ability to improve lumbopelvic stability is crucial for athletes, as it provides a stable foundation for efficient limb movement and reduces the risk of injury (Mullane et al., 2019).

The Dead Bug exercise is also effective in rehabilitation settings, particularly for individuals with lower back pain. It promotes trunk and pelvic stabilization, which can alleviate pain and improve functional outcomes. A comparative study found that while both the Dead Bug and plank exercises are beneficial, the plank exercise showed a

slightly higher effect in reducing low back pain. However, the Dead Bug remains a valuable exercise for core strengthening and rehabilitation (Paul & Thomas, 2023).

Proper technique is crucial for maximizing the benefits of the Dead Bug exercise. It involves lying on the back with arms extended towards the ceiling and legs bent at a 90-degree angle. The individual then alternates extending one arm and the opposite leg while keeping the core engaged. The exercise can be modified with regressions and progressions to suit different fitness levels, making it accessible for a wide range of individuals (Mullane et al., 2019).

The Dead Bug exercise improves general body stability by emphasizing controlled movements and keeping perfect form. In order to reduce falls and injuries, this enhanced stability can help with balance and coordination. By using the core muscles, patient can lessen the tension on the spine and support the lower back. By strengthening the muscles supporting the lower back on a regular basis, the Dead Bug exercise may help lessen chronic discomfort. By assisting in maintaining a neutral spine position, a strong core helps to maintain better posture. Better posture can ease soreness and relieve pressure on the lower back. There are no high-impact motions in the Dead Bug workout, so it is easy on the joints. Because of this, it's appropriate for people of different fitness levels and those healing from ailments.

1.2 Rationale

Chronic low back pain (CLBP) is a prevalent and disabling musculoskeletal condition that significantly impairs quality of life, functional independence, and work productivity. In Bangladesh, the incidence of CLBP is rising across both urban and rural populations due to sedentary lifestyles, poor ergonomics, and physically demanding occupations. The Centre for the Rehabilitation of the Paralyzed (CRP), Savar, plays a leading role in addressing CLBP through physiotherapy-based interventions.

Conventional treatments at CRP include manual therapy, electrotherapy, postural education, and general exercises. However, these methods often address symptoms without fully resolving the neuromuscular deficits that contribute to chronic pain and functional limitations. Recent attention has shifted toward core stabilization exercises, which target deep stabilizing muscles such as the transversus abdominis and multifidus to enhance spinal control and reduce pain recurrence.

Among these, the Dead Bug exercise has emerged as a safe, adaptable motor control technique that promotes spinal stability during dynamic limb movement. Unlike traditional strengthening exercises, it emphasizes neuromuscular coordination, making it particularly effective in reducing strain on the lumbar spine during rehabilitation.

Although core stabilization exercises are gaining popularity, there has been limited clinical evidence in the Bangladeshi context, particularly at CRP, to support the integration of Dead Bug exercise into standard physiotherapy protocols. This research addresses that gap.

Through a randomized clinical trial conducted at CRP, the study has demonstrated that incorporating the Dead Bug exercise alongside standard physiotherapy significantly improves pain levels, functional ability, and overall treatment outcomes in patients with CLBP. These findings validate the effectiveness of this intervention and support its inclusion in routine physiotherapy care at CRP.

This research contributes to evidence-based clinical practice and offers a scalable, cost-effective rehabilitation strategy that aligns with CRP's mission to deliver high-quality, inclusive care for musculoskeletal disorders.

1.3 Hypothesis

Null Hypothesis:

There is no significance difference between experimental and control group.

$$H_0: \mu_1 - \mu_2 = 0 \text{ or,}$$

$$\mu_1 = \mu_2$$

Alternative Hypothesis:

Patients who undergo the Dead-Bug treatment protocol will show a greater improvement.

$$H_a: \mu_1 - \mu_2 \neq 0 \text{ or,}$$

$$\mu_1 \neq \mu_2$$

1.4 Aims of the Research

To find out the evidence based effectiveness of Dead Bug exercise for the treatment of Chronic Low Back Pain.

1.5 Objectives

General Objectives:

- To evaluate the efficacy of Dead Bug Exercise for the patients with low back pain suffering from over 3 months.

Specific Objectives:

- To determine the demographic characteristics of participants with Chronic Low Back Pain.
- To establish the level of socioeconomic status of participants with Low Back Pain.
- To recognize the nature of current pain among the participants with Low Back Pain.
- To find the level of disability of participants before physiotherapy intervention and compare after intervention.
- To explore the relationship between CLBP patients and the level of disability in their activity of daily livings.
- To recommend the accurate physiotherapy treatment protocol for patients with Low Back Pain.

1.6 Operational Definitions

Chronic Low Back Pain (CLBP)

In this study, Chronic Low Back Pain is defined as self-reported pain and discomfort localized below the costal margin and above the inferior gluteal folds, with or without leg pain, persisting for more than 12 weeks. The intensity of pain is measured using the Visual Analog Scale (VAS), and disability level is assessed using the Oswestry Disability Index (ODI).

Dead-Bug Exercise

The Dead Bug Exercise is a core-strengthening exercise performed in a supine position with hips and knees flexed at 90 degrees and arms pointing towards the ceiling. The participant alternately extends the opposite arm and leg while maintaining a neutral spine. In this study, the exercise is used as a trunk stabilization technique, practiced 3–5 days per week for a specified number of repetitions under physiotherapist supervision.

Basic Physiotherapy Management

Basic physiotherapy management refers to a standardized regimen including modalities such as hot pack therapy, core strengthening, lumbar stretching, pelvic tilts, and McKenzie exercises (excluding Dead Bug). These are applied uniformly to both experimental and control groups in this study for the conservative management of CLBP.

Activities of Daily Living (ADLs)

ADLs refer to routine self-care tasks including walking, sitting, standing, bending, bathing, dressing, and household chores. In this study, the ability to perform ADLs is assessed through subjective reporting and reflected indirectly via improvements in the Oswestry Disability Index scores.

Trunk Stabilization Exercise

Trunk stabilization exercises are defined as specific motor control exercises aimed at improving the coordination and strength of the deep abdominal and back muscles to support spinal stability. In this study, Dead Bug Exercise is considered a trunk stabilization exercise.

Studies indicate that Chronic low back pain (CLBP) affects almost 60% to 80% of the global population during their lives according to Hoy et al. (2014). The condition badly affects functional capabilities whereas simultaneously decreasing life quality as well as creating major economic strain because of treatment expenses combined with efficiency losses. CLBP generates disability and psychological stress while causing people to participate less in daily functions so its proper management becomes essential (Maher et al., 2017).

Different types of conservative treatments exist to address CLBP though physiotherapy remains the key component in such therapies. The research community praises exercise therapy as the primary intervention which develops muscle strength and flexibility and neuromuscular control based on Delitto et al., 2012. Core stabilization exercises stand out as preferred exercise interventions since they both strengthen spinal stability and decrease pain symptoms (Panjabi, 1992). Highly recommended among core stability exercises, the Dead Bug prepares the transversus abdominis and multifidus muscles through movement sequences that support spinal control (Hodges et al., 2003).

The purpose of this literature review is to assess whether Dead Bug exercise enhances standard physiotherapy approaches for treating CLBP based on potential clinical advantages. This paper investigates core stabilisation mechanics as well as different exercise modalities' effectiveness before analysing how physiotherapy integration maximises treatment outcomes for patients with CLBP.

The condition of CLBP demonstrates lower back pain which lasts twelve weeks or more (Deyo et al., 2015). The condition combines three different factors which create its foundation and includes biomechanical, neurophysiological and psychosocial elements. Weakness or dysfunction of transversus abdominis and multifidus deep stabilising muscles constitutes a main factor in the development of chronic low back pain (Hodges & Richardson, 1996). The absence of proper activation in core muscles produces spinal instability which raises pressure on lumbar body structures thus causing pain and reduced functionality (Bergmark, 1989).

Treating CLBP through conservative methods includes receiving instruction and undergoing manual therapy treatment along with exercise therapy. Multiple healthcare professionals suggest Core stabilisation exercises combined with motor control training

and general strengthening exercises for treatment of CLBP patients (Shnayderman & Katz-Leurer, 2013). The pain reduction and movement efficiency goals of CLBP patients receive attention through treatments like soft tissue mobilization and joint manipulation and functional training therapy (Ferreira et al., 2007). Research demonstrates the capability of physiotherapy to decrease CLBP pain while enhancing patient function but the optimal exercise routines remain subject to further discussion. The Dead Bug exercise serves as a core stability movement which activates deep abdominal muscles during spine-neutral positions. The exercise requires alternating motions of arms and legs during supine position that activates core muscle function (McGill, 2007). Functional rehabilitation requires coordinated limb movements for which this exercise trains the body to keep the lumbar region stabilised.

Practise of the exercise helps control neuromuscular activity and enhances coordination together with strengthening the back stabilising muscles of the lumbar spine (Vera-Garcia et al., 2007). The Dead Bug exercise promotes segmental stabilisation through muscle function of transversus abdominis and multifidus without any excessive strain on spinal structures according to Akuthota et al. (2008) and unlike traditional exercises like sit-ups or crunches. During reciprocal limb motion patterns that resemble daily tasks it becomes possible to enhance dynamic stability and motor control.

The Dead Bug activates deep core muscles by maintaining isometric contractions that enhance both intra-abdominal pressure and spinal stiffness according to Hodges et al (2003). The exercise enhances spinal integrity through stability mechanisms that minimise improper spinal motion and decrease the strain on lumbar discs and facet joints which lengthen chronic low back pain (CLBP). The exercise provides better proprioceptive signals that assist patients with CLBP in regaining control of their movements while minimizing dysfunctions caused by pain (Vera-Garcia et al., 2007). There are many benefits of Dead bug exercises that makes it more relevant to the cure of chronic low back pain. These includes the improvement of core stability by activating deep stabilizing muscles, promoting better posture and spinal support, which are critical for lumbar health (Hodges et al., 2003); then it also enhances Neuromuscular Control by fostering better coordination between the trunk and limbs, improving dynamic stability and reducing compensatory movements that may exacerbate pain (Vera-Garcia et al., 2007).

This exercise can also be advised as it reduces pain and functional limitations by strengthening the deep core muscles through controlled activation that helps in reducing

the recurrence of CLBP and enhances overall mobility (Marshall et al., 2013). Moreover, compared to other physiotherapy interventions, such as heavy resistance training or high-impact exercises, the Dead Bug provides a low-risk alternative that effectively improves spinal stability without excessive load on the lumbar spine (McGill, 2007). Although, the exercise can be modified to suit different patient needs, ranging from beginners to advanced rehabilitation stages, making it a practical tool in conservative CLBP management. The Dead Bug exercise offers superior core rehabilitation because it tackles several aspects of lumbar functionality which traditional core-strengthening methods typically ignore.

Several investigations have evaluated the effectiveness of core stabilisation exercises when treating CLBP. Marshall et al. (2013) performed a systematic review which revealed that core stabilization exercises offer better outcomes than typical exercises when treating pain and disability in CLBP patients. The exercises concentrate on stabilizing deep muscles that benefit spinal alignment and movement patterns whereas general exercises mainly strengthen overall muscles instead of treating motor control deficits.

The study by Wang et al. (2012) revealed that when patients did Dead Bug exercises among other motor control exercises their pain intensity alongside functional capability significantly improved beyond standard physiotherapy treatment. Research demonstrates that the Dead Bug exercise functions better than traditional strength exercises at activating transversus abdominis and multifidus muscles because conventional exercises do not properly target these stabilizing muscles. Core stabilization exercises produce enduring pain relief compared to general exercises because they tackle neuromuscular misalignments which cause repeated low back pain incidents (Hodges et al. 2003).

The Dead Bug exercise along with related core stabilization methods provides functional outcome benefits compared to conventional interventions through its control of dynamic postural functions and enhanced proprioceptive ability. The clinical data demonstrates that core stability exercises deliver better outcomes than passive treatment methods including ultrasound therapy and electrical stimulation since they minimize disability symptoms and optimize functional movement (Ferreira et al., 2007).

When Dead Bug exercise combines with standard physiotherapy treatments, the results for CLBP management become more effective. Studies by Hodges et al. (2003) prove motor control exercises should combine with traditional rehabilitation practises to boost

lumbar stability. A structured physiotherapy program which integrates with the Dead Bug exercise helps rehabilitate CLBP patients by restoring proper movement patterns and neuromuscular control incidents typically found in this patient population.

