



Asian Spinal Cord Injury Network (ASCoN) Conference 2023

This is the 22nd Asian Spinal Cord Injury Network (ASCoN) Conference which is held on 25th to 27th November 2023 at BRAC-CDM, Savar, Dhaka. Centre for the Rehabilitation of the Paralyzed (CRP) is duly the only organization for Spinal Cord Injury (SCI) treatment and rehabilitation in Bangladesh and this year CRP is hosting this international SCI conference in Bangladesh.

Theme of this year conference is ***“Strengthening SCI Services through Knowledge Exchange and Deepening Friendship”***.

The Asian Spinal Cord Network (ASCoN) was initiated in 2001 following a meeting of regional experts during the International Conference on Spinal Cord Lesion Management hosted by the Centre for the Rehabilitation of the Paralyzed (CRP), Bangladesh. ASCoN has 75 member organisations across 18 countries in Asian region.

The 22nd ASCoN conference 2023 aims to promote cooperation and sharing of skills, knowledge, and ideas between ASCoN members. It brings together health care professionals, persons living with spinal injury, policy makers and managers from around the globe. Numerous practical workshops for multi-disciplinary team members and consumers are conducted during the Conference. The ASCoN Conference provides an excellent platform to advocate for policy change and enhanced services for people with SCI, enabling them to lead fuller lives. In relating to strengthening SCI Services through knowledge exchange and deepening friendship, this conference accepted more than 50 scientific research papers for oral and poster presentations. Those accepted papers' abstract are highlighted in below.

Accepted Paper for Oral/Poster Presentation:

Life Satisfaction and Socioeconomic Situation among Individual with Spinal Cord Injury at Community Setting in Bangladesh

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Abstract

Background: Individual with spinal cord injury (SCI) has faced many challenges in community settings after completing rehabilitation. Life satisfaction, community participation and socioeconomic situation are greatly hampered but which are very crucial for SCI individual.

Objectives: The study aimed to explore the level of life satisfaction and socioeconomic situation among the people with SCI in community setting.

Method: A community based cross-sectional survey through phone call was conducted with the SCI population who had completed their rehabilitation from a specialized rehabilitation centre in Bangladesh. The survey covered all of eight divisional



areas with 150 SCI participants. LISAT-11 and WHODAS 2.0 were used to explore the life satisfaction and socioeconomic situation respectively. Multivariate linear regression and spearman's correlation were used to find association and relationship between the variables.

Results: Among the participants, the traumatic SCI were highest 126 (84%) and male were 135 (90%), where 97 (64.7%) were found as paraplegic and 111 (74%) were from rural area. While considering the socio-economic status, the majority of the participants (46.7%) had shown to have considerable amount of monthly income. During participating in the society, the highest proportion of SCI participants faced a moderate type of disability (43.68%). While surveying on their life satisfaction, a significant proportion of SCI participants were found to be satisfied with their life as a whole (30.67%). The individuals with higher disability score tend to have lower life satisfaction ($r = -0.852$, $p = .001$). The monthly income ($\beta = 0.426$, $P < 0.001$) and injury severity ($\beta = -.323$, $P = 0.050$) was found to be associated with life satisfaction.

Conclusion: Participants with SCI returned to community faced economic challenges, difficulties in community participation and decline life satisfaction significantly. There is greatly need to initiate proper supportive steps to better reintegrate individual with SCI in the community.

Keywords: *Spinal cord injury, life satisfaction, community participation, socioeconomic situation, Bangladesh.*

Prevalence of Xerostomia Among Spinal Cord Injury (SCI) and their Oral Health Related Quality of Life

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Abstract

Background: SCI is a neurological condition resulting from traumatic or non-traumatic event resulting in partial or total loss of function (motor and/or sensory) which may lead an individual fully or partially dependent on others for the rest of their life. As a result, they may suffer from xerostomia which may occur as a secondary complication and is not a trivial condition itself, but can it greatly effect on the aspects of OHRQoL. So, it is essential to beware of the severity and undergo necessary treatment for better quality of life.

Objectives: This study evaluated the prevalence of xerostomia among SCI patient and the effect on their OHRQoL.

Methods: This is a quantitative type of cross-sectional survey study where 145 SCI patients were assigned through hospital-based randomization from Centre for the Rehabilitation of the Paralysed (CRP), Savar, from October to December 2021. In SCI patients, dry mouth was assessed by a Global single question and Xerostomia Inventory (XI) and Oral Health Impact Profile (OHIP-14) were used to assess OHRQoL as data collection instruments for the study. Data was analyzed by using descriptive statistical analysis, one-way Manova test and correlation coefficient test with SPSS.

Results: The majority of the participants about 69% (100) reported to have xerostomia in people with SCI. The analysis of one-way Manova revealed significant differences between the mean subscale score in each dimension of the OHIP-14, in the participants with dry mouth and without dry mouth ($P < 0.001$). Using correlation coefficient analysis, it shows that there was a statistically significant positive relationship between XI score and OHIP total at the ($P < 0.01$).

Conclusions: Researcher found that dry mouth had strong association with SCI. Xerostomia was strongly and independently associated and correlated with OHRQoL. So, SCI patients are more prone to experience dry mouth and to have poor OHRQoL.

Key Words: *Dry mouth, Spinal Cord Injury, Oral Health Related Quality of life.*

Influence of self-efficacy and self-esteem of spinal cord injury patients at CRP-An ICF based study.

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Abstract

Background: This study was to evaluate the level of Influence of self-efficacy and self-esteem of spinal cord injury patients at CRP.

Objectives: The objectives of this study were to determine the influence of self-efficacy and self-esteem of spinal cord injury patients in rehabilitation period, measure this relationship by a comprehensive bio-psycho-social perspective and evaluate the Moorong self-efficacy scale and Rosenberg self-esteem scale.

Methods: The cross-sectional study was chosen to carry out this study among 60 participants who were selected according to inclusion criteria. The “Moorong Self-Efficacy Scale” (MSES) and Rosenberg self-esteem scale which are standard structured questionnaires along with socio-demographic and disease-related questions were used to find the level of self-efficacy of people with spinal cord injury during rehabilitation among 60 participants. The study was conducted by using quantitative descriptive analysis.

Results: The study consisted of 60 SCI participants among whom 73.3% (n = 44) were male and 26.7% (n = 16) were female. Complete tetraplegia 16.7% (n=10), Incomplete Tetraplegia 36.7%(n=22), Complete Paraplegia 40%(n=24) and Incomplete Paraplegia 6.7%(n=4). The study showed an association between MSES or RSES items and socio-demographic variables age, gender educational qualification, occupation, skeletal level of injury, neurological level of injury, cause of lesion, type of paralysis with a 5% (p<0.05) level of significance.

Conclusions: Spinal Cord Injury (SCI) on individuals, emphasizing the emotional and physical challenges. Psychological and mental health issues are common consequences of SCI, which can have a detrimental impact on a patient's overall quality of life. Enhancing self-efficacy and self-esteem is a target in SCI rehabilitation, which can be achieved through physical exercise and improving self-management skills.

Key Words: *Self-Efficacy, Self-esteem, Spinal Cord Injury, ICF model, MSES, RSES, Rehabilitation.*

Complete Cervical Spinal Cord Injury Upright Standing Using Functional Electrical Stimulation.

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Abstract

Background: Functional Electrical Stimulation (FES) is a method to externally stimulate the nerves thus the paralysed muscles, enabling muscle force and torque production leading to function.

Objectives: Our team developed a closed-loop functional electrical stimulation (FES) system to support functional, efficient, and secured physical exercise including upright stance in individuals with spinal cord injury.

Methods: This is achieved by stimulating the quadriceps and gluteal muscles to achieve knee and hip extension. The developed FES system was controlled by two-channel Bluetooth and stimulation parameter optimization. The development work was followed by a pilot standing experiment with an FES user, who is a person with complete cervical level chronic spinal cord injury. A total of 4 trials were performed in two separate days, with 30 minutes of rest between trials, in different order each day. A goniometer was placed at the sagittal plane of knee joint, and the knee angle readings provided information about knee buckle to indicate critical fatigue state.

Results: The spinal cord injured patient was able to stand upright with strong contraction of the knee extensor muscles, supported lightly by harness and a physiotherapy behind him. Standing duration reached up to 80 seconds.

Conclusions: We foresee that with more habituation and training the standing duration can be further prolonged and potentially leads to other health benefits related to FES-evoked standing.

Key Words: *Complete cervical Injury, Functional Electrical Stimulation, Standing.*

Cognitive Impairment Among Spinal Cord Injury Patient in Bangladesh.

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Abstract

Background: This study investigates the prevalence of cognitive impairment among Spinal Cord Injury (SCI) patients in Bangladesh, to find the crucial need for Speech and Language Therapy (SLT) services for them.

Objectives: The study identified the number of people having Cognitive Impairment among Spinal Cord Injury patient in Bangladesh.

Methods: The study followed a quantitative cross-sectional survey was conducted among 150 hospitalized patients from SCI unit of CRP, by using purposive sampling method. Data was collected by using Mini- Mental State Examination & The Informant Questionnaire on Cognitive Decline in the Elderly. The data were analyzed using a descriptive statistical analysis method (SPSS - 20).

Results: The study encompassed 150 participants, with 87% being male and 13% female. Research findings indicate that 41% of individuals with spinal cord injuries (SCI) fall within the 21 to 35-year age range. Moreover, 79% of SCI patients exhibited incomplete SCI types, with paraplegia prevailing at 56% compared to tetraplegia at 44%. Regarding the timing of injury onset, cognitive impairment was prevalent, affecting 78% of SCI patients within the first three months. 49% of the participants in this study suffered from cervical spinal cord injuries. Furthermore, cognitive assessments using 'Mini Mental State Examination' & 'Informant Questionnaire on Cognitive Decline in the Elderly' identified profound cognitive impairment in 17% and 19% respectively of the group.

Conclusions: Memory deficits appear to be the main factor of these cognitive deficits. The study may contribute to raising awareness among Bangladeshi citizens and by taking preventative measures, SCI can be prevented.

Key Words: *spinal cord injury, cognitive impairment, paraplegic, tetraplegic, paralysis.*

Cardiorespiratory Effect of Wheelchair Basketball Players with Spinal Cord Injury People at CRP.

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Abstract

Background: Cardio-respiratory complications are one of the most evident secondary complications in Spinal cord lesion (SCL) survivors. The steady decline of cardio-respiratory fitness in the wheelchair users impacts upon function, livelihood, and psychological issues.

Objectives: The study aimed to evaluate the cardio-respiratory effect of wheelchair basketball sports in the rehabilitation phase of SCL.

Methods: A quantitative one arm parallel prior and post-experimental study design. 43 respondents were randomly selected from the first-time exposure to wheelchair basketball (WB) in a specific time frame. The International Wheelchair Basketball Federation classification system has been used as an inclusion criterion. The Cardio-respiratory outcome has been evaluated by a Peak flow meter, Sphygmomanometer, Pulse oximeter, Incentive Spirometry, and measurement tape before and after 3 weeks WCB sports.

Results: Significant changes has been noted in systolic blood pressure [MD 5.57±11.39, 95% CI (1.39, 9.92), t 3.09, P <.005] with effect size d .49; oxygen saturation [MD .725±1.12, 95% CI (.370, 1.08), t 4.13, P <.001, d .65] ; Pulse [MD 6.10±17.32, 95% CI (.56, 11.64), t 2.23, P <.05, d .03] ; speed of expiration [MD 102.37±42.27, 95% CI (82.26, 117.49), t 13.60, P <.001, d 2.16] ; vital capacity [MD 365.25 ±287.60, 95% CI (264.27, 448.23), t 7.83, P <.001, d 1.27] ; and Vo2Max [MD .194±.515, 95% CI (.081, .359), t 2.38, P <.05, d .38].

Conclusions: Wheelchair basketball have significant effect in cardio-respiratory functions in patients with Spinal cord lesion in their rehabilitation phase.

Key Words: *Spinal Cord Lesion, Wheelchair, Basketball, Cardiorespiratory effect.*

Lived Experience of Fatherhood among Person with Spinal Cord Injury: A Qualitative Narrative Study.

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Abstract

Background: Person with spinal cord injury (SCI) faced hardships in participating life roles. Several study findings revealed that family life perceived obstacles to participating in parental roles after disability. SCI fatherhood is a unique area of research to explore the lived experience of pre-parenting journey, during expecting child, upbringing of child and social support system.

Aim: This study explored to know the initial experiences of fatherhood, obstacles, coping mechanisms, understanding with partner and bonding with children.

Methods: A narrative inquiry approach in a qualitative study design was used. The purposive sampling technique comprised nine biological fathers with SCI, who completed rehabilitation services from Centre for the Rehabilitation for Paralysed (CRP) and were currently living community in Bangladesh, CRP is the specialized service centre not only Bangladesh but also in south Asian region. Face-to-face with semi-structured interviews were conducted using a self-developed interview guide. Braun and Clark's six phases of descriptive thematic analysis were used to analyse the data.

Results: Seven main themes that have emerged from data analysis included: 1) fathering with a disability, 2) Understanding with a partner, 3) Participation in child upbringing, 4) Father as a role model, 5) Challenges, 6) Support system and 7) Resiliency. In this study fathers with SCI had unfavorable reactions from society on the ability to be a father and relationship with partners were fundamentally viewed with stereotyped judgements. Each participant was incredibly psychologically strong despite facing obstacles.

Conclusion: The findings of this study revealed to access appropriate instruction about reproductive health and parenting journey for person with SCI. OTs have a crucial role in sexual participation as well as fatherhood-related issues after SCI. So, this study also highlighted re-integrated sexual health into their daily life roles.

Keywords: *Spinal Cord Injury, Fatherhood, Lived Experience.*

Relation between functional independence and community integration of People with Spinal Cord Injury in Bangladesh.

