Shoulder Pain among Rehabilitated Spinal Cord Injured Persons Using Manually Propelled Wheelchairs in the Gaza Strip: A Survey

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ABSTRACT

Shoulder pain among paraplegic persons has negative effects on their lives. The prevalence of shoulder pain among persons with spinal cord injury (SCI) varies from 30% to 70% in different studies and may be related to repetitive use of the shoulder during self-care and wheelchair-related activities.

Purpose: *This study focused on the prevalence of shoulder pain and examined its effects on activities of daily living and social participation, and on functional, work and recreational or athletic activities. It also aimed to detect the degree of satisfaction with shoulder functioning in wheelchair users who were paraplegic due to spinal cord injury, in the Gaza strip.*

Methods: *Cross sectional study design was used to collect data from 80 persons with paraplegia, post rehabilitation, who were still using manual wheelchairs (MWC) for ambulation. After giving informed consent, the selected persons were interviewed directly in their homes, and filled questionnaires which included demographic data, Wheelchair User's Shoulder Pain Index (WUSPI) and Shoulder Rating Questionnaire (SRQ).*

Results: *The prevalence rate of shoulder pain among paraplegics who use manual wheelchairs was 62%. Pushing a wheelchair for 10 minutes or more, and propulsion up ramps or inclines outdoors were the most common activities that caused and exacerbated shoulder pain. Sixty four percent from among the study sample mentioned that they had no limitation in shoulder-using ability during daily personal and household activities, while the rest experienced different degrees of limitation. Seventy-four percent reported no limitation during recreational or athletic activities, while the rest (26%) agreed that pain*

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has variably limited their participation in these activities. Fourteen percent from the sample rated the overall degree of satisfaction with their shoulder functioning as fair, and the rest rated their satisfaction from good to excellent.

Conclusion: *Shoulder pain, ranging from mild to severe, was highly prevalent among SCI paraplegics who use MWCs during their usual activities, and other activities which involve wheelchair propulsion. About two- thirds of the subjects reported no limitation in shoulder use during daily personal and household activities and in recreational or athletic activities.*

Key words: *Shoulder pain, Spinal cord injury, Paraplegia, Manual wheelchair*

INTRODUCTION

There is a lack of information on the topic of shoulder pain in persons using manual wheelchairs in the Arab region. There do not appear to be any studies that the researchers are aware of, that have been conducted to determine the extent of shoulder pain and its consequences among paraplegics in the Gaza strip, factors which constrain their activities in the community and affect their quality of life. Moreover, it is thought that the number of persons with SCI in the Gaza strip increased during the Al Aqsa Intifada due to the use of excessive force and explosive ammunition against Palestinian civilians. Most of affected persons have become completely dependent on wheelchairs for mobility and Activities of Daily Living (ADLs). Unfortunately this large group of persons with disabilities is usually overlooked and their pain is not taken seriously.

SCI is an acute and devastating event, resulting in significant and permanent life changes for the injured individuals. Worldwide, approximately 90 million people currently have SCI, and the incidence in developed countries varies from one to five persons per 100,000 (Holtz & Levi, 2006). The most common causes of injuries are motor vehicle accidents (50%), followed by falls (22%), acts of violence - primarily gunshot wounds (11%), and recreational sporting activities (8%) (Somers, 2001; Lin et al, 2003). SCI results in a complete or partial loss of motor and/or sensory function below the level of injury. It causes extensive functional impairment, compelling many persons to use wheelchairs (Bjerkefors, 2006).

Due to the extensive costs involved in the rehabilitation process, non-governmental organisations and various charitable societies have come forward to provide free services for persons with physical disabilities. The wheelchair is conventionally distributed to persons unable to walk. It is still considered a simple and all-purpose

ambulatory device, and is most commonly used due to its excellent manoeuvrability within a confined space, as well as the effective propulsion interface which provides the user with maximum feedback and control (Brubker et al, 1984).