Standaert et al. (2011) underline the necessity for exercise plans which consider all individual patient disabilities. Standard physiotherapy treatments which include manual therapy combined with postural retraining along with patient education prosper when the Dead Bug exercise is added into these treatments for full rehabilitation benefits. Patient therapy techniques assist in loosening tight muscles and enhancing spinal joint range of motion yet postural training stops future lumbar spine stress.

Clinical practitioners should increase difficulty levels of Dead Bug exercises depending on patient progress to achieve maximum muscle activation without worsening symptoms. Myofascial release along with proprioceptive training as complementary therapies maximize movement efficiency and eliminate the formation of compensatory patterns when used with the Dead Bug exercise. The combination of multiple therapeutic modalities through this approach generates complete patient healing and leads to long-term recovery which improves functional outcomes among CLBP patients.

The Dead Bug exercise serves as an efficient core stabilisation intervention when treating chronic low back pain through conservative therapy. The Dead Bug exercise contributes significant value to physiotherapy programmes because it improves neuromuscular control along with deep lumbar stability and functional mobility strength (Hodges et al., 2003; Marshall et al., 2013). Research shows that Dead Bug provides an acceptable and evolving treatment protocol which allows patients to maximise core activation without raising spinal stress levels (McGill, 2007).

Standard rehabilitation protocols at the Centre for the Rehabilitation of the Paralyzed (CRP) in Savar should incorporate Dead Bug exercise for physiotherapy patients in Bangladesh. CRP functions as a leading institution for musculoskeletal rehabilitation that handles treatment needs of numerous patients affected by CLBP. The Dead Bug exercise application at CRP produces both economical results and research-backed approaches to improve patient healing time and decrease pain return and increase the general well-being for patients.

The Physiotherapists at CRP should perform patient evaluation and individual customization of the Dead Bug exercise according to patient-specific requirements (Standaert et al., 2011). Standard Physiotherapy practise will connect with the Dead

Bug exercise while providing manual therapy and ergonomic training to achieve maximum treatment results (Ferreira et al., 2007). Patients can achieve long-term benefits through exercise adherence by receiving proper education about its benefits and execution method as a home exercise protocol (Wang et al., 2012). The treatment should use progressive phases to increase difficulty properly and minimise symptom intensities across each stage (Vera-Garcia et al., 2007).

The Dead Bug exercise integrated as a primary component in CLBP treatment programmes at CRP helps patients recover better functional abilities and decreases their need for medical medication or surgical interventions. Additional research needs to evaluate this intervention's extended use in the Bangladeshi clinical field along with patient experiences of use and treatment compliance and health results.

3.1 Study design

The study's was focused to determine the efficacy of dead bug exercise in the treatment of chronic low back pain. So, experimental design of quantitative research kind of Randomized Clinical Trail (RCT) was chosen because the experimental study of RCT is the finest technique to find out the success of the study.

A pre-test (before intervention) and post-test (after intervention) will be administered with each subject of both groups to compare the pain effects before and after the treatment. The design could be shown by-

R O X O (Experimental group)

R O O (Control group)

3.2 Study area

Data was collected from the outpatient, Musculoskeletal Physiotherapy unit of Centre for the Rehabilitation of the Paralyzed (CRP), Savar, Dhaka.

3.3 Study population

The study population were the patients with Chronic Low Back Pain associated with lower limb and postural impairment who attended the Outpatient Musculoskeletal Unit of the Physiotherapy Department at CRP, Savar and Mirpur, Dhaka.

3.4 Selection criteria

- **Inclusion Criteria**

- 1 Patients diagnosed with non-specific CLBP persisting for more than 12 weeks, as per clinical guidelines (Deyo et al., 2014).
- 2 **Age Range:** Individuals aged 18 to 60 years, as CLBP is commonly prevalent in working-age adults (Wang et al., 2012).
- 3 Functional impairment related to CLBP, measured using the Oswestry Disability Index (Fairbank & Pynsent, 2000).
- 4 Patients with a pain intensity score of 3 to 8 on the Numeric Pain Rating Scale (NPRS), ensuring inclusion of individuals with mild to moderate pain (Hicks et al., 2005).
- 5 Individuals capable of actively engaging in prescribed exercise therapy without severe movement restrictions or neurological deficits (Marshall et al., 2013).
- 6 Patients were willing to comply with the intervention protocol and attend scheduled physiotherapy sessions at CRP, Savar, Bangladesh.
- 7 Participants who were currently undergoing or eligible for standard physiotherapy interventions at CRP.

- **Exclusion Criteria**

- 1 Patients diagnosed with fractures, malignancies, infections, inflammatory arthritis, or other red-flag conditions requiring specialized medical care (O’Sullivan et al., 2012).
- 2 Individuals with radiculopathy, cauda equina syndrome or other neurological impairments that affect motor control and exercise participation (Standaert et al., 2011).
- 3 Patients with a history of spinal surgeries, including discectomy or spinal fusion, which may affect rehabilitation outcomes (Ferreira et al., 2007).
- 4 Participants with uncontrolled cardiovascular, respiratory or metabolic conditions that contraindicate physical activity (McGill, 2007).
- 5 Pregnant women were excluded due to potential biomechanical and physiological changes that affect spinal stability (Vleeming et al., 2008).
- 6 Patients with cognitive impairments, psychiatric disorders or personal constraints that may affect adherence to the intervention (Hicks et al., 2005).

3.5 Study Period

The duration of the study period is June-2024 to May-2025.

3.6 Sample size

Data were collected between December 2024 and March 2025. During this time, people who met the inclusion and exclusion criteria and provide agreement to participate were considered for the study.

The number of participants were estimated as 30 participants in each group as per calculation with adding 10% dropout rate.

3.7 Sampling Technique

Within the study period, a sample of people who are clinic-based and meet the inclusion criteria will be selected. All patients will be split into two groups, Group A and Group B, with a 1:1 ratio using basic random sample techniques. Half of the patients will be assigned to group A and the other half to group B following randomization.

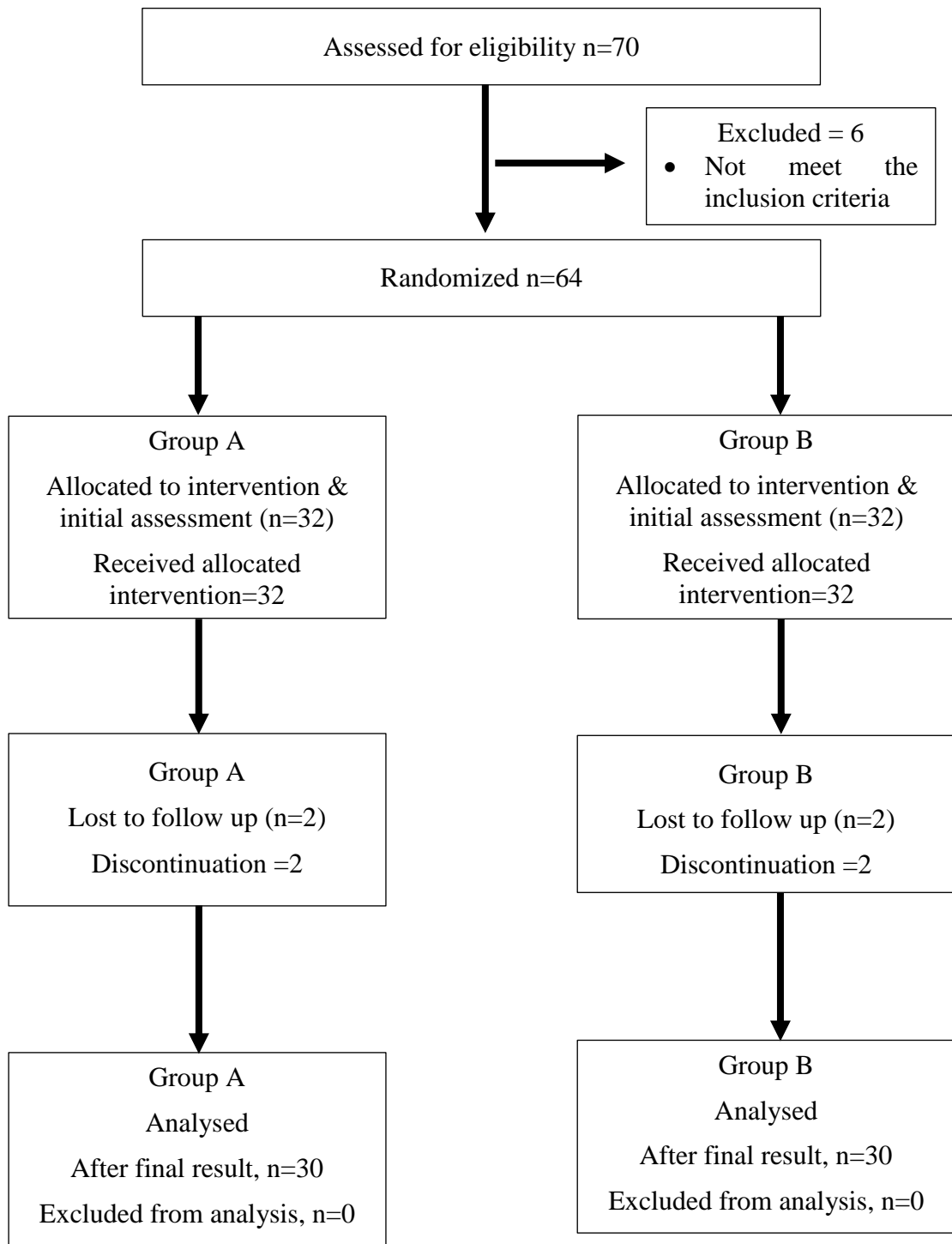
3.8 Data collection tools

- Information and Consent form
- Questionnaire- Designed to conduct the interview
- Paper, pen & pencil
- Outcome measurement tools (NPRS/ VAS scale, Oswestry Disability Index)

3.9 Data collection procedure

Data were collected at before and after intervention via face to face interview by taking a written consent from the patient.

Flow Diagram



N.B: Here, Group A is considered as Experimental Group and Group B is Control Group

3.10 Intervention

For Experimental Group: Booklet Exercises along with conventional Physiotherapy. Each session will follow a structured format, progressing from basic to advanced variations of the Dead Bug exercise.

Phase 1: Weeks 1-2 (Activation & Basic Control)

1. **Warm-up:** 5-10 minutes of gentle stretching and diaphragmatic breathing.
2. **Dead Bug Exercise Level 1:**
 - Supine position with knees bent at 90 degrees and arms extended toward the ceiling.
 - Alternate arm and leg movements while maintaining a stable lumbar spine.
 - 2 sets of 10 repetitions per side.
 - Focus on slow, controlled movements and proper core engagement.
3. **Cool-down:** 5 minutes of static stretching.

Phase 2: Weeks 3-4 (Strengthening & Coordination)

1. **Warm-up:** 5-10 minutes of dynamic mobility exercises.
2. **Dead Bug Exercise Level 2:**
 - Adding resistance bands or small weights for arm movements.
 - Emphasizing eccentric control and anti-rotational stability.
 - 3 sets of 12 repetitions per side.
 - Integration with functional tasks such as bridging and standing balance exercises.
3. **Cool-down:** 5-10 minutes of foam rolling and stretching.

Phase 3: Weeks 5-6 (Advanced Progressions & Functional Integration)

1. **Warm-up:** Dynamic stretching and core activation drills.
2. **Dead Bug Exercise Level 3:**
 - Unstable surface (e.g., stability ball) to challenge core endurance.
 - Increased resistance and tempo variations.
 - 3 sets of 15 repetitions per side.
 - Combination with movement retraining and proprioceptive exercises.
3. **Cool-down:** Relaxation techniques and guided stretching.

(Ikele, 2020 and Dimen, 2021)

For Control Group: Conventional Physiotherapy treatment for CLBP prescribed according to patient criteria at CRP. (Appendix-C)

3.11 Data analysis procedure

Data were analyzed using Statistical package of Social Science (SPSS) version 25 and MS Excel 2016 to compute the descriptive statistics using pie chart, bar chart, linear line diagram and also percentage and parametric tests were conducted using paired t-test and independent T-test.

The researcher had calculated the variables mean, mean difference, standard deviations, Standard error, degree of freedom and significant level to show that experimental group and control group mean difference in within group was significantly different than the Standard table values. In the between group, the data shows that the mean difference was greater than the control group. The researcher had tested mean variables stating problem to test using t statistic, which is paired t-test, that was predicted as normally distributed if $df \geq 30$.

