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Risk factors for rehospitalization among patients in El-wafa Medical Rehabilitation Hospital

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بِسْمِ اللَّهِ الرَّحْمَنِ الرَّحِيمِ

"قُلْ إِنَّ صَلَاتِي وَنُسُكِي وَمَحْيَايَ وَمَمَاتِي

لِلَّهِ رَبِّ الْعَالَمِينَ لَا شَرِيكَ لَهُ

وَبِذَلِكَ أُمِرْتُ وَأَنَا أَوَّلُ الْمُسْلِمِينَ"

(سورة الأنعام 162)

صدق الله العظيم

بِسْمِ اللّٰهِ الرَّحْمٰنِ الرَّحِیْمِ

Dedication

I would like to dedicate my work with deep love

To my father soul

My mother

My wife and daughters

My family especially brother Hosam

My colleagues especially Mr. Fuad Luzon

For their ever constant endless love and support.

Hisham M. Hassan

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The abstract

The background and the purpose: The general objective of this study is to identify the risk factors for rehospitalizations among rehabilitated patients in El-wafa Medical Rehabilitation Hospital, also to identify the most frequent risk factor for rehospitalization.

Methods: A case-control study design was used for conducting this study. Case subjects were those patients who were admitted two times or more during the period from 1/1/2000 to 31/1/2007, their diagnoses fall under Spinal Cord Injury (SCI), Traumatic Brain Injury (TBI), and Cerebrovascular Accidents (CVA). Moreover, control subjects had the same diagnoses, but were admitted once during the above-mentioned period. For the collection of the study data, the researcher used an interview with questionnaire filled by the interviewer.

Results: The study showed that, concerning Sociodemographic data, date of injury was a significant determinant of the readmission. The subjects who has an intermediate (date of injury (2000-2003)) has the highest percentage (57.9%) of the readmitted subjects. The relationship between gender and age, and rehospitalization was not statistically significant. The results showed that pain (64.9%) and disturbance in urination pattern (77.2%) were significant physiologic risk factors for the readmission among the readmitted subjects.

The most significant rehabilitation risk factor was the need to complete the rehabilitation program (61.4%). Also 50.9% of the readmitted subjects have completed their rehabilitation program and 82.5% of the readmitted subjects were greatly satisfied with the hospital services.

Psychologically, 19.3% of the readmitted subjects feel that they are a heavy load on their families, and 36.8% of them feel that their families care for them better in the hospital than in their homes.

In addition, the most prevalent diagnosis for readmission was SCI as they have higher number 25(43.9%) among the readmitted subjects, Whereas CVA represents 20 (35.1%)

among the readmitted subjects, but TBI have a lower number 12 (21.1%) of the readmitted subjects.

Concerning the length of stay (LOS), the results showed that, employment state is a significant sociodemographic factor in increasing the LOS, as the employed subjects have higher average LOS than those unemployed as follows respectively 100.86 days, 45.14 days. Furthermore, Respiratory Tract Infection (RTI) was a significant physiologic factor in increasing the LOS as subjects whose RTI was the cause for the 2nd admission have higher average LOS than those who was not, 104.60 days and 46.92 days respectively.

In addition, the results showed, psychologically, that subjects who feel that their families care of them in the hospital more than at home, have higher (67.24 days) average LOS than those who are do not (43.08 days). In addition, it showed that subjects who feel discomfort in their homes have higher (87 days) average LOS than those who do not (41.64 days).

Socially, the results showed that, subjects who claim to have a care giver in their homes, have lower (48.69 days) average LOS than those who do not (111.33 days), and the difference was extremely significant.

Finally, the risk of rehospitalization may fall under one of the following domains, physiological, psychological, rehabilitation, and social. However, the risk factor of these domains may differ from one diagnosis to another. Therefore, the researcher recommends a future study on rehospitalization risk factors for each diagnosis independently and the cost of rehospitalization.

ملخص الدراسة

أهداف الدراسة: تهدف هذه الدراسة لتحديد العوامل التي ممكن أن يكون لها تأثير في عودة المرضى المؤهلين إلى مستشفى الوفاء لتأهيل المعاقين، و تحديد أيضا العامل الأكثر تكرارا و الذي ممكن أن يؤثر في عودة المرضى المؤهلين إلى مستشفى الوفاء لتأهيل المعاقين و لتحديد العوامل المؤثرة في عودة المرضى للمستشفى.

الإجراءات: استخدم الباحث أسلوب حالات المقارنة من اجل الشروع في دراسته. حالات الدراسة هم المرضى الذين دخلوا مستشفى الوفاء مرتين أو أكثر خلال الفترة 1-1-2000 إلى 31-1-2007، و التشخيص لهؤلاء المرضى هو جلطة دماغية، وإصابة النخاع الشوكي، و إصابة دماغية. أما حالات المقارنة هي من نفس التشخيصات السابقة ولكن هذه الحالات دخلت المستشفى لمرة واحدة خلال الفترة السابق ذكرها. الباحث استخدم الاستبانة الصحية لجمع المعلومات عن طريق المقابلة مع الحالات.

النتائج: الدراسة أظهرت، بالنسبة للمعلومات الديموقرافية، أن تاريخ الإصابة يعتبر من المحددات و العوامل المؤثرة لعودة المرضى إلى مستشفى الوفاء بدلالة إحصائية عالية، و المرضى الذين لهم تاريخ إصابة متوسط (2000-2003)، هم أكثر المرضى (57.9%) عودة لمستشفى الوفاء. أما العلاقة بين الجنس و العمر مع عودة المرضى للمستشفى كانت غير محددة. كما و أظهرت الدراسة أن آلام الجسم (64,9%) و اضطراب عملية التبول (77,2%) هي من العوامل الفسيولوجية المؤثرة و المحددة لعودة المرضى إلى مستشفى الوفاء.

كذلك أظهرت النتائج أن أهم عوامل البعد التأهيلي المؤثرة في عودة المرضى إلى مستشفى الوفاء، هو حاجة المرضى لاستكمال برنامج التأهيل الخاص بهم من وجهة نظرهم (61,4%). أيضا أظهرت النتائج أن 50,9% من المرضى الذين عادوا إلى مستشفى الوفاء، قد أكملوا برنامجهم التأهيلي و 82,5% منهم كانوا عظيمي الرضا عن خدمات المستشفى التأهيلية بدلالة إحصائية عالية.

أما من الناحية النفسية، أظهرت الدراسة أن 19.3 % من المرضى الذين عادوا إلى مستشفى الوفاء، يشعرون بأنهم حالة وعبء على أسرهم في البيت بدلالة إحصائية عالية. أيضا أظهرت الدراسة أن 36,8 % منهم يشعرون بزيادة في الاهتمام من قبل أسرهم وهم في المستشفى أكثر منه وهم في البيت بدلالة إحصائية عالية.

بالإضافة إلى ذلك أوضحت النتائج أن مرضى النخاع الشوكي (25) هم أكثر المرضى (43,9%) عودة إلى مستشفى الوفاء مقارنة مع باقي مرضى الدراسة، بينما مرضى الجلطة الدماغية (20) كانوا الأقل (35,1%) ثم يليهم مرضى إصابات الدماغ (12) و يمثلون ما نسبته (21,1%) من المرضى الذين عادوا إلى مستشفى الوفاء.

بما يتعلق مدة المكوث في المستشفى، النتائج أوضحت أن العمل احد المعلومات الديموقرافية هو عامل مؤثر في زيادة مدة المكوث في المستشفى، بما أن المرضى الذين يعملون كانوا أكثر وقتا و مكوثا (المتوسط = 100,86 يوما) في المستشفى من المرضى الذين لا يعملون (المتوسط=45,14 يوما) بدلالة إحصائية عالية. النتائج أظهرت أيضا، أن التهابات الجهاز التنفسي كانت احد العوامل الفسيولوجية المؤثرة في زيادة مدة المكوث في المستشفى. بما أن المرضى الذين عادوا إلى مستشفى الوفاء بسبب التهابات الجهاز التنفسي كانوا أكثر وقتا و مكوثا (المتوسط = 104.60 يوما) في المستشفى من المرضى الذين عادوا إلى مستشفى الوفاء ولم يكن التهابات الجهاز التنفسي سبب عودتهم (المتوسط=46.92 يوما) بدلالة إحصائية عالية.

كما و أوضحت الدراسة بما يتعلق في البعد النفسي أن المرضى الذين يشعرون بزيادة في الاهتمام من قبل أسرهم وهم في المستشفى أكثر منه وهم في البيت كانوا أكثر وقتا و مكوثا (المتوسط = 67,24 يوما) في المستشفى من المرضى الذين لا يشعرون ذلك (المتوسط=43,08 يوما) بدلالة إحصائية عالية (P=0.02). كذلك أظهرت النتائج أن المرضى الذين يشعرون بعدم الراحة في بيوتهم كانوا أكثر وقتا و مكوثا (المتوسط = 87 يوما) في المستشفى من المرضى الذين لا يشعرون ذلك (المتوسط=41.64 يوما) بدلالة إحصائية عالية جدا..

بما يتعلق في البعد الاجتماعي الدراسة أظهرت أن المرضى الذين يدعون بان لديهم مقدم رعاية في بيوتهم كانوا اقل وقتا و مكوثا (المتوسط = 48.69 يوما) في المستشفى من المرضى الذين لا يدعون ذلك (المتوسط = 111.33 يوما) بدلالة إحصائية عالية جدا.

أخيرا،العوامل المؤثرة في عودة المرضى للمستشفى ممكن أن تقع تحت الأبعاد التالية: البعد الفسيولوجي و النفسي و التأهيلي و الاجتماعي. و لكن العوامل المؤثرة في تلك الأبعاد قد تختلف من تشخيص لآخر. لذلك يقترح الباحث دراسات مستقبلية تبحث في العوامل المؤثرة في عودة المرضى للمستشفى لكل تشخيص على حدة و تكاليف تلك العودة.

The contents

Subject	Page
Chapter one: The study plan	1
1.1 Introduction	2
1.2 Objectives of the study.....	6
1.2.1 General objective.....	6
1.2.2 Specific objectives	6
1.3 Demography and population	7
1.3.1 Palestine History	7
1.3.2. Gaza strip.....	7
1.3.3. The Palestinian population in the Palestinian Territories.....	8
1.3.4 Palestinian economy.....	9
1.4 Palestinian Health Care System	9
1.4.1 Primary health care (PHC)	9
1.4.2 Primary health care providers in Palestine	10
1.5 Classification of PHC according to Provider in Gaza Strip	10
1.5.1 MOH	10
1.5.2 NON-MOH PHC Centers	11
1.5.2.1 UNRWA Services	11
1.5.2.2 Medical Services for police (MSP) Services	12
1.5.3 Hospitals	12
1.6 The study Hypothesis.....	14
1.7 The study questions	14
1.8 The significance of the study	14
1.9 Operational Definitions	15
1.9.1 Rehabilitated Patients	15
1.9.2 Traumatic Brain Injury	15
1.9.3 Spinal Cord Injury	15
1.9.4 Cerebrovascular Accidents	15
1.9.5 Rehospitalization (Readmission)	15
1.9.6 First Admission	15
1.9.7 Second Admission	16

Chapter two: theoretical Background	17
2.1 Stroke.....	18
2.1.1 Definition	18
2.1.2 Epidemiology of Stroke	18
2.1.3 Risk Factors of Stroke	19
2.1.3.1 Medical stroke risk factors	19
2.1.3.2 Lifestyle stroke risk factors	20
2.1.3.3 Non-modifiable Risk Factors of Stroke	20
2.1.3.4 Modifiable Risk Factors of Stroke	20
2.1.3.5 Less well-documented risk factors of Stroke	21
2.1.4 Types of stroke	22
2.1.4.1 Ischemic Stroke	22
2.1.4.2 Hemorrhagic Stroke	22
2.1.4.3 Transient Ischemic Attacks	22
2.1.5 Signs and Symptoms of Stroke	23
2.1.6 Diagnosis of stroke	23
2.1.7 Treatment of stroke	24
2.1.8 Treatment of stroke according to CDC.....	24
2.1.9 Stroke rehabilitation	25
2.1.10 Stroke complications	26
2.1.10.1 The most common complications	26
2.1.11 Stroke Prognosis	26
2.2 Traumatic brain Injury (TBI).....	27
2.2.1 Definition	27
2.2.2 Definitions related TBI	28
2.2.2.1 Closed Head Injury	28
2.2.2.2 Open Head Injury	28
2.2.2.3 Diffuse Axonal Injury	28
2.2.2.4 Contusion	28
2.2.2.5 Penetrating Trauma	28
2.2.2.6 Secondary Injury	28
2.2.3 Epidemiology of TBI	29
2.2.4 Risk Factors of TBI	29

2.2.5 Causes of TBI	29
2.2.6 Signs and Symptoms of TBI	30
2.2.7 Types of TBI	30
2.2.7.1 Mild TBI symptoms	30
2.2.7.2 Moderate to Sever TBI symptoms	31
2.2.8 Diagnosis of TBI	31
2.2.9 Treatment of TBI	31
2.2.9.1 Acute treatment of TBI	32
2.2.9.2 Surgical treatment of TBI	32
2.2.10 Rehabilitation of TBI	33
2.2.11 Complications after TBI	33
2.2.11.1 Immediate complications after TBI	33
2.2.11.2 Long-term complications (disabilities) after TBI	34
2.2.12 Prognosis of TBI	34
2.3 Spinal Cord Injury (SCI)	34
2.3.1 Definition of SCI	34
2.3.2 Epidemiology of SCI	35
2.3.3 Causes of SCI	35
2.3.4 Risk factors of SCI	36
2.3.5 Types and Levels of SCI	36
2.3.5.1 Complete SCI	37
2.3.5.2 Incomplete SCI	37
2.3.5.2.1 Anterior cord syndrome	37
2.3.5.2.2 Central cord syndrome	37
2.3.5.2.3 Brown-Sequard syndrome	37
2.3.5.3 Injuries to a specific nerve root	38
2.3.5.4 Spinal concussions	38
2.3.5.5 Penetrating SCI	38
2.3.6 Mechanism of SCI	39
2.3.7 Signs and Symptoms SCI	40
2.3.8 Diagnosis of SCI	40
2.3.9 Treatment of SCI	41
2.3.10 Rehabilitation of SCI	41

2.3.11 Complications of SCI	42
2.3.12 Prognosis of SCI	44
2.4 Theoretical framework	46
Chapter Three: Literature Review	50
Chapter Four: Materials and Methods	58
4.1 Study design	59
4.2 Study population	59
4.3 Selection of cases	59
4.4 Selection of controls	60
4.5 Data collection	60
4.6 Sampling	60
4.6.1 Inclusion criteria	61
4.6.2 Exclusion criteria	61
4.7 Ethical Considerations	61
4.8 Setting (El-Wafa Medical Rehabilitation Hospital)	61
4.9 Period of the Study	61
4.10 Statistical analysis	62
4.11 Limitations of the study	62
Chapter Five: Results	63
5.1 Introduction	64
5.2 Distribution of the study population	64
5.2.1 Distribution of the study population by Sociodemographic variables...	64
5.2.2 Distribution of study population by Health Insurance information variables	65
5.2.3 Distribution of study population by Date of Injury and Diagnoses variables	66
5.2.4 Distribution of study population by Length of Stay and times of readmissions variables	67
5.2.5 Distribution of the study population by Physiologic variables	67
5.2.6 Distribution of study population by Characteristics of the major causes of the second admission	68
5.2.7 Distribution of the study population by rehabilitation variables	70
5.2.8 Distribution of the study population by satisfaction of supplies and	70

services variables	71
5.2.9 Distribution of the study population by Psychological variables	71
5.2.10 Distribution of the study population by Social variables	72
5.2.11 Distribution of the study population by Educational variables	73
5.2.12 Distribution of the study population by Community Follow up variables.....	74
5.3 Study Results for Readmission	76
5.3.1 Socio-demographic results of the study	76
5.3.2 Health insurance information and the use of air mattress results of the study	79
5.3.3 Physiologic risk factors	79
5.3.4 Rehabilitation risk factors	81
5.3.5 Psychological risk factors	82
5.3.6 Social risk factors	83
5.3.7 Causes for readmission	83
5.3.8 Educational program results of the study	85
5.3.9 Community follows up results of the study	86
5.4 Results of length of stay	88
5.4.1 Sociodemographic data and length of stay	88
5.4.2 Health insurance information and the use of air mattress data and length of stay	90
5.4.3 Diagnosis and date of injury and length of stay	91
5.4.4 Physiologic domain data and length of stay	92
5.4.5 Rehabilitation domain data and length of stay	95
5.4.6 Psychological domain data and length of stay	97
5.4.7 Social domain data and length of stay	98
Study Conclusion	100
Study Recommendation	101
References.....	103

The content of tables

Table No	Table Name	Page No
5-1	Distribution of the study population by Sociodemographic variables	65
5-2	Distribution of study population by Health Insurance Information variables	66
5-3	Distribution of the study population by Date of Injury and Diagnoses variables	66
5-4	Distribution of study population by Length of Stay and times of readmissions variables	67
5-5	Distribution of the study population by Physiologic variables	68
5-6	Distribution of study population by Characteristics of major causes of the 2 nd admission	69
5-7	Distribution of the study population by rehabilitation variables	70
5-8	Distribution of the study population by satisfaction of supplies and services variables	71
5-9	Distribution of the study population by Psychological variables	72
5-10	Distribution of the study population by Social variables	72
5-11	Distribution of the study population by Educational variables	73
5-12	Distribution of the study population by Community Follow up variables	75
5-13	Readmission by sociodemographic characteristics	78
5-14	Readmission by Health insurance information and the use of air mattress variables	79
5-15	Readmission by Physiologic variables	80
5-16	Readmission by rehabilitation variables	81
5-17	Readmission by psychological variables	82
5-18	Readmission by social variables	83
5-19	Readmission by cause of admission variables	84
5-20	Readmission by the Educational components	86
5-21	Readmission by Community Follow up variables	87
5-22	Average LOS by Sociodemographic risk factors	89
5-23	Average LOS by Health insurance and the use of air mattress data	91
5-24	Average LOS by Diagnosis and date of injury risk factors	92
5-25	Average LOS by physiologic risk factors	94
5-26	Average LOS by Rehabilitation risk factors	96
5-27	Average LOS by Psychological risk factors	98
5-28	Average LOS by Social risk factors	99

List of abbreviations

No.	Abbreviations	Meanings
1.	ADLs	Activity of Daily Livings
2.	AHRQ	Agency for Healthcare Research and Quality
3.	AD	Alzheimer's disease
4.	ASIA	American Spinal Injury Association
5.	ASA	American Stroke Association
6.	Apo E	Apolipoprotein E
7.	ALOS	Average Length of Stay
8.	CDC	Centers for Disease Control and Prevention
9.	CSF	Cerebro-Spinal fluid
10.	CVA	Cerebrovascular Accident
11.	CBR	Community Based Rehabilitation
12.	C/O	complaining of
13.	CT	Computed Tomography
14.	FFS	Fee For Service
15.	GS	Gaza Strip
16.	GDP	Gross Domestic Product
17.	GNP	Gross National Product
18.	HMO	Health Maintenance Organization
19.	HDL	High Density Lipoprotein
20.	HBCM	Hospital Based Case Management
21.	ICUs	Intensive Care Units
22.	LOS	Length of Stay
23.	MRA	Magnetic Resonance Angiography
24.	MRI	Magnetic Resonance Imaging
25.	MSP	Medical Services for police
26.	MOH	Ministry of Health
27.	NASCIS	National Acute Spinal Cord Injury Study
28.	NINDS	National Institute of Neurological Disorders and Stroke
29.	NSCIA	National Spinal Cord Injury Association
30.	NGOs	Non Governmental Organizations
31.	OT	Occupational Therapist
32.	PNA	Palestinian National Authority
33.	PU	Pressure Ulcer
34.	PHC	Primary Health Care
35.	RTI	Respiratory Tract Infection
36.	SCI	Spinal Cord Injury
37.	SPSS	Statistical Package Scientific System
37.	SAH	Sub-Arachnoids Hemorrhage
38.	TIA	Transient Ischemic Attack
39.	TCU	Transitional Care Unit
40.	TBI	Traumatic Brain Injury
41.	UNRWA	United Nations for Relief and Work Agency
42.	USD	United States Dollar
43.	UTI	Urinary Tract Infection
44.	VAP	Ventilator-Associated Pneumonia
45.	WB	West Bank
46.	WHO	World Health Organization
47.	Y/O	Years Old

The appendix table

No	Name	Page
1.	Map of Palestine	112
2.	Ethical approval letter to El-Wafa Medical Rehabilitation Hospital	113
3.	Arabic covering letter and informal consent forms	114
4.	English covering letter and informal consent forms	115
5.	English Questionnaire	116
6.	Arabic Questionnaire	124

Chapter One

Introduction

1.1 Introduction:

Hospital readmission, or Rehospitalization is a common event among the patients due to many factors especially the disease complications. Traumatic Brain Injury (TBI), Spinal Cord Injury(SCI), and Cerebrovascular Accidents (CVA) are neurological diseases which has a wide range of complications that oblige the patients to back to the rehabilitation hospital.

The phenomenon of rehospitalization appears through the experience of the workers in El-wafa Hospital. Many of patients who completed their rehabilitation programs, were readmitted to the hospital in a period ranging from 6 months to 1 year for different risk factors. This study directed toward exploring the risk factors of rehospitalization and for checking out the most frequent risk factor, which leads the hospital readmission.

The admission of the above-mentioned diagnoses costs the government, especially the Ministry of Health many expenses. According to El-wafa Hospital, the patient who is covered through the governmental health insurance, costs about 250 NIS a night (El-wafa Hospital, 2007). The governmental insured people represent 66.5% of the insured persons in Gaza strip (Palestinian Central Bureau of Statistics, 2004).

Recently, Health Care Providers directing their researches toward decreasing the length of hospital stay of the patient. This in turn, decreases the expenses on the government and decreases the chance of worthless long stay of the patient inside the hospital.

EL - Wafa Hospital is the first recognized inpatient rehabilitation hospital in Gaza Strip. It is a non-stock, non-profit Palestinian Non-Governmental Organization (NGO), established in 1996 to offer medical rehabilitation services for cases recovering from post acute and chronic physical and cognitive disabilities caused by Spinal Cord Injury (SCI), Traumatic Brain Injury (TBI), fractures, Cerebrovascular Accidents (CVA) and other conditions through in and outpatient departments. The rehabilitation team includes rehabilitation doctors, nurses, physiotherapists, occupational therapists, speech therapists and communication therapy specialist, and psychologist.

World Health Organization (WHO) has defined rehabilitation as a process aimed at enabling the people with disabilities to reach and maintain their optimal physical, sensory, intellectual, psychological and social functional levels. Rehabilitation provides disabled people with the tools they need to attain independence and self-determination. (WHO, 2008) ^a

Rehabilitation is type of the tertiary preventions, which concentrate on the prevention of disability complications and leading the disabled person toward independence. "Independence does not mean that the person who is paralyzed must learn everything to do by himself. For some people this will not be physically possible. Independence means that the paralyzed persons know what he wants and when he needs it. If he is unable to do something for himself then he will be able to tell someone else how to do it for him. He will be able to organize when things are to be done." (WHO, 1996)

From the researcher experience, the most common neurological disorders in El wafa Medical Rehabilitation Hospital, involve Cerebo-Vascular Accidents (CVA), Spinal Cord Injury (SCI), and Traumatic Brain injury (TBI). In addition, the patients with those diagnoses are the researcher's study concern.

