Faculty of Medicine

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Effectiveness of Self-Intervened Physical and Behavioral Problem-Solving Activities During the Leisure Period Along with Conventional Group Therapy for the Patients with Spinal Cord Injury Attended at the Centre for the Rehabilitation of the Paralysed (CRP): A Quasi-Experimental Study

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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, "**Effectiveness of Self-Intervened Physical and Behavioral Problem-Solving Activities During the Leisure Period Along with Conventional Group Therapy for the Patients with Spinal Cord Injury Attended at the Centre for the Rehabilitation of the Paralysed (CRP): A quasi-experimental study**" Submitted by **Sayeed Hossain Zibran**, for the partial fulfillment of the requirements for the degree of Bachelor of Science in Physiotherapy (B.Sc. PT).

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DECLERATION

I hereby declare that the research work entitled "**Effectiveness of Self-Intervened Physical and Behavioral Problem-Solving Activities During the Leisure Period Along with Conventional Group Therapy for the Patients with Spinal Cord Injury Attended at the Centre for the Rehabilitation of the Paralysed (CRP): A Quasi-Experimental Study**" 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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Acronym

ESES = Exercise Selg-Efficacy Scale

LTPA = Leisure Time Physical Activity

PA = Physical Activity

PHQ-2 = Patient Health Questionnaire -2

PSSQ = Problem-Solving Style Questionnaire

RCT = Randomised Control Trial

SCI = Spinal Cord Injury

SM = Self-Management

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ABSTRACT

Purpose: This study aimed to investigate the effectiveness of integrating leisure-time self-directed physical and behavior-modifying activities with conventional group therapy in improving health, functional fitness, and social cognition among adults with spinal cord injury (SCI). **Objectives:** The study sought to assess changes in health (both physical and mental health) status, social cognition, and exercise self-efficacy before and after the intervention, as well as to evaluate participants' adherence and engagement in self-managed rehabilitation. **Methodology:** A single-group quasi-experimental pre-post design was employed, involving 36 participants aged 18–65 years with traumatic or non-traumatic SCI, selected from the SCI Unit at the Centre for the Rehabilitation of the Paralysed (CRP), Savar, Dhaka. Participants underwent a four-week intervention comprising conventional group physiotherapy and self-managed activities guided by the SCI GET FIT Toolkit. Data were collected using standardized tools: PHQ-2 (health), SCI GET FIT Toolkit (functional fitness), PSSQ-20 (social cognition), and Exercise Self-Efficacy-10. **Results:** Post-intervention, depressive symptoms decreased, with PHQ-2 scores of 0 (no symptoms) rising from 6.7% to 16.7%. High exercise self-efficacy scores increased from 3.3% to 43.3%, while low-confidence scores dropped to 0%. "Thinking" and "Feeling" social cognition styles improved significantly ($p < 0.01$), indicating gains in logical and emotional reasoning. Toolkit quiz accuracy averaged 64%, and 73% of participants maintained ≥ 4 exercise sessions per week. **Conclusion:** The combined approach of self-directed physical and behavioral interventions with structured group therapy demonstrates significant positive impacts on health, functional outcomes, and social cognition in adults with SCI. This patient-centered, flexible rehabilitation model holds promise for wider implementation in community settings where access to conventional therapy may be limited.

Keywords: *Spinal cord injury, leisure-time activity, self-management, behavior change, group therapy, physical rehabilitation, social cognition, exercise self-efficacy, quasi-experimental study*

CHAPTER I INTRODUCTION

1.1 Background

Spinal cord injury (SCI) is an acute neurological condition characterized by damage to the spinal cord, with the risks of temporary or permanent changes in motor, sensory and autonomic systems, which as often as not leads to significant disability and imposes a huge burden on healthcare systems around the world (Qin et al., 2025) (Encarnacion et al., 2024) (Wilson et al., 2024). Traumatic spinal cord prevalence is highly dominant in males and incidence increases with age with a significant number of cases occurring within community settings (Wang et al., 2024). Spinal cord injury (SCI) may be either traumatic or non-traumatic. Non-traumatic SCI is caused mainly by chronic or acute pathological disorders including infections and malignancies, and traumatic SCI is caused by external physical forces, among which there are motor vehicle accidents, falls, and sport-related accidents (Encarnacion et al., 2024) (Kong, 2022). The spinal cord injury has serious health effects that affect people both in body and mind because people are usually faced with the effects of chronic pain, depression, anxiety and social discrimination. The injury can be complete and incomplete with various degrees of neurological disability though it can be in the form of paraplegia and tetraplegia. (Encarnacion et al., 2024) (Wilson et al., 2024). Treatment and management of the spine cord injury focus on stabilizing the patient, avoiding further damages, and using surgery, both drugs, and rehabilitation to enhance functional recovery. (Wilson et al., 2024). Despite the development made in terms of understanding the pathophysiology of spinal cord injury (SCI) and the development of relevant treatment models, the condition remains to be a key cause of morbidity and mortality, thus demanding further research and targeted and preventative measures to mitigate its impact (Kong, 2022) (Taylor et al., 2022).

Physical, psychological, and social health accidents resulting in spinal cord injury (SCI) have a substantial influence on the patient and thus understanding these effects adequately is essential to direct necessary adjustment measures. On the physical level, SCI often brings about significant disabilities, with paralysis and chronic pain being two of the main ones, which, in turn, increases the levels of dependence on caregivers

and the lack of physical exercise, exacerbating the already negative impact on health-related issues of obesity and cardiovascular diseases (Makkar et al., 2025) (Awidi et al., 2024). Psychologically, individuals with spinal cord injury (SCI) are predisposed to mental health diagnoses including depression and anxiety, the prevalence of which falls in the range of 7-47.7% (Rai et al., 2024) (Molina-Gallego et al., 2024). The mental problems are compounded by the harsh injury and the resultant changes to lifestyle which may lead into social reclusiveness and abject poor quality of life (Makkar et al., 2025). (Srikanth et al., 2024). Combined with the other factors, resilience and perceived social support have been found to be definitive in the mitigation of psychological and social issues; hence, developing supportive circumstances and instating resilience-inciting interventions. (Naimat et al., 2023). Moreover, physical exercise shows positive correlation with mental health, and it implies that tailored exercise interventions can enhance psychological status and overall quality of life in patients with spinal cord injury (Ong et al., 2024) (Omar et al., 2024). An interdisciplinary interventional measure which involves putting temporal emphasis to the physical, psychological and social factors in spinal cord injury is not only vital but very important in increasing the life quality of the affected individuals (Srikanth et al., 2024).

The processes involved in rehabilitating patients diagnosed with SCI have improved significantly, and they incorporate new and old techniques to enhance rehabilitation and quality of life. Consistent with the general prosthetics, conventional rehabilitation usually includes physical therapy that is the essence of the treatment and focuses on improving motor skills and avoiding the drawbacks like pressure ulcers and atrophy (Alhazmi et al., 2024) (Maggio et al., 2024). The combination of multidisciplinary approaches, psychological support, and cognitive training has proven significant improvements in motor abilities and cognitive parameters and improvement of the overall quality of life of the person with SCI (Maggio et al., 2024). The importance of early and patient-specific rehabilitation is highlighted and interdisciplinary approaches are necessary because the complicated nature of spinal cord injury affects the multi-systems, and can even lead to such problems as as autonomic dysreflexia, and neurogenic bladder (Güngör, 2024). Furthermore, self-management after discharge is also crucial, since after leaving the hospital, people use different strategies to balance the health and other requirements at the level of personal and social commitments (Qama et al., 2025). The sphere of SCI rehabilitation is marked with a quite dynamic

interplay between the mainstream methods and cutting-edge technology, the importance of the need of a multifactorial approach in terms of individualized recovery outcome enhancement (Alhazmi et al., 2024) (Fischer et al., 2024).

Exercise plays an exclusive role in the restoration and functional improvement of individuals with spinal cord injury (SCI) as it promotes neuronal remodelling, enhances motor performance and increases their living standards. Various exercise modalities, including aerobic, endurance, strength, and high-intensity interval training exercises have proved effective in improving the skeletal muscle physiology, neuroprotection, and neural plasticity thus leading to improved motor performance and performance of daily activities of patients with spinal cord injury (Li et al., 2024). Home-based, supervised exercise programs have been demonstrated to be realistic and acceptable, offering a realistic alternative to patients with chronic spinal cord injury that prevents access to traditional exercise facilities of some kinds (Pinelli et al., 2024). In addition, exercise has the potential of preventing maladaptive plasticity, such as nociceptive afferent sprouting that is associated with neuropathic pain and autonomic dysreflexia, thereby promoting improved functional outcomes (Cesarz, 2022). Despite these merits, a significant engagement disparity exists, as not all patients with spinal cord injury engage in routine exercise because of collaboration barriers like lack of information and social support system (Baehr et al., 2022). As a result, it is essential to develop well-rounded strategies of physical exercise addressing these barriers and maximizing the therapeutic value of the physical activity in the field of SCI rehabilitation.

Behavioral therapies are essential for improving social cognition and quality of life in patients with SCI. These strategies aim at addressing the complex problems that SCI patients experience; they include cognitive behavioral therapy (CBT), wellness programs, and digital psychosocial interventions. The CBT has been proved to significantly improve mental health, self-efficacy, and quality of life through changing the negative automatic thoughts into the positive ones and thus increasing the emotional stability and better results in the rehabilitation (Kim & Kim, 2023) (Shaoqing & Shaoqing, 2022). Digital based interventions like internet-based therapies and phone applications have emerged as potential alliances of administering psychosocial support to patients, with some evidences suggesting improvements in social cognition and empathy, though the standard and personalization of the interventions in spinal cord injury is to be optimized (Armstrong et al., 2024) (Lohaus et al., 2024). Applying

behavioral therapies in spinal cord injury rehabilitation programs requires careful consideration in order to overcome social cognitive impairments and to enhance the quality of life but they have to be thoroughly studied and developed to maximize the benefits.

Leisure time also can strongly influence the health outcomes of patients with SCI by different pathways, primarily, by improving physical and psychological well-being. Regular engagement in leisure-time physical activity (LTPA) is associated with increased health, fitness, muscle strength, and endurance as well as improved agility and perceived enjoyment, which are essential among people with SCI who are often subjected to inactive lifestyles and resultant health problems, such as cardiometabolic illnesses (Watson et al., 2024) (Stendell et al., 2024). Such benefits notwithstanding, there is a low rate of participation in leisure-time physical activities by the patients with spinal cord injury with a small percentage following the recommended physical activity levels, which are important in determining positive health outcomes (Watson et al., 2024). The reasons to engage in LTPA refer to the health improvement, weight management, and prevention of diseases, whereas the perceived benefits include psychosocial benefits such as reducing stress and social interaction (Watson et al., 2024). Difference in LTPA participation is marked and depends on these parameters like severity of injury and time duration since injury (Waller et al., 2024). Moreover, the recreation, including sports and community activities, has been linked with life satisfaction and happiness, reaffirming the role it serves as an adequate stress coping mechanism leading to subjective well-being and quality of life in challenging times, like the COVID-19 pandemic era and beyond (Kim et al., 2022). The most important factor of LTPA and other recreational activities is its promotion in the effort to improve the health outcomes and quality of life among SCI patients, and intensive interventions to increase participation and adherence to physical activity needs should be targeted (Watson et al., 2024).

People who have SCI are facing multiple hurdles to maintain physical activity and social interaction, and it has a devastating impact on their quality of life. Issues of access like proximity, transportation challenges and lack of enough facilities and programs, particularly in those locations that are not adequately funded (Wilson et al., 2024; Vermaak et al., 2022). Individual barriers such as low self-efficacy, lack of motivation, and physical limitations also hamper the involvement in physical activity (Watson et

al., 2024). Such challenges are exacerbated by social barriers, including unfavorable attitudes and caregiver dependence (Wilson et al., 2024). Environmental and cultural barriers, as well as, psychological and health-related issues, also determine social involvement (Mohan & Deb, 2023).

The distinguishing characteristic of self-directed activities and organized rehabilitation programs is that these two approaches mainly vary according to their methodical approach, structure, and the level of professional involvement. Self-management or self-rehabilitation, as they are more commonly referred to, are self-intervened activities that center on the active role of the person in the process of their own rehabilitation. Such activities tend to be performed within the comfort of their home and self-monitored and thus the attendee can go through the exercises and movements at his/her own pace and convenience. Self-management tools encourage independent performance of therapeutic activities to increase therapy dosage without any additional means (Whittaker et al., 2024). Such programs often include such elements as diaries or logs that will track the progress and ensure adherence (Westlake et al., 2023). On the contrary, organized rehabilitation programs are more structured and usually involve a larger degree of professional supervision, and intervention. It is common that such programs are applied in a clinical setting; they are designed to be systematic and comprehensive and also include numerous therapy modalities to be able to attain certain rehabilitation goals.

Integration of physical and behavioral treatment procedures has proved promising in the overall functionality of the individual with SCI addressing both the physiological and psychological implementation of rehabilitation. Multidisciplinary approaches composing of combination of traditional physiotherapy, cognitive rehabilitation, psychological support interventions have produced significant improvements in both motor and cognitive skills, and the quality of life by offsetting depressive symptoms and patient satisfaction (Maggio et al., 2024). Multimodal treatments including functional electrical stimulation, arm ergometry, and testosterone treatment in combination with behavioral motivational techniques have shown positive effects on aerobic capacity, musculoskeletal status as well as metabolic health and thus on overall well-being of patients with SCI (Reid et al., 2022). The behavioral components play a critical role in the sustainment of lifestyle change, including increase in physical activity that may lead to improvement in the aerobic fitness and decreased chronic pain

(Mulroy, 2020). Stakeholder interventions manifest that behavioral coaching can considerably boost the degree of physical activities and aerobic proficiency, highlighting the relevance of stakeholders in the formulation of powerful interventions (Ma et al., 2019).

Previous studies have focused on the various self-administered treatment in spinal cord injury (SCI) and this has focused on self-management (SM) interventions in improving independence and quality of life of the individuals with SCI. The study reported by Qama et al. (2025) highlighted the increasing variety of the research on SMs, emphasizing the need to integrate SMs into everyday experiences and improve relations between patients and medical workers (Qama et al., 2025). Another paper by Qama et al. (2025) established three approaches to SM integration in rehabilitation: compartmentalizing, mixing, and embedding, that are informed by mind-body interaction and societal views (Qama et al., 2025).

Recreational activities play a crucial role in a person with SCI, considering mood and social activity. Leisure, in all aspects, physical and human interactions, is positively associated with mental health prognoses, such as happiness, life satisfaction, and reduced depression among the older citizens. This evidence can be extended to the SCI patients, and the same benefits were observed in other groups (Yen et al., 2023). In addition, engaging in sports among individuals with SCI enhances mental health and health-related relationships positively related to lifestyle changes and negatively related to sleeplessness (Kaneda et al., 2024). Exercise therapies benefit SCI patients by improving mental health and health-related quality of life (HRQoL) and, therefore, total, subjective, psychological, and social well-being (Ponzano et al., 2024). However, in spite of these benefits, LTPA is very low in individuals with SCI, with a very small percentage of individuals reporting to exercise according to the recommended standards of physical activities (Watson et al., 2024). The participation percentage being low is worrying with the potential health benefits of the latter, i.e., health, fitness, and social integration, which are often mentioned as motivators and perceived benefits of LTPA (Watson et al., 2024). Barriers such as the physical setting, poor social attitudes, and psychological issues additionally create impediments to the social participation, and demonstrating that there is a need to develop personalized interventions to help enhance leisure activity participation (Moniruzzaman et al., 2024). To boost mental health and social interaction in SCI patients, the use of leisure activities like traveling,

sports, and exercise is important, and efforts need to be made to overcome existing barriers to generate greater participation in them (Kim et al., 2024) (Zhao & Cole, 2023) (Kaneda et al., 2024) (Ponzano et al., 2024).

