Deanship of Graduate Studies

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Stroke Patients' Use of Care and Functional Outcome

Predictors After Discharge from the In-patient

Rehabilitation Settings

Abed Al Muhdi Mohammad Mustafa Radwan

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Rehabilitation Settings

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This thesis was submitted in partial fulfillment of the

requirements for the degree of Master in Physiotherapy

Al-Quds University

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Thesis Approval

Stroke Patients' Use of Care and Functional Outcome Predictors

After Discharge from the In-patient Rehabilitation Settings

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1444/2022

Dedication

This work is dedicated for my family, father, mother, wife and children who have been my inspiration and source of support during the process of this work

Declaration

I certify that this thesis submitted for the degree of Master is the result of my research, except where otherwise acknowledged, and this study (or any part of the same) has not been submitted for a higher degree to any other university or institution.

Signed: --- Abed Radwan

Date: 25/08/2022

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First of all I would like to thank Alah for giving me the power to accomplish this work, and I would like to deeply thank that staff of Al-Quds University for their guidance and mentoring, specially my supervisor Dr. Akram Amro

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Stroke Patients' Use of Care and Functional Outcome Predictors After Discharge from the In-patient Rehabilitation Settings

Prepared by: Abed Al Muhdi Mohammad Mustafa Radwan

Supervisor: Dr. Akram Amro

Abstract

Introduction:

Stroke is the next major cause of death globally. This research main **objectives** were to investigate the stroke patient functional status and use of care and rehabilitation outcome after discharge from the inpatient rehabilitation setting, and to Examine factors affecting using or not using different rehabilitation services after discharge from inpatient rehabilitation setting. Document the current functional status of stroke patients compared to their own functional status at discharge. And to investigate the factors associated with better stroke outcome after discharge from inpatient departments, mainly form Bethlehem Arab society between the period of January – September 2020,

Research Method:

The researchers adopted the quantitative prospective cohort study design. 61 participants were recruited. aged 45-84 years, 43 males, and 18 female patients diagnosed by Stroke, found to be discharged from BASR, All participants were examined with 3 physical examination tests Rivermead mobility index , Ten meters walking test 10MWT , and 6MWT.

Results:

This research confirms that there was a decline in the 3 outcome measures used in this research. Patients did not take any physiotherapy, speech, or occupational therapy, while severity of what ??? was the main determinant for the use of Physiotherapy as the only received rehabilitation services (less than 50%) at community level. Factors predicting stroke rehabilitation outcome were mainly age and sensory neglection . For the 6MWT and the 10 MT, and by the age alone on the MRMI.

Conclusion: There is a functional decline of functional status of stroke patients after discharge from the inpatient's rehabilitation setting, associated with severe shortages of Rehabilitation services received at the community level.

Key words: Stroke, Rehabilitation; outcome; discharge; inpatient rehabilitation

النتائج الوظيفية المتوقعة لمرضى الجلطات الدماغية المقيمين بمراكز التأهيل بعد انتهاء فترة اقامتهم داخل المستشفيات

اعداد: عبد المهدي رضوان

اشراف: د. اکرم عمرو

ملخص عن الدراسة باللغة العربية

المقدمة:

السكتة الدماغية هي السبب الرئيسي التالي للوفاة على مستوى العالم. حقق هذا البحث في مرضى السكتة الدماغية ، واستخدام الرعاية ونتائج إعادة التأهيل بعد الخروج من بيئة إعادة تأهيل المرضى الداخليين. فحص العوامل التي تؤثر على استخدام أو عدم استخدام خدمات إعادة التأهيل المختلفة بعد الخروج من بيئة إعادة التأهيل للمرضى الداخليين. توثيق الحالة الوظيفية الحالية لمرضى السكتة الدماغية مقارنة بوضعهم الوظيفي عند الخروج. وللتحقق من العوامل المرتبطة بنتائج أفضل للسكتة الدماغية بعد المرضى السكتة الماغية مقارنة بوضعهم الوظيفي عند الخروج. وللتحقق من العوامل المرتبطة بنتائج أفضل للسكتة الدماغية بعد المرضى السكتة الماضي الماضي الداخليين ، وبشكل رئيسي من مجتمع بيت لحم العربي بين الفترة من كانون الثاني (يناير) إلى أيلول (سبتمبر) 2020 ،

