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Effectiveness of Task-oriented Training to Improve Upper Limb-Function/Recovery among Spinal Cord Injury Tetraplegic Patient

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DECLARATION

I declare that the work presented here is my own. All sources used have been cited appropriately. Any mistakes or inaccuracies are my own. I also decline that same any publication, presentation or dissemination of information of the study. I would bind to take consent from the department of Physiotherapy of Bangladesh Health Profession Institute (BHPI).

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"Effectiveness of Task-Oriented Training to Improve Upper Limb Function/ Recovery among Spinal Cord Injury Tetraplegic Patient"

Submitted by **Jolly Akter** for the partial fulfillment of the requirements for the degree of Bachelor of Science in Physiotherapy (B. Sc. In PT)

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List Abbreviations

TOT	Task-oriented Training
BHPI	Bangladesh Health Professions Institute
BMRC	Bangladesh Medical Research Council
CRP	Centre for the Rehabilitation of the Paralysed
ADL	Activity of Daily Living
TT	Tetraplegic
IRB	Institutional Review Board
SCIM	Spinal Cord Independence Measure
PT	Physiotherapy
PTs	Physiotherapist
RCT	Randomized Control Trail
SCI	Spinal Cord Injury
SD	Standard Deviation
SPSS	Statistical Package for the Social Science
WHO	World Health Organization

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Abstract

Introduction: Spinal cord injuries are a global health issue that affects a substantial number of individuals globally, resulting in either lifetime impairment or death. Trauma, infection, ischemia, tumor, or congenital illness can all result in SCI. Worldwide, the prevalence of SCI is approximately 15-40 persons per million, with incidence rates ranging between 10.4 and 83 cases per million in one year. **Objectives:** The objectives were to assess the effectiveness of task-oriented training to improve upper limb function among spinal cord injury tetraplegic patient. **Methodology:** Randomized Control Trial study was chosen to conduct this study. 30 participants were selected according to inclusion criteria and concealed allocated in both group. In experimental group, subjects were treated with task-oriented training whereas subjects in control group treated only conventional therapy with 15 sessions in four weeks. **Measurement tools:** Modified SCIM scale for upper limb, standard structured questionnaires were used to assess the upper limb independence on 30 participants. **Analysis:** Analysis was done through SPSS v20. For the between group analysis, Mann-Whitney U test was used and for the within group analysis, Wilcoxon test was used due to non-parametric data. **Results:** Among 30 participants the mean age of experimental group was 34.73 with standard deviation (± 10.194), median 35, mode 30, maximum age 56, minimum age 18 and control group mean was 39.93 with standard deviation (± 13.483), median 40, mode 40, maximum age 65, minimum age 19 of the participants. In statistical analysis, through mann whetney U test there were significant improvement of dressing function and writting skill. In wilcoxon test, all function were significant in experimental group, on the other hand, in control group, maximum function were significant without transfer and bathing function. **Conclusion:** Overall in this research shows that the task-oriented training is effective for improve upper limb recovery.

Keywords: *Spinal cord Injury; task-oriented training ;upper limb function;tetraplegia*

1.1 : Background

The World Health Organization estimates that every year, 250 to 500 million people suffer spinal cord injuries globally. The number of persons living with spinal cord injury (SCI) has increased, although in a worldwide context, it remains unclear (Wyndaele 2006). Long-term disability results from spinal cord injury (SCI), which causes significant motor, sensory, or autonomic loss below the level of the lesion (Furlan et al. 2011).

Injury to the spinal cord from the foramen magnum to the conus medullaries and cauda equina is known as spinal cord injury (SCI). Acute injury of spinal cord are among the most common cause of severe disability & death. The disruption of nerve transmission caused by a spinal cord injury (SCI) can have serious physical and emotional effects (Eng and Miller 2006).

A spinal cord injury is harm to the spinal cord. The spinal cord carries signals from the brain to every part of the body as well as back in the other direction. It is a serious physical injury that is likely to have a long-lasting, significant impact on the majority of aspects of everyday life. SCI patients experience a wide range of physical problems and body concerns. (2018) Hoque et al. SCI is a fatal illness that demands intensive and specialized clinical rehabilitation since it results in considerable functional handicap. SCI affects many people at an early age, and in recent years, their life expectancy has increased. SCI typically manifests at an early age, and those who have it have increased their (Siddall et al. 2017).

A Spinal Cord Injury (SCI) occurs when the spinal cord is damaged as a result of trauma, disease, vascular compression, or congenital neural tube anomalies. The severity of such an injury can range from minor to severe, depending on the size and location of the damage, and can be determined by the symptoms it produces, such as coma, mental dysfunction, sensory disturbances, autonomic dysfunctions, and motor issues (tetraplegia or paraplegia) (Wolf et al. 2016).

The patient's circumstance is altered, and their quality of life is reduced as a result of their SCI. Young people are most affected by traumatic SCI, with patients 65 years of age or older making about 20% of all SCI cases. Age 19 is the most common age for SCI in the UK, where it mainly affects younger people between the ages of 16 and 30. (Kennedy and Rogers, 2000). Patients with SCI exhibit distinctive qualities in terms of the underlying cause, sex, neurological attributes, and outcomes. Each year, there are approximately 11,000 new SCI cases in the US. Males make up 82% of SCI, whereas females make up only 18%. According to estimates, there are 223–755 spinal cord injuries (SCI) per million people worldwide, with an annual incidence of 10.4–83 per million people. Roughly 10,000 Americans experience spinal cord injuries that require hospitalization each year. 90million people worldwide experience spinal cord injuries of varying severity each year. Many nations are not aware of how common spinal cord injury is. The annual incidence of spinal cord injury (SCI) in the United States is estimated to be around (Singh et al. 2014).The patient's circumstances are changed by SCI, which also lowers their quality of life. While traumatic SCI is more likely in those under the age of 40, non-traumatic SCI is more common in people beyond the age of 40. Higher fatality rates have been noted in older SCI patients. (Kirshblum et al. 2011). In Bangladesh, approximately 4.6 percent of people are disabled as a result of a spinal cord injury or lesion and it is a major public health issue. The results show that young individuals are most frequently affected by traumatic SCI. Twenty percent of people 65 and older have SCI. In the UK, SCI happens most frequently. 16 to 30 year olds, with 19 being the most prevalent age. The etiology, gender, neurological traits, and consequences of SCI patients are diverse (Scivoletto et al. 2003). Spinal cord injuries occur annually at a rate of 1.5–2 per 100,000 people in Sweden. Around 1200 people in the UK suffer paralysis as a result of spinal cord injuries each year (Seema 2019). In India, there are over 20,000 new cases of spinal cord injuries each year (Singh et al. 2014).

According to the World Health Organization [WHO], between 250 000 and 500 000 people worldwide suffer spinal cord injuries each year. Spinal cord injuries, unfortunately, can cause varying degrees of paralysis, sensory loss, limited mobility, and functional independence. The damage could also have an impact on a number of other bodily systems and functions, resulting in a chronic reduction in mobility, reduced level

of activity, and a lower quality of life (Harvey 2016). Due to its impact on arm and hand function, which impacts independence, mobility, and quality of life, tetraplegia (partial or total loss of sensory or motor function of upper, lower, and/or trunk) is the most prevalent, deadliest, most devastating motor disorder (Winstein et al. 2016).

Depending on the level and severity of the injury, a cervical spinal cord injury can have various negative effects on arm and hand function. These impairments often have a negative impact on independence in doing daily tasks and have a negative impact on recreational activity participation. The ability of people with tetraplegia to undertake manual activities of daily living is severely limited by impaired hand function (Colyer 1981).

A full cervical SCI causes extremely specific abnormalities in hand and wrist movement. Those with total SCI below the sixth cervical level still have full wrist and some hand function, while complete spinal cord injury at the C6 neurological level leaves the patient completely paralyzed. Interferes with every hand function besides wrist extension and radial deviation. Complete injuries above the sixth cervical level leave no hand function. However, if the lesion is partial, the degree of hand function that remains after a cervical SCI might vary substantially (Van et al. 2002).

After spinal cord injury (SCI), tetraplegia caused by cervical injury is the most common neurologic category and causes significant impairment. Because it has an impact on mobility, independence, and quality of life, restoring arm and hand function following severe injuries is a top priority of therapy (Kotila et al. 2003). After a spinal cord injury, rehabilitation has concentrated on compensatory techniques to improve function above the degree of impairment in order to promote independence. Technology and therapy methods have advanced due to research activity; one such method is task-oriented training (Refshauge et al. 2019). In order to learn or re-learn a skill (characterized by consistency, flexibility, and efficiency), task-oriented training entails performing real-life tasks (such as walking, sitting, washing, or answering the phone) (Wolf et al. 2009).

Rehabilitation of the upper extremity is a key goal for people with tetraplegic spinal cord injuries, according to their reports(Snoek et al. 2004).Small improvements in upper extremity skill performance may have significant effects on quality of life and self-management.However, the basic approach to SCI rehabilitation is one in which patients receive a comprehensive package of therapy aiming at, among other things, arm and hand skilled performance. Depending on the severity and completeness of the lesion, the team determines the majority of the training's focus (Spooren et al. 2008).

1.2 Justification of the study:

SCI can result through damage to the vertebrae and surrounding tissue as well as direct injury to the spinal cord itself. Changes in sensation, movement, strength, and bodily functions below the injury site may be transitory or permanent as a result of this damage. When a patient has a spinal cord injury (SCI), their capacity to control bodily functions is lost, which leaves them with weak muscles and unable to control their movements. The most typical is tetraplegia, which is caused by partial muscle paralysis and resulting in neurologically-induced weakening of the upper limbs. Patients with spinal cord injuries have less ability to care for themselves and manage their motor functions. People with SCI place a high value on hand use and consider it to be a key factor in determining their quality of life. In spinal cord injury, one of the most important impairments is weak upper limb and no strength in upper limb because of the patient can not do their ADL and fully depend on their caregiver. A treatment method known as task-related training (TRT) or task-oriented physiotherapy involves repeating work-related, goal-oriented activities in a typical context. Additionally, it seeks to lessen impairment associated to balance functional status of the upper limb and enhance upper limb function to perform ADLs appropriately. To help patients lead better lives, the study will examine how task-oriented training can improve hand dexterity and upper-limb skill performance.

Although this kind of research and resources are not accessible in Bangladesh, many overseas studies have been published. The efficiency of task-oriented training to enhance upper limb function in SCI tetraplegic patients must therefore be determined in order to develop a treatment strategy. There are no researches about effectiveness of task-oriented training among spinal cord injury patients in CRP. So, it is beneficial for spinal cord injury patients and also physiotherapists because they are finding tools that help to improve spinal cord injury upper limb function quickly.

1.3 Hypothesis

Null Hypothesis (H0)

Task oriented training is not an effective training for improving upper limb function among spinal cord injured persons.

H0: $\mu_1 - \mu_2 = 0$ or $\mu_1 = \mu_2$,

There are no statistical significant difference on before and after training of task oriented exercise along with conventional therapy compare with conventional therapy alone on improving upper limb function.

Alternative Hypothesis (HA)

Task oriented training is an effective training for improving upper limb function among spinal cord injured persons.

HA: $\mu_1 - \mu_2 \neq 0$, or $\mu_1 \neq \mu_2$,

There are statistical significant difference on before and after training of task oriented exercises along with conventional therapy compare with conventional therapy alone on improving upper limb function.

1.4 Aim

To determine the effectiveness of task- oriented training along with conventional therapy compare with conventional therapy alone in improving Upper limb recovery after spinal cord injury.

1.5 Objectives of the study

1.5.1 General Objective

1.To evaluate efficacy of task oriented training compare with conventional therapy for improve upper limb performance.

1.5.2 Specific Objective

1. To find out the effectiveness of the Task oriented training with conventional therapy compare with conventional therapy alone to improve upper limb function for patients with spinal cord injury(tetraplegic).
2. To identify the socio-demographic features to select the participants.
3. To investigate level of improvement who practicing task oriented exercise.