3.12 Ethical consideration

- Researcher followed the Institution Review Board (IRB) guideline of BHPI.
- Researcher followed the WHO guideline.
- Researcher followed the Bangladesh Medical Research Council (BMRC) guideline.
- Strictly maintained the confidentiality.
- Informed consent was taken.
- All participants were informed about aim, objectives of the study prior to participation.
- Participant's rights and privileges were ensured.
- No harmful act was taken and the participant could withdraw themselves at any time.

In this chapter, the researcher discussed about the results of this study. The results includes the sociodemographic characteristics of the patients, individual outcome of the patients ADLs and other disabilities.

4.1 Sociodemographic Findings:

Table no. IV.I: Baseline Comparison of the patients

	Experimental Group	Control Group	p-value
Age (Mean±SD)	43.01 (±14.385)	50.23 (±11.956)	0.665
Gender (n %)	Male: 20 (66.7%) Female: 10 (33.3%)	Male: 19 (63.3%) Female: 10 (36.7%)	0.374
Occupation (n %)	Day labourer: 7 (23.3%) Service Holder: 5 (16.7%) Teacher: 2 (6.7%) Student: 2 (6.7%) House-wife: 6 (20.0%) Unemployment: 2 (6.7%) Businessman: 6 (20.0%)	Day labourer: 7 (23.3%) Service Holder: 3 (10.0%) Teacher: 5 (16.7%) Student: 0 (0.00%) House-wife: 9 (30.0%) Unemployment: 2 (6.7%) Businessman: 4 (13.3%)	0.325
Religion (n %)	Islam: 28 (93.3%) Budhists: 1 (3.33%) Cristian: 1 (3.33%)	Islam: 26 (86.7%) Hindu: 4 (13.3%)	0.257
Marital Status (n %)	Married: 22 (73.3%) Unmarried: 3 (10.0%) Divorced: 4 (13.3%) Separated: 1 (3.33%)	Married: 24 (80%) Unmarried: 2 (6.7%) Divorced: 2 (6.7%) Separated: 2 (6.7%)	0.665
Education (n %)	No education: 8 (26.7%) Primary education: 7 (23.3%) Secondary: 7 (23.3%) Higher education: 5 (16.7%)	No education: 8 (26.7%) Primary education: 6 (20.0%) Secondary: 8 (26.7%) Higher education: 6 (20.0%) Graduate: 2(6.7%)	0.249

	Graduate: 3 (10.0%)		
Residential Area (n %)	Urban: 19 (63.3%) Rural: 11 (36.7%)	Urban: 13 (43.3%) Rural: 17 (56.7%)	0.149
Smoking (n %)	Yes: 4 (13.3%) No: 26 (86.7%)	Yes: 12 (40%) No: 18 (60%)	0.779
BMI (n %)	Normal: 12 (40%) Obese: 10 (33.3%) Overweight: 8 (26.7%)	Normal: 7 (23.3%) Obese: 14 (46.7%) Overweight: 9 (30.0%)	0.479

The baseline characteristics of the 60 participants in this study, divided equally between the experimental and control groups (30 participants each), were compared to ensure homogeneity between groups prior to intervention. The mean age of the experimental group was 43.01 years (± 14.385), while the control group had a slightly higher mean age of 50.23 years (± 11.956), with no statistically significant difference ($p = 0.665$). Gender distribution was relatively similar between groups, with males comprising 66.7% of the experimental group and 63.3% of the control group, and females comprising 33.3% and 36.7%, respectively ($p = 0.374$). Occupational categories varied but were broadly comparable; day labourers made up the largest subgroup in both groups (23.3% each), followed by housewives and businessmen. Although some variation existed, such as more teachers in the control group (16.7%) and more students in the experimental group (6.7%), the overall occupational distribution did not differ significantly ($p = 0.325$). In terms of religion, the majority in both groups were Muslim (93.3% in the experimental group vs. 86.7% in the control group), with small representations of Buddhists, Christians, and Hindus ($p = 0.257$). Marital status was also comparable, with most participants being married in both groups (73.3% vs. 80%), and small percentages falling into unmarried, divorced, or separated categories ($p = 0.665$). Educational status showed no significant differences ($p = 0.249$), with varying levels from no education to graduate level. The majority of participants in the experimental group resided in urban areas (63.3%), compared to 43.3% in the control group, though this difference was not statistically significant ($p = 0.149$). Smoking status differed notably, with 13.3% of the experimental group being smokers compared to 40% in the control group; however, this difference did not reach statistical significance ($p = 0.779$). Lastly, BMI categories showed that normal BMI was more

prevalent in the experimental group (40%) compared to the control group (23.3%), whereas obesity was more common in the control group (46.7% vs. 33.3%), though these differences were not statistically significant ($p = 0.479$). Overall, there were no significant differences in any of the baseline characteristics, indicating that both groups were adequately matched prior to intervention.

4.1.1 Age of the participant:

Among all the participants, age range from 51 to 55 years participants were about 18.3% which is the largest. Average 13.3 % population were 28 to 35 years and 60 to 61 years of age. The lowest percentage were 46 to 50 years and 56 to 59 years age and that is about 6.7 percent.

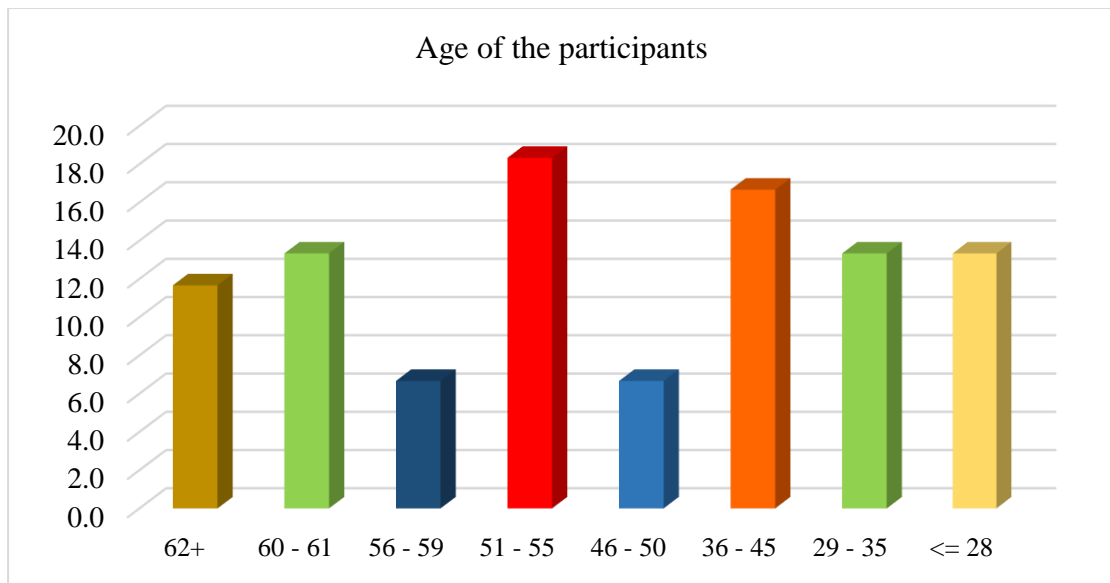


Figure-4.1.1: Age of the participants

4.1.2 Gender of the participants:

Among all the participants in the study, 35% participants were female and 65% were male.

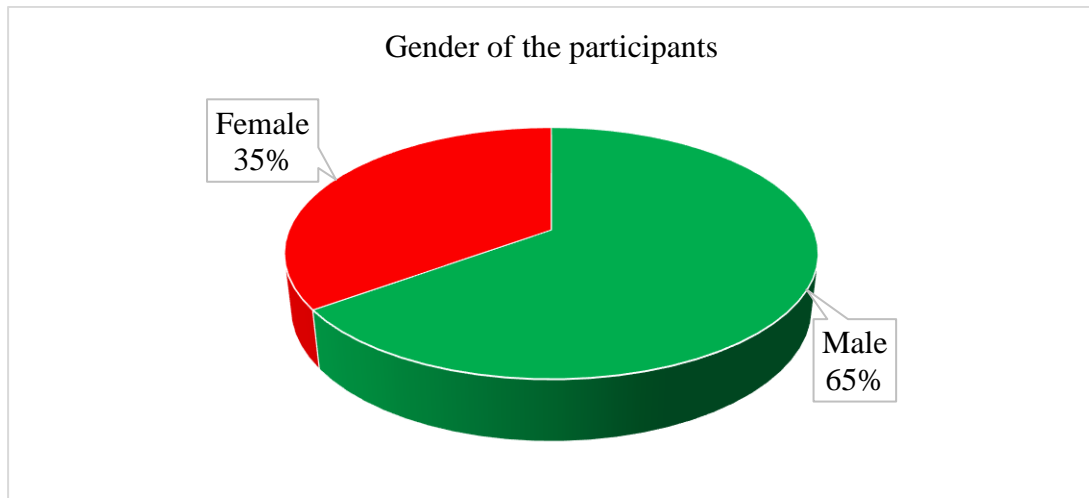


Figure-4.1.2: Gender of the participants

Gender distribution between Groups:

Among them, in Experimental Group 19 persons were Male and 11 persons were Female and in Control Group, 20 persons were Male and 10 persons were Female.

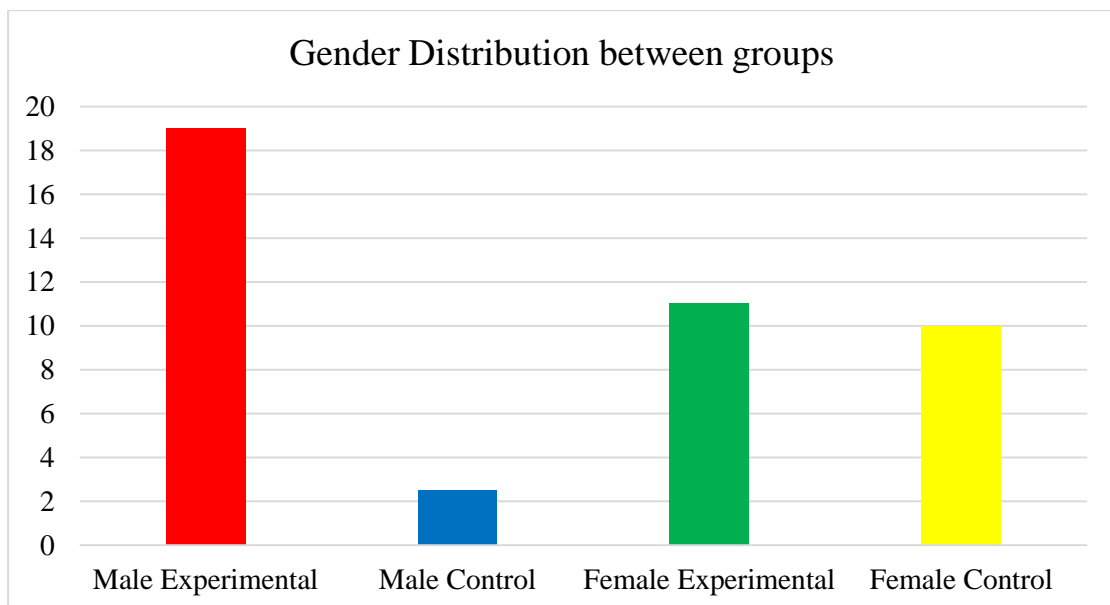


Figure-4.1.2.1: Gender distribution of the participants

4.1.3 Occupation of the participants:

Among the participants, most of the 23% participants were day labourer, 25% female were house-wives, businessman and service holders were 17% and 13% respectively, 12% teachers, 7% people are unemployed and last of all, 3% participants were students.