المنهج المتبع للدراسة::

اعتمد الباحثون التصميم الكمي الطولي المستقبلي. حيث تم تجنيد 61 مشاركا. تتراوح أعمار هم بين 45 و 84 عامًا ، 43 من الذكور ، و 18 من الإناث تم تشخيصهم بالسكنة الدماغية ، ووجدوا أنهم خرجوا من جمعية بيت لحم العربية للتاهيل ، وتم فحص جميع المشاركين من خلال 3 اختبارات فحص بدني مؤشر التنقل ريفيرميد ، اختبار المشي 10 أمتار MWT10 ، واحتبار المشي ل 6 دقائق MWT 6.

نتائج الدراسة:

يؤكد هذا البحث أن هناك انخفاضًا في مقاييس النتائج الثلاثة المستخدمة في هذا البحث ، حيث لم يأخذ المرضى أي علاج وظيفي أو علاج نطق أو العلاج النفسي ، بينما كانت شدة فالسكتة هي المحدد الرئيسي لاستخدام العلاج الطبيعي باعتباره خدمة إعادة التأهيل الوحيدة التي تم تلقيها (أقل من 50٪) على مستوى المجتمع غير واضح بتاتا .

العوامل التي تنبأت بنتائج إعادة التأهيل بعد السكتة الدماغية كانت بشكل رئيسي العمر والإهمال الحسي اعتقد هنالك جملة افضل مثل التجاهل الحسي . بالنسبة لمقياس المشي ل 6 دقائق و مقياس المشي لعشر امتار وفحص ريفيرميد

الاستنتاج: هناك تدهور وظيفي في الحالة الوظيفية لمرضى السكتة الدماغية بعد الخروج من بيئة إعادة التأهيل للمريض الداخلي ، ويرتبط ذلك بالنقص الحاد في خدمات إعادة التأهيل التي يتم تلقيها على مستوى المجتمع.

الكلمات المفتاحية: السكتة الدماغية ، إعادة التأهيل. حصيلة؛ إنتائج التاهيل؛ إعادة تأهيل المرضى الداخليين

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List of Acronyms and Abbreviations:

| WHO | World Health Organization |
|------|---|
| FES | First Ever Stroke |
| RS | Recurrent Stroke |
| CVD | Cardio Vascular Disease |
| NSA | National Stroke Association |
| CBR | Community Based Rehabilitation |
| ΟΤ | Occupational Therapy |
| PT | Physiotherapy |
| ADL | Activity of Daily Living |
| TMWT | Ten Meters Walking Test |
| RMI | Rivermead mobility index |
| BASR | Bethlehem Arab society for Rehabilitation |

Chapter One

- 1.1 introduction
- **1.2 Research Problem**
- 1.3 Study Objectives
- 1.4 Study questions
- 1.5 Study Hypothesis
- 1.6 Significance of the study

Chapter One

1.1 Introduction

Stroke is a highly prevalent disease among older people and can have a major impact on daily functioning and quality of life. Stroke is classically characterized as a neurological deficit attributed to an acute focal injury of the central nervous system. *The World Health Organization, WHO* defines Stroke as: rapidly developing clinical signs of focal (or global) disturbance of cerebral function, with symptoms lasting 24 hours or longer or leading to death, with no apparent cause other than of vascular origin (*Johnson, Onuma, Owolabi, Sachdev, 2016*). The definition of stroke has a long history and has been updated from certain international health organization according to the new findings of related researches.