1.6 Operational Definition

Spinal Cord Injury:

Multiple motor, sensory, and autonomic nervous system dysfunctions are brought on by a spinal cord injury (SCI), and people are more vulnerable to multisystem dysfunction, which increases the risk of secondary problems

Tetraplegia:

Tetraplegia is described as an injury to the neural structure within the spinal canal that results in a loss or impairment of sensory and/or motor function in the thoracic, lumbar, or sacral portions of the spinal cord, with the exception of the cervical segment.

Task-oriented training:

Real-world tasks (such walking or answering the phone) are practiced during task-oriented training with the goal of developing or needing a skill that is defined by consistency, adaptability, and efficiency.

The Spinal Cord Independence Measurement scale(SCIM):

A disability scale created especially for the SCI population to evaluate several activities of daily living (ADLs) is the Spinal Cord Independence Measure (SCIM), which is currently in its third version . It is now one of the most widely used research techniques for evaluating therapy response in people with SCI. The SCIM scale is the most extensively used to assess independence in people with spinal cord injuries. The SCIM was developed to address three unique areas of function in people with spinal cord injury (SCI). Self-care (feeding, grooming, washing, and dressing), breathing and sphincter control, and movement abilities (bed and transfers, indoors/outdoors) are all assessed.

Injury to the spinal cord is regarded as a serious health disorder that seriously damages the spinal cord and ultimately leads to a person having many health issues. Spinal cord damage has serious consequences for individuals, their families, and society. Even though people with spinal cord injuries are members of the community, they nonetheless face many challenges when moving, transferring, and going about their daily lives because of their medical condition. Injuries to the spinal cord can occur to anyone, anywhere in the world, at any time (Noonan et al. 2012).

Various therapies have developed over the past few decades in an effort to enhance arm and hand function in people with spinal cord injury (Leelapattana et al. 2012). One of the most debilitating effects of tetraplegia is the loss of arm and hand function, which has been demonstrated to be the population's top priority for recovery. According to Snoek et al. (2004), even a slight improvement in arm and hand function can boost independence in daily activities and enhance independence.

Damage to the spinal cord has had a significant effect on social, familial, and personal lives as well. Since traumatic spinal cord injuries were more common than other types of spinal cord injuries, it had a negative impact on society. According to Noonan et al. (2012), the affected population per million people worldwide ranged from 10 to 83. A spinal cord injury (SCI) is damage to the spinal cord that results in temporary or permanent alterations in function. SCI can have two different etiologies: traumatic and nontraumatics. In contrast to non-traumatic SCI, which occurs when the primary injury is caused by an acute or chronic disease process, such as a tumor, infection, or degenerative disc disease, traumatic SCI occurs when the spinal cord is acutely damaged by an external physical impact (for example, a car accident, fall, sports-related injury, or violence). SCIs are marked by a loss of independence and a continuously increased lifelong mortality rate, and they have catastrophic physical, social, and occupational repercussions for patients and their families. Additionally, the direct costs of caring for SCI patients are horrifying, averaging between

US\$1.1 and 4.6 million per patient over the course of their lives, underscoring the significance of prevention as the most crucial intervention we can offer. For SCI that cannot be prevented, the discovery of effective treatments becomes crucial (National Spinal Cord Injury Statistical Center, 2014). A bigger loss of function could occur depending on how severe the injury is. The severity of the lesion, the patient's age, and their level of activity all affect a SCI patient's physical capabilities (Janssen, Dallmeijer, Veeger and van der Woude, 2002). SCI is a grave injury that affects day-to-day activities. Rehabilitation specialists are necessary for SCI patients to maintain their functional independence (Haisma et al. 2008). There is strong evidence from past studies that the patient's physical capabilities are predicted by the lesion's severity (Kutty 2012). For SCI rehabilitation, physical activity is crucial. Achieving the maximal level of functional capacity and self-sufficiency is the aim of this therapy (Dalmeijer and Woude 2001). The patient center rehabilitation should be the main emphasis of this type of innovative rehabilitation program. This also includes follow-up care to enhance the functional status and quality of life of people with SCI as well as full and active engagement in their empowerment (Wolfe, Hsieh and Mehta 2010)

Physical capacity is the capacity of a person's respiratory system, circulatory system, and musculoskeletal system to perform at their best, including power production, oxygen uptake, muscular strength, and respiratory function (Haisma et al. 2006). Along with wheelchair proficiency, it emphasizes ADL training. Problems can be avoided, and their severity can be lessened, with its assistance. Training for muscle endurance and strength was also a component of the healing process (Haisma et al. 2008). Building a good aerobic exercise and physical activity program that is traditional and appropriate for SCI patients is challenging (Zoeller et al. 2005). If a person has a spinal cord injury, there is a direct correlation between their quality of life and how quickly they recover. A patient's quality of life is influenced by a variety of elements, including their level of physical fitness, social and psychological well-being, and overall satisfaction with the rehabilitation process and results (Kumar and Gupta 2016).

Only 16.4% of the sample population in Bangladesh made it through the 10-year period, which is significantly lower than the life expectancy rates in wealthy nations like Finland (97.9%), Australia (86%), Canada (92%), the United Kingdom (85%), and the United States (80.7%), according to a 10-year study on the subject. In addition, the study discovered that Bangladesh's situation is worse than that of other developing nations. The information shows that spinal cord injury survivors in Bangladesh have very little access to safe and worthwhile medical care. The study also identified a few potential factors that may contribute to the low life expectancy of people with SCI, including poor acute care and insufficient social reintegration (Razzak et al. 2011). According to Norton (2010), a spinal cord injury is the outcome of an acute traumatic lesion of the neural components in the spinal canal (spinal cord and cauda equina) that causes a temporary or permanent sensory and/or motor loss.

Intervertebral disc disease, vertebral injuries that do not result in spinal cord injury, nerve root avulsions and injuries to peripheral nerves outside the spinal canal, cancer, spinal cord vascular disease, and other non-traumatic spinal cord diseases are not included in the clinical definition of spinal cord injury (National spinal cord injury statistical center, 2011). When the spinal cord is damaged, certain bodily parts become paralyzed and lose their ability to feel (Peterson et al. 2009). Damage to the spinal cord is known as a spinal cord injury. It can be caused directly by harm to the spinal cord or indirectly by harm to the nearby bones, tissues, or blood vessels (Kakulas 2004).

Spinal cord injuries can result from either violent or non-traumatic causes. Traumatic damage can result from a variety of factors. They are dividing up into many sectors. similar to auto accidents involving trucks, buses, and jeeps. A fall could involve a jump, an unintentional shove, or a gunshot wound. motorbike accident 2-wheeled, tricycles, bicycles, and diving. Accidents involving machinery, such as those involving a tractor, bulldozer, go-cart, steamroller, train, road grader, forklift, sledding, snow tubing, tobogganing, playing ice hockey, or snowboarding, can happen to pedestrians as well as those who fall into the path of moving vehicles or jump into them. Personal contact, such as being struck by a blunt item, falling due to being pushed or receiving other piercing

injuries, being stabbed, being impaled, being hit by a boat or parachute, etc. Baseball/softball, football, water skiing, basketball/volleyball, high jump, bomb, grenade, dynamite, and gasoline are some more gymnastics events outside trampoline. Additionally, medical and surgical problems include spinal cord function impairment brought on by unfavorable outcomes of medical, surgical, or diagnostic operations and therapy; these complications have traumatic origins. Spinal tumor, spinal tuberculosis, transverse myelitis, physical abuse, physical weakness, etc. are among the non-traumatic causes (Chen et al. 2013).

The most frequent of all catastrophic injuries is spinal cord injury, which anyone can suffer from. Compared to other age groups, young adults suffer from lifelong disability more frequently. According to Winslow and Rozovsky (2003), spinal cord injuries occur at a rate of 54% in people between the ages of 16 and 30 and 75% in people under the age of 45. Spinal cord damage typically affects men. Complete injuries strike younger men more than older people or women. According to a study, there are numerous factors that have contributed to SCI since 2010: driving (36.5%), falling (28.5%), violence (14.3%), sports (9.2%), and other factors (11.4%). 80.7% of the rate is affected. Since 2010, the average age of this injury has been 46 (.

According to research, it might have traumatic or non-traumatic causes (Kennedy and Chessell 2013). Trauma, whether direct or indirect, can result in traumatic spinal cord injury. There are three main reasons why patients are hospitalized to hospitals in underdeveloped nations. They are being struck by an object, falling from a great height, and transportation accidents. According to a study, 561 people suffered severe spinal cord injuries between 2001 and 2010. Beijing's annual incidence rate is higher than that of other nations and regions at 60.6 per million. Depending on the severity of the lesion, TSCI patients may experience a variety of disorders, including stiffness, sensory abnormalities, and increased reflex actions .

Prognosis of SCI depends on various factors. The severity of the original injury determines whether or not recoveries will occur. Incomplete injuries have a better chance of further recovery than complete injuries. So, prognosis for incomplete SCI is better than complete

SCI. The timing for starting of rehabilitation programme also determines prognosis of SCI. If the rehabilitation programme starts later, recovery chances are very poor. It also affects by patients' age and status of complications like spasticity, contracture etc. which influence the recovery. Young age patient have better prognosis compare to old age patient(Waters et al. 1994).

According to prior research on spinal cord injuries, training the upper limb after a spinal cord injury improves muscle strength, upper limb function, daily living tasks, or quality of life (JUNG et al. 2019). Others looked at technology interference generally without mentioning a training method, whereas others of them explored the impact of specific forms of TOT without technology intrusion (Spooren et al. 2009).

This literature search revealed that the combination of TOT with other interventions appeals to be more famous for its promising results; a reason for its reputation among research assigned intervention rather than TOT alone and the fact of the significant technological advancements in the field seems to be motivating for researchers to engage them as a sort of unique intervention in their scientific work enrolling spinal cord injuries regarding lower extremity functions, gait, and walking.

The ability to perform routine tasks, including motor control, as a result of the interaction between demands of the work they completed is referred to as the task-oriented approach (Shumway-Cook and Woollacott, 2001). Repeating task strategies enhances upper limb recovery, according to numerous research (Higgins et al. 2006). The aim for task training is improved by this therapeutic intervention technique. This method motivates people to actively engage in boring chores in order to improve activity (Shumway-Cook and Woollacott, 2001). One study (Morris, Taub, and Mark 2006) found that task-oriented methods were combined with constraint-induced movement therapy (CIMT), which follows the task practice procedure.

In order to better understand how task-oriented training affects tetraplegic patients' ability to use their upper limbs, marrym et al. (2018) undertook a study. T12 level injuries were most common in patients, occurring in about 37% of cases, followed by T10 level injuries in 14.8% of cases, C6 and T6 injuries in about 11.1% of cases, and cauda equina and T4

injuries in about 3.7% of cases. A fall resulted in a spinal cord injury in 37% of cases, followed by car accidents (29.6%), transverse myelitis (22.2%), and gunshot wounds (11.1%). On the ASIA impairment scale, level A patients made up the majority (51.9%), followed by level C (24.9%), level B (11.1%), and level D (11.1%). Significant improvements in the SCIM scale score were seen after the intervention. The results suggest that TOT has a positive effect on improving arm and hand functions in a subset of patients with cervical SCI, despite the small number of included studies. However, the results should be interpreted cautiously due to the small sample sizes and their reflection on the patient's limited demographics and characteristics. According to prior research on spinal cord injuries, training the upper limb after a spinal cord injury can enhance muscle strength, upper limb function, daily living tasks, or quality of life (Jung et al. 2019).

The 4-weeks TOT greatly improved the participants' physical function in this study. The perceived levels of performance and happiness with the activities were found to be another benefit of the training. Additionally, the majority of participants were able to achieve their anticipated training objectives at the conclusion of the study (Chompoonimit and Nualnetr 2016).

