



Original Article

Prevalence of Shoulder Pain and Disability in Adults Using Manual Wheelchair: A Cross-Sectional Study

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ABSTRACT

Shoulder soreness is a frequent complaint among people who use wheelchairs. Shoulder discomfort is the major prevalent region of musculoskeletal pain in persons with spinal cord injury (SCI) functional skills. **Objective:** To find out the prevalence of shoulder pain and disability in adults using a manual wheelchair in Pakistan. **Methods:** This is a cross-sectional study. After taking consent and ethical approval from UOL, this study was conducted on manual wheelchair users from at last three months of Lahore. It included both males and females of 25 above age. Shoulder pain disability index (SPADI) and the Wheelchair User's Shoulder Pain Index (WUSPI) will be used to collect data. The questionnaire was filled on the spot. **Results:** Out of total 127 participants, 48.8% were female and 51.2% were male. The mean age of the study subjects was 32.32±4.719 years. The prevalence of shoulder pain documented in 127 participants is 78% with moderate pain 27.6% and severe pain in 38.0%. There was mild disability in 29.9% of health care providers and moderate disability in 31.5% of wheelchair users. **Conclusions:** The findings of this study concluded that 78.7% prevalence of shoulder pain in manual wheelchair users and 69.3% shoulder disability in manual wheelchair users. As the duration of wheelchair usage increases the shoulder pain and disability also increase.

INTRODUCTION

Shoulder soreness is a frequent complaint among people who use wheelchairs [1]. Shoulder discomfort is the major prevalent region of musculoskeletal pain in persons with spinal cord injury (SCI) functional skills [2]. Shoulder complex innervations are controlled by the C7 and C5 nerve roots, as well as the brachial plexus [3]. Rotator cuff fatigue can occur when the biceps brachii, infraspinatus and supraspinatus are subjected to high peak force throughout the push phase, additionally at the beginning and conclusion of the recuperation phase. The infraspinatus and supraspinatus muscles get fatigued as a result of the increased strain, leading to significant upper humeral head movement [4]. Treede defined pain as "an unpleasant sensory and emotional experience associated with or

resembling that associated with, actual or potential tissue damage [5]. The rotator cuff muscles provide for precise control of uneven contracts to retain the shoulder in the glenoid during forceful movements that will otherwise result in dislocation. Common symptoms include limited range of motion and shoulder placement to avoid pain [6]. A disability is defined as any physical or mental impairment that makes it more difficult for the person with the condition to conduct particular tasks and interact with the environment around them [7]. Detecting shoulder pain and dysfunction in MWCUs is a crucial first step toward gaining a better knowledge of wheelchair propulsion dynamics, and it may assist in identifying the components that lead to pathology [8]. A manual wheelchair is described as a

manually operated or power-driven equipment designed primarily for use by an individual with a mobility limitation for the primary function of both indoor and outdoor, locomotion [9]. Shoulder pain in wheelchair users is caused by excessive use, weakness in shoulder internal, adduction, external rotation, and other factors. Increased complaints of shoulder discomfort in wheelchair users are also associated with poor trunk control. Patients with long-term shoulder discomfort may be more difficult to identify. Manual wheelchair use causes significant strain on the upper extremities, especially the shoulder, as a result of the recurrent loading caused by wheelchair propulsion as well as other daily activities including transferring and weight reduction chores [10]. The most prevalent disorders related to shoulder pain are glenohumeral instability, joint oedema, inflammation of the bursa, rotator cuff tear and shoulder impingement syndrome [11]. Such illnesses may be catastrophic for wheelchair users since they might make it difficult for them to remain physically active, jeopardizing their independence and quality of life. Obesity and cardiovascular pathology are two secondary health problems that can arise as a result of a lack of physical activity. Injury-induced structural changes in the shoulder can lead to chronic illnesses such as osteoarthritis, which causes joint degradation and may eventually need shoulder arthroplasty [12]. Shoulder pain makes it difficult to do things like pushing a wheelchair up steep hills, using ramps, and transferring from bed to wheelchair and vice versa [13]. Some of the shoulder-specific tests that have been carried out are as follows: To detect subacromial impingement, the Neer, Hawkins-Kennedy, and Yocum painful arc tests are utilized. The rotator cuff muscular integrity was assessed using the Jobs test, lift-off, and resisted internal and external rotation. Glenohumeral instability can be diagnosed with the Sulcus sign, Cofield test, occupational relocation test, and jerk test. Among the most often used are the Yergason, O'Brien, and scarf tests [14]. Additional evaluating techniques include: The WUSPI is a self-reported evaluation of 13 health-related quality of life functions (sleeping, housework, driving, work school activity, self-care, wheelchair mobility and transfer) [15] and Visual Analogue scale (VAS) is a measuring instrument to measure pain. It is an easy and recurrent method to assess pain with different intensities of pain and the efficacy of the treatment. The scale consists of 0-10 numerical. "0" means "no pain" and "10" means "Extreme pain" [16,17]. This study will help to provide an awareness of pain and functional disability due to the use of a manual wheelchair. In our country, new interventions or strategies to reduce the negative impacts of wheelchairs should be devised.

METHODS

This is a cross-sectional study. The sample was selected according to previously defined inclusion and exclusion criteria from the general population to observe the pain and functional disability due to the use of a manual wheelchair. The inclusion criteria for this study were Use of a manual wheelchair for a duration of at least 3 months, because of these reasons (Spinal Cord Injury, Spina Bifida, Amputation, Cerebral Palsy, Multiple Sclerosis, and Fracture), both healthy males and females of age between 25 to 40 years. Exclusion criteria were persons who have shoulder pain as a result of a fall on the damaged shoulder after SCI, and people who have pain referred from heart and pancreas, mental illness and severe systemic disease. Each participant filled out a survey on his or her disability duration of time in a wheelchair, age, gender, and dominant hand. Subjects who stated they were experiencing shoulder pain were asked questions regarding how their pain was acting and their shoulder complex was clinically examined. SPADI and WUSPI will be used to collect data. SPSS was used to examine the data. The mean and standard deviation of quantitative variables were determined. The frequency and percentage of qualitative characteristics were calculated.

