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## Activity limitation and Community integration among adults with spinal cord injuries in Gaza Strip

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2004-4861

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**"A thesis submitted in partial fulfillment of the requirements for  
the degree of master in community mental health:  
Rehabilitation sciences"**

2009 م - 1430 هـ

# بِسْمِ اللَّهِ الرَّحْمَنِ الرَّحِيمِ

قال تعالى:

{ يرفع الله الذين آمنوا منكم والذين أوتوا العلم دَرَجَاتٍ  
والله بما تعملون خبير }

سورة المجادلة: (آية 11)

## **Abstract**

### **Background and Purpose:**

This study aimed to assess activity limitation (AL) and community integration (CI) among adults with spinal cord injury, and to study factors that may affect CI for spinal cord injury patients in Gaza Strip (GS).

### **Study design and methodology:**

A cross-sectional design was used in this study. It included 120 adults with spinal cord injury (SCI), 105 males and 15 females living in the community for at least three months after the injury. The researcher used non-probability convenience sampling. The data collected using a structured interview questionnaire to assess CI and the functional independence measure (FIM) to assess AL in the period from 8 March to 20 June 2008. Collected data was entered and analyzed using SPSS (for significance testing, Chi-Square statistical test was used).

### **Results:**

The mean age of the individuals in this study was 34.9 years. A great percent of them shows high level of CI 58.3% and independency in Activity of Daily Living (ADL) including self-activities, shopping, banking, and transportation 65%. There is no significant relationship between the level of education, level of injury and AL, while other factors as age, gender, marital status (MS), cause of injury, type of injury there is no relationship. There is significant statistical relationship between gender and the level of injury and CI,  $P=0.029$ , while other variables as age, gender, MS, cause of injury, type of injury and duration of living with SCI has no significant statistical relationship with CI. There is very strong statistical significant relationship between AL and CI,  $P= 0.001$ .

### **Conclusion:**

The study concluded that most of the individuals with SCI have High level of CI and independency in ADL, there is relationship between AL and CI, as the most independent individuals with SCI the high level of CI. The level of education and the level of injury, the higher level of education the higher level of independency, also affect the independency level. Individuals with cervical level lesion show the lowest level of CI and more dependency in the ADL. Concentration on achieving independency in ADL during the rehabilitation period is of great importance in the outcome of CI after discharge to home, and improving the level of education of the same importance.

## ملخص الدراسة

### أهداف الدراسة:

هدفت هذه الدراسة لتقييم مستوى الإعاقة الحركية و الدمج الاجتماعي لدى مصابي الحبل الشوكي ودراسة العوامل المحتمل تأثيرها على عملية الدمج الاجتماعي، والخروج بتوصيات من خلالها يمكن زيادة مستوى الدمج الاجتماعي و تقليل المخاطر والعوامل التي من شأنها زيادة تأثير الإعاقة على مصابي الحبل الشوكي في قطاع غزة.

### منهجية الدراسة:

استخدم الباحث دراسة مقطعية وصفية، تمت في المجتمع المحلي، في قطاع غزة.

### الإجراءات:

استخدم الباحث استبانة لقياس مستوى الدمج الاجتماعي و أداة قياس الاستقلال الوظيفي (FIM) كأدوات لجمع المعلومات من خلال المقابلة المباشرة مع مصابي الحبل الشوكي في قطاع غزة وكانت الاستجابة عالية جدا باستثناء شخص واحد رفض المشاركة. وقد شملت عينة الدراسة مصابي الحبل الشوكي الذين يعيشون في المجتمع منذ ثلاثة شهور فأكثر من بعد تلقيهم خدمات تأهيل، وشملت عينة الدراسة البالغين فوق 18 سنة من كلا الجنسين حيث بلغ عدد العينة 120 شخص منهم 105 رجال و 15 نساء. واستخدم الباحث البرنامج الإحصائي SPSS في تحليل البيانات.

### النتائج:

أظهرت الدراسة أن متوسط العمر للمشاركين في هذه الدراسة كان 34.9 سنة بانحراف معياري 12.225 كما أن مصابي الحبل الشوكي لديهم نسبة عالية من الدمج الاجتماعي حيث بلغت 58.3%. أما بالنسبة للنشاطات فقد أظهرت النتائج أن نسبة كبيرة بلغت 65% من مصابي الحبل الشوكي مستقلين تماما في جميع نشاطات الحياة اليومية، مع وجود علاقة ذات دلالة إحصائية بين مستوى التعليم ومستوى الإصابة من جهة والإعاقة الحركية من جهة أخرى. و أوضحت الدراسة أن الجنس و مستوى الإصابة لهما تأثير مباشر على عملية الدمج الاجتماعي مع وجود علاقة ذات دلالة إحصائية بينهما أما بقية العوامل، العمر، سبب الإصابة، الفترة ما بعد الإصابة، مستوى التعليم، الحالة الاجتماعية، نوع الإصابة، فلا يوجد علاقة ذات دلالة إحصائية مع الدمج الاجتماعي. وأظهرت الدراسة وجود علاقة قوية بين الإعاقة الحركية و الدمج الاجتماعي عند مستوى دلالة 0.001.

### الخلاصة:

خلص الباحث إلى، أن أكثر من نصف عينة الدراسة لديهم مستوى عالي من الدمج الاجتماعي و الاستقلالية في نشاطات الحياة اليومية مع وجود تأثير للإعاقة الحركية على عملية الدمج، ويوصى بتخريج المرضى من مستشفيات التأهيل بأقصى درجة من الاستقلالية مما يكون له المردود الايجابي الكبير على نتائج عملية الدمج الاجتماعي، وضرورة رفع مستوى لتعليم لهذه الشريحة من الناس.

بِسْمِ اللَّهِ الرَّحْمَنِ الرَّحِيمِ

## Dedication

**I would like to dedicate this work with my deep love to:**

**The Infinite Spring of Giving (My Mother),**

**The Light of the Heart (My Wife),**

**The Smile of my Life (Ahmad, Ne'eman and Osama).**

**My Colleagues and Real Friends**

**For their constant & endless love and support.**

**The researcher**

**Mohammad H. Kraizem**

## **In the name of Allah, the Beneficent, the Merciful**

### **Acknowledgements**

First of all, praise be to Allah, the lord of the world, and peace and blessings of Allah be upon the noblest of all Prophets and messengers, our prophet Muhammad, all thanks for Allah who granting me the help and capability to complete this thesis.

The work presented in this thesis was accomplish under the supervision of Dr. Khamis Elessi, and Dr. Jameel Etahrawi to whom I present my esteemed respect and I offer them my great thanks and appreciation for their patience, support and continuous guidance for me throughout my research.

Special thanks and appreciation to Dr. Ala'a Ibrahim and to all those who helped me in reviewing the questionnaire.

I would like to express my deep thanks and gratitude to the administration of El-Wafa Rehabilitation Hospital who helped me to complete this study.

I would like to express my deep thanks and gratitude to my colleagues in society of physically handicap physiotherapy department at GS, who were involved in helping me to undertake my study, without whose cooperation this study would not have been possible.

Finally yet importantly, I am particularly grateful to my family specially my wife for their unlimited support and encouragement, as without them I would have not been able to complete this work.

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### List of Abbreviations

<b>Abbreviations</b>	<b>The interpretation</b>
ADL	Activity of Daily Living
AL	Activity limitation
CI	Community integration
CIQ	Community integration questionnaire
FIM	Functional independence measure
GS	Gaza Strip
ICF	International classification of functioning
MPDL	El Movimiento por la Paz 9 Spanish association

MS	Marital status
QOL	Quality of life
SCI	Spinal cord injury
UMNs	Upper Motor neurons
LMNs	Lower Motor neurons
SD	Standard Deviation

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# **Chapter one**

## **Introduction**

## 1.1.Introduction:

SCI in general has become increasingly common worldwide, It's common cause traumatic, mainly road accidents, and other violence injuries, substantial financial consequences due to management of its' consequences are very high. Many studies was done focusing on the CI of SCI individuals.

SCI individuals continue the process of learning in the community, more or less, to adapt to and negotiate the conflicting paths and challenges in their respective communities and surroundings. When tackling the ways and extent to which individuals with SCI have or have not achieved CI, we have to understand what the concept of CI is and what success of integration means.

Individuals with SCI present unique challenges to health care providers. Major goal for them is to return to their community and resume their pre-injury activities, including return to their job, playing back their active role in the family, etc.

SCI is the main cause of disability in young adults. There is an estimate of 250,000 to 400,000 individuals with SCI in the United States. The annual incidence is approximately 11,000, accounting for thirty new injuries every day. The average age at injury is 38 years, which is the most productive period of life, with a higher incidence among men (78%), (NSCISC, 2003).

The most common cause of injuries is motor vehicle accidents 54%, (Apple & Hudson, 1990). Unfortunately there are no epidemiological studies prove the prevalence of SCI and the proportion among all types of SCI in GS, but I think that traumatic SCI is more than non-traumatic SCI, and gunshot wounds and/or explosive wounds of the spine are a major cause of SCI among Palestinians, due to Israeli terrorists attacks and worse entire events.

The effects of SCI depend on the type and level of injury. SCI can be divided into two major types of injury: complete and incomplete according to the American Spinal Injury Association (ASIA) impairment scale. The most common injury levels are cervical (C1 to C8), Thoracic (T1 to T12) and Lumbar (L1 to L5) levels. SCI results in a complete or partial loss of motor and/or sensory function below the level of injury. An SCI causes extensive functional impairment compelling many persons to wheelchairs usage (Bjerkefors, 2006).

The most common cause of death is respiratory ailment, whereas, in the past it was renal failure. An increasing number of people with SCI are dying of unrelated causes such as cancer or cardiovascular disease, similar to that of the general population. Mortality rates are significantly higher during the first year after injury than during subsequent years. (NSCISC, 2003).

## **1.2.Objectives**

### **General objective:**

To investigate the AL, CI and the related factors that may affect for SCI individuals.

### **The specific objectives are to:**

1. To assess the level of AL and CI for individuals SCI individuals.
2. To study the impact of socio-demographic factors on CI for SCI individuals .
3. To discuss the impact of injury related factors on CI for SCI individuals .

## **1.3.Research question:**

AL and CI is of great importance in the life of the individuals with SCI, for that the researcher set related questions to the topic of the study, in the study he tried to answer them to know the AL and CI.

1. What is the level of AL for SCI individuals ?
2. What is the level of CI among adults with SCI?
3. Is there a relationship between AL and CI for SCI individuals ?
4. What are the differences between the injury related factors and CI for SCI individuals ?
5. Is there a difference in the level of CI for SCI individuals related to Socio demographic factors?

## **1.4.Significance of the study**

From the researcher's experience in the field of Rehabilitation for 13 years, He noticed that most of spinal cord injured patients face difficulties in the process of integration in the community, when they are discharged from Rehabilitation hospitals, in which, all the facilities are available, meaning that, the patients lives in a very easy and adapted environment, and the rehabilitation staff besides the family take great care for this patient during the hospitalization period which will makes him satisfied, and they face few difficulties within that protected environment which can be easily coped by help of others.

However, when they are discharged home they find it hard to cope with the environment that they normally live in, and despite the fact that some of them can cope with these obstacles; others may regress and enter into a bad psycho-social state that will be reflected in their future health. So if they fail to overcome the obstacles they face, this will reflect on their pattern of life, their quality of life(QOL) is decreased, and the level of

satisfaction after SCI is decreased, they most of the time feel shame of being outside home, so they prefer to spend their time alone, away from other people, this will lead to many complications like pressure sores and respiratory complications which is life threatening, so keeping individuals with SCI healthy, and away from complications means good QOL, life satisfaction and CI. Most of individuals with SCI used to be productive persons before the injury, and keeping them productive after discharge is the mission of the society.

It has been known since many centuries that almost every society has a collection of many negative & positive attitudes towards the disabled. (Delisa J. et. al, 1998). In the ancient times, disability was looked at, as a punishment from god and a disgrace to the family and all disabled persons will be killed or starved to death or in the best circumstances will be gathered and secluded in a remote place away from the society.

In our religion (Islam), it has been the first doctrine to give the disabled their rights and give them equal share in the societal roles in both challenges and rewards. Currently, the societies especially in the Middle East and in the poor Arab countries, disabled are not given their opportunities to blend into the society. Their chances are limited and the society look at them as inferior individuals who need help from others most of the time.

Now, we know of many examples of disabled people who succeeded in their roles in the society likes. The famous spiritual Palestinian leader, freedom fighter Sheik Yassin, the number one physicist is a quadriplegic physicist Stephen Hawking, Dr. Taha Hussein and many others.

The social acceptance for this patient also affects his integration as he feels that he is isolated from his society that will affect his psychological status.

They may develop complications such as pressure sores, deep venous thrombosis or respiratory complications. Therefore, successful integration measured by good status of health, and independent living free of complications, is important as they still the same persons with the same minds after injury.

So no doubt that the SCI individuals have the right to live normally as human beings, as most of them belong to the youth population.

According to the MPDL survey on (2003), studying the disability in GS shows the following:

- \* 127 cases with SCI screened in Gaza city make up 1.6% of the cases found.
- \* 0.032% of the population in Gaza city, approximately three people in every 10000.
- \* 72% of SCI cases are males, whereas 28% are female.



Therefore, a great emphasis was given to this topic to improve the quality of life and successful CI for these people, as they represent a great cost to the government throughout their life, and these expenses increase when accompanied with complications. Note there is no statistics of the average yearly expenses in Palestine for SCI so we can use this average below while taking in consideration the difference of the social and economical levels between the countries. Here is an example of the costs in the U.S.A in the table (1.1) below:

**Table (1.1.) costs table of SCI in USA**

Average Yearly Expenses per SCI individual (2003) by US dollars		
Severity of Injury	First Year	Each Subsequent Year
High Tetraplegia (C1-C4)	\$682,957	\$122,334
Low Tetraplegia (C5-C8)	\$441,025	\$50,110
Paraplegia	\$249,549	\$25,394
Incomplete Motor Function at any Level	\$201,273	\$14,106

From the above table expenses of individuals with SCI is very high especially in the 1st year after injury, most of these expenses for medical supplies and treating of complications occurred in the society, so good level of CI means less expenses, good productivity for such people.

## **1.5.Study background:**

### **1.5.1. History and Political context of Palestine:**

Living in Palestine, which is a piece of land considered as a battlefield of continuous war since 1929, due to its position on the crossroads from Africa to Asia made it a target for occupiers and conquerors over the centuries. The last of these was Israel who occupied the GS from Egyptians in 1967. These frequent wars were met by various shapes of resistance since the British mandate on Palestine through 1948, and the establishment of Israel on the Palestinian land, and crossing the first Intifada in 1987 until reaching the Al-Aqsa intifada in 2000 against the occupation, huge numbers of Palestinians got injured, big percent of them were left with permanent disability, one of these disabilities is due to SCI.

### **1.5.2. Geography of Palestine**

Palestine has an important geographic and strategic location; it is located at the southwestern part of Asia at the eastern coast of the Mediterranean Sea in the Middle

East, Syria and Jordan from the East, Lebanon from the North, the Gulf of El Aqaba from the south and, Egypt and Mediterranean Sea on the West, border historical area of Palestine. The total area is 27000 square kilometer, while the Palestinian territories occupy only 6257 square kilometer, of them 5879 square kilometer in the west of Jordan River, and 378 square kilometer, in GS with 50 Km long and 5-12 Kilometers wide.

GS is a narrow piece of land located on the coast of the Mediterranean Sea; it is 362 square kilometer as in the map of Palestine, (See annex 1). The GS is divided into five governorates: North, Gaza, Midzone, Khan Younis and Rafah. There are four villages and eight refugees camps (PASSIA, 2007)

### **1.5.3. Demography of Palestine:**

The population number in Palestine is estimated at 3.7 million in midyear 2007. Out of this total number, 2.3 million reside in the West Bank and 1.4 million in GS representing 63% and 37%, respectively, (PCBS, 2008). 42.6% of the population in Palestinian territories is refugees. The majority of GS population is refugees (75%) and 40% of them live in the camps. In GS, the population density in the refugees' camps is one of the highest in the world (UNRWA, 2006).

In the population pyramid the age group 15-60 years (the working age) represents about 49.6%, the annual growth rate of GS was 2.8%, and life expectancy at birth was 70.7 years for males and 73.8 years for females (MOH,2004-c). The population of GS is concentrated in three cities, five small villages, and eight refugee camps that contain two thirds of the population of GS (PCBS, 2008). In GS, the population density is 3000 inhabitants/ km<sup>2</sup> and the prevalence of disabled population is about 3 % according to the 2006 census of Palestinian Ministry of Health in the year 2006 (PCBS, 2008 & MOH, 2006).

### **1.5.4. Socioeconomic status:**

The Palestinian economy refers to the economy of the Palestinian territory; including GS, West Bank and East Jerusalem. Current political events have severely damaged the Palestinian economy due to halting the international aid. MOH, 2004 reported that the GS is considered one of the lowest incomes in the Middle East area. The majority of the income comes from salary of the employees and security persons, while the agriculture products share by reasonable portion in the economy. The economy now a day mainly depends on international donors that are suspended. International aids were funding some projects and paid the salaries. The economic situation is usually especially after Al-Aqsa Intifada because of frequent closure and restriction of trade. The deteriorating economic situation, limited income and lack of work opportunities lead to low standard of living and inadequate health facilities. Despite poverty the Palestinians are eager to learn, literacy ratio (2004) among those aged 15 years and more is 92.3% (male: 96.5%, female: 88%) which is considered among the highest percentage of literacy rates of Arab countries (PASSIA,2007).

### **1.5.5. Health and Rehabilitation in GS:**

This slice of people received medical management in different places in Palestine or a broad, but during Al-Aqsa intifada they mostly receive their Rehabilitation program in GS, and the only specialized inpatient and nationally recognized center for rehabilitation in GS is El-Wafa Medical Rehabilitation and Specialized Surgery Hospital. It is a non-stock, non-profit Palestinian NGO, established in 1996 to offer medical rehabilitation services for cases recovering from post acute physical and cognitive disabilities through in and out patient departments. The Rehabilitation team includes rehabilitation doctors, nurses, physiotherapists, occupational therapists, speech and communication therapy specialists and psychologist. The capacity of inpatient department 50 beds, designated for different wards, including male, female and children. After discharge of the individuals, a notification system allows professionals at the community based rehabilitation program to further supervision of the discharged individuals.

There are different societies work in the field of rehabilitation of the individuals with SCI in the society, many governmental and non-governmental clinics in each area in GS, PT clinics related to government and UNRWA and Private clinics.

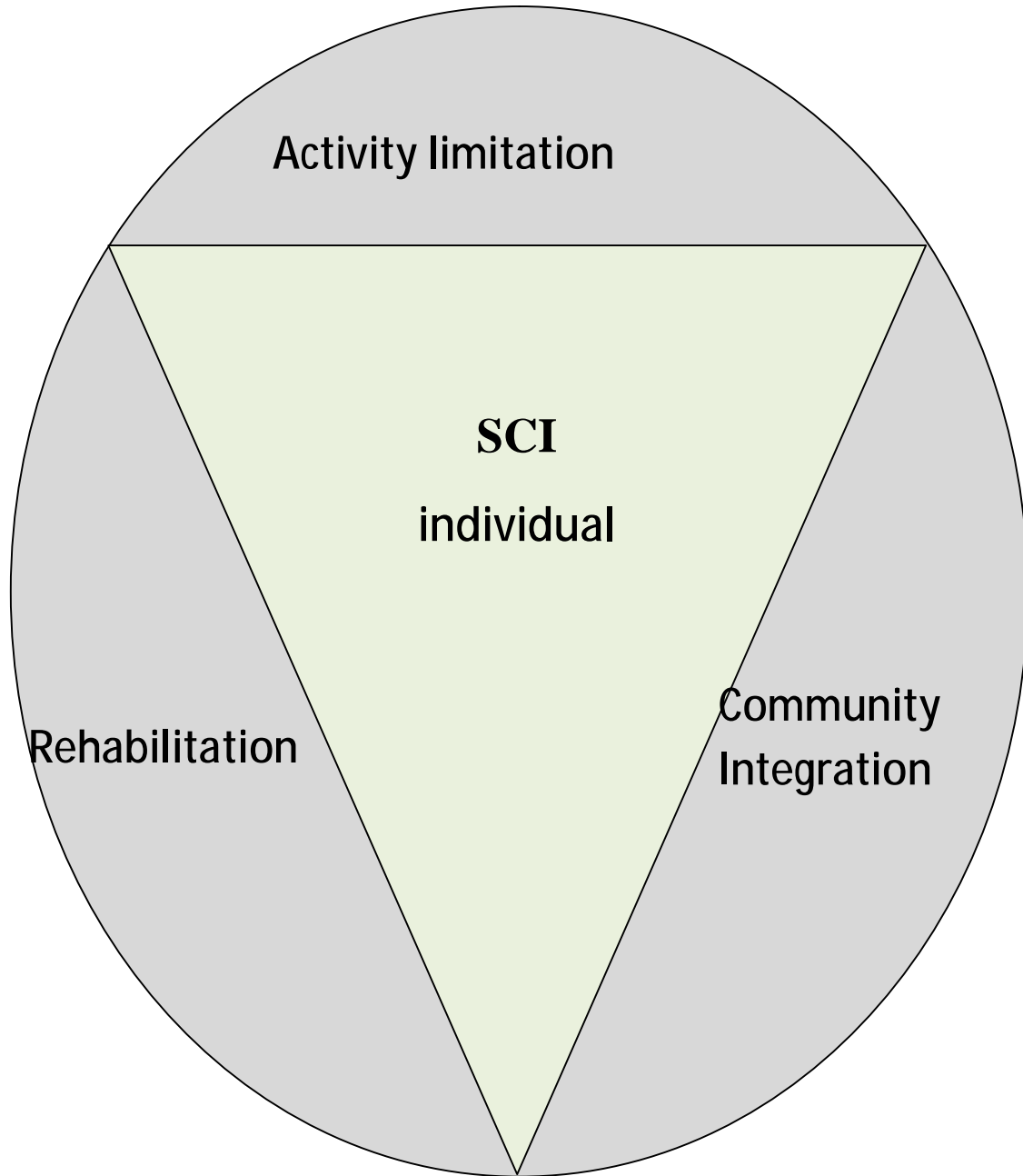
There is many societies work in the community based rehabilitation program (CBR) programs in GS, which is works with rehabilitation of individuals with SCI, to reintegrate them in the society and to live there life normally. The National Society for Rehabilitation is a specialized NGO CBR organization; work in the field of CBR since 1990, with localized area in GS, then the spread through different areas in GS from Rafah to Gaza city. While in the northern area of GS, there is independent CBR program belonged to the Palestinian Medical Relief Society, which established in the 2000, to serve people with disabilities including SCI, and other different disabilities.