This study found it interesting that individuals who underwent active rehabilitation as well as those who completed it showed a considerable improvement on a number of specified activities. Most studies to date have been unable to show significant functional changes upon discharge. According to Yarkony et al. functional improvement happens more quickly during inpatient rehabilitation, and this impact is related to the confluence of neurological healing, training rigor and an interdisciplinary strategy. The neurological recovery in the post-rehab group was deemed to have a limited impact in the current investigation. The current study reveals that patients who have completed their rehabilitation may still have the capacity to learn new skills because it shows significant changes after discharge. Future studies should evaluate the neurophysiologic mechanisms underlying the training methods. Additionally, it was noted that the needs of the patients in the post-rehab group were changing. After rehabilitation, as opposed to before release, they reported having changed demands.

3.1 Study design:

This study was a Randomized Control Trial Study. There are two groups in this study that are experimental and control groups. The study population and samples were randomized. There were an absolute (control) group and an experimental group where intervention was applied according to protocol. The samples were distributed in two groups by simple random sampling. Task oriented training group and non-task oriented group. A pre-test before intervention and post-test after 15 sessions of intervention was administered with each subject of both groups to compare the functional improvement of upper limb effects before and after the treatment.

3.2 Study setting:

Data was collected from the Spinal Cord Injury Unit, Centre for the Rehabilitation of the Paralysed (CRP), Savar, Dhaka. CRP is the pioneer rehabilitation centre for spinal cord lesion patients in South Asia.

3.3 Study site:

The study was conducted from inpatient, Spinal Cord Injury unit of center for rehabilitation of the paralysed (CRP), Savar, and Dhaka 1343.

3.4 Duration of data collection :

The researcher has been started collecting data from May,2023 and ended in July,2023

3.5 Study Population:

The patient of the Hospital treated in Spinal cord injury Unit inpatient of Physiotherapy Department who met the criteria set by researcher. Patients was Diagnosed as Spinal cord injury.

3.6 Sample size :

P1 = proportion of outcome from group 1

P2 = proportion of outcome from group 2

(1-a/2)= Z value corresponding level of significant

Z(1-b)= Z value corresponding level of power

P1 = 80%

P2= control (60-65 % efficacy)

Z(1-a/2)= 1.96 (fixed)

Z(1-b)= .84 (fixed)

n₁ = Sample size for one group

$$\begin{aligned}n_1 &= (Z_{1-\alpha/2} + Z_{1-\beta}) \frac{p_1(1-p_1) + p_2(1-p_2)}{(p_1-p_2)^2} \\ &= (1.96 + .84)^2 \times \frac{.80(1-.80) + .60(1-.60)}{(.80-.60)^2} \\ &= \sim 140\end{aligned}$$

In this study, 30 participants were selected due to time limitation according to the inclusion and exclusion criteria. 15 participants were in the experimental group and 15 participants in the control group

3.7 Sampling Technique:

30 participants with spinal cord injury who met the inclusion criteria selected conveniently from inpatient spinal cord injury unit of physiotherapy department of CRP, Savar and Dhaka. All the participants had equal probability of assessing to any of two groups and 15 patients were randomly assigned to experimental group comprising of treatment approaches of task oriented training along with conventional physiotherapy and 15 participants to control group treated by usual conventional therapy for this study. Single blinding procedure was followed in this study. The participants were assigned into experimental group and control group by using simple randomization technique are used

3.8 Inclusion criteria

- ✓ **Selected Tetraplegic patient:** In persons with a cervical spinal cord injury (C-SCI), improving arm and hand performance has a major role in rehabilitation and may lead to large improvement in self-management and quality of life(Snoek et al. 2004).
- ✓ **Age range between 18 to 60 years** with 19 being the most prevalent age (Scivoletto et al. 2003) (Barbonetti et al. 2011).
- ✓ **Both male and female participant's :** Both male and female who had spinal cord injury are included because Singh et al. 2014 stated that Males make up 82% of SCI, whereas females make up only 18%.
- ✓ **people who are willing to participate**

3.9 Exclusion criteria

- ✓ **Other disability with mental condition:** co-morbidity concerning neurological, orthopedic or rheumatologic diseases that might strongly interfere with ADL functioning , and inability to take part in upper extremity measurement (spooren et al. 2011).

3.10 Blinding:

A blinding process was maintained in the intervention part where the assessor was blinded.

3.11 Data collection process:

The data collection process is the most important part of a randomized control study. Before starting data collection, a training session was arranged for the assessor and treatment provider to avoid the error of measurement and providing intervention. The face to face interview session was arranged for every participant to collect the exact information from the participant. The data collection procedure was conducted through assessing the patient, initial recording, treatment and final recording. In 40 minutes, Duration of the treatment, 20 minutes for task-oriented training and 20 minutes conventional therapy received for experimental group. 12 sessions of treatment were provided for every subject. Thirty subjects were chosen for data collection according to the inclusion criteria. The researcher divided all participants into two groups and coded (n=15) for control group and (n=15) for experimental group. Experimental group received task oriented physiotherapy along with conventional therapy and control group received conventional physiotherapy alone. Pretest was performed before beginning the treatment and the independence were noted with SCIM scale score on questionnaire form. The same procedure was performed to take post-test at the end of 12 session of treatment. Researcher gave the assessment form to each subject before starting treatment and after four sessions of treatment and instructed to put tick mark on the subjective part and objective part like SCIM questionnaire according to their upper limb independence. The data collector collected the data both in experimental and control group in front of the qualified physiotherapist to reduce biasness.

3.12 CONSORT flow diagram:

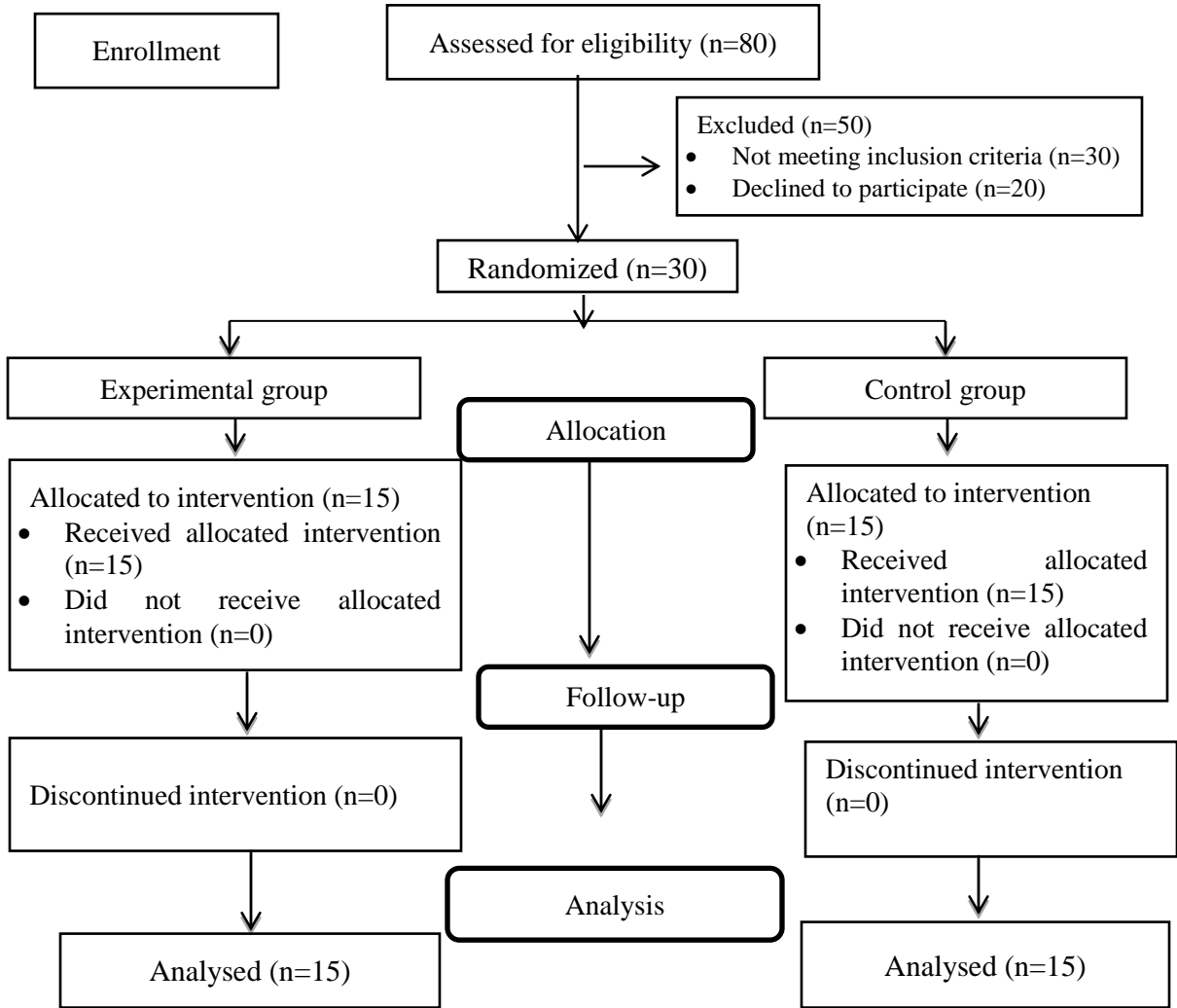


Figure-3.1: CONSORT flow diagram of the progress through the phases of a parallel randomized trial of two groups.

3.13 Intervention protocol:

In this study, the efficacy of task-oriented training for individuals with spinal cord injury tetraplegia was assessed. Spinal Cord Injury Measurement Scale are employed as measurement tools for gauging independence and upper limb function in order to assess the efficacy of this treatment. there were two groups of experimental and control, the experimental group are received task oriented training along with coventional therapy and control group are received conventional therapy alone. In 40 minutes,Duration of the treatment, 20 minutes for task-oriented training and 20 minutes conventional therapy recieved for experimental group.

Data were collected by using spinal cord independence measurement scale(SCIM) .

All patients were provided with task specific training for 4 weeks and again data were collected by using SCIM Scale. the exercise are include :

- ✓ **Catch and throw a ball,**
- ✓ **throwing towel off the table**
- ✓ **doing dusting on the table**
- ✓ **supination over foam roll**

later these exercises were progressed to include:

- ✓ **throwing cup with wrist, exercises with puttey and putting glass on top of each other**

When finger movements improved then exercise of finger were initiated these include:

- ✓ **switching, needling a macroni, turning and lifting cards off the table.**

These exercise are carried out 3 days\week on alternate days

(Marryam ,Umar and Al Ain 2018).

Intervention Regimen:



figure1: Catch and throw a ball



figure2: switching



figure3: supination over foam roll

The patient was provided an intervention protocol leaflet with a picture, description of treatments based on FITT approach.

Table 3.1: Treatment protocol for task oriented training programme

Variables	Values
Frequency	3 days in a week, total 4 weeks
Intensity	10 rep with 10 sec hold in each task oriented exercise
Time	1 times/day by supervision of pt and alternating day by pt himself or caregiver
Type of exercise	task-specific exercise practising <ul style="list-style-type: none"> ✓ Catch and throw a ball, ✓ throwing towel off the table ✓ doing dusting on the table ✓ supination over foam roll ✓ throwing cup with wrist, exercises with puttey and putting glass on top of each other ✓ switching, needling a macroni, turning and lifting cards off the table.

3.14 Questionnaire :

The questionnaire was developing under the advice and permission of the supervisor following certain guidelines. There were seven close ended questions with socio demographic information and seven questions for measuring Spinal cord injury independence measurement scale(SCIM). First seven questions were formulated to identify the socio demographic status of the Spinal cord injury patients,Seven question for independence. All questions were related to spinal cord injury tetraplegic patient's independence in upper limb activity.

3.15 Outcome measurement tools:

Structured questionnaires were used in this study. The interviewer was asked from the structured questionnaire which was designed to collect information on related. Socio-demographic part was included in the questionnaire and calculated the descriptive analysis and central tendency. The first section was included items of socio demographic characteristics and background information like- name, sex, age, educational qualification, height, weight, etc .Second section included items on independence related information by Spinal cord injury measurement scale(SCIM).