"The need for rehabilitation crosses all age groups, although the type, level, and goals of rehabilitation often differ by age. People with chronic impairments are often older people, they have different goals and require less intensive rehabilitation or a longer period of rehabilitation than do younger people with a temporary impairment." (Merck Manuals, 2008)

Being rehabilitated is the start to be integrated in the community and to participate as much as possible in the ordinary social activities like social interaction with others and family involvement.

From the researcher point view the most important goals of the rehabilitation process for a person with disability is to be back like before the injury and to live without complexity and free from any disability or complications which force these persons with disability to back to the hospital (to be rehospitalized).

Hospitalization considered as the largest expenses of the health care services, as manifested by the engagement of researchers toward reducing the hospital stay and the early hospital discharge through the development of community-based schemes as alternatives to hospital care (Criag, 2000). He through his comparison study concluded that early hospital discharge and home-based rehabilitation in our health care system proved to be a less costly alternative to conventional care and rehabilitation for patients with stroke. Although the reduction in cost was not statistically significant, the economic results indicate that an established scheme could play an important role in the release of hospital beds and be a cost-effective approach to the rehabilitation of patients with stroke.

In other studies it was shown that the interest in the establishment of such "hospital at home" schemes stems from a new emphasis on primary and community care, on offering a greater choice to consumers, and in being an attractive solution to the rising costs of rehabilitation for patients in hospital and the pressure to maximize productivity. (Marks 1990, Lafferty, 1996)

The number of admissions during the year 2000 was (185,356) which indicates that, the MOH hospitals managed to increase their admissions in the last five years by 50.43%, (93,483(admissions; with an annual average increase in the last five years of 10.09%. 8,732 admissions were to the Emergency Hospitals, and 879 were to the Mental Hospitals.

According to Palestinian Ministry of Health (MOH), annual report 2004, The MOH hospitals received 278,839 admissions, which is about 7.67% of the population admitted to the MOH hospitals with 76.66 admissions per 1,000 populations. There were 151,084 (54.18%) admissions in Gaza. Whereas, the number of admission in 2005, it was 297,098 admissions (69.3% of the total admissions in Palestine), which mean that about 8.8% of the population got a chance to be admitted to the MOH hospitals with 88.34 admissions per 1,000 population.

According to Palestinian Ministry of Health (MOH), annual report 2005, Apart from mental and emergency hospitals, the average length of stay was 2.5 days. In Gaza Strip (GS), it was 2.6 days while in the West Bank (WB) 2.3 days. The longest Average Length of Stay (ALOS) recorded was at 4.1 days in European Gaza Hospital, while the

shortest was 1.6 days in Al Aqsa Hospital. It was 61.6 days in the mental hospitals; (15 in GS and 110 in the WB), while in the emergency hospitals it was 1.6 days.

Financially, according to the Palestinian Ministry of Health (MOH), annual report 2005, the actual MOH expenditure was 139,584,400 USD, which means that the MOH expenditure per capita was 41.5 USD. Furthermore, the average cost of MOH hospital bed was 61(US \$), but the average cost of hospital day was 76 (US \$), where as the average cost per admission to the MOH hospitals was 230 (US \$).

In addition to that, it is important to mention that the MOH revenues were mainly from the health insurance premiums and the Co-payment, which were collected from the non-insured people when they receive medical care in the governmental institutions, licensing fees for the medical professionals and treatment of injured people in car accidents, covered by insurance companies. MOH revenues decreased from 39,315,769 USD in 2004 to 35,289,333 USD in 2005 out of which 29,957,111 (84.9%) from the health insurance which constituted 25.28% of the total MOH running budget in Palestine and the rest come from co-payment revenue/fees which was about 5,332,222 US\$ (15.1%) and constituted about (3.82%) of the total MOH running budget.

The NGOs Rehabilitation Hospitals Provided services for 2,132 inpatients during 49,800 hospitalization days. The average rate of bed occupancy at the four rehabilitation NGOs hospitals in Palestine was 86.9%. The average length of stay was 23.4 days. ((MOH), annual report, 2005)

In United States of America (USA), expenditures for hospitalization accounted for nearly one-third of all medical expenses (Agency for Healthcare Research and Quality (AHRQ), 2004). In 2004, in relation to source of payment, hospital inpatient stays account for nearly one-third of total health care expenses for the U.S. civilian non-institutionalized population. Private insurance (43.7 percent) and Medicare (38.8 percent) paid for the overwhelming majority of hospital inpatient expenses.

AHRQ (2004) found variations in expenses for the inpatient hospital stay. They added that overall, 7.5 percent of the civilian non-institutionalized population (about 22.1 millions) had expenses for an inpatient hospital stay in 2004. This percentage

increased substantially with age for both males and females, ranging from only 2.5 percent for children under 18 to about one-fifth of persons age 65 and over. Females (age 18–44) were more likely to have inpatient expenses than their male counterparts (10.0 versus 2.6 percent) were.

Lastly, rehospitalization is an indeed topic to study for its health and economical values. But first we are going to explore the risk factors for rehospitalization which can help in finding out many topics for study that can all lead to minimize the phenomenon of rehospitalization.

1.2 Objectives of the study:

1.2.1 General objective:

The general objective of this study was to identify the risk factors of rehospitalization among El-wafa rehabilitated patients in Gaza strip.

1.2.2 Specific objectives:

1. To identify the most frequent risk factor for rehospitalization.
2. To identify the most prevalent diagnostic conditions associated with the rehospitalization to El-wafa Hospital.
3. To explore the relationship between age and rehospitalization
4. To explore the relationship between gender and rehospitalization
5. To determine the average of length of stay for each risk factor
6. To contribute for formulation of an educational program
7. To describe the community follow up program of the rehabilitated patients

1.3 Demography and population:

1.3.1 Palestine History:

Palestine known as the land of Canaanites in ancient history, when Abraham migrated to the land of Canaan it was a well-developed country. The philistines entered the land of Canaan from Crete about 1250 B.C. and settled in the coastal areas. They were the people who gave Palestine its name since roman times. Nowadays Palestinians Arabs are Muslims and Christians. They are the descendants of all the races and nations which have lived in and conquered Palestine from the times of the Canaanites to the British occupation of Palestine in 1916. Under the ottoman Turks government in 1914, Palestine's population was composed of 634,000 Muslim and Christian Arabs and 55,000 Jews who had immigrated from Europe, mainly from Russia. Immediately after the publication of the Belfour declaration in 1917, clashes took place between Jews and Arabs in Palestine. In 1967, Israel launched a war of aggression against Egypt, Jordan and Syria and occupied the west bank, Gaza the Golan Heights and Sinai Peninsula. (MOH annual report, 2005)

Palestine stretches from Ras Al-Nakora in the north to Ellat in the south. The entire area of Palestine is about 27,000 sq.km including Tabariya, El-Hoola lakes and half of the area of Dead Sea. Now, Palestine comprises two areas separated geographically: the west bank and Gaza strip. The total area is 6,020sq.km with total population living in 3,762,005 individuals in 2005 with capita per sq. km. 625. (MOH annual report, 2005)

1.3.2. Gaza strip:

Gaza strip (GS) is a narrow piece of land lying on the lower part of the eastern coast of the Mediterranean Sea. Its position on the crossroads from Africa to Asia made it as essential target for occupiers and conquerors over the centuries. The last of these was Israel who occupied the GS and took it from administrative of Egyptian supervision in 1967. GS is very crowded place with area 365 sq.km and constitutes 6.1% of total area of Palestinian historic land. In year of 2005, the population became 1.389.789 mainly concentrated in the cities, small villages, and the eight refugee camps that

contain two thirds of the population of Gaza strip. In Gaza strip, the population density is 3,808 inhabitants/km² and it comprises the following main five governorates. (MOH annual report, 2005)

North of Gaza constituted 17% of the total area of Gaza strip and 1.0% of total area of Palestinian territory area with area 61 sq.km. . The total number of five populations living in north Gaza is to be 265,932 individuals in 2005 with capita per sq km 4,360. (MOH annual report, 2005)

Gaza city constituted 20.3% of the total areas of Gaza strip and 1.2% of total area of Palestinian territory area with area 74 sq. Km. The total number of population living in Gaza City is 487,904 individuals in 2005 with capita sq Km6,593. (MOH annual report, 2005)

Mid-Zone constituted about 15% of the total area of Gaza strip and 1.0% of total area of Palestinian territory area with area 58 sq. Km. The total number of population living in Mid-Zone is 201,112 individuals in 2005 with capita per sq Km 3,467. (MOH annual report, 2005)

Khan-younis constituted about 30.5% of the total area of Gaza strip and 1.8% of total area of Palestinian territory area with area 108 sq. Km. The total number of population in Khan-younis is 269,601 individuals in 2005 with capita per sq Km 2,496. (MOH annual report, 2005)

Rafah constituted about 16.2% the total area of Gaza strip and 1.1% of total area of Palestinian territory area with area 64 sq. Km. The total number of population in Rafah is 165,240 individuals in 2005 with capita per sq Km 2,582. (MOH annual report, 2005)

1.3.3. The Palestinian population in the Palestinian Territories:

The population number in Palestine estimated at 3.7 million in midyear 2005. Out of total number, 2.3 million in west Bank and 1.3 million in Gaza strip with percentage (63%) and (37%) respectively. According to the distribution of the

population by Governorates, Al-khaleil Governorate has the highest rate of population at 13.9% of the total population, followed by Gaza Governorate 13%; AL-Quds Governorate comes third with 10.6% on the other hand, Jericho Governorate has the lowest rate of population at the mid year of 2005 at 1.1%. (MOH annual report, 2005)

1.3.4 Palestinian economy: (MOH annual report, 2005)

The World Bank stated that the Gross National production (GNP) in Palestine has subjected to high fluctuations during the last five years. Gross National production (GNP) was 5,454 million US\$ in 1999 and decreased to 4,169 million US\$ in 2005. Gross Domestic Production (GDP) was 4,517 million US\$ in 1999 and decreased to 3,832 million US\$ in 2005. Gross Notional production per capita (GNP/capita) was 1,806 US\$ in 1999 and decreased to 1,039 US\$ in 2005. Gross Domestic production per capita (GDP/capita) was 1,496 US\$ in 1999 and decreased to 955 US\$ in 2005.

The number of Palestinian workers in Israel decreased from 135,000 in 1999 to 36.000 in 2005. The workers in Palestine also decreased from 453.000 in 1999 to 135.000 in 2005. The World Bank reported that the unemployment rate was 32%. This revealed a sharply increasing unemployment rate from 11.8% in 1999 to 32% and the poverty rate in Palestine was 44% in 2005. This situation is a result of Israeli enforced restriction on Palestinian movement, military operations, land confiscation and the construction of Barrier, in addition to other escalating activities on Palestinian people.

1.4 Palestinian Health Care System: ((MOH), annual report, 2005)

1.4.1 Primary health care (PHC):

PHC centers: Primary health care system (PHC) is a major component of Palestinian health care system; this system has provided health care to all Palestinian people especially for children and other venerable groups. Primary health care centers in Palestine provide primary and secondary health care services as well as tertiary services. In the last five years and after the uprising of second intifada (Al Aqua), PHC centers in Palestine have been developed in a dynamic way to face the instability of Palestinian situation were Israeli occupied forces tends to divide Palestinian localities

into isolated geographical areas. PHC centers try to offer accessible and affordable health services for all Palestinians regardless the geographical locations. According to MOH policy, PHC centers classified from level 1 to level 2. They offer different health services according to clinic level, these services include maternal and child health, care of chronic diseases, daily care, family planning, dental, mental services and other services according to center level.

1.4.2 Primary health care providers in Palestine:

The MOH are working with other health sectors in providing the primary health services mainly with United Nations for Relief and Work Agency (UNRWA), and NGOs sector. At the end of 2005, there are 654 PHC centers in Palestine; these centers cared for about 3.7 million people (129 centers in Gaza and 525 centers in West Bank). Classification of PHC according to providers shows that, the MOH considered the main provider with 63.6% from the total PHC centers, followed by the NGOs with 28.3%, then UNRWA with 8.1%. It is worth to mention that, Private sector plays an important role in providing PHC services to Palestinian people but there is limited information about these centers. The average ratio of persons per center was 5.752(10.774 in Gaza Strip and 4.519 in West Bank). The Number of PHC centers per 10.000 persons was 1.7 in 2005 while it was 1.9 in 2000. (Ministry of Health, 2006)

1.5 Classification of PHC according to Provider in Gaza Strip: ((MOH), annual report, 2005)

1.5.1 MOH:

Distribution of MOH-PHC shows that, there are 416 centers owned and supervised by the MOH with 63.6% from the total centers, these centers distribute as 56 centers in Gaza Strip and 360 centers in the West Bank.

The total number of PHC centers in Gaza strip is 56 in comparison with 43 centers in 2000, with an increase of 30.2%. The highest ratio of population per center recorded in Rafah with 41.310 persons per centre and the lowest ratio in Mid-Zone with 12.570.

The number of MOH–PHC centers per 10.000 persons was 0.40. PHC system in Gaza strip is well established and functioning despite the high population density and the over-crowdedness of population.

Classification of PHC according to center level illustrated that 30 centers classified as level II, 19 centers as level III and, seven of as level IV. In general, there are 6 centers working two shifts and 38 centers working only one shift. One of which has a delivery unit in Gaza City.

The PHC centers provide special health care services in different aspects, 42 centers provide immunization and antenatal care and family planning services, in addition to 107 specialized clinics and 30 dental and oral clinics. About 35 centers have laboratories and 13 centers have x-ray units.

1.5.2 NON-MOH PHC Centers:

The total number of NON MOH-PHC centers in the Gaza strip is 81 centers, distributed as 55 centers owned and supervised by NGOs (67.9%). 18 centers owed and supervised by UNRWA (22.2%) and 8 centers own and supervised by Medical Services for police (MSP) and general security (9.9%). The number of NON MOH-PHC centers per 10.000 persons was 0.58 in 2005 while it was 0.61 in 2004.

1.5.2.1 UNRWA Services:

UNRWA health program focuses on comprehensive preventive and primary health care. Services are covering medical care, family health, disease control and prevention, and health education. These services are provided directly and at no cost to Palestinian refugees through the agency's network of 53 primary health care facilities which are located both inside and outside refugee camps (18 in Gaza strip and 35 in the west bank). Medical care services consist of outpatient care, dental care and the rehabilitation for physically disabled persons in addition to clinics for refugees suffering from non-communicable disease such as diabetes and hypertension, and special care, covering pediatrics, obstetrics, gynecology and, cardiology. In the Palestinian

territories the number of registered refugee is 1.649.187 distributed 687,542 in the west bank and 961,645 in the Gaza strip; therefore, the ratio of refugees per center was 31,117 in Palestine, (53,425 in Gaza and 19,644 in west bank). Furthermore, all refugees in Gaza strip and west bank have the right of accessibility to the governmental health care services. In Gaza strip: in 2005, 2,761,256 visits reported to general UNRWA clinics and about 131,021 visits to specialized clinics.

1.5.2.2 Medical Services for police (MSP) Services:

In Palestine, MSP provides preventive and curative services to Palestinian people through a network of PHC centers, medical points and medical units. By the end of 2005, there are 13 PHC centers (5 in the west bank and 8 in Gaza strip. Also there are 18 medical units (11 in the west bank and 7 in Gaza strip) and 21 medical point (16 in Gaza strip and 5 in the west bank) they provide medical services for policemen general security persons and their families in addition to the general population.

1.5.3 Hospitals:

The MOH is responsible for a significant portion of the secondary healthcare delivery system (60-70% of general and specialized hospital beds) and more than this proportion in hospital services (about 70% of hospital services). In 2005, there are 43 general hospitals with 3,726 beds, 10 specialized hospitals with a total bed capacity of 812 beds, 19 maternity hospitals at a total bed capacity of 322 beds and four rehabilitation centers with a total bed capacity of 165 beds (51 in Gaza Strip, 99 in West Bank, and 5 in Jerusalem), and all of the rehabilitation hospitals are owned and operated by the NGOs. Rehabilitation hospitals provided services for 2,132 inpatients through 49,800 hospitalization days. The average bed occupancy rate at the four rehabilitation NGOs hospitals in Palestine was 86.9%. The average length of stay was 23.4 days.

EL - wafa Hospital is the first recognized inpatient rehabilitation hospital in Gaza Strip, established in 1996 to offer medical rehabilitation services for cases recovering from post acute and chronic physical and cognitive disabilities caused by head and spinal cord injuries, fractures, strokes and other conditions through in and outpatient departments. The rehabilitation team includes rehabilitation doctors, nurses,

physiotherapists, occupational therapists, speech therapists and communication therapy specialist, and psychologist.

The hospitals' inpatient department has a capacity of 50 beds designated for different wards, including male, female, children, and a special care unit. Incurring a disability has devastating and long lasting effects on a person.

Clients, who have experienced illness or injury of any origin, may recover physically after being managed medically but if there is a disability, there will be a need for continues care and extensive rehabilitation programs to bring them back to optimal levels of independence.

The hospital uses a holistic approach that sees the patient from all aspects of their problems and life situation. The hospitals' interdisciplinary team creates shared goals and develops an individualized plan of care for each client.

Following the client's discharge there is a notification system, which allows professionals at the community based rehabilitation program to further supervise the cases in the community and provide the hospital with feedback regarding any new problem occurring to the client for the proper intervention. On discharge, the client receives a full and comprehensive report containing recommendations such as home medication, frequency of periodic laboratory examinations and medical checkups, home adaptations, assistive devices and the follow up program of physiotherapy at home if needed.

Furthermore, the hospital provides assistive devices and medical aids to less privileged clients who would otherwise be unable to afford them.

In addition to patient care services the hospital take part in medical rehabilitation education and training of students from different Palestinian universities and colleges such as Islamic University, Al Azhar University and the UNRWA physiotherapy program.

1.6 Study Questions:

1. What are the risk factors for rehospitalization?
2. Is there a relationship between rehospitalization and gender?
3. Is there a relationship between rehospitalization and age?
4. What are the most prevalent diagnostic conditions associated with the rehospitalization to El-wafa Hospital?
5. What is the average of length of stay and cost for each risk factor?
6. Is there a community follow up program for the rehabilitated patients?

1.7 The study hypothesis:

There is a relationship between Rehospitalization to El-wafa Hospital in Gaza strip and sociodemographic data (age, education, gender, diagnosis, and marital status)

1.8 The significance of the study:

This study is the first study in Gaza strip exploring the risk factors for rehospitalization, so it will give new information to the research in Gaza strip. Hospitalization is one of the most costly medical services in the Ministry of Health programs. The study will give information about the risk factors that make the patient obliged for readmission to the hospital, and it will give the most frequent risk factor of rehospitalization. Therefore, the rehabilitation program teams will pay attention toward minimizing these risk factors through some modifications in the rehabilitation programs. As a result of that, there will be reduction in the rehospitalization rate among the rehabilitated patients and the expenses of the ministry of health will decrease. The study can provide information about the risk factors for rehospitalization, which will be used by the researches in the future especially in El-wafa future research center.

The study population will be all CVA, TBI, and SCI patients who were admitted to El-wafa Hospital, and received a complete rehabilitation program then discharged during the period from 1/1/2000 to 31/1/2007. That period has been chosen; because it is the period of the second intifada, which was a stressful period on the Palestinian people in Gaza strip, and many of the disabilities occurred at that period.

1.9 Operational Definitions:

1.9.1 Rehabilitated Patients:

The rehabilitated patients in this study are those that their diagnoses fall under the three major diagnoses of traumatic brain injury (TBI), Spinal Cord Injury (SCI), and Cerebrovascular Accidents (CVA), and were rehabilitated at El-wafa Hospital.

1.9.2 Traumatic Brain Injury:

It is any injury to the brain, which results in motor and sensory impairment in the body and the admission diagnosis is TBI in the patient admission file.

1.9.3 Spinal Cord Injury:

It is a traumatic and non-traumatic injury to the spinal canal, which results in a complete or incomplete cut of the spinal cord, that causes a paraplegia or quadriplegia and the admission diagnosis is SCI.

1.9.4 Cerebrovascular Accidents:

It is a non-traumatic injury to the brain vessels, which can lead to decreased blood perfusion or complete cut of the blood perfusion to the area of the brain that the blood vessel nourish. The result is motor and sensory impairment and the admission diagnosis is CVA.

1.9.5 Rehospitalization (Readmission):

It is the admission to El-wafa Hospital for second time or more with the same diagnosis as in the first admission but with different causes for admission.

1.9.6 First Admission:

It is the number one admission to El-wafa Hospital by the patients, with TBI, SCI, or CVA between the periods from 1/1/2000 to 31/1/2007.

1.9.7 Second Admission:

It is the second time admission to El-wafa Hospital, with the same diagnoses as in the first admission, but with different causes for admission between the periods from 1/1/2000 to 31/1/2007.

Chapter Two

Theoretical Background

In this chapter the researcher will discuss the main diagnoses, which fall under this study, that diagnoses being readmitted to El-wafa Hospital. These diagnoses are stroke, SCI, and TBI, and each will be discussed under the following headings (definition, epidemiology, cases, risk factors, treatment, complications, and prevention).

2.1 Stroke

2.1.1 Definition:

As revealed by the National Stroke Association stroke is the third leading cause of death in America and the number one cause of adult disability; also 80% of strokes are preventable. (National Stroke Association(NSA), 2008)

As stated by the National Stroke Association a stroke or "brain attack", occurs when a blood clot blocks an artery (a blood vessel that carries blood from the heart to the body) or a blood vessel (a tube through which the blood moves through the body) breaks, interrupting blood flow to an area of the brain. When either of these things happens, brain cells begin to die and brain damage occurs (NSA, 2008). However, U.S. National Library of Medicine has defined stroke, as a medical emergency. Strokes happen when blood flow to your brain stops. Within minutes, brain cells begin to die (U.S. National Library of Medicine, 2008)^b

WHO has defined stroke as the interruption of the blood supply to the brain, usually because a blood vessel bursts or is blocked by a clot. This cuts off the supply of oxygen and nutrients, causing damage to the brain tissue (WHO, 2008)^b. Whereas the Centers for Disease Control and Prevention (CDC) in USA has defined stroke as it occurs either when the blood supply to part of the brain is blocked or when a blood vessel in the brain bursts, causing damage to a part of the brain. A stroke also sometimes called a brain attack. (CDC, 2007)^a

2.1.2 Epidemiology of Stroke: (CDC, 2007)^b

- Stroke is the third leading cause of death in the United States. Over 160,000 people die each year from stroke in the United States.

- Stroke is a leading cause of serious long-term disability.
- About 700,000 strokes occur in the United States each year. About 500,000 of these are first or new strokes. About 200,000 occur in people who have already had a stroke before.
- Nearly three-quarters of all strokes occur in people over the age of 65. The risk of having a stroke more than doubles each decade after the age of 55.
- Strokes can occur at any age. Nearly one quarter of strokes occur in people under the age of 65.
- Stroke death rates are higher for African Americans than for whites, even at younger ages.

2.1.3 Risk Factors of Stroke: (NSA, 2008)

National Stroke Association stated about stroke risk factors that everyone has some stroke risk. A few stroke risk factors are beyond your control, such as being over age 55, being a male, being an African-American, having diabetes, and having a family history of stroke. If you have one of these risk factors, it is even more important that you learn about the lifestyle and medical changes you can make to prevent a stroke (NSA, 2008).