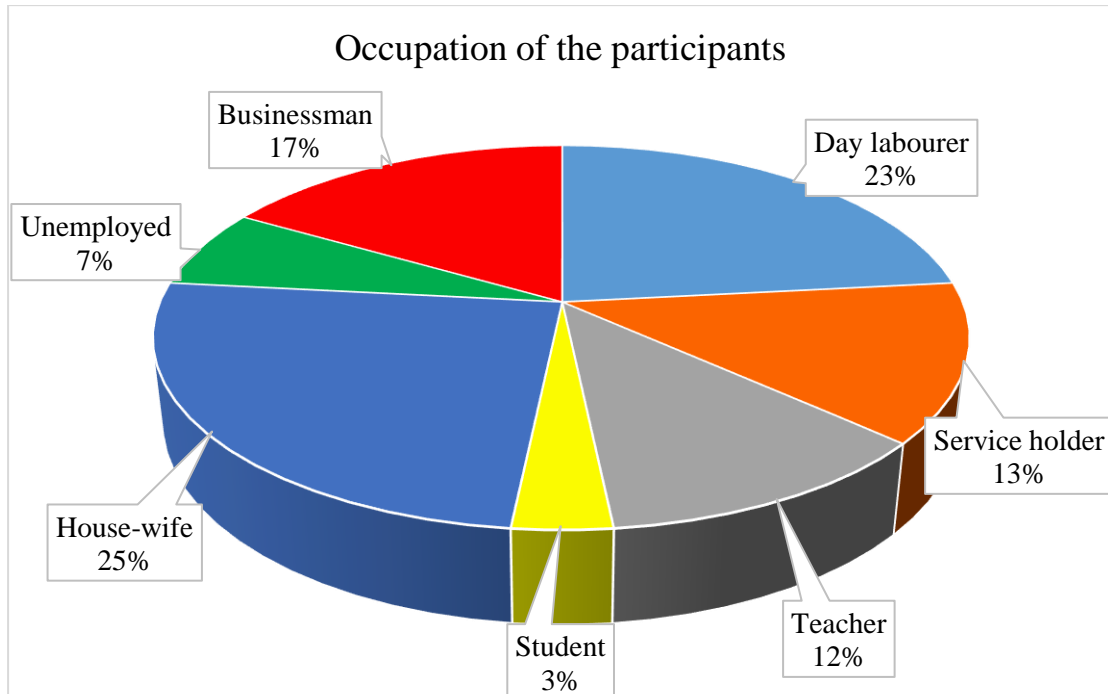


Figure-4.1.3 Occupations of the participants

4.1.4 Religion of the participants

There are majority number of participants are of Muslim community, about 90 percent people. The other participants are 6.7% Hindu and rest of them are Buddhist and Christians for about 1.7% respectively.

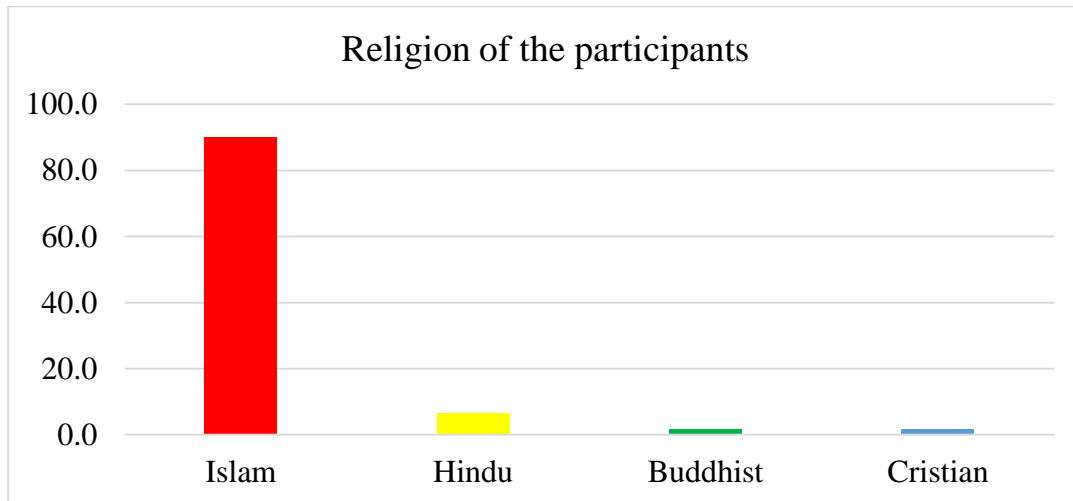


Figure-4.1.4: Religion of the participants

4.1.5 Marital status of the participants

Most of the participants associated in the study were married (about 76.7 %). Besides 8.3% people were unmarried, 10% of them got divorced and rest of the 5% were separated.

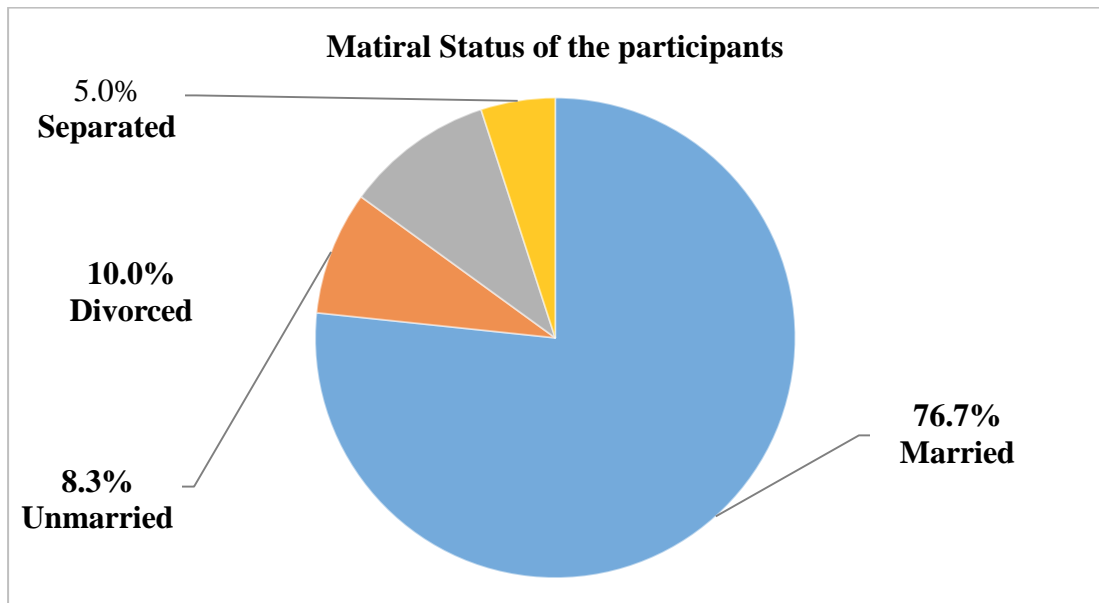


Figure-4.1.5: Marital Status of the participants

4.1.6 Education of the participants

The mentioned chart shows the education level of the participants, which is more crucial factors as it helps a participant to understand the effects of intervention. As it showed that most of the participants had not receive any education that is 27%. Moreover, on average, 22% people had completed primary education, 25% of secondary education, about 18% of higher educated people and a little of 8% people completed their graduation.

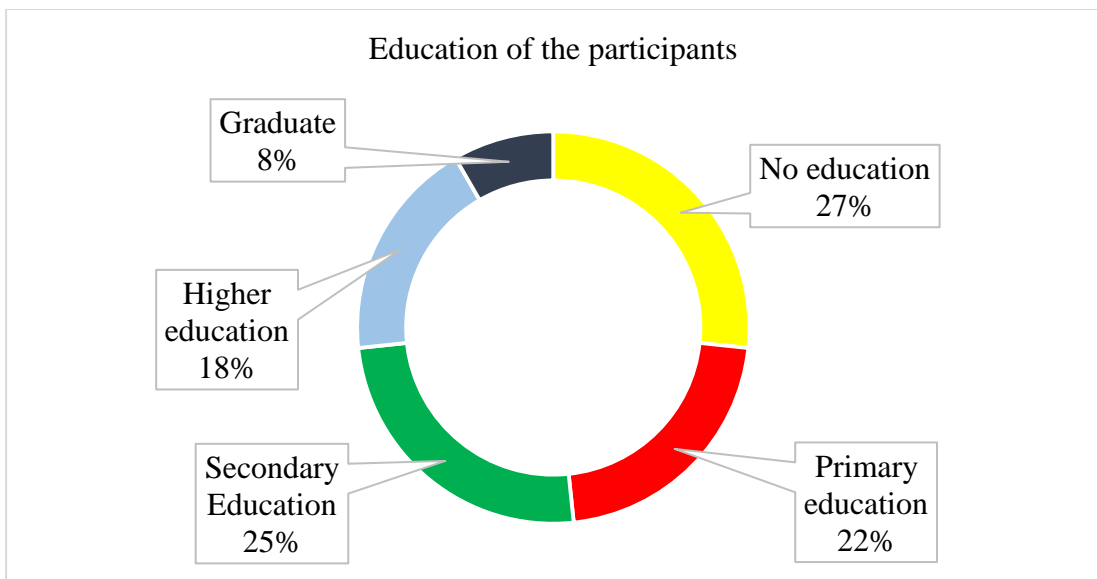


Figure-4.1.6: Education of the participants

4.1.7 Living area of the participants

Here the graph demonstrated that maximum participants of 53.3% who had received treatment in CRP, came from urban area, while the rest of the 46.7% participants belonged from rural area.

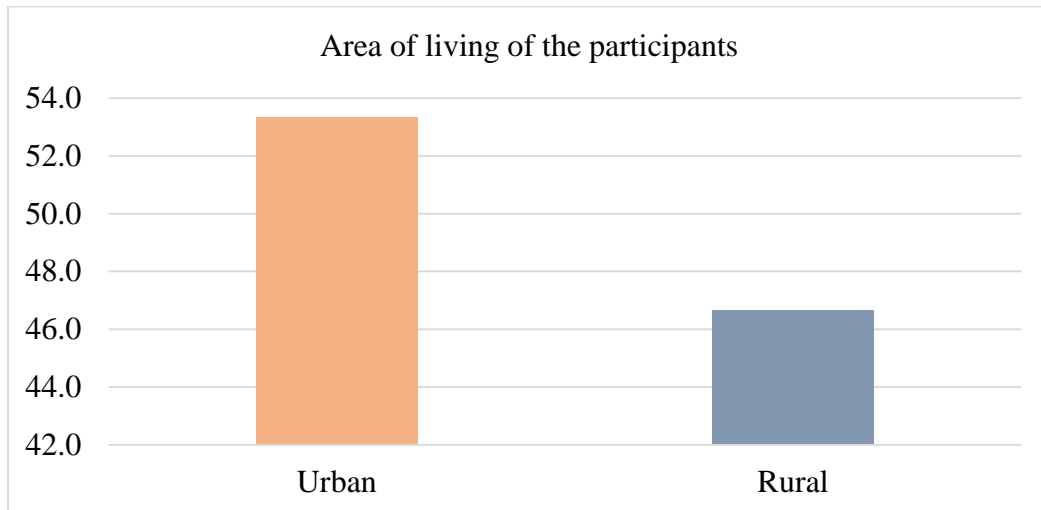


Figure-4.1.7: Living area of the participants

4.1.8 Smoking habits of the participants

As smoking is a bad habit and can be interpreted in the intervention, it is also a concerned factor. Though, there were only 26.6% participants who do smoking, the rest of the 73.3% people are non-smokers.

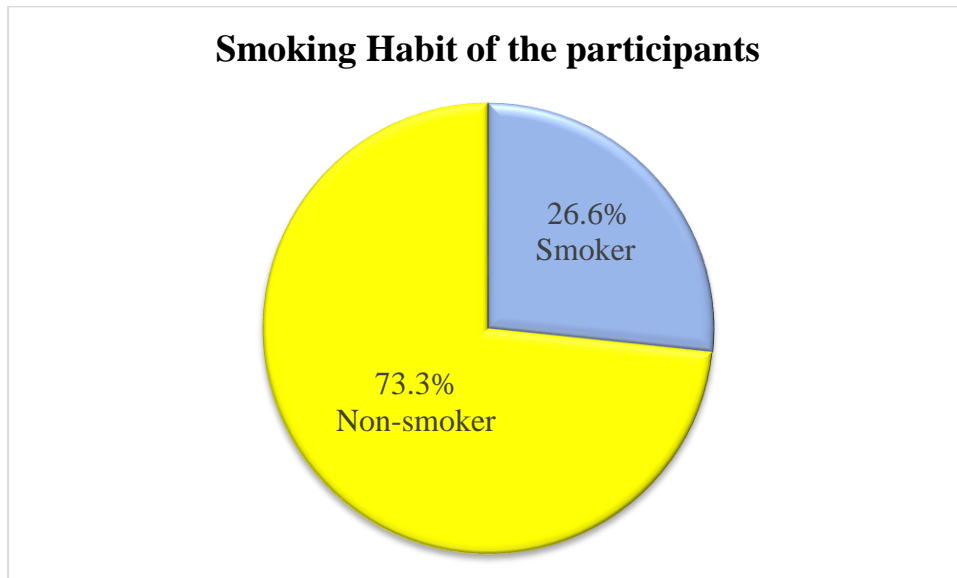


Figure-4.1.8: Smoking habit of the participants

4.2 OSWESTRY DISABILITY INDEX

Table no. IV.II: Paired sample t-test within group analysis of ODI scale

Group	Mean±SD (Pre)	Mean±SD (Post)	t-value	p-value
Experimental	16.5667±4.69	5.633±3.056	13.369	0.031
Control	12.233±3.39	6.833±2.320	13.310	0.009

The paired sample t-test was conducted to evaluate the within-group effect of the intervention on the level of disability, as measured by the Oswestry Disability Index (ODI), in patients with chronic low back pain. In the experimental group, which received the Dead Bug exercise intervention along with standard physiotherapy, the mean ODI score significantly decreased from 16.57 ± 4.69 before treatment to 5.63 ± 3.06 after the intervention. This reduction was statistically significant, with a t-value of 13.369 and a p-value of 0.031, indicating a meaningful improvement in functional disability following the Dead Bug exercise program. Similarly, the control group, which received only standard physiotherapy, also showed a significant reduction in ODI scores, with the mean decreasing from 12.23 ± 3.39 at baseline to 6.83 ± 2.32 post-intervention. The t-value for this change was 13.310 with a p-value of 0.009, suggesting that standard physiotherapy alone also contributed to improving functional status in these patients. Notably, although both groups demonstrated significant within-group improvements, the larger mean reduction in the experimental group implies that the addition of the Dead Bug exercise may have provided an enhanced therapeutic benefit in reducing disability associated with chronic low back pain.