3.16 Data analysis:

Data were analyzed with the software named Statistical Package for Social Science (SPSS) version 20.0 and Microsoft Office and Excel 2010. For the between group analysis, Mann-Whitney U test was used. It is a nonparametric test of the null hypothesis that, for randomly selected values X and Y from two populations, the probability of X being greater than Y is equal to the probability of Y being greater than X. For the control group analysis, Wilcoxon test was used. The Wilcoxon signed-rank test is a non-parametric statistical hypothesis test used to compare two related samples, matched samples, or repeated measurements on a single sample to assess whether their population mean ranks differ.

3.17 Level of Significance:

To find out the significance of the study, the “p” value was calculated. The p values refer to the probability of the results for the experimental study. A p-value is called the level of significance for an experiment and a p-value of <0.05 was accepted as a significant result for health service research.

3.18 Ethical consideration:

The proposal of the thesis including methodology was presented to the Institutional Review Board (IRB) of Bangladesh Health Professions Institute (BHPI) (Annexure-I). Again before starting data collection, the researcher obtained permission (Annexure-II) from the head of the physiotherapy department to access patient data-based management and allow full involvement of physiotherapists who have been working in SCI Unit, CRP, Savar. The researcher strictly maintained confidentiality regarding the participant’s condition and treatments. The researcher obtained consent from each participant to take part in this study. The participants were free to withdraw their consent and terminate participation at any time. Withdrawal of participation from the study did not affect their treatment in the physiotherapy department and they still had the chance to receive the same facilities. Every subject had the opportunity to discuss their problems with the senior authority or administration of CRP and had any questioned answer to their satisfaction. To eliminate ethical claims, the participants were set free to receive treatment for other purposes as usual. The participants have explained the purpose and goal of the study before collecting data from the participants. It was ensured to the participants that the entire field notes, transcripts, and all the necessary information will be kept in a locker to maintain confidentiality and all information will be destroyed after completion of the study.

3.19 Informed Consent:

Written consent was given to all participants before the completion of the questionnaire. The data collector explained to the participants about his role in this study and the aim and objective of this study. The data collector received a written consent form from every participant including a signature. So the participant assured that they could understand the consent form and their participation was voluntary. The participants were informed clearly that their information would be kept confidential. The researcher assured the participants that the study would not be harmful to them. It was explained that there might not a direct benefit from the study for the participants but in future cases like them might get benefit from it. The participants had the right to withdraw consent and discontinue participation at any time without prejudice to present or future care at the spinal cord injury (SCI) unit of CRP. Information from this study was anonymously coded to ensure confidentiality and was not personally identified in any publication containing the result of this study.

In order to ensure that the research have some values, the meaning of collected data has to be presented in ways that other research workers can understand. In other words, the researcher has to make sense of the results. As the result came from an experiment in this research, data analysis was done with statistical analysis.

4.Socio-demographic information:

Table 4.1: Baseline characteristic of sociodemographic information for experimental group and control group:

criteria	Experimental group	Control group
Age(Mean±SD)	34.73 (±10.194)	39.93 (±13.483)
Gender(%)	Male 93% Female 7%	Male 87% Female 13%
Educational qualification(%)	illiterate 33.3% primary 46.7 secondary13.3 higher 6.7%	illiterate 20% primary 40% secondary 40%
Height (Mean±SD)	66.73(±1.897)	65(±4.818)
weight (Mean±SD)	52.67(±10.048)	19(±10.283)

Age range distribution among participants :

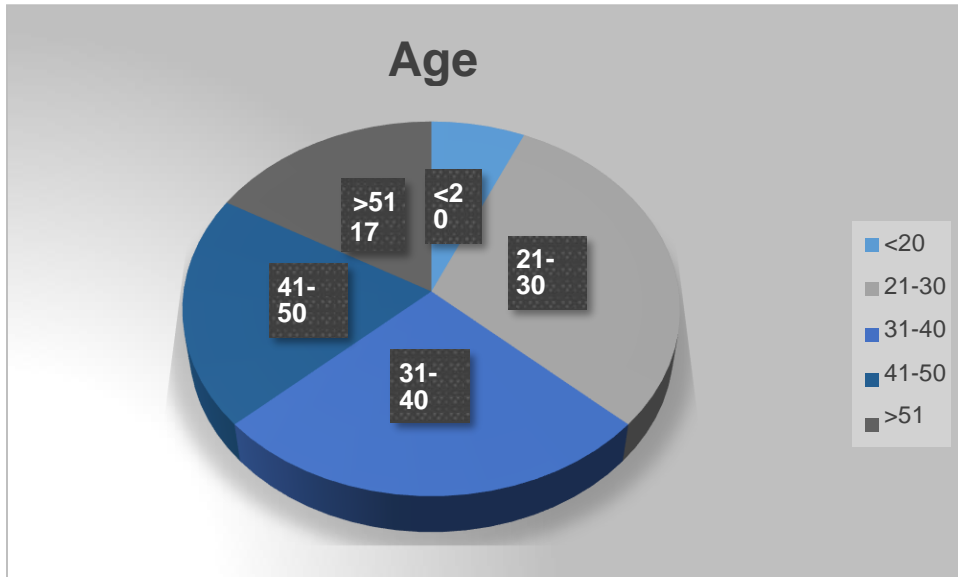


Figure 4.1: Age range distribution among participants

Figure 4.1 described that among the 30 participants, age ranges were grouped into 5 categories such as <20 years were 2 (6%), 21-30 years were 9(30%), 31-40 years were 8(27%), 41-50 years were 6 (20%) and >51 years were 5(17%).

4.1 Gender Distribution among participants

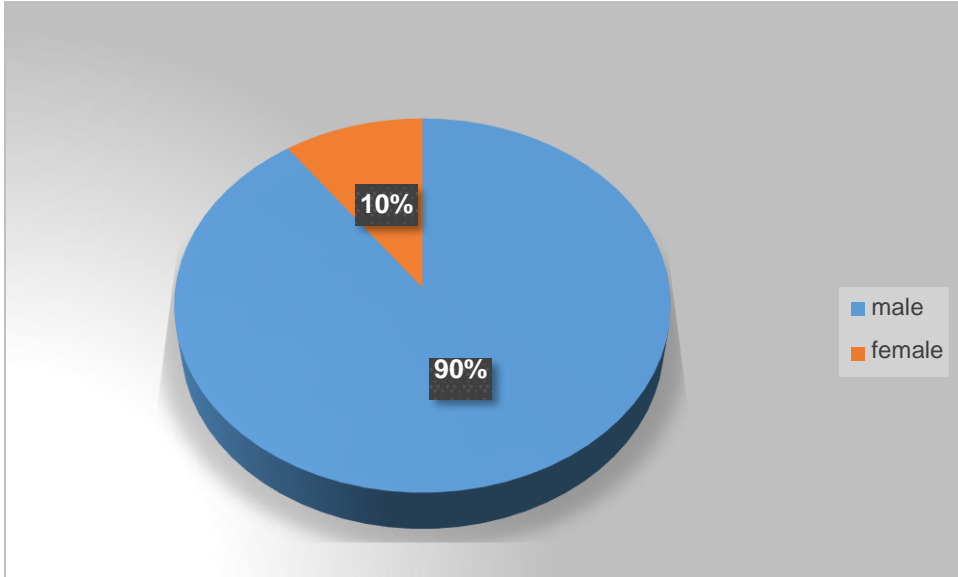


Figure 4.2: Gender distribution among participants n=30

Figure 4.2 described that among 30 participants, 27 (90%) participants were male and 3 (10%) participants were female. In control group male participants were 14 (93.3%) and female participants were 1 (6.7%). In experimental group male participants were 13 (86.7%) and female participants were 2 (13.3%).

4.2 Education of the participants:

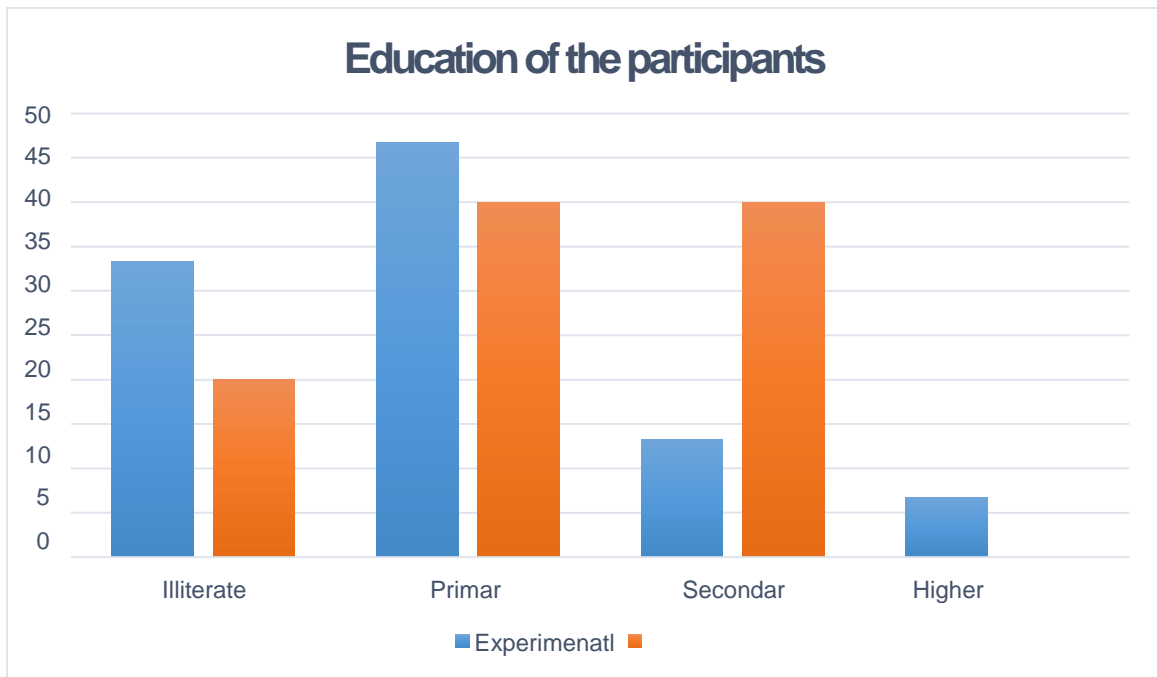


Figure:4.3 Educational Qualification of the participants

In experimental group, among 15 patients ,33.3%(n=5) were illiterate,46.7%(n=7) were primary education,13.3%(n=2) had secondary education and 6.7%(n=1) had higher secondary education.

In control group, among 15 patients , 20%(n=3) were illiterate,40%(n=6) were primary education and 40%(n=6) had secondary education.

4.3 Height of the participants:

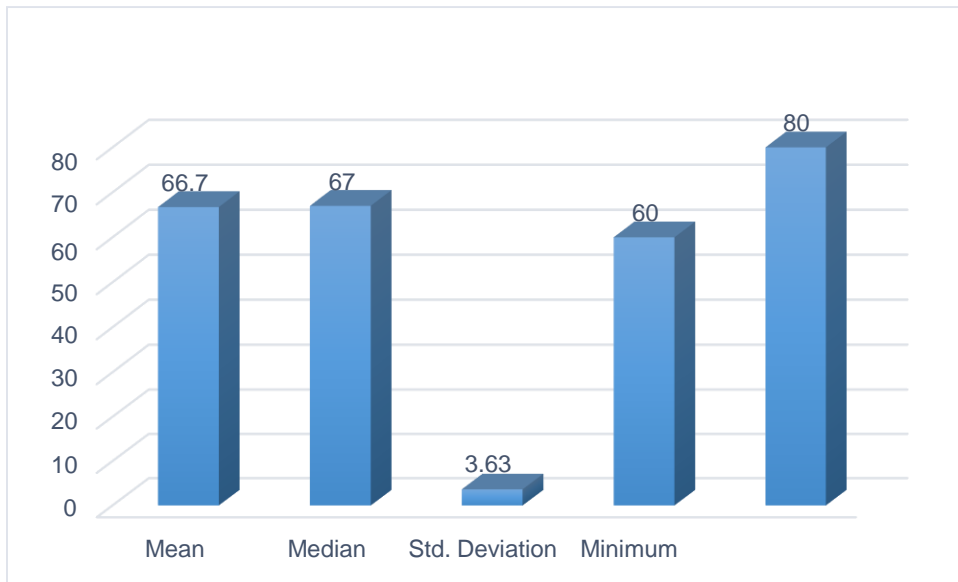


figure:4.4 height of the participants

figure 4 narrated that among 30 participants , mean height was 66.73,median was 67, std. deviation was 3.638,minimum height was 60 kg and maximum height 80 kg.