2.1.3.1 Medical stroke risk factors: (NSA, 2008)

Medical risk factors can be controlled like previous stroke, previous episode of transient ischemic attack (TIA) or mini stroke, high cholesterol, high blood pressure, heart disease, atrial fibrillation and carotid artery disease.

2.1.3.2 Lifestyle stroke risk factors: (NSA, 2008)

Smoking, being overweight and drinking too much alcohol. You can control these lifestyle risk factors by quitting smoking, exercising regularly, watching what and how much you eat and limiting alcohol consumption.

According to American Stroke Association (ASA), some stroke risk factors are hereditary. Others are a function of natural processes. Still others result from a person's lifestyle. ASA added that you cannot change factors related to heredity or natural processes, but those resulting from lifestyle or environment can be modified with the help of a healthcare professional. (ASA, 2008)

2.1.3.3 Non-modifiable Risk Factors of Stroke: (ASA, 2008)

- Age: stroke is common among the elderly, many people under 65 also have strokes.
- Heredity: your stroke risk is greater if a parent, grandparent, sister or brother has had a stroke.
- Sex (gender): stroke is more common in men than in women.
- Prior stroke or TIA: the risk of stroke for someone who has already had one is many times that of a person who has not. TIA are "warning strokes" that produce stroke-like symptoms but no lasting damage. TIAs are strong predictors of stroke.

2.1.3.4 Modifiable Risk Factors of Stroke: (American Stroke Association, 2008)

- High blood pressure: many people believe the effective treatment of high blood pressure is a key reason for the accelerated decline in the death rates for stroke.
- Cigarette smoking: in recent years, studies has shown cigarette smoking to be an important risk factor for stroke.
- Diabetes mellitus: many people with diabetes also have high blood pressure, high blood cholesterol and are overweight. This increases their risk of stroke.
- Carotid or other artery disease: the carotid arteries in your neck supply blood to your brain. A carotid artery narrowed by fatty deposits from

atherosclerosis (plaque buildups in artery walls) become blocked by a blood clot. Carotid artery disease also called carotid artery stenosis. Peripheral artery disease is the narrowing of blood vessels carrying blood to leg and arm muscles. It caused by fatty buildups of plaque in artery walls. People with peripheral artery disease have a higher risk of carotid artery disease, which raises their risk of stroke.

- Atrial fibrillation: this heart rhythm disorder raises the risk for stroke. The heart's upper chambers quiver instead of beating effectively, which can let the blood pool and clot. If a clot breaks off, enters the bloodstream and lodges in an artery leading to the brain, a stroke results.
- Other heart disease : People with coronary heart disease or heart failure have a higher risk of stroke than those with hearts that work normally.
- Sickle cell disease (also called sickle cell anemia) : "Sickled" red blood cells are less able to carry oxygen to the body's tissues and organs. These cells also tend to stick to blood vessel walls, which can block arteries to the brain and cause a stroke.
- High blood cholesterol: People with high blood cholesterol have an increased risk for stroke.
- Poor diet: Diets high in saturated fat, Trans fat and cholesterol can raise blood cholesterol levels.
- Physical inactivity and obesity: Being inactive, obese or both can increase your risk of high blood pressure, high blood cholesterol, diabetes, heart disease and stroke.

2.1.3.5 Less well-documented risk factors of Stroke: (ASA, 2008)

- Geographic location: Strokes are more common in the southeastern United States than in other areas. These are the so-called "stroke belt" states.
- Socioeconomic factors: there is some evidence that strokes are more common among low-income people than among people that are more affluent.
- Alcohol abuse: Alcohol abuse can lead to multiple medical complications, including stroke.
- Drug abuse: Drugs that are abused, including cocaine, amphetamines and heroin, have been associated with an increased risk of stroke.

2.1.4 Types of stroke: (CDC, 2007) ^c

2.1.4.1 Ischemic Stroke: (80% of all strokes)

An ischemic stroke occurs when an artery that supplies blood and oxygen to the brain becomes blocked. Most strokes are of this type. Blood clots are the most common cause of artery blockage. A narrowing of the arteries (called stenosis) can also cause ischemic strokes. The most common condition that causes stenosis is atherosclerosis. In atherosclerosis, plaque (a mixture of fatty substances including cholesterol and other lipids) and blood clots build up inside the artery walls, causing thickening, hardening, and loss of elasticity. These lead to decreased blood flow.

2.1.4.2 Hemorrhagic Stroke: (10-15% of all strokes)

A hemorrhagic stroke occurs when an artery in the brain bursts. Hemorrhage can occur in several ways. One cause is an aneurysm, a weak or thin spot on an artery wall that can expand like a balloon. The thin walls of the stretched artery can rupture or break. Hemorrhage also occurs when arterial walls lose their elasticity and become brittle and thin. They can then crack and bleed. This can happen with atherosclerosis. High blood pressure increases the risk of a hemorrhagic stroke.

There are two main types of hemorrhagic stroke. An intracerebral hemorrhage occurs when a blood vessel in the brain leaks blood into the brain itself. A subarachnoid hemorrhage is bleeding under the outer membranes of the brain and into the thin fluid-filled space, which surrounds the brain.

2.1.4.3 Transient Ischemic Attacks

A transient ischemic attack (TIA) sometimes called a mini-stroke. It starts just like a stroke but then clears up within 24 hours, leaving no apparent symptoms or deficits. A TIA is a warning that the person is at risk for a more serious stroke. Having other risk factors increases a person's chances of a recurrent stroke if they have had a TIA. For most TIAs the symptoms go away within an hour. However, there is no way to tell whether symptoms will be a TIA or a more serious stroke that can lead to death or disability. The sudden onset of the symptoms of a stroke should signal an emergency. Patients and witnesses should not wait to see if the symptoms go away.

2.1.5 Signs and Symptoms of Stroke:

According to National Institute of Neurological Disorders and Stroke (NINDS) on its official website, the symptoms of a stroke include the following: sudden numbness or weakness, especially on one side of the body; sudden confusion or trouble speaking or understanding speech; sudden trouble seeing in one or both eyes; sudden trouble with walking, dizziness, or loss of balance or coordination; or sudden severe headache with no known cause. (NINDS, 2008)^a

2.1.6 Diagnosis of stroke:

If stroke suspected, prompt, accurate diagnosis and treatment is necessary to minimize brain tissue damage. Diagnosis includes a medical history and a physical examination including neurological examination to evaluate the level of consciousness, sensation, and function (visual, motor, language) and determine the cause, location, and extent of the stroke.

Physical examination includes assessing the airway, breathing, and circulation (ABCs) and the vital signs (i.e., pulse, respiration, and temperature). The head (including ears, eyes, nose, and throat) and extremities also examined to help determine the cause of the stroke and rule out other conditions that produce similar symptoms (e.g., Bell's palsy).

Blood tests (e.g., complete blood count) and imaging procedures (e.g., CT scan, ultrasound, MRI) help the physician determine the type of stroke and rule out other conditions, such as infection and brain tumor.

Imaging Procedures When stroke suspected, computed tomography, (CT scan) performed as soon as possible. CT scan produces x-ray images of the brain and used to determine the location and extent of hemorrhagic stroke. CT scan usually cannot produce images showing signs of ischemic stroke until 48 hours after onset, so a repeat scan may be performed.

Ultrasound uses high-frequency sound waves to produce images of blood flow through the arteries in the neck that supply blood to the brain (i.e., carotid arteries) and may used to detect blockage.

Magnetic resonance imaging (MRI scan) with magnetic resonance angiography (MRA) uses a magnetic field to produce detailed images of brain tissue and arteries in the neck and brain, allowing physicians to detect small-vessel infarct (i.e., stroke in small blood vessels deep in brain tissue).

Angiogram involves injecting a contrast agent (dye) into the bloodstream and taking a series of x-rays of blood vessels. This test used to identify the source and location of arterial blockage and to detect aneurysms and blood vessel defects.

2.1.7 Treatment of stroke:

Generally, there are three treatment stages for stroke: prevention, therapy immediately after the stroke, and post-stroke rehabilitation. Therapies to prevent a first or recurrent stroke based on treating an individual's underlying risk factors for stroke, such as hypertension, atrial fibrillation, and diabetes. Acute stroke therapies try to stop a stroke while it is happening by quickly dissolving the blood clot causing an ischemic stroke or by stopping the bleeding of a hemorrhagic stroke. Post-stroke rehabilitation helps individuals overcome disabilities that result from stroke damage. Medication or drug therapy is the most common treatment for stroke. The most popular classes of drugs used to prevent or treat stroke are antithrombotic (anti-platelet agents and anticoagulants) and thrombolytic. (NINDS, 2008)^a

2.1.8 Treatment of stroke according to CDC: (CDC, 2007) ^d

Medical treatments can help to control the risk factors that put people at higher risk for stroke. These include treating high blood pressure, heart disease, and diabetes. Lifestyle changes such as quitting smoking can also lower the risk of stroke.

Acute stroke therapies try to stop a stroke while it is happening. These treatments try to dissolve the blood clot causing an ischemic stroke or to stop the bleeding of a hemorrhagic stroke. These therapies are most effective when given very soon after the onset of a stroke.

Post-stroke treatment and rehabilitation used to lower the risk of another stroke and to help patients overcome disabilities that result from stroke. People who have had a

stroke can do things to lower their risk of having another stroke. These include controlling their underlying risk factors.

Rehabilitation helps stroke victims relearn skills that may be lost when the brain damaged. Rehabilitation may include the following:

- § Physical therapy to help restore movement, balance, and coordination.
- § Occupational therapy to help the patient relearn everyday activities such as eating, drinking, dressing, bathing, cooking, reading and writing.
- § Speech therapy to help stroke patients relearn language and speaking skills, including swallowing, or learn other forms of communication.
- § Psychological or psychiatric help after a stroke. Psychological problems, such as depression, anxiety, frustration, and anger, can be common after a stroke.

2.1.9 Stroke rehabilitation: (NINDS, 2008)^a

As stated by the National Institute of Neurological Disorders and Stroke that successful rehabilitation depends on:

- § Amount of damage to the brain
- § Skill on the part of the rehabilitation team
- § Cooperation of family and friends. Caring family/friends can be one of the most important factors in rehabilitation
- § Timing of rehabilitation – the earlier it begins the more likely survivors are to regain lost abilities and skills

NINDS added that the goal of rehabilitation is to enable an individual who has experienced a stroke to reach the highest possible level of independence and be as productive as possible. Because stroke survivors often have complex rehabilitation needs, progress and recovery are unique for each person. Although a majority of functional abilities may be restored soon after a stroke, recovery is an ongoing process.

2.1.10 Stroke complications:

A prospective study in UK on 613 inpatient stroke cases for observing the type, timing, and frequency of complications occurring in hospitalized patients after an acute stroke found that the most common individual complications were falls (complicating 22% of all strokes), skin breaks (18%), and urinary tract (16%) or chest (12%) infections. Miscellaneous "other" complications complicated 32% of strokes. (Davenport et al, 1996)

2.1.10.1 the most common complications after stroke are: (ASA, 2007)

- § Edema — brain swelling after injury.
- § Seizures — abnormal electrical activity in the brain causing convulsions.
- § Clinical depression — a treatable illness that often occurs with stroke and causes unwanted emotional and physical reactions to changes and losses.
- § Bedsores — pressure ulcers that result from decreased ability to move.
- § Limb contractures — shortened muscles in an arm or leg from reduced range of motion or lack of exercise.
- § Shoulder pain — stems from lack of support or exercise of an arm.
- § Blood vessel problems — blood clots form in veins.
- § Urinary tract infection and bladder control — urgency and incontinence.
- § Pneumonia — causes breathing problems, a complication of many major illnesses.

2.1.11 Stroke Prognosis: (NINDS, 2008) ^a

Although stroke is a disease of the brain, it can affect the entire body. A common disability that results from stroke is complete paralysis on one side of the body, called Hemiplegia. A related disability that is not as debilitating as paralysis is one-sided weakness or Hemiparesis. Stroke may cause problems with thinking, awareness, attention, learning, judgment, and memory. Stroke survivors often have problems understanding or forming speech. A stroke can lead to emotional problems. Stroke patients may have difficulty controlling their emotions or may express

inappropriate emotions. Many stroke patients experience depression. Stroke survivors may also have numbness or strange sensations. The pain is often worse in the hands and feet and made worse by movement and temperature changes, especially cold temperatures. Recurrent stroke is frequent; about 25 percent of people who recover from their first stroke will have another stroke within 5 years.

According to the National Stroke Association, the prognosis of stroke disability cleared as follows:

- § 10% of stroke survivors recover almost completely
- § 25% recover with minor impairments
- § 40% experience moderate to severe impairments that require special care
- § 10% require care in a nursing home or other long-term facility
- § 15% die shortly after the stroke
- § Approximately 14% of stroke survivors experience a second stroke in the first year following a stroke.

2.2 Traumatic brain Injury (TBI):

2.2.1 Definition:

Traumatic brain injury (TBI), also called acquired brain injury or simply head injury occurs when a sudden trauma causes damage to the brain. TBI can result when the head suddenly and violently hits an object, or when an object pierces the skull and enters brain tissue. (National Institute of Neurological Disorders and Stroke, 2008)^b

CDC has defined TBI as a blow or jolt to the head or a penetrating head injury that disrupts the normal function of the brain. Not all blows or jolts to the head result in a TBI. The severity of a TBI may range from “mild,” i.e., a brief change in mental status or consciousness to “severe,” i.e., an extended period of unconsciousness or amnesia after the injury (CDC, 2008).

2.2.2 Definitions related TBI:

There are several ways to describe brain injuries. The brain is enclosed in the bony vault of the skull. The cerebrospinal fluid surrounds the brain and, most of the time, protects it from impact with the skull. If there is a rapid force applied to the skull or rapid deceleration of the head, the brain may strike the inside of the bony vault.

Brain tissue may stretch or tear because of the rapid movement. This can injure the nervous tissue of the brain directly. If a projectile such as a bullet enters the skull, it can directly injure the brain. Below is a list of terms and definitions that refer to the different injuries of TBI.

2.2.2.1 Closed Head Injury: The skull is intact and there is no penetration of the skull. Direct or indirect force to the head can cause this type of injury. This may be caused by rotational and/or deceleration in the case of both direct and indirect force.

2.2.2.2 Open Head Injury: penetration of the skull with direct injury to the head.

2.2.2.3 Diffuse Axonal Injury: diffuse cellular injury to the brain from rapid rotational movement. This is often seen in motor vehicle accidents or shaking injuries. The axons are the projections of the brains nerve cells that attach to other nerve cells. They are damaged or torn by the rapid deceleration. The injury is from the shearing force disrupting the axons, which compose the white matter of the brain.

2.2.2.4 Contusion: a bruise to a part of the brain. Like a bruise on the body, this is bleeding into the tissue.

2.2.2.5 Penetrating Trauma: any object that enters the brain. Causes direct injury by impact and pushing skull fragments into the brain.

2.2.2.6 Secondary Injury: swelling and release of chemicals that promote inflammation and cell injury or death. This causes swelling in the brain, which may increase the intracranial pressure and prevent the cerebrospinal fluid from draining out of the skull. This causes further increase in pressure and brain damage. If this is not controlled or prevented the brain can herniated (push through) the base of the skull and

cause respiratory failure and death. The only way to prevent the primary injury is to prevent the trauma. The prevention of this secondary injury is the focus of the acute medical care after injury. Secondary Injury Includes Intracranial hemorrhage (bleeding inside the skull), Brain swelling, Increased intracranial pressure (pressure inside the skull), Brain damage associated with lack of oxygen, Infection inside the skull, common with penetrating trauma, Chemical changes leading to cell death, and Increased fluid inside the skull (hydrocephalus)

2.2.3 Epidemiology of TBI:

TBI contribute to a substantial number of deaths and cases of permanent disability annually. Of the 1.4 million who sustain a TBI each year in the United States: 50,000 die; 235,000 hospitalized; and 1.1 million are treated and released from an emergency department. Where as among children ages 0 to 14 years, TBI results in an estimated: 2,685 deaths; 37,000 hospitalizations; and 435,000 emergency department visits annually (Langlois et al, 2004).

CDC estimates that at least 5.3 million Americans, approximately 2% of the U.S. population, currently have a long-term or lifelong need for help to perform activities of daily living because of a TBI (Thurman et al, 1999). Direct medical costs and indirect costs such as lost productivity of TBI totaled an estimated \$60 billion in the United States in 2000 (Finkelstein et al, 2006)

2.2.4 Risk Factors of TBI: (Mayo Clinic Staff, 2006)

- § Age: The risk of TBI is highest in two age groups —adolescents (ages 15 to 19) and small children (ages 0 to 4).
- § Sex: Males are 1.5 times as likely as females to suffer a traumatic brain injury.

2.2.5 Causes of TBI:

The leading causes of TBI are (Langlois et al, 2004):

Falls (28%); Motor vehicle-traffic crashes (20%); Struck by/against events (19%); and Assaults (11%).

2.2.6 Signs and Symptoms of TBI:

Symptoms of a TBI can be mild, moderate, or severe, depending on the extent of the damage to the brain and a person with a mild TBI may remain conscious or may experience a loss of consciousness for a few seconds or minutes. NINDS in 2008 added that symptoms of mild TBI include headache, confusion, lightheadedness, dizziness, blurred vision or tired eyes, ringing in the ears, bad taste in the mouth, fatigue or lethargy, a change in sleep patterns, behavioral or mood changes, and trouble with memory, concentration, attention, or thinking. Where as a person with a moderate or severe TBI may show these same symptoms. However, may also have a headache that gets worse or does not go away. Also repeated vomiting or nausea, convulsions or seizures, an inability to awaken from sleep, dilation of one or both pupils of the eyes, slurred speech, weakness or numbness in the extremities, loss of coordination, and increased confusion, restlessness, or agitation. (NINDS, 2008)^b

2.2.7 Types of TBI:

2.2.7.1 Mild TBI symptoms:

A traumatic brain injury (TBI) can classified as mild if loss of consciousness and/or confusion and disorientation is shorter than 30 minutes. Mild TBI is the most prevalent TBI and often missed at time of initial injury. 15% of people with mild TBI have symptoms that last one year or more. Mild TBI defined as the result of the forceful motion of the head or impact causing a brief change in mental status (confusion, disorientation or loss of memory) or loss of consciousness for less than 30 minutes. Post injury symptoms often referred to as post concussive syndrome. These symptoms may not be present or noticed at the time of injury. They may delay days or weeks before they appear. The symptoms are often subtle and often missed by the injured person, family and doctors.

While MRI and CAT scans are often normal, the individual has cognitive problems such as headache, difficulty thinking, memory problems, attention deficits, mood swings and frustration. These injuries commonly overlooked. Even though this type of TBI called "mild", the effect on the family and the injured person can be devastating. The person looks normal and often moves normal in spite of not

feeling or thinking normal. This makes the diagnosis easy to miss. Family and friends often notice changes in behavior before the injured person realizes there is a problem. Frustration at work or when performing household tasks, may bring the person to seek medical care.

2.2.7.2 Moderate to Severe TBI symptoms:

Brain injuries can range in scope from mild to severe. Traumatic brain injuries (TBI) result in permanent neurobiological damage that can produce lifelong deficits to varying degrees. Moderate to severe brain injuries typically refer to injuries that have the following characteristics:

- Moderate brain injury defined as a brain injury resulting in a loss of consciousness from 20 minutes to 6 hours and a Glasgow Coma Scale of 9 to 12.
- Severe brain injury defined as a brain injury resulting in a loss of consciousness of greater than 6 hours and a Glasgow Coma Scale of 3 to 8.

TBI can cause a wide range of functional changes affecting thinking, sensation, language, and/or emotions. It can also cause epilepsy and increase the risk for conditions such as Alzheimer's disease, Parkinson's disease, and other brain disorders that become more prevalent with age (NINDS, 2002)

2.2.8 Diagnosis of TBI:

NINDS said that Imaging tests help in determining the diagnosis and prognosis of a TBI patient. NINDS also reveals that the diagnosis of TBI can also be clear by skull and neck X-rays to check for bone fractures or spinal instability for mild to moderate injuries of the brain, where as a computed tomography (CT) scan imaging test can be helpful in the diagnosis of moderate to severe injuries of the brain. (NINDS, 2008)^b

2.2.9 Treatment of TBI:

According to NINDS, the treatment of TBI focus on preventing further injury and the primary concerns of that treatment include insuring proper oxygen supply to the

brain and the rest of the body, maintaining adequate blood flow, and controlling blood pressure. (NINDS, 2008)^b

2.2.9.1 Acute treatment of TBI:

Acute treatment of a Traumatic Brain Injury (TBI) aimed at minimizing secondary injury and life support.

Mechanical ventilation supports breathing and helps keep the pressure down in the head. A device may be placed surgically in the brain cavity to monitor and help control intracranial pressure.

Medications to sedate and put the individual in a drug-induced coma may be used to minimize agitation and secondary injury. Seizure prevention medications may be given early in the course and later if the individual has seizures.

Medications to control spasticity may be used as the patient recovers function. Behavioral issues also can be treated with medications. Medications for attention problems and aggressive behavior are often tried.

2.2.9.2 Surgical treatment of TBI:

Surgical treatment often used for patients of Traumatic Brain Injury (TBI). In closed head injury, surgery does not correct the problem. A bolt or ICP (intracranial pressure) monitoring device may be placed in the skull to monitor pressure in the brain cavity. If there was bleeding in the skull cavity, this may be surgically removed or drained. Bleeding vessels or tissue may need to be repaired. In severe cases, if there is extensive swelling and damaged brain tissue, a portion may be surgically removed to make room for the living brain tissue.

An open head injury confronts doctors with the same issues as a closed head injury; however, in addition, skull fractures may need to be repaired and damaged tissue removed.

The overall goal of all surgical treatment is to prevent secondary injury by helping to maintain blood flow and oxygen to the brain and minimize swelling and pressure.

2.2.10 Rehabilitation of TBI:

The families of traumatic brain injury (TBI) victims often have many questions when their loved one transferred to a rehabilitative care center.

Similar to the acute care facility, the TBI patient will be cared for by a team of professionals who specialize in the care of trauma victims, and their goals are to:

1. Stabilize the medical and rehabilitation issues related to brain injury and the other injuries.
2. Prevent secondary complications. Complications could include pressure sores, pneumonia and contractures.
3. Restore lost functional abilities. Functional changes could include limited ability to move, use the bathroom, talk, eat and think.
4. The staff will also provide adaptive devices or strategies to enhance functional independence.
5. The staff will begin to analyze with the family and the patient what changes might be required when the person goes home.

Each day, the patient will participate in therapy. Initially, the patient may require staff assistance for even the simplest activities: brushing teeth, getting out of bed and eating. The patient also may require staff for safety because there is a risk of falling, eloping (trying to get out of the hospital to go home) or getting hurt. The patient may be confused and forgetful.

2.2.11 Complications after TBI:

2.2.11.1 Immediate complications after TBI: (NINDS, 2008) ^b

Sometimes, health complications occur in the period immediately following a TBI. These complications are not types of TBI, but are distinct medical problems that arise because of the injury. Although complications are rare, the risk increases with the severity of the trauma. Complications of TBI include immediate seizures, hydrocephalus or post-traumatic ventricular enlargement, cerebrospinal fluid (CSF) leaks, infections, vascular injuries, cranial nerve injuries, pain, bed sores, multiple organ

system failure in unconscious patients, and multi-trauma (trauma to other parts of the body in addition to the brain).

2.2.11.2 Long-term complications (disabilities) after TBI: (NINDS, 2008) ^b

Alzheimer's disease (AD), Parkinson's disease and other motor problems, Dementia pugilistica.

