ORIGINAL ARTICLE

The Prevalence of Shoulder Pain in Spinal Cord Injury Patients Using Manual Wheelchair in KPK (Khyber Pakhtunkhwa)

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ABSTRACT

Objective: To determine the prevalence of shoulder pain in spinal cord injury patient using manual wheelchairs in Khyber Pakhtunkhwa.

Study Design: Cross sectional.

Place and Duration of Study: The study was carried out at Paraplegic Center Peshawar from 1st January 2014 to 30th June 2014.

Materials and Methods: A cross sectional survey using convenience sampling method was used to determine the prevalence of shoulder pain in spinal cord injury patients using manual wheelchair at Paraplegic Center Hayatabad Peshawar. A total of one hundred and fifty traumatic paraplegic and tetraplegic patients using manual wheelchair post two weeks were included in this study. Wheelchair user shoulder pain index (WUSPI) was used as data collection tool. Descriptive statistic was applied. Frequencies and percentages were calculated for identifying the responses of patients to different questions, for level of injury, and identifying the prevalence.

Results: A total of one hundred and fifty (150) manual wheelchair user tetraplegic and paraplegic spinal cord injury patients were included in this study. Among them 84% were male while 16% were female. The prevalence of shoulder pain was 34.7% while performing different activities in manual wheelchair users. From patient's responses, it was declared that shoulder pain was most common while pushing on inclined surfaces and ramps, pushing the wheelchair for 10 minutes or more, sleeping on the shoulder and transferring from bed into wheelchair. While at rest 89.3% of the subjects were free of pain.

Conclusion: Most of the traumatic spinal cord injury (SCI) manual wheelchair users (MWUs) complain of shoulder pain during the course of their rehabilitation program. Shoulder pain restricts most important activities of daily living like pushing wheelchair on inclined surfaces, ramps and transferring from bed to wheelchair and wheelchair to bed.

Key Words: *Manual Wheelchair User, Spinal Cord Injury, Shoulder Pain, Wheelchair User Shoulder Pain Index.*

Introduction

Any kind of neural disturbance in the spinal cord whether from trauma or disease is called spinal cord injury.[1] According to the Standards for Neurological Classification published by the American Spinal Injury, the term complete injury means no preservation of motor and/or sensory function more than 3 segments below the neurological level of injury while the Incomplete injury means some preservation of sensory and/or motor function more than 3 segments below the neurological level of injury.[2]

Spinal Cord Injury (SCI) is a devastating event that brings significant changes in life of the victims as well as their family. Presently there is no SCI registry at national level in Pakistan. Therefore, there is no accurate estimate of the number of individuals who suffer from SCI in Pakistan every year.

The research on epidemiology of traumatic SCI in Pakistan is very limited. About 650-750 spinal cord injuries occurred in October 2005 in Pakistan.[3] Globally around 90 million individuals are suffering from spinal cord injury (SCI). In developed countries SCI incidence ranges from 1 to 5 persons per 100,000.[4] The most common causes of spinal cord injury are automobile accidents (31.5%), fall from height (25.3%), gunshot injury (10.4%),motor cycle accidents (6.8%) and diving (4.7%).[5] The Manual

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wheelchair ((MWC) is a potential enabling technology for mobility impaired people.[6] The MWC is a source of mobility and support to the body. It facilitate activities of daily living (ADL), self-care and recreation activities.[7] In United States, around 1.7 million people were using wheelchair in 2000 in which 1.5million were MWUs (manual wheelchair users).[8] The lifelong dependency of SCI patient on MWC for their ADLs causes repetitive loading of shoulder joint and consequently results in shoulder pain.[9] The upper extremity repetitive use, high forces and awkward posture leads to shoulder impingement in MWCUs.[10] Also the increase weight, high seat position and prolong disability may lead to shoulder pain in these patients.[4] Shoulder pain in MWCUs may result from shoulder impingement (75%), rotator cup tears (65%), aseptic humeral head necrosis (22%), tendinitis and bursitis.[11] Epidemiological studies have revealed that shoulder pain is common in MWC users and its prevalence ranges from more than 32–78%.[12] Two third of MWUs complain of shoulder pain after five years of injury.[13] After 20 years of injury almost all of MWCUs complain of shoulder pain.[9] A study has reported that shoulder pain prevalence in tetraplegic is 59%and 42% in paraplegic MWCUs SCI patient.[14] Shoulder pain in manual wheelchair users result into decrease quality of life.[15] Initially MWC users ADLs may not be affected so much but later on it may result early fatigue, low level of endurance, lower work potential and reduced cardiopulmonary endurance.[16] The Wheelchair Users Shoulder Pain Index (WUSPI) is a 15 item tool for assessing shoulder pain while at rest and during activity. The pain intensity is measured through a 10cm line with zero (0) representing no pain and ten (10) representing the worse pain experienced on the basis of the past week activities.[17]