This study is especially topical in discussing the modern situation on the SCI recovery front. The relevance of this problem is supported by the fact that the levels of engagement in LTPA among people with SCI are low. Watson et al. (2024) found that only 13 percent of the participants were meeting the recommendations on physical activity, showing that there was a significant gap in the achievement of positive effects on health that could be produced by physical activity only (Watson et al., 2024). Such a combination of self-directed activities and group therapy is likely to overcome one of the barriers, including accessibility and motivation, which are necessary due to the challenges presented by people with SCI in accessing traditional rehabilitation centers, especially in rural or remote areas (Pinelli et al., 2024). The biopsychosocial model of rehabilitation stresses the importance of focusing on physical, emotional, and social aspects, and can be successfully addressed with the help of the individually-tailored and home-based intervention (Barría et al., 2025). Contributions show that physical exercise-based combined therapy can enhance cognitive performance, but it is necessary to repeat this study to confirm the findings (Li et al., 2024). Engaging in leisure activities constitutes an important part of successful aging and being integrated into the social environment, therefore, the importance of providing fully formed rehabilitation programs consisting of self-directed activities and group-based activities (Zhao et al., 2024). The holistic paradigm of self-directed rehabilitation of the spinal cord that synthesizes the groups treatment with self-driven approaches aligns with current patterns and needs of the discipline, which offers a universal strategy of promoting health, functioning and social cognition in this population.

1.2 Rationale

The rising recognition of a need of patient-based holistic rehabilitation plan among the patients with SCI is what drives this research. Traditional rehabilitation often focuses on physical or behavioral therapy separately, thus limiting the effectiveness of prolonged recovery in general. Moreover, SCI patients might be denied access to formal rehabilitation programs or even access to exercise facilities due to plight, environmental challenge, or even economic constraints. Therefore, the promotion of self-guided active leisure time practices as part of everyday activity introduce a feasible and attainable alternative. In addition, depression, anxiety and low self-efficacy are some of the behavioral disorders found prevalent among the SCI populations which has a negative influence on motivation and participation on rehabilitation. Psychological barriers can be alleviated through incorporation of behavior changing strategies, such as goal setting, and cognitive restructuring into the mechanism of rehabilitation in order to enhance participation. Complementing such self-guided strategies with conventional group therapy increases the advantages due to the development of a sense of community, the development of social cognitive skills, and emotional support. Individual or collective approaches, especially those with a peer-support element, have proved to increase engagement, lessen feelings of isolation, and increase overall life satisfaction. These multifactorial needs are what this study proposes in a quasi-experimental study to determine the applicability of using leisure-time self directed physical and behavioral interventions with traditional group treatment to determine their efficacy. The presently discussed creative and adaptive approach is aimed at boosting health, physical functioning, and social thinking, thus promoting the needs of adults with SCI, the quality of their life.

1.3 Research question

What is the effectiveness of self-intervened physical and behavioral problem-solving activities during the leisure period along with conventional group therapy for the patients with spinal cord injury attended at the centre for the rehabilitation of the paralysed (CRP): a quasi-experimental study?

1.4 Aim

To investigate the effect of leisure-time self-directed physical and behavior-changing activities combined with conventional group therapy in adults with spinal cord injury using a single-group quasi-experimental approach.

1.5 Objectives

1.5.1 General Objectives

To evaluate changes in health status, physical activity engagement, and social cognition among adults with spinal cord injury after receiving a combined intervention of self-managed leisure-time activities and conventional group therapy.

1.5.2 Specific Objectives

1. To assess the change in physical health outcomes (e.g. general well-being) before and after the intervention.
2. To determine the effect of the intervention on self-efficacy, social cognition, including social engagement, emotional understanding, and interpersonal behavior.
3. To analyze participant adherence and engagement with self-directed leisure-time physical and behavioral activities throughout the intervention period.
4. To promote an active lifestyle for inactive SCI adult persons through the integration of self-managed activities and group therapy.

1.6 Hypothesis

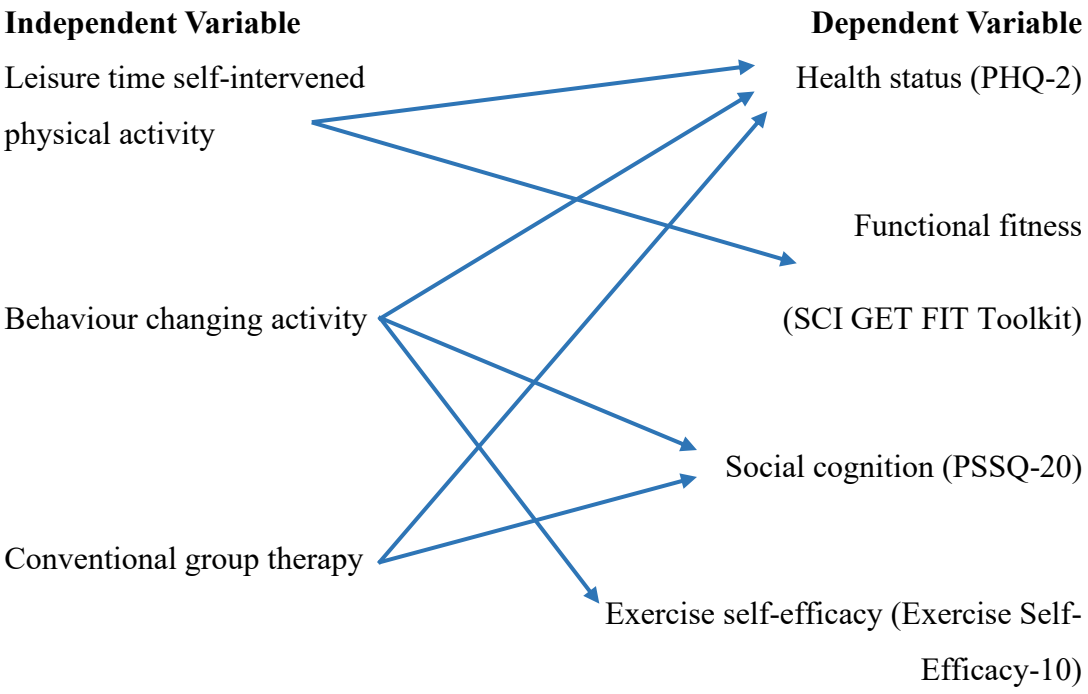
1.6.1 Alternative hypothesis:

There will be a significant improvement in health (as measured by PHQ-2), functional fitness (as measured by SCI GET FIT Toolkit), social cognition (as measured by PSSQ-20), and exercise self-efficacy (as measured by Exercise Self-Efficacy-10) in adult persons with spinal cord injury after engaging in leisure time self-intervened physical and behavior changing activities along with conventional group therapy.

1.6.2 Null hypothesis:

There will be no significant improvement in health, functional fitness, social cognition, and exercise self-efficacy in adult persons with spinal cord injury after engaging in leisure time self-intervened physical and behavior changing activities along with conventional group therapy.

1.7 Variables



1.8 Operational definitions

Leisure Time Self-Intervened Physical Activity

Exercises like range of motion, flexibility, or resistance training, independently performed by the participant during non-therapy hours, based on guidelines from the SCI GET FIT Toolkit.

Behaviour Changing Activity

Structured self-initiated tasks such as self-monitoring, goal setting, or motivational journaling to foster lifestyle change and self-discipline, guided by behavior change techniques embedded in the intervention.

Conventional Group Therapy

Group physiotherapy interventions focused on general mobility, strength, and coordination exercises conducted by a licensed therapist in a structured session.

Health Status

Mental well-being assessed using the Patient Health Questionnaire-2 (PHQ-2), focusing on symptoms of depression over the past two weeks.

Functional Fitness

Assessed through the SCI GET FIT Toolkit, including tests for endurance, strength, and flexibility specific to SCI individuals.

Social Cognition

Evaluated using the Problem-Solving Style Questionnaire (PSSQ-20), which reflects the individual's capacity for adaptive social behavior and interpersonal functioning.

Exercise Self-Efficacy

Measured by the Exercise Self-Efficacy Scale (10-item), reflecting the participant's confidence in their ability to engage in regular physical activity independently.

CHAPTER II LITERATURE REVIEW

The key theoretical models underlying spinal cord injury (SCI) rehabilitation encompass a variety of approaches that integrate anatomical, physiological, psychological, and social dimensions. One prominent model is the "Unified Theory" of spinal interneurons, which emphasizes the role of spinal central pattern generators in locomotor output and suggests that recovery trajectories improve when force output is maintained or regained post-injury (Magnuson, 2022). The Bio-Psycho-Social (BPS) Model is another significant framework, integrating biological, psychological, and social factors to address the complex interplay of these elements in rehabilitation (Jahan & Ellibidy, 2017). This model aligns with the International Classification of Functioning, Disability, and Health (ICF), which serves as a comprehensive framework for understanding the multifaceted nature of SCI rehabilitation (Jahan & Ellibidy, 2017) (Hodel et al., 2020). The SCI Rehab model further extends this by combining the ICF's focus on outcomes with practice-based evidence, emphasizing detailed data collection on person, process, and outcomes to enhance rehabilitation strategies (Whiteneck & Gassaway, 2010). Activity-Based Restorative Therapies (ABRT) focus on neuroplasticity and repetitive task-specific training to activate spinal pathways and improve functional mobility, highlighting the potential for recovery even in chronic SCI cases (Dolbow et al., 2015). The Health-Related Quality of Life (HRQoL) Model, as explored in the context of pain and disability, underscores the cascading effects of pain on physical disability and identifies potential intervention points to improve quality of life (Perrin et al., 2017). Collectively, these models illustrate the diverse and interdisciplinary nature of SCI rehabilitation, each contributing unique insights and methodologies to enhance recovery and quality of life for individuals with SCI.

The current state of research on physical rehabilitation for spinal cord injury (SCI) patients is characterized by a diverse array of therapeutic approaches and emerging technologies aimed at enhancing recovery and improving quality of life. Exercise training remains a cornerstone of rehabilitation, with modalities such as aerobic exercise, strength training, and high-intensity interval training showing promise in improving motor function and daily living abilities by enhancing skeletal muscle function and inducing neuroprotection and regeneration (Li et al., 2024). However, the precise mechanisms through which these exercises promote recovery, particularly

through changes in exercise, remain unclear, and there is no consensus on a standardized exercise regimen (Li et al., 2024). The interdisciplinary approach is crucial due to the multifaceted nature of SCI, which affects multiple systems and can lead to complications such as spasticity and autonomic dysreflexia (Güngör, 2024). Recent studies have highlighted the role of neuroplasticity in motor skill learning, suggesting that training-induced changes in cortical and subcortical areas can be monitored to assess rehabilitation progress (Emmenegger et al., 2024). Virtual reality fitness training (VRFT) has emerged as a promising home-based rehabilitation tool, offering convenience and accessibility while potentially improving muscle function and cardiopulmonary fitness (Kang et al., 2024). The integration of technologies in neurorehabilitation, such as functional electrical stimulation (FES) and robotic locomotor training, has been shown to enhance walking ability and physical independence (Lee & Jeoung, 2023). Overall, the field is moving towards a more personalized and technology-integrated approach, with ongoing clinical studies continuing to shape the future of SCI rehabilitation (Furlan et al., 2023).

Self-intervened physical activities have shown varying degrees of effectiveness in improving mobility among individuals with SCI. Activity-based therapies (ABTs) have been implemented in community settings, resulting in improvements in mobility, sitting balance, and quality of life, as evidenced by a 1.33-point increase in mobility scores and a 9% improvement in sitting balance (Oliveira et al., 2023). The Bridge Program, a personalized exercise initiative, increased physical activity and reduced anxiety symptoms, although it did not significantly affect depressive symptoms or self-efficacy (Butzer et al., 2023). Similarly, a co-developed behavioral physical activity intervention significantly increased self-reported and accelerometer-measured physical activity, as well as aerobic fitness, indicating substantial improvements in unsupervised physical activity (Ma et al., 2019). Home-based supervised exercise programs have also been found feasible and acceptable, potentially improving quality of life and functional capacity, although adherence remains a challenge (Pinelli et al., 2024). Early activity-based therapy (E-ABT) has been safely initiated shortly after severe traumatic SCI, showing high completion rates and no major adverse events, suggesting its potential for early mobility improvements (Dionne et al., 2024). While these interventions demonstrate promise, the heterogeneity in study designs and outcomes highlights the need for further research to conclusively determine the efficacy of self-intervened

physical activities in enhancing mobility for SCI patients (Sahely et al., 2022). Overall, these findings suggest that while self-intervened physical activities can improve certain aspects of mobility and psychosocial health, their effectiveness varies, and more robust studies are needed to establish comprehensive benefits for SCI patients.

Research on the impact of behavior change interventions on SCI recovery has been explored through various studies, each focusing on different aspects of rehabilitation and recovery. A study highlighted the importance of behavior change techniques (BCTs) in increasing physical activity (PA) among people with SCI. It found that interventions incorporating behavioral techniques were effective in enhancing subjectively measured PA, suggesting that behavior change is a crucial component in managing primary and secondary complications associated with SCI (Vachova et al., 2024). Similarly, a systematic review and meta-analysis confirmed that behavior-targeted interventions significantly increased PA participation, with practical support, individualization, and monitoring being particularly effective (Watson et al., 2023). The use of digital health technologies, such as smartphone applications, has also been evaluated for their potential to improve PA in SCI populations. Collectively, these studies underscore the significance of incorporating behavior change strategies in SCI rehabilitation to improve various recovery outcomes, including self-management, physical activity. However, the effectiveness of these interventions can vary, and further research is needed to optimize their design and implementation for diverse SCI populations.

Social cognition plays a pivotal role in the rehabilitation of spinal cord injury (SCI) patients by addressing the cognitive and emotional challenges that significantly impact their quality of life. The integration of social cognitive skills into rehabilitation programs is crucial for facilitating successful reintegration into society, as these skills encompass abilities such as social perception, empathy, perspective-taking, communication, and problem-solving (Pandey, 2024). The importance of social cognition in rehabilitation is underscored by its influence on functional ability and quality of life, with deficits in this area leading to difficulties in daily functioning and potential social isolation (Jha, 2024; Rivas-García et al., 2024). Rehabilitation programs that incorporate social cognitive theory have shown promise in enhancing self-efficacy among SCI patients, which is a critical factor for improving mobility, independence, and social integration (Badakhshian & Samiee, 2022) (Wilroy & Turner, 2020).

Emerging technologies, such as virtual reality and computerized cognitive training, offer innovative approaches to assess and improve social cognition, providing new avenues for rehabilitation strategies (Vasconcelos et al., 2024). Overall, the integration of social cognition into rehabilitation not only addresses cognitive deficits but also supports the emotional and psychological well-being of SCI patients, ultimately contributing to a more holistic recovery process (Halalmeh et al., 2025) (Singha, 2024).

Group therapy plays a significant role in the rehabilitation of spinal cord injury (SCI) patients by addressing both physical and psychological needs, thereby enhancing overall recovery outcomes. Various forms of group therapy, such as psychoeducation based on Cognitive Behavioral Therapy (CBT), have been shown to empower individuals by promoting active participation in their rehabilitation process and improving adherence to treatment plans (Oliveira, 2024). Multiple Family Group (MFG) interventions, which involve both SCI patients and their caregivers, have demonstrated effectiveness in reducing passive coping strategies and enhancing social support, which are crucial for managing the long-term adjustments required post-injury (Dyck et al., 2021). Therapeutic recreation during inpatient rehabilitation has been associated with improved community participation, life satisfaction, and reduced depression, highlighting the importance of engaging patients in meaningful activities (Gassaway et al., 2019). Solution-focused group therapy (SFGT) has been effective in managing neuropathic pain, improving pain self-efficacy, and reducing depression, thereby contributing to better quality of life for SCI patients (Li et al., 2019). Group physical therapy, which includes activities like strengthening and mobility training, is a significant component of inpatient rehabilitation, contributing to improved physical function and endurance (Zanca et al., 2011). Additionally, Meaning-Centered Group Psychotherapy (MCGP) has been shown to significantly enhance the sense of meaning in life for SCI patients, which is crucial for psychological well-being and motivation during rehabilitation (Abed et al., 2023). Overall, group therapy provides a multifaceted approach that addresses the complex needs of SCI patients, facilitating both physical recovery and psychological resilience, which are essential for successful rehabilitation.

