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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.

Introduction:

Spinal cord injury (SCI) is debilitating for patients and their family [1]. SCI is the leading cause of disability in Bangladesh, a developing nation with socioeconomic issues [2-3]. SCI incidence rates vary by location from 15 to 40 per million persons [1,4]. Due to economic and community development, Asia, especially Bangladesh, has a lower incidence than North America [5]. SCI rehabilitation programs increase quality of life and reduce mortality and disability [6]. Wheelchair users with SCI often experience shoulder pain [7]. Chronic impingement syndromes and rotator cuff injuries cause shoulder pain in SCI patients [8]. Shoulder pain affects mobility, social involvement, and quality of life [9]. SCI patients experience faster lower extremity bone loss and fractures [10]. Shoulder dysfunction affects a large percentage of SCI patients and limits function. Biomechanical stressors, postural and neuromuscular inadequacies, and lesion features contribute to SCI shoulder abnormalities [9, 12]. SCI patients must manage shoulder discomfort and dysfunction to maintain function and quality of life. Physical therapy, medication, and shoulder mobility and pain exercises are frequent treatments [11]. Shoulder pain may signal underlying problems that need treatment [12]. SCI is a serious health issue with serious socio-economic consequences, especially in underdeveloped nations like Bangladesh. Shoulder pain and dysfunction affect SCI patients' daily lives. SCI patients need effective rehabilitation to address these issues and improve their quality of life [1, 7, 12]. Experimental research on scapular mobilization in Bangladeshi spinal cord injury patients can assist create tailored rehabilitation strategies and increase quality of life. Rehabilitation practitioners will also learn more. The study aims to evaluate the changes in pain level, range of motion, and shoulder function after the intervention and compare them with the control group.

Method

Scapular mobilization was tested on spinal cord injury and shoulder pain patients utilizing a pretest and posttest methodology. CRP in Savar, Bangladesh, did the study. The study included patients with full and incomplete spinal cord injury who were admitted to CRP for treatment and rehabilitation, had shoulder pain, were wheelchair users, willing to participate, between 10-70 years old, and had neurological level T2-L2. Hospital-based randomization using Microsoft Excel worksheet v10 selected 16 participants from an initial pool of 50 patients tested indoors at CRP. Severe secondary problems, brain injury or other injuries, mental disease, and physical inactivity were excluded. Using a VAS and Universal Goniometer, a questionnaire collected socio-demographic, injury-related, and pain and range of motion data. 8 weeks following the pretest, post-test data was gathered. The ethical review committees of Bangladesh Open University (BOU) and CRP's Research Monitoring & Evaluation department approved the research. Participants gave verbal consent and were anonymous. SPSS v22 with Excel for pie and bar diagrams analyzed data. Data cleansing and data type-based statistical testing were done. This study will assess whether scapular mobilization reduces shoulder discomfort in spinal cord injury patients, which may improve rehabilitation programs.

Intervention

The treatment entails sliding the scapula superiorly and inferiorly, rotating the shoulder (both internally and externally), and distracting the shoulder. Ten reps, two sets, three times a week for two weeks, with a thirty-second rest period between each set is planned. A licensed physical therapy practitioner will administer the treatment.

Table 1: FITT Principle (Intervention was given followed by FITT principle)

Mode of Mobilization	Frequency	Intensity	Time	Type
Gliding (superior & inferior)	3 times per week	10 repetitions 2 set	5 min	Gliding
Rotation(upward & downward)	3 times per week	10 repetitions 2 set	5 min	Rotation
Distraction	3 times per week	10 repetitions 2 set	5 min	Distraction

Results

Table 2: Socio demographic and Medical information

Variable	Values
Age	
(Mean±SD)	27.69 (±11.50)
Median	27
Mode	18
Maximum	52
Minimum	13
Gender	
Female	6%
Male	94%
Occupation	
Farmer	18.8%
Businessmen	6.3%
Day labor	12.5%
Student	37.5%
Unemployed	6.3%
Others	18.8%
Marital status	
Unmarried	50%
Married	50%
Causes of injury	
Fall from height	50%