Table no. IV.III: Independent t-test between group analysis of ODI scale

Group	Mean difference	df	t-value	p-value
Between group	5.333	58	6.061	0.025

Based on the independent t-test conducted to compare the Oswestry Disability Index (ODI) scores between the experimental group (which received the Dead Bug exercise intervention) and the control group, the results reveal a statistically significant difference between the groups. The mean difference in ODI scores was found to be 5.333 points, with a degrees of freedom (df) of 58. The calculated t-value for this comparison was 6.061, which exceeds the critical value for significance at the chosen confidence level. Furthermore, the associated p-value was 0.025, which is less than the conventional alpha level of 0.05, indicating that the difference observed is statistically significant and unlikely to have occurred by chance alone. This result suggests that participants who performed the Dead Bug exercise experienced a greater reduction in disability related to chronic low back pain compared to those in the control group, thereby supporting the effectiveness of this core stabilization exercise in improving functional outcomes among individuals with chronic low back pain.

4.3 VAS Scale:

Table no. IV.IV: Paired sample t-test within group analysis of VAS scale

Group	Mean±SD (Pre)	Mean±SD (Post)	t-value	p-value
Experimental	6.9633±1.49683	3.4833±1.398	13.825	0.000
Control	6.033±2.02	5.9733±10.33	0.033	0.974

Based on the paired sample t-test results for the Visual Analog Scale (VAS) in this study investigating the effectiveness of the Dead Bug exercise for managing chronic low back pain, it is evident that there was a statistically significant reduction in pain intensity within the experimental group. Specifically, the mean VAS score in the experimental group decreased notably from a pre-intervention mean of 6.96 ± 1.50 to a post-intervention mean of 3.48 ± 1.40 . This change yielded a highly significant t-value of 13.825 and a corresponding p-value of 0.000, indicating that the reduction in pain was not due to chance and that the Dead Bug exercise was effective in alleviating pain among participants in this group. In contrast, the control group, which did not perform the Dead Bug exercise, showed minimal change in pain levels; the mean VAS score slightly decreased from 6.03 ± 2.02 to 5.97 ± 10.33 , with a t-value of 0.033 and a non-significant p-value of 0.974. This lack of significant change implies that the standard care or routine activities provided to the control group did not contribute meaningfully to pain reduction. Overall, these within-group analyses strongly support the efficacy of the Dead Bug exercise as an intervention to reduce pain intensity in individuals suffering from chronic low back pain.

Table no. IV.V: Independent t-test between group analysis of VAS scale

Group	Mean difference	df	t-value	p-value
Between group	3.4200	58	1.846	0.070

Based on the independent t-test analysis conducted to compare the Visual Analogue Scale (VAS) scores between the experimental group (who received the Dead Bug exercise intervention) and the control group, the mean difference was found to be 3.42 units. This indicates that, on average, the VAS score — which reflects the intensity of low back pain — differed by 3.42 points between the two groups. The degrees of freedom (df) for this test was 58, and the calculated t-value was 1.846. The corresponding p-value was 0.070. Although the mean difference suggests a trend towards pain reduction in the experimental group compared to the control group, the p-value exceeds the conventional level of statistical significance ($p < 0.05$). Therefore, this result implies that the observed difference in VAS scores between the groups is not statistically significant at the 5% level, suggesting that the Dead Bug exercise did not produce a significant reduction in pain intensity compared to the standard treatment alone within the study period. However, the near-threshold p-value indicates a potential trend that may warrant further investigation with a larger sample size or longer intervention duration to establish more definitive conclusions about its clinical effectiveness.

4.4 Back Muscle Strength Measurement using BP machine:

Table no. IV.VI: Paired sample t-test within group analysis of Back Muscle Strength

Group	Mean±SD (Pre)	Mean±SD (Post)	t-value	p-value
Experimental	15.297±2.359	17.265±2.398	10.873	0.000
Control	10.757±5.329	7.887±5.754	0.035	0.574

In the present study investigating the effectiveness of the Dead Bug exercise for managing chronic low back pain, a paired sample t-test was conducted to evaluate the within-group changes in back muscle strength as measured by a BP machine. In the experimental group, the mean back muscle strength increased notably from 15.297 ± 2.359 at baseline to 17.265 ± 2.398 after the intervention. This improvement was statistically significant, as reflected by a t-value of 10.873 and a highly significant p-value of 0.000, indicating that the Dead Bug exercise regimen effectively enhanced back muscle strength within this group. Conversely, in the control group, the mean back muscle strength decreased from 10.757 ± 5.329 pre-intervention to 7.887 ± 5.754 post-intervention. However, this change was not statistically significant, with a t-value of 0.035 and a p-value of 0.574, suggesting that without the specific exercise intervention, there was no meaningful improvement in back muscle strength. These results highlight the positive impact of incorporating Dead Bug exercises into standard physiotherapy for strengthening back muscles in individuals with chronic low back pain.

**Table no. IV.VII: Independent t-test between group analysis of
Back Muscle Strength Measurement**

Group	Mean difference	df	t-value	p-value
Between group	10.864	58	2.875	0.050

The independent t-test was conducted to compare the back muscle strength between the experimental group, who received the Dead Bug exercise intervention, and the control group, who did not. The analysis revealed a mean difference of 10.864 units in back muscle strength between the two groups. The test was performed with 58 degrees of freedom (df = 58), yielding a t-value of 2.875. The corresponding p-value was 0.050, which is exactly at the conventional threshold of statistical significance ($p < 0.05$). This indicates that there is a statistically significant difference in back muscle strength between the groups at the 5% significance level. Therefore, these results suggest that the Dead Bug exercise may have a positive impact on improving back muscle strength among individuals with chronic low back pain when compared to those who did not perform this specific exercise intervention. Overall, the findings support the effectiveness of incorporating the Dead Bug exercise into physiotherapy management for enhancing back muscle strength.

This randomized clinical trial investigated the efficacy of the Dead Bug exercise in combination with standard physiotherapy for managing chronic low back pain (CLBP). The results demonstrated that participants in the experimental group, who engaged in Dead Bug exercises, experienced significant improvements in pain intensity, disability level and back muscle strength compared to those who received only standard physiotherapy. The findings provide compelling evidence for incorporating core stabilization exercises such as the Dead Bug in the conservative treatment of CLBP.

Socio-Demographic Characteristics and their influence

The study population included 60 participants, with 30 in each group. The mean age of participants in the experimental group was 43.01 ± 14.39 years and in the control group was 50.23 ± 11.96 years, with no statistically significant difference ($p = 0.665$), indicating well-matched groups. Age is a key factor influencing the progression and response to treatment in CLBP. A study by Alodaibi et al. (2019) supports the finding that middle-aged adults are more likely to experience CLBP and respond favorably to core stabilization interventions due to their retained neuromuscular adaptability.

Gender distribution was relatively balanced between the two groups (66.7% male in the experimental group and 63.3% in the control group). Similar trends have been reported in prior CLBP studies, such as those by Koes et al. (2017), which found no substantial gender difference in the prevalence or treatment outcomes of CLBP when exercise therapy was applied.

The educational status of participants showed a predominance of lower educational attainment, with over 50% having no formal or only primary education. This is noteworthy because educational level often influences health literacy, exercise adherence, and understanding of self-management strategies. According to Heuch et al. (2018), individuals with lower education levels tend to report higher levels of disability due to lower health-seeking behaviors, which may partially explain the higher baseline Oswestry Disability Index (ODI) in our participants.

Occupational diversity was evident, with a predominance of day laborers and housewives. This finding is consistent with the notion that physically demanding jobs and prolonged sedentary activities can both contribute to CLBP (Hoy et al., 2018). Occupational variation was not significantly different between the groups ($p = 0.325$), ensuring that this variable did not confound the results.

Smoking behavior was more prevalent in the control group (40%) compared to the experimental group (13.3%). Though not statistically significant ($p = 0.779$), the negative effects of smoking on musculoskeletal health are well documented. Shiri et al. (2019) found that smoking impairs disc nutrition and accelerates degenerative processes, potentially exacerbating CLBP and slowing recovery.

Urban versus rural residence also appeared balanced, though slightly more urban participants were in the experimental group. As rural residents may have reduced access to healthcare resources, this factor is crucial in interpreting the efficacy of physiotherapeutic interventions. Hartvigsen et al. (2018) highlight the disparities in health outcomes and resource availability in urban versus rural populations, stressing the importance of targeted interventions.

Pain Intensity: VAS Outcomes

The experimental group showed a significant decrease in VAS pain scores from 6.96 ± 1.50 to 3.48 ± 1.40 ($p = 0.000$), while the control group exhibited minimal change (6.03 ± 2.02 to 5.97 ± 10.33 , $p = 0.974$). Although the between-group comparison yielded a p-value of 0.070 (not statistically significant at the 5% level), the effect size and direction suggest a clinically meaningful benefit.

This finding aligns with several previous studies emphasizing the analgesic effect of core stabilization exercises. A randomized controlled trial by Akuthota et al. (2017) demonstrated that core stability programs reduced VAS pain scores significantly more than traditional physiotherapy. Likewise, Chan et al. (2021) concluded that core activation, including the Dead Bug, engages the transversus abdominis and multifidus muscles, reducing lumbar loading and alleviating pain in CLBP patients.

While the p-value did not reach statistical significance between groups in our study, this could be attributed to sample size limitations or a relatively short intervention duration. A meta-analysis by Gordon et al. (2016) highlighted that core stability exercises typically require a 6–8 week intervention for optimal pain modulation, suggesting that extended programs might yield more robust between-group differences.

Functional Disability: Oswestry Disability Index (ODI)

Within-group analysis revealed a highly significant improvement in ODI scores in the experimental group (from 16.57 to 5.63, $p = 0.031$), compared to a less pronounced but still significant reduction in the control group (from 12.23 to 6.83, $p = 0.009$). The between-group difference was statistically significant (mean difference = 5.33, $p = 0.025$), indicating that the addition of the Dead Bug exercise conferred an added benefit in functional improvement.

This result resonates with the findings of Cairns et al. (2020), who reported that structured core exercises improve lumbar stability, reduce disability scores, and improve quality of life in CLBP populations. In particular, stabilization exercises have been shown to restore neuromuscular control of the deep spinal muscles, which are often impaired in chronic pain conditions (Panjabi, 2016).

Moreover, a study by Bhadauria and Gurudut (2017) compared core stabilization with conventional exercises and found that the former led to significantly greater improvements in ODI scores. Their findings substantiate the hypothesis that activating the deep abdominal muscles through exercises like the Dead Bug results in greater spinal support and reduces abnormal movement patterns contributing to disability.

Muscle Strength: BP Machine Measurement

Back muscle strength significantly increased in the experimental group (15.297 to 17.265, $p = 0.000$), whereas it declined slightly in the control group (10.757 to 7.887, $p = 0.574$). The between-group comparison yielded a significant difference (mean difference = 10.864, $p = 0.050$), reinforcing the effectiveness of the Dead Bug exercise in improving muscle performance.

Core strength enhancement is pivotal in the rehabilitation of CLBP, as weak back muscles are a known contributor to persistent pain and instability (Granacher et al., 2016). Exercises that challenge trunk coordination and muscular endurance, such as the Dead Bug, recruit the lumbar stabilizers efficiently. A study by Kavcic et al. (2020) demonstrated that isometric core exercises significantly improve trunk muscle activation, aligning with our findings of increased back muscle strength.