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Abstract

Background: The functional independence of Spinal Cord Injury (SCI) population is significantly lower than that of the population in general. Secondary complications, such as pressure ulcers, urinary and/or respiratory infections, pain, and severity of spasticity, may impact on the level of independence of a person with a SCI and in turn affect the outcome of their community re-integration.

Aim: To determine the relationship between functional outcome and home and social integration of people who had spinal cord injury and completed their inpatient rehabilitation at Centre for the Rehabilitation of the Paralysed (CRP), Bangladesh.

Methods: Prospective, cross-sectional study using the Spinal Cord Independence Measure (SCIM) and Community Integration Questionnaire (CIQ) to analyse the relationship between the functional outcome and home and social integration at the end of rehabilitation. Descriptive and inferential statistics were performed to analyse the data.

Results: A total of two hundred participants were recruited for the study. Approximately 60% of participants presented with paraplegia and 62.5% of participants were categorized on the ASIA Impairment Scale (AIS) as Grade A, complete spinal cord injury. Participants with paraplegia and participants with a Grade B, incomplete injury, on the AIS were functionally more independent ($p < 0.05$) compared with tetraplegia and other AIS grades. Participants with paraplegia reported having a more active lifestyle ($p < 0.05$) in their home and social activities compared to tetraplegia. There was no significant association found between functional independence at pre-discharged and community integration one-month post-discharge of the people with SCI.

Conclusion: After discharge, there is no statistically significant relationship between community reintegration and functional independence. A measure of functional independence may not be a suitable indicator of community integration. It is proposed that to monitor a person's community integration the CIQ could be used with a measure of quality of life.

Key words: *functional independence, community integration, spinal cord injury.*

Lived Experience of Elderly Individuals with Paraplegia: A Qualitative Study.

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Abstract

Background: Spinal cord injury is one of the devastating condition that affect the area of physical, psychological and social life of elderly population. Previous studies indicated a number of physical, psychological and social issues that the person with elderly faces their everyday life. However limited studies have been conducted on the lived experience of person with paraplegia in the elderly. Even there is no published data in Bangladesh.

Objectives: This research explored the physical experience, psychological experience, social experience and family relationship of person with paraplegia in elderly.

Methods: This study followed the phenomenological approach of qualitative research design. Seven participants were recruited using purposive sampling who had lived in the community for at least two years after completing rehabilitation services and were aged ≥ 60 years. The self-developed interview guide was used to conduct face-to-face, indepth interviews with participants at their homes. Data were analysed by Braun and Clarke's six steps of reflexive thematic analysis.

Results: Participants explained their experience with physical health, psychological health, society, family, and productive life. Eight main themes have emerged from data analysis: i. Occupational Role, ii. Physical Health Issues, iii. Emotional Health, iv. Relationships, v. Social Attitude, vi. Access to Fundamental Rights for Persons with Disabilities, vii. Burden of Age and Disability, viii. Resiliency. Each theme has a subtheme except Burden of Age and Disability, and Resiliency.

Conclusions: This thesis explored the lived experience of elderly persons with paraplegia. Specialised geriatric care service is essential in SCI rehabilitation unit and community levels for the older persons. Along with geriatric care services, we need to raise awareness for the access of persons with disabilities to fundamental rights in our community.

Key Words: *Spinal cord injury, Paraplegia, Elderly, Older adults, Geriatric population.*

Predictors of Long COVID symptoms (LCS) in patients with spinal cord injuries receiving rehabilitation at a tertiary-level rehabilitation center in Bangladesh.

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Abstract

Background: Post-COVID persistent symptoms, presented in 43% of COVID-19 instances worldwide, are experienced by more than half of people living in Asia [1]. Studies in Bangladesh have shown that prolonged COVID-19 symptoms have been seen.

A protracted COVID is seen in 16–24% of COVID-19 instances, according to studies from Bangladesh [2-3]. Long-lasting COVID symptoms ranged substantially across the globe, from 7 to 43% [4-5]. Spinal cord injury is a frequent traumatic neurologic condition with significant societal consequences and is acknowledged as a significant health issue in Bangladesh [6]. People with spinal cord injury (SCI) may be at risk of acquiring severe COVID-19 disease for many reasons. Patients with higher levels of SCI damage frequently have reduced pulmonary function and may be unable to empty their lungs [7] adequately. Higher cervical lesions increase the chance of respiratory failure and long-term ventilator dependency, requiring intensive Therapeutic Rehabilitation.

AIM: This study identifies the factors that predict the occurrence of Long COVID Symptoms (LCS) in individuals with spinal cord injuries undergoing rehabilitation.

Methods: This case-control study with 20+20=40 randomly selected participants focused on adults with Spinal cord injury who received rehabilitation at a specialized center for rehabilitation of paralyzed persons between 2022-2023. The study involved a retrospective review of data on patient and injury characteristics, including age, gender, level of SCI (cervical vs. thoracic vs. lumbar), Injury Severity Score (ISS), Rehabilitation time, mortality, presence/absence of Long Covid symptoms during their stay at the rehabilitation center, and other factors such as total sensory score, motor score, and Body Mass Index (BMI). Binary logistic regression evaluated the associations between Long COVID Symptoms and the rehabilitation period.

Results: Forty out of 72 eligible patients had complete data, and 15 (37.5%) developed Long COVID Symptoms (LCS). Patient and injury characteristics, including age (mean: 41.4; SD: 13.8), location of SCI (10 cervical, 25%), ISNCSCI-Classification ASI-A (7; 17.5%), ASI-B (15; 37%), and ISS (mean: 33.1; SD: 11.8), did not differ between COVID and non-COVID groups. Binary logistic regression analysis revealed that the male gender (OR: 34.1; CI95: 2.3–506.5, $p = 0.010$) has higher chances for LCS and increased rehabilitation time (OR: .927; CI95: .873–.983, $p = .012$) were associated with reduced risk of Long COVID Symptoms (LCS). Having an order for years lived with disability (OR: 1.0; CI: 116–8.70, $p = 0.99$) was not associated with a reduced risk of Long COVID Symptoms. There were no significant associations between LCS and the duration of the disability.

Conclusions: It was found that the duration of disability did not correlate with the onset of long COVID symptoms. However, it is important to note that increasing the duration of rehabilitation can help emphasize the need to prevent high-risk long COVID symptoms.

Keywords: *Predictors of Long COVID, Rehabilitation Time, Specialized Center for Rehabilitation of Paralyzed, Spinal Cord Injury.*

Accessibility for the person with physical disabilities in Dhaka City: Experience of Person with Physical Disabilities.

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Abstract

Background: Accessibility is an important issue for all people especially for person with disable. Most of person with physical disability are uses different devices and some are not using any device for their communication in the society. These persons are facing regularly different experiences regarding their accessibility. Bangladesh is still a developing country and our community environment not fully accessible for person with physical disable and there are many barriers against accessibility. It is also need to mention that, though Bangladesh has limited experts (Occupational Therapist) on accessibility and this professionals are not involve regarding accessibility issues by Government.

General objective-

- To identify the experience of accessibility for the person with physical disability.

Specific objective-

- To know the socio demographic factor for the person with disability.
- Generate the situation of accessibility in different place.
- Found the barriers to ensure accessibility for the person with physical disabilities.
- Gather information about GO and NGO initiative to increase accessibility for PWPDP.
- To incorporate the recommendation by person with physical disabilities.

Methods: The study was conducted among the PWPDP of Dhaka Division from 5 Thana's (Mohammadpur thana, Sutrapur thana, Mirpur thana, Savar and Shahbug thana) in Bangladesh. The study has been employed qualitative research method and researchers selected 12 PWPDP through using purposive sampling method for the study. The analysis was done by verbatim analysis of the respondent.

Results: Findings of the study show that, the accessibility situation of Dhaka is vulnerable. In accessible Environment facilitate disabilities. Accessibility situation in Bangladesh is not friendly and lack of accessible working environment; the participation in social activity is not accessible for person with physical disabilities. Inaccessible vehicles for the transport system.

The transport facilities, the important buildings of both Government and non-Government involving the hospitals, Universities, academic institutes, the recreational facilities are almost totally inaccessible. The government of Bangladesh include the Act of accessibility for person with disabilities but there is almost no implementation of this act, it is also needed to mention that, though Bangladesh has limited experts (Occupational Therapist) on accessibility and these professionals are not involve regarding accessibility issues by Government. There are very few NGO's takes imitativeness to work for accessibility but it is not enough to initiate an accessible environment. To ensure accessible environment it is essential to build awareness regarding accessibility, implementation of the existing low on the building code. Accessibility



in the area of transport, building, and recreational, educational, working environment is very essential for people with disabilities. The most important thing is to change the attitude about making an accessible environment for the PWPDP.

Conclusions: For inaccessible facilities PWPDP are not able to take initiative to participate in any productive work to economical contribution in their family, and they spent their time at a room of their home. This situation facilitates them to become poor, thus they are able to maintain vicious circle of poverty and disability in a regular basis at present time. The inaccessible situation for the PWPDP become makes them unemployment.

Key Words: *Physical disability, Accessibility, Dhaka City.*

Impact of specific breathing exercise for enhancing lung capacity in spinal cord injury patients: a case study.

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Abstract

Background: Patients with spinal cord injury (SCI) generally have compromised lung function and limited respiratory capacity, causing serious health issues. In diverse groups, breathing exercises improve lung capacity and respiratory function. However, there is little information on how specific breathing exercises improve lung capacity in SCI patients.

Objectives: To assess the impact of a specific breathing exercise on enhancing lung capacity in patients with spinal cord injuries.

Methods: This was a case study of Shamim, a 21-year-old with a C5-C6 spinal cord injury resulting from a car accident. He had faced challenges related to breathing, autonomic dysreflexia, and motor function. With a strong social support network, rehabilitation efforts had focused on pain management, emotional coping, and upper body strength. Objective assessments had indicated stable vital signs, limited limb mobility, and no sensation below C5-C6. Over a 4-week intervention period, Shamim had received treatment at the Centre for the Rehabilitation of the Paralyzed (CRP) from June 10 to July 8, 2023, by licensed physiotherapist in the Spinal Cord Injury Unit. The therapy had been comprehensive, addressing physical, mental, and respiratory aspects to improve overall quality of life.

Results: Lung function tests had revealed notable increases in Forced Vital Capacity (25%), Forced Expiratory Volume in 1 Second (33%), Peak Expiratory Flow (20%), and Diffusing Capacity for Carbon Monoxide (33%). Lung volume measurements had also shown positive changes in Total Lung Capacity, Reserve Volumes, Tidal Volume, Residual Volume, and Functional Residual Capacity. Furthermore, SF-36 scores had demonstrated enhancements in physical and mental health, indicating substantial benefits from the treatment.

Conclusions: This study strongly suggested that deep breathing and pursed lip breathing improved lung capacity. This showed the necessity of adding such breathing techniques in rehabilitation to improve lung function and well-being.

Key Words: Spinal Cord Injury, Lung capacity, Breathing Exercise, Rehabilitation.

Effects of Physiotherapy Intervention to Appraise the Level of Functional Independence of a Child with Spina Bifida Attending a Rehabilitation Centre of Bangladesh.

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Abstract

Background: Spina bifida (SB) is one of the most prevalent childhood ailments results from inadequate closure of the neural tube. The myelomeningocele, one of the most sophisticated congenital malformations compatible in life, is the worst and, regrettably, prevailing form of SB.

Objectives: The aim of the study was to measure the functional independence of a child with SB attending rehabilitation program through implementing physical rehabilitation.

Methods: The reported case for the study was 6 years old girl recruited from spinal cord injury unit of CRP diagnosed with Myelomeningocele. Purposive sampling technique was used in this study. The mother and child both decided to take part in this observational case report study with their consent. The research was carried out between April 2023 and May 2023. The subject has participated in 5 weeks physical rehabilitation program including stretching and strengthening exercises, gross motor practices, transitional

movements, and balance and coordination practices. This study employed a repeated-measures design conducted using the Pediatric Functional Independence Measure (WeeFIM).

Result: The results after 5 weeks evaluation demonstrated significant improvements in all the dimensions of the WeeFIM scores except dimension self-care in sphincter control. After posttest evaluation WeeFIM scores has found 73 where baseline assessment scores was 57. The dimension of communication, cognitive function, and self-care subtotal has observed greater improvement rather than mobility-transfer and locomotion after 5 weeks evaluation.

Conclusion: The study emphasizes the importance of physical rehabilitation programs for better outcomes of SB. Researcher believe that physical rehabilitation strategies enhance typical motor function and functional independence of child with Myelomeningocele.

Keywords: *Spina Bifida, Myelomeningocele, Physical Therapy, Physical Rehabilitation*

Incidence, severity, and time course of pressure injuries in people with spinal cord injuries in Bangladesh: a cohort study embedded in a clinical trial.

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Abstract

Background: Pressure injuries are a serious complication of spinal cord injury (SCI), especially in low-and middle-income countries. However, there are few accurate data from these countries about the incidence or severity of pressure injuries.

Objectives: The objectives of this cohort study were to determine the incidence, severity, and time course of pressure injuries over the first two years following discharge from hospital in people with SCI in Bangladesh.

Methods: Participants (n=186) were contacted by telephone on an average 39 times over the two years following discharge. At each point of contact they were asked about the presence of pressure injuries and if present, the severity of pressure injuries were determined using Pressure Ulcer Scale for Healing (PUSH). In addition, 4 to 6 in-person assessments were conducted over the two years. The incidence rate of first pressure injuries was determined by dividing the number of first pressure injuries by the total person time at risk. Survival analyses were conducted to determine the course of development of pressure injuries and recovery from pressure injuries.