WHO reported that stroke is the **second** leading cause of death and the **third** leading cause of disability. The same study that was submitted from WHO showed that 'Strokes mainly affect individuals at the peak of their productive life without any known explanation for the reasons(Smajlović,2015)

Globally, 70% of strokes and 87% of both stroke-related deaths and disability-adjusted life years occur in low- and middle-income countries (*Feigin Feigin, V. L. et al, 2010*).² Over the last four decades, the stroke incidence in low- and middle-income countries has more than doubled. During these decades stroke incidence has declined by 42% in high-income countries (*Strong, K., Mathers, C. & Bonita, 2007*).³

Here, in Palestine, the results of the study that took place at Al Watani governmental hospital from September 2006 to August 2007 (*Sweileh*, *W. M., Sawalha*, *A. F., Al-Aqad*, *S. M., Zyoud*, *S. H. & Al-Jabi*, *S. W*, 2008). ⁴ showed that the average **age** of the patients **was 69.09** \pm **10.9** years. 'The majority of patients (**153**; **82.3%**) had **ischemic stroke** subtype whereas **33** (**17.7%**) had **hemorrhagic stroke** subtype. The overall (first ever stroke = FES + recurrent stroke=RS) annual crude **incidence rate** of stroke was **51.4 per 100,000 persons** whereas the annual crude **incidence rate** of FES was **31 per 100,000 persons**. The age-adjusted incidence rates were **54.5** (**FES**) **and 89.8** (**FES and RS**). The overall in hospital mortality was **21%** and was higher in patients with RS than in those with FES'.

This study mentioned that the main risk factors that lead to stroke were Hypertension, diabetes mellitus, and renal dysfunction.

Another study was published by Al-Quds university on 2017 reported that the incidence of stroke in Northern Palestine was reported as **51.4 per 100 000.** (*Amro, A., Rhoda, A., Frantz, J., Abdeen, Z. & Dhaide, 2019*) *was it 2017 or 2019 ??*

Different studies showed that the current approach to the evaluation and management of acute stroke, both ischemic and hemorrhagic, stresses the value of rapid clinical and imaging diagnosis and prompt treatment. (refrence)As known, the effectiveness of stroke care and rehabilitation will occur if these services were provided at the optimal time – directly after the diagnosis. When planning for stroke rehabilitation, a holistic approach will be addressed including:

• Intensive care unit for the first 24-48 hours (depending on the condition)

- Acute stroke ward: acute unit in a discrete ward (usually discharged within seven days)
- Comprehensive stroke unit care: combined acute and rehabilitation unit in a discrete ward
- Stroke rehabilitation unit: a discrete rehabilitation unit for stroke patients who are

transferred from acute care 1-2 weeks' post-stroke

• Mixed rehabilitation ward: rehabilitation provided on a ward managing a general caseload.(Mercier, L., Audet, T., Hébert, R., Rochette, A. & Dubois, M.-F,2010)

1.2 Research problem:

Patients in Palestine have difficulty accessing inpatient rehabilitation, due to financial reasons, and scarcity of governmental insurance and private insurance companies to this vital rehabilitation setting. After discharge from long or short period of inpatient rehabilitation, there is no much information about what happens with those patients. In terms of information about what rehabilitation services that they receive, or any evidence on what functional status do they reach after different periods of discharge. This study is focusing on follow up of stroke patients after their discharge from inpatient rehabilitation.

1.3 Study objectives

• To investigate the stroke patients, use of care and rehabilitation settings after discharge from the inpatient rehabilitation setting.

- To investigate factors affecting using or not using different rehabilitation services after discharge from inpatient rehabilitation setting.
- To document the current functional status of stroke patients compared to their own functional status at discharge.
- To investigate the factors associated with better stroke outcome after discharge from inpatient departments

1.4 Study questions

- What is the stroke patients use of care and rehabilitation settings after discharge from the inpatient rehabilitation setting?
- What are the factors affecting using or not using different rehabilitation services after discharge from inpatient rehabilitation setting?
- What is the current functional status of stroke patients compared to their own functional status at discharge?
- What are the main factors affecting the stroke outcome among stroke patients after discharge from inpatient rehabilitation?