In a similar trial by Akuthota et al. (2018), participants engaged in progressive core activation regimens, including Dead Bug, showed marked increases in back extensor endurance and strength after 4 weeks. This supports the present study's result that Dead Bug exercises not only reduce pain and disability but also directly impact neuromuscular outcomes.

Clinical Relevance of Dead Bug Exercise

The Dead Bug exercise is recognized for its simplicity, low risk of injury, and high efficiency in activating the transversus abdominis and pelvic floor muscles without overloading the spine. According to a biomechanical study by Marshall and Murphy (2017), the Dead Bug elicits significant EMG activation of stabilizing muscles while maintaining a neutral lumbar spine—a key requirement in CLBP rehabilitation.

Our study's results corroborate these findings, with statistically and clinically meaningful improvements in pain, function, and strength in the Dead Bug group. These benefits align with the multidimensional goals of physiotherapy in CLBP, namely pain relief, functional restoration, and prevention of recurrence.

Comparison with Similar Studies:

The following table provides a summary comparison of findings from other studies using core stabilization in CLBP treatment:

Study	Intervention	Outcome	Alignment with Present Study
Bhadauria & Gurudut (2017)	Core stabilization vs. traditional exercises	Greater improvement in ODI and VAS	Consistent
Chan et al. (2021)	Core activation and EMG study	Deep stabilizer activation	Supports mechanism
Gordon et al. (2016)	Systematic review	Core exercises reduce pain, improve function	Supports long-term value
Kavcic et al. (2020)	Core exercise program	Muscle strength improvement	Aligns with our back muscle strength findings

These comparisons further affirm the rationale for including core exercises in CLBP management and emphasize the Dead Bug exercise as a viable, evidence-based addition.

Interpretation and Clinical Implications

The evidence presented in this study supports the inclusion of Dead Bug exercises in routine physiotherapy protocols for CLBP. The improvements in all measured outcomes—pain, disability, and strength—highlight its multifaceted therapeutic role. Additionally, the low complexity of the Dead Bug makes it accessible for patients across varying educational and occupational backgrounds, which is particularly relevant given the sociodemographic composition of our participants.

However, while statistically significant findings were observed, it is essential to interpret them in the context of clinical significance. A minimal clinically important difference (MCID) for the ODI is considered to be approximately 10 points (Meade et al., 2018). While our study observed a 10.93-point reduction in the experimental group, confirming clinical relevance, future studies should aim to validate this across larger and more diverse samples.

- The sample size is small, so the result is difficult to generalize among whole population.
- Sometimes treatment sessions were interrupted due to public holiday and others associated leave factors.
- 27% people were illiterate. That may affect the result.
- Time frame was limited. So proper intervention period may not be achieved.
- Potential confounding factors, such as participants' lifestyle or other co-morbid conditions, were not controlled or accounted for in the study. These factors may influence the outcomes of the intervention, and their absence could limit the ability to attribute improvements solely to the intervention.
- The study participants may not represent the full spectrum of age, gender or ethnic groups typically found in the general population of CLBP patients. A more diverse sample would provide a better understanding of how the intervention works across different demographics.
- The study relied on the Oswestry Disability Index (ODI) and VAS scores to measure pain and disability. While these are commonly used tools, they are subjective and do not capture more objective measures of function or muscle strength, such as functional movement assessments or pressure pain threshold testing.
- There was no blinding of participants or researchers, which could have introduced expectancy bias. Participants who know they are receiving the experimental intervention might report more favorable outcomes due to their expectations.

Based on the findings of this study, the following recommendations are made for both clinical practice and future research:

1. Incorporation of Core Stabilization Exercises in Physiotherapy:

Core stabilization exercises, such as the Dead Bug Exercise, should be incorporated into standard physiotherapy regimens for Chronic Low Back Pain (CLBP) patients. The significant improvements in pain relief, functional outcomes and muscle power observed in the Experimental Group suggest that such exercises can enhance the efficacy of conventional physiotherapy treatments. Clinicians should consider adding these exercises to their treatment protocols to improve patient outcomes.

2. Further Research with Larger Sample Sizes:

Future studies should include larger and more diverse sample sizes to improve the generalizability of the findings. A larger sample will provide more robust data and help confirm the effectiveness of the Dead Bug Exercise in CLBP management across different demographic groups (e.g. age, gender, ethnicity).

3. Long-Term Follow-Up Studies:

The current study was limited to a short-term intervention. Future research should include long-term follow-up assessments to evaluate the sustainability of the improvements in pain levels, disability, and muscle strength. This will help determine whether the benefits of the Dead Bug Exercise and physiotherapy combination are maintained over time.

4. Standardization of Physiotherapy Treatment:

To improve the reliability and validity of future studies, standardization of the physiotherapy treatment provided to the Control Group should be ensured. This will help isolate the effects of the Dead Bug Exercise and provide more accurate comparisons between the two groups.

5. Objective Measures of Pain and Disability:

In addition to self-reported measures such as VAS and ODI, future research should include objective measures of pain and functional capacity, such as pressure pain threshold testing and functional movement assessments, to enhance the accuracy and validity of the outcomes.

6. Exploration of Other Core Stabilization Exercises:

While this study focused on the Dead Bug Exercise, future research should investigate other types of core stabilization exercises, such as planks, bridges, or pelvic tilts, to determine the most effective exercise protocols for CLBP management. Comparing different exercises can help identify the optimal exercise regimen for improving core strength and pain relief.

7. Inclusion of a Diverse Patient Population:

Future studies should aim to include a more diverse patient population, ensuring representation across age, gender, and ethnicity. This will help to assess the effectiveness of the intervention across various demographic groups and provide insights into how core stabilization exercises affect different types of CLBP patients.

8. Collaboration Between Physiotherapists and Researchers:

Collaborative efforts between physiotherapists and researchers are crucial for the successful implementation and testing of core stabilization exercises in clinical settings. Clinical trials, when designed in collaboration with practicing physiotherapists, can ensure that the intervention is both feasible and effective in real-world clinical settings.

9. Addressing Confounding Variables:

Future research should also focus on controlling for confounding variables that might affect the outcomes, such as comorbid conditions, lifestyle factors, and previous treatments. Accounting for these factors will help isolate the effects of the Dead Bug Exercise on CLBP outcomes and provide a clearer understanding of its efficacy.

This study explored the effectiveness of the Dead Bug Exercise combined with standard physiotherapy treatment for the management of Chronic Low Back Pain (CLBP). The findings indicated that the Experimental Group, which received the Dead Bug Exercise in addition to standard physiotherapy, showed significant improvements in pain reduction (VAS scores), functional capacity (ODI scores), and back muscle power when compared to the Control Group that only received physiotherapy. Specifically, the Experimental Group experienced a significant decrease in pain and disability, while also showing a substantial improvement in muscle strength.

These results suggest that core stabilization exercises, such as the Dead Bug Exercise, are an effective addition to traditional physiotherapy for managing Chronic Low Back Pain. By focusing on core strengthening, this intervention appears to offer better outcomes in terms of pain relief, muscle function, and overall functional ability in patients with CLBP. The study's findings contribute to the growing body of evidence supporting the integration of core stabilization exercises into physiotherapy treatment plans for CLBP management.

However, the study also highlighted several limitations, including the small sample size, short duration, and lack of long-term follow-up, all of which should be addressed in future research to confirm and extend these findings.

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Appendix-A
Confirmation Letter



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

Ref: CRP-BHPI/IRB/12/2024/1010

Date: 15/12/2024

To
Mohammad Borshon Khan
4th Year B.Sc. in Physiotherapy
Session: 2019-2020, Student ID: 112190480
BHPI, CRP, Savar, Dhaka-1343, Bangladesh.

Subject: Approval of the thesis proposal “Efficacy of Dead Bug Exercise along with standard Physiotherapy Treatment for the conservative management of Chronic Low Back Pain: A Randomized Clinical Trial”

Dear Mohammad Borshon Khan,
Congratulations.

The Institutional Review Board (IRB) of BHPI has reviewed and discussed your application to conduct the above-mentioned dissertation, with you, as the principal investigator and Md. Ershad Ali, Lecturer, Department of Physiotherapy, BHPI as thesis supervisor. The following documents have been reviewed and approved:

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

The purpose of the study is to find out the evidence based effectiveness of Dead Bug exercise for the treatment of Chronic Low Back Pain. The study involves the use of Numeric Pain Rating Scale (NPRS), Oswestry Disability Index (ODI) and Goniometry questionnaire to explore Lumbar Spine Range of motion that may take 30 to 40 minutes to fill in the questionnaire any instruction or precaution for collection of specimen. There is no likelihood of any harm to the participants and participation in the study may benefit the participants or other stakeholders by knowing the evidence based effectiveness of Dead Bug exercise for the treatment of Chronic Low Back Pain as this study helps to develop an effective rehabilitation program and create awareness among patients about physiotherapy treatment. 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 in accordance with the Nuremberg Code 1947, the World Medical Association Declaration of Helsinki, 1964 - 2013, and other applicable regulations.

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-B
Data Collection Permission Letter

24th December, 2024

Head

Department of Physiotherapy

Centre for the Rehabilitation of the Paralysed (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 Mohammad Borshon Khan, a student of 4th year B.Sc. in physiotherapy at Bangladesh Health Professions Institute (BHPI). The Ethical committee has approved my research project entitled: "Efficacy of Dead Bug Exercise along with standard Physiotherapy Treatment for the conservative management of Chronic Low Back Pain: A Randomized Clinical Trial" under the supervision of Md. Ershad Ali, Lecturer, Department of Physiotherapy, BHPI. 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.

Yours faithfully,
Borshon
Mohammad Borshon Khan
4th Year B.Sc. in Physiotherapy
Class Roll: 03; Session: 2019-20
Bangladesh Health Professions Institute (BHPI)
(An academic Institution of CRP)
CRP-Chapain, Savar, Dhaka-1343.

Forwarded
Md. Ershad Ali
Lecturer
Department of Physiotherapy
BHPI, CRP, Savar, Dhaka-1343

Forwarded and Recommended.

Sudu
24.12.2024
Dr. Shazal Kumar Das, PhD
Assistant Professor and Head
Department of Physiotherapy
BHPI, CRP, Savar, Dhaka-1343.

Approved
A. Hossain
29/12/24

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

Review and Ethical Approval Letter

Date: 29/09/2024

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 research titled, "**Efficacy of Dead Bug Exercise along with standard Physiotherapy Treatment for the conservative management of Chronic Low Back Pain: A Randomized Clinical Trial**" with myself, as the principal investigator and Md. Ershad Ali, Lecturer, Department of Physiotherapy, BHPI, as my thesis supervisor. The purpose of the study is to find out the evidence based effectiveness of Dead Bug exercise for the treatment of Chronic Low Back Pain.

Numeric Pain Rating Scale (NPRS), Oswestry Disability Index (ODI) and Goniometry for Lumbar Spine Range of motion will be used in the study that will take about 20 to 30 minutes. Other related information will be collected from the socio-demographic 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,

.....
Borshon

Mohammad Borshon Khan
4th Year B.Sc. in Physiotherapy
Session: 2019-20, Student ID: 112190480
BHPI, CRP/CRP, Savar, Dhaka-1343, Bangladesh.

Recommendation from the thesis supervisor:

.....
Ershad Ali

Md. Ershad Ali
Lecturer, Department of Physiotherapy
BHPI, CRP, Savar, Dhaka-1343, Bangladesh.

Appendix-C

Conventional Physiotherapy Treatment Protocol



P.O. CRP-Chapain, Savar, Dhaka-1343
Tel +880 2 7745464-5, Fax +880 2 7745069
Email contact@crp-bangladesh.org
Web www.crp-bangladesh.org

Patient Prescription		
Diagnosis Code :	Prescription Date :	Patient Code :
Prescription Code :	Patient's Name :	Marital Status :
Patient's Age :	Sex :	Phone No :
Referred By :	Blood Group :	Police Station :
Village :	Post Office :	E-mail :
District :	Patient's Category :	

Conventional Physiotherapy treatment for LBP:

- McKenzie Protocol (flexⁿ, extⁿ, lateral principle)
- Cyriax manipulation
- Soft tissue mobilization technique
- Back muscle stretching exercise
- Back muscle strengthening exercise
- Maitland mobilization for LIS (G-I-G-II)
- Abdominal strengthening exercise
- Neuodynamics
- Core stability exercise
- Manual traction
- Motor control exercise
- Pelvic floor strengthening exercise
- Gluteus Contractⁿ

Sanjida Roy
Jr. Consultant, PT
29.09.24

Jakia Tasnuva
Jr. consultant
CRP. 28.09.24

Signature with Seal

Informed Consent

Health Care Centre: Centre for the Rehabilitation of the paralysed (CRP)

Assalamu Alaikum,

My name is **Mohammad Borshon Khan**. As part of the Bachelor of Physiotherapy (B.Sc in Physiotherapy) program, I am conducting a research project. The title of my study is: "*The Efficacy of Dead Bug Exercise in the Treatment of Patients with Chronic Low Back Pain: A Randomized Clinical Trial.*"

This research is being conducted at **Bangladesh Health Professions Institute** (BHPI), which is affiliated with the Faculty of Medicine, University of Dhaka. For this study, I would like to collect some personal and relevant information from you. It will take approximately 20–30 minutes.