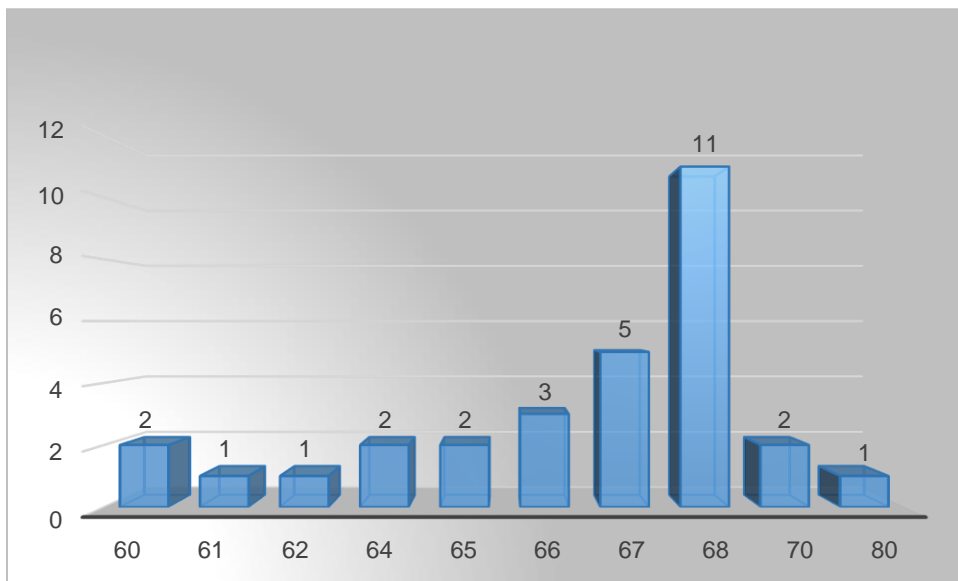


figure:4.4 height of the participants

figure 5 showed that,frequency of the height .most of the participants height was 68.

4.4 weight of the participants

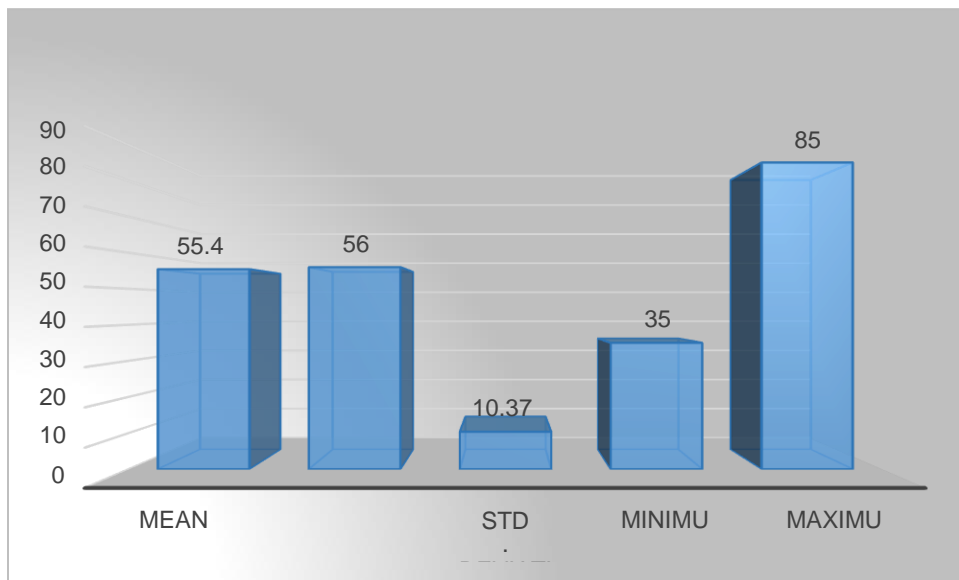


Figure 4.5: Weight of the participants

figure 6 narrated that among 30 participants ,mean weight was 55.43,median was 56, std. deviation was 10.378 ,minimum weight was 35 kg and maximum weight 85kg.

Test of Assumption: Mann-Whitney U and Wilcoxon Test are used because of non-parametric data(distribution is not normal)

4.5 feeding function between-group for the experimental and control group

Table-4.2 presented that the calculated value of the Mann-Whitney U test for feeding function of the participants between the experimental and control group was 91.500 with a Z value of -1.343 ,p-value of .179 indicated the significance that was more than 0.05. So, the task oriented exercise intervention was not effective than the conventional physiotherapy to improve feeding function among spinal cord injury tetraplegic patients.

Table-4.2: Mann-Whitney U-test for feeding function between the experimental and control group

Variable	Mean Rank		Mann-Whitney U Test	Z value	P value
	Experimental group	Control group			
feeding function post-test	16.90	14.10	91.500	-1.343	.179

4.6 Bathing function between-group for the experimental and control group

Table-4.3 presented that the calculated value of the Mann-Whitney U test for bathing function of the participants between the experimental and control group was 75.000 with a Z value of -1.000 ,p-value of .073. indicated the significance that was more than 0.05. So, the task oriented exercise intervention was not effective than the conventional physiotherapy to improve bathing function among spinal cord injury tetraplegic patients.

Table-4.3: Mann-Whitney U-test for bathing function between the experimental and control group

Variable	Mean Rank		Mann-Whitney U Test	Z value	P value
	Experimental group	Control group			
bathing function posttest	18.00	13.00	75.000	-1.000	.073

4.7 Dressing function between-group for the experimental and control group

Table-4.4 presented that the calculated value of the Mann-Whitney U test for dressing function of the participants between the experimental and control group was 59.000 with a Z value of -2.554 ,p-value of .011. indicated the significance that was less than 0.05. So, the task oriented exercise intervention was more effective than the conventional physiotherapy to improve dressing function among spinal cord injury tetraplegic patients.

Table-4.4: Mann-Whitney U-test for dressing function between the experimental and control group

Variable	Mean Rank		Mann-Whitney U Test	Z value	P value
	Experimental group	Control group			
dressing function posttest	19.07	11.93	59.000	-2.554	.011*

4.8 Grooming function between-group for the experimental and control group

Table-4.5 presented that the calculated value of the Mann-Whitney U test for grooming function of the participants between the experimental and control group was 84.500 with a Z value of -1.666, p-value of .096. indicated the significance that was more than 0.05. So, the task oriented exercise intervention was not effective than the conventional physiotherapy to improve grooming function among spinal cord injury tetraplegic patients.

Table-4.5: Mann-Whitney U-test for grooming function between the experimental and control group

Variable	Mean Rank		Mann-Whitney U Test	Z value	P value
	Experimental group	Control group			
grooming function posttest	17.37	13.63	84.500	-1.666	.096

4.9 Use of toilet function between-group for the experimental and control group

Table-4.6 presented that the calculated value of the Mann-Whitney U test for use of toilet function of the participants between the experimental and control group was 101.000 with a Z value of -.556, p-value of .578. indicated the significance that was more than 0.05. So, the task oriented exercise intervention was not effective than the conventional physiotherapy to improve use of toilet function among spinal cord injury tetraplegic patients.

Table-4.6: Mann-Whitney U-test for use of toilet function between the experimental and control group

Variable	Mean Rank		Mann-Whitney U Test	Z value	P value
	Experimental group	Control group			
use of toilet function posttest	16.27	14.73	101.000	-.556	.578

4.10 Transferring function between-group for the experimental and control group

Table-4.7 presented that the calculated value of the Mann-Whitney U test for transferring function of the participants between the experimental and control group was 82.500 with a Z value of -1.523, p-value of .128. indicated the significance that was more than 0.05. So, the task oriented exercise intervention was not effective than the conventional physiotherapy to improve transfer function among spinal cord injury tetraplegic patients.

Table-4.7: Mann-Whitney U-test for use of transferring function between the experimental and control group

Variable	Mean Rank		Mann-Whitney U Test	Z value	P value
	Experimental group	Control group			
transferring function posttest	17.50	13.50	82.500	-1.523	.128

4.11 writing skill between-group for the experimental and control group

Table-4.8 presented that the calculated value of the Mann-Whitney U test for writing skill function of the participants between the experimental and control group was 49.500 with a Z value of -2.930, p-value of .003. indicated the significance that was less than 0.05. So, the task oriented exercise intervention was more effective than the conventional physiotherapy to improve writing skill among spinal cord injury tetraplegic patients.

Table-4.8: Mann-Whitney U-test for writing skill between the experimental and control group

Variable	Mean Rank		Mann-Whitney U Test	Z value	P value
	Experimental group	Control group			
writing skill posttest	19.70	11.30	49.500	-2.930	.003*

4.12 Wilcoxon test for feeding function for control group:

Table 4.9 described the comparison of participant's before (pre) and after (post) erectile function. By examining the final test statistics portion of table by Wilcoxon signed-rank test it was discovered that conventional physiotherapy was effective for upper limb function in spinal cord injury tetraplegic patients. ($Z = -3.317$, $p = .001$).

Table-4.9: Wilcoxon test for feeding function for control group:

Variable	Mean		Standard Deviation		Z value	P
	pretest	posttest	pretest	posttest		
feeding function	.13	.87	.352	.516	-3.317	.001*

4.13 Wilcoxon test for feeding for experimental group

Table 4.10 described the comparison of participant's before (pre) and after (post) feeding function. By examining the final test statistics portion of table by Wilcoxon signed-rank test it was discovered that the task oriented training was highly effective for feeding function in spinal cord injury patients. ($Z = -3.606$, $p = .000$).

Table-4.10: Wilcoxon test for feeding function for experimental group

Variable	Mean		Standard Deviation		Z value	P
	pretest	posttest	pretest	posttest		
feeding function	.20	1.07	.414	.258	-3.606	.000*

4.14 Wilcoxon test for bathing for control group

Table 4.11 described the comparison of participant's before (pre) and after (post) bathing function. By examining the final test statistics portion of table by Wilcoxon signed-rank test it was discovered that conventional physiotherapy was not effective for bathing function in spinal cord injury patients. ($Z = -1.732$, $p = .083$).

Table-4.11: Wilcoxon test for bathing function for control group

Variable	Mean		Standard Deviation		Z value	P
	pretest	posttest	pretest	posttest		
bathing function	.13	.33	.414	.258	-1.732	.083

4.15 Wilcoxon test for bathing for experimental group

Table 4.12 described the comparison of participant's before (pre) and after (post) bathing function. By examining the final test statistics portion of table by Wilcoxon signed-rank test it was discovered that the task oriented training was effective for bathing function in spinal cord injury patients. ($Z = -3.126$, $p = .002$).

Table-4.12: Wilcoxon test for bathing function for experimental group

Variable	Mean		Standard Deviation		Z value	P
	pretest	posttest	pretest	posttest		
bathing function	.00	.67	.000	.488	-3.126	.002*

4.16 Wilcoxon test for dressing for control group

Table 4.13 described the comparison of participant's before (pre) and after (post) dressing function. By examining the final test statistics portion of table by Wilcoxon signed-rank test it was discovered that the conventional physiotherapy was effective for dressing function in spinal cord injury patients. ($Z = -2.236$, $p = .025$).