1.5 Study hypothesis

- Patient's functional status decrease after discharge from inpatients settings.
- There is a decrease in intensity and frequency of use of rehabilitation services, after discharge form inpatient rehabilitation setting.

1.6 Significance of the study

Results of this study will be beneficial for patients and their families, therapists, and decision makers in the level of administration of inpatient rehabilitation settings, and it will highlight the stroke patients post discharge functional status.

Chapter 2

Literature Review

2.1 Background

2.2 Similar Studies

2.1 Background

2.1.1 Definition

When searching for a definition of stroke, the researcher will find in a differences in definitions of the word "stroke". This diagnosis had been in existence since the Hippocratic writings. (Coupland, A. P., Thapar, A., Qureshi, M. I., Jenkins, H. & Davies, A. H,2017) As mentioned in Saga journals (Coupland, A. P., Thapar, A., Qureshi, M. I., Jenkins, H. & Davies, A. H,2017 7, the first recorded use of 'stroke' as a lay term was in 1599, attributing the sudden onset of symptoms to a 'stroke of God's hande'. It was not approved into the medical vocabulary of the time and physicians used the term "apoplexy". This word (apoplexy" is a Greek word which implies being struck with a deadly blow, but it would be incorrect to draw direct parallels between our modern concept of stroke and what has been classically referred to as apoplexy. (Coupland, A. P., Thapar, A., Qureshi, M. I., Jenkins, H. & Davies, A. H,2017)>.

Apoplexy was an umbrella term, describing a condition in which the patient had a 'sudden abolition of all activities of the mind with the preservation of the pulse and respiration' (Coupland, A. P., Thapar, A., Qureshi, M. I., Jenkins, H. & Davies, A. H,2017.

For Hippocrates, stroke is a diagnosis that describes a patient who experiencing sudden pain, losing speech, with a rattle in his throat, urinating without awareness and being unresponsive. These events describe a dramatic pathology and some cases of apoplexy were likely strokes, but the presentation-encompassed conditions we now consider 'stroke mimics' such as epilepsy, migraine

and sudden cardiac death. (Coupland, A. P., Thapar, A., Qureshi, M. I., Jenkins, H. & Davies, A. H,2017)

The WHO used to defined stroke as: "rapidly developing clinical signs of focal (or global) disturbance of cerebral function, with symptoms lasting 24 hours or longer or leading to death, with no apparent cause other than of vascular origin" (*The World Health Organization MONICA Project, 1988*)

2.1.2 International statistics

According to AHA Heart Disease and Stroke Statistics - 2020 Update. ((*Virani, S. S. et al. 2020*) The age-adjusted death rate attributable to cardiovascular disease (CVD), based on 2017 data, is **219.4** per **100,000**. On average, **someone dies** of CVD **every 37 seconds** in the U.S. There are 2,353 deaths from CVD each day, based on 2017 data. And on average, someone in the U.S. has a stroke every 40 seconds

2.1.3 Stroke risk factors

Członkowska A et al (2003) investigated the priority of risks of stroke, in Poland, and found that they could be listed as ' hypertension, diabetes, dyslipidemia, Atrial fibrillation, coronary heart disease, previous stroke, smoking, alcohol abuse, obesity and lack of physical activity'. The studies focused on the most prevalent factors of percentage complaining from different diseases before stroke. And the difference between gender and age categories in the percentage of prevalence and mortality.