This study was conducted in GS on individuals with SCI living in the community , The purpose of this study is to determine the impact of level of injury, severity of injury (complete or incomplete), age, marital status and gender on activity limitations and CI among adults with spinal cord injury.

# **Chapter two**

## **Theoretical background**

**Conceptual framework of AL and CI among individuals with SCI.**



## **2.1. Spinal cord injuries**

### **2.1.1. Anatomy and functions of the spinal cord**

The spinal cord is about 18 inches long and extends from the base of the brain, (foramen magnum) down the middle of the back, to about the waist line. Moreover, the major bundle of nerves carries nerve impulses to and from the brain to the rest of the body. The brain and the spinal cord constitute the Central Nervous System. Motor and sensory nerves outside the central nervous system constitute the Peripheral Nervous System, and another diffuse system of nerves that control involuntary functions such as blood pressure and temperature regulation are the Sympathetic and Parasympathetic Nervous Systems. (Martini, 1989).

The nerves that lie within the spinal cord are upper motor neurons (UMNs) and their function is to carry the messages back and forth from the brain to the spinal nerves along the spinal tract. The spinal nerves that branch out from the spinal cord to the other parts of the body are called lower motor neurons (LMNs). These spinal nerves exit and enter at each vertebral level and communicate with specific areas of the body. The sensory portions of the LMN carry messages about sensation from the skin and other body parts and organs to the brain. The motor portions of the LMN send messages from the brain to the various body parts to initiate actions such as muscle movement. (Snell, 1978 & Jackson, 2006).

Rings of bone called vertebra surround the spinal cord. These bones constitute the spinal column or vertebral column (back bones). The spinal column (or vertebral column) extends from the skull to the pelvis and is made up of 33 individual bones termed vertebrae (Figure 2.1). The vertebrae are stacked on top of each other group into four regions, (ASIA, 2003).

In general, the higher in the spinal column the injury occurs, the more dysfunctions an individual will experience. The vertebrae are named according to their location. The seven vertebrae in the neck are called the Cervical Vertebrae. The top vertebra is called C-1; the next is C-2, etc. Cervical SCI usually cause loss of function in the arms and legs, resulting in quadriplegia. The twelve vertebra in the chest is called the Thoracic Vertebrae. The first thoracic vertebra, T-1, is the vertebra where the top rib attaches. (Bradley, et al, 1996).

Injuries in the thoracic region usually affect the chest and the legs and result in paraplegia. The vertebrae in the lower back between the thoracic vertebrae, where the ribs attach, and the pelvis (hip bone), are the Lumbar Vertebrae.

The sacral vertebrae run from the Pelvis to the end of the spinal column. Injuries to the five Lumbar vertebrae (L-1 thru L-5) and similarly, injury to the five Sacral Vertebra (S-1 thru S-5) generally result in some loss of functioning in the hips and legs. (Jackson, C. 2006).

### **2.1.2. Spinal Cord Injury (SCI)**

SCI is any damage to the spinal cord integrity that results in a loss of function such as mobility or feeling. Frequent causes of damage are trauma or disease. The clinical pictures vary according to the extent and location of the lesion. The spinal cord does not have to be severed in order for a loss of functioning to occur. In fact, in most people with SCI, the spinal cord may seem intact, but the damage still results in loss of functioning. (Martini, 1989).

In the other hand a person can "break their back or neck" yet not sustain a SCI if only the bones around the spinal cord (the vertebrae) are damaged, but the spinal cord is not affected. In these situations, the individual may not experience paralysis after the bones are stabilized.

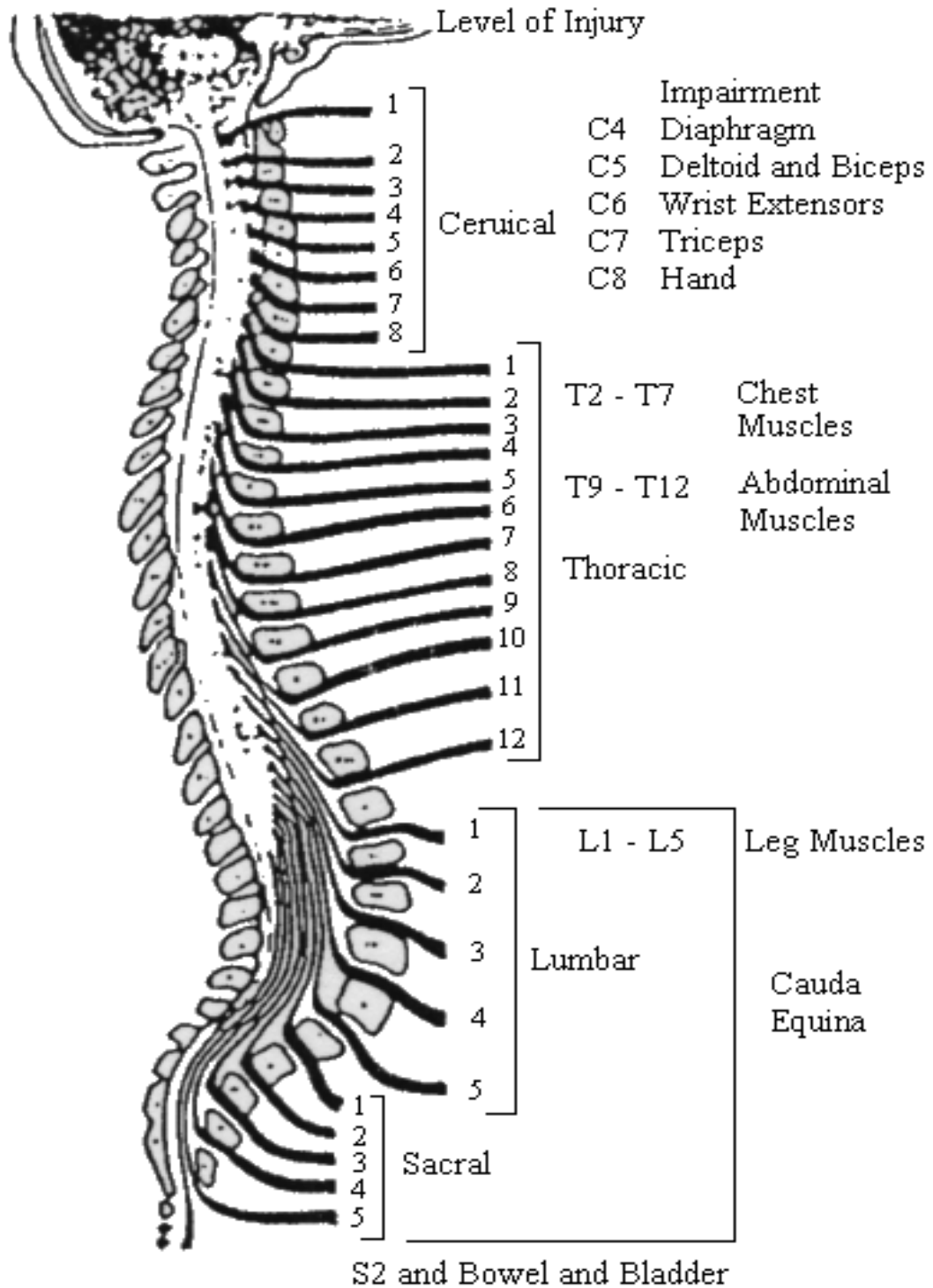
### **2.1.3. SCI levels**

When SCI occur, neurologists diagnose it exactly by localizing the area of injury (level of injury) and the severity (completeness) of the injury, and they may classify it according to the criteria of American Spinal Cord Injury Association (ASIA).

#### **The vertebral level and segmental level**

As we know from the anatomy of the spinal cord that is surrounded by rings of bones called vertebrae, within the spinal canal of these vertebrae the cord passes. The spinal cord has neurological level which is defined by the spinal roots enters and exit, which don't necessarily corresponds to the bony level, (figure 2.1). The vertebral level as the injury of the cord at the level of vertebrae. (Bradley, et al, 1996).

Figure 2.1:





Dermatome refers to the area of the skin innervated by the sensory axons with each segmental nerve (root). Myotome refers to the collection of muscle fibers innervated by the motor axons within each segmental nerve (root).

Vertebral segments consist of eight cervical, 12 thoracic, 5 lumbar, and five sacral vertebrae. The spinal cord segments are not necessarily situated at the same vertebral levels defines the thoracic vertebrae.

For example, while the C1 cord is located at the C1 vertebra, the C8 cord is situated at the C7 vertebra. While the T1 cord is situated at the T1 vertebra, the T12 cord is situated at the level of T8 vertebra. The lumbar cord is situated between T9 and T11 vertebrae. The sacral cord is situated between the T12 to L2 vertebrae.

The spinal roots for C1 exit the spinal column at the foramen of atlanto-occiput junction. The spinal roots for C2 exit the spinal column at the atlanto-axis. The C3 roots exit between C2 and C3. The C8 root exits between C7 and C8. The first thoracic root or T1 exits the spinal cord between T1 and T2 vertebral bodies. The T12 root exits the spinal cord between T1 and L1. The L1 root exits the spinal cord between L1 and L2 bodies. The L5 root exits the cord between L1 and S1 bodies. (Bromley, 1998).

The Cauda Equina in human, the spinal cord ends at L2 vertebral level. The tip of the spinal cord is called the conus. Below the conus, a spray of spinal roots is frequently called the Cauda Equina or horse's tail. Injuries to T12 and L1 vertebra damage the lumbar cord. Injuries to L2 frequently damage the conus. Injuries below L2 usually involve the cauda equina and represent injuries to spinal roots rather than the spinal cord proper. (Young, & Jackson, C. 2006)

#### **2.1.4. Classification of SCI**

##### **According to the degree of injury (Incomplete vs. Complete)**

While the complete lesion means total loss of sensory and motor function at and below the spinal level of injury. The classification for someone with a complete injury is ASIA A.

The incomplete SCI means there is partial preservation of sensory and/or motor power below the level of the lesion, and known syndromes, Brown-Sequard syndrome, characterize it: which is hemi section injury of the segment; anterior cord lesion characterized by motor impairment, Central cord lesion, and Posterior cord lesion mainly affects deep sensation. (Bradley, et al, 1996).

## **The effects of SCI**

Any damage of the spinal cord due to trauma, disease or congenital defect, will cause interruption of nerve conduction, the clinical picture will vary according to the extent and location of the lesion, which is classified into two basic schemes:

**Paraplegia:** Refers to impairment or loss of motor and/or sensory function in the thoracic, lumbar or sacral segments of the spinal cord, secondary to damage of neural elements within the spinal canal. With paraplegia, arm functioning is spared but depending on the level of injury, the trunk, legs, and pelvic organs may be involved.

**Tetraplegia (preferred to "quadriplegia"):** Caused by damage to the spinal cord at a higher level (the neck area), which causes Impairment or loss of motor and/or sensory function in the cervical segments of the spinal cord due to damage of neural elements within the spinal canal. Tetraplegia results in impairment of function in the arms as well as trunk, legs, and pelvic organs. It does not include brachial plexus lesions or injury to peripheral nerves outside the neural canal. (Bromley, 1998).

## **Clinical syndromes of incomplete SCI**

### **Brown-Sequard syndrome**

It is due to penetrating Injury to one half of the spinal cord which is characterized by ipsilateral Loss of motor and joint proprioception (deep and superficial) at the same side, and contra lateral Loss of temperature and pain at the opposite side (Decussated) below the level of the lesion. It has good prognosis of recovery. (Bradley, et al, 1996).

### **Anterior Cord syndrome**

These kinds of injuries are due to flexion trauma or vascular injuries that lead to Damage to the anterior portion of the gray and white matter of the spinal cord. It is characterized by Loss of motor function, pain and temperature depending on extent of injury. Joint Proprioception and touch, are Intact. It has poor prognosis regarding bowel and bladder function, hand function and ambulation. (Bradley, et al, 1996).

### **Central Cord syndrome**

It is due to hyperextension Injury of the central cord. Causing bleeding into the central gray matter of the spinal cord, it leads to more cord damage and more impairment of the function of the Upper extremities than the lower extremities. It has large variations in sensory loss. Usually this injury is apparent only in cervical injuries. . (Martini, 1989).

## **Posterior cord injury**

It defined as damage to the posterior portion of the gray and white matter of the spinal cord it is due to compression on the cord by tumor or infarction of the posterior spinal artery. It is characterized by preservation of Motor function but the individual experiences a loss of vibratory sense, crude touch, and sense of position. (Bromley, 1998).

## **Associated injuries**

The traumatic SCI represents 54% of causes of SCI, (Apple & Hudson, 1990), the most frequent associated injuries are fractures, occurring in 29.2% of cases, loss of consciousness is associated with more than one fourth of these injuries, according to Davidoff 49% of the cases found with traumatic SCI, and are associated with closed head injury. 17.8% of individuals with SCI are associated with pneumothorax/hemothorax. (Davidoff, 1988).

### **2.1.5. Causes and Epidemiology**

Injuries to the spinal cord have been classified as either traumatic in cause (e.g., motor vehicle, accidents, falls, violent incidences, diving) or non-traumatic (e.g., tumors, spinal stenosis, vascular). Traumatic SCI accounts for the larger proportion of SCI injuries, however, the exact proportion compared to non-traumatic SCI is difficult to ascertain because reporting of non-traumatic SCI has been inconsistent, and has different demographics than traumatic SCI as spinal stenosis and spinal tumors are more common in adults over 50 years of age. In addition, specific diseases such as multiple sclerosis, pediatric spina bifida or poliomyelitis can also contribute to non-traumatic SCI and each has demographics specific to the condition. Overall, compared to traumatic SCI, individuals with non-traumatic SCI tend to be older with less severe injuries, they are more likely females, married, retired, and have an incomplete paraplegic injury (McKinley et al. 1999, 2002a, 2002b).

Differences in demographics, clinical presentation and rehabilitation outcomes have important implications for management of non-traumatic SCI. The percent of traumatic SCI in relation to the overall SCI injury has been reported to be 63.49% in GS, 75% in Germany (Exner & Meinecke 1997), 61% in the United States (McKinley et al. 1999a) and 48% in the Netherlands (Schonherr et al. 1996).

Causes of SCI in GS are distributed as follows: The most frequent cause in Gaza city is traumatic which is the cause for 63.49% of the disabled population, 20.5% and

13.5 during the 2 Intifadas (male and female), 10.3% home and work accidents, 32.5% diseases. (MPDL, 2003).

In Canada, traumatic causes are distributed as follow car accidents: 35% falls: 16.5%, medical: 10.8%, sports 6.7%, other motor vehicle accidents: 6.2%, diving: 5.3%, industrial accidents: 5.3% and others: 14.2 %.( Pickett GE, et. al, 2006).

### **2.1.6. Pathology and mechanism of the SCI:**

The majority of SCI occurred due to traumatic causes, the injury may occur by one of these mechanisms, the Flexion: Head is suddenly and forcefully accelerated forward Causing extreme flexion of the neck, Hyperextension of the neck, as in Automobile accidents, Vertical compression as when individuals receives a blow to the top of the head causing the vertebrae to shatter bone enters the spinal canal and Penetrating injuries. (Donovan and Bedbrook, 1992).

### **2.1.7. Evaluation of SCI**

#### **History**

Review of the medical record before the first contact with the patient that provides good background about the case and identifies medical precautions that lead to safe and effective evaluation. Information of history includes personal information, diagnosis, date of injury, and cause of injury, pt. medical and surgical history, living situation, marital and family status, and smoking/alcohol status. Subjective: any information from the pt. the pt. statement of goals, problems and concerns should include. Objective evaluation of skin, neurological, sensory, motor, and functional mobility and activity of daily living.

#### **Neurological Examination**

This helps in determining the prognosis and status of the individual with SCI. The exam has two components (sensory and motor), which are separately described below. The neurological examination has both required and optional elements. The required elements are used in determining the sensory/motor/neurological levels, in generating scores to characterize sensory/motor functioning, and in determining completeness of the injury. The optional measures, though not used in scoring, may add to a specific patient's clinical description. (Bromley, 1998).

## **Sensory Exam**

The required portion of the sensory examination is completed through the testing of a key point in each of the 28 dermatomes on the right and left sides of the body. At each of these key points, two aspects of sensation are examined: sensitivity to pinprick and to light touch, the external anal sphincter is tested for sensation to help determine the completeness/incompleteness of the injury. Optional (though strongly recommended) elements of the sensory examination include position senses and awareness of deep pressure/deep pain. (Bradley, et al, 1996).

## **Motor Exam.**

The required portion of the motor examination is completed through testing of a key muscle (one on the right and one on the left side of the body) in the 10-paired Myotome. As warranted, it is suggested that the following muscles be tested: diaphragm, deltoid and lateral hamstrings. (Paz and Panik, 1997).

## **ASIA Impairment Scale (ASIA, 2003):**

The ASIA Impairment Scale uses the findings from the neurological examination to categorize injury types into specific categories. These categories allow researchers to identify the outcome of different injuries and degrees of spinal cord damage. The following scale is used in grading the degree of impairment (see annex No.7):

A = Complete. No sensory or motor function is preserved in the sacral segments S4-S5.

B = Incomplete. Sensory but no muscle function are preserved below the neurological level and extend through the sacral segments S4-S5.

C = Incomplete. Motor function is preserved below the neurological level, and the majority of key muscles below the neurological level have a muscle grade less than 3.

D = Incomplete. Motor function is preserved below the neurological level, and the majority of key muscles below the neurological level has a muscle grade greater than or equal to three.

E = Normal. Sensory and motor function is normal.

## **Functional mobility and ADL after SCI**

This part of evaluation does not started unless the pt. medical and surgical condition is stable. Which include bed mobility, transfers, wheelchair mobility,

ambulation, dressing bathing home management, grooming, bowel and bladder care, and endurance.

### **Functional Abilities and needs after Spinal Cord Injury**

Functional abilities and needs differ according to the level and severity of SCI. There is often variation between individuals who have similar levels of injury for a number of reasons, including severity of injury, associated conditions, age, body build, spasticity and personal goals and priorities. As shown in table 2.1. (Delisa, et. al, 1998 and Frmal, et al, 1996).

**Table 2.1. Functional Abilities and needs after SCI**

<b>Level of Spinal Cord Lesion</b>	<b>Functional abilities and needs (Based on complete injury)</b>
C1to C3	Assisted breathing (with ventilator). Use of motorized wheelchair with head control. Use of voice-activated computer. Environmental control systems used to operate appliances, e.g. TV, stereo.
C4 – C5	Power reclining wheelchair Wheelchair cushion Roll-in shower chair Hydraulic pt. lifter Electrical hospital bed Van (car) modification Computer Environmental control system
C6 –C7	Power upright wheelchair or manual upright wheelchair Roll-in shower chair Electrical hospital bed Van (car) modification

<b>Level of Spinal Cord Lesion</b>	<b>Functional abilities and needs (Based on complete injury)</b>
	<p>Hand control for the automobile</p> <p>Hand brace</p>
C8 – T1	<p>Lightweight manual upright wheelchair</p> <p>Wheelchair cushion</p> <p>Roll-in shower chair</p> <p>Tub chair / tub bench</p> <p>Raised padded toilet seat</p> <p>Hand control for the automobile</p>
T2 – T11	<p>Lightweight upright wheel chair</p> <p>Wheelchair cushion</p> <p>Hand control for the automobile</p> <p>Raised toilet</p>
T12 – L2	<p>Lightweight upright wheel chair</p> <p>Wheelchair cushion</p> <p>Hand control for the automobile</p> <p>Raised toilet</p> <p>Bilateral knee ankle foot orthosis</p>
L3-S1	<p>Increasing use of legs and therefore, walking with varying amounts of external support.</p>
S2-5	<p>Normal gait. Increasing voluntary control over bladder, bowel, and sexual functions.</p>

## **2.1.8. Management of SCI:**

### **Acute management:**

It starts from the time of accident by proper transfer, medical treatment and surgical intervention if needed. The most important phase is the Rehabilitation that is a holistic and integrated program of medical, physical, psychosocial and vocational intervention that empowers the disabled person to achieve a personal fulfillment. (Martini, 1989).

### **Pharmacological management:**

Neurological damage due to SCI may be a result of physical disruption of axons traversing the injury site local infarction because of ischemia or hypoxia or prevention of impulses by microhemorrhages or edema within the spinal cord at the injury site. The initial trauma alone rarely causes anatomical transection of the spinal cord. (Gesiler, et al, 1993). For that reason pharmacological intervention is very important in the acute time of injury.

### **Stabilization intervention:**

The most common procedures that used post SCI in the acute stage is stabilization of the neck or the back to prevent further damage, which can be performed by several means as skeletal traction, anterior stabilization, posterior stabilization or external stabilization techniques. This stabilization can be achieved through many modalities as halo fixation for cervical injuries Halo fixation device as the individual should never be moved or turned by holding or pulling on the halo device. Cervical collars as Philadelphia collar that is fabricated with polyethylene foam with rigid anterior and posterior plastic strips, easily applied by Velcro closures, which limit flexion, extension and rotary movements of the cervical spine. While stabilization Thoracic, Lumbar and Sacral Injuries can be achieved by: Bed rest, Immobilization with a fiberglass or plastic body (Trunk) cast and the use of brace or corset, Thoracic lumbar sacral orthosis (TLSOs) when the individual is out of bed. (Jackson, 2006).

### **Surgical Interventions for Thoracic and Lumbar / Sacral Injuries:**

Which used to remove the compression on the cord by removal of one or more lamina that allows for cord expansion from edema, it is performed if conservative methods fail to prevent neurological deterioration of the condition? Spinal fusion and Harrington Rod Insertion: this type of surgical intervention is used for thoracic spinal injuries to stabilize thoracic spine. After the surgery the pt. should wear a brace, a corset, or lumbosacral support (TLSO), to restrict the mobility of the spine. (Delisa, et al., 1995).



### **2.1.9. Complications**

The rehabilitation team must be aware of the complications that may be able to affect various systems of the body. Education of the pt. to prevent these complications is an important issue in rehabilitation process which continues from the time of admission to the post discharge.

One of these complications is skin complication and bed sores bedsores it may be life-threatening factor if it is not treated early.

Secondly, orthostatic hypotension and paralytic edema of lower extremity that occurs because of loss of sympathetic influences that lead to vasoconstriction, vasodilatation results in hypotension that combined of loss of pumping action of the muscle of the lower limbs.

Thirdly deep vein thrombosis (DVT) and pulmonary embolism are serious complications in SCI, which treated medically, bandaging and elevation. Passive movements should be stopped. (Yarkony, 1994).

Fourthly, Spasticity is considered a negative side effect of SCI as it is causing pain and restricting functions, it may offer some advantages, as prevent muscle atrophy, improve circulation and assist in some functional activities. Late medical complications After SCI may includes Pathological fractures, Post traumatic syringomyelia And Respiratory problems in high level SCI, life threatening problems.