Rehabilitation protocols that integrate self-directed interventions are increasingly being explored across various health conditions, emphasizing patient autonomy and engagement. These programs often incorporate motivational interviewing and ecological momentary assessments to boost adherence and engagement (Kim et al.,

2023). In pulmonary rehabilitation, self-management strategies are being evaluated for their effectiveness and safety, with a focus on reducing clinical supervision while encouraging patients to exercise independently (Ricke et al., 2023). In inpatient settings, the "My Therapy" program facilitates self-directed therapy activities, allowing patients to engage in therapeutic exercises independently, which is supported by comprehensive education and organizational backing to overcome barriers such as space and workload constraints (Brusco et al., 2023). These diverse applications of self-directed interventions across different rehabilitation contexts underscore their potential to enhance patient outcomes by fostering self-efficacy and reducing reliance on direct clinical supervision.

Previous studies have evaluated the effectiveness of leisure-time activities for spinal cord injury (SCI) patients by examining various dimensions such as participation rates, physical fitness, psychological benefits, and long-term impacts on life satisfaction. A study on the Australian SCI population found that while 58% of participants engaged in leisure-time physical activity (LTPA), only 13% met the recommended guidelines for fitness improvement, indicating low participation levels and insufficient activity intensity to elicit healthful changes (Watson et al., 2024). Another study highlighted a weak correlation between physical fitness and LTPA, suggesting that despite good physical fitness, SCI individuals often limit their activities to exercise-based routines rather than diverse recreational activities like sports or gardening (Attarde & Ravindran, 2024). Outdoor activities have been reported to provide positive experiences for SCI individuals, although barriers such as accessibility need to be addressed (Aaby et al., 2025). Motivations for engaging in LTPA include health improvements, weight management, and illness prevention, with perceived gains such as enhanced fitness and enjoyment being significant (Watson et al., 2024). Longitudinal studies have shown that while LTPA participation remains stable over time, individual variability is substantial, and many do not achieve sufficient activity levels for health benefits (Waller et al., 2024). Furthermore, leisure and recreation activities are positively associated with social integration and life satisfaction, with social integration mediating the relationship between leisure participation and life satisfaction (Zhao & Cole, 2023). These findings underscore the importance of promoting diverse and accessible leisure activities to enhance both physical and psychosocial outcomes for SCI patients. Overall, while

leisure-time activities offer potential benefits, there is a need for increased participation and diversity in activities to fully realize these benefits for SCI individuals.

The literature on self-intervened activities for spinal cord injury (SCI) patients reveals several gaps that need to be addressed to enhance self-management (SM) interventions. One significant gap is the lack of comprehensive understanding of how and why SM interventions work or fail, and the factors influencing their success, which necessitates longitudinal studies to monitor SM from rehabilitation to community reintegration in diverse contexts (Qama et al., 2025). Additionally, while mobile health (mHealth) technologies have shown potential in supporting SM for chronic conditions, there is a paucity of research on their public availability and comprehensive evaluation, particularly in terms of theory-based strategies and emotional management tasks (Bernard et al., 2024; Bernard et al., 2023). Furthermore, medication self-management interventions are limited, with few tools available to support polypharmacy management in SCI patients, highlighting the need for co-designed interventions with end-users to ensure comprehensive support (Cadel et al., 2023). The feasibility and acceptability of SM programs, such as the Spinal Cord Injury Self-Management (SCISM) Program, have been demonstrated, but there is a need for further efficacy trials to evaluate their potential in reducing secondary health conditions (SHCs) and improving quality of life (Kraus & Wolf, 2024) (Kraus, 2024). Lastly, while exercise is recognized as beneficial, accessibility issues due to geographical isolation limit its use, indicating a need for home-based exercise programs (Pinelli et al., 2024). Addressing these gaps through targeted research and development of comprehensive, accessible, and user-centered SM interventions could significantly improve the management of SCI.

Quasi-experimental designs have been effectively utilized in studies similar to this study by providing a robust framework for evaluating interventions where randomized controlled trials (RCTs) are not feasible. These designs are particularly valuable in clinical and implementation research, where ethical, logistical, or practical constraints limit the use of RCTs. For instance, in the context of spinal cord injury (SCI) rehabilitation, quasi-experimental designs have been employed to assess interventions like graded exercise integrated with education, which aims to improve physical fitness and exercise self-efficacy among patients (Hisham et al., 2019). Similarly, a coping-oriented supportive program for SCI patients was evaluated using a parallel-group

quasi-experimental design, demonstrating significant psychosocial benefits over a 12-week follow-up period (Li et al., 2020). These studies often use pre-post designs with non-equivalent control groups, which allow for the comparison of intervention effects while accounting for baseline differences between groups (Handley et al., 2018). Quasi-experimental designs such as interrupted time series and regression discontinuity are also highlighted for their ability to provide causal inferences in the absence of randomization, thus offering a balance between internal and external validity (Park et al., 2020). In policy evaluation, these designs are crucial for understanding the impact of interventions on injury and violence prevention, where RCTs are often impractical due to ethical concerns (Ranapurwala et al., 2022). The flexibility of quasi-experimental designs makes them suitable for real-world settings, enabling researchers to address complex questions related to intervention implementation and effectiveness, as seen in various studies on SCI rehabilitation and other health interventions (Miller et al., 2020; Barreto, 2016). Overall, the strategic use of quasi-experimental designs in these studies underscores their importance in advancing health research and policy by providing credible evidence where traditional experimental methods are not applicable.

Integrating self-directed interventions with group therapy can offer a range of benefits, enhancing the effectiveness of mental health treatments. When combined with group therapy, these interventions can provide a more comprehensive approach. Group therapy offers unique advantages, such as social support and the opportunity to form meaningful therapeutic relationships, which can be particularly beneficial for individuals with complex mental health issues or dual diagnoses (Chilton et al., 2020). For instance, group-based cognitive-behavioral therapy (CBT) has been effective in improving lifestyle factors in adults with metabolic syndrome, suggesting that the group setting can enhance self-management skills and promote health-promoting behaviors (Noghabi et al., 2021). Similarly, group therapy has been shown to improve self-care and reduce distress in adults with Type 1 diabetes, indicating its potential to address both psychological and physical health outcomes (Burkhardt et al., 2024). The combination of self-directed and group interventions can also cater to individuals with varying needs and preferences, such as those who may benefit from the flexibility of self-guided formats but also require the structured support of a group setting (Hallford et al., 2024). Overall, the integration of self-directed interventions with group therapy can leverage the strengths of both approaches, providing a more holistic and adaptable

treatment framework that can address a wide range of mental health and behavioral issues.

Previous studies in the field of leisure time self-intervened physical and behavior-changing activities, along with conventional group therapy for enhancing health, function, and social cognition in adults with spinal cord injury (SCI), exhibit several limitations. One significant limitation is the lack of comprehensive understanding and integration of behavior change techniques (BCTs) in self-management interventions, which are crucial for improving leisure time physical activity (LTPA) outcomes. Although some studies have identified effective BCTs, there is a need for further exploration of elements such as dose, mode of delivery, and tailoring of interventions to individual needs. Additionally, the barriers to LTPA, including personal, environmental, and activity-related challenges, are well-documented, yet solutions to these barriers are not sufficiently addressed in existing research, limiting the practical application of findings (Hwang et al., 2016). The evidence supporting the combined effects of activity-based training and spinal cord stimulation is also limited, with a lack of consensus on outcome measures and optimal protocol parameters, indicating a need for more large-scale randomized trials (Shackleton et al., 2022). Cognitive behavior therapy (CBT) has been explored for addressing psychological distress in SCI patients, but there are significant gaps in understanding its long-term effectiveness and integration with physical activity interventions. Moreover, the role of physiotherapists in promoting physical activity is underutilized due to a lack of training and concerns over fostering false hope, which highlights the need for better knowledge translation and education. Overall, these limitations underscore the necessity for a multidisciplinary approach that incorporates behavioral self-management strategies, addresses barriers comprehensively, and evaluates the long-term effectiveness of interventions to improve health outcomes for individuals with SCI (Dobkin, 2016; Khanzada et al., 2024).

The research is informed by several key findings from past studies. Firstly, leisure time physical activity (LTPA) is crucial for health benefits in individuals with SCI, yet participation remains low, with significant individual variability and insufficient activity levels to achieve positive health outcomes (Waller et al., 2024). Behavioral interventions, including those based on social cognitive theory, have been shown to effectively increase physical activity by enhancing self-efficacy and self-regulation,

which are critical for improving mobility, independence, and quality of life (Vachova et al., 2024; Wilroy & Turner, 2020). Additionally, exercise interventions have been found to improve mental health and health-related quality of life (HRQoL), although the evidence is of low certainty, and the effectiveness in older adults remains unclear (Ponzano et al., 2024). The integration of behavioral techniques with exercise interventions is particularly effective in increasing physical activity, highlighting the importance of a combined approach (Vachova et al., 2023). Furthermore, interventions targeting depressive symptoms in SCI patients, such as pharmacotherapy and behavioral therapies, have shown promise, emphasizing the need for individualized treatment plans (Cotter et al., 2024). Cognitive impairments, another common issue post-SCI, can be addressed through physical exercise combined with cognitive training, although more research is needed to confirm these findings due to concerns about study quality and sample sizes (Li et al., 2024). The prevalence of psychological distress, including depression and anxiety, is high among SCI patients, and interventions like mindfulness and cognitive behavioral therapy have shown beneficial effects (Rai et al., 2024). Overall, these studies underscore the importance of a multifaceted approach that combines physical, behavioral, and cognitive interventions to enhance health, function, and social cognition in adults with SCI. This comprehensive strategy is crucial for addressing the complex needs of this population and improving their overall quality of life (Castan et al., 2024; Butzer et al., 2023).

CHAPTER III METHODOLOGY

3.1 Study design

This study followed a quasi-experimental single-group pre-test and post-test design to investigate the effects of leisure time self-intervened physical and behaviour-changing activities, along with conventional group therapy, on adult persons with spinal cord injury (SCI). A single group of participants were selected based on pre-defined inclusion criteria. All participants received:

- Conventional group physiotherapy sessions, conducted regularly by rehabilitation professionals at the Centre for the Rehabilitation of the Paralysed (CRP), Savar.
- Alongside, they were guided to engage in self-managed physical and behaviour-changing activities during their leisure time. These activities were designed to promote self-efficacy, motivation, and consistent engagement in rehabilitation practices.

3.2 Study area

The researcher collected data from the Spinal Cord Injury (SCI) Unit of the Centre for the Rehabilitation of the Paralysed (CRP), Savar, Dhaka.

3.3 Study population

A population means the entire group of people or items that meet or fulfil the criteria set by the researcher. The populations of this study were diagnosed with either traumatic or non-traumatic spinal cord injury who were admitted to the Spinal Cord Injury (SCI) Unit of Centre for the Rehabilitation of the Paralysed (CRP), Savar, Dhaka.

3.4 Consort framework

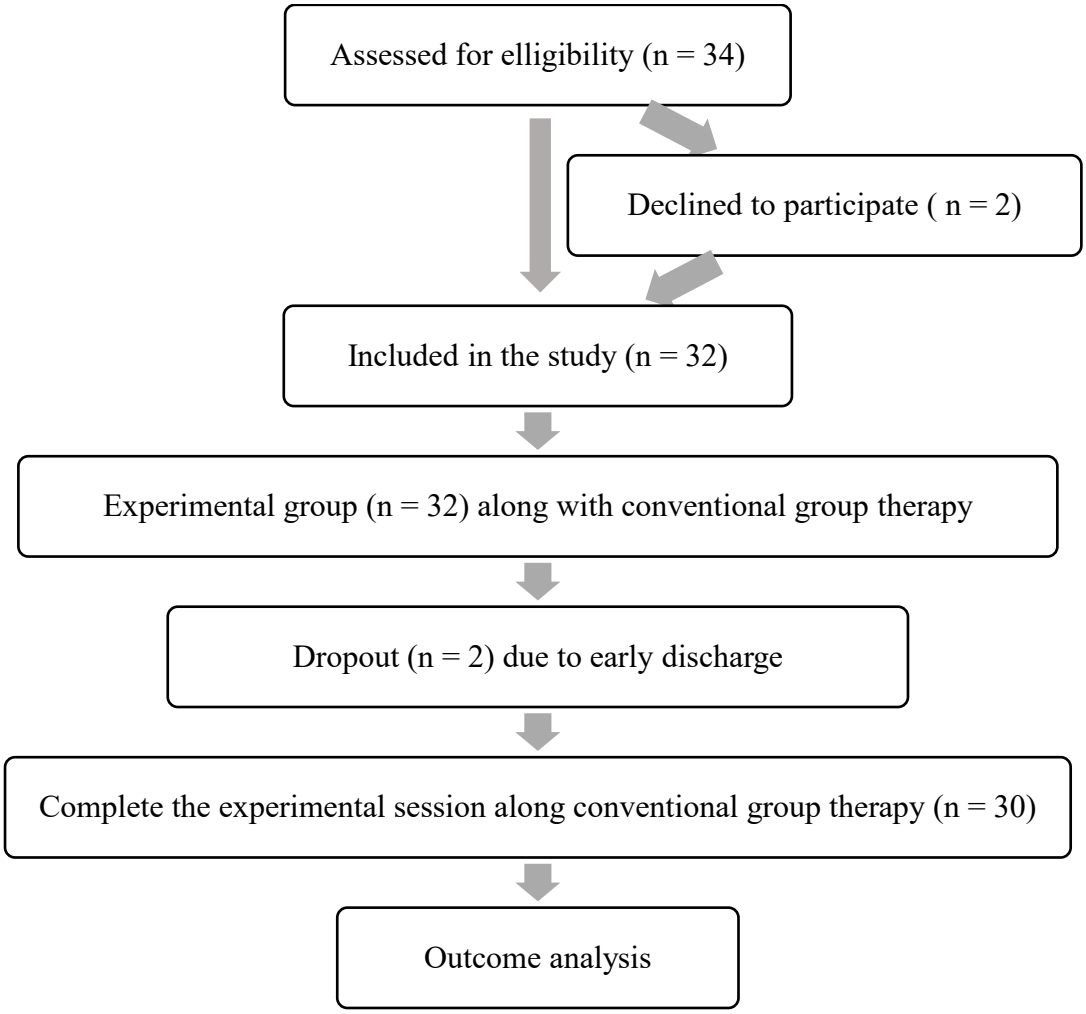


Figure 1: Consort framework

3.5 Sample size

As this study employed a single-group pretest–posttest quasi-experimental design, the same participants served as their own controls. This within-subjects design allows for greater statistical power with a smaller sample compared to between-group studies. Since this is a within-subjects design, the required sample size is generally smaller than in a two-group design (Faul *et al.*, 2007).

The formula remains the same as in a paired t-test (single-group pretest-posttest design):

$$n = \frac{\left(Z_{\propto/2} + Z_{\beta}\right)^2}{{d_z}^2}$$

We assume,

- Effect size (Cohen's dz) = 0.5 (moderate effect)
- Significance level (α) = 0.05 (5%)
- Power (1 - β) = 0.80 (80%)
- Two-tailed test (detects changes in both directions)

Where,

- $Z_{\alpha/2}$ = 1.96 (for α = 0.05, two tailed test)
- Z_{β} = 0.84 (for power = 80%)
- Effect size d_z = 0.5 (Hicks *et al.*, 2011)

Calculation,

$$n = \frac{(1.96+0.84)^2}{(0.5)^2}$$

$$n = \frac{(2.80)^2}{0.25}$$

$$n = \frac{7.84}{0.25}$$

$$n = 31.36$$

Since sample size must be a whole number, we round up:

$$n \approx 32 \text{ participants}$$

For a single-group pretest and post-test quasi-experimental study, the required sample size is approximately 32 participants.