Results: Seventy-seven participants (41%; 95% CI 34% to 49%) developed at least one pressure injury in the first two years after discharge (incidence rate 0.27 per person-year, 95% CI 0.22 to 0.34). Most pressure injuries were on the sacrum (23%) with a median (IQR) peak PUSH score 11/17 (8 to 13.5) and took a median (IQR) of 40 (29 to 57) days to heal.

Conclusions: Pressure injuries impose a large health burden on people with SCI in Bangladesh. Further studies are needed to identify those at most risk and to find effective solutions for the treatment and prevention of pressure injuries for Bangladesh and other LMICs.

Key Words: *Pressure injury, spinal cord injury, rehabilitation.*

Post-traumatic stress disorder among individuals with traumatic spinal cord injury in Nepal: a cross-sectional study.

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Abstract

Background and Objectives: This study aimed to determine the prevalence of posttraumatic stress disorder (PTSD) among individuals with traumatic spinal cord injury (TSCI) and explore the relationships between demographic and clinical factors and PTSD. The study was conducted at the Spinal Injury Rehabilitation Center (SIRC) and Dhulikhel Hospital, Kathmandu University Hospital (DH, KUH) in Nepal.

Methods: A cross-sectional design was used, and data was collected from TSCI patients aged 18 years and above who had been admitted to SIRC and DH, KUH between June 2019 and May 2021. The specific stress version of the Post-Traumatic Stress Disorder Checklist (PCL) was used to assess PTSD. Neurological status of TSCI patients was determined using the International Standard for Neurological Classification of Spinal Cord Injury (ISNCSCI). Hierarchical multiple regression analysis was conducted to identify predictors of PTSD.

Results: Among the 163 patients included in the study, the overall prevalence of PTSD was found to be 27%, with a mean PCL score of 36 ± 13.9 . Factors such as gender, family type, ethnicity, and literacy rate were found to be predictive of PTSD. Females, individuals from nuclear families, individuals with lower literacy levels, and individuals from lower castes were more vulnerable to developing PTSD. However, no significant association was found between clinical characteristics and the development of PTSD.

Conclusions: This study highlights a significant prevalence of PTSD among individuals with TSCI in Nepal. Understanding the risk factors associated with PTSD, particularly gender, family type, ethnicity, and literacy rate, can contribute to the development of targeted interventions and support for TSCI patients. However, clinical characteristics do not seem to significantly influence the development of PTSD in this population.

Key Words: post-traumatic stress disorder, spinal injury, demographic.

Factors influencing sports participation for physical activities of people with spinal cord lesions.

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Abstract

Background: Spinal cord injury (SCI) is a chronic debilitating condition with long-term suffering, and physical inactivity of SCI patients is considered a common comorbidity. Sports participation of SCI patients in the rehabilitation phase helps to increase physical activity.

Objectives: To identify the sociodemographic information of participants; find out participants' eagerness in sports; identify the factors that influenced them to participate in sports; find out the barriers to participating in sports; find out the benefits of sport participation in their life activities; find out the severity level of disability of participants in ADL; identify the limitations of participants in ADL.

Methods: This quantitative cross-sectional study investigated SCI patients who were rehabilitated and participated in sports at CRP. Study samples were conveniently selected at 127. Self-generated WHODAS 2.0 and a structured and semi-structured questionnaire collected data. All data were collected in person and numerically stored and synthesized in SPSS 20 while maintaining confidentiality and ethics.

Results: Among the 127 participants the males made up 89% (n=113) and females 11% (n=14) of the 127 participants. Their median age (IQR) was 28 (20-36). In the rehabilitation phase of SCI, 95% of male participants were interested in sports, while 5% were not. The Self-generated WHODAS 2.0 showed significant correlations between independent variables and domains, with the type of injury correlating with all domains (p-value <0.05) and life activities in school and work correlating with occupational status.

Conclusion: The study found significant factors of sports participation for spinal cord injury patients and found that they are more active daily. Recreation, fitness, socialization, confidence, physical activity, and quality of life for SCI patients influence sports participation.

Key Words: *spinal cord injury, sports participation, physical activities.*

Perception of benefits and barriers in performing sports at spinal cord injured patient at CRP in Bangladesh.

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Abstract

Background: In Bangladesh, approximately 4.6 percent of people are disabled as a result of a spinal cord injury. The incidence of SCI is estimated to be 2.5 cases per million in Bangladesh. It became one of the leading causes of disability in our country's population. Just as spinal cord injured patient can improve themselves in many ways through sports performances; they also have to face many benefits & barriers during sports performances such as physical, mental, financial, and environmental.

Objectives: To gather the socio-demographic information, to find out the benefits in performing sports, To know about the barriers patients face in performing sports, To figure out the way to overcome their barriers.

Methods: A qualitative descriptive approach with semi structured interview used to conduct the study where fifteen participants with SCI who had completed their rehabilitation from Centre for the Rehabilitation of the Paralyzed (CRP). Participated were selected by purposive sampling method. The data were collected by using a semi structured open ended questionnaire form and thematic analysis to determine key themes arising from individuals with SCI.

Results: Participants mentioned a number of benefits and barriers they face in performing sports. Benefits are physical (decrease pain, improve balance, movement, hand exercise etc), social (supportive, helpful, learning from others, increase unity etc), mental (decrease depression, mental refreshment, enjoyable etc), improve self - confidence. Barriers are physical (pain), mental (depression for paralyzed limb) and participants give their opinion to overcome their barriers.

Conclusions: This study highlighted the spinal cord injured patient perception about benefits and barriers in performing sports. Participants felt that they get a lot of benefits after participating in sports and some participants have a few barriers and they give their opinion to overcome those barriers. They can do better performance if their barriers can be removed.

Key Words: *Perception, benefits, barriers, sports, spinal cord injury.*

Effectiveness of Oral Hygiene Protocol on Oral Health for the Patients with Spinal Cord Injury (SCI).

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Abstract

Background: Spinal cord injury (SCI) patients in Bangladesh who are experiencing difficulties in voice and swallowing have benefited from the recent growth in the field of Speech and language therapy. Due to their limited mobility and dependence on others, individuals with SCI frequently suffer from poor oral health, which can result in pain, suffering, difficulty speaking, chewing, and swallowing, aspiration pneumonia, and cognitive impairment. So, it is essential to practice oral hygiene.

Objectives: This study evaluated oral health, assessed changes after implementing the oral hygiene protocol, and determined its effect.

Methods: It was a quasi-experimental study, and between October and December 2021, 60 samples were collected using hospital-randomized sampling from the inpatient SCI unit at CRP-Savar. A Speech and language therapist collected data using the Oral health assessment tool (OHAT). Simple oral hygiene comprising tooth brushing twice a day, mouth rinsing after lunch, etc. were implemented within the group. A week later, the oral health was evaluated. Socio-demographic data were analyzed using descriptive statistics, while the hypothesis was evaluated using a non-parametric test (the Wilcoxon Signed-Rank Test).

Results: The mean age of the 60 respondents was 33; 83% were male and 17% were female; 52% were tetraplegic and 48% were paraplegic; and 83% were male and 17% were female. The findings of the study indicate a substantial improvement in oral health. 78% of patients showed improvement, and 22% were referred to dentists. Overall, OHAT scores for all substances were statistically significant.

Conclusions: The implementation of a cost-effective oral hygiene protocol proved to be advantageous for those receiving inpatient rehabilitation for spinal cord injuries (SCI). It has the potential to prevent and mitigate oral health issues.

Key Words: oral health, oral hygiene protocol, spinal cord injury.

Experience of Performing Instrumental Activities of Daily Living at Community of Adults with Paraplegia following Rehabilitation: A Qualitative Phenomenological Study.

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Abstract

Background: Instrumental Activities of Daily Living (IADL) are essential for an independent life well-being. However, more evidence of IADL practice needed for people with SCI in developing, low and middle-income countries. IADL tasks are difficult to perform comparing to ADL tasks for persons with SCI. The study aimed to explore the experience of performing IADL in the community of adults with paraplegia after rehabilitation.

Objectives: The study followed phenomenological study design of qualitative research by conducting face-to-face interviews among 8 participants (6 Male, 2 Female) with SCI who completed rehabilitation from CRP, recruited through purposive sampling. The self-developed semi-structured guide was used for conducting interviews. Interview time was 40-50 minutes audio recorded and transcribed verbatim. According to Braun and Clark, the data analysis approach was inductive, followed by a six-step thematic analysis.

Methods: The study's findings were facilitators and barriers to performing IADL. There are eight main themes that represents the study findings; areas of IADL (most and less performing area of IADL), enablers were to IADL performance (adaptation and modification, assistance and support, assistive device, positive intrapersonal skill (self-confidence, self-satisfaction, reality acceptance etc) positive social feedback (positive attitude, societal acceptance, supportiveness etc), safety awareness, Income Generating Activities (IGA) and follow up) and barriers were to IADL performance (physical health issues, financial issues, physical accessibility issues, negative intrapersonal skill (lack of reality acceptance, inferiority complex, frustration etc) negative social feedback (traditional thinking, negligence, criticism, and lack of social manners etc).

Results: Mostly performing IADL are home establishment and management, and health manage and maintenance, meal preparation and clean up and less performing IADL are community mobility. Some factors enhance IADL performance such as: modified assistive device, accessibility, financial self-sufficiency, supports from family, community and health professionals. Cost-effective adaptation and modification should be ensured by health professionals for their being independent in the community.

Conclusions: Mostly performing IADL are home establishment and management, and health manage and maintenance, meal preparation and clean up and less performing IADL are community mobility. Some factors enhance IADL performance such as: modified assistive



device, accessibility, financial self-sufficiency, supports from family, community, and health professionals. Cost-effective adaptation and modification should be ensured by health professionals for their being independent in the community.

Key Words: *Instrumental Activities of Daily Living, Performance, Community, Spinal Cord Injury, Rehabilitation.*

Experience of Male Individuals with Spinal Cord Injury Regarding Opposite-Gender Occupational Therapist During Institution-Based Rehabilitation.

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Abstract

Background: In Bangladesh, CRP offers comprehensive rehabilitation services to individuals with Spinal Cord Injuries (SCI). The male-to-female ratio for persons with SCI admitted at CRP is 6:1, whereas for occupational therapists (OTs) in the workforce, it stands at 1:4. This trend aligns with global patterns identified in previous studies. Consequently, a significant number of males with SCI worldwide receive rehabilitation services from female OTs. This study aimed to explore the experience of males with SCI regarding their opposite-gender OTs during institution-based rehabilitation (IBR).

Methods: Face-to-face interviews were conducted with eight males with SCI who had received therapy from opposite-gender OTs for at least a month at CRP's rehabilitation unit. A Phenomenological approach was used, and a self-made interview guide was developed to explore their experiences at their preferred time and place. Following Braun and Clarke's six-step process, thematic analysis was employed to analyse the data.

Result: Six themes emerged from this study which are, 1) gender preference for occupational therapists, 2) state of comfort during therapy, 3) shared beliefs about opposite-gender therapists, 4) outlook about both male and female occupational therapists, 5) adjustment strategies during rehabilitation, and 6) satisfaction regarding female occupational therapist's professionalism. The results reflected that initially, males with SCI did not have a specific gender preference for therapists during rehabilitation; however, over time, they developed a preference for female OTs, resulting in a more positive rehabilitation experience and continued engagement in therapy.

Conclusion: To promote inclusivity in SCI rehabilitation and bridge therapeutic relationship gaps, OTs should address gender-related concerns. By considering the perspectives of individuals with SCI in therapy, OTs can enhance their understanding of gender's role in SCI rehabilitation. Further, studying female OTs' experiences treating opposite-gender SCI individuals can provide valuable insights.

Keywords: *spinal cord injury, male, occupational therapists, opposite gender, institution-based rehabilitation.*

Experience of Participating in Accessible Garden of Persons with Spinal Cord Injury: A Qualitative Study.

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Abstract

Background: Spinal Cord Injury (SCI) affects not only physical but also mental and psychosocial aspects of a person's life. CRP is the only rehab centre in Bangladesh for SCI rehabilitation, where Occupational Therapists engage individuals in productivity, leisure activities, and psychosocial well-being. Persons with SCI can become independent financially and relieve their disability-related mental stress through gardening activities.

Method: This study was conducted with the phenomenological approach of qualitative research design. Eight persons with SCI participated in this study who were admitted to CRP, Bangladesh, and engaged in CRP's garden activities. Both paraplegic and tetraplegic participants were in this study. A face-to-face semi-structured interview guide was used to collect data from the participants. Data were analysed by reflective thematic analysis following Braun and Clarke's six steps.

Result: Eight main themes have emerged from the data analysis including understanding about accessible garden, components of the accessible garden, Motivation about gardening, preference, usefulness during rehabilitation, new experience after gardening, difficulties during gardening, and participant's opinion about garden. Gardening was viewed as a leisure activity, with income sources being the most important factor for people with SCI. Participants believed gardening was an effective leisure activity and recommended regular gardening.

Conclusion: The study found that gardening activities are beneficial for physical and mental health. Health professionals need to plan a structured gardening program to ensure a better experience.

Key Words: *spinal cord injury, participation, accessible garden, horticulture therapy, occupational therapy, experience.*

Speech Characteristics of patients with Cervical Spinal Cord Injury in Bangladesh.

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Abstract

Background: It is evident that both complete and incomplete individuals of cervical spinal cord injury (CSCI) might have difficulties in effective verbal communication due to their prosodic and phonatory disturbance, and physical impairments in respiratory and laryngeal subsystems of speech production. However, in Bangladesh there is a limited or lack of information regarding speech intelligibility of CSCI patients.

Aims: The aim of this research was to focus on Speech characteristics of individuals with CSCI in the context of Bangladesh. Also, the present study was highlighting the contemporary scenario for the level of speech intelligibility after their injuries.