#### **Autonomic dysreflexia**

It's Massive uncompensated cardiovascular reaction of the sympathetic division of the autonomic nervous system characterized by Increase blood pressure suddenly, vasodilatation above the level of the lesion leading to flushing of the neck and face. The Most common causes of Autonomic dysreflexia are irritated bladder, fecal impaction or bowel irritation, and bed sores. (Delisa, et al., 1995)

#### **Spinal Shock**

It is a sudden depression of reflex activity in the spinal cord below the level of injury (areflexia), Occurs within the first hour of injury and lasts days to months, characterized by complete flaccid paralysis, Hypotension, Bradycardia, and loss of reflexes. Spinal shock ends when the reflexes are regained. Also known as neurogenic shock. (Yarkony, 1994).

## **2.2. Rehabilitation**

There is no doubt that the rehabilitation science urges workers in this field to work hard to promote and normalize life for those people who lost some of their abilities as walking ,feeling for some kinds of people with special needs, rehabilitation saves their lives. From this point, rehabilitation conquer its' importance. (Umphred D. 1995)

### **2.2.1. Definitions of rehabilitation**

According to the World health organization (WHO) it is, a problem solving and educational process aimed at reducing the disability and handicap experienced by someone because of disease (WHO 1980).

Rehabilitation can be defined as a holistic and integrated program of medical, physical, psychosocial and vocational interventions that empower a disabled person to achieve a personally fulfilling, socially meaningful and functionally effective interaction with the world. As rehabilitation seeks to empower, it is a mechanism for a disabled person to reclaim his or her world and a process whose goal is morally congruent with our society's exaltation of "independence" Jackson, C. (2006).

Rehabilitation is a process that extends from the point of admission, well past discharge, to the point of successful re-integration into society. This process involves a continuum of services beginning with the emergency medical system and extending through the acute and rehabilitation hospital stay into a program of lifetime medical care (Delisa J. et. al, 1998).

Patients with SCI are best treated in tertiary care facilities that include a direct linkage with emergency medical services, full trauma team availability, spinet specialist, Neurourologists, and on-site consultation by the staff of an accredited SCI rehabilitation program. A co-ordinate system of care shortens hospital stays and improves efficiency of function gains made during rehabilitation (Bromley, I. 2002).

The successful rehabilitation process is comprehensive: It includes prevention, early recognition, and inpatient, outpatient, and extended care programs: The comprehensive rehabilitation program for SCI is comprised of several health care professionals including the physicians, occupational therapist; physical therapist, therapeutic recreation specialist, prosthetist, orthotist, nurse, speech pathologist, respiratory therapist, psychologist, social worker, vocational counselor, and engineer (Bromley, 2002 & Delisa, et. al, 1998 ).

### **2.2.2. Basic Rehabilitation philosophy**

Still the basic philosophy of rehabilitation entails that it is a specialized field needs a specialized professionals. The pt. should actively take part in the decision making in the rehabilitation process it is crucial to involve, empower and make the pt responsible to achieve independence and social participation in the community, the pt needs to learn basic skills, advanced and go back to the society as a productive member. (Delisa J. et. al, 1995).

### **2.2.3. Rehabilitation assessment**

Each patient with SCI should be thoroughly evaluated by the SCI Team, once the evaluations have been completed, realistic goals are ideally set with the patient and family, and these goals are continuously reassessed and modified to meet the needs of the patient. The team then develops the most effective treatment plan for each individual. This plan is dependent on physician orders, type of injury, and patient's current level of function and patient's needs.

### **2.2.4. Phases of rehabilitation**

Rehabilitation of SCI individuals begins in the acute care unit when individual is hemo-dynamically stable and spinal shock has subsided that consists of five phases:

#### **Phase one (At bed rehabilitation phase):**

Immediately started after injury and the goals during this phase are to prevent further and secondary complications.

#### **Phase two (Out of bed rehabilitation phase):**

This period referred to be as the early phase of rehabilitation. Some activities out of bed have to be performed according to the tolerance of the patient. Continuity of the program is limited due to the unresolved medical problems.

#### **Phase three:**

Which is the most active period of the rehabilitation program, during this the effort of weeks and months of work become realized and tangible results can be seen, the pt may thought skilful activities.

#### **Phase four (Transitional phase and rehabilitation):**

Largely encompasses activities aimed in smooth transition to home although discharge planning culminates during this phase and other activities should be accomplished, Family training, Home modification recommendations vocational testing / planning, Final arrangement for discharge equipment, home management, and home exercise program referral to outside agencies.

#### **Phase five (follow up or post-discharge phase):**

When the patient become as outpatient, and other follow up services as well as community re-integration started. Individuals may return to their work, or schools, and resume their responsibilities at home. The role of the rehabilitation team is to serve resources in the community. (Delisa J. et. al, 1998)

### **2.3. Community integration(CI):**

As human being, we are in need for a place to live in, to share our families, friends, and colleagues their habit in wedding, traditions, and work, this place is the community where we live.

By our nature we are need each other to perform things that we cannot do alone. For that reason disabled people are put in specialized, segregated groups for more efficient service delivery, like sheltered workshops, they will form a community in those groups. However, since those groups are based on everyone getting help from the system, the community will be limited and dependent. While people with disabilities can live in the wider community of their neighborhoods and towns, they can participate in the natural give and take of their town.

For most of us, if our way of getting around town by car, bicycle, etc. - breaks down, we know we can find someone to help - family, friends, and next-door neighbors. We will do the same for them.

And if one of our neighbors is recovering from a broken leg, for example, we will ask how they are doing and if we can help. People with disabilities can give and receive those same supports in their community as well. If we help them fit into the diverse community of their neighborhoods, the kinds of support they give and receive will be more diverse. Drawing on the various resources of the community helps rehabilitation service providers offer a variety of supports to people with disabilities. Often, the best supports that staff can give are ones that help build community networks.

## **Definition of CI:**

CI is a concept that is often used when discussing rehabilitation outcomes but definitions and measures vary, “being part of the mainstream of family and community life; living independently; discharging the roles and responsibilities that are considered normal for someone of a specific age, gender, and culture; or being an active and contributing member of one’s social groups and society as a whole.” (Dijkers, 1998).

CI refers exclusively to non-institutional living, i.e., the focus is solely on people with SCI who are living in nonmedical, non-custodial settings. This definition adopted in the USA.

CI refers to a changing and long-term status of the individual. Because the effects of SCI and the individual's adaptations to injury are not static, short term or acute, but rather unfold over the lifetime, the individual's integration into the community must evolve over time. Furthermore, this evolution is a function not only of changes in the structures and functions of the individual's body, but also of a variety of developmental processes; for example, changes in the person's skills at negotiating life as a person with a disability, as well as the abilities and strengths the individual brings to situations--adaptability, intellectual skills, motivation level, and the like.

The dynamics of CI for an individual with SCI also vary with the ebb and flow of environmental resources, opportunities, and challenges; for example, vocational opportunities that change over time, social support provided within the individual's family and friend network, his or her access to economic resources, the community's willingness to provide opportunities and function inclusively with respect to individuals with disabilities, and the like (Brown, Gordon & Ragnarsson, 1987).

Community (re-)integration after/with physical impairment or disability is acquiring/resuming age, gender, culture appropriate roles/statuses/activities, including independence/interdependence in decision making and productive behaviors performed as part of multivariate relationships with family, friends, and others in natural community settings'. (Dijkers, 1998), CI as defined in this way corresponds with the participation component of the current WHO International Classification of Functioning, Disability, and Health (World Health Organization 2001).

CI also refers to the individual's status within a social-physical environment, i.e., how the individual "sits" within an environment defined by society and by natural law. (Gordon, 1997).

From the above definitions we can define CI in GS as the pattern of life for individuals with disability, which shows how they live physically, (i-e how can they do their ADL in home and outside), and socially, does they spent their time segregated or participate with family members and others in the community.

Briefly, CI has two main basics of life: where one lives and what one does within the social-physical context of living. These are the component of CI, for individuals with SCI to know if they are to be integrated in the society or not.

## **2.4. AL and disability**

AL is related to the inability to perform various activity of daily living including (bathing, toileting, feeding, dressing, sitting, and all other bed mobility activities). AL has a narrower concept of disability. Therefore, there is no universal agreement on the definition of disability, but there are two primary concepts of disability that most definitions fit into impairment and activity limitation.

In the past, AL term was known as disability. Notably, the World Health Organization (WHO) has replaced the term “disability” by the neutral term activity, thus disability is understood as “activity limitations” (WHO, 1999).

Impairment is a broad concept, defined as a physical or mental loss or abnormality that limits a person’s capacity to function. (WHO, 1981) Examples of impairments include hearing loss or loss of a limb or injury to the spinal cord.

An AL is defined as an impairment that leads to an inability to perform an activity or a limitation in performing roles and tasks that are socially expected. The implication of defining disability as an AL is that disability results from the interaction between impairment and the social environment.

From Medical Point Of View, disability was defined as a physical, mental, or psychological condition that limits a person’s activities. This was known as medical model of disability. That why, disability was linked to various medical conditions, and was viewed as a problem residing solely in the affected individual. Disability was seen solely as the result of an individual’s inability to function. Interventions usually included medical rehabilitation and the provision of social assistance. (Shakespeare, and Watson, 1997). While AL refers to the motor impairment that results from the injury, quantified with the Functional Impairment Measure (FIM); the participation restrictions refers to inability to be fully involved in life situations by the person with SCI, injury is quantifiable by the Craig Handicap Assessment and Reporting Technique (CHART).

The World Health Organization (WHO) has revised its 1980 International Classification of Impairments, Disabilities and Handicaps and has released a draft document, The International Classification of Impairments, Activities and Participation (ICIDH-2) (World Health Organization, 2001). So here we must know the new definition of the categories of the WHO regarding, Impairment, AL (functional limitation) and participation restriction.

Impairment is conceptualized as anatomical or physiological abnormalities and losses, dysfunctions and significant structural abnormalities in specific body systems, loss or abnormality of mental, physical or biochemical function or structure, or generally as problems in body function and structure. (WHO, 1999).

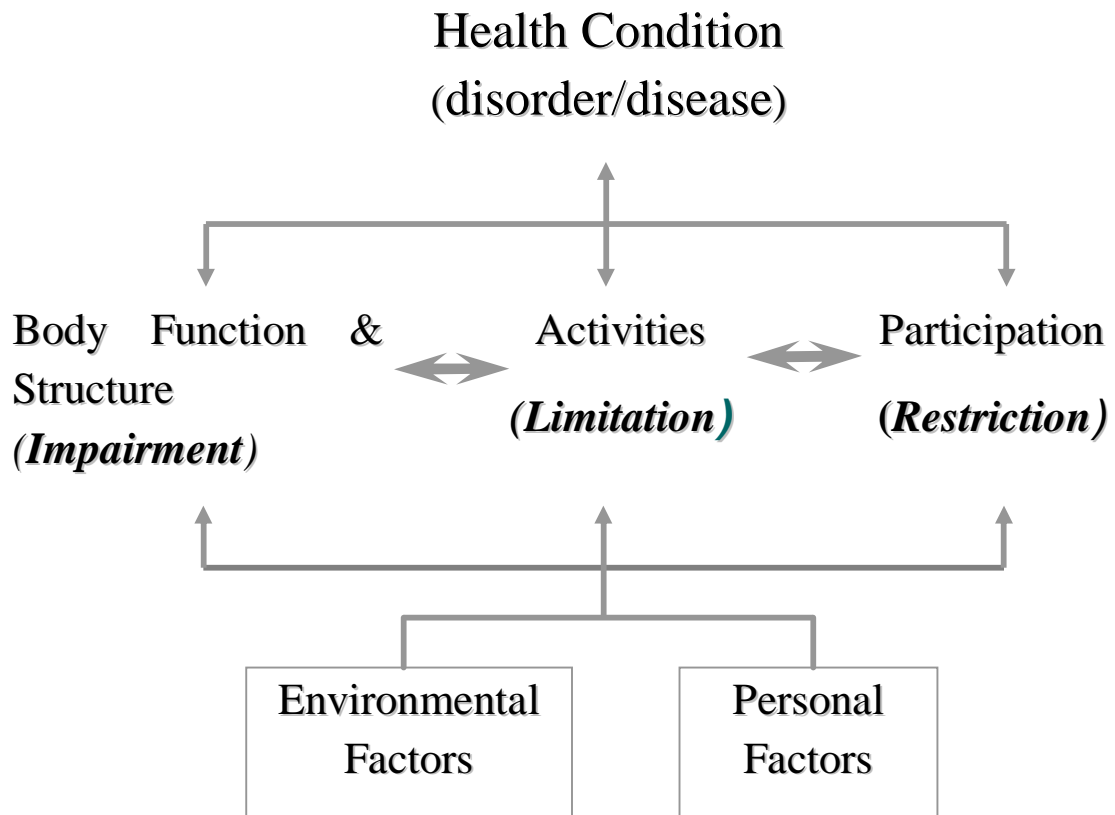
Functional limitations Defined implicitly or explicitly as physical or mental restrictions that the impairments pose on performance of tasks and obligations daily function and/or fulfillment of social roles, the newly used term “activity limitations” (WHO, 1999) denoting functional limitations since the concept of impairment was divided into “impairment of structure” and “impairment” of functions, and the blurred boundaries between definitions of impairment and disability were clarified; The new definition reflects three main areas of function and disablement, which includes the following: physiologic and/or psychological impairment; activity limitations (e.g., activities of daily living); and, restricted societal participation (e.g., community activities or work, Hunter, 2001). Participation restriction is a problem experienced by an individual in involvement in life situations. (WHO, 1999).

According to the International classification of functioning (ICF), Disability arises from the AL and restrictions placed upon Participation which originally emanates from the interaction between Body Structure and Function limitations and an unaccommodating environment. These interactions are summarized in Figure 2.2.

According to the social model, disability is the outcome of the interaction of person and their environment and thus is neither person nor environment specific. The International Classification of Functioning, Disability and Health (ICF) developed by the World Health Organization are the starting point for recent developments in measuring functional capacity. (Hughes & Paterson 1997)

From the above definitions of AL and disability, AL is a term used to express a status of shortage in performing of some activities of the daily life, that may affect the participation of the individual and may not affect, which influenced by other factors, as personal or environmental, and it a part of disability.

Figure 2.2: The ICF Model of disability





# **Chapter three**

## **Literature review**

### **3.1. Introduction**

In this chapter the researcher will focus on studies that describe the factors that influence the integration process of different SCI individuals, it will also review studies that were concerned with the level of satisfaction among SCI individuals about their lives in communities. All studies in this chapter will be divided under the following categories based on the factors they covered: epidemiology, socio-demographic factors, injury related factors, and environmental factors.

### **3.2. Epidemiology of SCI**

Understanding the epidemiology of SCI is essential for public resource allocation and primary prevention, SCI affects both sexes, but with different percentages, many studies were conducted to explore the real percentage of SCI in many countries, the following studies is examples of the epidemiological studies.

The percent of traumatic SCI to the overall SCI injury numbers has been reported to range from 75% in Germany (Exner & Meinecke 1997), to 61% in the United States (McKinley et al. 1999a) and to 48% in the Netherlands (Schonherr et al. 1996).

A prospective epidemiological survey of SCI in Taiwan was carried out among patients attended by physicians from various medical centers and general hospitals all over Taiwan from July 1992 to June 1996. In all, 1,586 new cases of SCI were registered, representing about 70% of all possible SCI cases in Taiwan. The results showed that the male-to-female ratio was 1.7:1, pattern of neurological deficits, and causes of injury and death of geriatric SCI patients differed significantly from those of the younger SCI group. Elderly women were exposed to a higher risk of SCI than younger women. Falls were the leading cause of geriatric SCI, and two thirds of them occurred on level ground. Traffic accidents accounted for a third of SCI cases, half of which involved motorcycle accidents, a fifth of them were pedestrians. Quadriplegia and quadriparesis occurred more frequently among elderly cases of SCI than in the younger group and a higher proportion of them died of SCI complications. Two thirds of elderly SCI patients recovered well enough after comprehensive treatment to be able to take care of them at home (Chen H, et al. 1997).

Here in GS only one scientific survey was conducted in the northern governorate, Gaza city and the middle camps area, for all kinds of disability, which carried out by the Spanish society MPDL in 2003, the results of the survey regarding SCI in particular, revealed that according to this survey, 127 cases in Gaza city suffered from SCI make up 1.6% of the cases found. 72% of cases were males, whereas 28% were female. The percentage of SCI persons represents 0.032% of the population in Gaza city, which approximately means three people in every 10000. While the most frequent cause of SCI in Gaza city is trauma which is the case for 63.49% of the disabled population, which is

distributed as follows, 20.5% and 13.5 during both Intifadas of both sexes male and female, causes was due to home and work accidents 10.3%, and the pathological causes of SCI represents 32.5% of the total numbers (MPDL, 2003).

In Australia each year, about 300–400 new cases of SCI from traumatic and non-traumatic causes are added to an estimated prevalent SCI population of about 9,000 (AIHW: Cripps 2007).

A Retrospective review study was conducted in Canada aiming to describe the incidence, clinical features, and treatment of traumatic SCI treated at a Canadian tertiary care center. Retrospectively reviewed hospital records on all patients with traumatic SCI between January 1997 and June 2001 (n = 151). The assessed variables include age, gender, and length of hospitalization, type and mechanism of injury, associated spinal fractures, neurologic deficit, and treatment. The result demonstrated that Annual age-adjusted incidence rates were 42.4 per million for adults aged 15-64 years, and 51.4 per million for those 65 years and older. Motor vehicle accidents accounted for 35% of SCI. Falls were responsible for 63% of SCI among patients older than 65 years and for 31% of injuries overall. Cervical SCI was most common, particularly in the elderly, and was associated with fracture in only 56% of cases. Thoracic and lumbar SCI were associated with spinal fractures in 100% and 85% of cases, respectively. In-hospital mortality was 8% omens all admitted patients. Mortality was significantly higher among the elderly. Treatment of thoracic and lumbar fractures associated with SCI was predominantly surgical, whereas cervical fractures were more likely to be treated with external immobilization alone or with surgery (Pickett, et al. 2006).

From the epidemiology of SCI we can see that the young people are the major slice of SCI people, traumatic causes are the most wide spread causes in the world mainly motor vehicle accidents, while gunshot injuries is the least percent, but Gunshot injury is a vital cause here in GS, which is due to the continuous aggression of Israeli occupation against Palestinians, other causes of SCI are nearly in the range all over the world. In addition, there is lack of information about SCI in GS, which is caused by the absence of data base centers regarding medical statistics.

### **3.3. Socio-demographic factors and CI**

Socio-demographic factors may have significant influence on CI, and may not. Here the researcher will review the studies that explain the influence of the factors that may affect the CI.

CI has four aspects which includes (relationships, productive occupation, personal and environmental resources, and psychological resources), a study was done and aimed to determine the extent to which women with SCI are able to achieve the same levels of CI as women without disabilities. The study sample included 120 women with SCI and 406 women without disabilities met the inclusion criteria. The impact of SCI on the CI of

women can be seen primarily in lower rates of employment, environmental barriers to socializing, and unmet needs for personal assistance services. There was no significant difference between the groups on measures of marital status, living arrangement, and satisfaction with relationships with friends and family members, personal and household income, self-esteem, or perceived control. There is discussion of new perspectives on gender-sensitive models of CI and the role of rehabilitation professionals in ensuring that clinical care is delivered in a gender-sensitive manner that empowers women to remove environmental barriers to their rehabilitation and community living goals. (Nosek, et al, 1998).

The marital status may influence the CI process; this was shown in a longitudinal study aimed to view the importance of spouses support towards the ongoing health and well-being of ageing individuals, whether or not they have a SCI or disability. This longitudinal study, which describes 225 British SCI long-term survivors, offers insight into marital status and its impact on general quality of life, depression, stress and CI for individuals with SCI. they found that When controlling for age, duration of injury, and gender, marital status was a significant predictor of better perceived life satisfaction and quality of life. (Richard & Susan, 1999).

Whiteneck and colleagues (1999), conducted a cross sectional and longitudinal aimed to determine the influence of demographic and injury characteristics on the community reintegration of people with SCI. the study sample included 3,835 individuals who met the inclusion criteria for the National SCI Database were studied cross-sectionally, and a subset of 347 individuals who were also enrolled in a longitudinal study of aging with SCI. Craig Handicap Assessment and Reporting Technique (CHART) are used in data collection, the results showed that, years' post injury, gender, ethnicity, and education explain, 29% of the variance in physical independence, 29% of the variance in mobility, 28% of the variance in occupation, 9% of the variance in social integration, and 18% of the variance in economic self-sufficiency.

In another longitudinal study with multivariate analysis design on three populations (American, British and Canadian). The study aimed to identify the international differences in outcomes associated with ageing and spinal cord injury. A sample of 352 individuals was assembled from five large, well-established databases. The Canadian sample was derived from the member database of the Canadian Paraplegic Association (Ontario and Manitoba divisions). The British sample was recruited from Southport Hospital's Northwest Regional Spinal Injuries Centre and Stoke-Mandeville Hospital's National Spinal Injuries Centre. The American sample has been recruited through Craig Hospital in Denver, Colorado. The sample included individuals who had incurred a SCI at least 20 years previously; were admitted to rehabilitation within 1 year of injury; were between age 15 and 55 at the time of injury.

Data were collected using a combination of self-completed questionnaires and interviews. The Results showed clear international differences existed between the three samples in the three different countries. After controlling the sample differences (i-e, differences in age, level of lesion, duration of disability, etc.), the following differences were seen: American individuals had a better psychological profile and fewer health and disability-related problems; British individuals had less joint pain and less likelihood of perceiving they were ageing more quickly; Canadians had more health and disability-related complications, particularly bowel, pain and fatigue problems. (McColl, et al., 2002)

In a case control study conducted by (Putzke and colleagues, 2002), the study revealed that none of the outcome measures differed significantly across racial groups. with the exception that nonwhites were at an increased risk of greater self-reported handicap in the area of mobility, but race appeared to act primarily as a proxy for other variables (e-g, injury severity, age, educational achievement), which in turn may be associated with poor outcome after SCI.

In another cross-sectional study aimed to determine factors associated with CI of adults who sustained SCI as children or adolescents. Including 216 adults (150 male & 66 female), with mean age 29 years. After data were analyzed, the results showed that, the three factors most strongly associated with CI were the level of education, employment, and income, while gender was not associated with CI (Anderson et al., 2003).