2.2.12 Prognosis of TBI: (NINDS, 2008) ^b

- Disabilities resulting from a TBI depend upon the severity of the injury, the location of the injury, and the age and general health of the individual.
- Some common disabilities include problems with cognition (thinking, memory, and reasoning), sensory processing (sight, hearing, touch, taste, and smell), communication (expression and understanding), and behavior or mental health (depression, anxiety, personality changes, aggression, acting out, and social inappropriateness).

2.3 Spinal Cord Injury (SCI):

Spinal cord injury is one of the devastating injuries that leads to a complicated problems to patients even in the future like social interactions and job problems. So we are going to explain what is SCI in details to have some understandings about its complications which can help in exploring the risk factors for rehospitalization.

2.3.1 Definition of SCI:

According to NINDS, spinal cord injury usually begins with a sudden, traumatic blow to the spine that fractures or dislocates vertebrae. the damage begins at the moment of injury when displaced bone fragments, disc material, or *ligaments* bruise or tear into spinal cord tissue. They added that most injuries to the spinal cord do not completely sever it. Instead, an injury is more likely to cause fractures and compression of the vertebrae, which then crush and destroy the *axons*, extensions of nerve cells that carry signals up and down the spinal cord between the brain and the rest of the body. Where as an injury to the spinal cord can damage a few, many, or almost all of these

axons, so some injuries will allow almost complete recovery but others will result in complete paralysis. (NINDS, 2003)

2.3.2 Epidemiology of SCI:

The annual incidence of SCI, worldwide, is estimated at 15 to 50 cases per 1,000,000 persons, with about 12,000 new cases per year in the U.S. These numbers may be underestimates because many patients succumb to the injuries prior to hospitalization. Mortality at the scene is probably in excess of 50%. Of those who survive to hospitalization, mortality at one year is 13%. Acute, traumatic, spinal cord injuries account for 2.5% of admissions to trauma centers. The prevalence is 900 cases per 1,000,000 admissions, affecting up to 250,000 patients in the United States. The median age of this group is a sobering 27 years. Sixty-five percent of those with SCI are younger than 35 years of age. The greatest incidence occurs between ages 20 to 24 years. The male-to-female ratio is nearly 4:1. The incidence of injury is highest during the summer months and on weekends. The most common level of injury is cervical, specifically C-5 followed by C-4 and C-6. The most common lower level is T-12 followed by L-1 and T-10. (Rowland et al, 2005)

2.3.3 Causes of SCI:

Vehicular accidents are the most common cause of traumatic paraplegia and tetraplegia. Patients in this group (i.e., those involved in single and multiple motor vehicle accidents, motorcycle accidents, and injuries to pedestrians), account for approximately 48% of all new cases of SCI. Other causes include falls (21%), sports and recreational injuries (13%), industrial accidents (12%), and acts of violence (16%). In the elderly, falls are an increasingly common cause of SCI. There are regional differences in causation (i.e., in large cities, gunshot wounds and stabbings are seen more frequently) and the relative frequency of these causes differs in different societies. Birth injuries, particularly in breech deliveries, may result in a stretched or compressed spinal cord caused by traction and hyperextension of the cervical spine. (Rowland et al, 2005)

2.3.4 Risk factors of SCI: (Mayo Clinic Staff, 2007)

Although a spinal cord, injury is usually the result of an unexpected accident that can happen to anyone, some groups of people have a higher risk of sustaining a spinal cord injury. These include:

- § Men. Spinal cord injury affects a disproportionate amount of men. In fact, women account for only about 20 percent of spinal cord injuries in the United States.
- § Young adults and seniors. People are most often injured between ages 16 and 30. However, there is another peak in people older than 60. Motor vehicle crashes are the leading cause of spinal cord injury for young people, while falls cause most injuries in older adults. However, in some cities, acts of violence — such as gunshot wounds, stabbings and assaults — are a major cause of spinal cord injury.
- § People who are active in sports. Sports and recreational activities cause 8 percent of the 11,000 spinal cord injuries in the United States each year, although sports-related spinal cord injury is becoming less common. High-risk athletic activities include football, rugby, wrestling, gymnastics, diving, surfing, ice hockey and downhill skiing.
- § People with predisposing conditions. A relatively minor injury can cause spinal cord injury in people with conditions that affect their bones or joints, such as arthritis or osteoporosis.

2.3.5 Types and Levels of SCI: (American Association of Neurological Surgeons, 2005)

The severity of an injury depends on the level part of the spinal cord that is affected.

- Tetraplegia (quadriplegia) results from injuries to the spinal cord in the cervical (neck) region, with associated loss of muscle strength in all four extremities.
- Paraplegia results from injuries to the spinal cord in the thoracic or lumbar areas, resulting in paralysis of the legs and lower part of the body.

2.3.5.1 Complete SCI:

A complete SCI produces total loss of all motor and sensory function below the level of injury. Nearly 50 percent of all SCIs are complete. Both sides of the body are equally affected. Even with a complete SCI, the spinal cord is rarely cut or transected. More commonly, loss of function is caused by a contusion or bruise to the spinal cord or by compromise of blood flow to the injured part of the spinal cord.

2.3.5.2 Incomplete SCI:

In an incomplete SCI, some function remains below the primary level of the injury. A person with an incomplete injury may be able to move one arm or leg more than the other may, or may have more functioning on one side of the body than the other may. An incomplete SCI often falls into one of several patterns.

2.3.5.2.1 Anterior cord syndrome:

It results from injury to the motor and sensory pathways in the anterior parts of the spinal cord. These patients can feel some types of crude sensation via the intact pathways in the posterior part of the spinal cord, but movement and sensation that is more detailed are lost.

2.3.5.2.2 Central cord syndrome:

Usually results from trauma and is associated with damage to the large nerve fibers that carry information directly from the cerebral cortex to the spinal cord. Symptoms may include paralysis and/or loss of fine control of movements in the arms and hands, with far less impairment of leg movements. Sensory loss below the site of the SCI and loss of bladder control may also occur, with the overall amount and type of functional loss related to the severity of damage to the nerves of the spinal cord.

2.3.5.2.3 Brown-Sequard syndrome:

A rare spinal disorder results from an injury to one side of the spinal cord. It usually caused by an injury to the spine in the region of the neck or back. In many cases, some type of puncture wound in the neck or in the back that damages the spine may be the cause. Movement and some types of sensation are lost below the level of

injury on the injured side. Pain and temperature sensation are lost on the side of the body opposite the injury because these pathways cross to the opposite side shortly after they enter the spinal cord.

2.3.5.3 Injuries to a specific nerve root:

It may occur either by them or together with a SCI. Because each nerve root supplies motor and sensory function to a different part of the body, the symptoms produced by this injury depend upon the pattern of distribution of the specific nerve root involved.

2.3.5.4 Spinal concussions:

It can also occur. These can be complete or incomplete, but spinal cord dysfunction is transient, generally resolving within one or two days. Football players are especially susceptible to spinal concussions and spinal cord contusions. The latter may produce neurological symptoms including numbness, tingling, electric shock-like sensations, and burning in the extremities. Fracture-dislocations with ligamentous tears may be present in this syndrome.

2.3.5.5 Penetrating SCI:

"Open" or penetrating injuries to the spine and spinal cord, especially those caused by firearms, may present somewhat different challenges. Most gunshot wounds to the spine are stable, i.e., they do not carry as much risk of excessive and potentially dangerous motion of the injured parts of the spine. Depending upon the anatomy of the injury, the patient may need to be immobilized with a collar or brace for several weeks or months so that the parts of the spine that were fractured by the bullet may heal. In most cases, surgery to remove the bullet does not yield much benefit and may create additional risks, including infection, cerebrospinal fluid leak, and bleeding. However, occasional cases of gunshot wounds to the spine may require surgical decompression and/or fusion in an attempt to optimize patient outcome.

2.3.6 Mechanism of SCI:

The mechanism of SCI may be divided into two distinct phases—primary and secondary injury. Primary injury refers to the structural damage occurring instantly after the traumatic event. Further primary injury may occur, however, if an injured spine not adequately immobilized. Secondary injury refers to a pathophysiological cascade initiated shortly after injury, including such insults as ischemia, hypoxia, edema, and various harmful biochemical events. Because it is extremely rare for the primary injury to cause transection of the spinal cord, and it has shown that less than 10% of the cross-sectional area of the spinal cord supports locomotion, it is very important to focus clinical attention on the secondary injury process (Blight, 1986).

"Ischemia is a very prominent feature of post-SCI events. Within 2 hours of injury, there is a significant reduction in spinal cord blood flow. This ischemia may be confounded by loss of the normal autoregulatory response of the spinal cord vasculature. When autoregulation is lost, blood flow becomes dependent on systemic pressures. Thus, in the multitraumatized patient or the patient with vasogenic spinal shock complicating the SCI, severe systemic hypotension may exacerbate the spinal cord ischemia. Hypovolemia and hypotension should be corrected rapidly. Hypotension in particular may increase the area of secondary injury in the spinal cord and worsen outcome. Crystalloids, colloids, and blood products may be used to replace volume as needed. If hypotension persists despite an adequate volume status, vasopressors should be used to maintain a mean arterial pressure of approximately 80mmHg.

Edema formation is another feature of the secondary injury process. Edema develops first at the injury site and subsequently spreads into adjacent and sometimes distant segments of the cord. The relationship between this edema and worsening of neurological function is not well understood.

Many biochemical mechanisms have been implicated in the evolution of the pathological changes and physiological derangements occurring after SCI. Electrolyte disturbances have been well documented, including increased intracellular calcium level, increased extracellular potassium level, and increased sodium permeability. Other events such as excitatory neurotransmitter accumulation, arachidonic acid release, endogenous opiate activation, and prostaglandin production have all been implicated as

damaging elements of the post-injury cascade. Other events, free radical production and lipid per oxidation, are believed to play a central role in this process. Ultimately, however, all of these events cumulatively result in ischemia, edema formation, membrane destruction, cell death, and eventually permanent neurological deficits." (Christopher, 2007)

2.3.7 Signs and Symptoms of SCI:

If the patient is conscious, he usually complain of acute pain in the back or neck that may radiate along with the involved nerve. Signs and symptoms of SCI depend on the level of injury of the cord (cervical, dorsal, lumbar) and the type of injury (complete cut of the cord or incomplete). According to that, clinical manifestations may include paraplegia or quadriplegia, sensory loss below the injury level, loss of bladder and bowel control, and respiratory problems (compromised respiratory function). (Smeltzer Suzanne C, Bare Brenda G, 1996)

2.3.8 Diagnosis of SCI: (Rowland et al, 2005)

After clinical neurologic assessment and stabilization, it is essential to obtain accurate and complete imaging of the spinal column soon after the time of injury. This done to enhance diagnostic accuracy, and to rule out unsuspected pathology, a possibility especially in the comatose, incoherent, or uncooperative patient.

Anterior-posterior (AP) and lateral plain-film x-rays must be taken at the appropriate level as directed by the clinical evaluation. Lateral x-rays of the cervical spine, encompassing the lower cervical region, are mandatory. Open-mouth, odontoid radiographic views should form part of the initial examination. In thoracic and lumbar injuries, AP, lateral, oblique, and extension views may be required.

CT is the best procedure for evaluating uncertain findings seen on plain x-rays, as well as for detecting bone pathology. High-resolution CT with sagittal reconstruction enhances radiologic diagnosis to 95% accuracy. In general, MRI is the best technique for soft-tissue imaging and CT is best for detecting bone pathology.

MRI is the most specific and sensitive technique for assessing soft-tissue Paraspinal lesions, disc herniation, spinal-cord hemorrhage, spinal-cord edema, and intra- or extradural hemorrhage. Monitoring of severely injured patients during MRI procedures, although improved, is still inadequate in many institutions. The ability to monitor the critically injured must be a priority when MRI is considered. If MRI is not available, intrathecally enhanced CT is the current best alternative.

Neurophysiologic assessment of spinal cord function is feasible with the use of sensory- and motor-evoked responses. Mixed nerve-evoked potentials may be useful in determining the integrity of particular spinal-cord pathways, such as the dorsal columns. These procedures used at times in Intensive Care Units (ICUs), or intra-operatively, for monitoring spinal cord function and identifying spinal-conduction blockade.

2.3.9 Treatment of SCI:

Treatment of the spinal cord-injured patient encompasses five phases: (1) emergency treatment with attention to circulation, respiration, patent airway, appropriate immobilization of the spine, and transfer to a specialized center; (2) treatment of general medical problems (e.g., hypotension, hypoxia, poikilothermy, ileus); (3) spinal alignment; (4) surgical decompression of the spinal cord, if indicated; and (5) a well-structured rehabilitation program. (Rowland et al, 2005)

2.3.10 Rehabilitation of SCI: (Rowland et al, 2005)

The ultimate aim for all patients with SCI is recovery of maximal independence or ambulation. This has increasingly become an achievable goal and may be accomplished in many patients who have injuries below the cervical area. It is best done in a rehabilitation center with trained personnel and adequate equipment. Such facilities are studying the use of functional electrical stimulation to augment partial weight-bearing, supported-treadmill training in patients with incomplete SCI, with promising initial results. When the arms are paralyzed, the therapeutic goal is more limited, but devices controlled by intact muscles and appropriate surgery may permit useful motion

of paralyzed arms. Implantation of diaphragmatic stimulators has permitted survival of high-cervical cord injured patients.

The development of spinal-cord care units specializing in the care of tetraplegia and paraplegia is important. An increase in life expectancy, reduction in the frequency of complications, and development of new techniques that allow greater patient autonomy and improve quality of life are areas of focus.

New hope has been stimulated by stem-cell research and SCI is a major focus. Although it is still embroiled in political controversy, the potential for recovery and repair of damaged neural tissue leading to functional improvement of these devastating injuries may not be denied. Current research is still mainly in the laboratory, but in the era of molecular biology, clinical trials may not be so remote an eventuality.

Finally, the best treatment must be prevention. Nationwide educational programs should be concerned with causes of SCI: motor vehicle safety, water and occupational safety, eliminating drunk driving, adhering to speed limits, and mandatory use of seatbelts and other protective gear.

2.3.11 Complications of SCI: (NINDS, 2003)

People who survive a spinal cord injury will most likely have medical complications such as chronic pain and bladder and bowel dysfunction, along with an increased susceptibility to respiratory and heart problems. Successful recovery depends upon how well these chronic conditions are handled day to day.

- § **Breathing:** any injury to the spinal cord at or above the C3, C4, and C5 segments, which supply the phrenic nerves leading to the diaphragm, can stop breathing. People with these injuries need immediate ventilator support.
- § **Pneumonia:** respiratory complications, primarily as a result of pneumonia, are a leading cause of death in people with spinal cord injury.

- § **Irregular heart beat and low blood pressure:** spinal cord injuries in the cervical region are often accompanied by blood pressure instability and heart arrhythmias.

- § **Blood clots:** people with spinal cord injuries are at triple the usual risk for blood clots. The risk for clots is low in the first 72 hours, but afterwards anticoagulation drug therapy can be used as a preventive measure.

- § **Spasm:** many of our reflex movements are controlled by the spinal cord but regulated by the brain. When the spinal cord is damaged, information from the brain can no longer regulate reflex activity. Reflexes may become exaggerated over time, causing *spasticity*.

- § **Autonomic dysreflexia:** autonomic dysreflexia is a life-threatening reflex action that primarily affects those with injuries to the neck or upper back. It happens when there is an irritation, pain, or stimulus to the nervous system below the level of injury.

- § **Pressure sores (or pressure ulcers):** pressure sores are areas of skin tissue that have broken down because of continuous pressure on the skin. People with paraplegia and quadriplegia are susceptible to pressure sores because they can't move easily on their own.

- § **Pain:** people who are paralyzed often have what is called neurogenic pain resulting from damage to nerves in the spinal cord.

- § **Bladder and bowel problems:** most spinal cord injuries affect bladder and bowel functions because the nerves that control the involved organs originate in the segments near the lower termination of the spinal cord and are cut off from brain input.

- § **Reproductive and sexual function:** spinal cord injury has a greater impact on sexual and reproductive function in men than it does in women. Most spinal cord injured women remain fertile and can conceive and bear children. Depending on the level of injury, men may have problems with erections and

ejaculation, and most will have compromised fertility due to decreased motility of their sperm.

2.3.12 Prognosis of SCI: (Rowland et al, 2005)

Long-term survival depends on the level and extent of the lesion, patient age, and the availability of special treatment units that include multidisciplinary personnel. Coexisting injuries, notably head injuries, increase mortality rates and leave survivors with more disability than SCI, alone. Patients with high cervical injuries are more likely to succumb to their injuries than those injured at lower levels. As might be expected, the mortality rate escalates with higher cervical lesions.

Of those who survive their injuries and acute hospital periods, the leading causes of death are pneumonia, cardiac dysfunction, septicemia, pulmonary emboli, suicide, and accidents. Renal failure was long believed to be a leading cause of death in this group, but that notion has not been borne out by recent data. In younger patients, suicide and accidents become more prevalent.

Neurologic recovery is assessed by changes on the American Spinal Injury Association (ASIA) impairment-scale grade and by changes in spinal cord level damage. Knowledge of the site and severity of the injury, and the degree of neurologic dysfunction, are critical in predicting the recovery of function. It is important to differentiate between neurologic recovery and functional recovery.

The role and timing of surgery continue to be controversial issues. Currently, immediate surgery is recommended for release of cord compression and many also are advocated for early intervention of unstable spine injury. Beyond that obvious cord compression, the optimal timing for surgery is not clear. Advocates of early surgery believe that any incomplete cord injury deserves surgical evaluation prior to the onset of cord edema and subsequent worsening. Recovery rates related to operative or non-operative care indicate no significant differences in neurologic outcome between the two groups. Early surgery seems to be safe, and in specific situations, may lead to earlier rehabilitation. Opponents of early surgery would cite the need for medical stabilization and resolution of edema, prior to any operative procedure.

In summary, neurologic assessment within the first 24 to 48 hours after SCI offers the best method of predicting the eventual outcome. The initial assessment must be done in an alert, cooperative patient, without the presence of alcohol intoxication, drug toxicities, or refractory shock interfering with the assessment. In both complete and incomplete lesions, predictors for return of neurologic function are inconsistent. A sign of serious injury is failure of return of any function within 48 hours of the accident.

De Vivo and colleagues (1987) studied the 7-year survival period following SCI. Patients with complete lesions, predictably, did less well than those with incomplete lesions. The cumulative 7-year survival rate among neurologically complete quadriplegics, and who were at least 50 years old when injured, was only 22.7%. The cumulative 7-year survival rate for all groups was 86.7 %.(De Vivo et al, 1987)

2.4 Theoretical framework

Understanding the rehabilitation cycle is of great importance for rehabilitation professionals. Rehabilitation cycle comprise three phases: community, general hospital, and rehabilitation hospital. However, the first two phases are important, but the current study is concerned with the rehabilitation phase.

Rehabilitation phase starts at the rehabilitation hospital, where the patient is medically stable. In this phase, the patient is one of the rehabilitation team members, who direct the rehabilitation program of that patient. Rehabilitation team includes the occupational therapist, the physical therapist, the prosthetist-orthetist, the rehabilitation nurse, the speech-language pathologist, the psychologist, the social worker, and the vocational counselor. (Delisa et al 1998)

In this phase, patient have to do and not to be a care receiver, so the patient must be active in the rehabilitation program and show initiative for the success of his program. Other team members are as facilitators for any of the activities that the patient can do.

After finishing the rehabilitation program, the patient should be prepared for the discharge from the rehabilitation hospital and to be integrated in the community, and he is ready to play his role as part of the society and share in the social activity exactly as possible as before the injury with some life modifications.

On the other hand, the community should be prepared to receive that patient through some environmental modifications, and the community-follow up of that patient in the manner that he is highly committed to the discharge plan and the rehabilitation team instructions. Therefore, the community also has a part in the completion of the rehabilitation program and making the patient on the line of successful rehabilitation.

However, some of those patients, despite completing rehabilitation program, they go back to the hospital for different reasons. These reasons found in the gap of care between the rehabilitation hospital and the community.

Therefore, in this study the researcher is concerned to explore those risk factors in the community and the rehabilitation hospital, which become the causes for rehospitalization among the rehabilitated patients. In addition, through the determination of those risk factors, this study is going to explain the role of the rehabilitation hospital and the community for the prevention of rehospitalization among those patients.

This study is going to make a relationship between those risk factors and the rehospitalization, therefore, the researcher through his revision to the literature reviews, he hypothesize that the risk factors are Physiologic (pressure ulcer, spasticity, upper respiratory tract infection, urinary tract infection, pain), rehabilitation, psychological, and social factors.

Predicting the risk factors of rehospitalization is increasingly important for the planning and assessment of interventions for the prevention of disability complication, which can lead to decreasing the risk of rehospitalization. Constructing teaching program to prepare the patient and his family for the hospital discharge and social integration is a great deal.

From the researcher point view, that program will play an important role in the prevention of disability complication and can prepare the patient for the social integration. Complete social integration can make the patient to be fully committed to his rehabilitation and educational programs.

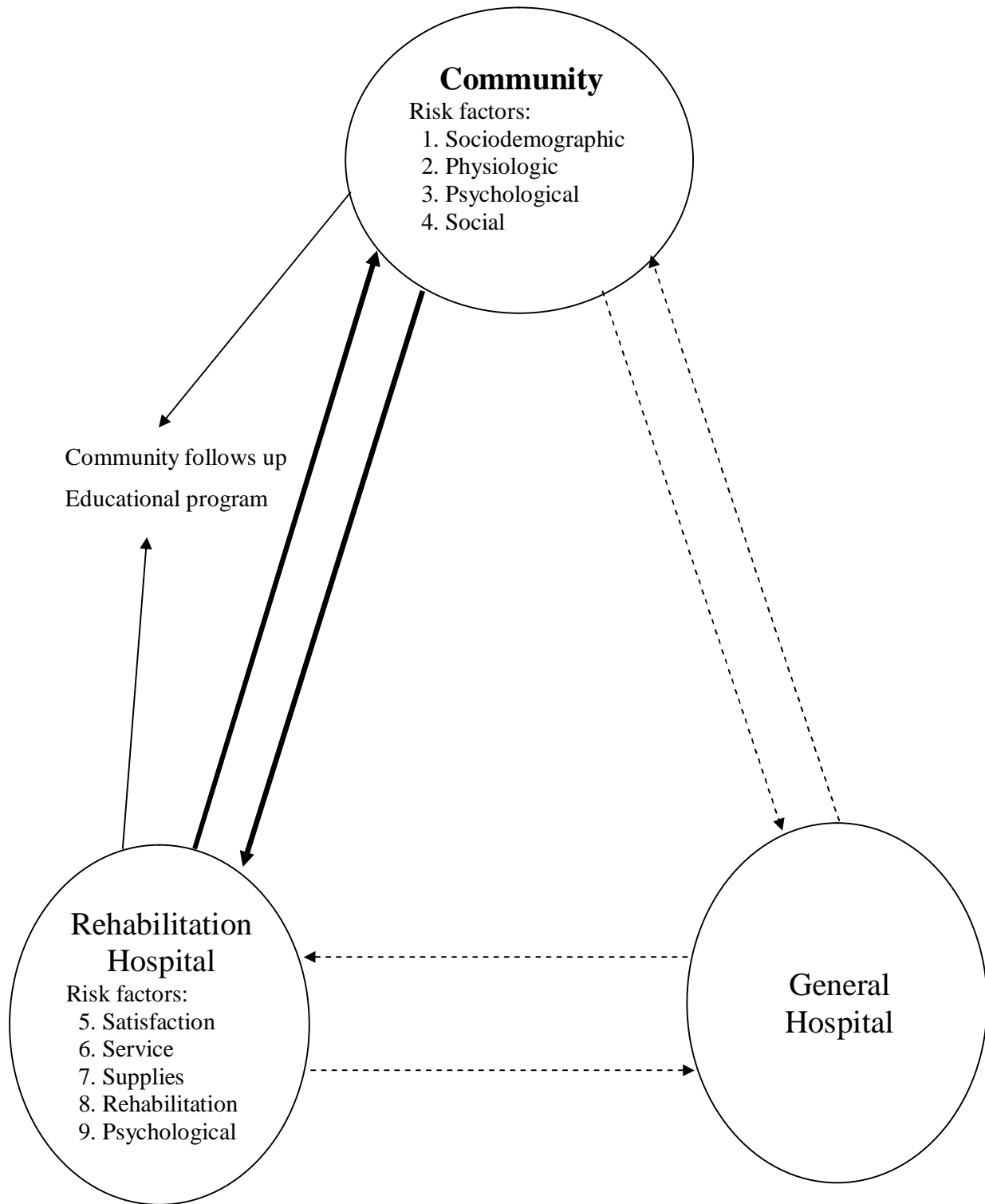
Teaching and learning is an integral part of rehabilitation practice. Therapists educate patients and families about their conditions, exercises to facilitate recovery, and prevention of complication related activities. Rehabilitation professionals are also heavily involved in the health education of the rehabilitated patients.