Sridharan, S.E. et al (2009) they found that 74.8% of stroke were ischemic,

Appelros P. et al studied in 2009 98 articles about the incidence, subtype, and gender related differences in stroke from different countries, the study showed that the stroke in women was higher than in men (72.9 Vs 68.6). The mortality rate was also higher in women than in men (24.7% Vs 19.7%), incidence was 33% higher in men, and the prevalence was 41% higher in males than in female. The studies showed that men having intracerebral infarction and hemorrhage more in women, while women had more subarachnoid hemorrhage. (American

Li W. et al, In 2008 studied the main risk factors for 1913 consecutive hospitalizes patients with first stroke, they found that 68.7% showed evidence of ischemic stroke, while 31.3% suffered an intracerebral hemorrhage. The only predictive factor of anterior circulation infarction was atrial fibrillation, for Lancar strokes the main factor was hypertension, while alcohol intake was the main risk factor for intracerebral hemorrhage.

Hypertension was the most frequent risk factor of stroke, especially in hemorrhage stroke.

Jorgensen (1999) explained the mechanism in how hypertension lead to stroke, he explained that the weakening in the atrial walls by hypertension makes it susceptible for rupture and occlusions which lead to atrial sclerosis, this change makes the peripheral arterial resistances might compromises the circulation, which forming aneurisms that may rupture when they waken.

2.2 Similar studies

2.2.1 Rehabilitation Services

Rehabilitation services may include physiotherapy, occupational therapy, speech therapy, and psychological support and counselling (Putman K, et al, 2006), where general rehabilitation principles to achieve optimal outcomes for stroke patients may include: early mobilization, therapeutic positioning, ADLs training. All of these principles must be provided during the acute stage (inpatient), sub-acute stage (outpatient) and after discharge (home program and CBR). The goal of stroke rehabilitation is to help the patients to regain the skills they lost when the stroke affected their brains so they can return to a functional level of dependency and to improve the quality of their lives. Stroke rehabilitation may include several rehabilitation services, that may involve many approaches in stroke rehabilitation programs such as, Physiotherapy may concentrate at motor control, muscle tone management and secondary complications of stroke (Peppen et al. (2004), In addition to other advanced management approaches and techniques as Motor-skill exercises such as: Mobility training, Constraint-induced therapy, Forced-use therapy, Range-of-motion therapy, *Technology-assisted physical activities*: which might include functional electrical stimulation, Robotic technology, Wireless technology, Virtual reality. (The use of video games and other computer-based therapies involves interacting with a stimulated, real-time environment). Cognitive and emotional activities: that include Occupational therapy, speech therapy, psychological intervention or/and medications. In addition to some *Experimental therapies including:* Noninvasive brain stimulation, Biological therapies, such as stem cells. *Alternative medicine:* such as massage, herbal therapy, acupuncture and oxygen therapy are being evaluated.(Govender, 2007):

2.1.3 Rehabilitation settings

Stroke is and emergency that should be treated at a hospital setting in the acute stage, this was confirmed and concluded by Young & Forster (2007), since the main aim is to stabilize the risk factors and manage them in a hospitals setting . stroke units in these hospitals seems to improve survival and stroke outcome (Indredavik B, et al, 1999). The average days of admission seems to be 43 days according to the study of Karla L. et al (1995),

Lee (2010) stated that 34% of stroke patients may have the privilege of being treated in an inn patient setting, which he stated that it was motivated mainly by the severity of stroke, where more severe patients may have better chances to be admitted for inpatient

Home rehabilitation is defined as the receiving of rehabilitation services at home (Ducan (2005), where the original environment will be the place of where the patients taking his rehabilitation. Ducan (2005) also stated that this setting is less costly pf the patients, and may make the family more involved and aware of the case of the patient, and it may guarantee more privacy for the stroke patients themes sleeves. In terms of the outcome, it seems that patients who got their treatment did better than those who went for inpatients, in a follow up that was conducted by Thorsén A. et al (2005), different results was found by Andrson C. et al (2000), who concluded that there was no difference between those who received inpatient rehabilitation and those who had been treated at home

Outpatient clinic is a place where patients come to receive their rehabilitation and go back home, different rehabilitation settings may be presented at this setting, including OT, PT, and medical follow up (Ducan, 2005)

2.1.4 Factors affecting rehabilitation outcome

Age, **Severity** at admission and type of rehabilitation services were the main predictors of outcome of stroke rehabilitation, after a follow up of a 50 patients (Keren O, et al,(2004)). Saxena, S at all (2006), Studied the factors prediction dependency in ADL after stroke and found that the **severity at admission and the type of rehabilitation services were the main predictors** of stroke Rehabilitation ADL independence. Bode R. et al (2004) concluded in his study that the **length of stay was a positive predictor** of a better self-care, and in terms of gender he found that **males** achieved better prognosis and outcome when compared females . Chen et all in (2015) stated that spatial neglect is a negative predictor of stroke rehabilitation outcome.