Age may be one of the important factors that may influence the Rehabilitation process outcome, consequently this may has impact on the CI process, as in a Cross-sectional study aiming to Determine the unique effects of age across a variety of outcome domains following SCI. the study population includes 6132 individuals with traumatic onset SCI in the National Spinal Cord Injury Statistical Center (NSCISC) database. FIM, Satisfaction with Life Scale (SWLS), the Craig Handicap Assessment and Reporting Technique (CHART), and the Short Form-12 (SF-12) are used to measure the outcome. The main results showed that older age was most consistently associated with decreased self-reported outcomes across most domains assessed. There is a small but consistent decline with age in several outcome domains following SCI, a significant linear decline with age was found for FIM. Follow-up longitudinal studies should help tease a part possible cohort effects from the effects of age. (Putzke, et al, 2003).

In a cross-sectional descriptive study conducted in France aimed to identify objective factors (social and economic status, impairments, functional limitations) contributing to the subjective quality of life of individuals presenting with residual neurological deficits from a traumatic SCI and living at home. The sample included 58 individuals followed at a Physical Medicine and Rehabilitation facility. Self-administered questionnaire included the following parameters: impairments (sensory and motor ASIA scores), disability (Barthel Index and Functional Independence Measure),

and quality of life (Reintegration to Normal Living Index and Nottingham Health Profile). The results showed a significant correlation between the level of quality of life and the current age, the age at the time of the accident, and the disability level, particularly for the dimensions of physical independence, social integration and mobility (Calmels, et al, 2003).

Another study was conducted by Martin B, and colleagues (2004) showed different results regarding gender against to the environmental barriers and community participation. The Craig Handicap Assessment and Reporting Technique (CHART) were used to assess CI, and the Craig Hospital Inventory of Environmental Factors was used to assess barriers. A sample of 2,048 patients participating in the Model SCI Care System was studied. Gender was found to be associated with environmental barriers; women experienced more across all domains. Gender differences were found for the Occupation scale of the CHART; also, they found that environmental barriers influence the CI process.

In a part of longitudinal study conducted in five centers in England, Canada, and the United States, aimed to identify differences in the aging experiences of men and women with SCI. the sample included 67 men and 67 women with SCI for at least 20 years. The two groups were matched on age, country of origin, and duration of disability. With mean, age 57 years and disability duration 33 years. The CHART, index of psychological well being and life satisfaction index were used in data collection. The results does not showed any differences between both sexes in their quality of life, there are more effect of pain, fatigue skin problem, and transportation problem than men, while men experienced more health problems, both sexes spent their time differently, consistent with traditional gender roles (McCull, et al, 2004).

In a study examining longitudinal changes in community reintegration among people aging with spinal cord injury, and to determine if these changes are related to demographic variables and scores on psychosocial measures of stress, life satisfaction, depression, psychological well-being, and perceived quality of life. The study was conducted on 178 members of a British population-the outcomes after SCI were evaluated at three-year intervals from 1990 to 1999. Individuals responded to a questionnaire that included measures of CI and perceived psychosocial status. The results showed that Community reintegration declined over time in this sample of British individuals aging with SCI. Although there were concurrent relationships between demographic variables of age and neurological group, neither these factors nor duration of injury appeared to influence change in community reintegration there is significant relationship between perceived life satisfaction and CI (Charlifue & Gerhart, 2004).

In summary, it is clear that, the socio-demographic factors as age, gender, level of education, economic status, race, and place of living, don't always has direct impact on CI, QOL, and life satisfaction. But from the reviewing the literature it was found that the

level of education and the economic status has significant impact on the pattern of life for the persons with SCI, while other factors vary from area to area and other variables interfere in the process of CI, QOL and life satisfaction.

### **3.4. CI and Injury related factors**

Many factors may influence, the discharge location following rehabilitation program for individuals with SCI.

Tetraplegics were more likely to be discharged to a nursing home than paraplegics, these findings of self-care and health needs are far exceed the available support systems and family members that can provide. (Dijkers, et al., 1995).

In a cross sectional survey, included 318 adult with SCI done in Netherland by Marcel M. and colleagues, aimed to analyze relationships between injury-related variables, demographic variables, functional health status, and life satisfaction of people with SCI. data collected through SIP68 to measure Health status, and Life Satisfaction Questionnaire to measure Life satisfaction. The results demonstrated that, the high prevalence of secondary complications and their importance to the health status of people with SCI. Level of social and psychological functioning are more important predictors of life satisfaction than the seriousness of the injury (Marcel et al, 1997).

Neurologic classification showed variation in the physical independence, mobility, social integration, occupation and self-economic sufficiency. (Whiteneck, et al, 1999).

In a study of Anderson and others (2003), the injury related factors including the level of injury, the duration of injury. Functional independence as measured by the Functional Independence Measure, and the perceived health as measured by Short Form-12 physical and mental component scores. Results showed that factors associated with CI include functional independence, and health status. While those factors who are not associated includes age at injury, duration, and level of injury.

At another study that was conducted in France, there was significant relationship between the level of quality of life the disability level, particularly for the dimensions of physical independence, social integration and mobility. (Calmels, et al, 2003).

In a pilot study aiming to determine the differences between wheelchair users and their matched able-bodied controls in grip strength, pain (as expressed by scores on the McGill Pain Questionnaire [MPQ]), and CI (as expressed by scores on the Craig Handicap Assessment and Reporting Technique [CHART]). To explore the relationships among CI, pain, strength, and demographic variables. The sample included 13 wheelchair users and 13 able-bodied individuals were matched for gender, age, and activity level. The results showed pain was associated with age for the wheelchair-user group and with

activity for the able-bodied group. In addition, grip strength was associated with CI for the wheelchair-user group. (Shechtman, et al., 2003)

The health and injury related factors shown great importance on the quality of life which is predictor of the CI, a Cross-sectional study conducted to demonstrate the value of common general health-related quality of life instruments, readily available for cross-cultural comparisons, in persons with SCI treated at spinal units in Melbourne, Australia and in Gothenburg, Sweden. The study included two groups consisting of 89 Australian and 71 Swedish SCI persons were surveyed. The 36-item short-form health survey (SF-36) and the SCI Quality of Life (23-item questionnaire) were used to cover the essential generic and specific domains of health and quality of life. Clinical and sociodemographic data were collected using questionnaires. The results showed that the most important predictors of QL perception in the Australian group were the same as for the Swedish group; mood, physical and social functioning and problems regarding injury. Despite similarities of health profiles, some areas of the SF-36 differed between the two groups. The demonstrated HRQL profiles in SCI persons have shown that valid measures can provide new information of clinical value beyond the self-evident physical and practical restrictions due to injury. (Kreuter, et al. 2005).

In a study conducted in British Columbia, Canada aiming to identify and describe factors that influence discharge location – extended care unit (nursing home) or other (private home, group home, or acute care) – following rehabilitation for individuals with a new high lesion SCI (C1–C4), including 52 participant with c1-c4 traumatic and non traumatic spinal cord lesion, between 1994 and 2003, with ASIA grade A – C at the time of discharge, the data reviewed from the records including individual characteristics, health-related characteristics, personal context, hospitalization factors, health resources, and other contextual factors were extracted. The result demonstrated that 40% of individuals were discharged to extended care units post rehabilitation. In total, seven variables were associated at a univariate level: age, employment at the time of injury, pre-existing medical conditions, social support, pre-injury living situation, and insurance (worker's compensation or motor vehicle) or private funding for equipment. Four variables were associated at the multivariate level: age, pre-injury living situation, and insurance or private funding for equipment. A range of individual, health-related, family and social policy variables influence discharge location following rehabilitation for high level of SCI in British Columbia. The rehabilitation team in the discharge planning process should consider this unique combination of variables presented by each individual. (Anzai, et al, 2006).

In summary many of the injury related factors seem to have direct impact on the life and CI of SCI people, this is shown clearly in the type of injury, complete versus incomplete, while there is differences of the effect of level of injury, cervical or lumbar according to the area of living and the socio-economic status, as poor people with low level of resources lumbar level of injury shows better level of CI, QOL, and better life



satisfaction. The duration after injury also plays a great role in the process of community participation, cause of injury sometimes has influence on the activity of the persons with SCI.

### **3.5. Environmental modification and other factors that may affect CI and AL**

In a study by Efthimiou and colleagues (1981) to ascertain the impact of electronic control devices on the activity patterns of individuals with SCI, it was found that the use of electronic control units was associated with increased frequency of participation in educational activities, increased independence, and decreased inactivity.

In another study of individuals with SCI, Brown (1983) found that access to a private vehicle increased the probability of being employed from 0 % to 50 %. (Brown, 1983)

Physical activities play an important role in handicap for persons with SCI, particularly persons with quadriplegic injuries. In the following cross sectional study the researcher aimed to determine the relationships among fitness, physical activity, subjective quality of life, and handicap in persons with SCI. the sample included 82 men and 10 women participating the study, many tools are used for data collection, Fitness (maximal incremental exercise test on arm ergo meter), physical activity (leisure time exercise questionnaire), subjective quality of life (Quality of Life Profile: Physical and Sensory Disabilities Version), and level of handicap (Craig Handicap Assessment Reporting Technique). Correlation analyses examined relationships between the measures. The result showed significant relationship between Physical activity and handicap score in quadriplegic and paraplegic individuals. There was no relation between the subjective quality of life scores and fitness and physical activity in either group. (Manns, et al, 1999).

In A pilot postal survey in the National Spinal Injuries Centre (NSIC), UK, conducted to examine the levels of sporting/recreational activities, education and employment in people with SCI and to assess if involvement in sport and recreation is associated with higher levels of education and employment. Forty-five individuals with SCI are included. The results demonstrated that the Levels of sporting/recreational activities and employment decreased significantly after injury. No significant correlation was found between sport/recreation involvement and education/employment status (Tasiemski et al, 2000).

Looking at vocational and other economic roles, researchers have found that access to resources can affect economic role functioning. Community reintegration after SCI is continually improving because of better acceptance, accessibility, and technology for building adaptations. (Steven, et al. 2002).

Ballinger and colleagues conducted a study in community aimed to determine if shoulder pain and range-of-motion (ROM) problems can be predicted by demographic, injury-related, body weight, and radiographic data over 3 years and to determine the relationships among these shoulder problems and functional limitations, disability, and perceived health. A longitudinal design, 2-panel study design was used in which data were collected at 2 points in time, 3 years apart. The study sample was 89 adult men with traumatic SCI in Texas area. The X-ray in standard anteroposterior position to the acromioclavicular and the glenohumeral joints was done. Functional limitations were determined with the FIM instrument; disability was measured with the Craig Handicap Assessment and Reporting Technique (CHART). The results demonstrated that Shoulder pain and ROM problems were relatively prevalent. Demographic, injury-related, and radiographic variables were identified that were predictive of these problems over a period of at least 3 years. The shoulder problems were related to functional limitations, disability, and perceived health (Ballinger, 2000).

SCI implies a drastic change in the quality of life of an individual; so many studies were done assessing the disability among persons with SCI. In a cross, sectional study conducted aiming to assess the degree of disability shown by patients with SCI at 5 years post-SCI. the Craig Handicap Assessment and Reporting Technique (CHART) scale that included the evaluation of occupation, physical independence, mobility, social integration and economic self-sufficiency are used. The sample of the study includes 90 patients who were admitted over a one-year period to the Hospital Nacional de Paraplégicos in Toledo, Spain. The results showed that 30% of the patients could be considered severely disabled, while 46.7% of the patients: most of these individuals were younger than 18 and had less severe neurologic injuries. It means that despite the enormous impact of SCI, according to the scale used most patients have scores above the disability level. (Benavente, et al., 2003)

In a study by Boschen, and colleagues to evaluate the community reintegration and quality of life of community-residing adults with SCI. mixed design (quantitative and qualitative) was used, data were collected through convenience sample of 100 individuals with SCI completed three questionnaires for the quantitative study phase. A self-selected subsample of 34 of the individuals then attended qualitative focus groups to further explore adjustment to living in the community after SCI. The results revealed that locus of control are crucial to subjective quality of life, productivity status, satisfaction with performance of daily activities and satisfaction with CI. Respondents confirmed that substantial adjustments are required after SCI, and that these can be aided through education, involvement in productive activity and participation in social and leisure activities. A dominant finding was that social support and peer mentoring were invaluable. Stable health and appropriate pain management were crucial to subjective satisfaction with CI, yet for many of the respondents these were elusive. Although the individuals valued the rehabilitation process, they felt that 'the system' was not client-

centered and that the timing of services and information was not always relevant to individual needs. The clinical and practical implications of these results are discussed. (Boschen, 2003).

A Cross-sectional, follow-up survey study was conducted by Whiteneck and others to investigate environmental barriers reported by people with SCI, and to determine the relative impact of environmental barriers compared with demographic and injury characteristics and activity limitations in predicting variation in participation and life satisfaction. The study population includes People with SCI rehabilitated at 16 federally designated Model SCI Systems of care, now living in the community (N=2726) who completed routine follow-up research interviews between 2000 and 2002. The used tools of data collection were The Craig Hospital Inventory of Environmental Factors-Short Form (CHIEF-SF), the Craig Handicap Assessment and Reporting Technique-Short Form, and the Satisfaction with Life Scale. The main result demonstrated top 5 environmental barriers reported by individuals with SCI, in descending order of importance, were the natural environment, transportation, need for help in the home, availability of health care, and governmental policies. The CHIEF-SF subscales accounted for only 4% or less of the variation in participation; they accounted for 10% of the variation in life satisfaction. The inclusion of environmental factors in models of disability was supported, but was found to be more strongly related to life satisfaction than to societal participation (Whiteneck et al, 2004).

A cohort study conducted aimed to examine whether home and community environmental barriers and facilitators are predictors of social and home participation and community participation at 1 and 6 months after discharge from an acute care or inpatient rehabilitation hospital. The sample included 342 individuals aged 18 years or older with mean age 68 years; 49% were women and 92% were white. Data collected through Participation Measure for Post-Acute Care. The results showed a great presence of home mobility barriers after one-month discharge, more social support associated with greater participation, but at 6 months social support was the only environmental factor associated with participation after adjusting for covariates. (Keysor, et al, 2006).

Environmental factors may have great impact on CI, In a study conducted on the USA aiming to explore the relationship between perceived environmental barriers and perceived CI (a participation proxy) in a sample of adults with traumatic SCI. an interview of African American and White women and men (n = 136) who had lived with SCI for an average of 11.5 years. The results showed that Individuals reported environmental barriers at twice the level indicated by previous studies; the natural environment and the policies of government were the most problematic. Levels of CI were also high. Data suggest a significant relationship between perceived environmental barriers and CI for adults with SCI. (Lysack, et al. 2007)

Many barriers to activity were faced by individual with SCI, the following study aimed to apply the World Health Organization model of functioning to study the perceived choice over life activities and barriers to engaging in life activities among persons with SCI. the sample included 255 individuals from 2 urban sites and 1 rural site. For data collection Items from the Participation of People With Mobility Limitations Survey were used the results showed that approximately half of the individuals reported little or no perceived choice with employment, and the majority reported low levels of satisfaction with choice with employment. The employment limitation due to physical barriers (48%) and transportation (46%). Physical impairment, pain, and fatigue were also barriers. (Schopp, et al, 2007).

With many cases, AL and environmental factors have significant effect on CI, QOL and Life satisfaction, AL interfere in all activities, independent people with SCI are more likely to be more integrated in the society, can easily cope the environmental obstacles, they face during the daily life, while others who were scored low grades in activities limitation scales as FIM and other scales concerned with measurement of the level of the activities, seen to face more difficulty on the community participation this level of low CI increased by increasing the environmental obstacles, so achieving independence level during the rehabilitation process and environmental adaptation is very important in improving the level of CI and reducing the AL.

### **3.5.1. Employment and SCI**

Return to paid employment is considered one of the most meaningful measures of successful rehabilitation (Krause et al, 1999). Thus, return to work appears to be related not only to demographic and impairment variables relatively immutable characteristics, but also to environmental factors which can be changed through accessing resources and through the provision of services (e.g., personal care assistance, electronic control units, accessible transportation).

In another study of individuals with SCI, Brown (1983) found that access to a private vehicle increased the probability of being employed from 0 percent to 50 percent.

so many studies was done to assess the employment status, one of these studies showed that, employment following SCI increases steadily, until 10 to 11 years post injury and one-third of those in the database were working. Thus, re-entry (or initial entry) into the world of work after SCI is a slow process, which means that individuals may span a decade or more; but two-thirds of this population appears not to move out of unemployment at all. (Dijkers et al., 1995).

A Cross-sectional study conducted in the USA aiming To describe the relationship of multiple biographic, injury-related, and educational factors with employment outcomes after SCI. data were collected from 3,756 individuals with traumatic SCI, and they fill model system forms I and II to identify biographic, injury-related status, employment at

injury, and productivity status upon follow-up (Form I is used to elicit basic demographic and discharge information, whereas Form II is used to track multiple outcomes during annual follow-ups). The CHART was used to assess hours spent in gainful employment and other productive activities. Findings were consistent with those in previous studies. Interventions to improve employability should focus on education and the needs of individuals from minority backgrounds (Krause et al, 1999).

Many factors seems to affect the employment, in the following semi structured interview study which aimed to examine factors that differentiated persons with SCI who returned to work from those who did not. The sample included six employed persons with SCI matched with six unemployed persons with SCI on the basis of education, race, age, gender, time since injury, and level of function. The results showed that Psychological and environmental factors were the most salient factors affecting employment in this matched sample. (Chapin, et al, 2001).

In another Structured interview study conducted in the United States and Canada aimed to determine employment outcomes of adults with pediatric-onset SCI and factors associated with those outcomes. The sample included 195 individuals with Mean age at injury were 14 years, mean age at interview was 29 years, and mean duration of injury was 15 years. A structured interview, the FIM instrument, the CHART, the Medical Outcomes Study 12-Item Short-Form Health Survey and the Satisfaction with Life Scale tools are used in data collection. The results showed (51%) were employed, (40%) were unemployed, (6%) were students, and (3%) were homemakers. both education and the CHART Mobility subscale, as independent variables, were among the factors significantly associated with the outcome of employment in a multiple regression model. (Anderson et al., 2002)

Another cross sectional study conducted in Taiwan aimed to study the employment rate and determinants of return to work for persons with traumatic SCI. the sample included 169 individuals their age between 18 and 60 years. A structured questionnaire was used for data collection. The results showed that 47 % of individuals engaged in remunerative employment, the factors that were associated with return to employment are education and functional independence, persons with high scores in the AL Scale and independent manipulation with private or public transportation had higher opportunities to return to work. Other factors significantly associated with employment included marital status, age at injury, pre injury occupation and vocational training after injury. (Jang, et al, 2005).

Many studies consider the successful return to work after SCI is of great importance in the process of CI integration, but the researcher in this current study excluded the employment domain, as we have a peculiar situation in GS, we all know that due to the Israeli occupation, the unemployment rate is very high in GS, and getting a job is very difficult for people without SCI, so having a new job is very difficult because there is

evident lack of Job opportunities, so returning to the same job just for people with SCI in some fields only as university teachers , because of the previous reasons, the researcher preferred to exclude the employment domain to take accurate results of the CI without including the employment.

### **3.5.2. Life satisfaction, quality of life and Psychological factors**

In a study done to investigate the level and correlates of the life satisfaction of persons with SCI who are residing in the community. A sample of 100 men and 40 women were chosen randomly from a cohort of 640 persons with SCI residing in a 13-county area in southeast Texas. Life Satisfaction Index-A (LSIA) was not correlated significantly with chronologic variables, the ASIA Total Motor Index Score, or a self-report version of the Functional Independence Measure (FIM). The LSIA was associated positively with self-assessed health, perceived control, and social support, as well as with the Social Integration, Occupation, and Mobility dimensions of the Craig Handicap Assessment and Reporting Technique. The life satisfaction of persons with SCI appears to be influenced, albeit by selective aspects of their social role performance (handicap), but not by their degree of impairment or disability. (Fuhrer, et al. 1992).

Fuhrer and colleagues studied Depressive symptomatology in a community-based sample of 100 men and 40 women with spinal cord injury. The mean for the Center for Epidemiologic Studies Depression Scale was high, and the mean for women was higher than that for men. They found from the Mobility dimension of the Craig Handicap Assessment and Reporting Technique (CHART) that differences between men and women in degree of mobility within home and community partly mediate the gender difference in depressive symptomatology. Other CHART dimensions, Social Integration and Occupation, were inversely related with depression scores, although these dimensions did not differentiate men and women. A statistically significant relationship was not obtained between depression and disability, assessed by a self-report version of the Functional Independence Measure, or between depression and impairment, reflected by the ASIA Total Motor Index Score. Depression was not related with the presence of either pressure ulcers or presumptive evidence of urinary tract infection. (Fuhrer MJ, et al. 1993).

Because providers' knowledge and attitudes may affect the care they provide and may influence patients and families struggling with critical treatment decisions, emergency care providers must be aware of outcomes, well-being, and life satisfaction following severe SCI, here in the following study the researcher used a closed-ended questionnaire to measure emergency care providers' attitudes toward QOL after SCI and to determine if their perceptions influence the care they provide. The sample included 153 emergency nurses, emergency medicine technicians, emergency medicine residents, and attending physicians at three levels I trauma centers were surveyed. The results showed that the quality of life, self-esteem, and outcomes that emergency health care

providers imagine after SCI are considerably more negative than those reported by SCI survivors. (Gerhart, et al, 1994).

The psychological adjustment after SCI may be influenced by some factors as age, gender and race, here in the following study which aimed to generate data on gender and race differences on subjective well-being (life satisfaction, adjustment, and problems) and to develop an improved measure of subjective outcomes after SCI. The sample included 362 individuals who were stratified according to gender, race, and age at injury onset, the data were collected through the Multidimensional Adjustment Profile (MAP). The results showed that the Caucasian individuals reported significantly higher levels of Career Satisfaction and fewer problems with Skills Deficit and Financial Limitations. Interaction between gender and race were observed for three scales (Emotional Distress, Physical Discomfort, and Adjustment), with more positive scores reported by minority males and Caucasian females. Results pointed to the importance of race differences in adaptation after SCI. (Krause, et al, 1997).

Life satisfaction is thought to be a subjective part of quality of life, i.e. the feelings of the person's concerns about their functioning and circumstances. In the following study, life satisfaction of spinal cord-injured persons living in the community was compared to life satisfaction of a population group. Respondents were a nationwide sample of 318 persons with SCI (response 60%) and 507 inhabitants of a large city in The Netherlands (response 42%). Life satisfaction was measured using the Life Satisfaction Questionnaire, Mean scores of general life satisfaction and of satisfaction with self-care ability, leisure situation, vocational situation and sexual life were lower in persons with SCI than in the population group, but satisfaction with family life was higher. However, differences in general life satisfaction, satisfaction with leisure situation and with vocational situation could be attributed to differences in the composition of both groups. Satisfaction with self-care ability was lower in persons with Tetraplegia than in persons with paraplegia, but no differences in other questions. Several relationships between life satisfaction and age and marital status existed, but they were more pronounced in the population group than in the group of persons with spinal cord injury. Time after injury and cause of injury were not related to life satisfaction variables. (Post, 1998).