Non-Randomization Impact: Increase sample by 10–15% to account for potential confounding.

So, now the final sample size would be,

$$n = 36 \text{ participants}$$

3.6 Selection Criteria

Inclusion Criteria

- Male and female with SCI/Duration > 3 months, aged 18-65 years (Cortes et al., 2013)
- Spinal Cord Levels must be within C5-L5 (DeVivo et al., 2006)
- Upper limb must have minimum muscle power of grade 4 (Ben et al., 2023)
- Currently undergoing rehabilitation (Perret et al., 2022)
- Willing to participate and medically stable and able to follow instructions (Perret et al., 2022)
- Cognitive ability to self-report and participate in self-intervened activities (Moreau-Gaudry et al., 2018)
- Are not forbade to lift weight (Melo et al., 2018)

Exclusion Criteria

- Individuals who have undergone surgery within the past three months (Perret et al., 2022)
- Individuals who have had grade 3–4 pressure ulcers within the past three months (Regan et al., 2009)
- Individuals experiencing limb pain that restricts their ability to exercise (Perret et al., 2022)
- Pregnant individuals (Perret et al., 2022)
- Individuals with a history of previous myocardial infarction (heart attack) or cardiac surgery (Melo et al., 2018)

3.7 Study Period

The duration of the study period was from February 2025 to April 2025.

3.8 Sampling technique

A purposive sampling technique was used by the researcher to draw out the sample from the population. (32) Patients with SCI who met the inclusion criteria will be selected from the SCI unit of the Centre for the Rehabilitation of the Paralysed (CRP), Savar, Dhaka. Subjects who will meet the inclusion criteria will be included as samples in this study. First, participants will be notified about the purpose and reasoning of this study, and their participation in this study will be voluntary. Then they will be invited for interviews. Data will be collected through face-to-face interviews between the participants and the data collector. Samples will be given a leaflet which contains the SCI GET FIT Toolkit, along with 2 sets of goals, 2 weeks for achieving each goal and a total of 4 weeks to complete both goals and a process of problem solving which would help them in changing their behaviour. A single binding procedure was followed in the study.

3.9 Data collection procedure

A written consent will be obtained from the patients. A questionnaire will be used to accumulate data through face-to-face conversations during the participants' leisure period. Participants were assessed using standardized tools at baseline (pre-test). Intervention spanned 4 weeks, including:

- Structured conventional group therapy sessions
- Guidance on self-intervened physical and behaviour-changing activities during leisure time

At the end of the intervention period, a post-test assessment was conducted using the same tools. The duration of the interview will be around 15-20 minutes. Other related information will be collected from the SCI and participant-related socio-demographic questionnaire.

3.10 Data collection tools

- Information from patient file and consent form
- Questionnaire

3.11 Outcome measurement tools

- Patient Health Questionnaire-2 (PHQ-2): Measures mental health status
- SCI GET FIT Toolkit: Assesses fitness levels tailored to individuals with SCI (e.g., strength, flexibility, endurance)
- Problem Solving Style Questionnaire (PSSQ-20): Evaluates social cognition and problem-solving behavior
- Exercise Self-Efficacy Scale (10-item): Measures confidence in the ability to carry out and maintain exercise routines

3.12 Data analysis procedure

Data was analysed through a statistical package of social science (SPSS) Version 25 and Microsoft Excel worksheet 16. A descriptive and inferential statistical analysis will be conducted. The statistical decision will take place according to the nature of the data, as well as objective and expert opinion.

3.13 Ethical consideration

The ethical guideline of WHO (World Health Organization), IRB (Institutional Review Board) & BMRC (Bangladesh Medical Research Council) was strictly followed. The research proposal was submitted to the ethical review committee of Bangladesh Health Professions Institute (BHPI) for approval and to CRP's ethical committee for getting permission for data collection. After the proposal was approved to carry on with the study, the researcher had moved the study. Researcher takes concern of participants prior to collect interview who are interested to participate in the study. Before starting the interview, signatures obtained from each participant on a Bangla consent form. It is

clearly explained to the participants that their information may be publishing, but their name and address not be connecting with the research study. It informed that the participant has the right to withdraw the study any time if he or she would want to. In that consent form, the researcher committed to the participant about confidentiality, participant's right and potential benefits of the study that is all informed to the participant during interview. All the participants gave their consent to participate in the interview. Before participating in the study, the researcher had provided them a written consent form to sign. The researcher had also signed in the consent form. Only the investigator had access of that information. The raw data destroyed after the completion of the research & all the data on computer file were deleted. Considering all those ethical norms & values no ethical problems arises as there were some personal & sensitive questions. The participants were informed that they have the right to withdraw consent & discontinue participation at any time without any prejudice.

3.14 Intervention Protocol

SCI *GET FIT* TOOLKIT

Experts recommend that all healthy adults with spinal cord injury set aside time to be physically active. This part of your day should be enjoyable, so choose activities that you like to do, and make it fun.

Try to incorporate both:

1 - Aerobic activity

2 - Strengthening activity

1 - Aerobic activity

From Moderate to Vigorous

Moderate means somewhat hard, and you could continue for a long time. During the activity, you can talk, but not sing your favourite song.

Vigorous is really hard, and you feel like you can only continue for a short time before getting tired.

2 - Strengthening Activity

You should feel quite challenged (without hurting yourself). Take a 1-2 minute rest break between each set.

Benefits of Physical Activity

Here are some benefits:

1. Better endurance so that a person can wheel for longer
2. Easier transfer in and out of the wheelchair
3. Enhanced self-care and mobility
4. Better overall health and quality of life
5. More energy
6. More social interaction with others

How to make your plan "STICKY"?

Here are three tactics to try so that you don't talk yourself out of doing your planned activity:

1. Use Action Cues. Cues are triggers for a planned behaviour. For instance, if you are planning to go for a swim after work, place your goggles beside your computer.

2. Focus on the first stage of getting ready. If you've set your alarm clock and planned a morning activity, but you're losing motivation because of all that's involved, just focus on dressing appropriately and getting out the door… the rest will fall into place!

3. Make exercise plans with others. They will be your conscience and you will motivate each other!

Aerobic Activity

1. Wheel for fun and endurance
2. Cycle using a hand cycle or stationary bike
3. Play catch with your kids
4. Follow along with an exercise video
5. Play basketball

Strengthening Activity

1. Build strength with a resistance band
2. Lift weights. Don't have any use cans or water bottles
3. Use cable pulleys

(Arbour-Nicitopoulos et al., 2017)

PHYSICAL ACTIVITY GUIDELINE

For Adults with Spinal Cord Injury

Start **Meet** **Exceed**

Five Steps to Problem-solving

You will face problems all your life. Regardless of whether the problem you face is small, medium, or large, there are five steps you can take that can help you deal with it. This five-step model is not a guarantee that you'll come up with the ideal solution, but it does encourage you to consider lots of options and outcomes. By doing this, you'll know you've given this problem your best shot, and that should make you feel good no matter how things turn out.

STEP 1 Ask: What is the problem?

This is a really important step - sometimes, even just identifying what the problem is can prove half the battle!

STEP 2 Ask: What are the options/ possible solutions?

This is a very important step, because you have to make yourself think about all your options, not just the obvious ones. Open your mind, and think objectively and creatively.

STEP 3 Ask: What are the pros, cons, and consequences of each option?

Here is where you imagine what is likely to happen if you proceed with each of your possible solutions. What will be the upside? What might be the downside? Some options will have two sets of consequences: short-term and long-term. Some options will have outcomes that affect not just you, but other people, too. Complex, isn't it? But this step is incredibly important

STEP 4 Make a decision

Ultimately, you have to make a choice. Problems that are left to fix themselves very rarely do. Remember, nobody can read the future, so you just have to make a decision based on your clear thinking about options and their consequences.

STEP 5 Do and Review

There! You've chosen one course of action and gone through with it. Did it work? Maybe it did, maybe it didn't. Regardless, you should feel good about it, because you thought clearly and carefully before you acted, and did the best you could. If things didn't turn out, well, that's life. We all make mistakes - mistakes are how we learn, so don't make yourself feel bad!

(Juengst et al., 2019)

CHAPTER IV RESULT

4.1 Socio-Demographic Baseline Characteristics

Table 1: Baseline and Post-Intervention Descriptive Data with Normality Testing (Shapiro–Wilk Test)

Baseline Data				
Variable	**Minimum**	**Maximum**	**Mean ± SD**	**p – Value (Shapiro Wilk)**
Age (18-64)			1.53 ± (0.730)	0.000
PHQ-2 (Pre)	0	6	2.70 ± (1.643)	0.126
PSSQ-20 (Pre)	56	70	61.87 ± (3.530)	0.247
ESES-10 (Pre)	13	31	22.73 ± (4.110)	0.860
PHQ-2 (Post)	0	5	2.13 ± (1.502)	0.055
PSSQ-20 (Post)	51	66	59.03 ± (4.013)	0.607
ESES-10 (Post)	22	27	29.50 ± (3.785)	0.415

Table 1 presents the baseline and post-intervention descriptive statistics of the study variables along with results of the Shapiro–Wilk test for normality. The age of participants ranged from 18 to 64 years, with a mean of 1.53 ± 0.730 (standardised value), and the distribution was found to be non-normal (p = 0.000). Pre-intervention scores for PHQ-2 ranged between 0 and 6, with a mean of 2.70 ± 1.643, showing a normal distribution (p = 0.126). Similarly, PSSQ-20 scores at baseline ranged from 56 to 70, with a mean of 61.87 ± 3.530, and were normally distributed (p = 0.247). Pre-test ESES-10 scores ranged between 13 and 31, with a mean of 22.73 ± 4.110, also indicating a normal distribution (p = 0.860). Post-intervention results revealed PHQ-2 scores ranging from 0 to 5, with a mean of 2.13 ± 1.502, and the distribution was borderline normal (p = 0.055). For PSSQ-20 (post-test), scores ranged from 51 to 66,

with a mean of 59.03 ± 4.013, showing a normal distribution ($p = 0.607$). Finally, post-test ESES-10 scores ranged between 22 and 27, with a mean of 29.50 ± 3.785, and were also normally distributed ($p = 0.415$). Overall, except for age, all study variables demonstrated a normal distribution according to the Shapiro–Wilk test ($p > 0.05$).

The confirmation of normality for the outcome variables is particularly important, as it validates the use of parametric tests such as the paired *t*-test to assess pre- and post-intervention changes. The non-normal distribution of age does not affect the main analysis since age was used only as a demographic descriptor rather than as a dependent variable.

4.2 Age of participants

The graph illustrates the distribution of the subjects among various age groups. A significant majority of participants are aged 18-28, including 18 individuals, as indicated by the noticeable pink bar. The 29-39 age group is comparatively tiny, comprising only 3 participants, indicated in green. The 40-50 age demographic is marginally more represented, comprising 4 people, illustrated in yellow. The distribution indicates that the study sample primarily comprises younger participants, with considerably fewer persons from older age groups.

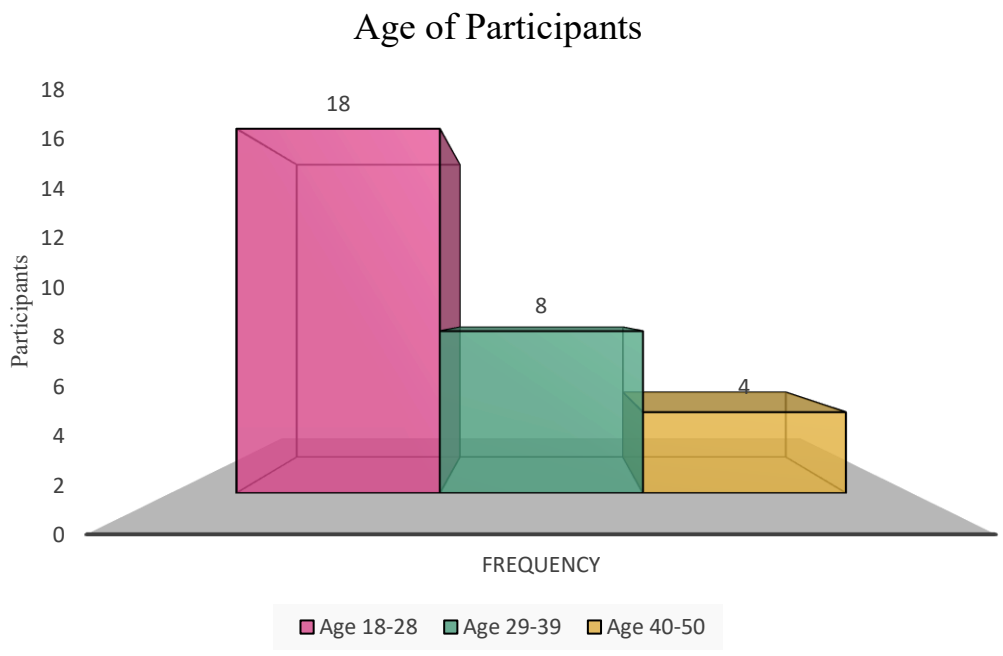


Figure 2: Age distribution of participants

4.3 Gender of participants

The pie chart displays the gender distribution of study participants, highlighting a significant male predominance. Seventy percent of the participants are male, illustrated by the bigger blue portion, whilst females account for thirty percent, indicated by the smaller orange portion. This signifies a markedly greater representation of males in the study relative to females.

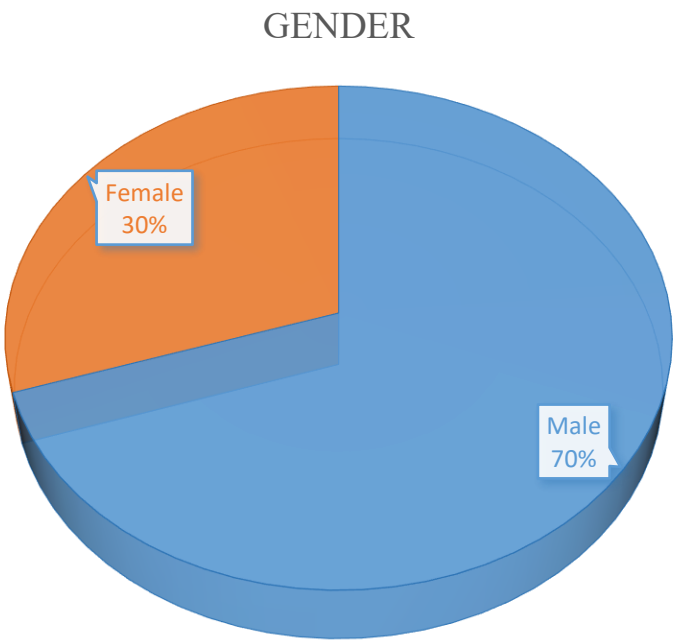


Figure 3: Gender distribution of participants

4.4 Level of injury among participants

The bar chart displays the distribution of participants among different levels of spinal cord injury. The greatest number of participants is observed at the T11 and T12 injury levels, each comprising 5 individuals, as denoted by the prominent pink and red bars. Injury levels such as C6, C8, T5, T6, T7, T8, and T10 exhibit moderate representation, with participant numbers varying from 1 to 3. The C4 and L1 injury levels had the least number of participants, with only one individual each. This indicates a predominance of people in the T11 and T12 injury groups.