Table-4.13: Wilcoxon test for dressing function for control group

Variable	Mean		Standard Deviation		Z value	P
	pretest	posttest	pretest	posttest		
dressing function	.07	.40	.258	.632	-2.236	.025*

4.17 Wilcoxon test for dressing for experimental group

Table 4.14 described the comparison of participant's before (pre) and after (post) dressing function. By examining the final test statistics portion of table by Wilcoxon signed-rank test it was discovered that the task oriented training was highly effective for dressing function function in spinal cord injury patients. ($Z = -3.606$, $p = .000$).

Table-4.14: Wilcoxon test for dressing function for experimental group

Variable	Mean		Standard Deviation		Z value	P
	pretest	posttest	pretest	posttest		
dressing function	.00	.87	.000	.352	-3.606	.000*

4.18 Wilcoxon test for grooming for control group

Table 4.15 described the comparison of participant's before (pre) and after (post) grooming function. By examining the final test statistics portion of table by Wilcoxon signed-rank test it was discovered that conventional physiotherapy was effective for grooming function in spinal cord lesion patients. ($Z = -3.162$, $p = .002$).

Table-4.15: Wilcoxon test for grooming function for control group

Variable	Mean		Standard Deviation		Z value	P
	pretest	posttest	pretest	posttest		
grooming function	.13	.80	.352	.561	-3.162	.002*

4.19 Wilcoxon test for grooming for experimental group

Table 4.16 described the comparison of participant's before (pre) and after (post) grooming function. By examining the final test statistics portion of table by Wilcoxon signed-rank test it was discovered that the task oriented training was effective for grooming function in spinal cord injury patients. ($Z = -3.606$, $p = .000$).

Table-4.16: Wilcoxon test for grooming function for experimental group

Variable	Mean		Standard Deviation		Z value	P
	pretest	posttest	pretest	posttest		
grooming function	.20	1.07	.414	.258	-3.606	.000*

4.20 Wilcoxon test for use of toilet for control group

Table 4.17 described the comparison of participant's before (pre) and after (post) use of toilet function. By examining the final test statistics portion of table by Wilcoxon signed-rank test it was discovered that conventional physiotherapy was effective for use of toilet function in spinal cord injury patients. ($Z = -2.236$, $p = .025$).

Table-4.17: Wilcoxon test for use of toilet function for control group

Variable	Mean		Standard Deviation		Z value	P
	pretest	posttest	pretest	posttest		
use of toilet function	.07	.40	.258	.632	-2.236	.025*

4.21 Wilcoxon test for use of toilet for experimental group

Table 4.18 described the comparison of participant's before (pre) and after (post) use of toilet function. By examining the final test statistics portion of table by Wilcoxon signed-rank test it was discovered that the task oriented training was effective for use of toilet function in spinal cord injury tetraplegic patients. ($Z = -2.646$, $p = .008$).

Table-4.18: Wilcoxon test for use of toilet function for experimental group

Variable	Mean		Standard Deviation		Z value	P
	pretest	posttest	pretest	posttest		
use of toilet function	.00	.47	.000	.516	-2.646	.008*

4.22 Wilcoxon test for transfer for control group

Table 4.19 described the comparison of participant's before (pre) and after (post) transfer function. By examining the final test statistics portion of table by Wilcoxon signed-rank test it was discovered that conventional physiotherapy was not effective for transfer in spinal cord injury tetraplegic patients. ($Z = -1.414$, $p = .157$).

Table-4.19: Wilcoxon test for transfer function for control group

Variable	Mean		Standard Deviation		Z value	P
	pretest	posttest	pretest	posttest		
Transfer	.07	.20	.258	.414	-1.414	.157

4.23 Wilcoxon test for transfer for experimental group

Table 4.20 described the comparison of participant's before (pre) and after (post) transfer function. By examining the final test statistics portion of table by Wilcoxon signed-rank test it was discovered that the task oriented training was highly effective for transfer in spinal cord injury tetraplegic patients. ($Z = -2.646$, $p = .008$).

Table-4.20: Wilcoxon test for transfer for experimental group

Variable	Mean		Standard Deviation		Z value	P
	pretest	posttest	pretest	posttest		
Transfer	.00	.47	.000	.516	-2.646	.008*

4.24 Wilcoxon test for writing skill for control group

Table 4.21 described the comparison of participant's before (pre) and after (post) writing skill function. By examining the final test statistics portion of table by Wilcoxon signed-rank test it was discovered that the conventional therapy was effective for writing skill in spinal cord injury tetraplegic patients. ($Z = -2.000$, $p = .046$).

Table-4.21: Wilcoxon test for writing function for control group

Variable	Mean		Standard Deviation		Z value	P
	pretest	posttest	pretest	posttest		
writing skill	.13	.40	.352	.632	-2.000	.046*

4.25 Wilcoxon test for writing skill for experimental group

Table 4.22 described the comparison of participant's before (pre) and after (post) writing skill. By examining the final test statistics portion of table by Wilcoxon signed-rank test it was discovered that the task oriented training was highly effective for writing skill in spinal cord injury tetraplegic patients. ($Z = -3.162$, $p = .002$).

Table-4.22: Wilcoxon test for writing function for experimental group

Variable	Mean		Standard Deviation		Z value	P
	pretest	posttest	pretest	posttest		
writing skill	.27	.93	.458	.458	-3.162	.002*

The purpose of this study was to determine the effect of task-oriented exercise along with conventional therapy in patients with tetraplegia spinal cord injury. A Randomized Control Trial study was followed by the researcher where 15 participants were selected for the experimental group and 15 participants were selected for the control group according to the inclusion and exclusion criteria. Among the total thirty participants, experimental group participants were given training of task-oriented exercise along with the conventional physiotherapy for 4 weeks of 12 sessions. On the other hand, control group participants were given treatment of conventional physiotherapy also for 4 weeks of 12 sessions. A pre-test and post-test data were collected by double blinded random sample technique. the non-parametric data were analyzed by using Wilcoxon Signed Rank Test and Mann Whitney U Test. After data analysis, it was evaluated that the maximum age population 21-30 years were 9(30%), mean age of experimental group was 34.73 with standard deviation (± 10.194), median 35, mode 30 ,maximum age 56, minimum age 18 and control group mean was 39.93 with standard deviation (13.483), median 40, mode 40, maximum age 65, minimum age 19 of the participants. and 90% participants were male in this study. It was also observed in socio-demographic area that 43.3% of the participants were completed their primary education which was the highest and most of the participants height was 68 in the study. among 30 participants ,mean weight was 55.43,median was 56, std. deviation was 10.378,minimum weight was 35 kg and maximum weight 85kg.

The study demonstrated that among the total 30 participants within group analysis, both experimental and control group upper limb recovery were significant,but experimental group were more significant. It indicates that task-oriented training was more effective on upper limb function/ recovery than conventional physiotherapy on the other hand physiotherapy also essential on improving upper limb function and in patients with tetraplegic SCI. In the study, Among the total 30 participants within group analysis through mann whitney U test, writting skill and dressing function was significant for experimental

group, It indicates that task-oriented had a great impact on improving upper limb function in patient with tetraplegic SCI. The researcher also evaluated that among the total participants between group analysis, in both experimental and control group upper limb function were significant. It indicates that conventional physiotherapy also effective in patient with tetraplegic SCI but less than task-oriented training. The participants' feeding function pre and post mean (SD) scores were $.20(\pm.414)$ and $1.07 (\pm.258)$ within the experimental group analysis (before the test) and at the end of the Wilcoxon test (after the test). A p-value of .000 indicates a significance of less than 0.05. In the control group, participants' intercourse satisfaction pre and post mean (SD) score were $.13 (\pm.352)$ and $.87 (\pm.516)$ within the experimental group analysis (before the test) and at the end of the Wilcoxon test (after the test). A p-value of .001 indicates a significance of less than 0.05 In non-parametric within group data analysis, through wilcoxon test ,in both experimental and control group feeding function were significant. . The participants' bathing function pre and post mean (SD) scores were $.00(\pm.000)$ and $.67 (\pm.488)$ within the experimental group analysis (before the test) and at the end of the Wilcoxon test (after the test). A p-value of .002 indicates a significance of less than 0.05. In the control group, participants' intercourse satisfaction pre and post mean (SD) score were $.13 (\pm.414)$ and $.33 (\pm.258)$ within the experimental group analysis (before the test) and at the end of the Wilcoxon test (after the test). A p-value of .083 indicates a significance of more than 0.05 Bathing function were significant in experimental group ,not control group. . The participants' dressing function pre and post mean (SD) scores were $.00(\pm.000)$ and $.87(\pm.352)$ within the experimental group analysis (before the test) and at the end of the Wilcoxon test (after the test). A p-value of .000 indicates a significance of less than 0.05. In the control group, participants' dressing pre and post mean (SD) score were $.07 (\pm.258)$ and $.87 (\pm.632)$ within the experimental group analysis (before the test) and at the end of the Wilcoxon test (after the test). A p-value of .025 indicates a significance of less than 0.05 in both experimental and control group dressing function were significant. . The participants' grooming function pre and post mean (SD) scores were $.20(\pm.414)$ and $1.07 (\pm.258)$ within the experimental group analysis (before the test) and at the end of the Wilcoxon test (after the test). A p-value of .000 indicates a significance of less than 0.05. In the control group, participants'

grooming pre and post mean (SD) score were .13 (\pm .352) and .80 (\pm .561) within the experimental group analysis (before the test) and at the end of the Wilcoxon test (after the test). A p-value of .002 indicates a significance of less than 0.05 . The participants' use of toilet function pre and post mean (SD) scores were .00(\pm .000) and .47 (\pm .516) within the experimental group analysis (before the test) and at the end of the Wilcoxon test (after the test). A p-value of .008 indicates a significance of less than 0.05. In the control group, participants' use of toilet pre and post mean (SD) score were .07 (\pm .258) and .40 (\pm .632) within the experimental group analysis (before the test) and at the end of the Wilcoxon test (after the test). A p-value of .025 indicates a significance of less than 0.05 in both experimental and control group use of toilet function were significant, in both experimental and control group use of toilet were significant. . The participants' transfer pre and post mean (SD) scores were .00(\pm .000) and .47 (\pm .516) within the experimental group analysis (before the test) and at the end of the Wilcoxon test (after the test). A p-value of .008 indicates a significance of less than 0.05. In the control group, participants' transfer pre and post mean (SD) score were .07 (\pm .258) and .20 (\pm .414) within the experimental group analysis (before the test) and at the end of the Wilcoxon test (after the test). A p-value of .157 indicates a significance of more than 0.05 . transfer function were significant in experimental group ,not control group . . The participants' writing skill pre and post mean (SD) scores were .20(\pm .414) and 1.07 (\pm .258) within the experimental group analysis (before the test) and at the end of the Wilcoxon test (after the test). A p-value of .000 indicates a significance of less than 0.05. In the control group, participants' writing skill pre and post mean (SD) score were .27 (\pm .458) and .93(\pm .458) within the experimental group analysis (before the test) and at the end of the Wilcoxon test (after the test). A p-value of .002 indicates a significance of less than 0.05 lastly, both experimental and control group writing skill were significant It refers that task- oriented training and also only conventional physiotherapy both were effective to improve these variables result in tetraplegic SCI patient but only task-oriented training were more effective to improve these variables result in tetraplegic spinal cord injury patients. So, it can be declared that task-oriented training and conventional physiotherapy is both effective but task-oriented training were more effective to improve upper limb function/recovery on tetraplegic SCI .

The other studies confirmed that physical therapists have great faith in task-oriented training (TOT) to treat some neurological disorders, such as spinal cord injury. This review sought to determine the strength of the evidence for TOT's efficacy in enhancing upper limb or hand dexterity in SCI patients. (Holanda et al. 2017). Only 22 of the total 34 individuals in the two trials were divided between a control group and a TOT intervention group that was not paired with any other interventions. The intervention took place for two hours every day, five days a week, for three weeks. The study demonstrated that earlier spinal cord injury therapy can enhance upper limb function through task-oriented training. (Herzer et al. 2016). A study conducted by Hoffman et al. found that task-oriented training improved the functional movement of the upper limb. Task-oriented training, according to Dobkin, can be utilized to improve both upper and lower limb function even after spinal cord damage. Significant improvements in SCIM were shown in this study. The maximum domain of self-care activities was increased. Dunlop discovered that exercising improved rehabilitation after a spinal cord injury. (Dunlop 2014).