Paraplegic persons have traditionally been rehabilitated with the use of wheelchairs for functional locomotion and sports practice. Many wheelchair users experience pain in the upper limbs, especially in the shoulders. It interferes with essential daily activities, such as propelling the wheelchair, driving, dressing, and transferring themselves, so that some of them request other people for help. Based on epidemiological studies, it seems evident that manual wheelchair propulsion and wheelchair-related daily life activities cause a heavy load on the upper extremities, especially for persons with cervical spinal cord injury, and more than two-thirds of manual wheelchair users with SCI report suffering or having suffered shoulder pain (Curtis et al, 1999).

Upper limb pain as a result of MWCs propulsion may occur as early as five years post- SCI. More than 70% of persons who have been paraplegics for over 20 years, experience shoulder pain that may result in a loss of functional independence (Sie et al, 1992). Other suggested risk factors for the development of shoulder pain are the duration of injury, age (e.g. older people have a higher risk than younger people), higher body mass index (BMI) (Boninger et al, 2001), and wheelchair propulsion style (Boninger et al, 2002).

Surveys involving as many as 450 wheelchair-based individuals found that 73% report some degree of chronic upper-extremity pain, which they attribute primarily to wheelchair propulsion and transfers (Subbarao et al, 1995).

OBJECTIVES

The objectives of this study were to focus on the prevalence of shoulder pain, to determine its effects on activities of daily living and social participation, and on functional, work and recreational or athletic activities, and to detect the degree of satisfaction with shoulder functioning among spinal cord injured paraplegic wheelchair users in the Gaza strip.

METHOD

Cross sectional study design was used to attain the objectives of this study, since it is quick and economical when the researcher's time and resources are limited (Pilot & Hungler, 1999).

Sample

The study population included both adult male and female paraplegics, with traumatic or non-traumatic SCI and currently using manual wheelchairs. The sample was chosen from El Wafa Medical Rehabilitation Hospital archives. A total of 123 persons were contacted and their informed consent was obtained for participation in this study. Thirty subjects were chosen to pilot the Arabic version of the questionnaires and were excluded from the main study. A total of 80 subjects formed the final sample of the study - 9 did not respond and 4 were excluded because they did not meet the study's criteria of inclusion.

Inclusion Criteria

The participants who met the study criteria were male or female persons with traumatic or non- traumatic spinal cord injury (paraplegics), aged between 18 -59 years, who had experienced at least 2 weeks of in-patient rehabilitation before discharge from hospital. They had been at home for at least 6 months prior to this research, and currently were users of manually propelled wheelchairs.

Exclusion Criteria

Paraplegics with progressive diseases or psychological problems, those who were able to walk or use a walker, and persons under 18 and over 60 years of age were excluded from the study.

Interview

On giving their consent, participants were interviewed face to face in their homes, for 15 to 25 minutes. The researchers recorded information on general demographics (age, gender, residence and educational level), occupation, period of in-patient rehabilitation and particular disability, etc. The following questionnaires were then administered to all:

Wheelchair User's Shoulder Pain Index: The Wheelchair User's Shoulder Pain Index (WUSPI), a reliable and valid 15-item questionnaire, was developed specifically for manual wheelchair users who are functionally independent (Curtis et al, 1995). It measures how shoulder pain has interfered with different daily activities, such as transferring, wheeling, and self-care. Each item is scored from 0 to 10, with 10 representing shoulder pain that has completely interfered with activity during the past week. One derives a total score by adding the item scores and dividing by a possible total of 10 for each item answered. Subjects answered each question by marking an "X" on a 10-cm visual analog scale anchored at "no

pain" to "worst pain ever experienced." If a question did not apply, subjects were asked to mark "NA".

Shoulder Rating Questionnaire (SRQ): The SRQ is an outcome tool that is more typically used in the general orthopaedic setting. The SRQ overall score reflects the severity of symptoms and the functional status of the shoulder, and comprises various domains: global assessment, pain, daily activities, recreational and athletic activities, and work. This tool is valid and reliable (L'Insalata et al, 1997). The satisfaction score, used as the third outcome measure in this scale, is an additional item in the SRQ.

Data Entry and Statistical Analysis

With the help of expert statisticians, the researchers entered the data from 80 questionnaires, using Statistical Package for the Social Sciences (SPSS).

The data were analysed, and the statisticians recommended the usage of Spearman Correlation Coefficient for measuring the internal consistency. The significance level set 'p' at less than 0.05. Spearman Brown coefficient and split half methods were used for measuring reliability of the paragraphs of questions, and Chi-Square test to test if there was a significant agreement in ranking among different perceptions.