Spinal cord injury patients exclusively rely on upper limb for weight bearing activities like transfer and wheelchair propulsion, so it is necessary to keep them aware of proper wheelchair use, shoulder loading and shoulder complication in order to keep them functional in society.[18]

Shoulder pain in spinal cord injury patients in Pakistan is under reported and up to author's knowledge no research has been found on this topic in Pakistan. This study was designed to determine the prevalence and study different aspects of shoulder pain experienced by spinal cord injury patients in Khyber Pakhtunkhwa (KPK), using manual wheelchairs.

Materials and Methods

A cross sectional survey was designed to identify the prevalence of shoulder pain in manual wheelchair users. The study was carried out at Paraplegic Center Peshawar from 1st January 2014 to 30th June 2014. A total of 150 subjects both male and female with traumatic SCI using MWC were included in this study. It was mandatory that subject have completed two weeks rehabilitation training in paraplegic center Peshawar and Rafsan neuro rehab center Peshawar and currently.

Data was collected using WUSPI with the help of follow up program team of paraplegic center Peshawar and some subject were directly interviewed in Rafsan neuro rehab center Peshawar and paraplegic center Peshawar. WUSPI is a 15-items questioner specifically designed for independent MWCUs scored from zero to ten with zero representing no interference of pain with daily activity and ten represents complete interference.

Inclusion criteria was independent Manual wheelchair users, patients of both gender with traumatic spinal cord injury, C5 and below level Quadriplegics subjects, age 18 -59 years, completed at least 2 weeks rehabilitation in an inpatient center.

Subjects with any of the following were excluded from the study: paraplegic and Quadriplegics not using MWC, progressive diseases Paraplegics, above C5 level Tetraplegic, patients with age range below18 years and above 60 years, , PWC (power wheel chair) user subjects, subject having shoulder pain from a history of fall on affected shoulder after SCI, subject experiencing referral pain from any other part of the body, subjects that are dependent for wheel chair propulsion and transferring.

The WUSPI was used for data collection which is a standard valid questioner. The covering letter was send along with the questioner to explain purpose of the study to the subjects. Willing participants filled consent form and questionnaire.

SPSS version 20 was used for data analysis. Descriptive statistic was applied. Frequencies and percentages were calculated for identifying the

responses of patients to different questions, for level of injury, and identifying the prevalence.

Results

The wheelchair user shoulder pain index (WUSPI) was used for data collection. A total of one hundred and fifty (150) manual wheelchair user tetraplegic and paraplegic spinal cord injury patients were included in this study. Among them 84% were male while 16% were female. The age limit was from 19 to 58 years. Among all 86.7% of the subjects were manual wheelchair users from one to five (1-5) years while the 13.3% were using wheelchair from the past five to twenty years. Among the total recruited patients there were 64% with thoracic, 28% with lumber and 7% with cervical level of spinal cord injury patients. The shoulder pain noticed was as following.

About 10.7 % of the subject reported shoulder pain even at rest while 89.3% of the subjects were free of shoulder pain while at rest. The prevalence of shoulder pain with wheelchair related activity was 34.7%. The shoulder pain was most common (41.3 %.) while pushing on inclined surfaces and ramps. Among all 20% of the participants reported mild shoulder pain when pushing their wheelchair for ten minutes or more. Some of the patients (24%) reported that they feel pain while washing their back while 17.3% reported that they feel pain during transferring from bed into wheelchair. The prevalence of shoulder pain while sleeping was 18.7%.The subjects were asked to mark their pain level on a 10cm line of visual analog scale (VAS) according to their pain intensity while performing activities. The severity of the pain on VAS was graded as"no pain, worse pain ever experienced and activity not performed".