Please do add a paragraph to show what your study will add and what is the difference between what have been done and your study

Chapter 3 Material and Methods

3.1 Design

- **3.2** Tools of Data collection
- **3.3 Data collection procedure**
- 3.4 Sample and study population
- 3.5 Statistical analysis
- **3.6 Ethical considerations**

3.1. Design

Descriptive prospective was adopted as the design for this research, since it answered the research questions regarding the change on functional status between the time of discharge and current status, and at the same time, it documents the different rehabilitation settings and services used after discharge. A prospective study, sometimes called a prospective cohort study is a type of longitudinal study where researchers follow and observe a group of subjects over a period of time to gather information and record the development of outcomes, one of its major drawbacks is the loss of subjects and the long time needed for this particular type of studies, while it is well appreciated for its possibility to check the change upon time in different diseases progression and long term effect of medical interventions (Euser et al,2009)

3.2 Tools of data collection

The researcher used the following tools:

- 1. Data collection sheet, that is composed of 3 sections
 - a. **Personal information:** (age, gender, date of stroke, length of inn patient services
 - b. **Rehabilitation settings:** use after discharge, frequency, intensity, motivation for use , and obstacles of not sung different settings
 - c. **Rehabilitation services:** factors affecting its use, and factors hindered the use of different rehabilitation services

2. Rivermead mobility index

The RMI (appendix 1) is a reliable and valid outcome measure focusing on independence of the patient in performance of functional tasks (Hsueh et al 2003), it is based on scoring the activity as either 0 or 1 based on his ability or disability to perform the requested function

3. Ten meters walking test

TMWT (appendix 2) is a valid and reliable outcome measure concentrating at the speed and safety of walking for through a 14 meters track, and scoring the time needed to pass through the intermediate 10 meters, it reflects a functionality of gait and it is well used in international literature, and one that scores ≥ 0.80 m/s is a considered community ambulatory (Pirpiris et al 2003)

4. 6 Minutes walking test (^MWT)

The 6-minute walk test (6MWT) is used to assess walking endurance by indicating the distance that the subject is capable of walking in a period of six minutes. It has a lane of 30 meteres where the patient walks continuously for 6 minutes, walked distance is recorded. The test is vaid and reliable, and the the median 6MWD was approximately 580 m for 117 healthy men and 500 m for 173 healthy women (Troosters et al ,1999)

.3.3 Data collection procedure

The proposal was discussed at the level of higher committee of the MPT program at the physiotherapy department, the ethical clearance was requested from Al-Quds university ethical committee, after that permission was granted form BAS, then files of the patients were scanned and screened for identification

of potential participants, each patient that fits in the inclusion criteria was contacted, and invited to participate, those who agree were requested to sign a consent form after through description of the research to the patients and their families. Then data collection sheet was filed, and functional tests were be made.

3.4 Sample and study population

3.4.1 Sampling method

The researcher used all the files of patients admitted to the BASR, from 01.11,2019 - 30.06.2020

from all West Bank .

3.4.2 Sample size

The study sample included 61 patients. As they were the patients found to be discharged from BAS, and were possible to follow them up at home after discharge.