RESULTS and DISCUSSION

Population Characteristics

As seen in Table 1, 80 manual wheelchair users with paraplegia, from among the 93 subjects of the eligible population, participated in this study with a response rate of 86%. They ranged in age from 18 to 59 years, the majority were male (85%) and there were fewer females (15%). Fifty percent of the participants received 2-3 months of rehabilitation, 32.5% received less than 2 months, and 17.5% received more than 3 months of in-patient rehabilitation.

The study results resemble those obtained by other researchers, which show higher trends of SCI among males and the younger population (Alaranta et al, 2000; Jackson et al, 2004; NSCID, 2005).

Fifty- one percent of the subjects were single at the time of collecting data, and about 46% were married (1.3% got married after injury), in keeping with NSCID (2005) reports that most people with SCI have never been married at the time of injury (51.8%), with the reduced likelihood of getting married after injury.

Table 1: Population Characteristics (n=80)

Variable	Class	Frequency	Percent
Age	Less than 30 years	42	52.5
	30-40 years	23	28.8
	More than 40 years	15	18.8
Gender	Male	68	85.0
	Female	12	15.0
Marital Status	Married	37	46.3
	Single	41	51.3
	Divorced	2	2.5
Period of in-patient rehabilitation	Less than 2 months	26	32.5
	2-3 months	40	50.0
	More than 3 months	14	17.5
	Primary	19	23.8
Level of education	Prep	11	13.8
	Secondary	37	46.3
	University	13	16.3
Monthly Income (financial situation)	Less than 250$	74	92.5
	250$ - 375$	2	2.5
	375$ - 500$	2	2.5
	More than 500$	2	2.5
Living area	City	50	62.5
	Camp	24	30.0
	Rural	6	7.5
	Traumatic	69	86.25
	Gunshot (G.S)	33	41.25
	Falling Down (F.D)	14	17.5
	Road Traffic Accident (R.T.A)	13	16.25
	Explosives	7	8.75
Cause of injury	Violence	2	2.5
	Non-traumatic	**11**	**13.75**
	Tumor	**4**	**5**
	Congenital	**4**	**5**
	Infections	**3**	**3.75**

As shown in Table 1, the percentage of traumatic injuries (86%) was high in comparison to non-traumatic injuries (14%), and gunshot (accounting for about 41%) was the major cause, followed by falling down (17.5%), and road traffic accidents (about 16%). These findings contradict most epidemiological studies which consider road traffic accidents to be the foremost cause of traumatic SCI, and falling as the next cause (Somers, 2001; Lin, 2003; NSCID, 2005).

Shoulder Pain Related to Activities of Daily Living

The researchers used the Wheelchair User Shoulder Pain Index (WUSPI), to determine the activities that cause and exacerbate shoulder pain among wheelchair users. Pushing the wheelchair for 10 minutes or more was considered to be the most common cause of shoulder pain, followed by propulsion up ramps or inclines outdoors, performing ADLs at work, school or home, performing various transfer techniques, loading the wheelchair into a car, and lastly, dressing (Table 2).

Table 2: Weight mean of the shoulder pain for members of the sample study

No.	Item	Mean	Standard Deviation	Weight Mean	Rank
How much shoulder pain did you experience when					
1	Transferring from a bed to a wheelchair	1.101	1.899	11.0	5
2	Transferring from a wheelchair to a car	1.013	1.784	10.1	7
3	Transferring from a wheelchair to the tub or shower	0.975	1.776	9.7	8
4	Loading your wheelchair into a car	0.333	0.577	3.3	13
5	Pushing your chair for 10 min or more	2.519	2.791	25.2	1
6	Pushing up ramps or inclines outdoors	2.423	2.656	24.2	2
7	Lifting objects down from an overhead shelf	0.763	1.737	7.6	9
8	Putting on pants	0.667	1.551	6.7	10
9	Putting on a T-shirt or pullover	0.595	1.335	5.9	12
10	Putting on a button-down shirt	0.228	0.973	2.3	14
11	Washing your back	0.763	1.513	7.6	9
12	Performing usual daily activities at work or school	1.250	0.957	12.5	3
13	Driving	0.628	1.604	6.3	11
14	Performing household chores	1.194	2.053	11.9	4
15	Sleeping	1.039	2.215	10.4	6
	All paragraphs	1.114	1.433	11.1	