Road traffic accident	37%
Fall of heavy object	13%
Skeletal level	
T7	6.3%
T8	6.3%
T9	6.3%
T11	18.8%
T12	31.3%
L1	12.5%
L2	6.3%
L4	12.5%
Neurological level	
T6	6.3%
T7	12.5%
T9	6.3%
T10	6.3%
T11	12.5%
T12	31.3%
L1	25%
ASIA	
Complete A	62.5
Incomplete B	12.5
Incomplete C	18.8
Incomplete D	6.3

The values of several variables connected to the population of people with spinal cord injuries are presented in the table. Age, gender, occupation, marital status, injuries sustained (both skeletal and neurological), and ASIA classification are all included. The majority of those hurt were male students, and the most common cause of injury was a fall from a great height. T12 was the most common skeletal level damaged, and it was also the most common neurological level. The vast majority of people were classified as A throughout all of ASIA.

Table 3: Comparison for Pain, Shoulder flexion, Shoulder abduction between pre and post-test group

Variable	Mean		Standard Deviation		Z value	P
	Pretest	posttest	pretest	posttest		
VAS	4.156	1.538	1.440	1.117	-3.521	0.001
Shoulder Flexion	167.00	176.81	10.237	5.369	-3.303	0.001
Shoulder Abduction	168.38	178.31	8.801	2.152	-3.189	0.001

Before and after a therapy or intervention, data on VAS (Visual Analog Scale) and shoulder flexion and abduction are presented in the table along with their respective means, standard deviations, Z values, and P values. These factors are measured at the beginning and end of the study. Negative Z values and very low p-values (0.001) demonstrate that both VAS scores and shoulder flexion and abduction significantly improved after the intervention.

Discussion

In the study, 16 people with a spinal cord damage and shoulder pain took part. The average age of the people in the test group was 27.69, and the standard deviation was 11.50. In the study, 6.3% of the people who took part were men. In an earlier study [13], the number of men who took part was lower. But in a different study [14], 84.3% of the people who took part were men. Most of the participants (50%) had only a primary education, while an earlier study [15]) found that a higher percentage of participants had a secondary education. Falls from a height were the most common way people got hurt (50%), followed by car crashes (37%), and then heavy things falling on them (12.5%). In another study [14], the most common cause was falling (30%), and the second most common cause was car accidents (55.7%). The study looked at different levels of injury in the spinal cord. T12 (31.3%) was the level with the most damage to the bones, and T12 (31.3%) was also the level with the most damage to the nerves. But another study [13] focused on T2-T8 and T9-T12 levels because people with T9-T12 level lesions have trunk muscle activity that helps them keep their posture and use their upper arms. Concerning the ASIA impairment scale, the study found that 62.5% of the people who took part were classified as full A, followed by 18.8% as incomplete C, 12.5% as incomplete B, and 6.3% as incomplete D. This matched what other studies [14,15] had found. The Wilcoxon signed-rank test results showed that the study showed that shoulder movement worked to reduce shoulder pain. Previous studies [16-17] also found that shoulder pain was common and that physical treatment helped reduce pain and improve shoulder joint movement. In short, the study gave information about the age, gender, cause of injury, level of schooling, and ASIA impairment scale of the people who had shoulder pain after a spinal cord injury. It also showed how shoulder movement can help reduce pain and improve flexion and abduction of the shoulder. But the study had some problems, like a small sample size and short follow-up times, which could make it hard to use the results in other situations. The study's weaknesses were a lack of generalizability as a result of its small sample size, restricted resources, and short duration of follow-up. Long-term efficacy and therapist bias were not evaluated in this study. In impoverished countries like Bangladesh, spinal cord injuries are common because of a lack of knowledge and understanding. Scapular mobilization is helpful for relieving the shoulder pain that often accompanies spinal cord injury. To enhance management and policymaking, further research is needed with larger, more representative samples.

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