Methods: A cross-sectional survey of people with CSCI (N = 28), who were admitted patients in SCI-Unit of CRP Bangladesh for a minimum 3-months period, who were in active in-patient rehabilitation. Data were collected via face-to-face interviews, after collecting voluntary consent, using a pretested language validated questionnaires on Frenchay dysarthria assessment (FDA) and Dysarthria Impact Profile (DIP). Ethical approval was obtained prospectively. A descriptive statistical analysis was applied to analyse the collected information.

Results: Prospective assessment exposed predominantly resonance and articulatory disturbances were common due to the respiratory, orofacial, and laryngeal consequences of speech production. Dysarthria assessment examined about 39.28% (n=11) CSCI patients were problems in back of the tongue or pharyngeal reflex. Importantly 96.43% (n=27) CSCI patients were facing difficulties in respiration, 64.28% (n=18) in laryngeal movements, and 57.14% (n=16) in tongue movements. Despite, 85.71% (n=24) CSCI patients were having difficulties for their speech intelligibility. A smooth decline in speech intelligibility ensued a diminished communicative effectiveness ratio for most participants. Individuals showed a high degree of variation and association between intelligibility and social acceptance, reaction, and effect.

Conclusion: The present study found a significant problem in speech production along with the indigent movements of orofacial muscles. Speech therapy is predominantly required for them in the clinical and community contexts, and further investigation is required to verify the physiological nature of the respiratory and laryngeal impairments found in the present investigation to determine the relative contributions of these to the overall presentation of speech and voice of individuals with post cervical spinal cord injury (CSCI).

Keywords: SCI, CSCI, Dysarthria, Speech Intelligibility, FDA, DIP.

Characteristics of Postural Hypotension among the SCI patient's attendance at Centre for the Rehabilitation of the Paralysed (CRP), Bangladesh.

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Abstract

Background: Postural (Orthostatic) hypotension is a common complication in patients with spinal cord injury (SCI) manifested by sudden drop of BP, sweating, fatigue, weakness, light headedness, dizziness, blurred vision, palpitations etc. Approximately 74% of the SCI population has been reported to have postural hypotension in acute stage which occurs more frequently in tetraplegia individuals.

Objectives: The primary objective of the study was to explore the characteristics and symptoms of postural hypotension and secondary objective was to find if there was any association between postural hypotension and bed rest duration among the SCI participants.

Methods: A cross sectional study with 44 participants was carried out by using purposive sampling technique at CRP. A standard questionnaire: Head-UP Tilt table testing (HUT) was used to collect data by face-to-face interview. Descriptive statistics done by using SPSS 28.0 version software (focus to table, pie chart and bar chart) and chi square test was used to find out the association.

Results: Among the participants, male (86.4%) were predominantly higher than female (13.6%), neurological level C4 - C7 (n=18) and T4 - T6 (n=15) were more common. AIS complete A were found to have postural hypotension more than incomplete SCI participants. The

most frequent symptoms were sweating 88.6% (n=39), fatigue 79.5% (n=35), weakness 75% (n=33) and light headedness 72.7% (n=32). Among the participants, times of suffering from postural hypotension were significantly associated ($p < 0.035$) with duration of bed rest.

Conclusions: Postural hypotension can interfere with initial rehabilitation in the acute post-traumatic recovery phase and successful reintegration into the communities as well. The characteristics and symptoms of postural hypotension should be considered for successful SCI rehabilitation and to improve quality of life.

Key Words: *spinal cord injury, postural hypotension, characteristics.*

Diaphragm pacing with phrenic nerve stimulation: 72 months follow up and technical considerations in a case of Ventilator-Dependent High Cervical Spinal Cord Injury.

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Abstract

Background: Diaphragm pacing (DP) with phrenic nerve stimulation (PNS) shows promise for ventilator-dependent patients with traumatic high cervical cord injury. Limited data exists on its long-term effectiveness in the Indian setting. To evaluate 72-months follow-up outcomes of DP with PNS in a single patient and discuss technical considerations.

Materials and Methods: Single-center, single-patient follow-up study conducted in a tertiary care spinal cord injury centre setting. A 30-year-old male patient (doctor) with high cervical spinal cord injury underwent DP with PNS for ventilator dependence. Follow-up assessments were performed at 6, 12, 24, 36, 48, 60 and 72 months postoperatively, evaluating respiratory function, quality of life, and complications. Technical considerations for implementing DP with PNS were examined.

Results: Post-DP surgery, respiratory function significantly improved and remained stable throughout the 72-month follow-up. Quality of life improved, and no major complications were observed. Technical considerations addressed included personnel availability, equipment, cost-effectiveness, patient selection, electrode placement, and pulse generator programming.

Conclusions: DP with PNS demonstrates long-term effectiveness as a viable treatment option for ventilator-dependent patients with traumatic high cervical injury, highlighting the importance of addressing technical considerations for successful and sustainable implementation.

Key Words: Ventilator Dependence, Traumatic Spinal Cord Injury, Diaphragm Pacing, Phrenic Nerve Stimulation.

Utility of Hip Surveillance for Heterotopic Ossification in Traumatic Spinal cord Injury; A Retrospective Analysis of Prevalence and Predictors in Patients Undergoing Long Term Institutional Rehabilitation.

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Abstract

Background: Heterotopic ossification (HO) is a common complication in patients with traumatic spinal cord injury (TSCI), leading to loss of joint mobility, loss of function, pressure sores and significant psychological morbidity. The aim of the study was to assess incidence of HO in our group of patients who undergo annual hip surveillance for HO and associated variables as risk factors.

Materials and Methods: We included patients admitted at a tertiary care SCI centre between Jan 2019 to Jan 2021 in this retrospective review, excluding patients with non-traumatic SCI. Clinical records of patients with radiological presence of HO in pelvis radiograph as per Brooker's classification were further evaluated for presence of TBI (traumatic brain injury), polytrauma, spasticity, mechanical ventilation more than 1 month, level of SCI and subjected to statistical analysis.

Results: 76 patients were included in the study with an average age of 28.26. There were 23 (30.26%) tetraplegics and 53 (69.73%) paraplegics. There were 18 (23.68%) patients with HO, 3 (16.66%) of grade I, 4 (22.22%) each of grade II & III and 7 patients (38.89%) of grade IV Brooker's grade of HO. Three patients (16.66%) underwent excision of the HO mass. TBI, polytrauma and spasticity were significantly associated with HO formation (p-value of 0.009, 0.01, 0.009 respectively). Level of injury and prolonged mechanical ventilation were associated with formation of HO without being statistically significant (p-value of 0.79 and 0.27 respectively).

Conclusions: The implementation of an effective assessment protocol of annual hip surveillance as a screening tool for early detection and effective management of HO is crucial to reduce patient's morbidity and health care cost. The protocol can be tailored for an individual as per presence of risk factors like polytrauma, spasticity and prolonged ventilation. The emphasis on timely detection with radiological screening is crucial and paramount.

Key Words: Heterotopic Ossification, Traumatic Spinal Cord Injury, Traumatic Brain Injury, Polytrauma, Spasticity.

Cardio-respiratory and Physical Functioning status in Post-COVID Spinal Cord Injury Patients: An Inception Cohort.

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Abstract

Background: Spinal cord injury (SCI) survivors are vulnerable to COVID-19 in multi-dimensional ways. COVID-19 impacts cardio-respiratory and physical functions in persons without a disability. The study aimed to observe the cardio-respiratory and physical functioning of SCI people shortly after the recovery from COVID-19.

Methods: The study was an inception cohort of four SCI people diagnosed COVID-19 positive in the real-time polymerase chain reaction (RT-PCR) test. Cardio-respiratory function measured as oxygen saturation (Spo₂) and heart rate by Pulse oximetry, Vo₂Max by calculating resting heart rate, Blood pressure by a sphygmomanometer, inspiratory lung volume by a spirometer, and expiratory lung volume by a pick flow meter. Physical function measured using Barthel index. Baseline data collected on the day of being COVID-negative and repeated measures taken in 2 weeks interval up to 6 weeks.

Result: Three had paraplegia and one had tetraplegia diagnosed as AIS A (2), B and AIS C. Highest skeletal and the neurological level was C4 and C5. All of the respondent reports “Long COVID” symptoms as fatigue, SOB, and dyspnea. The duration of long COVID ranged from 02 days to 11 days. The baseline SpO₂ was 95.5±1.9, Systolic BP 125±10, Diastolic BP 75±5.7, heart rate 86.7±5.3, VO₂Max 31.9±3.4, Inspiratory volume 1225±330.4, expiratory volume 475±64.5, and scores of Barthel index 55±37.6. Changes in SpO₂ (χ^2 9.8, p<.05), Inspiratory lung volume (χ^2 11.1, p<.05), and expiratory lung volume (χ^2 11.7, p<.01) found from the baseline to 6 weeks in Friedman’s ANOVA. In week-to-week post-hoc analysis by Wilcoxon test, clinically significant changes were noted in SpO₂, inspiratory and expiratory lung volume.

Conclusion: COVID survivors with an SCI are evident to suffer Long COVID symptoms and our study found a clinical and statistically significant recovery of oxygen saturation and lung volumes within 6 weeks.

Keyword: Spinal Cord Injury, Post-COVID-19, Cardio-respiratory, Physical Functioning.

Impact of community reintegration on self-esteem and life satisfaction among rehabilitated persons with spinal cord injury- A cross sectional survey.

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Abstract

Background: Spinal cord injury (SCI) is a catastrophic event leading to physical and psychological impairments which in turn leads to reduced community reintegration. Likewise, there are studies mentioning reduced life satisfaction and low self-esteem in individuals post SCI. This study attempts to understand the impact of community reintegration on self-esteem and life satisfaction in rehabilitated persons with SCI.

Objectives: To find correlation between community reintegration with self-esteem and life satisfaction in rehabilitated spinal cord injured individuals from Chandigarh Spinal Rehab.

Methods: It’s a cross sectional survey of 72 rehabilitated spinal cord injured persons from a tertiary rehabilitation facility in North India. Individuals who have had experience of residing in community at least 6 months post rehabilitation were recruited by telephonic interview. Validated Outcome measures used were- Craig Handicap Assessment and Reporting Technique, Life satisfaction 11 Questionnaire and Rosenberg Self Esteem scale along with the demographic data.

Results: Out of 72 individuals, 70.83% are men, 37.5% comprised of quadriplegics. 48.61 % are financially independent while 27.78% were unemployed. Correlation between Community reintegration and self-esteem is 0.88 while with life satisfaction 0.82 (p value <0.0001).

Conclusions: There is highly significant positive correlation of community re integration with self-esteem and life satisfaction among rehabilitated community living persons with spinal cord injury. Rehabilitation facilities in the country should keep the follow up with the discharged individuals to have better understanding of the problems faced and should come up with strategies to make it better.

Key Words: Spinal cord injury, Community reintegration, Self-esteem, Life satisfaction.

Effectiveness of scapular mobilization to reduce shoulder pain among the patients with Spinal Cord Injury.

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Abstract

Background: Patients with Spinal Cord Injury often experience debilitating shoulder pain. This study investigates the effectiveness of scapular mobilization as a potential intervention to alleviate this pain and enhance the quality of life for these individuals. Objectives: The objectives were to identify the effectiveness of scapular mobilization in reducing shoulder pain among patients with spinal cord injury.

Methodology: Pretest and posttest designs were used to conduct this study. 16 participants were selected according to inclusion criteria. The 'VAS' and 'Goniometer' were used to assess the shoulder pain and joint range of motion (ROM). Analysis was done through SPSS v22. To analyze the pre-post test data, the Wilcoxon signed-rank test was used.

Result: Among 16 participants, the mean age was 27.69 with a standard deviation of ± 11.5 , median 27, mode 18, maximum age 52, minimum age 13. Male participants were predominantly higher than female participants. Out of the 16 participants, 93.8% (n=15) were male, and 6.3% (n=1) were female. Among them, 50% (n=8) of the participants were caused to fall from a height, 37% (n=6) were caused by a road traffic accident, and 12.5% (n=2) were caused by heavy objects falling on them. The most significant neurological level was T12, with a percentage of 31.3%, while 25% were at L1, and 12.4% were at T7 and T11, respectively. The right-sided shoulder joint was affected in 43.75% of cases, the left-sided in 31.25%, and 25% were affected on both sides. In the statistical analysis, there was a significant improvement in shoulder pain reduction, shoulder flexion, and extension.

Conclusion: Overall, this dissertation showed that scapular mobilization was more dominant than only conventional physiotherapy in reducing shoulder pain and improving shoulder movement.

Keywords: *Spinal cord injury; Scapular mobilization; Shoulder Pain and Movement.*

Does Quality of Life (QOL) in Persons with Traumatic Spinal Cord Injury Correlate with Functional Outcome; A Prospective Analysis of Factors Affecting QOL in Patients with ASIA 'A' Neurology Undergoing Long Term Institutional Rehabilitation.

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Abstract

Background: Traumatic spinal cord injuries (SCI) result from life-altering events, causing physical, social, and psychological challenges. World Health Organization Quality of Life Brief Version (WHOQOL-BREF) measures QOL effectively.

Objectives: Primary aim: correlate QOL using WHOQOL-BREF and Spinal Cord Independence Measure (SCIM-III) scores in American Spinal Injury Association (ASIA) Impairment scale 'A'. Secondary goal: analyze age, marital status, and level of injury on WHOQOL-BREF domains.

Methods: Prospective Observational study with traumatic SCI patients aged 20-65 years. Excluded non-traumatic SCI (ASIA AIS C-E). Face-to-face bedside interviews were conducted, and statistical analysis of the data was done.