The role of the rehabilitation professional in the clinic has changed and education of patients and families has become even more important as the number of persons with disability has increased. Which in turn, increase the need for the highly expensive rehabilitation services. With fewer visits, therapists must be certain that

patients understand their home programs and those family members can comfortably assist in their care.

The presence of community workers can also alleviate the phenomenon of rehospitalization. Those workers can help the discharged patients in the integration in the community, and can do many jobs in the community regarding the rehabilitation and the continuity of care of those patients.

Rehospitalization is a phenomenon that relates to diagnoses, and each has a risk factors for rehospitalization. This study is concerned about the rehabilitation hospital which is the work place of the researcher, so the return of the patients to the hospital attracted the researcher to explore that phenomenon.



Chapter Three

Literature Review

In this chapter the researcher exhibited the literature review that purely talked about rehospitalization, also the literature review consisted of some variables that pertaining to the study like incidence rate, length of stay, risk factors of rehospitalization, and cost of rehospitalization. Each of the recently mentioned variables was exhibited in a chronological way as they appear in this chapter, and as two studies have the same design.

The incidence rate of rehospitalization among tetraplegic patients in USA was 62% (Young, 2006). He added that the most common reasons for rehospitalization were dermatological (23%), orthopedic (18%) and urological (14%). Another study conducted in UK for the identification of rehospitalization among tetraplegic patients by Vaidyanathan (1998). He revealed that during the 2-year period, 155 tetraplegic patients readmitted and 44 of them (28.4%) required more than one readmission. "Among the reasons for the readmissions, evaluation and care of urinary tract disorders topped the list with 96 readmission episodes (43.43%) involving 70 patients," Vaidyanathan said. He added that it may be possible to prevent some of the complications of spinal cord injury and hence the need for a readmission.

Cifu (1999) reported in a descriptive prospective study that the annual incidence of rehospitalization among traumatic brain injured patients ranged from 20% - 22.5%, where as the leading cause for rehospitalization was for elective reasons. Marwitz (2001) reported the same leading cause for rehospitalization, where as the incidence for rehospitalization ranged from 22.9% one year after injury to 17% at 5 years after injury.

Previous study was conducted in the department of medicine for the Elderly Woodend Hospital in Aberdeen to examine the nature of readmission of elderly in order to establish how many of them were avoidable (Gautam, 1996). The researcher found that there were 109 episodes of readmissions resulting from 713 discharges, making a readmission rate of 15.3%. He added that the majority of unplanned readmissions were medical in nature and unavoidable. Similar study retrospectively conducted in Singapore by Au (2002), reported that the incidence rate of readmission was (150/1632) 9.2%. The study revealed that unplanned readmissions are relatively common in elderly patients and they can not be entirely prevented in a view of multiple chronic illnesses. Approximately, similar incidence rate was reported by comette (2005) with mild

differences. Comette found that the rate of readmissions among elderly with 1 month after discharge was 10.7%. Nevertheless, different incidence rate (23%) was reported within 3 months after discharge (Comette, 2005). He added that beside severe morbidities at discharge, diagnoses and previous hospitalization, pre-admission IADL was an independent risk factor for 2-3 month readmission.

Davidoff (1990) reported that 39% of acutely spinal cord injured patient in Michigan, were readmitted at least once by day 365. The difference between characteristics of readmitted and those for non readmitted groups, that the readmitted group was less educated as the average age of readmitted group was 11.8 +/- 2.1 years and for non readmitted group was 12.9 +/- 0.3 years.

From 40 states in USA, 167 rehabilitation facilities were included in a study about the characteristics of rehospitalized stroke patients (Ottenbacher, 2001). He found that 18.1% of non-Hispanic white men and 17.9% of African-American men were rehospitalized. In contrast, only 10.1% of Hispanic men and 11.4% of Asian men were rehospitalized.

In Australia, the incidence rate for rehospitalization among spinal cord injured patients was 58.6% (Middleton, 2004). Similar study in UK found that 64% of the sample required hospital readmission (Savic, 2000). Another study in Istanbul Physical Medicine and Rehabilitation Center has 7.6% incidence rate for rehospitalization (Paker, 2006).

Bohannon (2004) found that the incidence of rehospitalization among stroke patients was 37.3% for the same hospital. He added that the readmissions occur within 100 days of discharge, and the most common readmission diagnosis was stroke (14.1%).

An analysis of out patient complications found that 1.4% of trauma patients required readmission (Battistella, 1997). He added that 84% of readmissions were within 30 days and 71% were within 14 days.

Across- sectional survey in Michigan shows 57% incidence rate of rehospitalization among spinal cord injured patients (Meyers, 1985). Another study in Michigan shows that nine of the 12 patients rehospitalized 21 times, mainly for urinary tract infections and decubitus ulcer (Weingarden, 1992).

In a study of rehospitalization in persons with acute traumatic spinal cord injury, the leading cause for rehospitalization was disease of the genitourinary system, including urinary tract infections (Cardenas, 2004). He added that diseases of the respiratory system tended to be more likely in patients with quadriplegia (C1-8 American Spinal Injury Association (ASIA) grades A,B,C), whereas patients with paraplegia (T1-S5 ASIA) grades A,B,C) were more likely to be rehospitalized for pressure ulcers.

The most common reason for rehospitalization among traumatic brain injured patients was for orthopedic and reconstructive surgery followed by Infectious disorders and general health maintenance (Cifu, 1999).

Kee (1998), found that readmission to the hospital account for a significant number of all admissions. He added that early discharge and inadequate care both during and after hospitalization are among the causes that responsible for the significant number of readmissions.

A study in university of Alabama at Birmingham-Spain Rehabilitation Center shows that the most frequent causes for rehospitalization among spinal cord injured patients were urinary tract complications (usually infections). Another reasons for rehospitalization were described by the researcher were as follows: primary nervous system conditions (usually autonomic dysreflexia: 8.4 percent), digestive system complications (8.2 percent), trauma (6.5 percent), psychoses, drug and alcohol problems (5.0 percent), musculoskeletal conditions (4.8 percent), cardiac and circulatory conditions (3.6 percent), diabetes, endocrine and nutritional problems (2.4 percent), and all others (3.0 percent). (Michael J. DeVivo, 1999)

Middleton (2004), reports in a longitudinal study that the most frequent causes for rehospitalization among spinal cord injured patients were genitourinary (24.1% of

readmissions), gastrointestinal (11.0%), further rehabilitation (11.0%), skin-related (8.9%), musculoskeletal (8.6%) and psychiatric disorders (6.8%). Similar study by Paker shows the same results with mild differences in the causes and the manner of these causes. He reports that the reasons for rehospitalization were, in descending order, spasticity 25%, and additional rehabilitation 21.4%, pressure sores 17.9%, urinary infection 16.1%, spinal surgery 8.9%, urinary system surgery 5.4% and pain 5.4% (Paker, 2006).

One indicator of quality Home Health Care is the prevention of rehospitalization (Rosati, 2003). The researcher explored those 7,393 patients who had at least one episode of rehospitalization. The study results revealed that after the data had been adjusted for age and gender, a number of demographic, clinical, and functional factors predicted repeat hospitalizations.

Health Maintenance Organizations' (HMO) patients were younger, male, and non-Caucasian and had fewer comorbid conditions (Smith, 2005). He explored that when compared with fee-for-service (FFS) patients, HMO patients were more likely to be rehospitalized within 30 days for a primary diagnosis of ischemic stroke or ill defined conditions (e.g. rehabilitation) and they are less likely to be rehospitalized for fluid-electrolyte disorders or circulatory-respiratory problems.

A retrospective study shows that the reasons for readmissions among trauma victims were wound (29%), abdominal (29%), pulmonary (18%), and thromboembolic (19%) complications (Battistella, 1997). He added that injury Severity Score, length of hospitalization, and gender were not independent predictors of readmission.

Ivie (1994) reported in a cross-sectional study that factors associated with increased likelihood of rehospitalization among spinal cord injured patients, were lack of college education, Indwelling urethral catheter, motor complete injuries, dependence in self care and dependence in ambulation. He added that 26% of persons were rehospitalized during the most recent follow-up year.

The leading diagnoses resulting in early readmissions were related to heart and circulatory problems, with a mean of 12.5 days between discharge and readmission

among patients aged 65 years old and over (Timms, 2002). However, a study in Hong Kong regional hospital shows that the patients who are frequently readmitted to the hospital are severely ill, on public assistance and may need special attention when discharged. The study suggested that those the only three factors for predicting rehospitalization (Wong, 2002).

The average annual cost of rehospitalization among tetraplegic patients was 14,197 US dollars (young, 2006). He found that as many as 74% of the total number of days persons spent rehospitalized, 64% of the monies spent on rehospitalization, and 47% of rehospitalizations could have been prevented. Another study among spinal cord injured patients shows that the mean hospital charge per admission was 9,683 US dollars (Davidoff, 1990).

Kim (2005) studied the effect of hospital based case management (HBCM) on readmission of patients. He found that HBCM interventions were not significantly effective in reducing readmissions, but he revealed that his meta-analysis study demonstrates a 6% decrease in readmission rate for those patients received HBCM interventions. Ashton (1997) conducted similar Meta-analysis study. The study was to explore the association between quality of inpatient care and early readmission. He revealed that early readmission is significantly associated with the process of inpatient care and the risk of early readmission increased by 55% when care is of relatively low quality.

Weingarden (1992), reports in his study in Michigan that the charges for 18 of 21 rehospitalizations, among spinal cord injured patients, amounted to over 423,110 US dollars for 599 days of care.

Michael J. DeVivo (1999) reported that the mean charge per cause per readmission was 1996 dollars. They added that in 1996 dollars, average charges were highest for skin (\$33,621) and musculoskeletal (\$32,699) conditions, and were lowest for endocrine and nutritional problems (\$6,078). They found that based on Medicare cost-to-charge ratios for urban and rural hospitals in this state, these cause-specific average charges correspond to average costs of \$17,222 for skin, \$16,748 for musculoskeletal, and \$3,169 for endocrine and nutritional disorders.

Cardenas (2004) found in his study that the average length of stay (LOS) for spinal cord injured patients per rehospitalization at the year 5 was approximately 12 days. Similar study shows a mean of LOS about 11.9 +/- 2.1 days per admission (Davidoff, 1990).

Young (2006), in a quadriplegics study gives average LOS about 9.2 days/year. Where as the average LOS was 15.5 days per rehospitalization in Australia study for spinal cord injured patients (Middleton, 2004).

Savic (2000) and Paker (2006), report ranges of LOS among spinal cord injured patients. Savic in his study shows a mean LOS about 12.03 days per readmission. Paker in his study shows average LOS about 72.21 days per readmission and the average age was 34.25 years. Another study shows that the average LOS among spinal cord injured patients was 45.1 days/person/year (Meyers, 1985).

Tuel (1992) investigated the benefit after readmissions for rehabilitation among sever head injured patients retrospectively. He found that 53% (26 patients) showed improvement, and the difference between readmission and discharge Barthel scores was statistically significant ($p = 0.0001$). The study revealed that patients with mid-range admission Barthel scores (21-85) demonstrated the largest gains, with 79% showing improvement.

Anderson (2005), reported that the characteristics of Transitional Care Unit (TCU) readmitted patients that they were females, widowed with 8 diagnoses and taking 12 different medications. He proposed that understanding high-risk patients' characteristics that lead to costly hospital readmission during a stay in the TCU can assist clinicians and healthcare providers to plan and implement timely and effective interventions, and help facility personnel in fiscal and resource management issues.

A study in USA hypothesized that a follow-up intervention after discharge could reduce readmission rate and prevent functional decline (Andersen et al, 2000). The study revealed that readmission rates within 6 months after discharge were significantly lower in the intervention groups than in the control group. The researcher explored that

readmission is common among disabled stroke survivors. Follow-up intervention after discharge seems to be a way of preventing readmission, especially for patients with long inpatient rehabilitation.

Chapter Four

Methodology

In this chapter, the researcher will exhibit his methods and tools for conducting his study. He explained more about the study design, population, data collection, sampling, and setting of that study.

4.1 Study design:

A case-control was design used for conducting this study. The case patients were those who have been admitted to El-wafa Hospital, their diagnoses fall under SCI, CVA, or TBI, and readmitted to El-wafa Hospital. The control patients were those who have been admitted to El-wafa hospital, their diagnoses fall into the same categories SCI, CVA, or TBI and not readmitted to El-wafa Hospital. This design has been chosen for its value in reaching the study objectives, and in addition, that it is economic, quicker, and needs fewer subjects than other designs.

4.2 Study population:

The study population is all CVA, TBI, and SCI patients who admitted to El-wafa Hospital, then discharged during the period from 1/1/2000 to 31/1/2007.

The data of all study population was obtained from the hospital's database unit. The data included the patient's name (first name, father's and family's name), date of admission, age, times of admission, file number, Phone or mobile number, gender, city, diagnosis, discharge date, and the referring agency name.

After the exclusion of all diagnoses that were out of SCI, TBI, and CVA, the real total number of study population was 723 patients.

4.3 Selection of cases:

The case patients were those who admitted to El-wafa Hospital, their diagnoses fall under SCI, CVA, or TBI and readmitted to El-wafa Hospital. After refining the data, the number of patients for TBI was 163 with 14 readmitted patients, for SCI were 145 patients with 26 readmitted patients, and for CVA were 415 patients with

22 readmitted patients. All the readmitted patients (62) are alive and they taken as cases including the three diagnoses..

4.4 Selection of controls:

The control patients were those who admitted to El-wafa Hospital, their diagnoses fall under the same categories SCI, CVA, or TBI and not readmitted to El-wafa Hospital. The controls taken from each diagnosis list by choosing the previous patient name that is above or below the readmitted patient with one digit. The number of controls equals the number of readmitted cases for each diagnosis.

4.5 Data collection:

Data collection was not simple, there was many of obstacles faced the researcher in gathering the information for the study. Concerning the study population, the researcher face a difficulties in determining the study population because of untidy computer data storing. About the study sample, there was many of missed information like living place and good living place description, so some times the researcher back to the medical records of the study sample to have the accurate information. Some of the study sample were died after the hospital discharge. After that the study sample is ready for data collection, but it was so difficult because the study sample is distributed over all Gaza strip and also the clashes in Jabalia camp in 2008 has delayed the data collection. Finally, data was collected through retrospective review of medical record and face-to-face filled questionnaire (**Appendix 5, 6**) and the researcher interviewed the study sample.

4.6 Sampling:

All the readmitted patients are the cases. For the controls, stratified sampling method used, each diagnosis was put in a single stratum then the controls picked up by choosing the previous patient name that is above or below the readmitted patient with one digit.

4.6.1 Inclusion criteria:

- All patients who were admitted to the hospital between the periods from 1/1/2000 to 31/1/2007.
- Diagnosed as SCI, CVA, or TBI.
- Has one or more rehospitalization to the same hospital (El-wafa).
- Have completed or ended their rehabilitation program

4.6.2 Exclusion criteria:

- The admission date is out of the determined period of the study.
- Have admission diagnosis other than SCI, CVA, or TBI.
- Have no history of rehospitalization.
- Have not completed or ended their rehabilitation program

4.7 Ethical Considerations:

- Approval from El-Wafa hospital to apply this study obtained.
- Covering letter and informed consent forms obtained from each participant prior to study. (**Appendix 3, 4**)

4.8 Setting:

The study was carried out at El-wafa Medical Rehabilitation Hospital in Gaza in both male and female departments at the period between October 2007 - August 2008

4.9 Period of the Study:

- Starting month is October 2007.
- Finishing month is August 2008.

4.10 Statistical analysis:

SPSS (Statistical Package Scientific System-Version 12) was used for data entry and analysis. Data management plan was put for the right way of data entry. Data management plan included the following:

1. Matching data with a relevant statistical package.
2. Data coding and entry.
3. Data Cleaning.
4. Coding of variables.
5. Frequency tables for all study variables.
6. Cross tabulation of results.
7. Chi Square test used for the statistical analysis of the study variables (categorical variables).
8. The study results will be statistically significant and accepted, when the P. value is less than 5% ($P. < 0.05$) statistically significant.

4.11 Limitations of the study:

The study has some limitations as follows:

- The lack of complete data about the subjects in El-wafa information center.
- Lack of the cause of readmission in the subject medical file.
- Limited Arabic studies concerning the study title.
- Limited literature review as hard copies in Gaza strip.
- The bad political situation as it obstacle the data collection.
- Time to time electricity problems.
- The real number of study population was reached with many difficulties, among these difficulties that the database in the hospital was not professional, because there was a mismatching between the diagnoses. In addition, the computer was counting the readmission as a single digit, which makes sometimes, the number of patients doubled.

Chapter Five

Results and Discussion

5.1 Introduction:

In this chapter, the researcher views the results of this study by using the suitable statistical methods to answer the study questions.

After data cleaning and recoding, the researcher had scheduled his data according to the domain and for each variable, and its schedules were separately distributed. The researcher also used the valid percent instead of the percent from data description, when there is missing values.

5.2 Distribution of the study population

5.2.1 Distribution of the study population by Sociodemographic variables

Table No. 5-1 shows the distribution of population according to the sociodemographic variables. It was divided into 7 variables; each variable has 2 to 4 divisions with variation in the value of each division. The age of the subject has 3 categories as follows: young subjects (less than 20 Y/O - 20 Y/O) were 30 and they are 27.5% of the total population, and youth subjects (21 Y/O -60 Y/O) were 40 and 36.7% of the total population, whereas elderly (61 Y/O - more than 60 Y/O) were 39 subjects and 35.8% of the total population. Males and females were 74 and 35 in number and 67.9% and 32.1% of the total subjects respectively. In addition, according to the marital status of the subjects, 42 subjects (38.5%) were single, 59 subjects (54.1%) were married, and 8 subjects (7.3%) were divorced or widowed. For the educational state 42 (38.5%) were illiterate and 67 (61.5%) educated. Almost, half of the study population were highly educated (12- more than 12 YOE) which are 32(47.8%), according to the years of education (YOE), and the remaining are low educated (less than 11 YOE -11 YOE) and represent 35(52.8) of the total population. The majority of the study population were unemployed 94(86.2), whereas the employed were 15(13.8%). The largest number of the population were living in Gaza City 45(41.3%), 26(23.9%) in the southern area, 22(20.2%) in the northern area, and 16(14.7%) in the middle area.

Table 5-1: Distribution of the study population by Sociodemographic variables

Variable	Kinds	Number	Percentage
Age	Young (less than 20 Y/O - 20 Y/O)	30	27.5
	Youth (21 Y/O -60 Y/O)	40	36.7
	Elderly (61 Y/O - more than 60 Y/O)	39	35.8
Sex	Male	74	67.9
	Female	35	32.1
Marital Status	Single	42	38.5
	Married	59	54.1
	Divorced and Widowed	8	7.3
Education Status	Illiterate	42	38.5
	Educated	67	61.5
Years of Education (YOE)	Low Educated (less than 11 YOE -11 YOE)	35	52.2
	Highly Educated (12- more than 12 YOE)	32	47.8
Employment Status	Employed	15	13.8
	Unemployed	94	86.2
Residence	Northern Area	22	20.2
	Gaza	45	41.3
	The Middle Area	16	14.7
	Southern Area	26	23.9

5.2.2 Distribution of the study population by Health Insurance information variables

Table No. 5-2 shows that in the first admission, 87(79.8%) were governmentally insured and 22(20.2%) of the study population were insured by other types (military, company, private doctor, or self-referral) of health insurance. However, for the rehospitalized, the larger number was 50, (84.4%) were governmentally insured, but the other types of insurance the number was 9 (15.3%) of the total population, and the same numbers and percentages were for totally covered by the insurance and partially covered respectively.

Table 5-2: Distribution of the study population by Health Insurance Information variables

Variable	Kinds	Number	Percentage
Type of Insurance in 1 st Admission	Governmental	87	79.8
	Others	22	20.2
Type of Insurance in 2 nd Admission	Governmental	50	84.7
	Others	9	15.3
Hospital Referral Coverage in 2 nd Admission	Yes Totally	50	84.7
	Yes Partially	9	15.3

5.2.3 Distribution of the study population by Date of Injury and Diagnoses variables

The researcher find that there is no big difference in number and percentage between SCIs and CVAs, but there is a big gap between both CVAs and SCIs compared with TBIs in the same values. According to the date of injury, the numbers and percentages were almost having the same interval of differences in values.

Table 5-3: Distribution of the study population by Date of Injury and Diagnoses variables

Variable	Kinds	Number	Percentage
Diagnosis	CVA	42	38.5
	SCI	45	41.3
	TBI	22	20.2
Date Of Injury	Old(prior to Jan. 1999-1999)	23	21.1
	Intermediate(2000-2003)	50	45.9
	Recent(2004-after December 2004)	36	33

5.2.4 Distribution of the study population by Length of Stay and times of readmissions variables

Table No 5-4 shows in the second admission that 18(31.6%) have little (lowest less than 20 days-20days) Length of Stay (LOS), 22(38.6%) have intermediate (21days-59days) LOS, and 17(29.8%) have long (60days-more than 60 days) LOS. Mostly, 41 (71.9%) readmitted once, but 16(28.1%) were readmitted more than once.

Table 5-4: Distribution of the study population by Length of Stay and times of readmissions variables

Variable	Kinds	Number	Percentage
Length of Stay in 2 nd Admission	Little LOS (less than 20 days-20days)	18	31.6
	Intermediate LOS (21days-59days)	22	38.6
	High LOS (60days-more than 60 days)	17	29.8
Times of Readmission	Readmitted Once	41	71.9
	Readmitted more than Once	16	28.1

5.2.5 Distribution of the study population by Physiologic variables

Table No 5-5, shows that there is a big difference with those who have been rehospitalized except in PU, which represents 27(24.8%). In addition, the others were as follows: 13(11.9%) for spasticity, 10(9.2%) for pain, 6(5.5%) for UTI, 5(4.6%) for RTI, 9(8.3%) for disturbance in the urination pattern, and 4(3.7%) for disturbance in defecation pattern.