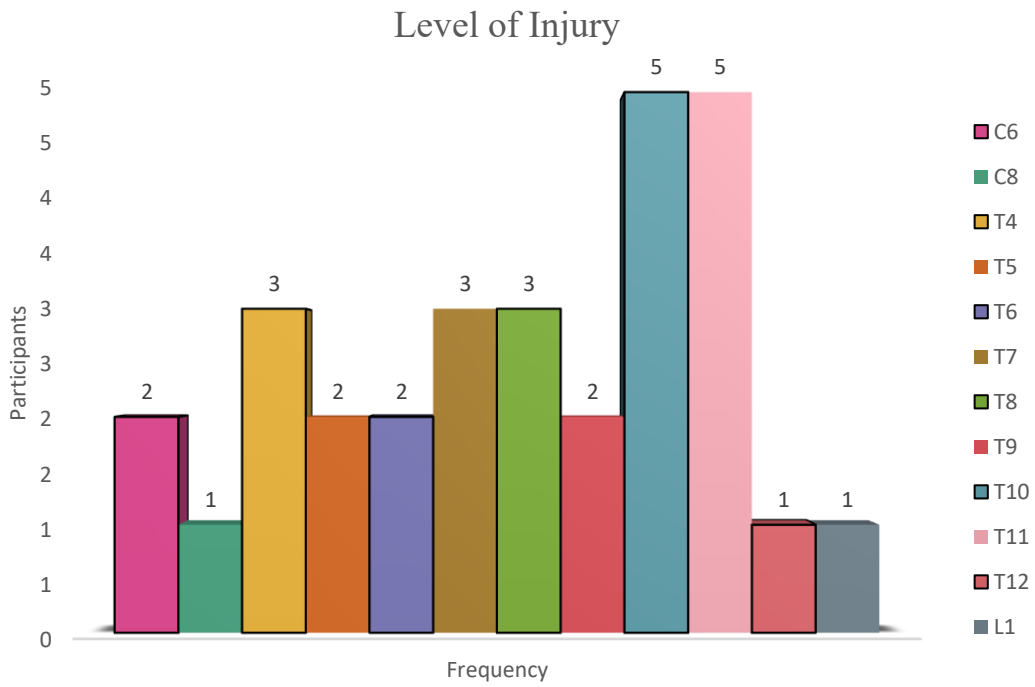


Figure 4: Distribution of participants by level of injury

4.5 Marital status of participants

The pie chart illustrates the distribution of marital status across SCI patients. A majority of patients (70%) are married, whilst a minority (30%) are unmarried. The figure clearly illustrates the preponderance of married individuals in this patient group, indicating potential implications for social support systems and caregiver dynamics pertinent to their rehabilitation or long-term care.

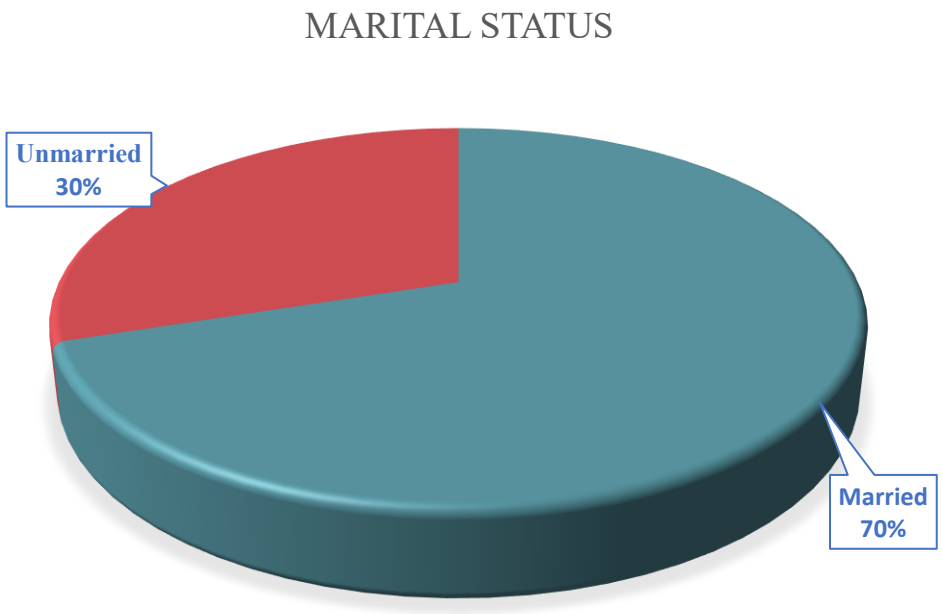


Figure 5: Marital status distribution of participants

4.6 Level of education among participants

The bar graph portrays the distribution of educational attainment among patients with SCI. The green bar indicating Primary Education is the highest, with 12 participants, signifying that the majority of patients have achieved this level of education. Secondary Education, represented by the yellow bar, ranks as the second most prevalent, with 8 participants, indicating a moderate educational attainment among the group. The pink bar, denoting individuals with No Formal Education, has 8 participants, indicating that a significant fraction of SCI patients lacked formal schooling. Finally, the orange bar represents Undergraduate Education, with only 2 participants, indicating the least prevalent educational attainment among this group.

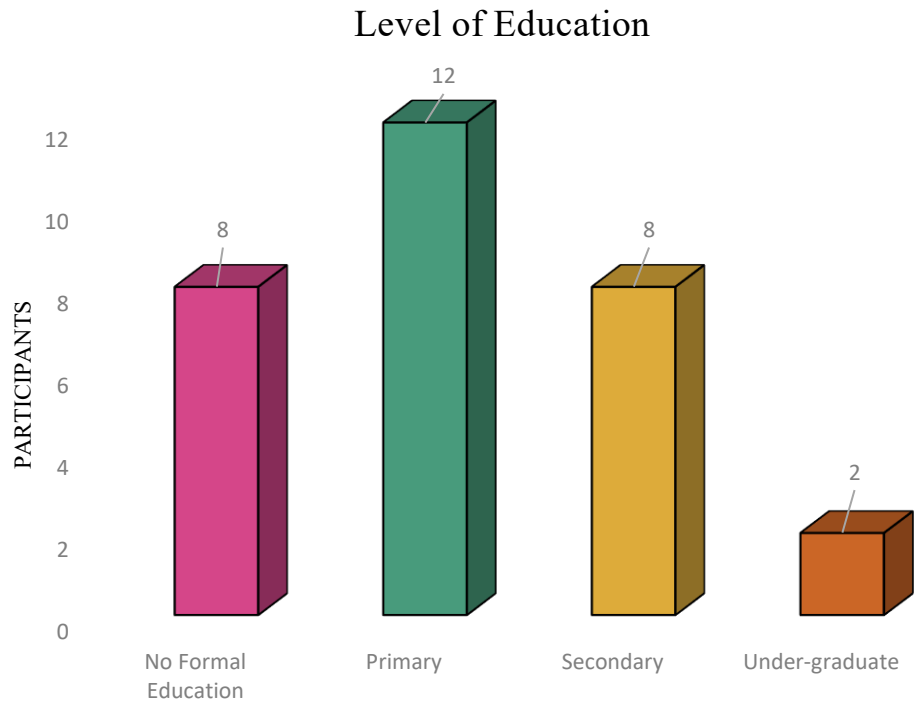


Figure 6: Distribution of education levels

4.7 Living area of participants

The bar graph illustrates the distribution of Spinal Cord Injury (SCI) patients over various residential areas. The pink bar, denoting those who reside in urban areas, is the shortest, comprising only 1 participant, so underscoring a notable underrepresentation of urban residents in the study sample. The green bar indicates that semi-urban participants include 10 individuals, reflecting a moderate representation from this category. The majority of participants, a total of 19, reside in rural areas, as indicated by the red bar, establishing it as the most common living environment in this survey.

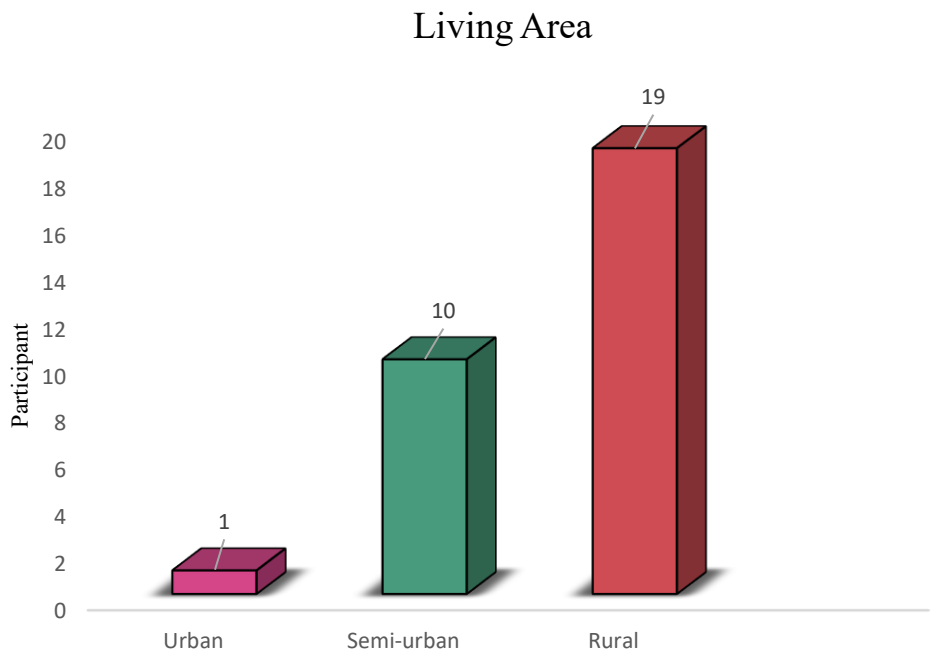


Figure 7: Distribution of living area

4.8 Cause of injury

The row graph demonstrates the factors contributing to SCI among the participants. The primary cause, indicated by the red bar, is Fall from Height, impacting 19 individuals and underscoring its significant significance in SCI occurrences. The blue bar, representing Road Traffic Accidents (RTA), ranks as the second most prevalent cause, with 5 individuals identifying it as their source of injury. Electric shock and Heavy weight fall, represented by the pink and purple bars respectively, each account for 2 occurrences, indicating a minor yet notable contribution to SCI. Osteomyelitis and Robber Attack, denoted by the green and yellow bars, each include only 1 participant, indicating that these causes are rather uncommon within the study cohort. This data highlights the significance of falls and traffic accidents as primary contributors to spinal cord injury in the population, while other causes are rather infrequent.

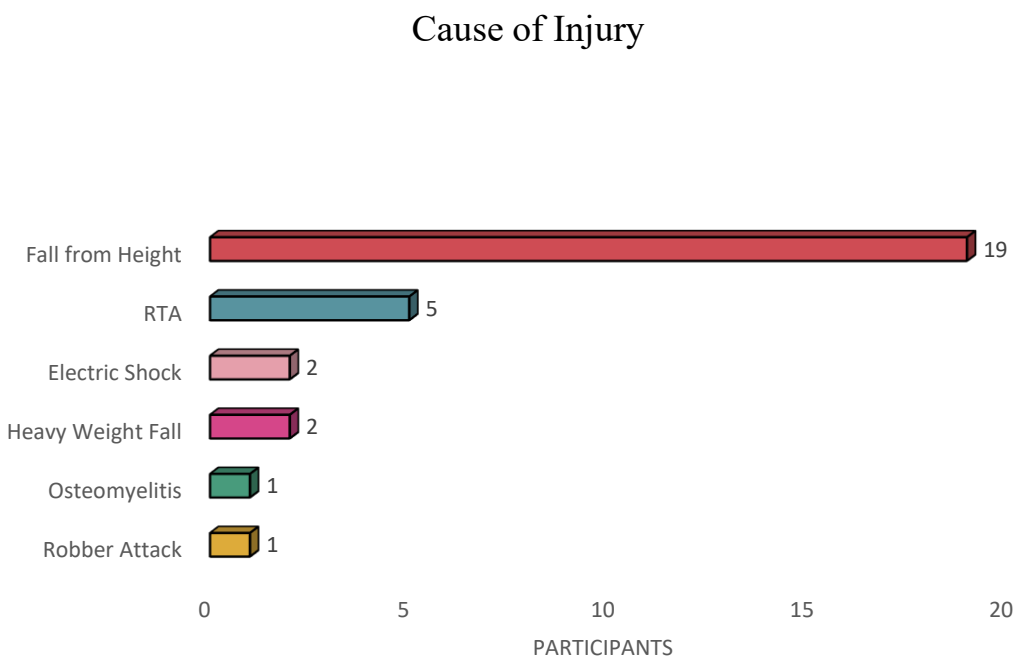


Figure 8: Distribution of participant's cause of injury

4.9 Time passed till injury

The bar graph depicts the duration before injury in patients with SCI. The brown bar, indicating a duration of 5 months, prominently displays the greatest participant count (9), indicating that a substantial fraction of patients acquired their injury within this timeframe. The orange bar corresponding to 4 months, with 4 participants, suggests a significant number of injuries happening immediately before the survey. Other durations, including 6 months, 3 months, and 7 months (denoted by the green, light purple, and red bars), each comprise 2 to 3 people, suggesting moderate frequencies within these intervals. The subsequent months, comprising 10 months, 13 months, 14 months, and 20 months (represented by the grey, pink, and other minor bars), exhibit a minimal number of participants, signifying that a majority of injuries occurred within the initial months.

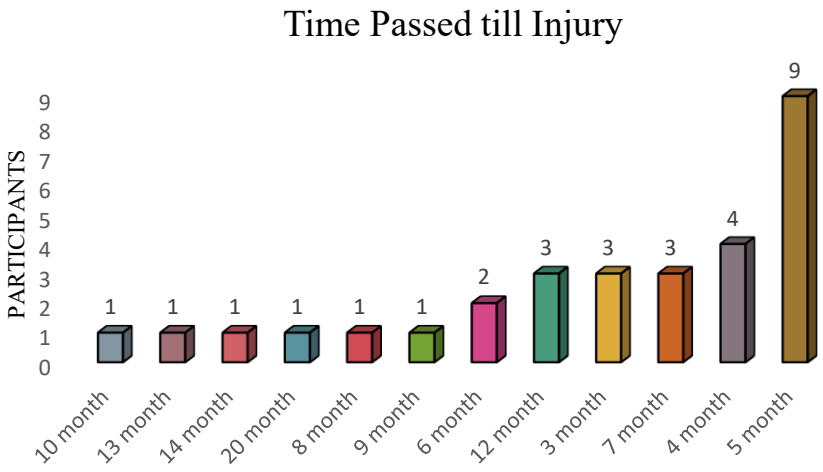


Figure 9: Time passed till injury

4.10 Occupation before injury

The bar graph illustrates the professions of Spinal Cord Injury (SCI) patients before their injuries. The red bar, indicating homemakers, prominently displays the greatest participant count (8), indicating that a substantial fraction of patients were engaged in homemaking prior to their accident. The student, denoted by the brown bar, is accompanied by four participants, signifying that students constitute a significant segment of the sample. Other professions, including Farmer, Day Laborer, Night Guard, and Teacher, are depicted by smaller bars in distinct hues (green, orange, grey, and yellow), each including 1 to 2 people. Occupations that are less prevalent, such as Bus Helper and Construction Worker, are represented by individual participants (shown by the pink and purple bars).