In a study conducted in the community which aimed to determine long-term outcomes and life satisfaction of adults who sustained pediatric SCI, structured interview of 46 individuals aging 25 or older, and collected by convenience sample, data were collected through structured questionnaire, the Craig Handicap Assessment and Reporting Technique, and two measures of life satisfaction. The results showed that the mean age of the participant were 27 years old. Individuals who had pediatric SCI, much like adult-onset SCI, have the greatest opportunity for a satisfying adult life if rehabilitation emphasizes psychosocial factors such as education, employment, and long-term health management. (Vogel, et al, 1998).

In a retrospective study conducted in tertiary rehabilitation center in Canada, aiming to describe the self care, productivity and leisure problems identified by individuals with SCI during rehabilitation, and to describe the perceived level of satisfaction and performance with self-care, productivity and leisure activities following SCI, also it aimed to quantify the relationship between the Canadian occupational performance measure (COPM), a client-centered, individualized measure of function, and the (FIM). Data was collected by reviewing Health records of 41 individuals with an SCI admitted between 2000 and 2002. The results showed that, the top three problems identified by individuals with an SCI were functional mobility (including transfers and wheelchair use), dressing and grooming. A fair relationship was found between the COPM and the FIM. (Donnelly, et al. 1999).

Hanks and colleagues (1999), found in prospective, descriptive study conducted: A Midwestern, urban, university-affiliated rehabilitation hospital aiming to examine the utility of executive function tests in predicting rehabilitation outcome. The study population includes 90 consecutive admissions to traumatic brain injury, orthopedic, and SCI units, Aged between 17 and 73 years old. The tools that used to measure the outcome CIQ, Disability Rating Scale (DRS), and SF-36 Health Survey. The findings of this study revealed that the measures of executive functioning and verbal memory were strongly related to measures of functional outcome 6 months after rehabilitation, as measured by the DRS and the CIQ.

Access to the environment (an “outside the person” factor) is important in predicting satisfaction with life for persons with spinal cord injury. The study of (Richards, and colleagues 1999), aimed to determine the potential relation between satisfaction with life after SCI and access to the environment as measured by selected items from the Craig Handicap Assessment and Reporting Technique (CHART). Data were collected through satisfaction with life scale. (SWLS) the sample included 650 individuals evaluated at 1 and 2 years post injury. The results showed that access to the environment was positively and linearly associated with satisfaction with life, demonstrated both positive and negative change over time, and was positively associated with subject's neurologic status. Access to the environment added to the explanatory model to predict life satisfaction even after all other independent measures were accounted for.

In a survey study done to analyze the correlates of life satisfaction for individuals with SCI by a sample of 2,183 persons with SCI, from 1 to 20 years post injury, were self-selected for annual research (and clinical) follow-up by one of 18 model systems of SCI care. The study found that Life satisfaction after SCI can be reliably measured by means of the Satisfaction with Life Scale (SWLS). Correlates of subjective well-being parallel those suggested by earlier studies and those for the population at large. The effects of life satisfaction on social participation, health, and other aspects of life need further study. (Dijkers, 1999).



According to Richard & Susan (1999), married individuals with SCI having less depression, greater life satisfaction and psychological wellbeing, and they perceived their quality of life much better.

In the following study the researcher aimed to quantify relationships among 3 sets of factors: demographic factors, health and disability factors, and QOL. A part of longitudinal study on aging and SCI involving 3 populations, American, British, and Canadian. The sample included 352 individuals . A combination of self-completed questionnaires and interviews were used for data collection. The results showed that QOL was affected both directly and indirectly by age, health and disability problems, and perceptions of aging. Those who experienced fewer disability-related problems were more likely to report a qualitative disadvantage in aging, and the younger members of the sample were more likely to report fatigue. (McColl, et al, 2003).

In a descriptive study aimed to determine whether QOL and satisfaction with life differ among persons with SCI as they grow older and to compare the differences in QOL and satisfaction with life between men and women and different socioeconomic status (i.e., level of education and income). The CHART and SF-12 were used for data collection. The sample included 59 individuals of both sexes. Analysis of data showed that age and level of income and education were significant predictors of QOL; there were no differences between men and women. Overall mean QOL scores in persons with SCI were lower compared with the range of CHART and SWLS scores. (Madhusudana, et al, 2003).

In a Cross-sectional study, aiming to examine the community needs of people with SCI across four European countries and to identify areas of unmet needs, to use resulted information in rehabilitation professionals in fostering greater social participation among SCI individuals. Data were collected through Self-report questionnaires measured current needs, CI, mood, appraisals, coping strategies, functional independence and perceived manageability, sent to 1000 people with SCI resident in the community in the UK, Germany, Austria and Switzerland. The result showed Occupation, sexual activity and pain relief were areas indicative of highest community needs in all four countries. Most individuals were psychologically well adjusted and socially integrated into the community. Well-addressed needs were skin management, wheelchair needs and accommodation. Some differences that occurred in certain areas across the four countries were found. (Kennedy P, et al, 2004).

Health literacy has been related to indicators of health outcomes in a number of populations, but not in SCI. In a Cross-sectional study conducted in New Jersey outpatient SCI center aimed to describe levels of health literacy in SCI and to investigate its possible associations with morbidity, health-related quality of life, functional independence, community participation, and life satisfaction. The study population includes 107 community-living people with SCI the results showed that Health literacy

levels in this sample were higher than those found in other groups. Health literacy was independently related to physical health morbidity, but its associations with other outcomes were limited, entwined with education, and affected by severity of injury. Future research might examine higher-level aspects of health literacy to overcome ceiling measurement problems. Mediators of the association between health literacy and morbidity, such as health self-care behaviors, should also be examined. (Johnston, et al, 2005).

In a cross sectional study conducted in Australia, aimed to study the interaction between quality of life in people with SCI and expectations of daily living (self-efficacy) and pain. The sample Included 106 individuals living in the community for 1 year or more in duration. The results showed that Persons with SCI were found to have lowered quality of life (QOL) compared with the Australian general population. Low self-efficacy and pain intensity were found to reduce QOL across all SF-36 domains even further. There is no significant relationship between completeness of lesion, sex, age at time of injury, and time since injury and reduced QOL (Middleton, 2007).

Carpenter and colleagues (2007) conducted a survey study aiming to describe participation among a community-based sample of SCI and to explore the relationship between participation and life satisfaction, including A sample of 357 people with SCI recruited through the British Columbia Paraplegic Association with mean age 46.0 years, mean time since SCI was 13.0 years, and 68% of the respondents were men. The Descriptive survey included data on community participation specifically related to social involvement, physical activity and relationship with others, transportation, and community access. Life satisfaction and happiness assessed using the Satisfaction with Life Scale and Happiness Scale. The results showed no limitations to participation were experienced by 18.5% of the respondents. While Satisfaction with transportation was associated with owning one's own vehicle, there was overall satisfaction with access to community buildings. Ability to be engaged in physical activity was also important to a majority of individuals 75%. Individuals who were living with others received better supports than who lived alone. (Carpenter, et al, 2007).

In a cohort study conducted in Netherlands aimed to determine the impact of SCI on life satisfaction of persons with SCI one year after discharge of inpatient rehabilitation. The sample included 147 adult with SCI. The Life Satisfaction Questionnaire is used for data collection, the results showed that Life satisfaction decreased in persons with SCI. the Level of lesion and suffering secondary impairments or pain were associated with low life satisfaction 1 year after discharge from inpatient rehabilitation.( van Koppenhagen, et al, 2008).

In summary, CI and AL are very important issue as they can be in closed relation with life satisfaction and QOL for individuals with SCI. many studies considered the more independent individuals in the ADL the best QOL. The importance of QOL was

seen from the quantity of the studies found in the literature studying these domains, CI and AL considered as a main component of these domains. CI and AL are used in the literature as indicator of measuring life satisfaction and QOL. From the literature many factors influence the life satisfaction and QOL, these factors including socio-demographic, injury related factors, environmental, employment and other factors. By somehow we can get general overview that all factors that mentioned in the literature interfere together and QOL may consider as indicator of CI.

# **Chapter Four**

## **Methodology**

## **4.1. Introduction:**

This chapter addresses issues relating to methodology used to answer the research questions. The chapter commences with study design, study population, study sitting, period of the study, sample size, sampling method. It's presents construction of the questionnaire, piloting ethical consideration, data collection and data analysis. Furthermore it's illustrates the validity and reliability of the study instrument, and eligibility criteria of the study.

## **4.2. Study design:**

Cross sectional design was used in this study, as it is the most suitable design for such study, which is one type of non-experimental design, in which the investigator does nothing to affect the outcome, but simply observes what happens.

It is quantitative since we are going to study the degree of CI of the spinal cord injured people in the society.

## **4.3. Study population:**

The study population included individuals with spinal cord injury, who received Rehabilitation programs in a rehabilitation hospital; both sex's male and female have equal chances to be included in this study, accurate number of the population is not available but estimated number according to the records of the society of physically handicap and Elwafa Medical Rehabilitation Hospital are 166 adults individual with SCI.

## **4.4. Procedures**

### **4.4.1. Study setting**

The study was carried out in GS including individuals with SCI who were living in the community for at least three months after completing a rehabilitation program in a rehabilitation center.

### **4.4.2. Period of this study**

This study was conducted from 1st of January, 2008 to 1st of sep., 2008.

#### **4.4.3. Sample size**

There is no accurate database or numbers in GS about people with SCI. But according to Elwafa Medical Rehabilitation Hospital statistics the total number of SCI people who were rehabilitated inside the hospital and reside in GS was (94) adult individuals, (WMRH, 2007). But according to the last survey of the National Center for Community Based Rehabilitation (2002, 2003) there was 320 individuals with SCI with all age groups. But there are no addresses available for them; also classification according to age is not available, for this cause they are excluded. From the records of society of physically handicap there are 166 adult SCI individual, this number including the all individuals with SCI in Gaza strip, no more data about them, such as addresses or cause of injury, no telephone number, or mobile number are given. So the researcher reached 120 individuals of them, one individual refused to participate in the study, 17 SCI individual excluded as they are used for pilot study, 3 individuals are died, and the other 19 remaining individuals of population haven't addresses or telephone numbers. The who are participated in this study distributed between both sexes 105 males, 15 females. Response rate was very high, only one refused to participate in this study.

#### **4.4.4. Sampling procedures**

The researcher used a non probability sample called convenience sample for recruiting SCI individuals to participate in this study.

#### **Eligibility Criteria:**

##### **Inclusion criteria:**

Individuals who were included in this study met the following criteria:

1. Sustained SCI in childhood or adulthood.
2. People with SCI due to Intifada events, road traffic accidents (RTA), pathological causes, and other causes.
3. They are living in GS.
4. They have received a rehabilitation program in a rehabilitation center whether in GS, west bank, or abroad.
5. They are currently living in the community at least for three months or more after completion of the Rehabilitation program.
6. Their Ages range from 18 – 65 years old.

##### **Exclusion criteria:**

The study excluded individuals with SCI who have any of the followings:

Associated head injuries.

Mental retardation.

Children who are unable to answer the questionnaire.

#### **4.4.5. Data collection**

The data was collected by the researcher in addition to, two assistants who received training to give the same directions and explanations to all individuals . All questions were arranged, and numbered serially. Each questionnaire consisted of a consent form in the front page inviting the patient to participate in the study if they agree, with time allowance between 15 to 20 minutes to fill the questionnaires. The researcher collected 120 questionnaires and they were all checked for completeness before data entry into the computer.

#### **4.4.6. Data entry and analysis**

The researcher entered the data of 120 questionnaires using the SPSS version 15 with cooperation of a statistician. Data analysis which illustrated in the following steps:

Over viewing the filled questionnaires.

Coding of questionnaires.

Designing data entry model.

Defining variables.

Coding variables.

Data cleaning.

Frequency table for the study variables.

Testing validity and reliability.

Cross tabulation of results.

Conducting advanced statistical tests like Cronbach's alpha.

Correlation coefficient.

## **4.5. Instrumentation**

### **4.5.1. community integration questionnaire (CIQ):**

It is a self structured questionnaire was designed for this study was used since it is one of the most widely used data gathering tools. Formulating precise written questions from those whose opinions or experiences you are seeking seems as an easy task. But experience tells that it is not as simple as it might seem.

Functional Independent Measure (FIM) scale to measure AL.

#### **Questionnaire design:**

The questionnaire was designed in Arabic language. (A structured Interviewing Questionnaire).

The questionnaire was revised by both experts in Arabic language and experts in Rehabilitation, CI, list of expert's names, (see annex, 4)

The researcher tried to avoid unnecessary personal data, leading, complex or duplicated questions.

In each questionnaire, an explanatory letter was attached to ease the mission of researcher, (see annex, 3).

The questionnaire was divided into four categories

First part : personal data including information about the cause of injury , the level of education, the date of injury , the level of injury , the marital status, the place of residence.

The second part dealt with the activities of SCI people at the activity of daily living.

The third part dealt with participation in the society.

The Last part dealt with the relation and behavior of the person in the family and the society. Copy of the questionnaire will be in the annexes, (See annex, 5).



## 4.5.2. Psychometric testing of instrument

Validity: of an instrument is that the degree to which an instrument measures what it supposes to measured (Polit, 2004).

### **Face and content validity:**

Face and content validity of an instrument is necessarily based on judgment that, the degree to which the item in an instrument adequately represents the universe of content. The instrument is submitted to an expert's panel with experience and knowledge of the topic that make suggestions and judgment about the adequacy of the instrument.

Face and content validity were done prior data collection, to judge clarity, simplicity and completeness of the instrument.

About 6 instruments were sent to various experts and researchers (see annex, 2) including the study objectives, research questions, explanatory letter and the questionnaire.

Because the questionnaire was designed in Arabic language, the questionnaire was revised by experienced individuals in Arabic language and the researcher modified the instrument by adding and removing some items and statements.

### **Reliability:**

Reliability of instrument reflects the degree of consistency of an instrument during measurement the attribute (Polit, 2004).

A reliable measure is one that maximizes the true score component and minimize the error component. In this study, the statistical test used was Cronbach's alpha coefficient and this test measure the reliability of the instrument between each domain and the whole of the instrument.

Researcher estimated the means reliability of the instrument of this study by using the equation of Cronbach's alpha (No. of items = 43); where the value of alpha = (0.936), which indicating that this instrument has high reliability.

The normal range of Cronbach's alpha value between (0.00- and +1.0)

And the interclass correlation coefficient was 0.000 which indicated that there is significant correlation.

### **4.5.3. FIM scale to measure AL**

FIM to measure patient's functional status. The researcher measure AL with the FIM scale according to what he see with the individual in the community, (see annex, 6).

The FIM is an ordinal scale covering 18 items. It uses a 7-point rating scale. Each item consists of maximum score of 7 and minimum score of 1. Total possible FIM scores range from 18 to 126. Each level of scoring is defined. For example, a score of 7 equals "complete independent", a score of 1 equals "complete dependence", and 3 equals "moderate assistance". The areas examined by the FIM include: self-care, sphincter control, transfers, locomotion, communication, and social cognition. These areas are further divided into motor and cognitive domains (Granger, 1993).

The motor domain includes the items in the areas of self-care, sphincter control, transfers, and locomotion subscales. The cognitive domains include items from the subscales of communication and social cognitive. Ratings consider performance rather than capacity and may be based on observation, patient interview, or medical records. Evaluators are usually physicians, nurses, or therapists. The FIM takes 20 -30 minutes to administer and score for each patient.

The way of this questionnaire was administering by face to face interview.

### **4.6. Pilot study**

This study carried out as a pre-test of instruments, as it was conducted mainly to test recruitment response rate, clarity, length and suitability of questions.

The study was carried out on (17) individuals (16 Males and 1 Females), with SCI who are eligible for this study. The results directed the researcher to modified, cancelled and rephrase some items and questions.

The piloted individuals were excluded from the main study population.

### **4.7. Statistical analysis approaches**

For data and calculation and analysis, the researcher used:

- T-test to calculate the differences.
- Anova test.
- Pearson's Correlation to compute the correlation between the variables.

- Calculation for means, SD, standard errors of means, range, percentage, etc...

#### **4.8. Ethical considerations**

The agreement of each individual was taken by signing a consent form before being including in this study, (see annex, 3).

Ethical committee approval was also obtained for the experts to judge the questionnaire, (see annex, 2).

Permission letter to the societies where individuals participated in the study, (see annexes, 8, 9, and 10).

#### **4.9. Limitation of the study**

The study reported here has some limitation:

- Limited resources such as journals, books and further researches.
- Limited literature related to AL and CI among adults with spinal cord injuries.
- Very bad political and socioeconomic conditions led to absence of a lot of individuals who lived in the boarder's line and it is very danger to reach them.
- There is no clear data base about the total number, addresses, and phone numbers about the individuals with SCI in GS.
- The effect of siege on transportations means which restricted the data collection process and made it took too long time (from March, 7th, 2008 – may, 15th, 2008). Data collection process was paused many times due to lack of transportation in GS.
- Lack of printer papers to copy the questionnaires in books' shop.
- The multiple cut of electricity for long hours during the day and night wasted a huge amount of time and delayed data collection and analysis.

# **Chapter five**

## **Results**

## Results

### Introduction

In this chapter the researcher will view the results of the study, answering the proposed questions in main sections including the socio-demographic data results which views the frequencies of the study sample, the AL section, CI and the last section will view the differences and correlations between the different variables and factors.

### 5.1. The results of socio-demographic data

#### Age:

The mean age of individuals was 34.58 years with standard deviation (SD) 12.225 years.

Fifty three of the study samples aged between 18-30 years (44.2 %), 29 aged between 31-40 years (24.2 %), 24 individuals were between 41 – 50 years (20%), and 14 individuals aged between 61- 65 years of the study population (11.7%).

#### Gender:

From the following table (table 5.1), it is clear that, the higher percentage of people with SCI were males 105 (87.5%), while the percentage of females were much lower 15 individuals (12.5%).

#### Level of education

The distribution of individuals according to the level of education was as follows: it was found that, 33 SCI were university educated (27.5%), 35 individuals were secondary school educated (29.2%), 27 individuals were intermediary school educated (22.5%), 24 individuals were primary school educated (20.0%), and surprisingly only 1 individuals was not educated (0.8%), this may be due to the culture that we live here in GS.

#### Marital status:

As shown in the table (5.1) the higher percentage of the sample was married individuals 73 (60.8%), while single individuals were 43 (35.8%).

**Table (5.1): The socio-demographic results**

Categories	Subcategories	Frequency	Percentage%
<b>Age</b> <b>(Years)</b>	18 – 30 years	53	44.2
	31 – 40 years	29	24.2
	41 – 50 years	24	20.0
	51 – 65 years	14	11.7
	Total	120.0	100.0
<b>Gender</b>	Male	105	87.5
	Female	15	12.5
	Total	120	100.0
<b>Level of education</b>	Not-educated	1	0.8
	Primary School	24	20.0
	Preparatory School	27	22.5
	Secondary School	35	29.2
	University Degree and above	33	27.5
	Total	120	100.0
<b>Marital status</b>	Single	43	35.8
	Married	73	60.8
	Others	4	3.3
	Total	120	100.0

## **5.2. Injury related factors**

### **Cause of injury:**

From the table (5.2): injury related factors the researcher found that:

The cause of injury due to Intifada clashes with Israeli soldiers was higher than other causes including traumatic, pathological, surgical, and other causes. From the data collected it was found that, the intifada individuals with SCI were 62 individuals of the entire sample (51.7%), and SCI due to other causes were 58 individuals (48.3%).

### **The level of injury:**

Regarding the level of injury, the researcher classifies the areas of injury into three categories cervical, thoracic and lumbar. People with cervical injuries were 27 individuals of the total sample (22.5%). Thoracic injuries were 54 individuals (45.5%). The lumbar injuries were 39 individuals (32.5%).

### Type of injury:

For this category the researcher classify it wither it is complete cord Lesion or incomplete cord Lesion, from the results we find 46 individuals are with complete cord lesion (38.3%), the incomplete cases were 74 individuals , (61.7%).

The major of SCI are with incomplete cord lesions.

### Years after spinal cord injuries:

Results revealed that, 23 individuals (19.2%), had the SCI 1-2 years ago, 62 individuals (51.7%) had their SCI 3-10 years ago, while individuals who lived with SCI  $\geq$  11 years ago were 29.2% of individuals .

**Table (5.2): Injury related factors results**

Categories	Subcategories	Frequency	Percentage
Cause of injury	intifada	62	51.7
	Others	58	48.3
	Total	120	100.0
Level of injury	Cervical	27	22.5
	Thoracic	54	45.5
	Lumbar	39	32.5
	Total	120	100.0
Type of injury	Complete cord lesion	46	38.3
	Incomplete cord lesion	74	61.7
	Total	120	100.0
Years after having SCI	1-2 years living with SCI	23	19.2
	3–10 years living with SCI	62	51.7
	11 years and above living with SCI	35	29.2
	Total	120	100.0

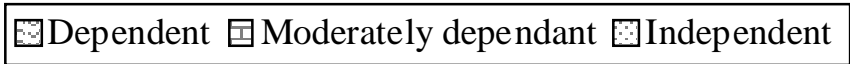
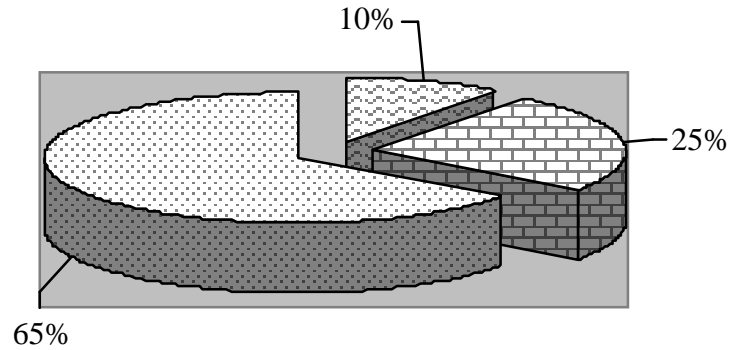
### 5.3. The results of AL measured by FIM

FIM total scores are classified into motor subtotal scores and cognitive subtotal scores, the motor subtotal area is classified into two areas. The self care area includes eating, grooming, bathing, dressing upper body, dressing lower body, and toileting. The 2nd area assessed the sphincter control area which includes bladder management, and bowel management.

### 5.3.1. Total FIM scores (level of AL)

The mean scores of total FIM scores were 92.23 with standard deviation (SD) 24.147. As shown in the following diagram, there were 12 dependent individuals in ADL (10%), 30 were moderately dependant in ADL (25%), and 78 individuals were completely independent in ADL (65%). The minimum FIM score was 18 and the maximum score was 126.