I would like to inform you that this is purely academic research and will not be used for any other purpose. All the information provided by you will be kept strictly confidential and your identity will not be disclosed in any report or publication.

Participation in this study is entirely voluntary. You may withdraw from the study at any time without any negative consequences. Furthermore, you have the full right to decline to answer any question during the interview.

If you have any questions regarding this research or your rights as a participant, you may contact the researcher **Mohammad Borshon Khan** or my supervisor **Md. Ershad Ali**, Lecturer, Department of Physiotherapy, BHPI, CRP, Savar, Dhaka-1343.

Can I start the interview?

Yes No

Signature of the patient: Date:

Signature of the data collector: Date:

Signature of the Physiotherapist: Date:

অনুমতি পত্র

(অনুগ্রহ করে অংশগ্রহণকারীকে পড়ে শোনান)

আসসালামু আলাইকুম,

আমার নাম **মোহাম্মাদ বর্ষণ খাঁন**। আমি ব্যাচেলর অফ ফিজিওথেরাপি (**বি.এস.সি ইন ফিজিওথেরাপি**) প্রোগ্রামের অংশ হিসেবে একটি গবেষণা প্রকল্প পরিচালনা করছি। আমার গবেষণার শিরোনাম হলো “দীর্ঘস্থায়ী কোমড় ব্যথায় আক্রান্ত রোগীদের চিকিৎসায় ডেড-বাগ এক্সারসাইজ এর কার্যকারিতাঃ একটি র্যান্ডোমাইজড ক্লিনিকাল ট্রায়াল”। গবেষণাটি বাংলাদেশ হেলথ প্রফেশনস ইনস্টিটিউট (বিএইচপিআই), যা ঢাকা বিশ্ববিদ্যালয়ের মেডিসিন অনুষদের সাথে সংযুক্ত এবং এর জন্য আমি কিছু ব্যক্তিগত এবং সংশ্লিষ্ট তথ্য সংগ্রহ করতে চাই। এটি প্রায় ২০-৩০ মিনিট সময় নেবে।

আমি আপনাকে জানাতে চাই যে এটি সম্পূর্ণরূপে পেশাগত গবেষণা এবং অন্য কোনো উদ্দেশ্যে ব্যবহার করা হবে না। আপনার দ্বারা প্রদত্ত সমস্ত তথ্য গোপন রাখা হবে এবং কোনো প্রতিবেদন বা প্রকাশনায় তথ্যের উৎস নামহীন রাখা হবে।

এই গবেষণায় আপনি সম্পূর্ণরূপে নিজ ইচ্ছায় অংশগ্রহণ করতে পারেন এবং কোনো ধরনের নেতিবাচক প্রভাব ছাড়াই আপনি যেকোনো সময় এতে অংশগ্রহণ বন্ধ করতে পারেন। এছাড়াও, আপনি ইন্টারভিউ চলাকালীন যে কোনো প্রশ্নের উত্তর দিতে না চাইলে সেটিও সম্পূর্ণরূপে আপনার অধিকারের মধ্যে পড়বে।

যদি গবেষণা সম্পর্কে আপনার কোনো প্রশ্ন থাকে বা একজন অংশগ্রহণকারী হিসেবে আপনার অধিকার সম্পর্কে কোনো প্রশ্ন থাকে, তবে আপনি গবেষক **মোহাম্মাদ বর্ষণ খাঁন** অথবা আমার তত্ত্বাবধায়ক **মোঃ এরশাদ আলী**, প্রভাষক, ফিজিওথেরাপি বিভাগ, বিএইচপিআই, সিআরপি, সাভার, ঢাকা-১৩৪৩ এর সাথে যোগাযোগ করতে পারেন।

আমি কি ইন্টারভিউ শুরু করতে পারি?

হ্যাঁ না

অংশগ্রহণকারীর স্বাক্ষর: তারিখ:

তথ্য সংগ্রাহকের স্বাক্ষর: তারিখ:

ফিজিওথেরাপিস্ট এর স্বাক্ষর: তারিখ:

প্রশ্নাবলী(বাংলা)

রোগীর পরিচিতি

আইডি নং:	
রোগীর নাম:	
বয়স:	
লিঙ্গ:	<input type="checkbox"/> পুরুষ <input type="checkbox"/> মহিলা
ওজন (কেজিতে):	
উচ্চতা (মিটারে):	[১ ফিট = ০.৩০৪৮ মিটার]
বিএমআই (BMI):	<input type="checkbox"/> ১ = অতি কম ওজন (<১৮.৫০ কেজি/মি ^২) <input type="checkbox"/> ২ = স্বাভাবিক ওজন (১৮.৫০-২৪.৯৯ কেজি/মি ^২) <input type="checkbox"/> ৩ = অতিরিক্ত ওজন (২৫-২৯.৯৯ কেজি/মি ^২) <input type="checkbox"/> ৪ = স্থূলতা (≥৩০ কেজি/মি ^২)
মোবাইল নং:	
ঠিকানা:	

অধ্যায়-১

আর্থ-সামাজিক এবং জনসংখ্যাতাত্ত্বিক তথ্য

(বিঃ দ্রঃ নির্ধারিত ঘরে টিক দিয়ে সঠিক উত্তর নিতে হবে।)

১.১ পেশা

- | | | |
|---|-------------------------------------|-----------------------------------|
| <input type="checkbox"/> কৃষক | <input type="checkbox"/> ব্যবসায়ী | <input type="checkbox"/> কর্মচারী |
| <input type="checkbox"/> দিনমজুর | <input type="checkbox"/> শিক্ষকতা | <input type="checkbox"/> বেকার |
| <input type="checkbox"/> চাকুরিজীবী | <input type="checkbox"/> ছাত্র | <input type="checkbox"/> গৃহিণী |
| <input type="checkbox"/> গার্মেন্টস কর্মী | <input type="checkbox"/> গাড়ি চালক | <input type="checkbox"/> অন্যান্য |

১.২ বৈবাহিক অবস্থা

- | | | |
|-----------------------------------|--------------------------------------|--------------------------------|
| <input type="checkbox"/> বিবাহিত | <input type="checkbox"/> তলাকপ্রাপ্ত | <input type="checkbox"/> বিধবা |
| <input type="checkbox"/> অবিবাহিত | <input type="checkbox"/> আলাদা | |

১.৩ ধর্ম

- | | | |
|--------------------------------|-----------------------------------|------------------------------------|
| <input type="checkbox"/> ইসলাম | <input type="checkbox"/> হিন্দু | <input type="checkbox"/> খ্রিস্টান |
| <input type="checkbox"/> বৌদ্ধ | <input type="checkbox"/> অন্যান্য | |

১.৪ শিক্ষাগত যোগ্যতা

- | | | | |
|---|---|-----------------------------------|--|
| <input type="checkbox"/> স্কুলে যায় নি | <input type="checkbox"/> প্রাথমিক | <input type="checkbox"/> মাধ্যমিক | <input type="checkbox"/> উচ্চ-মাধ্যমিক |
| <input type="checkbox"/> উচ্চশিক্ষা | <input type="checkbox"/> স্নাতক/স্নাতকোত্তর | <input type="checkbox"/> অন্যান্য | |

১.৫ পরিবারের আকার

- | | |
|-------------------------------------|-------------------------------------|
| <input type="checkbox"/> একক পরিবার | <input type="checkbox"/> যৌথ পরিবার |
|-------------------------------------|-------------------------------------|

১.৬ সন্তান সংখ্যাঃ

১.৭ আবাসিক এলাকা

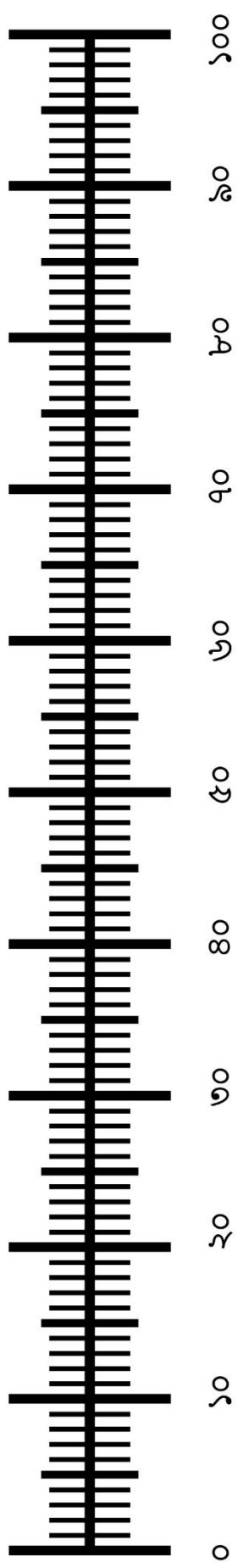
- | | |
|--------------------------------|------------------------------|
| <input type="checkbox"/> গ্রাম | <input type="checkbox"/> শহর |
|--------------------------------|------------------------------|

১.৮ ধূমপান

- | | |
|--------------------------------|-----------------------------|
| <input type="checkbox"/> হ্যাঁ | <input type="checkbox"/> না |
|--------------------------------|-----------------------------|

অধ্যায়-২

ভাস- ভিজুয়াল এনালগ পেইন রেটিং স্কেল



কোন
ব্যথা
নেই

অল্প ব্যথা

মাঝারী ব্যথা

তীব্র ব্যথা

অসহনীয়
ব্যথা

প্রি-ভাস স্কোরঃ

১০০ এর মধ্যে

পোস্ট-ভাস স্কোরঃ

১০০ এর মধ্যে

{বি. দ্রঃ ভাস স্কোর এর ফলাফল বক্সে
সংখ্যায় লিখুন। }

অধ্যায়-৩
অস-ওয়েস্ট্রি কোমড় ব্যথার অক্ষমতা সংক্রান্ত প্রশ্নাবলী

৩.১ ব্যথার তীব্রতা

- আমি কোনো ব্যথা অনুভব করি না।
- আমার ব্যথা খুব মৃদু।
- আমার ব্যথা মাঝারি।
- আমার ব্যথা খুব বেশি।
- আমার ব্যথা অত্যন্ত বেশি এবং সহ্য করা কঠিন।
- আমার ব্যথা অসহনীয়।

৩.২ ব্যক্তিগত যত্ন(ওয়াশিং, ড্রেসিং ইত্যাদি)

- আমি কোনো সমস্যার সম্মুখীন হই না।
- আমি মৃদু সমস্যা অনুভব করি।
- আমার যত্ন নিতে মাঝারি সমস্যার সম্মুখীন হই।
- আমি খুব বেশি সমস্যার সম্মুখীন হই।
- অন্য কেউ আমার যত্ন নেয়।
- আমি নিজেকে একদমই যত্ন নিতে পারি না।

৩.৩ উত্তোলন

- আমি সহজেই ভার বহন করতে পারি।
- আমি মৃদু ভার বহনে সমস্যা অনুভব করি।
- মাঝারি ওজন বহনে সমস্যা হয়।
- আমি কেবল হালকা ওজন বহন করতে পারি।
- ভার বহন করা আমার জন্য অত্যন্ত কষ্টকর।
- আমি কোনো ওজন বহন করতে পারি না।

৩.৪ হাটা

- আমি কোনো সমস্যা ছাড়াই হাঁটতে পারি।
- আমি ১ কিলোমিটার হাঁটতে পারি।
- আমি ৫০০ মিটার হাঁটতে পারি।
- আমি ১০০ মিটার হাঁটতে পারি।
- আমি একেবারে কম হাঁটতে পারি।
- আমি হাঁটতে পারি না।