These findings were supported by those of Subbarao et al (1995), who designed a study to determine which activities caused or exacerbated the shoulder pain, and assessed functional and emotional responses to chronic pain. It was found that wheelchair propulsion and transfers caused the most pain, and increased the degree of pain as well. Gironda and his colleagues (2004) reported that shoulder pain intensity was most severe during the performance of wheelchair-related mobility and transportation activities. Along the same lines, Gellman et al (1988) found that 25% of paraplegics complained of shoulder pain during transfer activities. In contrast, Curtis and Black (1999) determined that the highest intensity of shoulder pain was reported during household chores and activities, propulsion up ramps or inclines, lifting things overhead, and while sleeping. In the current study these activities ranked at 4th, 2nd, 9th and 6th places respectively. Similarly, while Salisbury et al (2006) found that the most painful activity was lifting an object from overhead, it ranked 9th in this study.

Prevalence of Shoulder Pain

Table 3: Degree of shoulder pain during activities and rest

Degree of pain	Usual pain in the shoulder during activities		Usual pain in the shoulder at rest		Sleep difficulties at night due to shoulder pain	
	Frequency	Percent	Frequency	Percent	Frequency	Percent
Very severe	0	0.0	0	0	2	2.5
Severe	4	5.0	0	0	7	8.8
Moderate	12	15.0	2	2.5	6	7.5
Mild	33	41.3	10	12.5	11	13.8
None	31	38.8	68	85.0	54	67.5
Total	**80**	**100.0**	**80**	**100.0**	**80**	**100.0**

As shown in Table 3, 62 % of the subjects reported shoulder pain during their usual activities. The pain ranged from mild (41%) to severe (5%) but it was relieved by rest. 56% of the subjects experienced from mild to moderate shoulder pain. This high prevalence rate was similar to figures in many studies all over the world, which ranged from 30% to 70% (Nicholas et al, 1979; Curtis et al, 1999; Curtis & Black, 1999). Moreover there is a relation between shoulder pain during activities and level of education (p-value=0.019) as revealed in Table 4.

Table 4: Population Characteristics and Shoulder Pain

Shoulder pain at rest		Shoulder pain during activities		Shoulder pain which makes sleep difficult at night		Severity of shoulder pain	
Chi-square	**p-value**	**Chi-square**	**p-value**	**Chi-square**	**p-value**	**Chi-square**	**p-value**
4.478	0.345	2.908	0.82	10.861	0.21	6.638	0.356
0.623	0.732	1.755	0.625	3.589	0.465	9.774	0.021
2.766	0.598	7.563	0.272	11.237	0.189	6.291	0.391
3.217	0.522	2.906	0.814	5.415	0.712	3.796	0.704
5.472	0.485	19.9	0.019	16.182	0.183	17.638	0.04
19.746	0.003	13.105	0.158	8.86	0.715	9.738	0.342
1.319	0.858	5.142	0.526	7.139	0.522	7.486	0.278

Eighty percent of the subjects did not complain of any shoulder pain while at rest. Since shoulder pain is alleviated by resting, this could lead to reduced social participation by manual wheelchair users. Further, 67.5% of the participants had no sleep difficulties, and there was no correlation between shoulder pain at rest and financial situation (p=0.003).

When persons with SCI suffer from shoulder pain, their mobility and daily activities are further limited by this ''secondary'' disability. Unlike the average person who experiences shoulder pain, they are not able to rest their shoulders, as the upper limbs are required for all activities of daily living.

The findings show that 2.5 % of the participants had difficulty sleeping every night, 8.8% had difficulty sleeping several nights a week, 7.5% had difficulty one night a week, and 13.8% found it difficult to sleep at night less than once per week. About 67.5% of the participants did not suffer from difficulty in sleeping at night. Eighty- six participants had no difficulty in combing or brushing their hair, ten (12.5%) experienced mild difficulty and one person (1.3%) had moderate difficulty due to shoulder pain. Eighty percent of the subjects had no difficulty in reaching overhead shelves, while 20% experienced difficulty ranging from mild to severe. This is in contrast to reports by Salisbury et al (2006), who found that the most painful activity was lifting an object from overhead.