**Diagram (5.1): total of FIM scores**

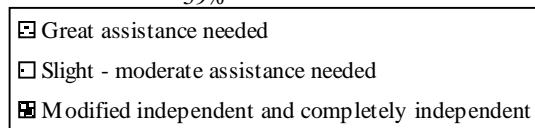
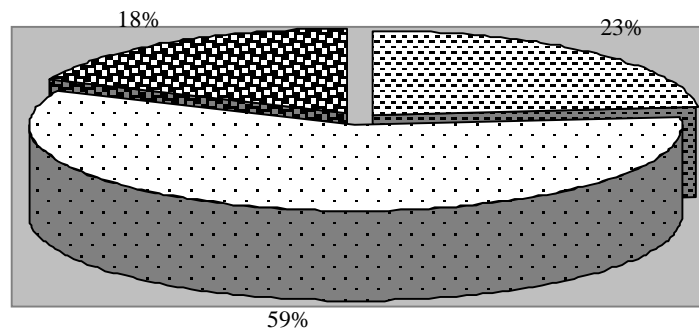


### 5.3.2. Motor subtotal scores

This area includes the motor subtotal scores which consist of 13 items containing the self care and sphincter control areas.

Twenty eight individuals needed great assistance (23.3%), 70 individuals need slight moderate assistance (58.4%), and 22 individuals were labeled as modified independent and completely independent (18.3%).

**Diagram (5.2): motor subtotal scores**

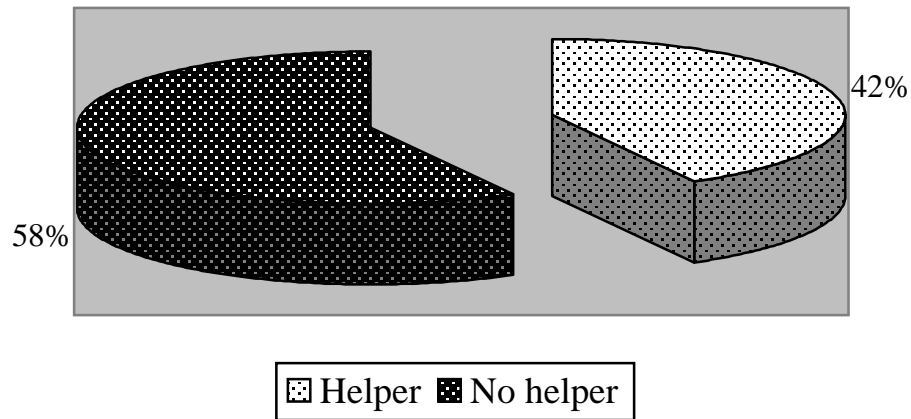




### 5.3.3. Results of self care activities

As shown in the diagram (5.2), the researcher found that 51 individuals need helper (42%) to perform their ADL, 69 individuals are completely independent with a device or not (58.0%).

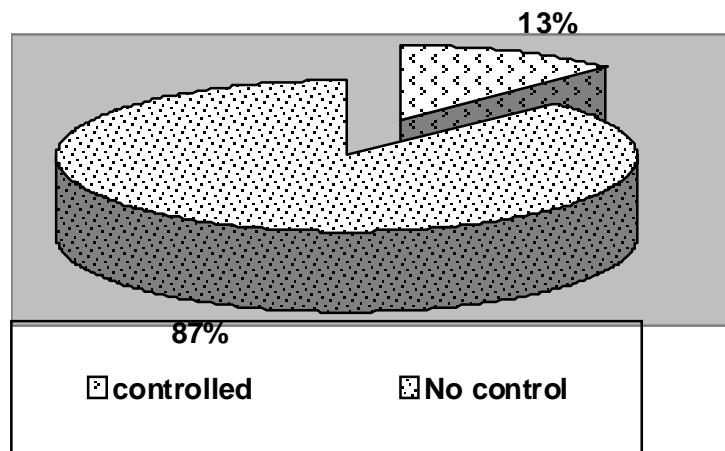
**Diagram (5.3): Results of self care activities**



### 5.3.4. Sphincter control among adults with SCI

As shown in the diagram (5.4), 105 individuals had no control over the sphincters function (87.5%), 15 individuals controlled their sphincters function (12.5%).

**Diagram (5.4): sphincter control**



## 5.4. Results of CI domain

The next diagram (5.5) shows the level of CI among adults with SCI in GS, which was classified as follow:

CIQ consisted of four main categories three of them with 43 items:

First part personal data, Second part: deals with various activities of the individuals with SCI at the activity daily living, and consists of 15 items. The third part deals with individual's participation in the society, and consists of 15 items. The Last part of the questionnaire deals with participation role inside the family and with friends, it consists of 13 items.

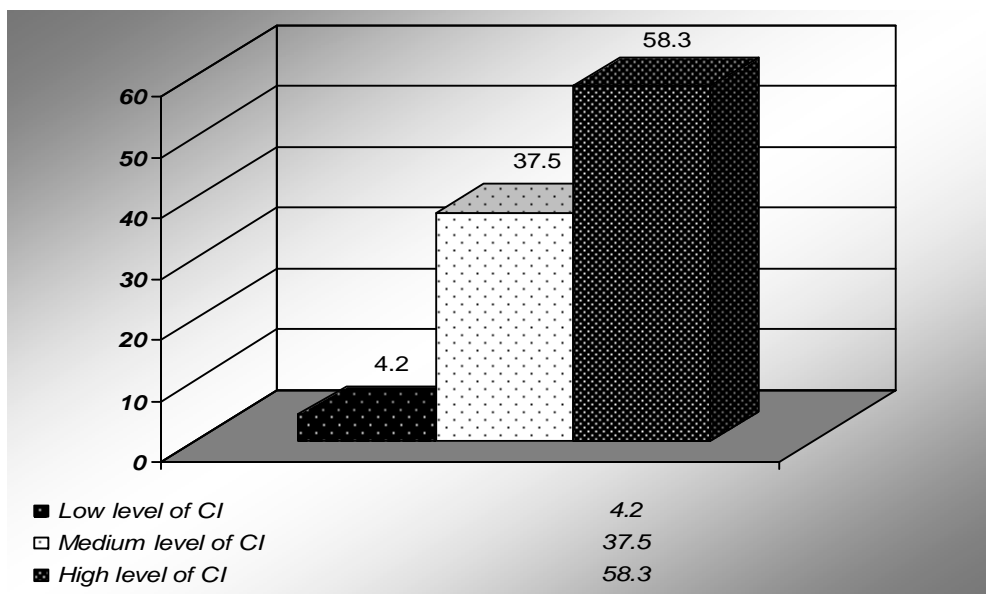
The total scores of CIQ are 129 points, the maximum score is 129, and the lowest score is 43.

### 5.4.1. Scores of CIQ

The mean of the CIQ scores is 100.38, the minimum score recorded was 63, and the maximum score was 129, with standard deviation 17.606.

Individuals with Low level of CI (who had scores between 43-70 points in the CIQ) were 5 individuals (4.2%). Individuals with medium level of CI (who had scores between 71-97 points in the CIQ) were 45 individuals (37.5%). Individuals with high level of CI (who had scores between 98-129 points in the CIQ) were 70 individuals (58.3%).

**Diagram (5.5): Total of CI questionnaire group**



#### 5.4.2. Daily Activities

It is the part of the questionnaire that consists of 15 questions asking about shopping, preparing food, home making and other activities.

The table revealed that 27 individuals were completely dependent in the activity part (22.5%), 34 individuals need assistance (28.3%), and 59 individuals were completely independent (49.2%).

#### 5.4.3. Community participation

This part consists of 15 questions asking about the participation of the individual in the community whether assistance is needed or not.

Thirteen individuals had poor participation (10.8%), 58 individuals has weak participation as they needs moderate to great assistance, (48.4%), and 49 individuals had good participation 49 (40.8%).

#### 5.4.4. Social relation

The last part of the questionnaire consisted of 13 questions asking about participation of individual inside the family such as talking, and joking with family members, taking food with family and others.

The majority of individuals have good participation inside the family, (68.4%). Only 1 participant had poor participation with his family (0.8%).

**Table (5.3): results of CI components**

Categories	Subcategories	N	%
<b>Daily Activities</b>	Completely dependant (15-23)	27	22.5
	Needs assistance (24-36)	34	28.3
	Independent (37-45)	59	49.2
	Total	120	100.0
<b>Community participation</b>	Poor participation (15-23)	13	10.8
	Weak participation (24-36)	58	48.4
	Good participation (37-45)	49	40.8
	Total	120	100.0
<b>Social relations</b>	Poor participation (13-20)	1	0.8
	Weak participation (21-31)	37	30.8
	Good participation (32-39)	82	68.4
	Total	120	100.0

### 5.4.5. AL (FIM scores) and CI.

As shown in the following table, the higher percent of SCI who were completely independent had the high level of CI 60 (85.7%), followed by 10 moderately dependent SCI individuals (14.3%). Nineteen of moderately dependent SCI individuals had the higher percent of medium level of CI (42.2%), followed by 18 completely independent SCI individuals (40.0%). And 4 of completely dependent SCI individuals had the higher percent of low level of CI (80.0%), followed by 1 moderately dependent SCI individuals (20.0%).

This results shows strong statistically significant differences between AL and CI (P=0.000). One way ANOVA test between mean's revealed that there were significant mean's different between dependant and moderately dependant SCI individuals (p=0.001), and there were strongly significant mean's different between dependant and completely independent SCI individuals (P= 0.001), and there were strongly significant mean's different between completely independent and moderately dependant SCI individuals (P=0.001). And the results of correlation between AL and CI shows strong positive correlation coefficient (R= 0.692), and this correlation is statistically significant (P = 0.000)

**Table (5.4): CI and AL**

	High level of CI		Medium level of CI		Low level of CI		P-value
	N	%	N	%	N	%	
<b>Dependant (50 and lower)</b>	0	0.0	8	17.8	4	80.0	***0.000
<b>Moderately dependent(51 – 89)</b>	10	14.3	19	42.2	1	20.0	
<b>Completely independent(90 and above)</b>	60	85.7	18	40.0	0	0.0	
<b>Total</b>	70	100.0	45	100.0	5	100.0	
*p< 0.05		**p< 0.01			***p< 0.001		

### 5.4.6. CI and socio demographic factors CI and age:

Thirty-two SCI individuals age between 18 and 30 years old had the higher percentage of high level of CI (45.7%), followed by 18 individuals age between 31 and 40 years (25.7%), and 14 individuals age between 41 and 50 years (25.0%), and only 6 individuals age between 51 and 65 had the lowest account of high CI (8.6%).

Nineteen SCI individuals age between 18 and 30 years old had the higher number of medium level of CI (42.2%), followed by 10 individuals of age between 31 and 40 years (22.2%), 10 individuals of age between 41 and 50 years old (22.2%), 6 SCI individuals age between 51 and 65 years old (13.3%). And 2 of SCI individuals age between 18 and 30 years old had low level of CI (40.0%), 2 individuals age between 51-65 years old(40.0%), followed by only 1 participant age between 31 and 40 years (20.0%). (See table 5.5).

This result shows no statistical significant in differences between age and CI (P= 0.481). the results of correlation between CI and age shows negative correlation-coefficient (R = -0.095) , and this correlation is not statistical significant (P= 0.306).

**Table (5.5): CI and age results:**

		High level of CI		Medium level of CI		Low level of CI		P-value
		N	%	N	%	N	%	
<b>Age group</b>	18-30 years	32	45.7	19	42.2	2	40.0	0.481
	31-40 years	18	25.7	10	22.2	1	20.0	
	41-50 years	14	20.0	10	22.2	0	0.0	
	51-65 years	6	8.6	6	13.3	2	40.0	
	Total	70	100.0	45	100.0	5	100.0	
		*p< 0.05		**p< 0.01		***p< 0.001		

**CI and Gender:**

As shown in the following table (5.6), concerning gender and CI, 66 males' participant's lives with high level of CI (94.3%), 35 males individuals lives with medium level of CI (77.8%), and 4 males individuals lives with low level of CI (3.8%). Four females individuals lives with high level of CI (5.7%), 10 females individuals lives with medium level of CI (22.2%), and only one female participant lives with low level of CI (20.0%). Regarding gender and CI the results were strongly statistically significant in differences (P= 0.029). T test results is not statistically significant (T= 0.572).

**Table (5.6): CI and gender results:**

		High level of CI		Medium level of CI		Low level of CI		P-value
		N	%	N	%	N	%	
<b>Gender</b>	Male	66	94.3	35	77.8	4	80.0	*0.029
	Female	4	5.7	10	22.2	1	20.0	
	Total	70	100.0	45	100.0	5	100.0	
		*p< 0.05		**p< 0.01		***p< 0.001		

### **CI and Life experience with SCI**

Regarding years living with SCI, 35 individuals who had 3-10 years experience living with SCI had the higher percentage of high level of CI (50.0%), followed by 22 individuals who had 11 years and above of experience living with SCI (31.4%), and 13 individuals who had 1-2 years experience (18.6%). Twenty-five individuals who had 3-10 years experience living with SCI had the higher percentage of medium level of CI (55.6%), followed by 11 individuals who had 11 years and above of experience living with SCI (24.4%) ,and 9 individuals who had 1-2 years experience (20.0%). Two individuals who had 3-10 years, and 2 individuals who had 11 years and above of experience living with SCI had the higher percentage of low level of CI (40.0% for each), followed by only 1 participant who had 1-2 years of experience living with SCI (20.0%%). This result shows no statistical significant in differences between experience years living with SCI and CI (P= 0.910), ANOVA test was not statistically significant.

**Table (5.7): CI and Experience Years living with SCI results:**

		High level of CI		Medium level of CI		Low level of CI		P-value
		N	%	N	%	N	%	
<b>Experi ence Years living with SCI</b>	1-2 Years	13	18.6	9	20.0	1	20.0	0.910
	3-10 years	35	50.0	25	55.6	2	40.0	
	11+years	22	31.4	11	24.4	2	40.0	
	Total	70	100.0	45	100.0	5	100.0	
		*p< 0.05		**p< 0.01		***p< 0.001		

### **CI and Level of education**

Regarding the level of education and CI, the results showed that there were no statistical significant differences between level of education and CI among SCI (P= 0.286). The result showed that 25 of university degree educated individuals had the higher percentage of high CI level (35.7%), followed by 21 of secondary school educated (30.0%), 12 of primary school educated (17.1%), 11 of preparatory school educated (15.7%), and 1 of not-educated participant (1.4%). Fifteen of preparatory school educated individuals had the higher percentage of medium CI level (33.3%), followed by 12 of secondary school educated (26.7%), 11 of preparatory school educated (24.4%), and 7 of university degree educated (15.6%). Two of secondary school educated SCI individuals had the higher percentage of low CI level (40.0%), followed by 1 of university degree educated (20.0%), 1 of preparatory school educated (20.0%), and 1 of primary school educated participant (20.0%).

**Table (5.8): CI and Level of education results:**

		High level of CI		Medium level of CI		Low level of CI		P-value
		N	%	N	%	N	%	
<b>Level of education</b>	Not-educated	1	1.4	0	0.0	0	0.0	0.286
	Primary School	12	17.1	11	24.4	1	20.0	
	Preparatory School	11	15.7	15	33.3	1	20.0	
	Secondary School	21	30.0	12	26.7	2	40.0	
	University Degree	25	35.7	7	15.6	1	20.0	
	Total	70	100.0	45	100.0	5	100.0	
*p< 0.05		**p< 0.01				***p< 0.001		

**CI and Marital Status.**

Concerning MS, the results shows that 43 of married individuals had the higher percentage of high CI level (61.4%), followed by 25 single individuals (35.7%), and 2 individuals who were classified as other (2.9%). Also married individuals had the higher percentage of medium level of CI level 28 (62.2%), followed by 15 by 25 single individuals (33.3%), and 2 individuals who were classified as other (4.4%). And 3 single individuals had the higher percentage of low level of CI (60.0%), followed by 2 married individuals (40.0%).

This result shows no statistical significant in differences between MS and CI (P= 0.800).



**Table (5.9): CI and marital status results:**

		High level of CI		Medium level of CI		Low level of CI		P-value
		N	%	N	%	N	%	
<b>MS</b>	Single	25	35.7	15	33.3	3	60.0	0.800
	Married	43	61.4	28	62.2	2	40.0	
	Others	2	2.9	2	4.4	0	0.0	
	Total	70	100.0	45	100.0	5	100.0	
		*p< 0.05		**p< 0.01		***p< 0.001		

### 5.4.7. CI and injury related factors

#### CI and Type of injury

Concerning injury related factors and CI, the results shows 45 individuals with incomplete cord lesion had the higher percentage of o high CI level (64.3%), followed by 25 individuals with complete cord lesion (35.7%). Also incomplete cord lesion individuals had the higher percentage of medium CI level (60.0%), followed by 25 individuals with complete cord lesion (40.0%). And 3 individuals with complete cord lesion had the higher percentage of low CI level (60.0%), followed by 2 individuals with incomplete cord lesion (40.0%).

Regarding injury related factors and CI the results are not statistically significant in differences (P= 0.536, T = 0.002).

#### CI and Level of injury

Regarding level of injury, the results shows that 33 individuals with thoracic level of injury had the higher percentage of high level of CI (47.1%), followed by 30 individuals with lumbar level (42.9%), and 7 individuals with cervical level of injury (10.0%). Also individuals with thoracic level of injury had the higher percentage of medium level of CI 21 (46.7%), followed by 15 individuals with cervical level of injury (33.3%), and 9 individuals with lumbar level of injury (20.0%). And only 5 individuals with cervical level of injury had low level of CI (100.0%).

Regarding the level of injury and CI the results were strongly statistically significant in differences (P= 0.000).

## CI and Cause of injury

Regarding the cause of injury and CI, the results shows that 39 individuals of intifada injury had the higher percentage of high level of CI (55.7%), followed by 31 individuals of other factors related to injury (44.3%). Twenty-four individuals of other factors related to injury had the higher percentage of medium level of CI (53.3%), followed by 12 individuals of intifada injury (46.7%). And 3 individuals of other factors related to injury had the higher percentage of low level of CI (60.0%), followed by 2 individuals of intifada injury (40.0%).

The results shows no statistical significant in differences between cause of injury and CI (P= 0.554), T test is not significant statistically (T = 0.126).

**Table (5.10): CI and injury related factors table**

Injury related factors		High level of CI		Medium level of CI		Low level of CI		P-value
		N	%	N	%	N	%	
Type of injury	Complete cord lesion	25	35.7	18	40.0	3	60.0	0.536
	Incomplete	45	64.3	27	60.0	2	40.0	
	Total	70	100.0	45	100.0	5	100.0	
Level of injury	Cervical	7	10.0	15	33.3	5	100.0	***0.000
	Thoracic	33	47.1	21	46.7	0	0.0	
	Lumbar	30	42.9	9	20.0	0	0.0	
	Total	70	100.0	45	100.0	5	100.0	
Cause of injury	Intifada	39	55.7	12	46.7	2	40.0	0.554
	Others	31	44.3	24	53.3	3	60.0	
	Total	70	100.0	45	100.0	5	100.0	
		*p< 0.05		**p< 0.01		***p< 0.001		

## **5.5. CI domains and other variables**

### **5.5.1. Activity limitation (AL)**

In table (5.11) the results show that 25 university educated individuals had the higher percentage of high CI level related to AL(42.4%), followed by 13 of secondary school educated (22.0%), 10 of preparatory school educated (16.9%), 10 of primary school educated (16.9%), and 1 of not-educated participant (1.7%). Fifteen of secondary school educated individuals had the higher percentage of medium CI level related to AL(44.1%), followed by 9 of preparatory school educated (26.5%), 5 of university educated (14.7%), 5 of primary school educated (14.7%). Nine of primary school educated had the higher percentage of low CI level related to AL(33.3%), followed by 8 followed by (29.6%), 7 of secondary school educated (25.9%), and 3 of university educated (11.1%)

Regarding the level of education and CI related to activity limitation, the results showed that there were statistical significant differences between level of education and CI related to AL among SCI (P= 0.015).

### **5.5.2. Community participation**

The results shows that males individuals had the higher percentage of high CI level related to community participation (93.9%), followed by 3 females individuals (6.1%). Fifty-three male's individuals had the higher percentage of medium level of CI (91.4%), followed by 5 female's individuals (8.6%). And 7 females individuals had the higher percentage of low CI level related to community participation (87.5%), followed by 6 males individuals (46.2%)

The results shows strong statistically significant differences between gender and CI related to community participation among SCI individuals (P= 0.000). T-test considered statistical significant difference between the two group means (p=0.001).

Individuals with complete cord lesion who have high level of CI related to community participation are 20 (40.8%), followed by 29 individuals with incomplete cord lesion who have high level of CI (59.2%), and 16 individuals with complete cord lesion had medium level of CI (27.6%), and 42 individuals with incomplete cord lesion having the same level of CI related to activity participation (72.4%), while those who have low level of CI with complete cord lesion are 10 individuals (76.9%) and 3 ones with incomplete cord lesion having low level of CI related to community participation(23.1%).

There are strong statistically significant differences between gender and CI related to community participation among SCI individuals (P= 0.004). T-test considered statistical significant difference between the two group means (P=0.002).

**Table (5.11): CIQ domains and socio-demographic factors**

<b>AL</b> <b>Sociodemographic factors</b>	<b>Activity limitation</b>	<b>Community participation</b>	<b>Social relations</b>
<b>Gender</b>	P=0.401	P=***0.000	P=0.126
<b>Age group</b>	P=0.603	P=0.182	P=0.508
<b>Experience Years living with SCI</b>	P=0.691	P=0.469	P=0.879
<b>Level of education</b>	P=*0.015	P=0.234	P=0.677
<b>MS</b>	P=0.228	P=0.153	P=0.764
*p< 0.05      **p< 0.01      ***p< 0.001			

### 5.5.3. AL and factors related to injury

SCI individuals with thoracic level had the highest percentage of high CI level related to AL30 (50.8%), followed by 26 individuals of Lumbar level (44.1%), and 3 individuals of cervical level of SCI (5.1%). Also 16 of thoracic level had the highest percentage of moderate level of CI related to AL(47.0%), followed by 12 individuals of lumbar level (35.4%), and 6 individuals with cervical level of SCI (17.6%). And 18 individuals with cervical level had the highest percentage of low level of CI related to AL(66.6%), followed by 8 individuals with thoracic level (29.6%), and only 1 participant with lumbar level (3.8%).

There were strong statistically significant differences between level of injury and CI related to activities among SCI individuals (P= 0.000).