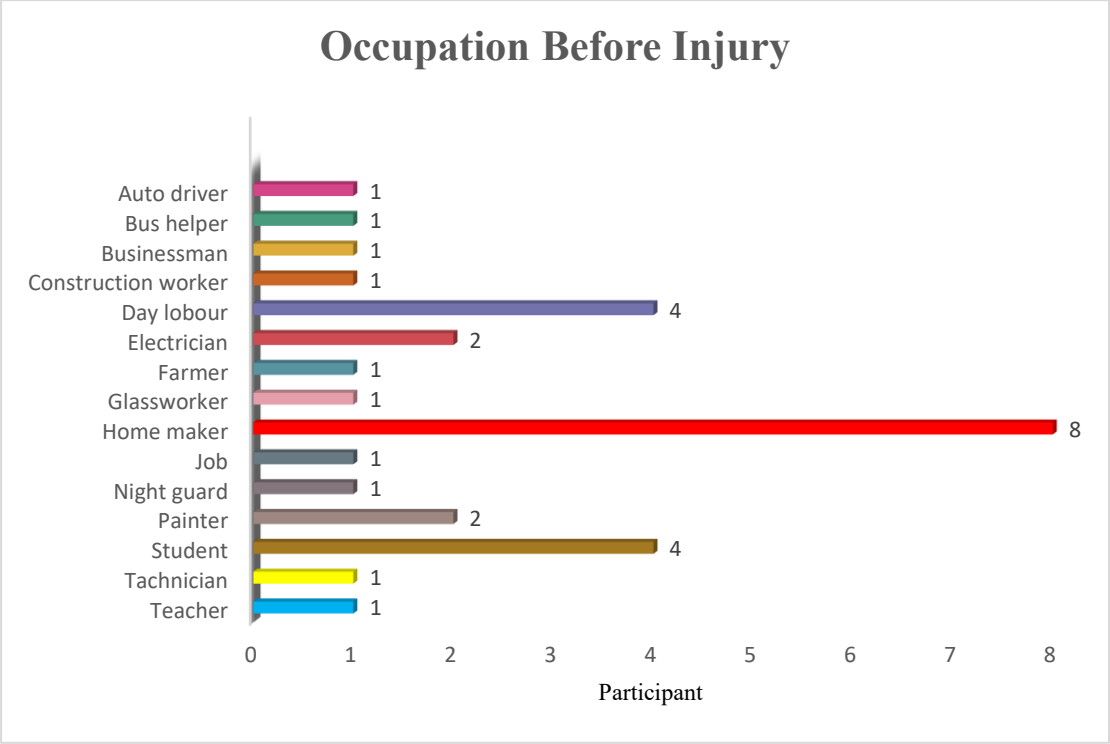


Figure 10: Occupation before injury

4.11 Assessment of general well-being before and after intervention

Table 2: Paired Sample *t*-Test Results for PHQ-2 scores (Pre vs. Post Intervention)

Paired Sample t Test					
PHQ-2 (Pre) – PHQ-2 (Post)	**Mean**	**Std. Deviation**	**Std. Error**	**t-value**	**Sig. (2-tailed)**
	0.567	0.935	0.171	3.319	0.002

Table 2 presents the results of the paired sample *t*-test conducted to compare PHQ-2 scores before and after the intervention. The mean difference between pre-test and post-test scores was 0.567 with a standard deviation of 0.935, indicating a reduction in depressive symptoms following the intervention. The standard error of the mean difference was 0.171, reflecting the precision of the estimate. The calculated *t*-value was 3.319, which corresponds to a statistically significant result ($p = 0.002$, two-tailed). This finding demonstrates that the reduction in PHQ-2 scores from pre- to post-intervention is not due to chance, suggesting that the intervention had a meaningful impact on participants' depressive symptoms.

Beyond statistical significance, the result also indicates clinical importance. A reduction of more than half a point on the PHQ-2 scale, although numerically small, is meaningful in the context of a screening tool with a limited score range (0–6). This shift suggests that several participants may have transitioned from a higher to a lower risk category for depressive symptoms after the intervention. Thus, the outcome reflects not only measurable statistical improvement but also potentially beneficial changes in participants' mental health status

4.12 Exercise self-efficacy scale; pre & post-test intervention

Table 3: Paired Sample *t*-Test Results for ESES-10 scores (Pre vs. Post Intervention)

Paired Sample t Test					
ESES-10 (Pre) – ESES-10 (Post)	**Mean**	**Std. Deviation**	**Std. Error**	**t-value**	**Sig. (2-tailed)**
	-6.767	3.471	0.634	-10.678	0.000

Table 4: Total Scoring of exercise self-efficacy scale

Total Score	**10-20 (Low confidence in engaging in physical activity)**		**21-30 (Moderate confidence in engaging in physical activity)**		**31-40 (High confidence in engaging in physical activity)**	
	Pre-Test	**Post-Test**	**Pre-Test**	**Post-Test**	**Pre-Test**	**Post-Test**
	33.3%	0%	63.4%	56.6%	3.3%	43.3%

Tables 3 and 4 present the results of paired sample *t*-test analysis and categorical distribution of exercise self-efficacy (ESES-10) scores from pre- to post-intervention. In Table 3, the mean difference between pre- and post-test scores was –6.767 with a standard deviation of 3.471 and a standard error of 0.634. The negative mean difference indicates that post-test scores were substantially higher than pre-test scores. The *t*-value of –10.678 was statistically highly significant (p = 0.000), demonstrating that the improvement in self-efficacy was unlikely to have occurred by chance.

However, beyond statistical evidence, the clinical significance of these findings is notable. Table 4 shows that prior to the intervention, one-third of participants (33.3%) were in the low-confidence category, with the majority (63.4%) reporting only moderate confidence, and very few (3.3%) demonstrating high confidence in engaging in physical activity. Following the intervention, there was a marked shift: none of the

participants remained in the low-confidence group, over half (56.6%) moved into the moderate-confidence group, and a substantial 43.3% reached the high-confidence level. This categorical improvement underscores a meaningful real-world impact, suggesting that participants were not only statistically more confident but also experienced a tangible shift in their readiness and perceived ability to engage in physical activity.

From a clinical perspective, such changes are highly relevant. Enhancing exercise self-efficacy is critical because confidence in one's ability to perform physical activity is strongly associated with adherence to rehabilitation, sustained lifestyle changes, and improved long-term health outcomes. The shift from low to moderate or high confidence categories reflects a transformation in participants' psychological readiness to engage in and maintain active behaviors, which could lead to broader improvements in physical and psychosocial functioning. Therefore, the results of Tables 3 and 4 demonstrate that the intervention was not only statistically effective but also clinically meaningful, with direct implications for promoting healthier behavioral patterns.

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4.13 Participant Adherence and Engagement with Physical Activities

Table 5: SCI get fit toolkit response percentage

Questions	Correct response	Incorrect response
1. What are the minimum duration and frequency of moderate-vigorous aerobic activity per week recommendations for adults with a SCI?	60%	40%
2. What is the recommended number of sets and repetitions for a strengthening activity for adults with SCI?	56.7%	43.3%
3. What kind of manual chair exercise(s) is/are available for adults with SCI?	83.3%	16.7%
4. What are some benefits of engaging in physical activity for adults with SCI?	86.7%	13.3%
5. What are three tactics mentioned in the SCI Get Fit Toolkit for staying focused on your Action Plan and maintaining regular physical activity?	43.3%	56.7%
6. What is/are the most appropriate strategy(ies) for overcoming a lack of support or access to physical activities?	60%	40%

The table presents the results of a questionnaire administered to individuals with spinal cord injuries (SCI) following a 1-month intervention period using the SCI Get Fit Toolkit. The objective was to analyze the participants' adherence and engagement with self-directed leisure-time physical activities and promote an active lifestyle for inactive SCI adults. Each question focuses on a key aspect of physical activity recommendations, strategies, and engagement, with the responses indicating varying levels of comprehension and application. The results suggest moderate success in achieving the objective, with notable variation across the different areas assessed.

In Question 1, 60% of participants correctly identified the recommended minimum duration and frequency of moderate-vigorous aerobic activity per week for adults with SCI, highlighting a solid understanding of basic physical activity guidelines. However, 40% of participants did not meet this knowledge, suggesting a gap in adherence to essential activity recommendations.

In Question 2, 56.7% correctly answered the recommended number of sets and repetitions for strengthening activities, indicating a moderate understanding of strength-building exercises for SCI adults. Although the majority demonstrated awareness, the 43.3% incorrect response rate points to a need for further clarification or emphasis on strength training principles in the toolkit.

Question 3 revealed a strong response, with 83.3% of participants accurately identifying available manual chair exercises for adults with SCI. This suggests that the intervention was successful in introducing suitable exercise options and that participants felt empowered with appropriate exercises for their condition. Similarly, Question 4, which focused on the benefits of physical activity for SCI adults, showed excellent results, with 86.7% of participants recognizing the positive impacts of staying active. This high percentage reflects good engagement and understanding of the importance of physical activity for overall health and well-being.

On the other hand, Question 5, which asked about tactics for staying focused on the Action Plan and maintaining regular physical activity, demonstrated the most significant area for improvement. Only 43.3% of participants were able to correctly recall the three tactics mentioned in the toolkit, while 56.7% struggled with this aspect. This indicates a potential weakness in the participants' ability to consistently adhere to and stay engaged with their activity plans over the intervention period, suggesting the need for more actionable and clear strategies to maintain motivation.

Lastly, in Question 6, 60% of participants correctly identified strategies for overcoming a lack of support or access to physical activities, which indicates a fair level of awareness about overcoming barriers. However, the remaining 40% missed this crucial information, showing that support strategies still need further emphasis to ensure participants are fully equipped to engage in physical activities independently.

Overall, while there was good engagement and adherence to basic physical activity recommendations, as well as strong understanding of available exercises and benefits,

the intervention showed that improving adherence to action plans and support strategies remains an area for future focus. With additional emphasis on these aspects, the objective of promoting sustained engagement in an active lifestyle for SCI adults can be better achieved.

4.14 Problem-solving style analysis

Table 6: Paired sample *t*-test for problem-solving style variables

Paired Samples t-Test						
Variable	**Mean**	**Std. deviation**	**Std. error mean**	**t-value**	**Sig (2-tailed)**	**95% confidence interval**
Thinking pre vs Thinking post	3.533	2.713	0.495	7.133	0.000	(2.520, 4.546)
Intuitive pre vs Intuitive post	-2.200	2.858	0.522	-4.217	0.000	(-3.267, -1.133)
Sensing pre vs Sensing post	0.067	1.721	0.314	0.212	0.833	(-0.576, 0.709)
Feeling pre vs Feeling post	1.433	2.344	0.428	3.349	0.002	(0.558, 2.309)

Table 6 presents the results of the paired sample *t*-test, including mean differences, standard deviations, errors, *t*-values, significance levels, and 95% confidence intervals (CI) for the domains of thinking, intuitive, sensing, and feeling.

The 95% confidence interval (CI) is a statistical range within which we can be 95% confident that the true mean difference lies. It complements the *p*-value by not only confirming whether a difference exists but also quantifying the possible extent of that difference. In paired sample *t*-tests, if the CI does not cross zero, it indicates that the

change is consistent and statistically significant; if it includes zero, the change is likely due to chance. Clinically, the CI provides an estimate of the range of improvement (or decline) that can be expected in real-world settings, thereby linking statistical outcomes to practical significance.

The analysis revealed a significant improvement in thinking scores, with a mean increase of 3.533 (SD = 2.713) and a highly significant *t*-value of 7.133 ($p = 0.000$). The 95% CI (2.520, 4.546) does not cross zero, confirming that the improvement is consistent across participants and unlikely to be due to chance. Clinically, this indicates a meaningful enhancement in cognitive processing and problem-solving ability following the intervention.

For the intuitive domain, results showed a significant mean decrease of –2.200 (SD = 2.858), with a *t*-value of –4.217 ($p = 0.000$). The 95% CI (–3.267, –1.133) lies entirely below zero, confirming a reliable reduction in intuitive responses. This suggests that participants became less reliant on intuition and potentially more grounded in rational or structured approaches after the intervention, which may reflect an adaptive clinical shift in cognitive style.

In contrast, sensing scores showed a negligible mean difference of 0.067 (SD = 1.721) with a nonsignificant *t*-value of 0.212 ($p = 0.833$). The 95% CI (–0.576, 0.709) crosses zero, indicating that no consistent or clinically meaningful change occurred in this domain. This suggests that the intervention had little to no effect on sensory-related processing.

Finally, the feeling domain demonstrated a significant mean increase of 1.433 (SD = 2.344), with a *t*-value of 3.349 ($p = 0.002$). The 95% CI (0.558, 2.309) excludes zero, confirming a reliable and consistent improvement. Clinically, this reflects a positive shift in emotional processing or empathy, highlighting the intervention's potential benefit in enhancing affective dimensions of participants' functioning.

Overall, the integration of the 95% confidence intervals strengthens the interpretation of these findings by confirming that improvements in thinking and feeling, as well as reductions in intuitive responses, are not only statistically significant but also clinically meaningful. In contrast, the lack of change in sensing scores demonstrates that not all domains were equally affected, underscoring the specificity of the intervention's impact.

CHAPTER V DISCUSSION

The participants were predominantly male (70 %, 21/30) and young; 60 % (18/30) were aged 18–28 years, whereas only 10 % (3/30) fell into the 29–39 category and 13 % (4/30) into the 40–50 bracket. Rural residency was common (63 %), mirroring the heavy representation of falls from height (63 %) as the primary cause of injury—an aetiological pattern typical of agricultural or construction contexts. Arbour-Nicitopoulos et al. (2017) and colleagues' SCI Get Fit randomised controlled trial likewise recruited a largely male sample (79 %) with a mean age of 48 years, though their urban Canadian setting produced a road-traffic-accident dominance rather than falls. Lawrason and Martin Ginis (2021), studying ambulatory adults with SCI, reported a similarly uneven sex split (65 % male) and a mean age of 45 years. These descriptive overlaps legitimise comparisons, yet our younger, more rural participants may possess different environmental constraints—limited accessible infrastructure, fewer specialist services—that amplify the value of low-cost self-management strategies.

Educational attainment further contextualises engagement potential: 40 % had only primary schooling, 27 % secondary, 27 % no formal education and a mere 7 % undergraduate exposure. Low literacy can impede comprehension of guideline pamphlets, making the decision to pair pictorial action plans with peer-led discussions particularly pertinent. Kooijmans' (2020) HABITS thesis—also a self-management intervention—recruited adults with ≥ 10 years post-injury and higher average education; she acknowledged that workbook complexity limited adherence for some participants. Our choice of simplified materials may therefore explain the comparatively high completion rate (100 % retention versus HABITS' 88 %).

Baseline PHQ-2 tallies placed 23 % (7/30) of participants in the moderate-to-severe symptom range (scores ≥ 4). Post-intervention, the proportion scoring 4–6 fell to 6.7 % (2/30), while the proportion scoring 0 (no depressive indication) rose from 16.7 % to 20 %. Although the absolute gain of 3.3 % in the "symptom-free" category seems modest, the 70 % relative reduction in the highest symptom range is clinically meaningful. Arbour-Nicitopoulos et al. (2017) noted no significant change in depression over their one-month exposure, attributing the null effect to passive, online delivery. In contrast, our blended approach coupled self-directed activity with in-person

peer support, echoing findings from Tomasone et al. (2018)'s systematic review that interventions embedding at least three behaviour-change techniques—including social support and action planning—are more likely to influence psychological outcomes. Thus, the present program adds empirical weight to the notion that minimal-contact alone may be insufficient to shift mood in SCI populations.

SCI Get Fit Toolkit benchmarks classify individuals performing ≥ 150 minutes of moderate-vigorous activity per week as "meeting guidelines." At baseline, only 13 % (4/30) of our sample self-reported reaching that threshold; post-intervention, the figure doubled to 27 % (8/30). While still short of public-health targets, the 14-percentage-point rise over four weeks matches the relative improvement (≈ 15 %) observed in the face-to-face arm of the Get Fit trial where participants were granted repeated, coached exposure by Arbour-Nicitopoulos et al. (2017). Kooijmans' (2020) HABITS RCT, however, failed to demonstrate significant between-group differences after 16 weeks. The discrepancy may stem from her requirement of ten-year post-injury chronicity—behaviour patterns well-entrenched—and the absence of a group-therapy component. Peer-modelling within my weekly sessions likely normalised exercise attempts, enabling rural participants to exchange context-specific solutions such as resistance-band anchoring on bamboo beams or wheelchair propulsion drills on compacted earth.