Table 5-5: Distribution of the study population by Physiologic variables

Variable	First Admission		Second Admission	
	Number	Percentage	Number	Percentage
Pressure Ulcer	37	33.9	27	24.8
spasticity	57	52.3	13	11.9
Pain	55	50.5	10	9.2
UTI	79	72.5	6	5.5
RTI	36	33	5	4.6
Disturbance in urination pattern	74	67.9	9	8.3
Disturbance in defecation pattern	77	70.6	4	3.7

5.2.6 Distribution of the study population by Characteristics of the major causes of the second admission

In the table No 5-6, can explain what is the most defined characteristic for each major cause of the second admission. For the PU as a cause for the second admission, 22(81.5%) noticed increase in size and depth. Spasticity as a cause for the second admission, 12(92.3%) affects his activity of daily livings (ADLs) and his joint movement. Also pain as a cause for the second admission, 9(90%) affects his ADLs. When talking about UTI, 6(100%) affects his urine control. For the RTI, 5(100%) affects his ADLs. Disturbance in urination pattern, makes 6(75%) c/o bladder retention. In the disturbance in defecation pattern, as a cause for the second admission, 4(100%) c/o Chronic constipation.

Table 5-6: Distribution of the study population by Characteristics of the major causes of the second admission

Variable	Number	Percentage
Pressure Ulcer:		
Increase in size and depth	22	81.5
Can care for pressure ulcer	15	55.6
Infected pressure ulcer	16	59.3
Know to prevent PU	20	74.1
Adequate positioning	20	74.1
Use of Mattress	20	74.1
Spasticity:		
Affects his ADLs	12	92.3
Affects his joint movement	12	92.3
Affects his community participation	8	61.5
Pain:		
Affects his sleeping pattern	9	90
Affects his ADLs	8	80
Can tolerate pain	5	50
UTI:		
UTI disturb his urine control	6	100
Cannot manage the UTI by himself	3	50
RTI:		
Affects his ADLs	5	100
Complaining of Dyspnea	4	80
Urination pattern disturbance:		
Can control his bladder	1	12.5
Complaining of bladder retention	6	75
Complaining of urine leakage	5	62.5
Defecation pattern disturbance:		
Can control his bowel	1	25
Complaining of chronic constipation	4	100
Complaining of irregularity in his bowel motions	2	50

5.2.7 Distribution of the study population by rehabilitation variables

In the first admission, as table No. 5-7 shows, 69(63.3%) of the total population, according to their perspective, has completed their rehabilitation program. However, for the rehospitalized (48(80%)) of them, they think that they have benefited from the second admission. About 102(93.6%) do not know another rehabilitation center to go for seeking help. However, 48(48%) need to complete their rehabilitation program.

Table 5-7: Distribution of the study population by rehabilitation variables

Variable	Yes		No	
	Number	Percentage	Number	Percentage
Completed Rehabilitation in 1 ST admission	69	63.3	40	36.7
Benefit from 2 nd admission	48	80	12	20
Know another Rehabilitation center	7	6.4	102	93.6
Need to complete rehabilitation	48	48	52	52

5.2.8 Distribution of the study population by satisfaction of supplies and services variables

Concerning the satisfaction of hospital supplies in table, No 5-8, it was as follows: 68(62.4%) greatly, 38(34.9%) moderately, 1(0.9%) mildly, and 2(1.8%) were unsatisfied, whereas satisfaction about hospital supplies was a motivating cause in the second admission for about 44(67.7%) of the total population. However, for the satisfaction of hospital services, it was somewhat different as it represents the following: 77(70.6%) greatly, 25(22.9%) moderately, 3(2.8%) mildly, and 4(3.7%) were unsatisfied, whereas the satisfaction about hospital services was a motivating cause in the second admission for about 48(75%) of the total population.

Table 5-8: Distribution of the study population by satisfaction of supplies and services variables

Variable	Kinds	Number	Percentage
Satisfaction with hospital supplies	Greatly	68	62.4
	Moderately	38	34.9
	Mildly	1	0.9
	Unsatisfied	2	1.8
Hospital supplies a motivating cause	Yes	44	67.7
	No	21	32.3
Satisfaction with hospital services	Greatly	77	70.6
	Moderately	25	22.9
	Mildly	3	2.8
	Unsatisfied	4	3.7
Hospital services a motivating cause	Yes	48	75
	No	16	25

5.2.9 Distribution of the study population by Psychological variables

Psychologically, as in table No. 5-9, 105(96.3%) were comfort in dealing with the hospital workers, and trust El-Wafa rehabilitation team, furthermore, 107(98.2%) think that El-Wafa is satisfactory in rehabilitation. In addition, 14(13.1%) feels that they are a heavy load on their families, 30(27.8%) their families care him in the hospital more than in their home, 41(37.6%) like to be among the rehabilitation team, and 20(18.9%) feels discomfort in their homes. For that, 30(27.8%) of the total population has been rehospitalized as the cause of rehospitalization was psychological.

Table 5-9: Distribution of the study population by Psychological variables

Variable	Yes		No	
	Number	Percentage	Number	Percentage
Comfort with hospital workers	105	96.3	4	3.7
Trust El-Wafa rehabilitation team	105	96.3	4	3.7
El-Wafa satisfactory in rehabilitation	107	98.2	2	1.8
Heavy load on his family	14	13.1	93	86.9
Family care him in hospital more than in home	30	27.8	78	72.2
Like to be among rehabilitation team	41	37.6	68	62.4
Discomfort at home	20	18.9	86	81.1
The cause was psychological	30	53.6	26	46.4

5.2.10 Distribution of the study population by Social variables

As indicated in table No. 5-10, for the social variable, the majority (105(97.2%)) has a caregiver at their homes, slightly lesser number (102(94.4%)) their families provide them with adequate care. Large number (83(77.6%)) their existence at home does not affect their families social roles, whereas (7(17.1%)) the social factors were the cause for their second admission.

Table 5-10: Distribution of the study population by Social variables

Variable	Yes		No	
	Number	Percentage	Number	Percentage
Care giver at home	105	97.2	3	2.8
Family give adequate care	102	94.4	6	5.6
Existence does not affect the social role	83	77.6	24	22.4
The cause was social	7	17.1	34	82.9

5.2.11 Distribution of the study population by Educational variables

In the first discharge, the subjects took different instructions about their disability and a little number did not according to the table No. 5-11. 7(6.42%) do not have any instructions in their first discharge. Among the types of instructions for the prevention of disability complications, the majority 38(34.86%) were for PU, and 60(55.04%) for all types of instructions, whereas 3(2.75%) who do not have any instructions. The majority (53(48.62%)) agree that lectures is the best method for patient teaching.

Table 5-11: Distribution of the study population by Educational variables

Variable	Kinds	Number	Percentage
Type of instructions in 1 st discharge	Medical	11	10.09
	Social	4	3.6
	Psychological	8	7.3
	Occupational	19	17.43
	Physiotherapy	38	34.86
	Nursing	11	10.09
	All	55	50.45
	None	7	6.42
Information for disability complication prevention	Pressure Ulcer	38	34.86
	Spasticity and physiotherapy	27	24.77
	Urinary tract infection	9	8.25
	Pain	4	3.6
	ADLs and occupational therapy	12	11
	Respiratory tract infection	3	2.75
	All	60	55.04
	None	3	2.75
Method for patient teaching	Role-play	47	43.1
	Lectures	53	48.62
	Electronic material	3	2.75
	Pamphlets	4	3.6
	Brochures	9	8.25
	Special written instruction	11	10.09
	Workshops	15	13.76

5.2.12 Distribution of the study population by Community Follow up variables

In the table No. 5-12, almost half (50(46.3%)) of the total population have been visited by the society NGOs as community follow up for the persons with disability. In addition, the purposes of those visits were as follows: 3(2.75%) for help, 35(32.11%) for further rehabilitation, 10(9.17%) for supplies donation, 11(10.09%) for medication donation, 5(4, 58%) for medical investigation and 3(2.75%) for all the above purposes. As more prescription about the community follow up, 44(40.7%) of the total study population receives support from the community social workers. In addition, the majority (29(26.6%)) of support was psychological, supplies represents 24(22%), but the other supports have a big difference if we say that medical aid represents 4(3.6%), 3(2.75%) for information and other supports, and 1(0.9%) for community activity. Furthermore, almost half (55(50.9%)) of the study population receives information from El-Wafa social worker about the Community Based Rehabilitation (CBR) services. About satisfaction of CBR services 35(32.1%) were greatly satisfied, and 32(29.4%) were unsatisfied, but 23(21.1%) were moderately, and 19(17.4%) were mildly satisfied.

Table 5-12: Distribution of the study population by Community Follow up variables

Variable	Kinds	Number	Percentage
Society NGOs visit in 1 st discharge	Yes	50	46.3
	No	58	53.7
Purpose of visit	Help	3	2.75
	Further rehabilitation	35	32.11
	Supplies	10	9.17
	Medication	11	10.09
	Investigation	5	4.58
	All	3	2.75
Support from community social workers	Yes	44	40.7
	No	64	59.3
Type of support	Community Activity	1	0.9
	Information	3	2.75
	Medical aid	4	3.6
	Supplies	24	22
	Psychological support	29	26.6
	others	3	2.75
Received information about CBR services	Yes	55	50.9
	No	53	49.1
Satisfaction about CBR services	Greatly	35	32.1
	Moderately	23	21.1
	Mildly	19	17.4
	Unsatisfied	32	29.4

5.3 Study Results for Readmission

5.3.1 Socio-demographic results of the study

As shown in the following table (5-13), people who aged between 21-60 Years Old (y/o) (youth) were the majority (24(42.1%)) of the readmitted subjects of the study population, and the lesser (20(35.1%)) were the elderly who aged 61 y/o and above, then young subjects (20 and below y/o) represents 13 (22.8%) of the total population. The youth, from the researcher point view are more at risk of having spinal cord injury, and that type of injury is more complicated than the other diagnoses, which can lead to the occurrence of readmission.

The higher number of the readmitted subjects 38 were males (66.7%) of the readmitted subjects, and the lower number 19 were females and represented (33.3%) of the readmitted females. We can say that males are in need to be out of home on their wheelchairs, and the long time on the wheelchair can increase the risk of developing pressure ulcer, which can be a cause for the readmission.

In addition, a study by Rosati (2003), study results revealed that after the data had been adjusted for age and gender, a number of demographic, clinical, and functional factors predicted repeat hospitalizations. Nevertheless, study by Battistella (1997), shows the opposite concerning gender, gender was not independent predictors of readmission.

The researcher has find that SCI subjects have higher number 25(43.9%) among the readmitted subjects, Whereas CVA represents 20 (35.1%) among the readmitted subjects, but TBI have a lower number 12 (21.1%) of the readmitted subjects. As indicated in the above results that SCI persons are the higher number among the population diagnoses. Nevertheless, this result is in contrast with another study by Bohannon (2004) which say that the most common readmission diagnosis was stroke (14.1%). However, spinal cord injured persons are at high risk of having pressure ulcer which can lead to the occurrence of readmission.

The majority 33(57.9 %) of the readmitted people has an intermediate (2000-2003) date of injury, whereas the recently (2004- 2007) readmitted people represent 16(28.1%) of the total population, but the readmitted people who have old (1999 and below) date of injury represent the minority 8 (14 %) of the total population. The intermediate date of injury is the time of heyday of al-aqsa Intifada that lead to the increase of disabilities and casualties.

In the marital status of the population, the large number (31(54.4%)) of the readmitted people are married, and the readmitted subjects who are single are lesser and represent 22 (38.6%) of the total population, whereas the lowest 4 (7 %) are between divorced and widowed.

In addition, 20 of the readmitted subjects (35.1%) of the total population are illiterate, 37 (64.9 %) of them are educated. The majority 20(54.1%) of the readmitted and educated subjects are highly educated (12 y and above), whereas 17 of them are low educated (11y and below) and represents (45.9%) of the total population.

Most of the readmitted subjects (50) are unemployed and represents 87.7% of the total population, whereas the minority 7(12.3%) are employed. Concerning the address, 19(33.3%) are living in Gaza, 15(26.3%) in the southern area, 14(24.6%), and 9 (15.8%) are in the middle area, knowing that the numbers are of the readmitted people and percentages are of the total population.

Table 5-13: Readmission by sociodemographic characteristics

Variable	Kind	Readmission				Total	P-value
		Yes		No			
		Number	Percentage	Number	Percentage		
Age	Young (20 y/o and below)	13	22.8	17	32.7	30	0.38
	Youth (21y/o -60 y/o)	24	42.1	16	30.8	40	
	Elderly (61 and above)	20	35.1	19	36.5	39	
Sex	Male	38	66.7	36	69.2	74	0.77
	Female	19	33.3	16	30.8	35	
Diagnosis	CVA	20	35.1	22	42.3	42	0.73
	SCI	25	43.9	20	38.5	45	
	TBI	12	21.1	10	19.2	22	
Date of injury	Old (1999 and below)	8	14	15	28.8	23	0.02
	Intermediate (2000-2003)	33	57.9	17	32.7	50	
	Recent (2004- 2007)	16	28.1	20	38.5	36	
Marital status	Single	22	38.6	20	38.5	42	0.99
	Married	31	54.4	28	53.8	59	
	Divorced and widowed	4	7	4	7.7	8	
Educational state	Illiterate	20	35.1	22	42.3	42	0.28
	Educated	37	64.9	30	57.7	67	
Years of education	Low educated (11y and below)	17	45.9	18	60	35	0.25
	High educated (12 y and above)	20	54.1	12	40	32	
Employment state	Employed	7	12.3	8	15.4	15	0.63
	Unemployed	50	87.7	44	84.6	94	
Present address	Northern area	14	24.6	8	15.4	22	0.33
	Gaza	19	33.3	26	50	45	
	Middle area	9	15.8	7	13.5	16	
	Southern area	15	26.3	11	21.2	26	

5.3.2 Health insurance information and the use of air mattress results of the study

In the type of insurance variable, as shown in the following table (5-14), the large number (47) of the readmitted subjects were governmentally insured and represents 82.5% of the readmitted subjects, followed by 6 (10.5%) for company insurance, 3 (5.3%) for self referral, and 1 (1.8%) for military insurance. In our country, people are in a poor state, which make them unable to pay for the expenses of their care so they use the opportunity of governmental insurance as possible as they can, and that increases the chance of readmission.

Subjects who readmitted and using the air mattress were 20 and represents 35.1% of the readmitted subjects. Whereas, subjects who readmitted and using the air mattress were 37 and represents 64.9% of the readmitted subjects.

Table 5-14: Readmission by Health insurance information and the use of air mattress variables

Variable	Kind	Readmission				Total	P-value
		Yes		No			
		Number	Percentage	Number	Percentage		
Type of insurance in 1st admission	Governmental	47	82.5	40	76.9	87	0.76
	company	6	10.5	9	17.3	15	
	self referral	3	5.3	2	3.8	5	
	military	1	1.8	1	1.9	2	
The use of air mattress	Yes	20	35.1	14	26.9	34	0.35
	No	37	64.9	38	73.1	75	

5.3.3 Physiologic risk factors

As shown in the following table (5-15), knowing that the numbers of the readmitted people and percentages are of the readmitted subjects, 19 of the readmitted subjects were complaining of pressure ulcer in the first admission and represents 33.3%

of the readmitted subjects. In addition, 28 (49.1%) were complaining of spasticity, 37(64.9%) were complaining of pain, 41(71.9%) were complaining of UTI, 20(35.1%) were complaining of RTI, 44 (77.2%) were complaining of disturbance in their urination pattern, and 42 (73.7%) were complaining of disturbance in their defecation pattern. These results show the most common physiologic risk factors for the readmission. And these results supported by Middleton (2004) study, which shows that the most frequent causes for rehospitalization among spinal cord injured patients were genitourinary (24.1% of readmissions), gastrointestinal (11.0%), further rehabilitation (11.0%), skin-related (8.9%), musculoskeletal (8.6%) and psychiatric disorders (6.8%).

Table 5-15: Readmission by Physiologic variables

Variable	Kind	Readmission				Total	p-value
		Yes		No			
		Number	Percentage	Number	Percentage		
Pressure ulcer	Yes	19	33.3	18	34.6	37	0.88
	No	38	66.7	34	65.4	72	
Spasticity	Yes	28	49.1	29	55.8	57	0.48
	No	29	50.9	23	44.2	52	
Pain	Yes	37	64.9	18	34.6	55	0.002
	No	20	35.1	34	65.4	54	
UTI	Yes	41	71.9	38	73.1	79	0.89
	No	16	28.1	14	26.9	30	
RTI	Yes	20	35.1	16	30.8	36	0.63
	No	37	64.9	36	69.2	73	
Disturbance in urination	Yes	44	77.2	30	57.7	74	0.02
	No	13	22.8	22	42.3	35	
Disturbance in defecation	Yes	42	73.7	35	67.3	77	0.46
	No	15	26.3	17	32.7	32	

5.3.4 Rehabilitation risk factors

According to the patient perspective in table (5-16), 29 of the readmitted subjects say that they have complete rehabilitation program and represents 50.9% of the readmitted subjects, and only 5 of the readmitted subjects know another rehabilitation center to go and they represents (8.8%) of the readmitted subjects.

In addition, 37(64.9%) were greatly satisfied about El-Wafa Hospital supplies and 47 (82.5%) were also greatly satisfied about El-Wafa hospital services, but 35 of the readmitted subjects 61.4% of the readmitted subjects need to complete their rehabilitation program.

The above results come with the truth that El-wafa Hospital is the most official rehabilitation center in Gaza strip that provide the people with the rehabilitation services.

Table 5-16: Readmission by rehabilitation variables

Variable	Kind	Readmission				Total	P-value
		Yes		No			
		Number	Percentage	Number	Percentage		
Complete rehabilitation	Yes	29	50.9	40	76.9	69	0.005
	No	28	49.1	12	23.1	40	
Know another rehabilitation center	Yes	5	8.8	2	3.8	7	0.29
	No	52	91.2	50	96.2	102	
Satisfaction with hospital supplies	Greatly	37	64.9	31	59.6	68	0.72
	Moderately	19	33.3	19	36.5	38	
	Mildly	0	0	1	1.9	1	
	Unsatisfied	1	1.8	1	1.9	2	
Need to complete his rehabilitation	Yes	35	61.4	13	25	48	<0.001
	No	22	38.6	39	75	52	
Satisfaction with hospital services	Greatly	47	82.5	30	57.7	77	0.02
	Moderately	9	15.8	16	30.8	25	
	Mildly	0	0	3	5.8	3	
	Unsatisfied	1	1.8	3	5.8	4	

5.3.5 Psychological risk factors

In table (5-17), the large number (55) of the readmitted subjects feels comfort in dealing with El-Wafa Hospital Rehabilitation Team, trusts them, and represents 96.5% of the readmitted subjects. In addition, according to the patient perspective, the whole readmitted subjects (100%) of the readmitted subjects say that El-Wafa hospital is satisfactory in rehabilitation.

Little number (11) of the readmitted subjects (19.3%) of the readmitted subjects feels that they are a heavy load on their families. Furthermore, two-third (21) of the readmitted subjects and 36.8% of the readmitted subjects feel that their families care of them in the hospital more than at home and the same number (21) and percentage (36.8%) like to be among the rehabilitation team.

In addition, 13 of the readmitted subjects and 22.8% of the readmitted subjects feel discomfort at their home.

Table 5-17: Readmission by psychological variables

Variable	Kind	Readmission				Total	p-value
		Yes		No			
		Number	Percentage	Number	Percentage		
Comfort in dealing with hospital workers	Yes	55	96.5	50	96.2	105	0.92
	No	2	3.5	2	3.8	4	
Trust El-Wafa rehabilitation team	Yes	55	96.5	50	96.2	105	0.92
	No	2	3.5	2	3.8	4	
El-Wafa is satisfactory in rehabilitation	Yes	57	100	50	96.2	107	0.13
	No	0	0	2	3.8	2	
Heavy load on his family	Yes	11	19.3	3	5.8	14	0.03
	No	46	80.7	49	94.2		
Family care for him in hospital more than at home	Yes	21	36.8	9	17.3	30	0.02
	No	36	63.2	43	82.7	79	
Like to be among rehabilitation team	Yes	21	36.8	20	38.5	41	0.86
	No	36	63.2	32	61.5	68	
Discomfort at home	Yes	13	22.8	7	13.5	20	0.20
	No	44	77.2	45	86.5	89	

5.3.6 Social risk factors

For the social risk factors, as shown in table (5-18), no statistical significant values seen between the readmitted and non readmitted subjects, as the p-value was > 0.05 for all social risk factors and as cleared by the following values for the social risk factors.

The majority 54 of the readmitted subjects have a caregiver at their homes and represents 94.7% of the readmitted subjects, followed by 52 (91.2%) those whose families adequately care of them, and 41 (71.9%) whose existence at their homes do not affect the family social roles. May the close relation among the Palestinian family members make the above results not significant, as there is no significant social risk factor for the second admission?

Table 5-18: Readmission by social variables

Variable	Kind	Readmission				Total	p-value
		Yes		No			
		Number	Percentage	Number	Percentage		
Have care giver at his home	Yes	54	94.7	51	98.1	105	0.35
	No	3	5.3	1	1.9	4	
His family adequately care of him	Yes	52	91.2	50	96.2	102	0.29
	No	5	8.8	2	3.8	7	
His existence does not affect the family social roles	Yes	41	71.9	42	80.8	83	0.27
	No	16	28.1	10	19.2	26	

5.3.7 Causes for readmission

In the following table (5-19), the researcher will view the causes of readmission as the direct cause for the readmission.

Among the readmitted subjects, 27 of them the direct cause for their readmission was pressure ulcer, and represents 47.3% of the total readmitted subjects, followed by 13 (22.8%) of them the cause was spasticity. In addition, other direct causes for

readmission are as follows: 10 (17.5%) for pain, 6 (10.5%) for UTI, 5 (8.8%) for RTI, 8 (14%) for disturbance in the urination pattern, and 4 (7%) for disturbance in the defecation pattern. All are physical causes for their second admission. However, the majority (30 (52.6%)) of the readmitted subjects back to the hospital was for psychological causes, whereas the minority (7 (12.3%)) was for social causes. The above-mentioned results supported by Paker (2006) study as he reports that the reasons for rehospitalization were, in descending order, spasticity 25%, and additional rehabilitation 21.4%, pressure sores 17.9%, urinary infection 16.1%, spinal surgery 8.9%, urinary system surgery 5.4% and pain 5.4%

Table 5-19: Readmission by cause of admission variables

Variable	Kind	Yes		No	
		Number	Percentage	Number	Percentage
Causes	Pressure Ulcer	27	47.3	30	52.7
	spasticity	13	22.8	44	77.2
	Pain	10	17.5	47	82.5
	UTI	6	10.5	51	89.5
	RTI	5	8.8	52	91.2
	Disturbance in urination	8	14	49	86
	Disturbance in defecation	4	7	53	93
	Psychological	30	52.6	27	47.4
	social	7	12.3	50	87.7
Rehabilitation causes	Hospital supplies	41	69.5	18	30.5
	Hospital services	46	64.2	16	25.8

5.3.8 Educational program formulation contribution results of the study

In the first discharge, the subjects took different instructions about their disability and a little number did not, so the types of instructions, according to the table (5-20), were as follows: 11(10.09%) medical, 4(3.6%) Social, 8(7.3%) psychological, 19(17.43%) occupational, 83(34.86%) Physiotherapy, 11(10.09%) nursing, 55(50.45%) all types of instructions, and 7(6.42%) do not have any instructions in their first discharge. The above results explain about the role of each rehabilitation team member, which can lead to the prevention of disability complication. Therefore, every member of the rehabilitation team has a role in the discharge instructions.