RESULTS

In this current study total of 127 participants participated with a mean age of 32.32 ± 4.719 years. The minimum age was 25 years and the maximum age was 45 years. In this study, 65(51.2%) males and 62(48.8%) females participated. 117(92.1%) manual wheelchair users were right-handed and 10(7.9%) were left-handed (Table 1).

Age	
Mean \pm SD	32.32 \pm 4.719 years
Minimum	25.00
Maximum	45.00
Gender	
Frequency and Percentage	
Male	65(51.2%)
Female	62(48.8%)
Dominant hand use for manual wheelchair	
Frequency and Percentage	
Right	117(92.1%)
Left	10(7.9%)

Table 1: Descriptive statistics of demographic variables

In the current study, 48(37.8%) participants used wheelchair due to amputation and the duration of wheelchair was more than 1 year in 38(29.9%) of participants. The prevalence of shoulder pain using WUSPI questionnaire is 78.7% (Table 2).

Variables	Construct	Frequency	Percentage
Sport activity before using MWC	Yes	14	11.0%
	No	113	89.0%
Reason of using manual wheelchair	Fracture	36	28.3%
	Amputation	48	37.8%
	Spinal cord injury	27	21.3%
	Cerebral palsy	7	5.5%
	MS	9	7.1%
Duration of using manual wheelchair	3-6 months	25	19.7%
	7-9 months	27	21.3%
	10-12 months	37	29.1%
	> 1 year	38	29.9%
Any rehabilitation session done before	Yes	17	13.4
	No	110	86.6
Prevalence of shoulder pain using manual wheelchair (WUSPI)	78.7%		

Table 2: Prevalence of shoulder pain in manual wheelchair users

In the final Scoring of pain scale of SPAID, 15(11.8%) of wheelchair users had mild pain, 35(27.6%) had moderate pain, 49(28.0%) had severe pain and 1(0.8%) had the worst pain in the study. 38(29.9%) of manual wheelchair users had mild disability, 40(31.5%) had a moderate disability and 10(7.9%) had severe disability in the study. The prevalence of shoulder pain using SPADI is 78.7% and disability is 69.3% (Table 3).

Variables	Construct	Frequency	Percentage
Pain scale of SPADI	No pain	27	21.3%
	mild pain	15	11.8%
	moderated pain	35	27.6%
	severe pain	49	38%
	worst pain	1	0.8%
Disability scale of SPAID	no disability	39	30.7%
	mild disability	38	29.9%
	moderate disability	40	31.5%
	severe disability	10	7.9%
Prevalence of shoulder pain in manual wheelchair users (SPADI)	78.7%		
Prevalence of shoulder disability using manual wheelchair (SPADI)	69.3%		

Table 3: Prevalence of shoulder pain and disability in manual wheel chair users shoulder pain and disability index (SPADI)

DISCUSSION

Shoulder soreness is a common complaint among wheelchair users [1]. Shoulder discomfort is the most prevalent site of musculoskeletal pain in individuals with SCI who use manual wheelchairs (MWC), and its presence can considerably impede a person's functional skills [2]. Manual wheelchair use causes significant strain on the upper extremities, especially the shoulder, as a result of the recurrent loading caused by wheelchair propulsion as well as other daily activities including transferring and

weight reduction chores [10]. The result showed that 92.1% of participants used their right hand dominantly, 19.7% of wheelchair users used wheelchairs for 3-6 months, 21.3% used for 7-9 months, 29.1% used for 10-12 months and 29.9% used for > 1 year. Another contrast study stated that increasing the duration of wheelchair use causes the development of shoulder pain [18]. 37.8% of participants use a wheelchair due to amputation and 28.3% due to fracture. The result shows that 86.6% of participants do not do any rehabilitation sessions before. Visual Analogue scale (VAS) is a measuring instrument to measure pain. It is easy and recurrent method to assess pain with different intensities of pain and the efficacy of the treatment. The scale consists of 0-10 numerical. "0" means "no pain" and "10" means "Extreme pain". Results show that 11.8% of wheelchair users had mild pain, 27.6% had moderate pain and 28.0% had severe pain in the study. In the final Scoring of Disability Index of shoulder pain and disability index, 29.9% of manual wheelchair users had mild disability, 31.5% had moderate disability and 7.9% had severe disability in the study. Another comparable study conducted by Karal K Wessels et al., reported that 47 percent of individuals experienced shoulder discomfort, which was within the normal range [19]. In the current study, 11.5% of participants complained of mild pain, 27.6% had moderate pain and 39.4% had severe pain during activity according to Wheelchair User's Shoulder Pain Index (WUSPI). In contrast, another comparable study was conducted by Curtis KA et al., The prevalence and degree of shoulder discomfort during functional activities were substantially greater in tetraplegic patients than in paraplegic subjects [20]. Silfverskiold and Waters [14] reported that although 6 to 18 months after the beginning of SCI, 33% of patients with tetraplegia had moderate to severe functional impairment, whereas paraplegics had modest functional losses owing to shoulder discomfort [21].

CONCLUSIONS

The findings of this study concluded that there is a 78.7% prevalence of shoulder pain in manual wheelchair users and a 69.3% prevalence of shoulder disability in manual wheelchair users. As the duration of wheelchair usage increases the shoulder pain and disability also increase.

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