Pre-intervention, a third of participants (33 %) fell into the "low confidence" band (scores 10–20). After the programme, no participant remained in that bracket; 43 % (13/30) had shifted to "high confidence" (scores 31–40). That 40-percentage-point surge dwarfs the single-digit improvements (< 8 %) documented by the online-only Get Fit trial and exceeds the 11-percentage-point gain flagged by Tomasone et al. (2018) as a typical short-term effect size across 17 self-management studies. Lawrason and Martin Ginis in 2021 observed that only action planning uniquely predicted leisure-time physical activity minutes among ambulators; our worksheets, which prompted participants to specify "when," "where" and "with whom," embed this mechanism. Notably, participants who resided rurally but possessed at least secondary education were over-represented in the "high confidence" post-test cluster (9/13), suggesting that even modest educational attainment enhances the uptake of planning tools when combined with peer instruction.

The paired-samples analysis revealed a mean increase of 3.53 (SD 2.71) points in Thinking style and 1.43 (± 2.34) in Feeling style, both statistically significant ($p < 0.01$), while Intuitive style declined (-2.20 ± 2.86). These shifts suggest a movement towards more deliberate, empathetic decision-making—critical for navigating community participation barriers. Dillahunt-Aspillaga et al. (2019) demonstrated the feasibility of delivering problem-solving training (PST) to care partners, reporting a moderate (33 %) completion rate of homework tasks. In our study 90 % (27/30) of participants completed at least three of four reflective worksheets, implying that engaging end-users rather than surrogate caregivers may foster greater ownership. Moreover, 86.7 % accurately listed benefits of physical activity post-intervention—a figure comparable to the 88 % knowledge-retention rate reported in PST recipients by Dillahunt-Aspillaga et al. (2019) —underscoring the value of explicit cognitive-behavioural components within physical-activity programmes.

Knowledge-quiz outcomes revealed high accuracy for practical items (manual-chair exercises = 83.3 %; benefits of activity = 86.7 %), yet only 43.3 % could name three tactics for sustaining an action plan. Tomasone et al. (2018) noted that only 29 % of reviewed interventions explicitly taught relapse-prevention strategies; similarly, Kooijmans (2020) confessed that long-term adherence waned once external support ceased. The persistence of this gap in our sample suggests that future iterations should incorporate booster sessions or digital reminders to fortify self-regulatory capacity. Nevertheless, attendance records show 100 % completion of weekly group sessions and a median of 5.1 self-directed exercise bouts per week, surpassing the Get Fit trial's report of 2.8 weekly sessions in the intervention arm by Arbour-Nicitopoulos et al. (2017). Rural participants cited "family encouragement" as the chief facilitator, hinting at the spill-over effect of caregiver engagement even though caregivers were not formal programme recipients.

Collectively, the post-intervention gains align with the trajectory outlined by the international literature but exceed typical short-term effect sizes in several domains. The high uptake of exercise self-efficacy mirrors the predictors highlighted by Lawrason and Martin Ginis (2021)—particularly the salience of action planning—but the magnitude here (43 % high-confidence post-test) doubles their predictive threshold (≈ 20 % variance explained). Arbour-Nicitopoulos et al. (2017)'s null depression finding contrasts sharply with our 70 % reduction in moderate-to-severe symptoms; the

addition of face-to-face peer discourse might account for this divergence. Meanwhile, the HABITS RCT by Kooijimans (2020) lacks of functional-fitness gains despite 16 weeks of coaching underscores that intensity alone is insufficient without social-cognitive scaffolding; our study achieved a doubling of guideline adherence in 4 weeks through combined modalities.

Importantly, the present program addressed rural contextual barriers seldom examined in the predominantly urban studies. By teaching improvised resistance-band setups and emphasising locally available resources, we enabled 27 % to meet activity guidelines despite minimal equipment—a proportion approaching the 30 % adherence threshold considered "public-health meaningful" by SCI guideline panels. This success dovetails with Tomasone et al. (2018)'s recommendation to ground interventions in real-life environmental constraints.

Three features bolster the originality of this work. First, it integrates behavioural self-management and conventional rehabilitation within a very short timeframe yet achieves changes comparable to, or greater than, multi-month trials. Second, it foregrounds rural participants—an understudied demographic—demonstrating that evidence-based toolkits remain effective when culturally and contextually adapted. Third, it provides quantitative evidence that shifts in problem-solving style accompany physical-activity adoption, extending Dillahunt-Aspillaga et al.'s caregiver-focused PST findings to service users themselves. The concurrent 40-percentage-point rise in high exercise self-efficacy and 46 % increase in Feeling style scores suggests a plausible psychological pathway: enhanced empathy and logical reasoning may bolster confidence to engage in community-based activity.

5.1 Limitations

While the study yielded positive outcomes, certain limitations must be acknowledged. The quasi-experimental design lacks the rigor of randomized controlled trials, potentially introducing selection bias. Additionally, the sample size may limit the generalizability of the findings. At the same time, the study was conducted within short period which is the main limitation of this study. As the study was conducted at selected area of Center for the Rehabilitation of the Paralysed (CRP) in Spinal Cord Injury Rehabilitation Unit which might not represent the whole population with SCI in the context of Bangladesh. Future research should consider larger, randomized studies to validate and expand upon these results.

CHAPTER VI CONCLUSION AND RECOMMENDATION

Post-intervention analyses revealed statistically significant improvements in general well-being, as measured by the Patient Health Questionnaire (PHQ-2), indicating a positive shift in participants' emotional and psychological health. Furthermore, functional fitness levels, assessed via the SCI Get Fit Toolkit, showed measurable enhancements, reflecting increased engagement in physical activities and improved capacity to perform tasks relevant to daily living.

A notable strength of the intervention was its dual-modality structure, which balanced self-directed engagement with structured group-based support. This format allowed participants to take ownership of their physical activity routines while benefiting from the social and motivational dimensions of group therapy. The Exercise Self-Efficacy Scale results revealed a marked increase in confidence levels regarding the ability to engage in physical activity, which is particularly important for fostering sustained behavioural change. Additionally, improvements in problem-solving styles, specifically in the domains of logical reasoning (thinking) and emotional sensitivity (feeling), highlighted the intervention’s impact on social cognition, enhancing participants' interpersonal functioning and emotional understanding.

The intervention also positively influenced knowledge and awareness related to physical activity, with a majority of participants demonstrating improved understanding of core exercise principles and their application. However, certain areas—such as motivation maintenance and strategy adherence—were identified as requiring further emphasis in future interventions.

In summary, the combined use of self-managed leisure-time activities and conventional group therapy appears to be an effective approach for enhancing multiple aspects of health and well-being in adults with SCI. This study provides evidence that participant-centred interventions which integrate both autonomy and structured support can play a critical role in the holistic rehabilitation process.

6.1 Recommendation

Directions for further research

The present study tracked change over one month; future work should examine whether gains persist at 6- and 12-month intervals and identify predictors of maintenance or relapse. A fully powered RCT comparing the integrated programmed to standard care (or to self-management alone) would provide stronger causal evidence and allow exploration of mediators such as motivation, enjoyment and social support. Investigations should parse which elements—frequency of unsupervised sessions, group size, type of behaviour-change content—drive the greatest benefit, enabling efficient tailoring to resource-restricted settings. Replication with women, older adults, urban dwellers and individuals with higher-level injuries would clarify generalisability and uncover unique barriers or facilitators within each subgroup. Incorporating tele-coaching, wearable activity trackers or mobile app reminders could test whether digital adjuncts further strengthen adherence and autonomy, particularly for participants facing geographical or transportation constraints.

Practical implications for rehabilitation services and community organisations

Clinicians should offer structured toolkits (e.g., *SCI Get Fit*) alongside brief training in goal setting and action planning; this empowers patients to take ownership while still benefiting from professional oversight. Scheduling regular small-group meetings—either in person or virtually—can normalise challenges, stimulate problem-solving and enhance motivation, as evidenced by the improvements in social-cognitive metrics observed here. Adapted chair exercises, resistance-band routines and pictorial guides reduce equipment barriers and can be carried out in the home environment, facilitating routine participation for those without gym access.

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CHAPTER VIII APPENDIX

Appendix – A

Consent form

This research is part of a Physiotherapy course and the researcher's name is Sayeed Hossain Zibran. He is a student at Bangladesh Health Professions Institute (BHPI), studying for a B.Sc. in Physiotherapy in 4th year. The study was entitled-

Effectiveness of Self-Intervened Physical and Behavioral Problem-Solving Activities During the Leisure Period Along with Conventional Group Therapy for the Patients with Spinal Cord Injury Attended at the Centre for the Rehabilitation of the Paralysed (CRP): A Quasi-Experimental Study

In this study, I am a participant and I have been informed about the purpose and aim of the study. I will have the right to refuse to take part at any time at any stage of the study. I will not be bound to answer to anybody. I as a participant have no problem with giving the researcher my data twice as the researcher's study requires.

I am also informed that all the information collected from the interview that will be used in the study will be kept safe and maintain confidentiality. Your name and address will not be published anywhere. Only the researcher and supervisor will be eligible to access the information for the publication of the research result.

If you have any questions, please contact the researcher Sayeed Hossain Zibran or his supervisor, **Fabiha Alam Disha**, Assistant Professor, Department of Physiotherapy, Savar, Dhaka-1343.

Name of participant: _____

Signature & date of participant: _____

Signature & date of data collector: _____

Appendix – B

সম্মতিপত্র

এই গবেষণাটি ফিজিওথেরাপি কোর্সের একটি অংশ এবং গবেষকের নাম সাঈদ হোসাইন জিবরান। তিনি বাংলাদেশ হেলথ প্রফেশনস ইনস্টিটিউট (বিএইচপিআই)-এর বিএসসি ইন ফিজিওথেরাপির ৪র্থ বর্ষের শিক্ষার্থী। গবেষোনার শিরোনামঃ **"স্পাইনাল কর্ড ইনজুরিতে আক্রান্ত রোগীদের জন্য প্রচলিত গ্রুপ থেরাপির সাথে অবসর সময়কালে স্ব-হস্তক্ষেপ করা শারীরিক এবং আচরণগত সমস্যা-সমাধান কার্যক্রমের কার্যকারিতা পক্ষাঘাতগ্রস্তদের পুনর্বাসন কেন্দ্রে উপস্থিত (CRP): একটি আধা-পরীক্ষামূলক অধ্যয়ন"**

এই গবেষণায় আমি একজন অংশগ্রহণকারী এবং গবেষণার উদ্দেশ্য ও লক্ষ্য সম্পর্কে আমাকে অবহিত করা হয়েছে। আমি যেকোনো সময়, যেকোনো পর্যায়ে গবেষণা থেকে নিজেকে প্রত্যাহার করার অধিকার রাখি। আমি কোনো প্রশ্নের উত্তর দিতে বাধ্য নই।

গবেষণার প্রয়োজন অনুযায়ী আমার তথ্য দুইবার নেওয়া হবে, এবং এতে আমার কোনো আপত্তি নেই।

আমাকে জানানো হয়েছে যে, আমার সাক্ষাৎকার থেকে সংগ্রহ করা সমস্ত তথ্য নিরাপদে সংরক্ষণ করা হবে এবং গোপনীয়তা বজায় রাখা হবে। আমার নাম ও ঠিকানা কোথাও প্রকাশিত হবে না। কেবল গবেষক এবং সুপারভাইজার গবেষণার ফলাফল প্রকাশের জন্য এই তথ্য ব্যবহার করতে পারবেন।

যদি আমার কোনো প্রশ্ন থাকে, তাহলে আমি গবেষক **সায়ীদ হোসাইন জিবরান** অথবা তার সুপারভাইজার **ফাবিহা আলম দিশা, সহকারী অধ্যাপক, ফিজিওথেরাপি বিভাগ, সাভার, ঢাকা-১৩৪৩**-এর সাথে যোগাযোগ করতে পারি।

অংশগ্রহণকারীর নাম : _____

অংশগ্রহণকারীর স্বাক্ষর ও তারিখ : _____

তথ্য সংগ্রহকারীর স্বাক্ষর ও তারিখ : _____

Appendix -C

Socio-Demographic Questions

অংশগ্রহণকারীর নাম : কোড নং.:

ঠিকানা: আইডি নং. :

মোবাইল নাম্বার : আঘাতের তারিখ :

নিউরোলজিক্যাল লেভেল : আঘাতের কারন :

বয়স	○ ১৮ – ২৮ ○ ২৯ – ৩৯ ○ ৪০ – ৫০ ○ ৫১ – ৬১ ○ ৬২ – ৬৪
লিঙ্গ	○ পুরুষ ○ মহিলা
বৈবাহিক অবস্থা	○ বিবাহিত ○ অবিবাহিত ○ বিধবা ○ তালাকপ্রাপ্ত
শিক্ষাগত অবস্থা	○ নিরক্ষর ○ প্রাথমিক ○ মাধ্যমিক ○ উচ্চ-মাধ্যমিক ○ অনার্স / মাস্টার্স
আঘাতের পুর্বে যে পেশায় নিযুক্ত ছিলেন	
বাসস্থান	○ গ্রাম ○ উপজেলা-শহর ○ জেলা-শহর

আঘাতের পর থেকে আজকে পর্যন্ত কত মাস বা বৎসর অতিবাহিত হয়েছে	_____মাস/বৎসর
আপনার কি শারীরিক কোন জটিলতা আছে?	○ হ্যাঁ ○ না

Patient Health Questionnaire (PHQ)

আপনার প্রয়িক্রিয়াটি (√) দিন

গত ২ সপ্তাহে, আপনি কতবার নিম্নলিখিত সমস্যাগুলির দ্বারা বিরক্ত হয়েছেন?		মোটেই না	বেশ কিছু দিন	দিনের অর্ধেকেরও বেশি সময় ধরে	মোটামোটি প্রতিদিনই
১	কাজ করতে সামান্য আগ্রহ বা আনন্দ	০	১	২	৩
২	হতাশ, বা আশাহীন বোধ করা	০	১	২	৩
		_____+_____+_____+_____ মোট যোগফল = _____			

Problem-Solving Style Questionnaire (PSSQ)

আপনার প্রয়িক্রিয়াটি (√) দিন

বিবৃতি		দৃঢ়ভাবে একমত	সামান্য একমত	নিশ্চিত নই	সামান্য দ্বিমত	দৃঢ়ভাবে অসম্মতি
১	বেশিরভাগ মানুষ মনে করে যে আমি বস্তুনিষ্ঠ এবং যৌক্তিক	৫	৪	৩	২	১
২	বেশীরভাগ লোকই বলবে যে আমি আবেগপ্রবণ এবং বরং প্রেরণাদায়ক	৫	৪	৩	২	১
৩	বেশিরভাগ লোক বিশ্বাস করে যে আমি আমার কাজের বিবরণ জানি এবং এটি খুব সঠিকভাবে করি	৫	৪	৩	২	১
৪	বেশিরভাগ মানুষ একমত যে আমি একজন জটিল এবং বুদ্ধিদীপ্ত ব্যক্তি	৫	৪	৩	২	১
৫	আমি চলমান সমস্যাগুলিতে লক্ষ্য রাখি এবং অন্যদের দূর ভবিষ্যতের বিষয়ে উদ্বিগ্ন হতে দিই	৫	৪	৩	২	১
৬	আমি অন্যদের খুশি করার চেষ্টা করি এবং	৫	৪	৩	২	১

	মাঝে মাঝে নিজের প্রশংসার প্রয়োজনিয়তা অনুভব করি					
৭	যখন আমি কোন সমস্যার সম্মুখীন হই, আমি সমস্ত ঘটনা বিশ্লেষণ করার চেষ্টা করি এবং সেগুলিকে পদ্ধতিগত ক্রমে রাখার চেষ্টা করি	৫	৪	৩	২	১
৮	আমি দীর্ঘ-পরিসরের প্রভাবগুলিতে বেশি আগ্রহী এবং প্রায়শই ছোট ছোট বিবরণ বিরক্ত হই	৫	৪	৩	২	১
৯	আমি সাধারণত কর্মমুখীর চেয়ে বেশি লোকমুখী	৫	৪	৩	২	১
১০	আমি একটি প্রকল্পে শ্রম দেওয়ার আগে, আমি জানতে চাই এতে আমার জন্য কী আছে	৫	৪	৩	২	১
১১	আমি সাধারণত বিশদ বিবরনে অনেক সময় নষ্ট না করে দ্রুত সমস্যার সমাধান করি	৫	৪	৩	২	১
১২	আমার যখন একটি কাজ থাকে, আমি তা	৫	৪	৩	২	১