৩.৫ বসা

- আমি কোনো সমস্যা ছাড়াই বসতে পারি।
- আমি কিছুক্ষণ বসতে পারি, তবে সমস্যার সম্মুখীন হই
- দীর্ঘ সময় বসে থাকলে অস্বস্তি অনুভব করি।
- আমার খুব কম সময় বসা সম্ভব।
- আমি বসতে গেলে অনেক সমস্যা হয়।
- আমি বসতে পারি না।

চিকিৎসার শুরুতে	চিকিৎসা শেষে
৩.১ ব্যথার তীব্রতা	
০	০
১	১
২	২
৩	৩
৪	৪
৫	৫
৩.২ ব্যক্তিগত যত্ন	
০	০
১	১
২	২
৩	৩
৪	৪
৫	৫
৩.৩ উত্তোলন	
০	০
১	১
২	২
৩	৩
৪	৪
৫	৫
৩.৪ হাটা	
০	০
১	১
২	২
৩	৩
৪	৪
৫	৫
৩.৫ বসা	
০	০
১	১
২	২
৩	৩
৪	৪
৫	৫

৩.৬ দাঁড়ানো

- আমি কোনো সমস্যা ছাড়াই দাঁড়াতে পারি।
- আমি কিছুক্ষণ দাঁড়িয়ে থাকতে পারি।
- আমার দীর্ঘ সময় দাঁড়াতে সমস্যা হয়।
- আমি কম সময় দাঁড়াতে পারি।
- আমার দাঁড়ানো অত্যন্ত কষ্টকর।
- আমি দাঁড়াতে পারি না।

৩.৭ ঘুমানো

- আমি কোনো সমস্যা ছাড়াই ঘুমাতে পারি।
- আমার ব্যথা মাঝে মাঝে ঘুমের সমস্যা তৈরি করে।
- ব্যথার কারণে ঘুমানো কঠিন হয়।
- ব্যথার জন্য আমি ভালো ঘুমাতে পারি না।
- ব্যথার কারণে ঘুমানো প্রায় অসম্ভব।
- আমি একেবারে ঘুমাতে পারি না।

৩.৮ যৌনজীবন

- আমার যৌনজীবন স্বাভাবিক এবং কোন ব্যথা তৈরি করে না
- আমার যৌনজীবন স্বাভাবিক এবং কিছুটা ব্যথা তৈরি করে
- আমার যৌনজীবন স্বাভাবিক কিন্তু অনেক ব্যথা তৈরি করে
- আমার যৌনজীবন গুরুতরভাবে সীমাবদ্ধ
- আমার যৌনজীবন ব্যথার জন্য অনেকটাই গুরুতরভাবে সীমাবদ্ধ
- আমার যৌনজীবন ব্যথার জন্য পুরোটাই গুরুতরভাবে সীমাবদ্ধ

৩.৯ সামাজিক জীবন

- আমার সামাজিক জীবনে কোনো প্রভাব নেই।
- আমার সামাজিক জীবনে অল্প প্রভাব পড়েছে।
- ব্যথার কারণে আমার সামাজিক জীবনে মাঝারি প্রভাব পড়েছে।
- ব্যথার কারণে আমি সামাজিক জীবন উপভোগ করতে পারি না।
- আমার সামাজিক জীবন অত্যন্ত সীমিত।
- আমি কোনো সামাজিক জীবনে অংশ নিতে পারি না।

৩.১০ ভ্রমণ

- আমি ভ্রমণে কোনো সমস্যা অনুভব করি না।
- আমার মৃদু সমস্যা হয়।
- আমি মাঝারি সমস্যার সম্মুখীন হই।
- ভ্রমণ আমার জন্য অনেক কষ্টকর।
- আমি ভ্রমণ একদম কম করি।
- আমি ভ্রমণ করতে পারি না।

চিকিৎসার শুরুতে	চিকিৎসা শেষে
৩.৬ দাঁড়ানো	
০	০
১	১
২	২
৩	৩
৪	৪
৫	৫
৩.৭ ঘুমানো	
০	০
১	১
২	২
৩	৩
৪	৪
৫	৫
৩.৮ যৌনজীবন	
০	০
১	১
২	২
৩	৩
৪	৪
৫	৫
৩.৯ সামাজিক জীবন	
০	০
১	১
২	২
৩	৩
৪	৪
৫	৫
৩.১০ ভ্রমণ	
০	০
১	১
২	২
৩	৩
৪	৪
৫	৫
তারিখঃ	

অধ্যায়- ৪
কোমডের পেশীর শক্তি নির্ণয়

প্রি-টেস্ট:

প্রাথমিক শক্তি	পরবর্তী শক্তি	গড় শক্তি
২০ মিলিমিটার মার্কারি	১ম রিডিং: ২য় রিডিং: ৩য় রিডিং:	

পোস্ট-টেস্ট:

প্রাথমিক শক্তি	পরবর্তী শক্তি	গড় শক্তি
২০ মিলিমিটার মার্কারি	১ম রিডিং: ২য় রিডিং: ৩য় রিডিং:	

Questionnaire (English)

Patient Introduction

ID No:	
Name of the patient:	
Age:	
Gender:	<input type="checkbox"/> Male <input type="checkbox"/> Female
Weight (in kg):	
Height (in meter):	[1 Feet = 0.3048 Meter]
Body Mass Index (BMI):	<input type="checkbox"/> 1 = Under weight (<18.50 kg/m ²) <input type="checkbox"/> 2 = Normal weight (18.50-24.99 kg/m ²) <input type="checkbox"/> 3 = Heavy weight (25-29.99 kg/m ²) <input type="checkbox"/> 4 = Obesity (≥30 kg/m ²)
Mobile No:	
Address:	

Chapter-1

Socio-Demographic Information

(N.B. Put tick mark on correct Answer)

1.1 Occupation

- | | | |
|--|--------------------------------------|---------------------------------------|
| <input type="checkbox"/> Farmer | <input type="checkbox"/> Businessman | <input type="checkbox"/> Employee |
| <input type="checkbox"/> Day labourer | <input type="checkbox"/> Teacher | <input type="checkbox"/> Unemployment |
| <input type="checkbox"/> Service holder | <input type="checkbox"/> Studnet | <input type="checkbox"/> House-wife |
| <input type="checkbox"/> Garments worker | <input type="checkbox"/> Driver | <input type="checkbox"/> Others |

1.2 Marital Status

- | | | |
|------------------------------------|------------------------------------|--------------------------------|
| <input type="checkbox"/> Married | <input type="checkbox"/> Divorced | <input type="checkbox"/> Widow |
| <input type="checkbox"/> Unmarried | <input type="checkbox"/> Seperated | |

1.3 Religion

- | | | |
|-----------------------------------|---------------------------------|------------------------------------|
| <input type="checkbox"/> Islam | <input type="checkbox"/> Hindu | <input type="checkbox"/> Christian |
| <input type="checkbox"/> Buddhist | <input type="checkbox"/> Others | |

1.4 Educational Status

- | | | |
|---|--|------------------------------------|
| <input type="checkbox"/> No education | <input type="checkbox"/> Primary education | <input type="checkbox"/> Secondary |
| <input type="checkbox"/> Higher education | <input type="checkbox"/> Graduation | <input type="checkbox"/> Others |

1.5 Family size

- | | |
|--|---------------------------------------|
| <input type="checkbox"/> United family | <input type="checkbox"/> Joint family |
|--|---------------------------------------|

1.6 Number of child:

1.7 Living area

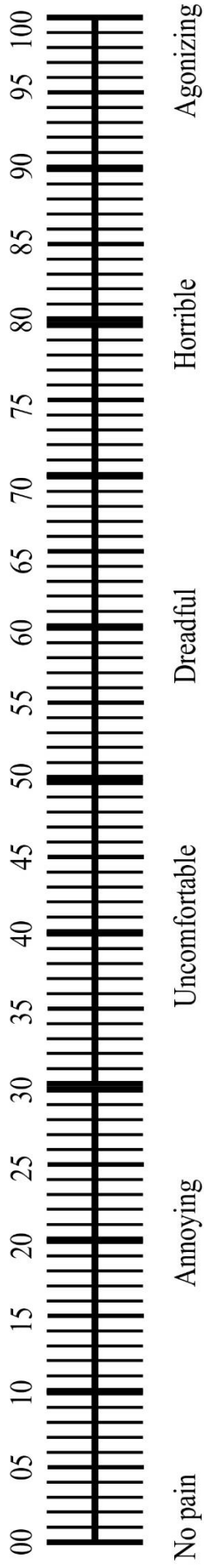
- | | |
|--------------------------------|--------------------------------|
| <input type="checkbox"/> Urban | <input type="checkbox"/> Rural |
|--------------------------------|--------------------------------|

1.8 Smoking

- | | |
|------------------------------|-----------------------------|
| <input type="checkbox"/> Yes | <input type="checkbox"/> No |
|------------------------------|-----------------------------|

Chapter-2

Visual Analog Scale (Vas) for pain



xxii

Pre-Vas Score: within 100

Post-VAS Score: within 100

Chapter-3
Oswestry Disability Index (ODI)

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 manage most of my personal care
- I need help every day in most aspects of self-care
- I do not get dressed

3.3 Weight lifting

- I can lift heavy weights without extra pain
- I can lift heavy weights but it gives extra pain
- Pain prevents me from lifting heavy weights off the floor, but I can manage if they are conveniently placed eg. on a table
- Pain prevents me from lifting heavy weights, but I can manage light to medium weights if they are conveniently positioned
- I can lift very light weights
- I cannot lift or carry anything at all

3.4 Walking

- Pain does not prevent me walking any distance
- Pain prevents me from walking more than 2 kilometres
- Pain prevents me from walking more than 1 kilometre
- Pain prevents me from walking more than 500 metres
- I can only walk using a stick or crutches
- I am in bed most of the time

3.5 Sitting

- I can sit in any chair as long as I like
- I can only sit in my favourite chair as long as I like
- Pain prevents me sitting more than one hour
- Pain prevents me from sitting more than 30 minutes
- Pain prevents me from sitting more than 10 minutes
- Pain prevents me from sitting at all

Initial	Final
3.1 Pain intensity	
0	0
1	1
2	2
3	3
4	4
5	5
3.2 Personal Care	
0	0
1	1
2	2
3	3
4	4
5	5
3.3 Lifting	
0	0
1	1
2	2
3	3
4	4
5	5
3.4 Walking	
0	0
1	1
2	2
3	3
4	4
5	5
3.5 Sitting	
0	0
1	1
2	2
3	3
4	4
5	5

3.6 Standing

- I can stand as long as I want without extra pain
- I can stand as long as I want but it gives me extra pain
- Pain prevents me from standing for more than 1 hour
- Pain prevents me from standing for more than 3 minutes
- Pain prevents me from standing for more than 10 minutes
- Pain prevents me from standing at all

3.7 Sleeping

- My sleep is never disturbed by pain
- My sleep is occasionally disturbed by pain
- Because of pain I have less than 6 hours sleep
- Because of pain I have less than 4 hours sleep
- Because of pain I have less than 2 hours sleep
- Pain prevents me from sleeping at all

3.8 Sexual Life

- My sex life is normal and causes no extra pain
- My sex life is normal but causes some extra pain
- My sex life is nearly normal but is very painful
- My sex life is severely restricted by pain
- My sex life is nearly absent because of pain
- Pain prevents any sex life at all

3.9 Social Life

- My social life is normal and gives me no extra pain
- My social life is normal but increases the degree of pain
- Pain has no significant effect on my social life apart from limiting my more energetic interests eg, sport
- Pain has restricted my social life and I do not go out as often
- Pain has restricted my social life to my home
- I have no social life because of pain

3.10 Travelling

- I can travel anywhere without pain
- I can travel anywhere but it gives me extra pain
- Pain is bad but I manage journeys over two hours
- Pain restricts me to journeys of less than one hour
- Pain restricts me to short necessary journeys under 30 minutes
- Pain prevents me from travelling except to receive treatment

Initial	Final
3.6 Standing	
0	0
1	1
2	2
3	3
4	4
5	5
3.7 Sleeping	
0	0
1	1
2	2
3	3
4	4
5	5
3.8 Sexual Life	
0	0
1	1
2	2
3	3
4	4
5	5
3.9 Social Life	
0	0
1	1
2	2
3	3
4	4
5	5
3.10 Travelling	
0	0
1	1
2	2
3	3
4	4
5	5
Date:	

Chapter-4
Back Muscle Strength Measurement

Pre-Test

Initial Strength	Final Strength	Mean Strength
20 mmHg	1st Reading: 2nd Reading: 3rd Reading:	

Post-Test

Initial Strength	Final Strength	Mean Strength
20 mmHg	1st Reading: 2nd Reading: 3rd Reading:	