Results: The study included 76 male patients with an average age of 33.14 years, 64.1% being paraplegics and 35.9% tetraplegics. All patients were more than six months' post-injury, with the majority (78.4%) in the 18-36 months' post-injury range. 60.5% were married. The SCIM-III scores at admission had a mean score of 24.99 and increased to 63.11 at present. Weak positive correlations were found between SCIM-III scores at present and the psychological (p=0.333) and social (p=0.286) domains of the WHOQOL-BREF. No significant correlation was found between SCIM-III scores and the physical and environmental domains. Strong positive correlations were identified between age and the psychological (p=0.096) and social (p=0.015) domains of the WHOQOL-BREF. Additionally, a strong positive correlation was found between SCIM-III scores at admission and present (p=0.03). The reliability of the analysis was acceptable (Cronbach's alpha=0.7), and no significant correlation were observed between scores and age, marital status, or level of injury.

Conclusions: There is a positive correlation of QOL, age and SCIM-III scores with the psychological and social domain scores in patients with ASIA 'A' neurology. Future research is necessary to guide policy improvements and providing better support for this patient population.

Key Words: *QOL in SCI, WHOQOL-BREF, SCIM-III, ASIA Impairment scale (AIS), level of injury.*

Incidence and factors related to bladder overdistension in patients with SCI during post-acute rehabilitation: a retrospective study.

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Abstract

Background: Intermittent catheterization (IC) by nurse is recommended for the patients having difficulty urination. During post-acute spinal cord injury (SCI) rehabilitation admission, the IC program with regular interval of IC, 5-6 times per day: at 6 am, 10 am, 2 pm, 6 pm, 10 pm, 1 am (if bladder scan showing bladder capacity over 200 ml), restricted drinking schedule of 2 liters per day with the last drink of 200 ml at 8 pm. During the IC program, bladder overdistension should not be overdistended as it affects detrusor contractility and may cause urinary tract infection.

Objectives: To determine incidence and identify possible factors related to bladder overdistension.

Methods: Electronic medical records of patients with SCI admitted at Rehabilitation Ward from June to August 2023 were retrospectively reviewed. Catheterized volume over 600 ml was counted as bladder overdistension.

Results: Out of 26 patients recruited, 3 (1%) experienced bladder overdistension, with average catheterized volume of 865 ml (670 ml to 1.2 liters), and average urine output of 2.6 liters (2.2-2.9 liters) per day. A total number of IC was 390 times, all 4 catheterizations with bladder overdistension were detected in the evening, and the incidence was 1 per 100 catheterizations. All 3 patients took bladder relaxants while those not having bladder overdistension did not take such medications. One drank extra fluid, not in the drinking schedule.

Conclusions: The incidence of bladder overdistension during post-acute SCI rehabilitation admission is about 1% or 1 out of 100 catheterizations. Taking bladder relaxants, not complying to the drinking schedule, urine output more than 2 liters per day, and evening catheterization seem related to bladder overdistension when on IC program of 5-6 times per day. Nurses should be aware of such factors and educate their patients so that they adhere to the drinking schedule.

Key Words: *Bladder overdistension, intermittent catheterization, post-acute rehabilitation, spinal cord injury, patient adherence.*

Efficiency of cystometry/urodynamic test provision: a retrospective study at Rehabilitation Ward, Maharaj Nakorn Chiangmai Hospital.

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Abstract

Background: Every patient with spinal cord injury (SCI) and neurogenic lower urinary tract dysfunction (NLUTD) should have cystometry/urodynamic test (UDT) done. At our setting, such investigation has been performed by nurses helping arrangement of equipment and catheterization and rehab residents and/or physiatrist running the test and interpreting the findings. Urinary tract infection (UTI) symptoms are checked at day 3 and day 7 after investigation. However, some cases were cancelled by doctors due to urine strip showing white blood cells (WBCs) > 500. Being cancelled discouraged the patients due to high cost of transportation from home to hospital.

Objectives: To determine efficiency of cystometry/UDT provided, incidence of symptomatic UTI after investigation, and whether performing the test when having urine WBCs > 500 without UTI symptoms causes symptomatic UTI.

Methods: Medical and nurse records of patients with SCI appointed for cystometry/UDT from September 2022 to October 2023 were retrospectively reviewed. Numbers of appointed cases, cases done, cases cancelled due to WBCs more than 500, and cases with symptomatic UTI within 3-7 days after investigation, were counted.

Results: Out of 392 appointed cases, 364 cases (92.7%) had cystometry/UDT done, 4 cases (1.1%) cancelled on the appointment date due to patients' personal reason. Twenty-four cases (6.2%) were cancelled and antibiotics were prescribed for suspected UTI. There were 14 cases with WBCs > 500 but the investigation was done, 8 were treated with antibiotics and 6 cases did not. After investigation, no one reported UTI symptoms.

Conclusions: Provision of cystometry/UDT seems efficient and safe with a low rate of cancellation due to suspected UTI and no symptomatic UTI after investigation. Urine strip showing WBCs > 500 without UTI symptoms may be a relative contra-indication. Antibiotics treatment may be prescribed when cystometry/UDT findings and other evidence support the diagnosis of UTI.

Key Words: *Urinary tract infection, cystometry, urodynamic test, spinal cord injury, neurogenic lower urinary tract dysfunction.*

Understanding how a community-based intervention for people with spinal cord injury in Bangladesh was delivered as part of a randomized controlled trial: a process evaluation.

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Abstract

Background: People with spinal cord injury (SCI) in low- and middle-income countries (LMICs) face many challenges when discharged home after their initial injuries. They are not supported after discharge by developed healthcare systems in LMICs like in developed countries. This is why a model of care to support people with SCI after discharge in the community was developed (called CIVIC Trial).

Objectives: To understand how a community-based intervention for people with SCI in Bangladesh was delivered as part of a randomised controlled trial and to gauge the perceptions of participants and healthcare professionals to the intervention.

Methods: A community-based intervention was administered to 204 participants as part of a randomised controlled trial. Case-managers followed-up participants with regular telephone calls and home visits over the first two years after discharge. The following data were collected alongside the trial: (i) chart audit of telephone calls and home visits (ii) recordings of 20 telephone calls (iii) interviews with 14 intervention participants and 4 healthcare professionals including 3 case managers.

Results: Participants received the target number of telephone calls and home visits. Pressure injuries were identified as a problem during at least one telephone call by 43% of participants. Participants and case-managers valued regular telephone calls and home visits and believed that calls and visits prevented complications and alleviated social isolation. Participants trusted case-managers and were confident in the care and advice provided. Case-managers expressed concerns that people with SCI in Bangladesh face many problems impacting on well-being and motivation stemming from poverty, limited employment opportunities, societal attitudes and inaccessible environments.

Conclusions: A community-based intervention involving regular telephone calls and home visits was administered as intended and was well received by the recipients of the care. Nonetheless, people with SCI in Bangladesh face economic and social problems which cannot be fully addressed by this type of intervention alone.

Key Words: *spinal cord injury, rehabilitation, community reintegration.*

Epidemiology of Spinal Cord Injury in Bangladesh from 2012 to 2022: A Ten-Year Observation from a Single Center Study.

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Abstract

Background: Spinal cord injuries, which frequently lead to severe and enduring functional deficits, put a substantial strain on healthcare systems. This article provided a thorough retrospective analysis covering a decade of epidemiological and demographic data for patients with Spinal Cord Injury (SCI) who were admitted to the Centre for the Rehabilitation of the Paralyzed (CRP).

Objective: To provide a comprehensive understanding of the changing situation and significant knowledge regarding the occurrence, factors, and demographics of SCI.

Methods: A retrospective study among the 3575 participants who were admitted and discharged from the CRP during the 2012–2021 period.

Results: There were a total of 3575 cases, and among them, 3315 (92.7%) traumatic and 260 (7.3%) non-traumatic SCI cases were reported and admitted between 2012 and 2021. The overall mean age was 34.41, the IQR (Q3~Q1) was 45~24, and the median age was 32 years. Prime-working-age people (25–54 years) showed the highest proportion among overall SCI patients (n = 2242, 62.7%). The proportion of male patients (88.4%) was higher in traumatic SCI than in non-traumatic SCI; female patients (50.8%) were slightly higher than males. Falling from a height (47.1%), RTA (29.2%), and falling while carrying heavy lifting (16.4%) were the three most common causes of traumatic SCI. Meanwhile, the most common causes of non-traumatic SCI were spinal tumours (33.1%), followed by post-surgical

complications (21.2%) and transverse myelitis (17.7%). Falling from height (39.5%) was the leading cause of traumatic paediatric SCI in patients aged ≥ 18 years, followed by RTA (28.2%).

Conclusion: Focusing on the dynamic characteristics of SCI by examining data gathered over a span of ten years and endeavoured to facilitate the development of more effective healthcare strategies and interventions that are tailored to meet the unique needs of individuals with SCI.

Keywords: *SCI, Epidemiology.*

Impact of Spinal Cord Injury on Women's daily life.

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Abstract

Background: Spinal cord injuries (SCI) profoundly impact women's physical, emotional, and social lives. Limited mobility, caregiver dependence, chronic pain, and emotional misery influence their daily existence. Reproductive and sexual health becomes difficult. Their quality of life depends on comprehensive care and individualized therapy.

Objectives: To find out the activity limitations, environmental barriers, and life satisfaction of women with SCI.

Methodology: The cross-sectional study examined the effects of SCI on women who had completed rehabilitation at the Centre for the Rehabilitation of the Paralyzed (CRP). A hospital based random sample of 101 women was selected. Women over 18, tetraplegia and paraplegia cases, traumatic and non-traumatic causes, complete and incomplete injuries, and those who had completed rehabilitation at least 5 years ago were eligible. Formal questionnaires and interviews were used to collect data, including the Functional Independence Measure (FIM), Craig Hospital Inventory of Environmental Factors (CHIEF-SF), and Diener Satisfaction with Life Scale. Data collection followed ethical and informed consent guidelines. Descriptive and inferential SPSS v26.0 analyses were used.

Results: In the study, 101 responders with spinal cord injuries had a mean age of 32.21 ± 12.76 years. Most participants age was 21-30 (31.7%), housewives (51.5%), and primary-educated (37.6%). Rural (75.2%) and married (48.5%) were the majority. The most prevalent injuries were thoracic (41.6%) and paraplegia (78.2%). Mild environmental and activity constraints were common (85.1% and 86.1%). Living was satisfactory (51.5%) or extremely satisfying (23.8%) for most individuals. Age and kind of injury were substantially connected with activity limits, environmental barriers, and life satisfaction.

Conclusion: This study highlights the significant impact of spinal cord injuries on daily life, particularly among women, emphasizing the need for improved support and policies.

Key words: *Spinal Cord Injury, Women, Activity Limitation, Environmental Barrier, Life Satisfaction*

Knowledge of nursing students on prevention of pressure ulcers.

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Abstract

Background: Pressure ulcers, also known as pressure injuries or pressure sores, form a significant complication for at-risk patients that are exposed to prolonged times of pressure on the skin. Many risk factors can increase the chance of a patient forming a pressure ulcer. Pressure ulcers create an increased risk of complications like necrosis and infection and can lead to significant health risks.

Setting: The setting of the research project is the Centre of Rehabilitation of the Paralyzed (CRP) Nursing College. CRP is a specialized NGO for patients with spinal cord injuries. The organization has access to an inpatient hospital and rehabilitative departments. The CRP Nursing College is a residential nursing college bordering the grounds of CRP Hospital in Savar, Bangladesh. The college follows the syllabus of the Bangladesh Nursing and Midwifery Council and offers both a three-year Diploma of Nursing course and a four-year Bachelor of Science in Nursing course.

Objectives: The aim of the research project is to assess the knowledge and attitude of undergraduate nursing students of The Centre of Rehabilitation of the Paralyzed (CRP) Nursing College on the prevention of pressure ulcers.

Methods: Quantitative and qualitative method was used in the research project. The quantitative research took the form of a cross-sectional study using the Pressure Ulcer Knowledge Assessment Tool Version 2.0. 47 Nursing students were asked to make a translated physical copy of the PUKAT 2.0 to assess their level of knowledge on the prevention of pressure ulcers. The qualitative study consisted of 10 individual interviews to further assess the level of knowledge and to identify the attitude of the students towards the prevention of pressure ulcers. The



interviews followed a semi-structured design using a topic list and a time limit was set to 30 minutes. A translator was present to translate questions and answers from English to Bangla if necessary.

Results: The general score of the nursing students was 31.7%. The students scored low in the areas of aetiology (28.7%) and Risk assessment (27.7%). The results of the students at CRP Nursing College are low compared to similar research done in other countries but follow the same trend on the themes that students deem the most difficult. The interviews identified shortcomings with the translation of the survey which made the test more difficult for them. During the interviews, the students were asked questions based on aetiology, risk assessment and prevention. The students showed adequate knowledge and confidence in the theme of aetiology but lacked knowledge of risk assessment and prevention. The attitude of the students on the principles and importance of prevention was found to be positive.

Conclusions: A shortage of knowledge has been found among nursing students. However, due to complications with the survey, no definitive numbers can be given to assess the shortage. The students show adequate knowledge of the subject in conversation with the exception of prevention and risk factor identification. Additional study material is necessary to teach the students about the subject. Research is necessary to identify the best possible risk factor identification tool and the best teaching method to implement the use of the tool. The attitude of the students toward the prevention of pressure ulcers has been found positive. The students seem to understand the importance of the prevention of pressure ulcers and can name some preventative methods.