	করি, এমনকি যদি ঐ কাজের প্রক্রিয়া অন্যদের অনুভূতিতে আঘাত লাগায়					
১৩	রুটিন মাফিক কাজ করতে আমার একঘেয়েমি লাগে এবং নতুন ও জটিল সমস্যার সমাধান করতে আমার ভালো লাগে	৫	৪	৩	২	১
১৪	অন্যরা সমস্যাগুলি সম্পর্কে কেমন অনুভব করে সে সম্পর্কে আমি বেশ ভাল বুঝতে পারি	৫	৪	৩	২	১
১৫	কোনো সমস্যাই আমাকে বিরক্ত করতে পারে না, সেটা যতই কঠিন হোক না কেন	৫	৪	৩	২	১
১৬	আমি এমন কিছু করতে পছন্দ করি যা আমি ভাল করি, কিন্তু আমি নতুন দক্ষতা শেখার চেষ্টা করতে স্বাচ্ছন্দ্যবোধ করি না	৫	৪	৩	২	১
১৭	আমি যেকোনো কাজের গ্রুপে মধ্যে সম্প্রীতি পছন্দ করি - অন্যথায় দক্ষতা ক্ষতিগ্রস্ত হয়	৫	৪	৩	২	১

১৮	আমি নতুন যেকোনো সমস্যা সমাধান করতে উপভোগ করি	৫	৪	৩	২	১
১৯	আমি খুব দ্রুত যেকোনো কিছু শিখতে পারি, কিন্তু আমি তাত্ত্বিক, ভবিষ্যত ধারণা পছন্দ করি না	৫	৪	৩	২	১
২০	প্রয়োজন এর সময় কঠিন কঠিন সিদ্ধান্ত নিতে আমার কোন সমস্যা হয় না	৫	৪	৩	২	১

Exercise Self-Efficacy Scale (ESES)

আপনার প্রতিক্রিয়াটি (o) দিন

ESES Rating Scale

১ = সবসময় সত্য নয় ২ = কদাচিৎ সত্য

৩ = মোটামুটি সত্য ৪ = সবসময় সত্য

আমি আত্মবিশ্বাসী যে.....		রেটিং
১	শারীরিক ক্রিয়াকলাপ এবং ব্যায়ামের ক্ষেত্রে আমি বাধা এবং চ্যালেঞ্জগুলি কাটিয়ে উঠতে পারি যদি যথেষ্ট কঠোর চেষ্টা করে	১ ২ ৩ ৪
২	আমি শারীরিকভাবে সক্রিয় এবং ব্যায়াম করার উপায় খুঁজে বের পারি	১ ২ ৩ ৪
৩	আমি আমার শারীরিক কার্যকলাপ এবং ব্যায়ামের লক্ষ্যগুলি পূরণ করতে পারি যা আমি সেট করেছি	১ ২ ৩ ৪
৪	যখন আমি শারীরিক কার্যকলাপ বা ব্যায়ামের প্রতিবন্ধকতার মুখোমুখি হই, তখন আমি এই বাধা অতিক্রম করার জন্য বিভিন্ন সমাধান খুঁজে বের করতে পারি	১ ২ ৩ ৪
৫	আমি ক্লান্ত থাকা সত্ত্বেও শারীরিকভাবে সক্রিয় হতে পারি বা ব্যায়াম করতে পারি	১ ২ ৩ ৪
৬	বিষণ্ন বোধ করা সত্তেও আমি শারীরিকভাবে সক্রিয় হতে পারি বা ব্যায়াম করতে পারি	১ ২ ৩ ৪
৭	আমি আমার পরিবার বা বন্ধুদের সাহায্য ছাড়াই শারীরিকভাবে সক্রিয় বা ব্যায়াম করতে পারি	১ ২ ৩ ৪

৮	আমি একজন থেরাপিস্ট বা প্রশিক্ষকের সাহায্য ছাড়াই শারীরিকভাবে সক্রিয় বা ব্যায়াম করতে পারি	১ ২ ৩ ৪
৯	আমি বেশ কিছুদিন বিশ্রাম নেবার পরে আবার শারীরিকভাবে সক্রিয় হতে বা ব্যায়াম শুরু করে নিজেকে অনুপ্রাণিত করতে পারি	১ ২ ৩ ৪
১০	আমি শারীরিকভাবে সক্রিয় হতে পারি বা ব্যায়াম করতে পারি এমনকি যদি আমার জিমাগার, প্রশিক্ষণাগার বা পুনর্বাসনা এর সুবিধা না থাকে	১ ২ ৩ ৪
	যোগফল	

Appendix – D

Socio Demographic Questions

Patient Name:

Address: Code no.:

Contact Number: Date of injury:

Level of Injury: Cause of Injury:

Age	○ 18 – 28 ○ 29 – 39 ○ 40 – 50 ○ 51 – 61 ○ 62 – 64
Gender	○ Male ○ Female
Marital Status	○ Married ○ Unmarried ○ Widowed ○ Divorced
Level of Education Completed	○ No Formal Education ○ Primary Level ○ Secondary Level ○ Higher Secondary Level ○ Under Graduate/Graduated
Previous occupation (write the response)	
Living Area	○ Rural ○ Semi-urban ○ Urban
How much time has passed till injury (write the response)	_____years/months
Any complication	○ Autonomic dysreflexia ○ Pressure sore ○ Hypertension ○ Others

Patient Health Questionnaire (PHQ)

Please use (√) to decide your response

Over the last 2 weeks, how often have you been bothered by any of the following problems?		Not at all	Several days	More than half the days	Nearly every day
1	Little interest or pleasure in doing things	0	1	2	3
2	Feeling down, depressed, or hopeless	0	1	2	3
For office coding		_____+_____+_____+_____ Total Score = _____			

Problem-Solving Style Questionnaire (PSSQ)

Please use (√) to decide your response

Statement		Strongly agree	Slightly agree	Not sure	Slightly disagree	Strongly disagree
1	Most people think that I am objective and logical	5	4	3	2	1
2	Most people would say that I am emotional and rather motivating	5	4	3	2	1
3	Most people believe that I know the details of my job and do it very accurately	5	4	3	2	1
4	Most people agree that I am a complex and intellectual person	5	4	3	2	1
5	I tend to focus on immediate problems and let others worry about the distant future	5	4	3	2	1

6	I try to please others and need occasional praise myself	5	4	3	2	1
7	When I face a problem, I try to analyze all the facts and put them in systematic order	5	4	3	2	1
8	I'm more interested in long-range implications and am often bored with minor here and now details	5	4	3	2	1
9	I'm usually more people oriented than task oriented	5	4	3	2	1
10	Before I put energy into a project, I want to know what's in it for me	5	4	3	2	1
11	I normally solve problems quickly without wasting a lot of time on details	5	4	3	2	1
12	When I have a job to do, I do it, even if others' feelings might get hurt in the process	5	4	3	2	1
13	I get bored with routine and prefer to deal with new and complicated challenges	5	4	3	2	1
14	I'm a pretty good judge as to how others feel about problems	5	4	3	2	1
15	I don't let problems upset me, no matter how difficult they are	5	4	3	2	1
16	I like to do things that I do well, but I'm not comfortable trying to learn new skills	5	4	3	2	1

17	I prefer harmony in a work group-otherwise efficiency suffers	5	4	3	2	1
18	I really enjoy solving new problems	5	4	3	2	1
19	I am a quick learner, but I don't like theoretical, futuristic concepts	5	4	3	2	1
20	When necessary, I have no trouble making tough, hard-nosed decisions	5	4	3	2	1

Exercise Self-Efficacy Scale (ESES)

Please use (o) to decide your response

ESES Rating Scale

1 = Not always true 2 = Rarely true

3 = Moderately true 4 = Always true

I am confident …….		Ratings
1	That I can overcome barriers and challenges with regard to physical activity and exercise if try hard enough	1 2 3 4
2	That I can find means and ways to be physically active and exercise	1 2 3 4
3	That I can accomplish my physical activity and exercise goals that I set	1 2 3 4
4	That when I am confronted with a barrier to physical activity or exercise, I can find several solutions to overcome this barrier	1 2 3 4
5	That I can be physically active or exercise even when I am tired	1 2 3 4

6	That I can be physically active or exercise even when I am feeling depressed	1 2 3 4
7	That I can be physically active or exercise even without the support of my family or friends	1 2 3 4
8	That I can be physically active or exercise without the help of a therapist or trainer	1 2 3 4
9	That I can motivate myself to start being physically active or exercising again after I've stopped for a while	1 2 3 4
10	That I can be physically active or exercise even if I had no access to a gym, exercise, training or rehabilitation facility	1 2 3 4
	Sum	

Appendix – E

IRB Approval Letter

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

Ref: CRP-BHPI/IRB/12/2024/1037 Date: 15/12/2024

To
Sayeed Hossain Zibran
B. Sc. in Physiotherapy
Session: 2019-20, ID: **112190476**
BHPI, CRP, Savar, Dhaka-1343, Bangladesh

Subject: **Approval of the thesis proposal "Effectiveness of self-intervened physical and behavioral problem-solving activities during the leisure period along with conventional group therapy for the patients' spinal cord injury attended at the Centre for the Rehabilitation of the Paralysed (CRP): a quasi-experimental study" by ethics committee.**

Dear Zibran,

Congratulations!

The Institutional Review Board (IRB) of BHPI has reviewed and discussed your application to conduct the above-mentioned thesis, with yourself, as the principal investigator and Fabiha Alam, Assistant Professor, Department of Physiotherapy, BHPI as thesis supervisor. The following documents have been reviewed and approved:

Sl. No.	Name of the documents
1	Dissertation proposal
2	Questionnaire (English)
3	Information sheet & Consent form

The study aims to explore the outcomes of self-intervened physical and behaviour-changing activity, along with conventional group therapy on an SCI person's health, physical activity, social cognition and self-efficacy. It involves the use of a semi-structured questionnaire which may take 20 to 30 minutes for collection of the specimen and participation in the study may benefit the participants or other stakeholders. 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 24th 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 with a copy of the final report. This Ethics Committee is working per the Nuremberg Code of 1967, the World Medical Association Declaration of Helsinki, 1964-2013 and other applicable regulations.

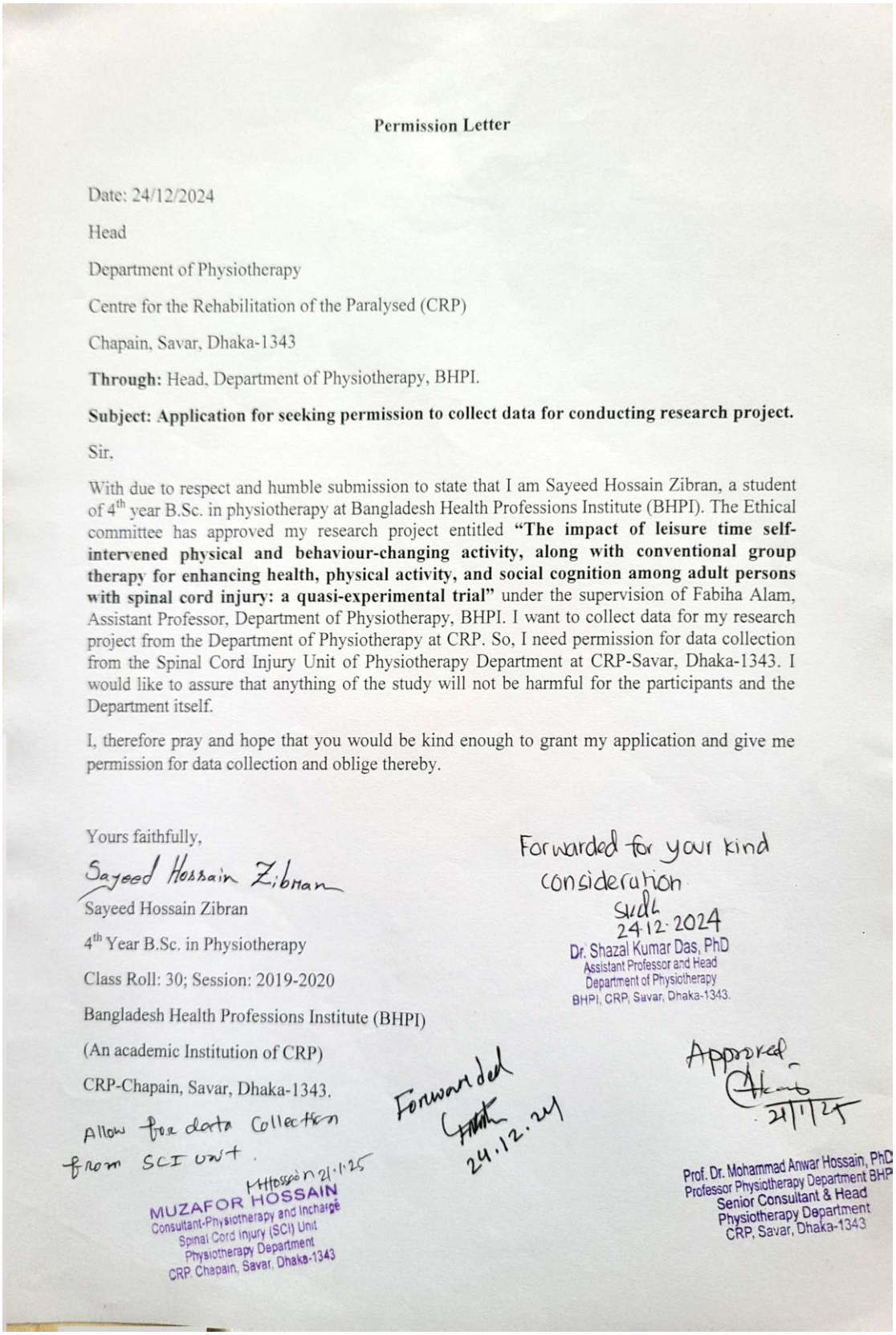
Best regards,

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 ২২৪৪৫৪৬৪-৫, +৮৮ ০২ ২২৪৪১৪০৪, 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-F

Permission Letter



Permission Letter

Date: 24/12/2024

Head

Department of Physiotherapy

Centre for the Rehabilitation of the Paralysed (CRP)

Chapain, Savar, Dhaka-1343

Through: Head, Department of Physiotherapy, BHPI.

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

Sir,

With due to respect and humble submission to state that I am Sayeed Hossain Zibran, a student of 4th year B.Sc. in physiotherapy at Bangladesh Health Professions Institute (BHPI). The Ethical committee has approved my research project entitled **"The impact of leisure time self-intervened physical and behaviour-changing activity, along with conventional group therapy for enhancing health, physical activity, and social cognition among adult persons with spinal cord injury: a quasi-experimental trial"** under the supervision of Fabiha Alam, Assistant Professor, 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 Spinal Cord Injury 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,

Sayeed Hossain Zibran

Sayeed Hossain Zibran

4th Year B.Sc. in Physiotherapy

Class Roll: 30; Session: 2019-2020

Bangladesh Health Professions Institute (BHPI)

(An academic Institution of CRP)

CRP-Chapain, Savar, Dhaka-1343.

Forwarded for your kind consideration

24.12.2024

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

Approved

21/1/25

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

Allow for data collection from SCI unit.

Forwarded

24.12.24

MUZAFOR HOSSAIN 21.1.25
Consultant-Physiotherapy and Incharge
Spinal Cord Injury (SCI) Unit
Physiotherapy Department
CRP, Chapain, Savar, Dhaka-1343