Table I: Rehabilitation duration of the study population (n= 150)

Years of Rehabilitation	Frequency	Percent
0-5	130	86.7
5-20	20	13.3
Total	150	100.0

Table II: Level of injury of the study population (n= 150)

Level	Frequency	Percent
Thoracic	97	64.7
Lumbar	42	28.0
Cervical	11	7.3
Total	150	100.0

Table III: Pain at rest and on activity

Shoulder pain at rest		
	Frequency	**Percent**
No	134	89.3
Yes	16	10.7
Total	150	100.0
Activity related shoulder pain		
	Frequency	**Percent**
No	98	65.3
Yes	52	34.7
Total	150	100.0
Shoulder pain while pushing on inclined surfaces and ramps		
	Frequency	**Percent**
No pain	69	46.0
Mild	62	41.3
Not performed	10	6.7
Moderate	8	5.3
Worst pain ever	1	.7
Total	150	100.0
Shoulder pain while transferring from bed into wheelchair		
	Frequency	**Percent**
No pain	118	78.7
Mild	26	17.3
Moderate	2	1.3
Worst pain ever	2	1.3
Not performed	2	1.3
Total	150	100

Discussion

Postspinal Cord Injury (SCI) life expectancy of the patient has improved as a result of advancement in medical care and followed up in specialized unit. The SCI patient are compelled to go through repetitive weight bearing activity through their upper limb(UL) joints as a compensation for paralyzed lower limb (LL) and trunk muscle while performing different activity of daily life (ADL), as a consequence, they develop shoulder joint pain at some stage of their life.

Very less number of patients (10.7 %) reported shoulder pain at rest while 34.7% reported shoulder pain with wheelchair related activities. Most of the participants (41.3%) reported shoulder pain while pushing wheelchair on inclined surfaces and ramps.

This study results revealed that 89.3% of the SCI patients have no pain while it rests. A similar results were obtained from a study conducted it the United Kingdom by Dorsett (2001) showed that among SCI

manual wheelchair users 80% have no shoulder pain while at rest.[19] This study's result showed that 41.3% of the clients experienced Shoulder pain while pushing on inclined surfaces and ramps. These finding were supported by a study conducted by subbarao et al (1955) who conducted a study to find the prevalence of wrist and shoulder pain in SCI patients and find that wheelchair transfer and propulsion activity exacerbated most of the shoulder pain in MWUs.[19] This study result showed that pushing the wheelchair for 10 minutes or more produced shoulder pain in 20% of patients. These finding were supported by a study conducted by Salisbury et al (2006) and reported that wheelchair propulsion is the main cause of shoulder pain.[15] Also Curtis et al, (1999) conducted a study about shoulder pain in wheelchair user tetraplegic and paraplegic patients and reported that most of the wheelchair users complain of shoulder pain while propelling on ramps, inclined surfaces.[17] This study result showed that 17.3% of patients were having pain during transferring from bed into wheelchair,8% of patients have pain in transferring from wheelchair to a tub or shower and 6.7% of patients have shoulder pain while transferring from wheelchair to a car. These finding were supported by a study conducted by Gellman et al where they revealed that25% of the patient complain shoulder pain in post-traumatic weight bearing UL while transferring activities.[18] A survey has reported that 31 to 73% shoulder pain in wheelchair users rehabilitated patients increases continuously up to 20 years and then it begins to declines.[11] A study from the United Kingdom by Dorsett (2001) showed that among manual wheelchair users 80% did not reported shoulder pain while at rest.[19] Shoulder pain should be treated at priority it may later restrict patient's ADLs.

Table IV: Prevalence of spinal cord injuries

Authors	Sample	Number of subjects	Prevalence	Outcome measure used
Ballinger et al (2000)	P and T	89	30%	FIM
Salisbury et al (2003)	T	40	85%	101 point, numerical, Rating Scale
Bayley et al (1987)	P and T	94	30%	Self-report
Curtis et al (1999a)	P and T	195	T=59%, P=42%	WUSPI

Conclusion

This study concludes that the prevalence of activity related shoulder pain was high than pain at rest as many participants were having pain during activity. This study also concludes that most of the manual wheelchair users with spinal cord injury experience shoulder pain in activities which put more load on their shoulder joint and rotator cuff muscles, like profiling on inclined surfaces and transferring from bed to wheelchair. Most of the patient experience shoulder pain in their later years of rehabilitation.

Recommendations

This study recommends that the proper wheelchair training and upon experience of shoulder pain; proper treatment should be taken to facilitate further wheelchair use and combat immobility. Patients should be taught not put abnormal weights on the shoulder and always ask for assistance for activities that demands high forces.

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