Among the types of instructions for the prevention of disability complications, the majority 38(34.86%) were for PU, then 27(24.77%) for physiotherapy and spasticity, 9(8.25%) for UTI, 4(3.6%) for pain, 12(11%) for occupational therapy and ADLs, 3(2.75%) for RTI, 60(55.04%) for all types of instructions, whereas 3(2.75%) who do not have any instructions. As the majority of the study-population show that pressure ulcer was the cause for the second admission, so most of them were concerned about pressure ulcer and instructions about the prevention of it.

The majority (53(48.62%)) agree that lectures is the best method for patient teaching, whereas 47(43.1%) agree for role-play, 3(2.75%) for electronic materials, 4(3.6%) for pamphlets, 9(8.25%) for brochures, 11(10.09%) for special written instructions, and 15(13.76%) for workshops. May most of the study population only understand one method of teaching which is lecture as they feel it the easiest way for understanding the instructions.

Table 5-20: Readmission by the Educational components

Variable	Kinds	Number	Percentage
Type of instructions in 1 st discharge	Medical	11	10.09
	Social	4	3.6
	Psychological	8	7.3
	Occupational	19	17.43
	Physiotherapy	38	34.86
	Nursing	11	10.09
	All	55	50.45
	None	7	6.42
Information for disability complication prevention	Pressure Ulcer	38	34.86
	Spasticity and physiotherapy	27	24.77
	Urinary tract infection	9	8.25
	Pain	4	3.6
	ADLs and occupational therapy	12	11
	Respiratory tract infection	3	2.75
	All	60	55.04
	None	3	2.75
Preferred method by patient for teaching	Role-play	47	43.1
	Lectures	53	48.62
	Electronic material	3	2.75
	Pamphlets	4	3.6
	Brochures	9	8.25
	Special written instruction	11	10.09
	Workshops	15	13.76

5.3.9 Community follows up results of the study

In table (5-21), almost half (50(46.3%) of the total population have been visited by NGO societies as community follow up for the persons with disability. Moreover, the purposes of those visits were as follows: 3(2.75%) for help, 35(32.11%) for further rehabilitation, 10(9.17%) for supplies donation, 11(10.09%) for medication donation, 5(4, 58%) for medical investigation and 3(2.75%) for all the above purposes. As more

prescription about the community follow up, 44(40.7%) of the total study population receives support from the community social workers. In addition, the majority (29(26.6%)) of support was psychological, supplies represents 24(22%), but the other supports have a big difference if we say that medical aid represents 4(3.6%), 3(2.75%) for information and other supports, and 1(0.9%) for community activity. Furthermore, almost half (55(50.9%)) of the study population receives information from El-Wafa social worker about the community based rehabilitation (CBR) services. About satisfaction of CBR services 35(32.1%) were greatly satisfied, and 32(29.4%) were unsatisfied, but 23(21.1%) were moderately, and 19(17.4%) were mildly satisfied.

Table 5-21: Readmission by Community Follow up variables

Variable	Kinds	Number	Percentage
Society NGOs visit in 1 st discharge	Yes	50	46.3
	No	58	53.7
Purpose of visit	Help	3	2.75
	Further rehabilitation	35	32.11
	Supplies	10	9.17
	Medication	11	10.09
	Investigation	5	4.58
	All	3	2.75
	Support from community social workers	Yes	44
	No	64	59.3
Type of support	Community Activity	1	0.9
	Information	3	2.75
	Medical aid	4	3.6
	Supplies	24	22
	Psychological support	29	26.6
	others	3	2.75
Information about CBR services	Yes	55	50.9
	No	53	49.1
Satisfaction about CBR services	Greatly	35	32.1
	Moderately	23	21.1
	Mildly	19	17.4
	Unsatisfied	32	29.4

5.4 Results of LOS

5.4.1 Sociodemographic data and LOS

In table (5-22), subjects who are young (20 y/o and below) have higher average LOS (68.69 days) then followed by youth (21y/o -60 y/o) which have average LOS 53.08 in days, and the lesser average LOS (39.8 days) was for elderly subjects(61 and above). P-value was not significant (p-value= 0.38). Young people are more at risk of having spinal cord injury than other age categories, and spinal cord injured persons need to have high LOS for their rehabilitation process or solving problems resulted from the complication of SCI.

Females have higher average length of stay (LOS) than male patients with 53.79 days and 51.08 days respectively, but the difference between the two categories did not reach the statistical significance level (p-value= 0.24). For the nature of females, they need longer time than males to get independent by increasing their muscle power.

Single and married subjects have nearly the same average LOS 51.73, 52.58 days respectively, but divorced and widowed subjects have lower (48.75 days) average LOS, also the P-value did not reach the significance level (P-value= 0.99).

Educated subjects have higher (56.86 days) average length of stay (LOS) than Illiterate subjects (42.95days), but the difference between the two categories did not reach the statistical significance level (p-value= 0.29). From the researcher point view, educated people have more questions about their disability, and time to time, they explore their need to have longer time for the achievement of more functions.

Low educated subjects have lower (54.12 days) average LOS than those with high education (59.20 days), but the difference did not reach the significant level (P-value=0.71).

The difference between the employed and unemployed subjects is significant (P-value=0.005) as the employed subjects have higher average LOS than those unemployed as follows respectively 100.86 days, 45.14 days. Most of the employed

persons have governmental health insurance, so they reveal no financial problem in having longer time of hospital stay for getting better and healthier.

Subjects who live in the northern and the middle areas have higher average LOS, 78.57, 70.56 days respectively than those who live in Gaza and the southern area (33.79, 39.07 days respectively). P-value also is not significant (P-value=0.09).

Table 5-22: Average LOS by Sociodemographic risk factors

Risk Factor	Category	Number	Average LOS	P-value
Age	Young (20 y/o and below)	13	68.69	0.38
	Youth (21 y/o -60 y/o)	24	53.08	
	Elderly (61 and above)	20	39.8	
Sex	Male	38	51.08	0.24
	Female	19	53.79	
Marital status	Single	22	51.73	0.99
	Married	31	52.58	
	Divorced and widowed	4	48.75	
Education State	Illiterate	20	42.95	0.29
	Educated	37	56.86	
Years of education	Low educated (11 y and below)	17	54.12	0.71
	High educated (12 y and above)	20	59.20	
Employment State	Employed	7	100.86	0.005
	Unemployed	50	45.14	
Present address	North area	14	78.57	0.09
	Gaza	19	33.79	
	Mid area	9	70.56	
	South area	15	39.07	

5.4.2 Health insurance information and the use of air mattress data and LOS

Table (5-23) shows that subjects who were insured in the 1st admission, by company have higher average LOS (88.67 days), followed by those who insured by self referral(51.33 days), governmental (48.34 days) and the least (5 days) for those who were insured by military health insurance. The P-value did not reach the significance level (P-value=0.37). Company health insurance cover all the expenses of the hospital care and all the rehabilitation process even the assistive devices, so the patients decide in the meeting with the hospital team to increase their LOS to get more independency.

Subjects who use air mattress have lower (49.55 days) average LOS than those (53.30 days) who are not using the air mattress with not significant p-value = 0.24

Subjects who were insured in the second admission, by company have higher average LOS (86.71 days), followed by those who were insured by governmental (48.92 days), military (5 days) and the least (3 days) for those who insured by self-referral. The P-value also did not reach the significance level (P-value=0.27).

Subjects who were readmitted once have lower (46.29 days) average LOS than those who were readmitted more than once(66.56 days), and it is not significant (P-value=0.20)

Table 5-23: Average LOS by Health insurance and the use of air mattress data

Risk Factor	Category	Number	Average LOS	P-value
Type of insurance in 1st admission	Governmental	47	48.34	0.37
	Company	6	88.67	
	Self referral	3	51.33	
	Military	1	5	
The use of air mattress at home	Yes	20	49.55	0.24
	No	37	53.30	
Type of insurance in 2 nd admission	Governmental	48	48.92	0.27
	Company	7	86.71	
	Self referral	1	3	
	Military	1	5	
Times of readmission	Readmitted once	41	46.29	0.20
	Readmitted more than once	16	66.56	

5.4.3 Diagnosis and date of injury and LOS

As shown in table (5-24), the highest (62.33 days) average LOS among the study subjects was for the TBI subjects, and then followed by SCI subjects (57.84 days) and the lowest (38.45 days) was for CVA subjects. P-value was not significant (P-value=0.43). The above results reveals that TBI may be more complicated cases than SCI, which need high average LOS for the completion of their care and solving the problems that resulted from the complication of TBI.

Subjects with an intermediate (2000-2003) date of injury have higher (60.15 days) average LOS than those with old (1999 and below) and recent (2004- 2007) date of injury as the average LOS was as follows (44.25 days), (39 days) respectively. The P-value also did not reach the significance level (P-value=0.46).

Table 5-24: Average LOS by Diagnosis and date of injury risk factors

Risk Factor	Category	Number	Average LOS	P-value
Diagnosis	CVA	20	38.45	0.43
	SCI	25	57.84	
	TBI	12	62.33	
Date of Injury	Old (1999 and below)	8	44.25	0.46
	Intermediate (2000-2003)	33	60.15	
	Recent (2004- 2007)	16	39	

5.4.4 Physiologic domain data and LOS

As shown in table(5-25), subjects whose pressure ulcer was the cause for the 2nd admission have higher average LOS than those who were not, 64.19days and 41 days respectively but the difference is not significant (P-value=0.08). Pressure ulcer is one of the complicated problems after disability occurs, and for solving that problem, according to the researcher experience, need long time to get the pressure ulcer healed. That result supported by Weingarden (1992) study in USA, which revealed that nine of the 12 patients rehospitalized 21 times, mainly for urinary tract infections and decubitus ulcer.

Subjects whose spasticity was the cause for the 2nd admission have lower average LOS than those who were not, 32.15 days and 57.84 days respectively but the difference is not significant (P-value=0.09). From the researcher point view, spasticity may need only training on relaxing of treating exercises, and the patient can do it at home, so it needs a lower average LOS to solve the spasticity problem. But study by Paker (2006) show that spasticity have the higher percentage of readmission among the causes for readmission as follows: spasticity 25%, and additional rehabilitation 21.4%, pressure sores 17.9%, urinary infection 16.1%, spinal surgery 8.9%, urinary system

surgery 5.4% and pain 5.4% , which can reveals that spasticity have a higher average LOS which in contrast with the above result.

Almost slight difference of average of LOS was noticed between those whose pain was their cause for the 2nd admission (50.30) and those who were not (52.34). However, the p-value was not significant it was P-value= 0.62. The above result is in contrast with a study say that pain have the lowest percentage of readmission and so the lowest average LOS. The study was by Paker (2006) and reveals that the reasons for rehospitalization were, in descending order, spasticity 25%, and additional rehabilitation 21.4%, pressure sores 17.9%, urinary infection 16.1%, spinal surgery 8.9%, urinary system surgery 5.4% and pain 5.4%

Subjects who were c/o UTI in the 1st admission have lower average LOS than those who were not, 51.15 days and 54.13 days respectively, but the difference is not significant (P-value=0.57). Although, subjects whose UTI was the cause for the 2nd admission have lower average LOS than those who were not, 43 days and 53.04 days respectively, but the difference is not significant (P-value=0.30).

As shown in the above mentioned table, subjects whose RTI was the cause for the 2nd admission have higher average LOS than those who were not, 104.60 days and 46.92 days respectively, and the difference is significant (P-value=0.02). RTI are more common among rehabilitated patients, especially with SCI and those who have high level injury (C5-D1), and also the recurrence of RTI among those persons is more common. That is may the cause for the higher average LOS.

Also subjects whose disturbance in his urination pattern was the cause for the 2nd admission have higher average LOS than those who were not, 79.13 days and 47.55 days respectively, and the difference is not significant (P-value=0.14). again subjects whose disturbance in his defecation pattern was the cause for the 2nd admission have higher average LOS than those who were not, 62.50 days and 51.19 days respectively, and the difference is not significant (P-value=0.51).

Disturbances in the elimination pattern can be annoying problem to the persons with disability, so any one who did not reach the regulation level for his elimination

pattern; he will back to the hospital for further rehabilitation of his bowel. The frequency of readmissions for that purpose can increase the average length of stay.

Table 5-25: Average LOS by physiologic risk factors

Risk Factor	Category	Number	Average LOS	P-value
C/O pressure ulcer in the 1st admission	Yes	19	67.26	0.09
	No	38	44.34	
Pressure ulcer was cause for 2nd admission	Yes	27	64.19	0.08
	No	30	41.00	
C/O spasticity in 1st admission	Yes	28	48.18	0.64
	No	29	55.66	
Spasticity was cause for 2nd admission	Yes	13	32.15	0.09
	No	44	57.84	
C/O pain in the first admission	Yes	37	51.62	0.62
	No	20	52.65	
Pain was cause for 2 nd admission	Yes	10	50.30	0.62
	No	47	52.34	
C/O UTI in the first admission	Yes	41	51.15	0.57
	No	16	54.13	
UTI was the cause for the second admission	Yes	6	43	0.30
	No	51	53.04	
C/O RTI in the first admission	Yes	20	54.45	0.70
	No	37	50.65	
RTI was cause for 2 nd admission	Yes	5	104.60	0.02
	No	52	46.92	
C/O disturbance in his urination pattern in 1st admission	Yes	44	56.68	0.34
	No	13	36.08	
Disturbance in his urination pattern was the cause for the 2nd admission	Yes	8	79.13	0.14
	No	49	47.55	
C/O disturbance in his defecation pattern in 1st admission	Yes	42	45.17	0.18
	No	15	71.07	
Disturbance in his defecation pattern was cause for the 2nd admission	Yes	4	62.50	0.51
	No	53	51.19	

5.4.5 Rehabilitation domain data and LOS

In table (5-26), the difference of average of LOS was not significant (P-value=0.45), as subjects who completed their rehabilitation program in first admission have higher (56.76 days) average LOS than those who did not (47.04 days). But subjects who benefited from the 2nd admission and know another rehabilitation center to go have lower, (50.77 days), (42.80days) respectively, average LOS than those who did not (58.44 days), (52.87 days) respectively, further more the difference is not significant (P-value=0.84), (P-value=0.44) respectively.

Subjects who are unsatisfied with the hospital supplies have the highest (120 days) average LOS and that was for one patient, then followed by subjects who are moderately satisfied and those who are greatly satisfied, (57.89 days) and (47.11 days) respectively. P-value= 0.41. The above result may affected by the LOS to say satisfied about the hospital supplies.

Subjects who hospital supplies were the motivating cause for 2nd admission have higher (53.61days) average LOS than those who were not(47.81days), and also the difference was not significant (P-value=0.31). The higher (56.74 days) average of LOS was for patients who need to complete their rehabilitation program and those who do not (44.41days), and (P-value=0.24). Also Paker (2006) support the last result in that patients who need to complete their rehabilitation program have the second higher percentage of readmission as he said that the reasons for rehospitalization were, in descending order, spasticity 25%, and additional rehabilitation 21.4%, pressure sores 17.9%, urinary infection 16.1%, spinal surgery 8.9%, urinary system surgery 5.4% and pain 5.4%

Furthermore, subjects who are moderately satisfied about the hospital services have the highest (61.11days) average LOS, then followed by subjects who are greatly satisfied and those who are unsatisfied, (50.89 days) and (21 days) respectively. P-value= 0.78. Whereas, Subjects who hospital services were the motivating cause for 2nd admission have higher (56.43 days) average LOS than those who were not(36.92 days), and also the difference was not significant (P-value=0.35). The satisfaction with the

introduced services can increase the average LOS and can be a motivating cause for the second admission.

Table 5-26: Average LOS by Rehabilitation risk factors

Risk Factor	Category	Number	Average LOS	P-value
Completed his rehabilitation program in 1st admission	Yes	29	56.76	0.45
	No	28	47.04	
Benefited from the 2nd admission	Yes	48	50.77	0.84
	No	9	58.44	
Know another rehabilitation center to go for	Yes	5	42.80	0.44
	No	52	52.87	
Satisfaction with hospital supplies	Greatly	37	47.11	0.41
	Moderately	19	57.89	
	Mildly	0	0	
	Unsatisfied	1	120	
Were the hospital supplies a motivating cause for readmission	Yes	41	53.61	0.31
	No	16	47.81	
Need to complete his rehabilitation program	Yes	35	56.74	0.24
	No	22	44.41	
Satisfaction with hospital services	Greatly	47	50.89	0.78
	Moderately	9	61.11	
	Mildly	0	0	
	Unsatisfied	1	21	
Were the hospital services a motivating cause for readmission	Yes	44	56.43	0.35
	No	13	36.92	

5.4.6 Psychological domain data and LOS

Psychologically, as shown in table (5-27), subjects who feel comfort in dealing with the hospital workers have higher (52.40 days) average LOS than those who do not (40.5 days), and the difference did not reach the significance level (P-value=0.55). Whereas, for those who trust El-Wafa rehabilitation team have lower (51.69 days) average LOS than those who do not (60 days), and also the difference did not reach the significance level (P-value=0.23).

Subjects who feel that they are a heavy load on their families have higher (79.64 days) average LOS than those who do not (45.37 days); P-value (0.12) is not significant. Whereas, subjects who feel that their families care of them in the hospital more than at home, have higher (67.24 days) average LOS than those who are do not (43.08 days), P-value reach the significance level (0.02).

Subjects who like to be among the rehabilitation team, have higher (64.29 days) average LOS than those who do not (44.81 days), P-value (0.69) is not significant. Furthermore, subjects who feel discomfort in their homes have higher (87 days) average LOS than those who do not (41.64 days), P-value is extremely significant(<0.001) is not significant.

For the subjects whose psychological aspect was the cause for the second admission has higher (56.17 days) average LOS than those who were not (47.33 days), P-value is not significant (0.97).

The words trust, like, feel toward El-wafa Hospital, are the psychological view that can affect the readmission and the LOS for those patients, as in the above results some of patients like to be among the rehabilitation team, others feel comfort in dealing with the rehabilitation team and others feel that they are a heavy load on their families.

Table 5-27: Average LOS by Psychological risk factors

Risk Factor	Category	Number	Average LOS	P-value
Comfort in dealing with the hospital workers	Yes	55	52.40	0.55
	No	2	40.50	
Trust El- Wafa rehabilitation team	Yes	55	51.69	0.23
	No	2	60	
Heavy load feeling on his family	Yes	11	79.64	0.12
	No	46	45.37	
Family care of him in hospital more than at home	Yes	21	67.24	0.02
	No	36	43.08	
Like to be among the rehabilitation team	Yes	21	64.29	0.69
	No	36	44.81	
Feels discomfort at home	Yes	13	87	<0.001
	No	44	41.64	
The psychological aspect was the cause for the 2 nd admission	Yes	30	56.17	0.97
	No	27	47.33	

5.4.7 Social domain data and LOS

In table (5-28), subjects who claim that they have a care giver in their homes, have lower (48.69 days) average LOS than those who do not (111.33 days), and the difference was extremely significant (P-value<0.001). The persons who have a care giver in their homes can be trained in the hospital about caring of their patient and that is will be a helpful in decreasing the LOS and the chance of readmission.

The higher (53.46 days) average LOS was for subjects whose their families provide them with adequate care in home, but those who do not have the lower (36.60 days) average LOS, but the P-value is not significant. (P-value=0.3)

Subjects who their existence does not affect their families social roles, have higher (55.27 days) average LOS than those who does (43.56 days), and the difference was not significant (P-value=0.12)

Those who the social aspect was the cause for the 2nd admission, have higher (78 days) average LOS than those who was not (48.34 days), but the difference was not significant (P-value=0.08). Social integration is a big facing problem for the patients who discharge from the hospital, and some of them get afraid of being discharged. So many of those patients who face a problem in being socially integrated will back to the hospital for further rehabilitation as they claim in every time.

Table 5-28: Average LOS by Social risk factors

Risk Factor	Category	Number	Average LOS	P-value
Have caregiver at his home	Yes	54	48.69	<0.001
	No	3	111.33	
His family provide him with adequate care at home	Yes	52	53.46	0.3
	No	5	36.60	
His existence does not affect his family social roles	Yes	41	55.27	0.12
	No	16	43.56	
Was the social aspect the cause for the 2nd admission	Yes	7	78	0.08
	No	50	48.34	

Study Conclusion

The following conclusions can be drawn from the present study:

1. Most of the sociodemographic data were not significant determinant for readmission like gender and age, except the date of injury which was a significant determinant of the readmission as the P-value was 0.02, and the subjects who has an intermediate (2000-2003) date of injury has the highest percentage (57.9%) of the readmitted subjects. I think that the above mentioned years were the most escalating years of intifada and many of El-wafa Hospital patients referred to abroad for health management and they back from abroad to El-wafa Hospital.
2. Pain and disturbance in the urination pattern were significant physiologic risk factors for the readmission among the readmitted subjects.
3. The most significant rehabilitation risk factor for readmission is the need to complete the rehabilitation program (61.4%). Moreover, 82.5% of the readmitted subjects were greatly satisfied with the hospital services.
4. Psychologically, the risk factor of readmission is that the readmitted subjects feel that they are a heavy load on their families and also feel that their families take care of them in the hospital more than in their homes.
5. In addition, the most prevalent diagnosis for readmission was SCI as they have higher number 25(43.9%) among the readmitted subjects.
6. The results shows that, employment state and Respiratory tract infection were a significant factors in increasing the LOS, as the employed subjects have higher average LOS than those unemployed and subjects whose RTI was the cause for the 2nd admission have higher average LOS than those who were not
7. In addition, the results shows, psychologically, that subjects who feel that their families take care of them in the hospital more than at home, have higher

average LOS than those who are do not. In addition, it shows that subjects who feel discomfort in their homes have higher average LOS than those who do not.

8. Socially, the study shows that, subjects who claim that they have a caregiver in their homes have lower average LOS than those who do not.
9. Concerning the educational program, The majority (53(48.62%)) agree that lectures is the best method for patient teaching.
10. About the community follow up, the study finds that almost half (50(46.3%) of the total population have been visited by NGO societies as community follow up for the persons with disability. In addition, As more prescription about the community follow up, 44(40.7%) of the total study population receives support from the community social workers.

Study Recommendation

1- General recommendations:

a- I recommend that El-wafa Hospital should improve the health management information system.

b- I recommend that El-wafa Hospital should emphasize on the teamwork beside the patient participation.

c- I recommend that El-wafa Hospital should have a well-managed educational program on the discharge of the patient.

d- The study recommends the participation of the patient on what information are in need at the discharge for the prevention of disability complication.

2- Recommendations for future research:

a- The computation of the cost for each risk factor and the contribution of each risk factor to increase the cost of the stay are also in need in the future.

b- Studies about the relationship between rehospitalization and the level of injury of the spinal cord patients.

c- Rehospitalization risk factors for each diagnosis independently and the risk factors for rehospitalization in the general and governmental hospitals.

d- Clarification of causes for rehospitalization.