Although significant improvements were shown in this study but still there were some limitations; small sample size, single group study and patient compliance with follow up. In addition, all type of spinal cord injury were included. the study recommended that large sample size will be conducted with a different study design on single type of spinal cord injury in order to further specify the effect (Marryam et al. 2017). Although considerable gains were demonstrated in this trial, there were notable limitations, including a limited sample size, a single group study, and patient compliance with follow-up. Furthermore, all types of spinal cord injuries were considered. In order to better characterize the effect, the study recommended that a large sample size be undertaken using a different study design on a single type of spinal cord injury.

Another study found that, while the results suggest that TOT has a positive impact on improving arm and hand functions in a select group of patients with cervical SCI, the findings should be interpreted with caution due to the small sample sizes and the patients' limited demographics and characteristics. suggested that upper limb training after a spinal cord injury improves muscle strength, upper limb function, and daily living activities or

quality of life (Morris et al. 2019). Some of them investigated the effects of some types of TOT without technology intrusion, while others investigated technology interference in general without specifying a training approach. The combination of TOT with other interventions appears to be more famous for its promising results; a reason for its reputation among researchers assigned intervention rather than TOT alone, and the fact of major technological advances in the field appears to be motivating for researchers to enrol. Another study found a modest level of evidence for a non- significant benefit of task-oriented training on improving upper limb function and hand dexterity in patients with spinal cord injuries. (Mohamed et al. 2021).

- There were some situational limitations and barriers while considering the results of the study in different aspects. Those are as follows:
- The sample size is really very small, so the result is difficult to generalize among whole population.
- Sometimes treatment sessions were interrupted due to public holiday and recruit physiotherapists taken leave in the data collection that may interrupt the result
- Data collection of the study is done in summer. The other season like winter and rainy season may vary in the result and also in the patient's complications.
- It was an undergraduate student's first research project. As a result, the researcher had limited expertise with procedures and strategies in terms of the practical components of research. Because this was the researcher's first survey, there may have been some errors that the supervisor and the respectable teacher disregarded.

One of the most severe conditions in human history is spinal cord damage. Every year, millions of people suffer from spinal cord injuries. There is a paucity of information and a reliable database about spinal cord injury in Bangladesh. There is no way to estimate the number of people in Bangladesh who have spinal cord injuries. Bangladesh is in the process of developing. The majority of them have low economic and educational status. There is also a dearth of understanding of damage, particularly harm induced by spinal cord injuries, in these countries. Patients with spinal cord damage live their entire lives. They feel helpless and hopeless. Because of their handicap and functional incapacity, they believe they are a burden to society.

It was a randomized control trial study where pre-test and post-test design with two group of experimental and control to examine the effectiveness of task oriented training to improve upper limb function on Tetraplegic SCI, where the results of the study have demonstrated that task oriented training along with conventional therapy have beneficial effects on the improvement of upper limb recovery/ function in tetraplegic patient with Spinal Cord Injury.

Recommendations

The researcher proposed the various recommendations to certain authorities and personnel. A double blinded randomized clinical trial is recommended in future with large sample size. Government need to plan awareness program in different area of our country for preventing the SCI and its complications with the risk. Specialized those were involved in the management and treatment team should refer to Physiotherapists for improvement for the client's conditions. CRP providing massive services to the SCI patients and need to create more post for Physiotherapy to provide collaborative services. Continued and regular study in this area should play an essential part in improving quality of life of the SCI patient. Recommendation for other researcher for further research in this field to increasing the number of sample.

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APPENDIXES

Date: March 28, 2023

To

Head

Department of Physiotherapy

Centre for the Rehabilitation of the Paralysed (CRP)

Chapain, Savar, Dhaka-1343

Through: Head, Department of Physiotherapy, BHPI

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

Sir,

With due respect and humble submission to state that I am Jolly Akter, student of 4th year B.Sc. in Physiotherapy at Bangladesh Health Professions Institute (BHPI). The Ethical committee has approved my research project entitled: **“Effectiveness of task-oriented training to improve upper limb function/recovery among Spinal Cord Injury Tetraplegic Patient”** under the supervision of Md. Shofiqul Islam, Associate Professor and Head, Department of Physiotherapy, BHPI, CRP, Savar, Dhaka-1343. Conducting this research project is partial fulfillment of the requirement for the degree of B.Sc. in Physiotherapy. I want to collect data for my research project from Department of Physiotherapy. So, I need your kind permission for data collection at Spinal Cord Injury Unit of CRP, Savar, Dhaka. I would like to assure that nothing of the study would be harmful for the participants.

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

Sincerely

Jolly

Jolly Akter

4th Year

B.Sc. in Physiotherapy

Class Roll: 36; Session: 2017-18

Bangladesh Health Professions Institute (BHPI)

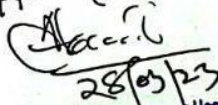
Chapain, CRP, Savar, Dhaka, 1343.

Recommended
Shofiq

28.03.2023

Md. Shofiqul Islam
Associate Professor & Head
Department of Physiotherapy
Bangladesh Health Professions Institute (BHPI)
CRP, Chapain, Savar, Dhaka-1343

Approved


28/03/23

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

Allow for data collection
from SCI unit. PT
Hossain 22.5.23

Mzafor Hossain
Consultant - Physiotherapy & In-charge
Spinal Cord Injury (SCI) Unit
Inpatient Department
CRP Chapain, Savar, Dhaka 1343



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

Ref: CRP/BHPI/IRB/03/2023/717

Date: 13/03/2023

To
Jolly akter
B.Sc. in Physiotherapy.
Session: 2017-2018, DU Reg. No: 8660
BHPI, CRP, Savar, Dhaka- 1343, Bangladesh

Subject: Approval of the dissertation proposal “Effectiveness of Task-Oriented Training to Improve Upper Limb Function/Recovery among Spinal Cord Injury Tetraplegic Patient”- by ethics committee.

Dear
Jolly Akter,
Congratulations

The Institutional Review Board (IRB) of BHPI has reviewed and discussed your application to conduct the above-mentioned dissertation, with yourself, as the Principal Investigator Md. Shofiqul Islam, Head of the Department, Department of Physiotherapy, BHPI., as dissertation supervisor. The following documents have been reviewed and approved:

Sr. No.	Name of the Documents
1	Dissertation Proposal
2	Questionnaire (English and Bengali version)
3	Information sheet & consent form

The purpose of the study is to find out effectiveness of task-oriented training after spinal cord injury to improve upper limb recovery. Should there any interpretation, type, spelling, grammatical mistakes in the title, it is the responsibilities of the investigator. Since the study involves questionnaire that takes maximum 20- 25 minutes and have no likelihood of any harm to the participants. The members of the Ethics committee approved the study to be conducted in the presented form at the meeting held at 09:00 AM on January 9, 2023 at BHPI, 34th IRB Meeting.

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

Best regards,

Muhammad Millat Hossain
Associate Professor, Dept. of Rehabilitation Science
Member Secretary, Institutional Review Board (IRB) BHPI,
CRP, Savar, Dhaka-1343, Bangladesh

Date: 16th February 2023
The Chairman
Institutional Review Board (IRB)
Bangladesh Health Professions Institute (BHPI), CRP
Savar, Dhaka-1343. Bangladesh

Subject: Application for review and ethical approval.

Dear sir,

With due respect, I am Jolly Akter student of B.Sc. in physiotherapy program at Bangladesh Health Professions Institute (BHPI) the academic institute of Centre for the Rehabilitation of the Paralyzed (CRP) under the Faculty of Medicine, University of Dhaka. As per the course curriculum, I have to conduct a dissertation entitled “Effectiveness of Task-Oriented Training to improve upper limb function/recovery among Spinal Cord Injury Tetraplegic Patient” under the supervision of Md. Shofiqul Islam, Head of the Department, Department of Physiotherapy, BHPI.

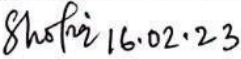
The purpose of the study is to determine the effectiveness of task-oriented training in improving upper limb recovery after spinal cord injury. The study involves face-to-face interview by using semi-structured questionnaire to explore the efficacy of task-oriented training for improve upper limb function among spinal cord injury tetraplegic patient in Bangladesh that may take 30 to 40 minutes to fill in the questionnaire and there is no likelihood of any harm to the participants. Related information will be collected from the patients’ medical record if needed. Data collectors will receive informed consent from all participants and the collected data will be kept confidential.

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

Sincerely,
Jolly Akter

Jolly Akter
4th Year B.Sc. in Physiotherapy
Session: 2017-2018 Student ID: 112170418
BHPI, CRP, Savar, Dhaka-1343, Bangladesh

Recommendation from the dissertation supervisor


Md. Shofiqul Islam
Head of the Department
Department of Physiotherapy, BHPI.

Dissertation presentation date: 9th January, 2023


Head, Department of Physiotherapy, BHPI

Md. Shofiqul Islam
Associate Professor & Head
Department of Physiotherapy
Bangladesh Health Professions Institute (BHPI)
CRP, Chapari, Savar, Dhaka-1343

± Conventional Therapy :

- (1) Upper limb stretching
- (2) Upper limb strengthening
- (3) Hand mobilization
- (4) soft tissue mobilization for upper limb muscle
- (5) ROM exercise for upper limb
- (6) Isometric exercise to improve muscle ^{strength}
- (7) Weight bearing exercise

MHossain (0229)

Sarida

Consent Form

(Please read out to the participant)

Assalamu Alaikum,

I am Jolly Akter ,4th -year B.Sc in Physiotherapy student of Bangladesh Health Professions Institute (BHPI). I am conducting a research entitled “Effectiveness of Task-oriented Training to improve upper limb function/recovery among Spinal Cord Injury Patient”. Spinal Cord injury is very common in our country. The purpose of the study is To determine the effectiveness of task- oriented training in improving Upper limb recovery after spinal cord injury patients. Your participation in this research is entirely voluntary. It is your choice whether to participate or not. Whether you choose to participate or not, all the services you receive at this hospital will continue and nothing will change. I would like to know about some personal and other related information regarding Spinal Cord Injury (SCI). You will perform some task which are mention in this form. It will take 30-40 minutes to take information from you. I would like to inform you that ot is a purely academic study and will not be used for any other purpose. The information that I collect from this research project will be kept confidential. Information about you that will be collected during the research will be put away and no one but the researcher will be able to see it. Any information about you will have a number on it instead of your name. Only the researcher will know what your number is and I will lock that information up. It will not be shared with or given to anyone except myself. The knowledge that I get from doing this research will be shared with you through meetings before it is made widely available to the public. Confidential information will not be shared. After the meeting, I will publish the results so that other interested people may learn from my research.

You do not have to take part in this research if you do not wish to do so. You may also stop participating in the research at any time you choose and refusing to participate will not affect your treatment at this hospital in any way. It is your choice and all of your rights will still be respected.

If you have any questions you may ask me now or later, even after the study has started. If you wish to ask questions later, you may contact me through my mobile number which is

01710163250 / and or my supervisor Md. Shofiqul Islam, Associate Professor & Head,
dept. of Physiotherapy, BHPI, CRP, Savar, Dhaka.

I have read the foregoing information or it has been read to me. I have had the opportunity
to ask questions about it and any questions that I have asked have been answered to my
satisfaction. I consent voluntarily to participate as a participant in this research.