Recreational and Athletic Activities

About 74% of the subjects described the functioning of their shoulders during recreational or athletic activities as having no limitation, 16% had mild limitation

and 10% had moderate to severe limitation, as shown in Table 5. A high percentage of participants (81.3%) recorded the absence of any limitation while throwing a ball as a part of a sporting activity, while 12.5%, 2.5% and 3.8% from among them had mild, moderate and severe limitations respectively. The majority (75%) denied experiencing any limitation during recreational and athletic activities and 25% of them had variable degrees of limitation..

Table 5: Recreational and Athletic Activities

	How would you describe the functioning of your shoulder?		How much difficulty have you had throwing a ball overhand or serving in tennis due to your shoulder?		The degree of limitation at shoulder due to activities	
	Frequency	Percent	Frequency	Percent	Frequency	Percent
Very severe limitation; unable	0	0.0	0	0.0	1	1.3
Severe limitation	4	5.0	3	3.8	0	0.0
Moderate limitation	4	5.0	2	2.5	3	3.8
Mild limitation	13	16.3	10	12.5	16	20.0
No limitation	59	73.8	65	81.3	60	75.0
Total	**80**	**100.0**	**80**	**100.0**	**80**	**100.0**

The researchers did not find studies concerning recreational and athletic activities for persons with SCI in the region. Owing to the situation in the Gaza Strip, there are no real opportunities for recreational and athletic activities to be carried on continuously, and there is a shortage of place for persons with disabilities to participate safely.

Table 6: Work and Employment

During the past month, what has been your main form of work?	**Frequency**	**Percent**
Paid work	9	11.3
Housework	2	2.5
Schoolwork	10	12.5
Unemployed	54	67.5
Disabled due to your shoulder	3	3.8
Disabled secondary to other causes	0	0.0
Retired	2	2.5
Total	**80**	**100.0**

Sixty- seven percent of all subjects were unemployed. Of the 26.3% who had jobs, the distribution was as follows: 11.3% have paid work, 2.5% do housework and 12.5% are occupied with school work. Four percent (3.8%) were unable to perform any job due to pain in the shoulder and 2.5% had retired soon after the injury. Moreover, there is a relation between main form of work and age, gender, marital status, level of education, and living area (p= 0.023, 0.024, 0.012, 0.00, 0.00 respectively).

The number of subjects who continue to hold jobs and earn a living is a lower figure than those cited in many studies. In more recent studies, the percentage of persons still working has improved and ranges from 31% to 48% (Siösteen et al,1990; Murphy et al,1997). In the US, less than 30% of the 18 to 62 year- old persons with traumatic SCI were employed ((Hunt et al, 1999). Levi et al (1996) reported that 46% of their study population, consisting of persons with SCI living in the Stockholm area in Sweden, were employed.

Dorsett (2001) found that the employment of the respondents dropped from the pre-injury figure of 83% employed to only 14% employed immediately following discharge from hospital. Almost half the respondents (46%) were fully dependent on government- funded income support, with 70% of them having an income of less than 400$ per fortnight at the time of discharge from hospital. Three years post- discharge from hospital, almost 40% of the sample continued to report income of less than 400$ per fortnight.

Dalyan and his colleagues (1999) found a significant association between employment status and upper limb pain. Unemployment was higher (21.4% versus 7.1%) and full-time employment was lower (20% versus 45.2%) in persons with upper limb pain as compared to those without pain.

In the present study, there was a relation between the main form of work and age, gender, marital status, level of education and living area, but there was no relation between the main form of work and period of in-patient rehabilitation and income, since p-value was greater than 0.05. However there was a relation between inability to do usual work because of the shoulder and income, since p-value was less than 0.05 (Table 6).

Individuals who have higher levels of education are consistently identified as having a better chance of being employed. This outcome may also be influenced by the fact that higher levels of education may prepare people for occupations that are less physically demanding. It has also been suggested that engaging in educational activities post-injury are a significant predictor of employment (Tomassen et al, 2000). This indicates that low educational level in the current

research (only about 16% had university education) is one of the main problems faced by most paraplegics in the present study.