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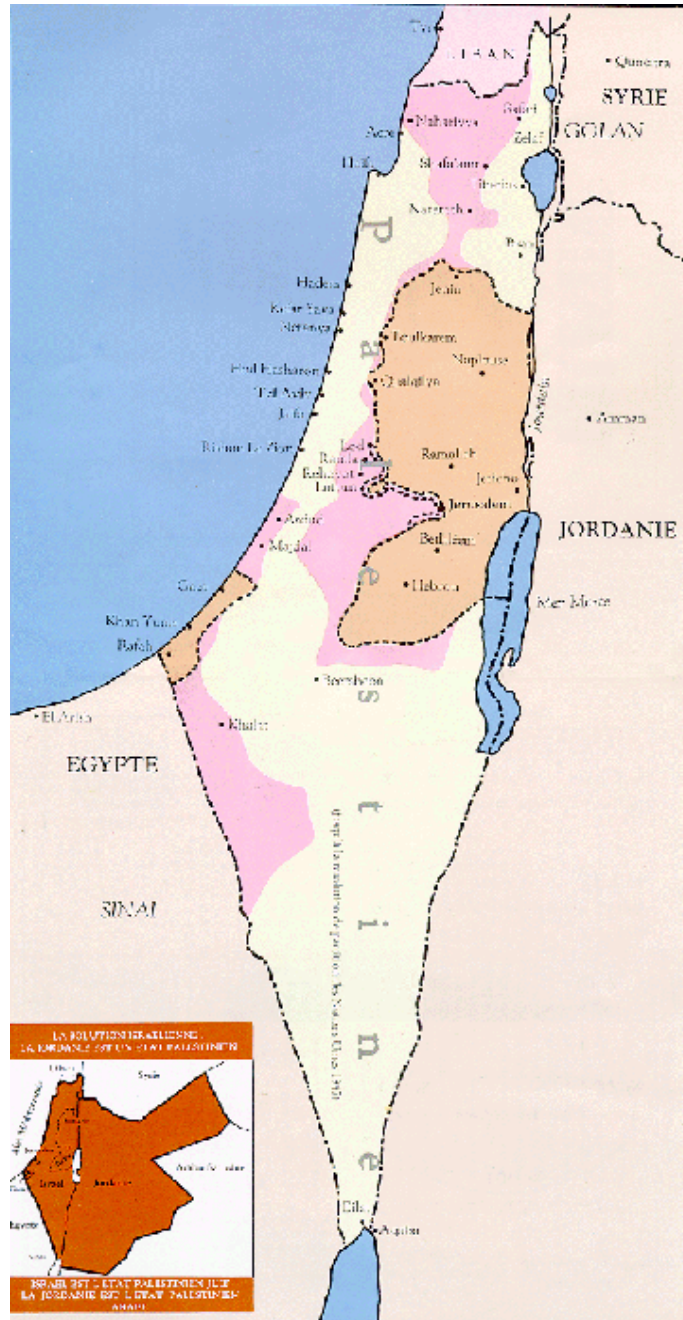
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Appendix (1)

Map of Palestine



Appendix (2)

Ethical approval letter to El-Wafa Medical Rehabilitation Hospital

بِسْمِ اللَّهِ الرَّحْمَنِ الرَّحِيمِ



الجامعة الإسلامية - غزة
The Islamic University - Gaza

Academic Affairs - Quality Unit
هاتف داخلي: EXT-1029

الشؤون الأكاديمية - وحدة الجودة
الرقم: 46 / 2007
التاريخ: الأحد، 12 ربيع الثاني، 1428
2007/04/29

الأستاذ / تيسير البلناجي
مستشفى الوفاء للتأهيل الطبي
هاتفه الله...
السلام عليكم ورحمة الله وبركاته
وعد،

الموضوع: تسهيل مهمة طالب ماجستير

يهدىكم المجلس الأكاديمي لبرنامج ماجستير الصحة النفسية والمجتمعية بالجامعة الإسلامية
طبيب التحيات، وترجو من سيادتكم التكرم بتسهيل مهمة الطالب/ هشام محمد الزظمة
رقم جامعي: 2004/4858 المسجل في برنامج الماجستير بكلية التربية تخصص صحة نفسية
ومجتمعية/ عدم تأهيل، وذلك بهدف الحصول على إحصائيات لغاية البحث العلمي.

وفضلاً بقبول ذاتي الاحترام والتقدير،»

رئيس المجلس الأكاديمي للبرنامج

د. عليان عبد الله الحواري

صورة في:
ملف:

Appendix (3)

كتاب تغطية و قبول

العنوان/ العوامل المؤثرة في عودة المرضى لمستشفى الوفاء للتأهيل الطبي.

أود أن أعلمكم أنني أعمل في مستشفى الوفاء الطبي للتأهيل وأنا ملتحق بالجامعة الإسلامية لأحصل على درجة الماجستير في علم التأهيل وأنا أقوم ببحث الأسباب الكامنة وراء عودة المرضى للدخول لمستشفى الوفاء للتأهيل الطبي و الذين جرت لهم عملية تأهيل في مستشفى الوفاء. لقد حصلت على أسمائكم من أرشيف مستشفى الوفاء للتأهيل الطبي، وأنا أقدر بالطبع مدى مساعدتكم لي في الحصول على المعلومات الخاصة بهذا البحث، فهي مهمة لمجال التأهيل ولفهم أوسع للعوامل المؤثرة في عودة المرضى للدخول لمستشفى الوفاء للتأهيل الطبي. كما وأود أن أعلمكم أن هذه الدراسة لن تسبب لكم أية إزعاج أو مضايقات ولن تؤثر على مستقبل حياتكم المرضية.

إن تعبتكم للاستبيان تعني الموافقة على المشاركة في هذه الدراسة، مع العلم أن لكم الحرية في عدم الإجابة على أية سؤال/ أسئلة أو حتى الانسحاب من عينة الدراسة في أية وقت و دون إعطاء أية أسباب لذلك.

إنني شاكر جدا لتعاونكم معي ومشاركتكم لي في هذه الدراسة، ولو كانت لديكم أية أسئلة، يمكنكم الاتصال بي في أية وقت.

التوقيع: _____

التاريخ: _____

الباحث: **هشام محمد حسن**

جوال: **0599461443**

البريد الإلكتروني: hisham_zatma@yahoo.Com

Appendix (4)

Covering letter and consent

Title: Risk factors for rehospitalization among patients in El-wafa Medical Rehabilitation Hospital

I am working in El Wafa Medical Rehabilitation Hospital. I will be graduating from Islamic University with master degree in Rehabilitation Science, and I am researching the Risk factors for Rehospitalization among rehabilitated patients in El-wafa Medical Rehabilitation Hospital.

I obtained your name from El Wafa Medical Rehabilitation Hospital archive. I very much appreciate your volunteering to help me with job search information. It is very important to the field of rehabilitation to understand the factors influencing rehospitalization. This study will not be harm to you and without affecting your future medical condition.

By completing the questionnaire, you agree to participate in the study. You are free not to answer any question or questions or withdraw from the study at any time, without having to give a reason for withdrawing.

I am very thankful to your cooperation and participation in my study. If you have any question later on, you are willing to contact me at any time.

Signature: _____

Date: _____

Hisham M. Hassan

Telephone number: 0599461443

Email address: hisham_zatma@yahoo.com

Appendix (5)

English Questionnaire

Serial Number:

Diagnosis: CVA SCI TBI

Socio-demographic:

Name (optional):

Date of Injury:

ID Number:

Medical file number:

Age: ... years

Gender: Male

Female

Marital status: Single

Married

Divorced

Widowed

Education:

Illiterate

Educated

Years of education (if any):

Employment state:

Employed

Unemployed

Monthly Income (Shekel) (if any):

Present address:

General information:

1. What type of hospital referral did you have in the first admission to El-wafa

Hospital?

Governmental

Company

Private Doctor

Self-referral

Military

2. If any, what type of hospital referral do you have in the second admission? Please specify

Governmental

Company

Private Doctor

Self-referral

Military

3. Did your hospital referral cover your second admission expenses?

Yes totally

Yes partially

No

4. If any, how long did you stay in the second admission?

5. If any, how many times of readmissions do you have?

6. Are you using air mattress in your home?

Yes

No

Physiologic Domain:

7. Have you complained of pressure ulcer in the first admission?

Yes No

8. If any, was the pressure ulcer the cause for the second admission?

Yes No

If your answer for question number 8 is no, please go to question number 14.

9. Did you notice an increase in size and or depth of the pressure ulcer?

Yes No

10. Do you think that you can take care of your pressure ulcer in home?

Yes No

11. Do you notice any infections in your pressure ulcer?

Yes No

12. Do you know how to prevent further pressure ulcers?

Yes No

13. Do you have adequate positioning to prevent the development of new ulcers or deterioration of the present one?

Yes No

14. Have you ever complained of spasticity (rigidity of limbs) in the first admission?

Yes No

15. If any, was spasticity the cause for the second admission?

Yes No

If your answer for question number 15 is no, please go to question number 19.

16. Does spasticity affect your activities of daily livings?

Yes No

17. Does spasticity affect your joint movement?

Yes No

18. Does spasticity restrict your participation in the community?

Yes No

19. Have you ever complained of pain in your body in the first admission?

Yes No

20. If any, was pain the cause of the second admission?

Yes No

If your answer for question number 20 is no, please go to question number 24.

21. Does the pain awake you from sleeping?

Yes No

22. Does pain affect your activities of daily living?

Yes No

23. Can you tolerate the pain?

Yes No

24. Have you ever complained of urinary tract infection (UTI) in the first admission?

(to be explained to the patient)

Yes No

25. If any, was urinary tract infection (UTI) the cause for the second admission?

Yes No

If your answer to question number 25 is no, please go to question number 28.

26. Does UTI disturb your urine control?

Yes No

27. Do you think that you yourself cannot manage the UTI in home?

Yes No

28. Have you ever complained of respiratory tract infection (RTI) in the first admission? (to be explained to the patient)

Yes No

29. If any, was respiratory tract infection (RTI) the cause for the second admission?

Yes No

If your answer to question number 29 is no, please go to question number 32.

30. Does RTI affect your activities of daily livings?

Yes No

31. Have you ever complained of dyspnea?

Yes No

32. Have you suffered from any disturbance in your urination pattern in the first admission?

Yes No

33. If any, was the disturbance in your urination pattern the cause for the second admission?

Yes No

If your answer to question number 33 is no, please go to question number 37.

34. Can you control your bladder?

Yes No

35. Have you ever complained of bladder retention?

Yes No

36. Have you suffered from a leakage of urine from your bladder?

Yes No

37. Have you suffered from any disturbance in your defecation pattern in the first admission?

Yes No

38. If any, was the disturbance in your defecation pattern the cause for the second admission?

Yes No

If your answer to question number 38 is no, please go to question number 42.

39. Can you control your bowel?

Yes No

40. Have you ever complained of chronic constipation?

Yes No

41. Have you ever complained of irregularity in your bowel motions?

Yes No

Rehabilitation Domain:

42. Do you think that you have a complete rehabilitation program in the first admission? (patient perspective)

Yes No

43. If any, have you benefited from the readmission?

Yes No

44. Is there another rehabilitation center to go for?

Yes No

45. How do you rate your satisfaction regarding hospital supplies? (patient perspective)

Greatly Moderately Mildly Unsatisfied

46. Were hospital supplies a motivating cause for your readmission?

Yes No

47. Do you need to complete your rehabilitation program? (patient perspective)

Yes No

48. How do you rate your satisfaction about hospital services in the first admission?

Greatly Moderately Mildly Unsatisfied

49. Were hospital services in the first admission a motivating cause for your readmission?

Yes No

Psychological Domain: (patient perspective)

50. Do you feel comfort when you deal with the hospital workers?

Yes No

51. Do you trust El-Wafa Rehabilitation Team?

Yes No

52. Do you think that El-Wafa hospital is satisfactory in rehabilitation?

Yes No

53. Do you consider yourself as a heavy load on your family?

Yes No

54. Do you think that your family takes care of you inside the hospital more than in your home?

Yes No

55. Do you like to be among the rehabilitation team?

Yes No

56. Do you feel discomfort in your home?

Yes No

57. If your answer to any of the questions 50 to 56 is yes, was it the cause for the second admission?

Yes No

Social Domain:

58. Do you have a caregiver in your home?

Yes No

59. Can your family provide you with adequate care in home?

Yes No

60. Does your existence do not affect your family's social roles?

Yes No

61. If your answer to any of questions 58, 59, and or 60 is no, was it the cause for the second admission?

Yes No

Educational Program Domain:

62. What type of instructions do you have on your first discharge?

You can check more than one point

Medical Social Psychological Occupational therapy
 Physiotherapy Nursing All None

63. What information do you think is helpful for the prevention of disability complications? You can check more than one point

Pressure ulcers Spasticity and Physiotherapy Urinary tract infection
 Pain Activity of Daily Livings and Occupational therapy
 Respiratory tract infection All None

64. What is the most useful method of patient teaching?

You can check more than one point

- Role-play Lectures Electronic material
 Pamphlets Brochures Special written instruction
 Workshops

Community follow-up Domain:

65. Have you ever been visited by any society after your first discharge?

Yes No

66. If your answer to question 65 is yes, what was the purpose of the visit? Please specify.

- Help further rehabilitation Supplies
 Medication Investigations Others

67. Do you have any support from the social worker in the community?

Yes No

68. If your answer to question 67 is yes, what was the type of support? Please specify

- Activity Information Medical aid
 Supplies Psychosocial support others.....

69. Did the social worker in El-wafa Hospital provide you with adequate information about community based services?

Yes No

70. How do you rate your satisfaction about community-based services?

Greatly Moderately Mildly Unsatisfied

Appendix (6)

Arabic Questionnaire

استبيان صحي

الرقم التسلسلي: التشخيص: جلطة دماغية إصابة النخاع الشوكي إصابة دماغية

المعلومات الديموقرافية:

الاسم (اختياري): تاريخ الإصابة: رقم الهوية:

رقم الملف الطبي: العمر: الجنس: ذكر أنثى

الحالة الاجتماعية: أعزب/آنسة متزوجة مطلقة أرملة

التعليم: متعلم غير متعلم سنوات التعلم (إن وجد):

العمل: اعمل لا اعمل الدخل الشهري (بالشيكل):

العنوان الحالي:

المعلومات العامة:

1. ما نوع الإحالة المرضية عند دخولك لأول مرة لمستشفى الوفاء؟

حكومية شركات تأمين طبيب خاص ذاتية خدمات طبية عسكرية

2. ما نوع الإحالة المرضية عند دخولك للمرة الثانية لمستشفى الوفاء؟ (حدد)

حكومية شركات تأمين طبيب خاص ذاتية خدمات طبية عسكرية

3. هل قامت إحالتك المرضية بتغطية تكاليف دخولك المستشفى في المرة الثانية؟

نعم كلياً نعم جزئياً لا

4. إذا كان كذلك، كم كانت مدة مكوثك في المرة الثانية بالأيام؟

5. إذا كان كذلك، كم كان عدد مرات عودتك للمستشفى؟

6. هل تستخدم فرشاة هواء طبية في بيتك؟

نعم لا

البعد الفسيولوجي:

7. هل كنت تعاني من تقرحات الفراش عند دخولك لأول مرة لمستشفى الوفاء؟

نعم لا

8. إذا كان كذلك، هل كانت القرحة هي السبب في عودتك للمستشفى؟

نعم لا

إذا كانت إجابتك للسؤال 8 هي لا، اذهب للسؤال 14

9. هل كان هناك زيادة في حجم أو عمق القرحة؟

نعم لا

10. هل تعتقد أنك تستطيع الاهتمام بقرحتك في البيت؟

نعم لا

11. هل القرحة كانت ملتهبة؟

نعم لا

12. هل تعرف كيفية منع حدوث التقرحات في المستقبل؟

نعم لا

13. هل قمت بتغيير أوضاع نومك لمنع ظهور تقرحات جديدة أو منع تدهور القرحة الحالية عندك؟

نعم لا

14. هل كنت تعاني من الشد العضلي عند دخولك لأول مرة لمستشفى الوفاء؟

نعم لا

15. إذا كان كذلك، هل كان الشد العضلي هو السبب في عودتك للمستشفى؟

نعم لا

إذا كانت إجابتك للسؤال 15 هي لا، اذهب للسؤال 19

16. هل كان الشد العضلي يؤثر على حياتك اليومية؟

نعم لا

17. هل كان الشد العضلي يؤثر على حركتك؟

نعم لا

18. هل كان الشد العضلي يؤثر على تنقلك من البيت و المشاركة الاجتماعية؟

نعم لا

19. هل كنت تعاني من آلام في جسمك عند دخولك لأول مرة لمستشفى الوفاء؟

نعم لا

20. إذا كان كذلك، هل كانت تلك الآلام هي السبب في عودتك للمستشفى؟

نعم لا

إذا كانت إجابتك للسؤال 20 هي لا، اذهب للسؤال 24

21. هل الآلام تؤثر على نومك؟

نعم لا

22. هل كانت الآلام تؤثر على حياتك اليومية؟

نعم لا

23. هل تستطيع تحمل الآلام؟

نعم لا

24. هل كنت تعاني من التهابات المسالك البولية عند دخولك لأول مرة لمستشفى الوفاء؟

نعم لا

25. إذا كان كذلك، هل كانت التهابات المسالك البولية هي السبب في عودتك للمستشفى؟

نعم لا

إذا كانت إجابتك للسؤال 25 هي لا، اذهب للسؤال 28

26. هل تؤثر التهابات المسالك البولية على تحكّمك في عملية التبول؟

نعم لا

27. هل تعتقد أنك غير قادر على علاج التهابات المسالك البولية لوحدك؟

نعم لا

28. هل كنت تعاني من التهابات الجهاز التنفسي عند دخولك لأول مرة لمستشفى الوفاء؟

نعم لا

29. إذا كان كذلك، هل كانت التهابات الجهاز التنفسي هي السبب في عودتك للمستشفى؟

نعم لا

إذا كانت إجابتك للسؤال 29 هي لا، اذهب للسؤال 32

30. هل كانت التهابات الجهاز التنفسي تؤثر على حياتك اليومية؟

نعم لا

31. هل سبق و أن عانيت من ضيق في النفس؟

نعم لا

32. هل كنت تعاني من اضطرابات في عملية التبول عند دخولك لأول مرة لمستشفى الوفاء؟

نعم لا

33. إذا كان كذلك، هل كانت اضطرابات عملية التبول هي السبب في عودتك للمستشفى؟

نعم لا

إذا كانت إجابتك للسؤال 33 هي لا، اذهب للسؤال 37

34. هل تستطيع التحكم في عملية التبول؟

نعم لا

35. هل سبق و أن عانيت من احتباس المثانة؟

نعم لا

36. هل سبق و أن عانيت من تسرب بولي؟

نعم لا

37. هل كنت تعاني من اضطرابات في عملية الإخراج عند دخولك لأول مرة لمستشفى الوفاء؟

نعم لا

38. إذا كان كذلك، هل كانت اضطرابات عملية الإخراج هي السبب في عودتك للمستشفى؟

نعم لا

إذا كانت إجابتك للسؤال 38 هي لا، اذهب للسؤال 42

39. هل تستطيع التحكم في عملية الإخراج؟

نعم لا

40. هل سبق و أن عانيت من الإمساك المزمن؟

نعم لا

41. هل سبق و أن عانيت من عدم انتظام في عملية الإخراج؟

نعم لا

البعد التأهيلي:

42. هل تعتقد أنك حصلت على برنامج تأهيل متكامل عند دخولك للمستشفى لأول مرة؟

(من وجهة نظر المريض)

نعم لا

43. أن وجد، هل استقدت من عودتك للمستشفى؟

نعم لا

44. هل باعتقادك أن هناك مركز تأهيل أحر للذهاب إليه؟

نعم لا

45. كيف تقيم رضاك عن إمكانيات المستشفى؟ (من وجهة نظر المريض)

كثيرا متوسط قليل غير راضي

46. هل كانت إمكانيات المستشفى في المرة الأولى سبب مشجع لك للعودة إليها؟

نعم لا

47. هل تعتقد أنك بحاجة لإكمال برنامجك التأهيلي؟ (من وجهة نظر المريض)

نعم لا

48. كيف تقيم رضاك عن خدمات المستشفى؟ (من وجهة نظر المريض)

كثيرا متوسط قليل غير راضي

49. هل كانت خدمات المستشفى في المرة الأولى سبب مشجعا لك للعودة إليها؟

نعم لا

البعد النفسي: (من وجهة نظر المريض)

50. هل تشعر بالارتياح في التعامل مع موظفي المستشفى؟

نعم لا

51. هل تتق بفريق التأهيل التابع لمستشفى الوفاء؟

نعم لا

52. هل تعتقد أن خدمات المستشفى التأهيلية مرضية؟

نعم لا

53. هل تحس أنك عالة أو عبء على أسرتك؟

نعم لا

54. هل تشعر بزيادة اهتمام الأسرة و أنت في المستشفى أكثر منه و أنت في البيت؟

نعم لا

55. هل تحب التواجد دائما مع فريق التأهيل؟

نعم لا

56. هل تشعر بعدم الراحة في البيت؟

نعم لا

57. إذا كانت إجابتك للأسئلة ما بين 50 و 56 هي نعم، هل كان تلك هي الأسباب لعودتك للمستشفى؟

نعم لا

البعد الاجتماعي:

58. هل عندك من يردعك في البيت؟

نعم لا

59. هل توفر أسرتك الاهتمام الكافي لك في البيت؟

نعم لا

60. هل وجودك في البيت بشكل عائلاً، 59 دور العائلة الاجتماعي؟

نعم لا

61. إذا كانت إجابتك على الأسئلة 60,59,58 هي لا، هل كان تلك هي الأسباب لعودتك للمستشفى؟

نعم لا

بعد البرنامج التعليمي:

62. ما هي نوع التعليمات التي تلقيتها عند خروجك من المستشفى؟ (يمكن اختيار أكثر من خيار)

طبية اجتماعية نفسية علاج وظيفي علاج طبيعي
 تمريضية جميع مسبق لاشيء مما سبق

63. من وجهة نظرك، ما هي المعلومات الأكثر أهمية لمنع مضاعفات الإعاقة؟

تقرحات الفراش الشد العضلي و العلاج الطبيعي التهابات المسالك البولية
 الآلام أنشطة الحياة اليومية و العلاج الوظيفي التهابات الجهاز التنفسي
 جميع مسبق لاشيء مما سبق

64. ما هي الطريقة الأفضل لتلقي تلك المعلومات؟

لعب الأدوار المحاضرات مادة الكترونية كتيبات كراسات
 تعليمات خاصة مكتوبة ورشات عمل

بعد المتابعة المجتمعية:

65. هل قام احد من المؤسسات المجتمعية بزيارتك عند خروجك من المستشفى؟

نعم لا

66. إذا كانت إجابتك للسؤال 65 هي نعم، ماذا كان الهدف من الزيارة؟ (يمكن اختيار أكثر من خيار)

- مساعدة متابعة التأهيل أدوات طبية مساعدة أدوية متابعة طبية
 جميع مسبق لاشيء مما سبق

67. هل قام الباحث الاجتماعي المجتمعي بدعمك؟

- نعم لا

68. إذا كانت إجابتك للسؤال 67 هي نعم، ماذا كان نوع الدعم؟ (يمكن اختيار أكثر من خيار)

- نشاط اجتماعي تثقيف صحي مساعدة طبية أدوات طبية مساعدة
 دعم نفسي جميع مسبق لاشيء مما سبق

69. هل الباحث الاجتماعي في مستشفى الوفاء زودك بمعلومات عن الخدمات المجتمعية الخاصة بالمعاقين؟

- نعم لا

70. كيف تقيم رضاك عن الخدمات المجتمعية الخاصة بالمعاقين؟

- كثيرا متوسط قليل غير راضي