Name of the participant _____

Signature of the participant _____

Date _____

ENGLISH QUESTIONNAIRE

Research Title: **Effectiveness of Task Oriented Training to Improve Upper Limb Function/recovery among Spinal Cord Injury Tetraplegic Patient”.**

Questionnaire Form:

Part-I: Personal information

Patient's Identification:		
Date of interview:		
Code number:		
Name of participant:		
Hospital, ID no:		
Address: P.S:	Village: District:	P.O:
mobile no:		

Part II - Socio demographic information:

QN	Question	Response
1.	How old are you?	•years
2.	Gender	• Male • Female
3.	Educational qualification	• Illiterate • Primary • Higher secondary • Honors • Masters
4.	Height of the patient	•m
5.	weight	•..... Kg

➤ **SCIM Scale (modified for upper limb related information):**

feeding: (cutting, opening containers, bringing food to mouth, holding cup with food)	0(need parenteral,gastronomy,or fully assisted oral feeding)	1(needs partial assistance for eating and drinking)	2(eats independently, needs adaptive device or assistance only for cutting food,pouring ,opening container)	3(eats and drink independently, does not need assistance and adaptive device)
Bathing: (soaping, washing, drying body and head,manipulating water tap)	0(Requires total assistance)	1(require partial assistance)	2(Washes independently with adaptive devices or in a specific setting (e.g., bars,chairs)	3(Washes independently;does not require adaptive devices)

Dressing: (clothes, shoe, permanent orthoses, wearing, undressing)	0(Require total assistance)	1(Require partial assistance)	2(Independent with wobble; requires adaptive devices and/or specific settings)	3(Dresses (any cloth) independently; does not require adaptive devices or specific setting)
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Grooming: (washing hands and face, brushing teeth, combing hair, shaving, applying makeup)	0(require total assistance)	1(require partial assistance)	2(grooms independently with adaptive device)	3(grooms independently without adaptive device)
Use of toilet: (perineal hygiene, adjustment of clothes before/after, use of napkins or diapers)	0(require total assistance)	1(partial assistance need)	2(use toilet independently with some assistance)	3(use toilet independently)
Transfer: (wheelchair skill, locking wheelchair, transfer to bed from wheelchair, removing and adjusting arm-rest)	0(require total assistance)	1(partial assistance need)	2(need supervision)	3(Independent (or does not require wheelchair))
writing skill (hand function, hold pen)	0(require total assistance)	1(partial assistance need)	2(need supervision)	3(write independently)

অনুমতি পত্র

(অংশগ্রহণকারীকে পড়ার জন্য অনুরোধ করা হলো)

আসসালামু আলাইকুম

আমি জলি আক্তার, ঢাকা বিশ্ববিদ্যালয় এর চিকিৎসা অনুষদের অন্তর্ভুক্ত বাংলাদেশ হেলথ প্রফেশনস ইন্সটিটিউট এর বিএসসি ইন ফিজিওথেরাপি কোর্সের ২০১৭-২০১৮ সেশনের শিক্ষার্থী। বিএসসি ইন ফিজিওথেরাপি ডিগ্রী অর্জনের জন্য আমাকে একটি গবেষণা সম্পূর্ণ করতে হবে। আমার গবেষণাটির শিরোনাম হল “ টেট্রাপ্রিজিক রোগীদের মধ্যে উপরের অঙ্গের কার্যকারিতা উন্নত করার জন্য টাঙ্ক ওরিয়েন্টেড প্রশিক্ষণের কার্যকারিতা”। এই গবেষণাটি অধ্যয়নের মূল লক্ষ্য হচ্ছে স্পাইনাল কর্ড ইনজুরি উপরের অঙ্গের ফাংশনগুলির পুনর্বাসনের কার্যকারিতা উন্নয়ন করার জন্য টাঙ্ক ওরিয়েন্টেড প্রশিক্ষণের কার্যকারিতা নিরূপণ করা। এই গবেষণা সম্পর্কিত আপনাকে কিছু প্রশ্ন করার জন্য আমি আপনার সাথে দুইবার দেখা করব, একবার হস্তক্ষেপের আগে এবং আবার সমাপ্তির পরে। আপনাকে আশ্বস্ত করছি, দক্ষ ফিজিওথেরাপিস্টরা আপনাকে চিকিৎসা দিবেন, অতএব আপনাকে দেওয়া চিকিৎসার ফলে আপনার কোনোরূপ ক্ষতি হবে না। আপনার দেওয়া তথ্য গোপন রাখা হবে এবং শুধুমাত্র গবেষণার উদ্দেশ্য ব্যবহার করা হবে। যে কোন সময় গবেষণায় আপনার অংশগ্রহণ বন্ধ করার অধিকার রয়েছে। পাশাপাশি আপনি যদি কোন প্রশ্নের উত্তর দিতে অস্বস্তি বোধ করেন তবে আপনি সেই প্রশ্নটি এরিয়ে যেতে পারেন। প্রশ্নাবলী পূরণ করতে ৩০ মিনিট থেকে ৪০ মিনিট সময় লাগবে। অনুগ্রহ করে আমাকে প্রশ্নগুলির সঠিক উত্তর দিন এবং আপনার স্বাস্থ্যের মূল্যায়ন করতে ডেটা সংগ্রহকারীকে যথাসাধ্য সহযোগিতা করুন। আপনার কোন প্রশ্ন থাকলে আমার সুপারভাইজারের সাথে যোগাযোগ করতে পারেন। মোঃ শফিকুল ইসলাম, বিএইচপিআই এর প্রভাষক, বিভাগীয় প্রধান ফিজিওথেরাপি ডিপার্টমেন্ট, বিএইচপিআই, সিআরপি। আপনি যদি অনুগ্রহপূর্বক আপনার সম্মতি দেন, তবে আমরা শুরু করতে পারি।

হ্যাঁ

না

ধন্যবাদ আপনার অংশগ্রহণের পাশাপাশি প্রশ্নগুলোর যথাযথ উত্তর দিয়ে সহযোগিতা করার জন্য।

অংশগ্রহণকারীর স্বাক্ষর

তারিখ

তথ্য সংগ্রহকারীর স্বাক্ষর

তারিখ

গবেষকের স্বাক্ষর

তারিখ

বাংলা প্রশ্নপত্র

শিরোনাম: টেট্রাপ্লেজিক রোগীদের মধ্যে উপরের অঙ্গের কার্যকারিতা উন্নত করার জন্য টাস্ক ওরিয়েন্টেড প্রশিক্ষণের কার্যকারিতা

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মেরুদন্ডের আঘাতের পরিমাপ স্কেল দ্বারা কার্যকরী স্বাধীনতা পরিমাপ করার জন্য প্রশ্নাবলী তৈরি করা হয়েছিল। অনুগ্রহ করে টিক মার্ক করে উত্তর পূরণ করতে একটি কালো কলম ব্যবহার করুন। আমি আপনাকে নির্দিষ্ট একটি উত্তরে টিক চিহ্ন প্রদান করার জন্য অনুরোধ করছি।

রোগির পরিচয়ঃ
সাক্ষাৎকারের তারিখঃ
কোড নম্বরঃ
অংশগ্রহনকারীর নামঃ
হাসপাতাল, আইডি নং
ঠিকানা: গ্রাম: পোস্ট অফিসঃ
জেলাঃ পুলিশ স্টেশনঃ
মোবাইল নাম্বারঃ

প্রশ্নপত্রের ফর্ম:

➤ সামাজিক জনসংখ্যা সংক্রান্ত তথ্যঃ

প্রশ্নের	উত্তর
আপনার বয়স কত?	<input type="text"/> বছর
লিঙ্গ	<input type="checkbox"/> পুরুষ <input type="checkbox"/> মহিলা
শিক্ষাগত যোগ্যতা	<input type="checkbox"/> নিরক্ষর <input type="checkbox"/> প্রাথমিক <input type="checkbox"/> উচ্চ মাধ্যমিক <input type="checkbox"/> অনার্স মাস্টার্স
রোগীর উচ্চতা	<input type="text"/>মি
ওজন	<input type="text"/> কেজি

➤ ফ্রিম স্কেল (উপরের অঙ্গ সম্পর্কিত তথ্যের কারণে পরিবর্তিত হয়েছে):

খাওয়ানো: (কাটা, পাত্র খোলা, মুখে খাবার আনা, কাপ ধরে রাখা)	০ (প্যারেন্টেরাল, গ্যাস্ট্রোস্টমি, বা সম্পূর্ণ সহায়তা দরকার হয় মুখে খাবার খাওয়ানোর সময়)	১ (খাওয়ানো এবং পান করার সময় আংশিক সহায়তার দরকার হয়)	২ (নিজে খেতে পারে, কিন্তু খাবার কেটে খওয়া, ফল কাটা, গ্লাসে পানি ভরে খাওয়া এবং বোতলের মুখ খোলার সময় সাহায্যকারী যন্ত্র এবং অন্যের সাহায্যের দরকার হয়)	৩ (নিজে নিজে খেতে ও পান করতে পারে, কোন সাহায্য বা সাহায্যকারী যন্ত্রের প্রয়োজন নেই)
গোসল করাঃ (সাবান লাগানো, শরীর ধোয়া, চুল শুকানো, পানির কল ছেড়ে বন্ধ করা)	০(সম্পূর্ণ সাহায্যের প্রয়োজন)	১(আংশিক সাহায্যের প্রয়োজন)	২ (সাহায্যকারী যন্ত্র ছাড়াই নিজে নিজে শরীর ধোত করতে পারে)	৩ (সাহায্যকারী যন্ত্র ছাড়াই নিজে নিজে শরীর ধোত করতে পারে)
পোশাক পরিধান: কাপড়, জুতা, স্থায়ী অর্থোসিস পড়া এবং কাপড় খোলা)	০(সম্পূর্ণ সাহায্যের প্রয়োজন)	১(আংশিক সাহায্যের প্রয়োজন)	২ (সাহায্যকারী যন্ত্র ছাড়াই নিজে নিজে শরীর ধোত করতে পারে)	৩ (যে কোন জামা নিজেই স্বাধীনভাবে পড়তে পারে কোন সাহায্যকারী যন্ত্রের প্রয়োজন হয় না)
সাজসজ্জাঃ হাত ধোয়া, মুখ ধোয়া, দাঁত ব্রাশ করা, চুল আঁচড়ানো, সেভ করা, মেকআপ করা)	০(সম্পূর্ণ সাহায্যের প্রয়োজন)	১ (আংশিক সাহায্যের প্রয়োজন)	২ (সাহায্যকারী যন্ত্রের সাহায্যে নিজে নিজে পারে)	৩ (স্বাধীনভাবে নিজে নিজে পারে কোন সাহায্যকারী যন্ত্রের সাহায্য ছাড়া)
টয়লেট ব্যবহার: পেরিঅ্যানাল সাস্টিবিধি বা ডাইপার ব্যবহারের আগে এবং পরে পরিধানের সমন্বয়)	০ (সম্পূর্ণ সাহায্যের প্রয়োজন)	১(আংশিক সাহায্যের প্রয়োজন)	২ (কিছু সাহায্য নিয়ে বাথরুম ব্যবহার করতে পারে)	৩ (নিজে নিজে বাথরুম ব্যবহার করতে পারে)

<p>স্থানান্তর: (এক জায়গা থেকে অন্য জায়গায় যাওয়া, হুইল চেয়ারের ব্যবহারের সঠিক জ্ঞান, হুইলচেয়ার লক করা, হুইল চেয়ার থেকে বিছানায়, বিছানা থেকে হুইলচেয়ারে যাওয়া, আর্ম রেস্ট খোলা এবং ঠিকভাবে লাগানো)</p>	<p>০ (সম্পূর্ণ সাহায্যের প্রয়োজন)</p>	<p>১(আংশিক সাহায্যের প্রয়োজন)</p>	<p>২ (তদারকি প্রয়োজন)</p>	<p>৩ (স্বাধীনভাবে এক জায়গা থেকে অন্য জায়গায় যেতে পারে, হুইল চেয়ারের দরকার নেই)</p>
<p>লেখার দক্ষতাঃ (হাতের শক্তি, কলম ধরতে পারা, লিখতে পারা)</p>	<p>০ (সম্পূর্ণ সাহায্যের প্রয়োজন)</p>	<p>১ (আংশিক সাহায্যের প্রয়োজন)</p>	<p>২ (তদারকি প্রয়োজন)</p>	<p>৩ (স্বাধীনভাবে লিখতে পারে)</p>