Although most of the sample population in this study were young and had less severe injury, a lower rate of employment was found. This is contradictory to what DeVivo and Richards (1992) reported, namely, that people with less severe injuries (i.e. incomplete injuries or paraplegia) have a greater chance of re-entering the workforce, and those who are younger at the time of injury have a better chance of becoming employed post injury. It is possible that the low level of education among persons with SCI in this study population would further decrease their chances of finding a job.

Many of the factors identified as predictors of employment for spinal cord injured persons are biographical characteristics such as age, gender, or race, and as such are not amenable to intervention by rehabilitation professionals. Education and transport issues are the easily addressed issues that will directly impact the individual. Other issues require intervention at a policy or societal level (Dorsett, 2001).

Table 7: Work Activities

	How often were you unable to do any of your usual work due to pain?		How often were you unable to do your work efficiently due to shoulder pain?		How often did you have to work a shorter day because of your shoulder?		How often did you have to change the routine in your work due to pain?	
	Frequency	Percent	Frequency	Percent	Frequency	Percent	Frequency	Percent
All days	2	9.5	0	0.0	0	0.0	0	0.0
Several days per week	1	4.8	1	4.8	1	4.8	2	9.5
One day per week	0	0.0	2	9.5	1	4.8	2	9.5
Less than one day per week	1	4.8	1	4.8	0	0.0	1	4.8
Never	17	81.0	17	81.0	19	90.5	16	76.2
Total	**21**	**100.0**	**21**	**100.0**	**21**	**100.0**	**21**	**100.0**

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Among 21 subjects, 17(81%) were able to do their usual work carefully or as efficiently as they could, 2 subjects (9.5%) were unable to do any of their usual work on all days, 1 person (4.8%) could not do any of the usual work several days per week, and 1 person was unable to do the usual work less than one day per a week.

Five percent of the participants worked a shorter day because of shoulder pain several days per week, 4.8% worked a shorter day because of shoulder pain one day per week, but surprisingly, 90.5% of those employed did not cut short their working days for any length of time during the week.

From these findings, it is concluded that just 17 subjects (about 21% of the total sample) were able to work efficiently, without any trouble causing them to cut short their work day.

On account of the shoulder, nine and a half percent of the participants change the usual way of working several days per week, 9.5% of the participants change the usual way of working one day per week, 4.8% of the participants change the usual way of working less than one day per week, and 76.2% of the participants never change the usual way of working.

No relevant studies regarding the workplace of persons with traumatic or non-traumatic SCI in this region were found.

Table 8: Population Characteristics and Work

Variable	The main form of work		Inability to do usual work because of the shoulder		Inability to do work as carefully or as efficiently because of the shoulder		Working a shorter day because of the shoulder		Changing the usual way of working because of the shoulder	
	Chi-square	p-value	Chi-square	p-value	Chi-square	p-value	Chi-square	p-value	Chi-square	p-value
Age	20.735	0.023	5.676	0.64	5.676	0.46	4.421	0.352	8.063	0.234
Gender	12.956	0.024	4.138	0.247	4.138	0.247	3.592	0.166	1.706	0.636
Marital Status	22.67	0.012	5.437	0.143	5.435	0.143	2.432	0.296	3.961	0.266
Period of in-patient rehabil-itation	14.485	0.152	8.172	0.226	8.172	0.226	6.858	0.144	4.644	0.59

Level of education	54.252	0	13.245	0.152	13.245	0.152	10.684	0.099	10.565	0.307
Income (financial situation)	22.486	0.096	21.654	0.01	1.163	0.999	0.52	0.998	1.544	0.997
Living area	38.726	0	5.194	0.514	14.066	0.029	10.852	0.028	14.795	0.022

There was no relation between inability to do work as carefully or as efficiently because of the shoulder and age, gender, marital status, period of inpatient rehabilitation, level of education and income, since p-value was greater than 0.05, but there was a relation between inability to do work as carefully or as efficiently because of the shoulder and living area, since the p- value was less than 0.05 and vice versa regarding working a shorter day due to the shoulder (Table 8) .There was relation between working a shorter day because of the shoulder and living area, and no relation with other variables.