Key Words: *Prevention, Pressure Ulcers, Knowledge, Attitude, CRP, Nursing students.*

Story of pregnancy in a patient with Spinal Cord Injury

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Abstract

Background: Traumatic spinal cord injury (SCI) is one of the major causes for poor outcomes of pregnancy. Pregnancy in women with spinal cord injury is considered high risk because it may exacerbate many of their existing problems, including autonomic dysreflexia, spasms, decubitus ulcers, urinary tract infections and respiratory infections along with risks related with pregnancy. This is a case report. In this case study we have described the journey of a pregnant lady who suffered a lot after SCI, finally attaining courage to conceive and sequences afterwards. We received the 26 years old patient, nurse in profession, in a chair bound for the last 10 years. It was 16th April 2013, suddenly felt down from a 3 storied building when she was picking up mango following loss of consciousness for 2 hours, after regain consciousness felt unable to move both lower limbs. She had undergone open reduction and internal fixation on the same day. The injury was at the level of D9 and D10. Unfortunately, immediately after the operation, there was postoperative incisional site infection and finally got reopened and removal of prosthesis having no further refixation. After SCI she mostly suffered from paraplegia, neurogenic bowel and bladder problems with chronic UTI. She was unmarried during her injury, gradually she was caught by depression and took suicidal attempts for 3 times. She treated with medication, rehabilitation and counseling. Initially she was classified as ASIA impairment scale and neurological level of injury was T8, for that she lost her mobility which still persists but can manage herself to move from side to side in bed and from bed to chair after rehabilitation. She took courage to marry a supportive life partner. Despite a lot of negative counseling, she decided to conceive and was blessed with a healthy baby girl by cesarean section (LUCS). Throughout the pregnancy, she underwent antenatal checkup and never suffered from any pregnancy related complications and even LUCS done under local anesthesia as a lack of sensation due to SCI. SCI might bring a pause but fail to halt her to lead a near normal life.

Conclusions: Even though after various complication after pregnancy in SCI patient is common but sometimes it can bring blessing.

Key Words: *SCI, Pregnancy, ASIA, IUCS.*

The lived experience of People with spinal cord injury: Bangladesh part of the International Community Survey 2023: Preliminary Data.

BanSCI Team.

Abstract

Background: Spinal cord injuries (SCIs) are recognized to have a significant influence on people's lives, spanning physical, psychological, and social aspects. However, the specific lived experiences of people with SCI are still being studied. This study aims to provide insights into the multifaceted aspects of the lived experience of people with spinal cord injuries living in the community.

Methods: International Spinal Cord Injury (InSCI) is the first worldwide survey on community-dwelling persons with spinal cord injury. The current study represents Bangladesh as part of the InSCI global survey for 2023. The cross-sectional study was conducted using a community-based approach to gather data from individuals with spinal cord injuries in Bangladesh. The sampling frame was drawn from participants of diverse socio-economic backgrounds, ages, and genders across the country, and participants were recruited from the database of our previous study (Phase-A). Data was collected from all eight divisions of Bangladesh through face-to-face interviews. A structured questionnaire was developed, addressing various dimensions of the lived experience. SPSS version 27 was used for statistical analysis. Descriptive statistics were employed to analyze the data and identify prevalent themes. Ethical permission was obtained from the IRB of BSMMU.



Results: We are presenting the preliminary data of the ongoing study. The study involved 400 individuals with spinal cord injuries (SCIs), with 69.3% being male, 30.5% female, and 1 patient was found to be transgender/3rd gender. The majority (34.8%) was in the 18–30-year age group and a significant number of participants (81.3%) had received institutional education, with the majority having a primary level of education (32.3%). The findings illustrate how severely SCIs affect a person's daily life, which presents challenges with movement and engaging in worthwhile activities. Among them, 48% were paraplegic, 28.7% were tetraplegic, and 23.3% had recovered. Considering the pattern of the lesion of SCI, 72.5% sustained traumatic SCIs, and the remainder was attributed to a disease condition. The leading cause of traumatic SCIs was Accident during work such as fall from tree, construction work (34.48%), followed by road traffic accidents (20.69%). Disease-related SCIs were most commonly degenerative (31.82%), followed by Pott's disease (27.27%). Notably, 69% of participants sought care from Physical Medicine and rehabilitation doctors or rehabilitation hospitals, and 30.8% expressed extreme satisfaction with the services received. In terms of social benefits, 16% received support, primarily from governmental sources (14.8%) as well as from NGOs and other private organizations. The survey results reveal that 86.3% of respondents were unemployed due to their conditions, with 67.5% expressing an unwillingness to engage in a paid job, primarily because 58.3% believed they were incapable of doing any paid work. Additionally, before their injuries, 65.5% were not participating in any paid employment. About one-third reported no issues when assessing mobility challenges, while approximately a quarter experienced slight problem. Moreover, 10–11% encountered moderate to severe difficulties, and a fifth of the participants could not move. This comprehensive data sheds light on the multifaceted implications of SCIs on individuals' lives, encompassing various aspects of health, well-being, and societal support.

Conclusion: The comprehensive study with SCI offers valuable insights into the multifaceted repercussions of the characteristics of injuries, age, gender, and level of education. The profound impact of SCI becomes evident through mobility challenges, which encompass varying degrees of difficulty in daily living activities, unemployment rates, and limited engagement in productive activities.

Anxiety and depression after spinal cord injury (SCI); is it a norm? An analysis of persons with SCI on long term institutional rehabilitation

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Abstract

Background: Traumatic spinal cord injuries (SCI) result from life-altering events, causing physical, social, and psychological challenges. The psychological effects of SCI include anxiety and depression.

Objective: To analyse the prevalence of anxiety and depression among patients undergoing long term institutional rehabilitation.

Methods: In a prospective, cross-sectional study, patients with SCI were enrolled, excluding patients with head injury and pre-injury anxiety or depression state. Level of injury, ASIA scale, duration post injury and socioeconomic parameters, Hamilton Anxiety Rating Scale (HAM-A), Hamilton Depression Rating Scale (HDRS), Hospital Anxiety and Depression scale [HADS – depression (D) and anxiety (A) subsets] were correlated.

Results: In this study, 71 male patients with an average age of 32.65 years (SD-6.83) were evaluated, comprising 51 (71.8%) paraplegics and 20 (28.1%) tetraplegics. All participants had surpassed the 6-month post-injury mark, with the majority (56.3%) falling within the 18–36-month timeframe. Approximately 50.7% reported having financial security after discharge. Anxiety, measured using HAM-A, was found to be mild in 98.6% and mild to moderate in 1.4% of patients. Meanwhile, depression, assessed with HDRS, was normal in 81.7%, mild in 14.1%, moderate in 2.8%, and severe in 1.4%. Factors contributing to anxiety and depression showed a weak association and were statistically insignificant concerning education levels ($p=0.256$ and 0.218). While financial security post-discharge displayed a weak association with HAM-A scores, HADS scores revealed abnormalities in patients with lower educational status and married males, albeit without statistical significance ($p=0.9$ and 0.21). No statistically significant associations were observed regarding age, time from injury (TFI), or the level of injury.

Conclusions: About 50% of patients had normal scores, while others were at a higher risk of depression. Risk factors included lower education, being married, male, tetraplegic with ASIA A neurological status, and lacking post-discharge financial security.

Key Words: SCI, HAM-A, HADS, HDRS, trauma.

Story of a rescued Spondyloarthropathy case who planned for recurrent spine Surgery for sciatica.

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Abstract:



Background: Although sciatica is often caused by a herniated lumbar disc, this is not invariably the case. Many pathologic processes, such as bone encroachment, tumors, and metabolic disorders can also result in lumbar radiculopathy. It is of utmost significance that disc herniation is often an incidental finding on imaging of the lumbar spine of asymptomatic individuals. Therefore, without a clear correlation with the history and physical examination, imaging studies alone can be more misleading than beneficial. When disc herniation results in radiculopathy, the precise cause of the pain is not fully understood. The two possibilities are mechanical compression and inflammation. It has been demonstrated that in a “non-irritated” nerve, mechanical stimulus rarely leads to pain. In contrast, an “irritated” nerve usually results in pain. A number of non-spinal disorders mimic lumbar radiculopathy because they generate pain referral patterns similar to lumbosacral dermatomes. Their etiology is diverse and includes joint, soft tissue, vascular and peripheral nerve sources.

A 45 years gentleman, presented with severe buttock pain with radiation to left lower limb initially, then shifted to right side had been diagnosed as a case of Spinal canal stenosis due to PLID L4-5 on the basis of MRI in February 2022 and went to spinal surgery at same level 05.09.2022. Soon he developed low back pain immediately after one month. The pain was so severe that he could not walk even (VAS-10). He was again suggested for MRI and told for revision spinal surgery in tertiary hospital after 2 months. We took the detailed history and clinical examination. Duration of the low back pain (in months) association with morning stiffness more than 30 minutes. Patient had a history of chronic lumbago specially with alternating buttock pain since 4 years, initially good response to NSAIDs then gradually it was radiating and he felt numbness upto calf muscle, not below the ankle joint which was persistent. Finally, he developed difficulties with walking and other functional activities. We went through clinical examination and found sacroiliac joint tenderness, Deep palpation over the buttock was tender but straight leg raising (SLR) was 80 degree. FAIR test/modified FAIR test; piriformis stretch test; numeric rating scale (NRS) was positive. Femoral nerve stretch (FNS) was negative. Patient has history of planter fasciitis. We excluded the history of peripheral arthritis, psoriasis, uveitis, inflammatory bowel disease. CRP was raised while HLAB27 was negative, RA factor and anti CCP Ab was negative. We got Grade 2 sacroilitis bilaterally in Ferguson view and MRI L/S Spine was unsupported to have disc pathology. As per ASAS criteria, we diagnosed him as a case of Axial SpA with peripheral arthritis and performed ultrasound-guided sacroiliac intervention and piriformis release. Immediate after the injection, we have started sulfasalazine (SSZ) and he has sent for physical therapy. After three months, he has got a complete relief (VAS-1) from the total symptoms and performed full Tarawih in Ramadan. Now he is on SSZ only and under follow up.

Conclusions: Diagnosis of sciatica should be based upon clinical and systemic features too. Evaluation for extra spinal sciatica before spinal surgery is a must to avoid unwanted surgery.

Key Words: SpA, Sciatica, Spinal Surgery, PLID

Effectiveness of task-oriented training to improve upper limb function/recovery among spinal cord injury tetraplegic patient.

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Abstract

Background: Patients with spinal cord injuries have less ability to care for themselves and manage their motor functions. The ability of people with tetraplegia to undertake manual activities of daily living is severely limited by impaired hand function. People with SCI place a high value on hand use and consider it to be a key factor in determining their quality of life.

Objectives: The objectives were to assess the effectiveness of task-oriented training to improve upper limb function among spinal cord injury tetraplegic patient.

Methods: Randomized Control Trial study was chosen to conduct this study. 30 participants were selected according to inclusion criteria and concealed allocated in both groups. 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.

Results: Among 30 participants, the mean age of experimental group was 34.73±10.194, median 35, mode 30, maximum age 56, minimum age 18 and control group mean was 39.93±13.483, median 40, mode 40, maximum age 65, minimum age 19 of the participants. In statistical analysis, through Mann-Whitney U test there was significant improvement of dressing function and writing skill. In Wilcoxon test, all function were significant in experimental group, on the other hand, in control group, maximum function was significant without transfer and bathing function.

Conclusions: Overall in this research shows that the task-oriented training is effective for improve upper limb recovery.

Key Words: spinal cord injury, task-oriented training, upper limb function.

The relationship between mental health variants and physical functional level among persons with spinal cord injury in Bangladesh.

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Abstract

Background: Spinal cord injury (SCI) brings sweeping changes to life. SCI is associated with mental health problems such as anxiety and depression as well as reduce physical functioning, and they suffer from it especially when they return to their community after completing the rehabilitation.

Objectives: To identify the association between mental health and physical functional level among people with spinal cord injury who completed their rehabilitation from Centre for the Rehabilitation of the Paralysed (CRP) and return to their community.

Methods: The design of the study was cross sectional. The study involved 40 male & 26 female participants with SCI selected by conveniently who completed rehabilitation from inpatient SCI Unit, CRP-Savar, Bangladesh and returned to their community. Data was collected by using Generalized Anxiety Disorder (GAD-7), Patient Health Questionnaire (PHQ-9) and Functional Independence Measurement Scale (FIM).

Results: In this study, mental health; mainly anxiety and depression and physical functional level associated with each other which means mental health had highly impact on physical functional level of SCI patient.

Conclusions: The study would indicate that if a SCI patient had suffered from psychological distress, then it can severely affect the person's physical functional status.

Key Words: *spinal cord injury, anxiety, depression, physical functioning, rehabilitation, community.*

Perception About Accessibility in The Community Among Wheelchair Users with Spinal Cord Injury.

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Abstract

Background: The incident of a spinal cord injury prompts to a tremendous change to individual's lifestyle. In developing countries there are some hurdles that have profoundly impact on community participation as a consequence of spinal cord injury. This study demonstrates wheelchair user's perception about accessibility in community participation after spinal cord injury.

Objectives: To identify the perception about accessibility in community, to identify the structural barriers in house, to identify the structural barriers in house to detect the environmental barrier in community, to identify the barrier in spiritual and cultural participation, to find out the perception about family and social support.

Methods: A qualitative descriptive approach with semi structured interview used to conduct the study where eleven participants with Spinal Cord Injury (SCI) who had completed their rehabilitation from Centre for the Rehabilitation of the Paralysed (CRP) were participated selected by purposive sampling method. The data were collected by using a semi structure open ended questionnaire form and thematic analysis to determine key theme arising from individuals with SCI.

Results: Participants mentioned a number of barriers they face because of inconvenient accommodation in their house environment such as kitchen, limited access in toilet, inadequate space in room, narrow doorway. They also remarked that environmental barrier, inadequate ramps and faulty outdoor construction, hostile weather also a major barrier in their community participation. It identified that, comparatively women wheelchair user experienced more barrier than man. Stigmatized social attitude and ignorance seems also a major barrier in community participation. They also remarked that, supportive family, and good social relationship act as a strong facilitator for wheelchair user SCI person for their community participation.