#### 5.5.4. Community participation and factors related to injury

SCI individuals with incomplete spinal cord lesion had the highest percentage of high level of CI related to community participation 29 (59.2%), followed by 20 individuals with complete cord lesion (40.8%). Also 42 individuals with incomplete spinal cord lesion had the highest percentage of moderate level of CI related to community participation (72.4%), followed by 16 individuals with complete cord lesion (27.6%). And 10 individuals with complete cord lesion had the highest percentage of low level of CI related to community participation (76.9%), followed by 10 individuals with incomplete cord lesion (23.1%).

**Table (5.12): CIQ domains and injury related factors**

	<b>Activity limitation</b>	<b>Community participation</b>	<b>Social relations</b>
<b>Type of injury</b>	P=0.954	P= **0.004	P=0.117
<b>Level of injury</b>	P=***0.000	P=0.147	P=0.058
<b>Cause of injury</b>	P=0.051	P=0.092	P=0.580
	*p< 0.05	**p< 0.01	***p< 0.001

# **CHAPTER six**

## **Discussion**

## **6.1. Introduction**

In this chapter the researcher will discuss the main findings of this study and compare the results with that of global and regional studies then display the suggested recommendations and suggested studies in the future.

It is worth reminding the reader that the presented information based on 120 individuals with SCI living in the community in GS.

To the best of the researcher knowledge this the first study to identify AL and CI and its related factors.

## **6.2. Socio-demographic Data and CI**

### **Gender:**

The main results of this study regarding gender showed the that, the higher percentage of people with SCI were males (87.5%), while the relationship between gender and CI the results were strongly statistically significant in differences ( $P= 0.029$ ), The results shows strong statistically significant differences between gender and CI related to community participation among SCI individuals ( $P= 0.000$ ).

This finding was lower than the ratio found in the study conducted by the International Committee of the Red Cross (Deconinck, 2003) in two towns in Afghanistan counting proportionately fewer females than expected with a male to female ratio of 9:1. This result also was different from the usual studies that held in the United States of America (USA), as the male to female ratio was 4:1 (Kemoun G, et. al, 1993 & SCI Information Network, 2002).

Statistics from the national Spinal Cord Injury Statistical Center in the USA also showed lower percent of women representation among SCI individuals as they represent about 20% of all new cases of SCI each year; however, they make up 25–30% of the total SCI population (Klebina, 2003).

The findings of this study demonstrated a significant gender differences among males and females ratio as the males very high in comparison to females.

In a study conducted in the USA, gender was found to be associated with the environmental barriers including the CI, women experienced more difficulties across all factors affects CI (Martin B, et al, 2004). Another study showed Women with SCI were more likely to experience barriers than men. Measures of barrier prevalence and intensity also revealed that women reported a greater experience of barriers than men (Newman, 2007), this result agreed with results of our study In another study conducted in the USA

showed no effect of gender on SCI (Anderson et al., 2003), which differ from the results of this study.

The findings from these studies combined with the statistical data in the Chart book on Women and Disability (Jans & Stoddard, 1999) clearly demonstrates that women with SCI face many obstacles when attempting to return to their pre-injury level of community participation. But in this study the researcher does not focus on these obstacles but generally there are significant differences in CI and AL regarding gender.

From the researcher point of view, this high percentage of SCI among males is due to the man dominance in our societies as the principal bread winner and hence more act and therefore more prone to all sorts of accidents and risks of SCI more than female. Also regarding the strong relation between gender and community participation, this may be due to the role of the woman in our society, as the main manager of the home with many roles in raising kids and serving them.

### **Age:**

The main results regarding age showed that, The mean age of the individuals was 34 years, there is no statistical significant in differences between age and CI, there is no significant relationship between age from one side and CI and AL from the other side.

From the results of age, most of the individuals are still young, as this decade of life is the most active period of life and more exposed to top risks during working, driving and other activities, results of the other studies all over the world agreed with this result, in the study of (Anderson et al., 2003) the mean age was 29 years. In another study conducted in the USA, the mean age at interview was 29 years too, in the study of (Vogel, et al, 1998) the mean age of the participant were 27 years old. From these studies the mean age of individuals with SCI between the 2nd and 3rd decade of life. But there is some studies found different mean age as in the study of (McColl, et al, 2004) which conducted in England, Canada, and the USA the mean age was 57 years.

The youth of the individuals help them to regain functional activities more than elderly people, as they showed low scores in the activities domains. While better scores is achieved in community participation, family and social relationships. This was supported by a study of the Canadian Paraplegic Association (CPA) given that the majority of traumatic SCI occur in young adults, who return to work or school is of high importance, but often necessitates a change in vocation. Less than 18% of those employed at the time of injury were able to return to the same job (CPA, 1997). But there is no statistical significant relationship between age and CI, this result differ from the results of the CPA , 1997 study which revealed logically and statistically younger people is more active than elderly.



The relationship between activities category in CIQ and age, young individuals showed higher scores than elderly, but there is no statistical significant relationship between activities in CIQ and age, this result agreed with another study which revealed those who are injured younger are more likely to return to work (Gordon & Brown, 1997).

### **Marital status:**

SCI considered as a devastating agent on the family, once the injury occurred to the individuals, his life is changed, and the role of the family become different, especially when the injury is acute as the family supports the victim, from here the importance of family relationships are very important as they push forward the process of rehabilitation, wives has major supportive impact on married SCI individuals.

The findings of the study demonstrates that more than the half of the individuals are married about 60.8% of the total individuals, 35.8% are single 3.3% classified as others which is very rare percent, some of them are divorced or widows, This result shows no statistical significant in differences between MS and CI, there is no statistical significant relationship between CI and AL.

Some of the studies in the literature considered the marriage or MS as CI; the study DeVivo (1992) granted that MS represent the CI. (DeVivo, et al, 1992). Which agreed with another study conducted in the USA which studied the social relations of SCI individuals on "domain-specific satisfaction with pediatric onset of the spinal cord injuries" showed that dating and sexual opportunities is the least satisfied domain with other two domains of satisfaction, which has a significant impact on overall satisfaction, dating and sexual opportunities has the effect of MS on CI which affected by life satisfaction (Anderson, C. & Vogel, L. 2003). Higher rates of being discharged into nursing homes were seen amongst divorced (9 percent), separated 11% and widowed persons 24%, compared to those who were single or married 4% (Gordon & Brown, 1997), from the previous study people with SCI who are widowed or divorced does not integrate in the community so they discharged to nursing home more than others who are married. Some studies examining marriages after SCI have found fewer problems and higher levels of marital satisfaction. (Crewe et. al.1979).

Despite of the results of the present study that revealed singles and married individuals has the same chances in the CI, but from the researcher point of view the individuals who lived in an extended families even they are single, they has the same opportunities to reintegrate in the community as married persons who, this may be refer to that they find the support from the family, which compensate the support of wives for married people. Also married persons receive support from their family in addition to their wives, so marital status by a way or another has impact on the CI among individuals with SCI.

## **Level of education**

Education has major impact on the CI; some consider it as independent variable, and measuring it as outcome of the CI. The present study highlights the impact of the level of education on CI. However, in some ways, education and employment may be considered synonymous with CI, as it is a predictor of CI. (Anderson et al., 2003). So in this chapter the researcher will discuss the results of this studies with other studies in the literature that studied the impact of level of education directly on the CI, or other outcome of rehabilitation as employment which considered as CI, this is also shown in a study of CI among adults with SCI, education with other out comes as employment, marital status selected to represent CI, (DeVivo and Richards 1992).

The results in this study shows that the percent of educated people is very high about 79% of the individuals , while individuals who are not educated or with primary education level about 21%, there were no statistical significant differences between level of education and CI among SCI. while there is statistically significant differences between level of education and CI related to AL among SCI individuals (P= 0.015). From these results we see that there is indirect relationship between level of education and CI, as there is direct relationship between level of education and AL. and there is strongly significant relation between AL and CI.

The results of this study go on with the results of another study conducted in the USA revealed that having more years of education were all predictive of being employed. (Krause J., 1999). This is agreed with the results of this study as employment needs activities physically, which has strong relationship with CI. In a comparison study done on two groups, one disabled (N=22) and nondisabled (N=22), found that 15 of those with SCI had advanced degrees of education versus 12 in the nondisabled sample. (Brown et al., 1987), which granted of the results of this study which shows high percent of educated people.

this study also granted to the previous studies, as a vast percent of the individuals are educated and spent long time of education, while the low educated who didn't spent long time of education or non educated individuals percent is very low, the results agreed that the high level of education percent are the high integrated in the community, as they spent more time out of their houses in recreation and working if they have, this refers to that they understand their conditioned well and they wish to live their life as normal as they can, when we reviewed the result we find the secondary and above university individuals having higher level of CI, while non educated people find difficulties in understanding their conditions and how they will live after disability.

### **6.3. Injury related factors**

#### **Type of injury**

It's the classification of severity of injury based on the completeness and incompleteness of the injury of the spinal cord, and its' effect on the total CI process of the SCI individuals . Here the researcher will compare the results of this study with other studies in the literature and see the effect of the level of injury on the CI process.

In this study the results shown that the highest percent of individuals are with incomplete cord lesion about 60%, the type of injury has no statistically significant impact on CI, these results are agreed with another study which showed the type of injury has no statistically significant impact on CI, (Anderson et al., 2003). Also the type of injury has not statistical relationship with AL.

From the results in the literature found that SCI individuals with complete or incomplete cord lesion have the same opportunities to reintegrate in the society and live their life like other peoples without SCI and trying to take their chances in the challenges of the life, these studies agrees with the results of the current study, but in some studies the severity of injury may has an impact on CI as in a study showed lesser impairment has been associated with greater CI (Tate et al. 1998, Whiteneck et al. 1999). As the completeness of injury affects the functional activities. This may has not clear interpretation, why people with complete or incomplete cord lesion have the same chances of CI.

#### **Level of injury**

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In this study the results shown that the highest percent of individuals are with incomplete cord lesion about 60%, the type of injury has no statistically significant impact on CI, these results are agreed with another study which showed the type of injury has no statistically significant impact on CI, also the type of injury has not statistical relationship with AL. (Anderson et al., 2003).

From the results in the literature found that SCI individuals with complete or incomplete cord lesion have the same opportunities to reintegrate in the society and live their life like other peoples without SCI and trying to take their chances in the challenges of the life, these studies agrees with the results of the current study, but in some studies the severity of injury may has an impact on CI as in a study showed lesser impairment has been associated with greater CI (Tate et al. 1998, Whiteneck et al. 1999). As the completeness of injury affects the functional activities. This may has not clear

interpretation, why people with complete or incomplete cord lesion have the same chances of CI.

### **Cause of injury**

Cause of injury in the current study classified into two main categories, first one is intifada which include all cases with traumatic injury due to clashes with occupation forces, while the 2nd one others which include all causes of spinal cord injuries, traumatic, RTA, fallings down, diving, pathological and others.

In the present study the results showed the high percent of individuals with SCI is due Intifada 52%, other causes 48%, the cause of injury has no significance statistical impact on CI, as all the individuals due to intifada causes and individuals with other causes have the same opportunities in CI, this results controvert the think of the researcher that intifada's SCI individuals may has better chances to have high level of CI as all the resources and equipments are available for them without fees, while others with other causes may have not the same opportunities except SCI individuals after RTA, the insurance company provide those individuals with their needs, this may decrease the expenses of insurance company after the judge. But from the researcher point of view this refers to that all SCI individuals have the same resources and the same inducement to live their lives.

### **Years of experience living with spinal cord injuries**

This term refers to the period of life that the individual lived with SCI, and how does this will affect CI, some of the studies takes this dimension but in different way, for example studying the period living with SCI and its' impact on return back to work, they found that by the first year post-injury, 16 percent of those who at the time of injury were working have returned to work, and 8 percent have entered school; more than 70 percent consider themselves to be unemployed. Employment following SCI increases steadily, until at 10 to 11 years post-injury one-third of those in the database were working. (Gordon & Brown, 1997).

From studies in the literature showed that an educational program following SCI, data from the National SCI Model Systems database indicate that about 15 percent of this group had improved their level of education after injury. At 5 years after injury, those with SCI had somewhat less education than the general U.S. population, but by 10 years post injury those with SCI were somewhat better educated. (Dijkers et al., 1995).

Whiteneck and others (1999), conducted a study aimed to determine the influence of demographic factors on community reintegration, the results showed that, years' post injury explain, 29% of the variance in physical independence, 29% of the variance in mobility, 9% of the variance in social integration. Which supports the results of this study

that there is strong relationship between years experience after injury, and CI and AL. (Whiteneck, et al, 1999)?

The above results by way or another it agreed with results of this study, as the highest scores of CI level are for people with one to two and 2 - 10 years experience living SCI, and the level of CI decreases after 10 years experience, there is no obvious cause for that despite of the say that Saied just practice make progress but her the situation is different, from the researcher point of view this may refer to the age of the participant as by time they become elderly and the level of activity is diminished, on the other hand the mean age of the individuals of the current study was 34 years, after 10 or more years they become older, and their level of activity diminished, and this will affect their level of CI.

#### **6.4. Relationship between CI and AL**

There is a fundamental belief among consumers with SCI that, their needs to be an example shift in the approach to rehabilitation from an institutionally based physical restoration model to a community-based independent living model (Rick Hansen SCI Network 2005). The results of the current study revealed a strong statistical relationship between AL (which measured by FIM and AL paragraph in the CIQ) and CI, as  $P= 0.000$  in FIM and CI, and  $P=0.015$  in AL paragraph and CI. So persons with a disability conceives of living in the community can be vastly different from living without disability, as some of individuals with SCI think that AL has great impact on the CI, and they can't participate in any activity in the community with their AL, but in fact many studies in the literature reject that as the results of one of these studies showed that FIM scores are predictive of independent living, physical independence, mobility, and occupation, it is interesting to note that neither level of injury nor FIM are predictive of the subscale of Social Integration. (Anderson et al., 2003).

Also another study agreed with Anderson et al. (2003), but not used the FIM to measure the physical independence but used CHART with level of injury in regression analysis; found that the level of injury was a strong predictor of physical independence i- e AL, mobility, and occupation, but a much weaker predictor of social integration, (Hall, et al., 1998).

These two studies are contradicting the results of the current study which showed strong relation between the CI and AL. there is significant relationship between Physical activity and handicap score in quadriplegic and paraplegic individuals . These results agreed with the results of the current study there was no relation between the subjective quality of life scores and fitness and physical activity in either group. (Manns, et al, 1999).

At the end the current study agreed with other studies in the literature regarding, gender, age, years of experience living with spinal cord sometimes with trivial differences, because of the specialty of our society, and obvious disagreement regarding AL and CI, as all literature agreed that there is no impact of AL or FIM outcome on CI, but there is impact on the physical independence level, while the current study showed significant impact of AL on CI, and agreed with them regarding the impact on physical independence, according to the researcher point of view this refers to the nature of our society and the resources available for the individuals with SCI which ease their physical independence. Another point referred also to the individuals themselves that they wouldn't like to bother other by asking for things which is not important as they think, for example going out of home and participate in social and recreational activities, does not mean just to be there, CI much more than to be there.

## 6.5. Conclusion:

The objectives of this study were to assess the level of CI, AL, the relationship between them and to study the factors that may affect CI among individuals with SCI.

Therefore a cross-sectional study was undertaken on the individuals with SCI in GS, the sample was collected by convenience sampling, which included (N=120) individuals . Only one person refuses to participate in this study.

This study concluded the following:

- Socio-demographic data shows strong, wide variation in the gender affection of SCI as the highest percentage of individuals were male, and very low percentage of female individuals . The study results showed more than half of the individuals are highly educated (above secondary education), while those with no education or primary school education level represented very low percent. The majority of the individuals are married about 60% of the population study. SCI individuals due to Intifada related actions are the most common of individuals of this study which accounted for 51% of the study population.
- The majority of the individuals of this study are paraplegics (thoracic level or lumbar level) as it represent 78% of the total study population, while quadriplegic individuals were low percent. While the severity of injury of SCI among the individuals shows high percentage of incomplete lesion which represents 61.7% of the total study population.
- The period living with SCI shows that most of individuals had experience from 3-11 years after injury, that's means most of injuries occurred during the Aqsa Intifada.
- According to the outcome of FIM scale about 65% of the individuals of this study were completely independent, while the completely dependent individuals are very low. Regarding the daily activities, a great percentage of the individuals with SCI didn't need helper in performing self activities, while those who needed help were about 42.0%.
- More than 58% of the individuals need mild help in the motor activities especially in ambulation, while great assistant is needed for low percent. The vast majority of the study sample had high level of CI percentage, and the great percent of individuals can do activities as shopping, preparing foods and other daily life activities, whether assistant is needed or not.
- From the results of the study most of the individuals had some sort of community

participation, (vary from medium level to high level of community participation), while those who had low level of community participation are very low about 10% of the study sample.

- Family and social relation is very important as most the individuals had weak to good level of participation inside the family; only one participant had low level of participation with the family.
- Regarding the injury related factors, there is significant relationship between gender and CI in GS. While other socio-demographic factors as level of education, Age group, MS and the Experience Years living with SCI hasn't significant relationship with CI.
- In the current study the researcher found that there is highly significant relationship between the level of injury and CI, while other injury related factors as type of injury and cause of injury does not showed significant relationship with CI.
- There is very highly significant relationship between AL and CI among adults with SCI people, there is very significant relationship between the AL and the level of education, while other socio-demographic factors as age group, MS and the Experience Years living with SCI hasn't significant relationship with CI. While the most significant were found is community participation in relation to the level of injury.

## **6.6. Recommendations:**

- In view of this study's findings, the researcher attain the following recommendations:
- Rehabilitation team have to focus on the family and patient education before the discharge from the rehabilitation centers will increase the level of independency and increase the level of CI for individuals with SCI.
- Governmental and non governmental agencies should focus on the environmental adaptation to increase the independency level of ADL and daily activities as shopping, will improve the outcome of CI.
- Providing the SCI individuals with proper assistive devices and wheelchairs will improve the level of CI.
- Establishing a sufficient and scientific data base for individuals with SCI in GS.
- Increase the level of education to the families about SCI and its complications.
- Increase the education for the persons of SCI about the nature of their injury.
- Improving public awareness to help improve CI and reduce AL among SCI



individuals .

- There is a great need for establishing a national society for SCI individuals .
- Advices to decision makers to remove obstacles in the community for disabled people.
- Advices to rehabilitation professionals to concentrate on achieving full independency in activities of daily living and self activities.

### **6.7. Suggestions for future studies**

This study was an initial step in the field of rehabilitation of individuals with SCI, for that it was faced by many obstacles in the process if implementation of this study, for to have a holistic picture of the rehabilitation situations for people with SCI in GS the researcher suggested some topics for future studies in the field of SCI rehabilitation in GS including the followings:

- For establishing a sufficient and scientific data base about SCI people studies on the prevalence of SCI in GS is suggested.
- Studies on the life satisfaction after SCI in GS.
- Studies on the QOL for SCI in GS.
- Studies of factors that influence QOL after SCI.

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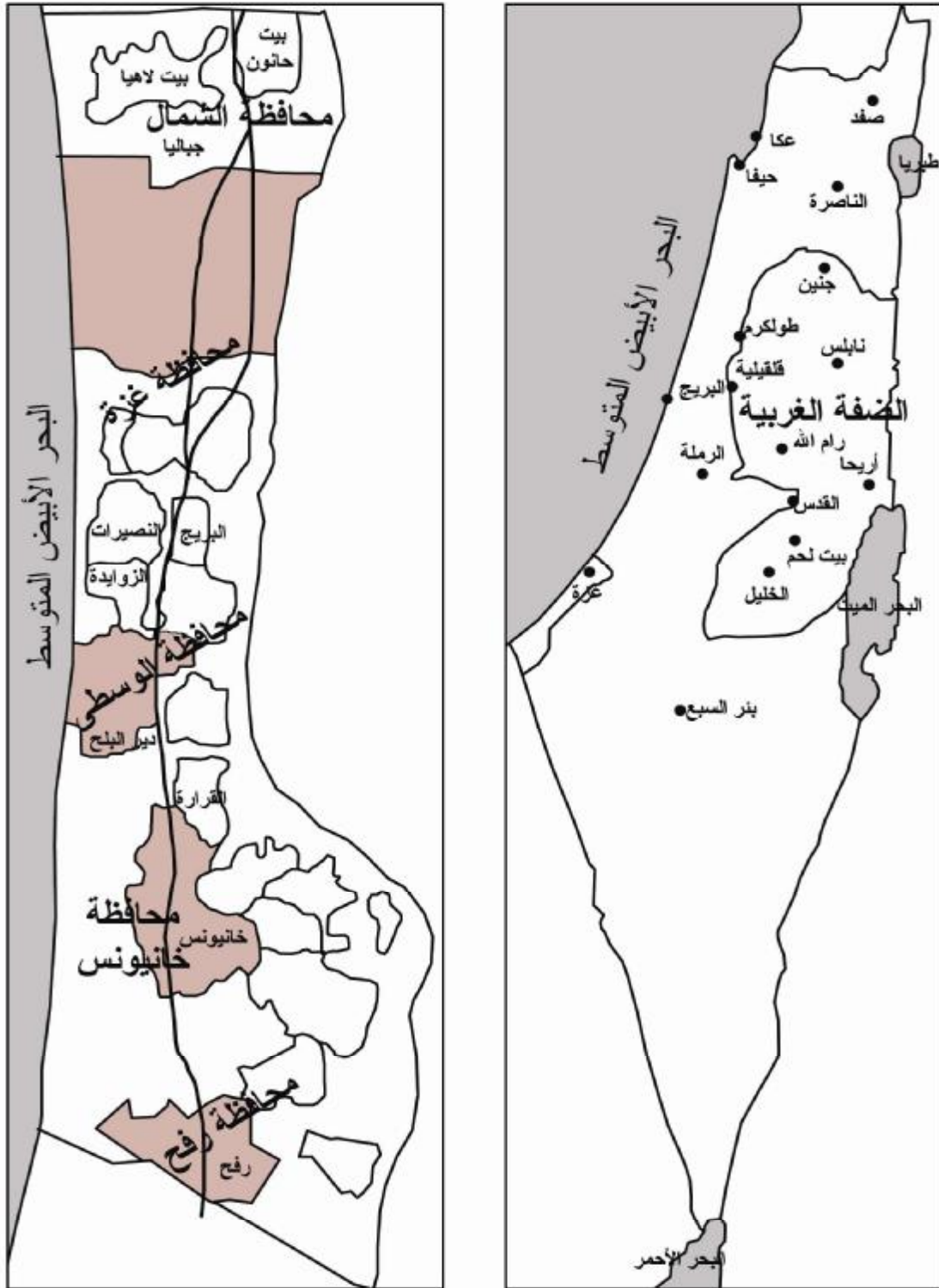
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# Annexes

Annex 1. Map of Palestine and Map of GS



بِسْمِ اللَّهِ الرَّحْمَنِ الرَّحِيمِ

حفظه الله،،،،

سعادة الدكتور /

السلام عليكم ورحمة الله وبركاته،،،، وبعد

### الموضوع/ تحكيم استبانة

يطيب لي أن أتقدم لكم بجزيل الشكر على جهودكم التي تبذلونها، وأفيدكم علماً بأنني

اجري دراسة بعنوان:

### Activity Limitation And Community Integration Among Adults With Spinal Cord Injuries

استكمالاً لمتطلبات الحصول على درجة الماجستير في الصحة النفسية والمجتمعية – علوم

التأهيل – من الجامعة الإسلامية.