Degree of Satisfaction about Shoulder Function

Degree of satisfaction was distributed between fair to excellent, with 35% rating their overall degree of satisfaction as very good, 25% as good, 26.3% as excellent and 13.8 % as fair. There is a relation between overall degree of satisfaction with the shoulder, and marital status (p= 0.048).

Table 9: Degree of Satisfaction about the Shoulder

Overall degree of satisfaction with your shoulder?	Frequency	Percent
Poor	0	0.0
Fair	11	13.8
Good	20	25.0
Very good	28	35.0
Excellent	21	26.3
Total	80	100.0

Table 10: Relationship between Overall Degree of Satisfaction with the Shoulder and Population Characteristics

Variable	Overall degree of satisfaction with the shoulder	
	Chi-square	p-value
Age	8.19	0.224
Gender	1.711	0.634
Marital Status	12.693	0.048
Period of in-patient rehabilitation	0.934	0.988
Level of education	10.541	0.309
Income (financial situation)	9.184	0.42
Living area	4.408	0.622

Twenty five of the subjects (31%) chose daily personal and household activities, and the same percentage chose work, as a first priority to be improved, followed by 15 subjects (19%) wishing for improvement in shoulder pain and the same number (19%) wishing for less limitation in recreational and athletic activities. Twenty five of the subjects (31%) chose daily personal and household activities and the same number of subjects (31%) also chose recreational and athletic activities as the number two priority that they wished to be improved, followed by work (22.5%), and shoulder pain (15%).

These finding revealed that the subjects' first priority for improvement was daily personal and household activities, followed by work, and recreational and athletic activities. There was relation between overall degree of satisfaction with the shoulder and marital status, since p-value was less than 0.05 (Table 10).

Study Limitation

- Research scales were unavailable in Arabic, so translation and back-translation were needed.
- The sample population in this study was composed of rehabilitated adults with paraplegia, so this is not representative of those rehabilitated in out-patient centres and of children with injuries.

- Lack of safety due to the complex political situation, especially in remote areas near the borders, closure of the Gaza Strip, electricity breakdowns, and escalation of paper cost delayed the study process.
- The archives in El Wafa Medical Rehabilitation and Specialised Surgery Hospital were incomplete before the year 2000.
- No database of persons with disabilities, especially about SCI persons, is available in Palestinian territories.
- Some individuals were living in out- of- reach areas.
- There were changes in participants' personal data such as telephone number and address.

CONCLUSION

The study revealed that the sample of persons with SCI were mainly male (85%), and approximately half of the respondents were young (52.5% under 30 years of age), and single (51%). About two- thirds of them were unemployed. Shoulder pain which ranged from mild to severe, especially during their usual activities, was prevalent among paraplegics (62%) who use MWCs, but it was relieved at rest, while 15% of the subjects suffered from mild to moderate shoulder pain.

There was a relationship between shoulder pain among adult paraplegic manual wheelchair users and activities related to wheelchair propulsion. The activities that cause and exacerbate shoulder pain the most were pushing the wheelchair for 10 minutes or more, followed by propulsion up ramps or inclines outdoors, performing usual daily activities at work or school, performing household chores and transferring from a bed to a wheelchair.

RECOMMENDATIONS

- Further research about the prevalence of shoulder pain among out-patient rehabilitated persons with SCI and among children with SCI, which was not included in this study, is needed.
- There is a need to implement environmental adaptations for streets and crossings, as well as the entrances of all institutions to be more suitable for persons with disabilities.
- Studies are needed on the quality of life among those with shoulder pain.

- Studies are needed to answer the following questions: a) what are the treatment options to relieve pain, and b) do psychological factors have any effect on shoulder pain and treatment.
- The researchers recommend that the government and decision makers should allocate adequate budgets for tertiary rehabilitation.
- There is a need for further experimental research about the types of shoulder pain and specific causes concerning the shoulder pain.
- Advocacy is needed for the right of those with SCI to have specialised places for sporting and recreational activities.
- Implementation of the 5% quota for employment of persons with disabilities should be emphasised.

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