Conclusions: This study highlighted that wheelchair user's perception about their inconvenient accommodation, inaccessible environment in community participation, stigmatized social attitude and also strong contribution of personal care giver in community participation. Participants felt that if societies as well as government can legislation to advocate persons with differently able for equal rights with the aim of moving towards an equal, inclusive, and accessible society, these barriers can be removed.

Key Words: Perception, wheelchair user, accessibility, Spinal Cord Injury.

An open design of a programmable electrical stimulator for transcutaneous stimulation therapy to restore function after neurological injury.

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Abstract:

Background: Transcutaneous electrical stimulation, a non-invasive, neuromodulation method holds tremendous promise for functional rehabilitation of people with spinal cord injury (SCI) and other neurological conditions. Yet, there are very limited availability of such stimulation devices compared to other successful electrical stimulators such as neuromuscular electrical stimulator (NMES) and functional electrical stimulator (FES), especially for many people with neurological injuries in the developing world.

Objectives: The objective of this study was to develop and share a low-cost open-source transcutaneous electrical stimulator capable of neuromodulation therapy.

Methods: A versatile transcutaneous electrical stimulator is designed and prototyped to facilitate anyone with a minimum technological knowledge to develop their own stimulator for the neuromodulation treatment. Special care has been given to minimize the complexity of the design and to use most commonly available off-the-shelf (OTS) components so that one can build the stimulator from anywhere in the world.

Results: Total component and prototyping cost of the stimulator is less than US\$100. The stimulator is being tested in several individuals around the world and deemed safe to use. It is, however, warned to handle the stimulator with the highest caution and care as it can generate high voltage which can have adverse health effects, if not handled carefully. The entire design and source-code are freely shared online: <https://github.com/RehabExo/OpenExoStim>.

Conclusions: This low-cost open-source stimulator gives hope on the future of non-invasive neuromodulation treatment for SCI paralysis around the world.

Key Words: Neuromodulation, Transcutaneous Electrical Stimulation, Open-source, Stimulator.

Effectiveness of Kegel exercise and psychosexual counselling versus usual counselling for managing erectile dysfunction in incomplete spinal cord injury: A randomized clinical trial.

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Abstract

Background: Spinal cord injury (SCI) causes lifelong disability and leads to impairments in physical functioning, psychosexual health, and life participation. In the post-injury period, patients lose their erectile function due to disturbance of sensory, motor, and autonomic function. Seventy-one percent of Bangladeshi SCI males lead a married life, and sexual satisfaction is a crucial demand for them to lead a better quality of life.

Objectives: To elicit the combined effectiveness of Kegel exercise and psychosexual counselling (KPC) compared to usual counselling (UC) for SCI males with erectile dysfunction.

Methods: The study design was Double-blind, randomized parallel group two-arm clinical trial. 50 SCI males with erectile dysfunction were recruited in either KPC or UC group through concealed allocation and treated for 12 weeks period. The outcome was evaluated by five domains of the international index of erectile function (IIEF) questionnaire, (1) Erectile function, (2) Orgasmic function, (3) Sexual desire, (4) Intercourse satisfaction, and (5) Overall satisfaction. Baseline and post-treatment assessments were performed in 12 weeks intervals.

Results: Participants of both groups had similar socio-demographic and clinical baseline criteria ($P > .05$). Both groups had statistically significant ($P < .001$) improvement in five domains of IIEF erectile function, orgasmic function, sexual desire, intercourse satisfaction, and overall satisfaction compared to baseline. KPC had a superior outcome in erectile function score ($t, 2.53$; $P < .05$), intercourse satisfaction score ($t, 2.4$; $P < .05$), and sexual desire score ($t, 2.71$; $P < .01$). The KPC group also had clinically significant (MCID:4) superior outcome compared to UC in all domains of IIEF.

Conclusions: Kegel exercise might be a potential adjunct therapy along with counselling intervention for managing erectile dysfunction in incomplete SCI males. Further research is warranted to elicit the true effect of Kegel exercise on erectile dysfunction for SCI people.

Key Words: *Kegel exercise, psychosexual counselling, erectile dysfunction, Spinal Cord Injury*

Feasibility, Usability, and Acceptability of a Low-Cost Manual Standing Wheelchair.

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Abstract

Background: Regular standing, even with full assistance, is prescribed for a person with spinal cord injury (SCI) as it provides numerous health and psychological benefits. But most standing wheelchairs are expensive, heavy, and cumbersome to use.

Objectives: The objective of this study is to examine the feasibility, usability, and acceptability of a recently developed manual standing wheelchair.

Methods: We have recently developed a standing wheelchair that utilizes gas spring mechanisms for standing. 30 SCI paraplegic wheelchair users ($n = 30$; 26 Males, 4 Females) were enrolled to test the usability of the wheelchair. The study was conducted over 8 weeks at the Centre for the Rehabilitation of the Paralysed (CRP). A wheelchair usability questionnaire was used to collect the data with the use of a Likert scale and their feedback was obtained through a qualitative questionnaire.

Results: Each study participant on average spent a total of 7.7 ± 1.2 hours in the standing wheelchair per day. Our questionnaire data suggests that the study participants felt safe (mean score 8.4 out of 10) in our standing wheelchair and very little effort was needed to operate and propel (3.3 / 10) the wheelchair. Furthermore, being able to talk to people in a standing position using the standing wheelchair made them feel more confident (7.7 / 10) and they felt very happy (8.2 / 10). When standing, all subjects showed a lower level of nervousness (2.4 / 10). The users also anticipated that the SWC would enhance their involvement in household activities (7.3 / 10). The overall user satisfaction of the standing wheelchair was high (7.1 / 10).

Conclusions: Our prototyped standing wheelchair costs only US\$166 which is affordable for most wheelchair users. Our results support that it is usable and feasible in the context of the developing world.

Key Words: *SCI, wheelchair, feasibility, usability, acceptability.*

The cost of providing a community-based model of care to people with spinal cord injury, and the healthcare costs and economic burden to households of spinal cord injury in Bangladesh.

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Abstract:

Background: Bangladesh is an LMIC in which healthcare is largely funded by out-of-pocket healthcare payments, around 2.2% of Bangladesh's gross domestic product was spent on healthcare; of which 73% was attributed to the out-of-pocket healthcare costs of individuals. Yet there is very limited universal health care such as access to health services and financial support for the people with SCI in Bangladesh.

Objectives: To determine the costs associated with providing a community-based model of care delivered as part of the CIVIC trial to people discharged from hospital with recent SCI, and to determine the economic burden to households.

Methods: Records were kept of the costs of providing a community-based model of care to participants of the CIVIC trial. Data were also

collected at discharge and 2 years post-discharge to capture out-of-pocket healthcare costs over the preceding 2 years.

Results: The mean cost of providing the community-based model of care to participants assigned to the intervention group (n = 204) was US\$237 per participant. The mean out-of-pocket health care cost over the first 2 years post-discharge was US\$472 per participant (n=410), and US\$ 448 per control participant (n =206). Median (IQR) equivalent annual household incomes prior to SCI and at 2 years post discharge were US\$721 (US\$452– 1129) and US\$464 (US\$214–799), respectively. Of the 378 participants alive at 2 years, 324 (86%) had catastrophic health expenditure, and 161 of 212 participants who were not in poverty prior to injury (76%) were pushed into illness-induced poverty within 2 years of injury.

Conclusions: The cost of providing community-based support to people with SCI for 2 years post-discharge in Bangladesh is relatively inexpensive but an overwhelming majority of households rapidly experience financial catastrophe, and most fall into poverty.

Key Words: *SCI, Community-based model, Health care cost.*

Factors influencing pressure ulcer among the spinal cord injury patients after two years discharge from center for the rehabilitation of the paralysed.

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Abstract:

Background: The majority of people affected with pressure ulcers are those having health conditions (mental or physical) that encourage immobility, especially those who are confined to bed or chair for prolonged periods of time.

Objectives: To identify the influencing factors of pressure ulcer among the spinal cord injury patients after two years discharge from CRP.

Methods: The study was a cross sectional design. Only 35 samples were selected from different district of Bangladesh who have completed rehabilitation services from Centre for the Rehabilitation of the Paralysed (CRP), Savar. Initially all the subjects were assessed and then data were collected by semi structured questionnaire.

Results: There were some important factors associated with a higher risk for developing pressure ulcer. Age, immobility, inadequate nutrition, food habit, dehydration and prolonged sitting identified as influencing factors for developing pressure ulcers. Persons with diabetes were at risk for developing pressure ulcers, owing to the neuropathy and tendency for unnoticed trauma. The affected pressure ulcer area requires thorough cleaning and dressing. Maintenance of cleanliness found as the key factor to avoid pressure ulcer development.

Conclusions: Studies have identified factors associated with pressure ulcers in many health care settings including location of the pressure ulcer, participant's daily lifestyle, their personal hygiene, nutritional condition, their food habit taking and cleanliness of their personal things.

Key Words: *Pressure ulcer, Risk factors, Spinal Cord Injury.*

Life satisfaction and community participation after vocational training among working adult individuals with Spinal Cord Injury.

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Abstract

Background: More than 80% spinal cord injury (SCI) patients live in more than 100 developing countries. SCI can cause multiple impairments, which interact with a person's environment as a result activity limitation and social participation restriction occurs which affect life satisfaction of spinal cord injury patients.

Objectives: To explore the level of Life Satisfaction and Community Participation after Vocational Training among Working Adults with Spinal Cord Injury.

Methods: The design of the study was cross-sectional. Total 54 participants with SCI were selected conveniently for this study from the community of Savar, Dhamrai, Manikgong in Bangladesh who completed rehabilitation services and vocational training from the Centre for the Rehabilitation of the Paralysed (CRP), Savar, Dhaka, Bangladesh and returned to their community and joined to work. Data was collected by using of questionnaire (LiSAT-9) and Modified TNO Arbeid Questionnaire.

Results: This study found that, as a whole, the satisfactory percentage of people SCI among the 54 participants, about 5.6% (n=3) participants had dissatisfying, whereas 5.6% (n=3) had rather dissatisfying, 27.8% (n=15) participants had Rather Satisfying, 51.9% (n=28) had Satisfying and 9.3% (n=5) at an average had Very Satisfying has been found, which means after receiving vocational training SCI patients were more satisfying about their life than previous.

Conclusions: The study would indicate that if a SCI patient had had received the vocational training, then their life satisfaction and community participation will be increased.

Key Words: *SCI, vocational training, life satisfaction, community participation.*

Breast feeding experience among the mother with Spinal Cord Injury in Bangladesh.

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Abstract

Background: Successful breastfeeding depends on both maternal and infant factors, as well as, and it is influenced by physiological and psychological components such as hand function, nipple shape, breast tissue function, sensory feedback, and the mental status of the mother. Insufficient production of milk is the most common problem experienced by lactating mothers with spinal cord injury. Mothers with spinal cord injury often feel intense pressure to breastfeed. This pressure often comes from family and society and can lead to feelings of guilt and inadequacy if they don't breastfeed. Sometimes mothers with spinal cord injury face difficulties, with breast feeding due to sleep disruption, dysfunctional limbs and not eating nutritionally balanced meals.

Objectives: The purpose of this study is to explore the experience of breastfeeding among women with spinal cord injury, especially the factors that hinder and assist their breastfeeding.

Methods: Qualitative descriptive exploratory design was used. Six mothers with spinal cord injury who have a baby after their injury had been purposely sampled gave informed consent before data was collected through in-depth one-on-one interviews. Data was recorded, transcribed and analyzed inductively using the content analysis technique.

Results: The knowledge gap of a new mother because of not seeking advice from a lactation consultant is one of the key issues for Bangladeshi women with spinal cord injury, as we do not have this kind of available consultant. Lack of support from family members, limited awareness and knowledge about breastfeeding practices and lack of advice from health staff during antenatal visits hinder breastfeeding. Nowadays, the knowledge of breastfeeding is changing positively through social media or television, especially the consequences.

Conclusions: Breastfeeding protocol for mothers with spinal cord injury should include all maternity hospitals and rehabilitation centres.

Key Words: *breastfeeding, mother with spinal cord injury, Bangladesh*

Exploring the mediating role of resilience in the relationship between depression, and life satisfaction in persons with spinal cord injury.

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¹: Chandigarh Spinal Rehab, Chandigarh India.

Abstract

Background: Spinal Cord Injury (SCI) is one of the devastating events that often results in profound physical, psychological, and social challenges for affected individuals. These challenges can significantly impact various aspects of the individual's life, including their mental health, and overall life satisfaction. Understanding the intricate relationships between these factors with resilience is important for their well-being.

Objectives: The primary objective of this pilot survey is to investigate the potential mediating role of resilience in the complex interplay between depression, and life satisfaction among individuals living with spinal cord injuries (SCI)

Methods: A one-time survey with simple random sampling using chit was used among post-rehabilitated candidates from Chandigarh Spinal Rehab. Data was collected telephonically by trained experts, PHQ-9, LISAT-9, and CD-RISC25 were used to collect the data, and STATA 14.0 used for analysis.

Results: Results: The statistical analysis shows, there is a significant positive correlation between resilience with life satisfaction and no correlation with patient health Questionnaire.

Conclusions: To sum up, this survey is a promising first step towards understanding resilience's mediating role in the context of depression, and life satisfaction among people with SCI. It underlines the necessity of further study and emphasizes the potential advantages of resilience-focused therapies in improving well-being and general life satisfaction among the SCI population.

Key Words: Resilience, Life-Satisfaction, Spinal cord injury, depression.