ولما لسعادتكم من خبرة في مجال تحكيم الاستبانة، فإنني أمل منكم تحكيم الاستبانة

المرفقة، وإبداء رأيكم وملاحظاتكم عليها، من أجل البدء بتوزيعها على أفراد العينة.

شاكرين لكم سلفاً حُسن تعاونكم

الباحث

محمد حسين كريزم

0599-602265

**Annex 3.** Questionnaire explanatory and ethical approval letter to each participant of the study (Arabic version)

بِسْمِ اللَّهِ الرَّحْمَنِ الرَّحِيمِ

استبانته رقم: -----.

حفظهم الله

الأخوات والإخوة

السلام عليكم ورحمة الله وبركاته

يقوم الباحث بدراسة " الإعاقة و الدمج المجتمعي للبالغين من مصابي الجبل الشوكي في قطاع غزة " .

إن هذا البحث يشكل جزء ضروري من دراستي للحصول على درجة الماجستير في علوم التأهيل / بالجامعة الإسلامية - بغزة، وقد تم اختياركم لهذه الدراسة .

إذا كنت توافق على المشاركة في هذه الدراسة، يُرجى التكرم بمساعدة الباحث في تعبئة هذه الاستبانة بالإجابة عن هذه الأسئلة بموضوعية لما في ذلك من أثر كبير على صحة النتائج والنصائح التي سوف يتوصل إليها الباحث. مع التأكيد بأن هذه البيانات سوف تُستخدم لأغراض البحث العلمي فقط، وستُعامل بسريّة تامّة.

أوافق

لا أوافق

ملاحظ/ الوقت اللازم لتعبئة الاستبانة كاملة لا يستغرق أكثر من 20 دقيقة.

شاكرين حسن تعاونكم

الباحث: محمد حسين كزيم

للموج رقم: 0599602265

بريد الكتروني: [mohdkzm@yahoo.com](mailto:mohdkzm@yahoo.com)

**Annex 4.** Panel committee names

**Experts panel names**

<b>Member</b>	<b>Place of work</b>
Dr. Mohammad K .Nasser	The head of physiotherapy collogue of applied medical sciences/ Al-Azhar university-Gaza
Dr. Mohammad W. El-helo	Education / psychology-Islamic university-Gaza
Dr. Ala'a Ebrahim	Assistant Professor of Physiotherapy / the Jordanian university
Dr. Sanna Abu Dagga	Education / psychology-Islamic university-Gaza.
Mr. Mossa Abu Mustafa	The head of occupational therapy department (El-Wafa Medical. Rehabilitation Hospital)
Dr. Fadel Mohammad Elnems	Al-aqsa University Gaza

Annex 5. The primary version of questionnaire (Arabic)

استبانة الدمج المجتمعي قبل التحكيم

1.	الجنس	<input type="checkbox"/> ذكر	<input type="checkbox"/> أنثى		
2.	العمر	-----			
3.	الحالة الاجتماعية	<input type="checkbox"/> أعزب/ة	<input type="checkbox"/> متزوج/ة		
4.	المستوى التعليمي	<input type="checkbox"/> غير متعلم	<input type="checkbox"/> ابتدائي	<input type="checkbox"/> إعدادي	<input type="checkbox"/> ثانوي <input type="checkbox"/> جامعي
5.	نوع الإصابة	<input type="checkbox"/> قطع كامل	<input type="checkbox"/> قطع جزئي		
6.	مستوى الإصابة	<input type="checkbox"/> عنقي	<input type="checkbox"/> قطني	<input type="checkbox"/> صدري	

أولاً: النشاطات

الرقم	النشاطات	دائماً	أحياناً	إطلاقاً
1.	أقوم بالتسوق بحاجيات للبيت			
2.	لدي القدرة على اعداد الطعام			
3.	لدي القدرة على طبخ الطعام			
4.	لدي القدرة على تقديم الطعام			
5.	أستطيع تنظيف السفارة بعد الأكل			
6.	لدي القدرة على ترتيب غرفتي			
7.	لديك القدرة على التعامل مع الأولاد (ملاعبهم)			
8.	لدي القدرة على الترتيب والاعداد لنشاطات مع العائلة والأصدقاء			



			(مثل تجهيز البيت عند زيارتي )
			لدي القدرة على الذهاب إلى البنك وعمل بعض المعاملات أو دفع الفواتير المنزلية <b>9.</b>
			أستطيع تحضير نفسي للصلاة <b>10.</b>
			عند حدوث مشكلة صحية أذهب الجهة المختصة- ( الطبيب - العيادة - المستشفى - الصيدلية)- لحل المشكلة <b>11.</b>
			بإمكاني شرح مشكلتي الصحية للطبيب <b>12.</b>
			أستطيع الحصول على الدواء اللازم <b>13.</b>
			أستخدم المواصلات السيارة <b>14.</b>
			أستطيع الوصول للعنوان المحدد <b>15.</b>

ثانيا: المشاركة في المجتمع

الرقم	المشاركة في المجتمع	دائما	أحيانا	اطلاقا
<b>16.</b>	أصلي في المسجد			
<b>17.</b>	أشارك في الرأي أثناء النقاشات			
<b>18.</b>	أشارك في النشاطات التطوعية التي تقام			
<b>19.</b>	أشارك في النشاطات الترفيهية مع الأصدقاء (لعب الورق- مشاهدة التلفاز مع الأصدقاء)			
<b>20.</b>	أشارك في النشاطات الرياضية او مشاهدتها في الملعب			
<b>21.</b>	أذهب الى المطاعم والأماكن العامة لتناول الطعام لوحدي أو مع أصدقائي			
<b>22.</b>	أخرج من البيت وأجلس على الشارع			

			23. أخرج من البيت و أذهب لأي مكان آخر لقضاء وقت الفراغ
			24. أقوم بحضور المهرجانات و المناسبات الوطنية
			25. أحب أن أرة الناس و أخاطبهم
			26. لا أشعر بأني وحيدا ومهمش في البيت
			27. لا أشعر بأني وحيدا ومهمش في المجتمع
			28. أهتم لسماع الأخبار السياسية التي تحصل في منطقتنا

ثالثا: العلاقات الاجتماعية

الرقم	العلاقات الاجتماعية	دائما	أحيانا	اطلاقا
29.	أقوم بالمشاركة في المناسبات الاجتماعية الافراح			
30.	أقوم بالمشاركة في المناسبات الاجتماعية المآتم			
31.	أفضي ببعض الأسرار الخاصة بي لصديق أثق به			
32.	أقوم بزيارات اعتيادية لأقاربك و أصدقائك			
33.	أقوم بزيارة أقاربي و أصدقائي في الأعياد			
34.	يقوم أقاربي و أصدقائي بزيارتي في بيتي			
35.	أستمتع عندما يزورني أصدقائي أو أقاربي			
36.	أنتفاعل معهم في الحديث و أدلي برأيي			
37.	أبني دعوات أصدقائي و أقاربي لتناول الطعام معهم			
38.	أقوم بدعوة أصدقائي و أقاربي لتناول الطعام عندي			

**Annex 6. The final version after panel committee of questionnaire(Arabic)**

**استبانه مقابلة الدمج المجتمعي بعد التحكيم**

1. الجنس  ذكر  أنثى
2. العمر .....
3. الحالة الاجتماعية  أعزب/ة  متزوج/ة  غير ذلك
4. المستوى التعليمي  غير متعلم  ابتدائي  إعدادي  ثانوي  جامعي فما فوق
5. نوع الإصابة  قطع كامل  قطع جزئي
6. مستوى الإصابة في الحبل الشوكي  عنقي  صدري  قطني
- 7- سبب الإصابة  انتفاضة  غيرها
- 8- تاريخ الإصابة

أولاً: النشاطات

الرقم	النشاطات	دائماً	أحياناً	إطلاقاً
1.	أقوم بالتسوق لشراء احتياجات البيت بنفسي			
2.	لدي القدرة على إعداد الطعام بنفسي			
3.	لدي القدرة على طبخ الطعام بنفسي			
4.	لدي القدرة على تقديم الطعام بنفسي			
5.	أستطيع تنظيف السفارة بعد الأكل بنفسي			
6.	لدي القدرة على ترتيب غرفتي بنفسي			
7.	لدي القدرة على التعامل مع الأولاد (ملاعبتهم)			
8.	لدي القدرة على الترتيب والاعداد لنشاطات مع العائلة			
9.	لدي القدرة على الذهاب إلى البنك والتعامل مع معاملته بنفسي			
10.	أتوضاً للصلاة بنفسي			
11.	عند حدوث مشكلة صحية أذهب إلى الجهة المختصة-( الطبيب			
12.	أستطيع شرح مشكلتي الصحية للطبيب بنفسي			
13.	أستطيع الحصول على الدواء اللازم بنفسي			
14.	أستخدم المواصلات العادية (التاكسي)			
15.	أستطيع الوصول للعنوان المحدد بنفسي			

## ثانيا: المشاركة في المجتمع

الرقم	المشاركة في المجتمع	دائما	أحيانا	اطلاقا
16.	أصلي في المسجد			
17.	أشارك في الرأي أثناء النقاشات			
18.	أشارك في النشاطات التطوعية التي تقام في حيننا			
19.	أشارك في النشاطات الترفيهية مع الأصدقاء (لعب الورق - مشاهدة			
20.	أشارك في النشاطات الرياضية او مشاهدتها في الملعب			
21.	أذهب الى المطاعم والأماكن العامة لتناول الطعام لوحدي أو مع			
22.	أخرج من البيت وأجلس على الشارع			
23.	أخرج من البيت و أذهب لأي مكان آخر لقضاء وقت الفراغ			
24.	أقوم بحضور المهرجانات و المناسبات الوطنية			
25.	أحب أن أرى الناس و أخالطهم			
26.	أحس بأهمية وجودي في البيت من قبل العائلة			
27.	أحس بأهمية وجودي في المجتمع			
28.	أهتم لسماع الأخبار السياسية التي تحصل في منطقتنا			
29.	أنتمي إلى جمعية تعنى بشئون المعاقين			
30.	أشارك في صنع القرارات التي المتعلقة بالمعاقين			

## ثالثا: العلاقات الأسرية والاجتماعية

الرقم	العلاقات الأسرية و الاجتماعية	دائما	أحيانا	اطلاقا
31.	أقوم بالحديث مع افراد أسرتي و أسامرهم			
32.	أتناول وجبات الطعام والولائم مع الأهل في المنزل			
33.	يتم استشارتي في القرارات التي تتخذ في المنزل			
34.	أقوم بالمشاركة في المناسبات الاجتماعية كالافراح			
35.	أقوم بالمشاركة في المناسبات الاجتماعية كالمآتم			
36.	أفضي ببعض الأسرار الخاصة بي لصديق أثق به			
37.	أقوم بزيارات اعتيادية للأقارب والأصدقاء			
38.	أقوم بزيارة أقاربي وأصدقائي في الأعياد			
39.	يقوم أقاربي و أصدقائي بزيارتي في بيتي			
40.	أستمع عندما يزورني أصدقائي أو أقاربي			
41.	أنتفاعل مع الآخرين في الحديث و أدلي برأيي			
42.	ألبي دعوات أصدقائي و أقاربي لتناول الطعام معهم			
43.	أقوم بدعوة أصدقائي و أقاربي لتناول الطعام عندي			

Annex 7. FIM<sup>SM</sup> instrument


LEVELS	7	Complete independence (timely, safely)	NO HELPER		
	6	Modified independence (device)			
	5	Modified dependence supervision	HELPER		
	4	Minimal assist (subject = 75% +)			
	3	moderate assist (subject = 50% +)			
	2	Complete dependence Maximal assist (subject = 25% +)			
	1	Total assist (subject = 0% +)			
		<u>Self-care</u>	<u>Admit</u>	<u>Discharge</u>	<u>Follow-up</u>
A.	Eating				
B.	Grooming				
C.	Bathing				
D.	Dressing-upper body				
E.	Dressing-lower body				
F.	Toileting				
	<i>Sphincter control</i>				
G.	Bladder management				
H.	Bowel management				
	<i>Transfers</i>				
I.	Bed, chair,				
J.	Toilet				
K.	Tub, shower				
	<i>Locomotion</i>				
L.	Walk/ wheelchair	Walk <input type="checkbox"/> Wheelc <input type="checkbox"/> Both <input type="checkbox"/>	<input type="checkbox"/>	Walk <input type="checkbox"/> Wheelc <input type="checkbox"/> Both <input type="checkbox"/>	<input type="checkbox"/>
M.	Stairs	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	<i>Motor subtotal score</i>				
	<i>Communication</i>				
N.	Comprehension	Audi <input type="checkbox"/> Visu <input type="checkbox"/> Both <input type="checkbox"/>	<input type="checkbox"/>	Audi <input type="checkbox"/> Visu <input type="checkbox"/> Both <input type="checkbox"/>	<input type="checkbox"/>
O.	Expression	Voca <input type="checkbox"/> Non <input type="checkbox"/> Both <input type="checkbox"/>	<input type="checkbox"/>	Voca <input type="checkbox"/> Non <input type="checkbox"/> Both <input type="checkbox"/>	<input type="checkbox"/>
	<i>Social cognition</i>				
P.	Social interaction				
Q.	Problem solving				
R.	Memory				
	<i>Cognitive subtotal score</i>				
	<u>Total FIM</u>				

**Note:** leave no blanks; enter 1 if patient not testable due to risk.

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Patient Name \_\_\_\_\_

Examiner Name \_\_\_\_\_ Date/Time of Exam \_\_\_\_\_



AMERICAN SPINAL INJURY ASSOCIATION

## STANDARD NEUROLOGICAL CLASSIFICATION OF SPINAL CORD INJURY



### MOTOR

KEY MUSCLES (scoring or reverse side)

R	L		
C5	Elbow flexors	C2	LIGHT TOUCH
C6	Wrist extensors	C3	R
C7	Elbow extensors	C4	L
C8	Finger flexors (distal phalanx of middle finger)	C5	R
T1	Finger abductors (4th finger)	C6	L
TOTAL	<input type="checkbox"/> + <input type="checkbox"/> = <input type="text"/>	C7	PIN PRICK
(MAXIMUM)	(25) (25) (50)	C8	R
		T1	L

### SENSORY

KEY SENSORY POINTS

L2	Hip flexors	T1	LIGHT TOUCH
L3	Knee extensors	T2	R
L4	Ankle dorsiflexors	T3	L
L5	Long toe extensors	T4	R
S1	Ankle plantar flexors	T5	L
	Voluntary anal contraction (Yes/No)	T6	R
	<input type="checkbox"/> S4-5	T7	L
		T8	R
		T9	L
		T10	R
		T11	L
		T12	R
		L1	L
		L2	R
		L3	L
		L4	R
		L5	L
		S1	R
		S2	L
		S3	R
		S4-5	L

Comments: \_\_\_\_\_

LOWER LIMB TOTAL (MAXIMUM)  +  =  (25) (25) (50)

UPPER LIMB TOTAL (MAXIMUM)  +  =  (25) (25) (50)

TOTALS:  +  =  (100) (100) (200)

Any anal sensation (Yes/No)

PIN PRICK SCORE (max: 112)

LIGHT TOUCH SCORE (max: 112)

NEUROLOGICAL LEVEL  R  L

COMPLETE OR INCOMPLETE?

ASIA IMPAIRMENT SCALE

ZONE OF PARTIAL PRESERVATION

SENSORY MOTOR  R  L

**Key Sensory Points**

• Key Sensory Points

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SP-1016

## MUSCLE GRADING

- 0 total paralysis
  - 1 palpable or visible contraction
  - 2 active movement, full range of motion, gravity eliminated
  - 3 active movement, full range of motion, against gravity
  - 4 active movement, full range of motion, against gravity and provides some resistance
  - 5 active movement, full range of motion, against gravity and provides normal resistance
  - 5\* muscle able to exert, in examiner's judgement, sufficient resistance to be considered normal if identifiable inhibiting factors were not present
- NT not testable. Patient unable to reliably exert effort or muscle unavailable for testing due to factors such as immobilization, pain on effort or contracture.

## ASIA IMPAIRMENT SCALE

- A = Complete:** No motor or sensory function is preserved in the sacral segments S4-S5.
- B = Incomplete:** Sensory but not motor function is preserved below the neurological level and includes the sacral segments S4-S5.
- C = Incomplete:** Motor function is preserved below the neurological level, and more than half of key muscles below the neurological level have a muscle grade less than 3.
- D = Incomplete:** Motor function is preserved below the neurological level, and at least half of key muscles below the neurological level have a muscle grade of 3 or more.
- E = Normal:** Motor and sensory function are normal.

## CLINICAL SYNDROMES (OPTIONAL)

- Central Cord  
 Brown-Sequard  
 Anterior Cord  
 Conus Medullaris  
 Cauda Equina

## STEPS IN CLASSIFICATION

The following order is recommended in determining the classification of individuals with SCI.

1. Determine sensory levels for right and left sides.

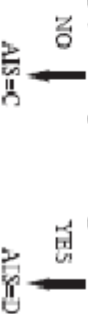
2. Determine motor levels for right and left sides.  
*Note: In regions where there is no response to test, the motor level is presumed to be the same as the sensory level.*

3. Determine the single neurological level.  
*This is the lowest segment where motor and sensory function is normal on both sides, and is the most cephalad of the sensory and motor levels determined in steps 1 and 2.*

4. Determine whether the injury is Complete or Incomplete (sacral sparing).  
*If voluntary anal contraction = No AND all S4-5 sensory scores = 0 AND any anal sensation = No, then injury is COMPLETE. Otherwise injury is incomplete.*

5. Determine ASIA Impairment Scale (AIS) Grade:  
 Is Injury Complete? If YES, AIS=A Record ZPP  
 (For ZPP record lowest dermatome or myotome on each side with same (non-zero score) preservation)  
 Is Injury Incomplete? If NO, AIS=B  
 (Yes=voluntary anal contraction OR motor function more than three levels below the motor level on a given side.)

Are at least half of the key muscles below the (single) neurological level graded 3 or better?



**If sensation and motor function is normal in all segments, AIS=E**  
*Note: AIS E is used in follow up testing when an individual with a documented SCI has recovered normal function. If at initial testing no deficits are found, the individual is neurologically intact; the ASIA Impairment Scale does not apply.*

Annex 9. Ethical approval letter to national society for rehabilitation

**الجامعة الإسلامية - غزة**  
The Islamic University - Gaza

هاتف داخلي: 1150

عمادة الدراسات العليا  
رقم: ج.س.ع/35/3  
Date: 2007/12/24

الأخوة الأفاضل/ الجمعية الوطنية للتأهيل  
السلام عليكم ورحمة الله وبركاته،  
حفظها الله،

**الموضوع/ تسهيل بحسبة طالب ماجستير**

تهديكم عمادة الدراسات العليا أعطر تحياتها، وترجو من سيادتكم التكرم بتسهيل مهمة الطالب/ محمد حسين كرزيم برقم جامعي 2006/4861 المسجل في برنامج الماجستير بكلية التربية تخصص الصحة النفسية للمجتمعة/ علوم التأهيل، وذلك بهدف الحصول على المعلومات التي تساعد في إعداد دراسته بعنوان:

**"الدمج الاجتماعي لمصابي الحبل الشوكي في المجتمع بمدينة غزة"**  
والله ولي التوفيق،،

عميد الدراسات العليا

د. مازن إسماعيل هنية

صورة ملونة  
صورة بيضاء  
مكاف

م.ب. 108، رمال، غزة، فلسطين. هاتف: +970 (8) 286 0700. فاكس: +970 (8) 286 0800. [public@iugaza.edu.ps](mailto:public@iugaza.edu.ps) [www.iugaza.edu.ps](http://www.iugaza.edu.ps)



Annex 10. Ethical approval letter to society of physical handicap

**الجامعة الإسلامية - غزة**  
The Islamic University - Gaza

عمادة الدراسات العليا  
رقم: ج س/ع/35  
Date: 2008/03/12

هاتفه داخلي: 1150

الأخوة الأفاضل/ جمعية المعاقين حركياً  
حفظها الله،  
السلام عليكم ورحمة الله وبركاته،

الموضوع / تسجيل مهتممة طالب ماجستير

تهديكم عمادة الدراسات العليا أعطر تحياتها، وترجو من سيادتكم التكرم بتسهيل مهمة الطالب/ محمد حسين كريزم برقم جامعي 2006/4861 المسجل في برنامج الماجستير بكلية التربية تخصص الصحة النفسية المجتمعية/ علوم التأهيل، وذلك بهدف الحصول على المعلومات التي تساعد في إعداد دراسته بعنوان:

"الدمج الاجتماعي لمصابي الحبل الشوكي في المجتمع بمدينة غزة"

والله ولي التوفيق،،،

عميد الدراسات العليا  
  
د. مازن إسماعيل هنية



صورة لـ:  
الطالب

عن: 108 الرمان خربة فلسطين - الفون: +970 (8) 286 0700 - الفاكس: +970 (8) 286 0800  
www.iugaza.edu.ps  
public@iugaza.edu.ps

بِسْمِ اللَّهِ الرَّحْمَنِ الرَّحِيمِ



**الجامعة الإسلامية - غزة**  
**The Islamic University - Gaza**

**عمادة الدراسات العليا**

هاتف داخلي: 1150

رقم.....ج من ع/35/Ref  
التاريخ.....2008/10/13/Date

**الأخ الفاضل/ مدير عام جمعية الوفاء الخيرية**  
**حفظه الله،**  
السلام عليكم ورحمة الله وبركاته،

**الموضوع/ لتسهيل عملية طالب الماجستير**

تهديكم عمادة الدراسات العليا أعطر تحياتها، وترجو من سيادتكم التكرم بتسهيل مهمة الطالب/ محمد حسين كريزم برقم جامعي 2006/4861 المسجل في برنامج الماجستير بكلية التربية تخصص الصحة النفسية المجتمعية/ علوم التأهيل، وذلك بهدف الحصول على المعلومات التي تساعد في إعداد دراسته بعنوان:

**"الدمج الاجتماعي لمصابي الحبل الشوكي في المجتمع بمدينة غزة"**  
وأنه ولي التوفيق،،،

**عميد الدراسات العليا**



**د. زياد إبراهيم مقداد**



صورة إلى:-  
المنفذ

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