Assistive devices

Indoor- Outdoor Motorized Wheelchair

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Purpose of Developing this Device:

- (1.) To work like power wheelchair, so the users can use motorized wheelchair like power wheelchair in Bangladesh.
- (2.) To provide smart wheelchair in less price comparing to the power wheelchair.
- (3.) Help to reduce the strain on wheelchair users- shoulders and arms so they can continue to perform transfers safely.
- (4.) to reduce user effort in controlling the wheelchair and to ensure safety during movement.
- (5.) To provide indoor - out door design and motorized function within one model of wheelchair.

Usefulness:

who may need to use a wheelchair for distances or over terrain which would be fatiguing in a manual wheelchair. To focus one wheelchair with indoor-out door function. To use multi-function in one design of wheelchair. To introduce motor in wheelchair design for Spinal cord injury users in low resource country like Bangladesh.

Cost:

53000/= BD Taka

Portability:

Indoor -Outdoor with Motorized wheelchair is portable everywhere.

Accessibility:

This wheelchair will be easily accessible. There are four wheels in the Wheelchair- two rare wheels, one cluster wheel and one front wheel that can easily move anywhere in the country.

Availability:

This wheelchair will be available in Metal workshop, CRP Production. We have modified in our existing design so this wheelchair will be available in CRP Workshop, according to need basis of the users.

Category of this Assistive Device:

Indoor and Outdoor motorized wheelchair mechanism.

Brief Summary:

For Spinal cord Injury patients, we prescribed and delivered Basic level wheelchair. Some paraplegia patients with good trunk control and balance are wanted to do different business, jobs, and academic education according to their functional level. To fulfil their desired, we wanted to make indoor-outdoor motorized wheelchair within one design. So, users can use one wheelchair with different purposes- that can be used inside of home/ outside of home/can visit long distance with motor support. Here we used 24 volt and 250 watts motor. Users can use the wheelchair at home to remove the front part of the wheelchair. when the users want to move long distance than add the front part of the wheelchair within short time and by using the motor, users can cover long distance. Here we used the charger mechanism to make charge the motor of the wheelchair. By this design the user will get multipurpose wheelchair in one model.

Basic Wheelchair with Tilt in space mechanism.

Fahmida Banu^{1*}, Md. Imran Hossain¹, Subol Minggu¹, and Dayal Kanti Chakma¹

¹. Centre for the Rehabilitation of the Paralyzed (CRP), Savar, Dhaka-1343, Bangladesh.

Purpose of Developing this Device:

1. To assist with reduced head and trunk control.
2. To reduce risk of falls and sliding from chairs.
3. To assist with corrective positioning for those with kyphotic postures.
4. To improve physiological processes
5. Tilt provides postural stability and support for those who cannot maintain an upright posture when seated.
6. To facilitate easier repositioning by individual/carer.
7. Manual wheelchairs with tilt: Provide a means for weight shifts and position changes. Reduce the risk of pressure injury by redistributing pressure from the pelvis to the trunk. Provide a safe and easy way for assistants to provide weight shifts for occupants.

Use fullness: Both reclining wheelchairs and tilt systems can provide pressure relief, increase circulation, improve head, neck and trunk control, improve functional posture and positioning, support safe transfers by various means and minimize variations/fluctuations in the user's muscular control.

Cost: 19000/=BD Taka.

Portability: This wheelchair is easy portable.

Accessibility: This wheelchair will be easily accessible. There are four wheels in the Wheelchair, two cluster wheels and two rare wheels that can easily move anywhere.

Availability: This wheelchair will be available in Metal workshop, CRP Production. We have modified in our existing design so this wheelchair will be available in CRP Workshop, according to need basis of the users.

Category of this Assistive Device: Basic level wheelchair with tilt in space mechanism.

Brief Summary: This is a Basic level wheelchair with tilt in space mechanism. This wheelchair will be appropriate for Upper tetra patients, T6 level injury or above that level because, Postural hypotension is more common with cervical and high thoracic (levels 1-6) spinal cord injuries. Here we consider 5 degrees to 25-degree tilt. This type of degrees will be helpful for provide pressure relief, increase circulation, improve head, neck, and trunk control, improve functional posture and positioning. Here we modify our existing design of Metal frame in Basic level wheelchair, we used long push handle for caregiver's. All the degrees of Tilt in space -will use according to function, like-feeding, moving, watching TV, writing on the table, moving in long distance. During the postural hypotension condition in SCI patients - this wheelchair will work immediately or like a magic. We produce tilt in space wheelchair for SCI patients from the very beginning from our production, but it used to take more time for making and it was costly. But this wheelchair will be easy to make and less price.

NeoFly customized wheelchair & NeoBolt outdoor mobility attachment.

Siddarth Daga^{1*}

¹. NeoMotion Assistive Solutions Pvt Ltd, India.

Purpose of Developing this Device: According to WHO, 1% population of any country could benefit from wheelchairs, and most don't have access to one. There is a large number of people in the country who could benefit from quality mobility solutions. The team travelled across India and interacted with over 200 wheelchair users and found that most wheelchair users are confined to four walls with poor health, no employment and no social engagement. The two major problems that caught their attention were.

Challenges in Indoor Mobility: One-size-fits-all wheelchairs, widely in use, offer incorrect posture causing back, shoulder, and body pain. They are difficult to propel owing to the poor ergonomics. They are often large in size making them in-accessible inside small doors, small bathrooms, etc. A bad wheelchair inflicts significant damage to user within a short span of time.

Challenges in Outdoor Mobility: Conventional wheelchairs are unusable outdoors. For outdoor mobility people use alternates as tricycles and tri-scooters. A large wheelbase and three-point contact with ground makes them stable on rough terrain. But both these devices, requires the user to shift from the wheelchair to a Tricycle / Modified Scooter, making it difficult. Wheelchair users are dependent on others for this. Further, they need to carry a wheelchair along for use at destination.

Presently, there is no mobility solution which can meet the needs of both indoor and outdoor environment. Many people with disability like Spinal Cord Injury, Muscular Dystrophy, Polio, Neurological Disorders, etc. find it difficult to transfer from one device to another, especially from a wheelchair to a tricycle or modified scooter. They restrict themselves to wheelchairs and stay inside their house, significantly reducing their quality of life.

Target Group:

- Spinal Cord Injury

- Polio
- Lower limb Amputation

Solution: The solution to the problem of independent indoor and outdoor mobility is a Clip-On Device to a Wheelchair. The user stays seated on wheelchair. When users want to go outdoors, they can attach the Clip-On Device to wheelchair independently. Now the device is ready to be used outdoors.



NeoFly is a personalized wheelchair designed to enhance health and lifestyle. 18 customizations ensure a perfect fit to the user's need. NeoFly covers three to five times more distance for every push owing to the right posture, a rigid frame and an ergonomic pushrim. A 30% smaller footprint for the same seating area enhances accessibility of narrow spaces. The design conforms to the user's body, making the user more visible than the wheelchair. A cushion with every NeoFly, is specially designed to enhance skin care, stability, and ease of transfer.

NeoBolt is a motor-powered clip-on which converts NeoFly into a safe, roadworthy vehicle. It is designed to enable wheelchair users to go out into the world, explore life, get employed and have fun! NeoBolt eliminates the need to transfer into other vehicles and can be independently attached by the user within seconds. It has a maximum speed of 25 kmph and travels up to 25 km per charge.

NeoBolt can be safely used on uneven terrains. It will empower wheelchair users with a low-cost mode of outdoor mobility when compared to cars, autorickshaw or modified scooters.



VIDEO of the Solution (Hindi & English) - <https://www.youtube.com/watch?v=18DWeFYHVNI>

VIDEO of the Solution (Bengali) - <https://www.youtube.com/watch?v=1PSFCL-Gdbs&t=70s>

Impact on the lives of wheelchair users:

Wheelchair users in towns and cities are going to their workplace using NeoFly NeoBolt. They are not dependent on their car-drivers; they don't need to hire a car. They also use metro trains to go around the city – this allows them to cover to use public transport and reach long distances within the city.



Wheelchair users are travelling to school and colleges using NeoFly NeoBolt, allowing them to complete their education, have friends and be a part of the society. This independence also frees their parents of the time they had to spend to bring their children to school / college.

Wheelchair users are participating in multiple sports events, improving their morale and bringing positivity in outlook towards life. NeoFly is being used for cricket, rifle-shooting, table-tennis. Users of other sports also use NeoFly NeoBolt to travel to their training / coaching center on a daily basis.



100+ wheelchair users have taken up jobs in last mile food delivery, courier delivery, etc. Many wheelchair users are unable to access desk jobs. By taking up an un-skilled job as delivery, they can find opportunity at their own village, town, city and can start earning.

Many wheelchair users are from villages and have farms. They may not be able to work on farm directly, but they can be involved in monitoring and supervising activities. With NeoFly NeoBolt, wheelchair users are able to visit and take care of their farms, travelling through the muddy paths with no roads.



Many wheelchair users have small shops. They are often dependent on others to buy supply from the market. With NeoFly NeoBolt they buy supplies from the market independently thereby improving their earnings. They also travel to their shop independently.

Many wheelchair users are involved in animal husbandry. With NeoFly NeoBolt, they are now able to visit the nearby markets to buy grains / food for the animals. And also sell the animals / meat in the market, thereby making the wheelchair users an active earning member of family.



Travelling from one place to another is often needed to meet friends and relatives. With NeoFly NeoBolt, wheelchair users are now able to travel in trains, and participate in the community, significantly improving their quality of life.



Availability: Currently, the entire set of the NeoFly & NeoBolt is around **USD \$1300**. 4500+ users across different states of India use NeoMotion products. Products are purchased in either of these means (a) directly by individuals (b) government (c) CSR (Corporate Social Responsibility) programs of companies / industries. Users who buy the products on their own, are usually employed and have a steady means of income. We also provide easy installment & financing solutions so that users can afford the product over a period of time.

Governments have program in their territory to support people with locomotor disability with quality mobility products. NeoMotion products have been introduced in one such program in the state of Tamil Nadu in India, and work is in progress for introduction in other states. Users who need NeoMotion products are identified by the government based on their identity card, and products are supplied to them.

CSR (Corporate Social Responsibility) programs of companies / industries mandates them to invest some portion of their profits into societal upliftment – disability is a focus area. Users are identified with the help of Charitable Organizations based on need, economic condition, clinical assessment; and products are provided to users.

Post-sale service: NeoMotions provides a one-year warranty. A tool kit and a few spare parts are provided along with the product. Issues with tire, tube, brakes can be repaired locally at a two-wheeler repair shop. For after sales support, there is a dedicated phone number and email id. Users contact NeoMotion with their issue through these channels. After scrutinizing the issue, service is provided through one of the following options. (a) Do-it-yourself Service: the required spare part is sent by courier; a video call is made, or a pre-recorded video is sent to guide the user. (b) Carry-in Service: the product is brought to NeoMotion facility for service.

Category of Assistive Device: Mobility.

Brief Summary: NeoFly is a personalized wheelchair designed to enhance health and lifestyle. 18 customizations ensure a perfect fit to the user's need. NeoFly covers three to five times more distance for every push owing to the right posture, a rigid frame and an ergonomic pushrim. A 30% smaller footprint for the same seating area enhances accessibility of narrow spaces.

NeoBolt is a motor-powered clip-on which converts NeoFly into a safe, roadworthy vehicle. It is designed to enable wheelchair users to go out into the world, explore life, get employed and have fun! NeoBolt eliminates the need to transfer into other vehicles and can be independently attached by the user within seconds. It has a maximum speed of 25 kmph and travels up to 25 km per charge. It will empower wheelchair users with a low-cost mode of outdoor mobility when compared to cars, autorickshaw or modified scooters.

A Low-cost Open-source Manual Standing Wheelchair.

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Purpose: The wheelchair's primary purpose is to facilitate independent standing, promoting better circulation, digestion, and overall health for individuals with mobility limitations.

Target Group: Target A Low-cost Manual Standing Wheelchair for People with Paraplegia.

Usefulness: A standing wheelchair provides numerous health benefits such as prevent pressure ulcers, pressure sores due to prolonged seating, increased participation in daily activities, independence, and improved overall well-being through regular standing.

Cost: Costs are crucial, as affordability is a primary concern in the developing world where most of the disability occurs. Total retail materials of our wheelchair were only US\$166 suggesting about 80-90% drop from the current market cost!

Portability: The standing wheelchair has been prototyped with metals and rugged materials, hence safe to transport. The wheelchair's weight, size, and ease of transportation make it suitable for everywhere usage.

Accessibility: The wheelchair was designed with keeping accessibility in mind since this is another key objective of this project: to make it accessible to everyone. The design is shared open-source, so anyone from anywhere can create their own standing wheelchair for them or their family or friend.

Availability: This is another key component of our design. We have shared our computer aided design (CAD) of the wheelchair to all through online file sharing platform. The full design and prototyping instructions can be freely downloaded from:

<https://github.com/SHOVANPARVEZ/StandingWheelchair-manual>

Category of Assistive Device: Postural Care (Sitting and standing).

Brief Summary: Continuous sitting in a wheelchair can cause serious consequences including life threatening pressure ulcers in individuals with paralysis. A standing wheelchair can easily solve this problem and is highly recommended for these individuals not only to avoid pressure ulcers but also to have numerous health benefits such as improved cardiovascular health, increased muscle mass and bone density below the level of injury by simply standing regularly. But conventional standing wheelchairs are too expensive for most individuals to reap the benefits of standing. Hence, we have developed a low-cost open source standing wheelchair. Our standing wheelchair was manufactured using inexpensive materials purchased from the local market of Dhaka, Bangladesh. Total retail materials cost was only US\$166. The prototype had been tested and well-received by regular wheelchair users. One time fitting and training ensure optimal operation, posture, and comfort. Participants showed high interests in using the standing wheelchair for their daily life.