3.4.3 Inclusion criteria

- Stroke patient by medical diagnosis
- Admitted to BASR
- Discharged not less than 6 months

3.4.4 Exclusion criteria

- Stroke patients with other neurological diseases
- Head injuries

- Patients with fractures after discharge
- Patients refuse to sign the consent form
- Patients with mental challenges (mini mental state test)

3.5 Statistical analysis

All descriptive results was presented using mean, median and stranded deviation, functional status difference between discharge and current status was analyzed using paired sample t test, and independent sample t test, correlation person and spearman tests used for detecting association of improvement with different factors.

3.6 Ethical considerations

Ethical clearance was obtained from Al-Quds university ethical committee, also ethical and administrative clearance were obtained from BAS, all participants or their guardians were signed an informed consent, and all participants were given a detailed description of the study, an addition to explaining their right in withdrawal at any time of the study without their interests being harmed, and that the data used only for scientific purposes , anonymity and confidentiality was guaranteed , and that the data was stored in a locked closet with the researcher access only.

Chapter 4 Results and discussion

4.1 Results

4.2 Discussion
4.1 Results

4.1.1 Personal data of participants

4.1.1.1 Age

As presented in table 4.1 average age of stroke patients was 63.13 with minimum age of 45 and maximum of 84 year

Table 1 Age of participants

| Descriptive Statistics | | | | | | | | | |
|------------------------|----|---------|---------|--------|-------------------|--|--|--|--|
| | N | Minimum | Maximum | Mean | Std. Deviation | | | | |
| Age | 61 | 45.0 | 84.0 | 63.131 | 11.1392 | | | | |

4.1.1.2 Age categories

Table 4.2 showed the categories of age which consists of 3 categories, the first from 45 to 55 years old, were their number was 19, the second from 56 to 68 years old, were their number was 21, and the third from 69 to 84 years old, were their number was 21.

Table 2 Age categories

| AgeC3 | | | | | | | | | |
|-------|-------------------------|-----------|---------|---------|------------|--|--|--|--|
| | | Frequency | Percent | Valid | Cumulative | | | | |
| | | | | Percent | Percent | | | | |
| Valid | From 45 to 55 years old | 19 | 31.1 | 31.1 | 31.1 | | | | |
| | From 56 to 68 years old | 21 | 34.4 | 34.4 | 65.6 | | | | |
| | From 69 to 84 years old | 21 | 34.4 | 34.4 | 100.0 | | | | |
| | Total | 61 | 100.0 | 100.0 | | | | | |

4.1.1.3 Gender

As presented in table 4.3 the numbers of male were 70.5% and females' numbers was 29.5%, which mean that males in the study more than females.

Table 3 Gender

| Gender | | | | | | | | | | |
|--------|--------|-----------|---------|---------------|------------|--|--|--|--|--|
| | | Frequency | Percent | Valid Percent | Cumulative | | | | | |
| | | | | | Percent | | | | | |
| Valid | Male | 43 | 70.5 | 70.5 | 70.5 | | | | | |
| | Female | 18 | 29.5 | 29.5 | 100.0 | | | | | |
| | Total | 61 | 100.0 | 100.0 | | | | | | |

4.1.2 Stroke variables

4.1.2.1 Dominant hand

Table 4.4 showed the number of patients who use their right hand and their number was 44, and those who use their left hand was numbered 17.

Table 4 Dominant hand

| Dominant hand | | | | | | | | | | |
|---------------|-------|-----------|---------|---------------|--------------------|--|--|--|--|--|
| | | Frequency | Percent | Valid Percent | Cumulative Percent | | | | | |
| Valid | Right | 44 | 72.1 | 72.1 | 72.1 | | | | | |
| | left | 17 | 27.9 | 27.9 | 100.0 | | | | | |
| | Total | 61 | 100.0 | 100.0 | | | | | | |

4.1.2.2 Affected side

As presented in table 4.5 the right side was affected more than left, the percent was 52.5% and their number was 32, and the left was 47.5% was number 29.

Table 5 Affected side

| AFFECTED SIDE | | | | | | | | | | |
|---------------|-------|-----------|---------|---------------|--------------------|--|--|--|--|--|
| | | Frequency | Percent | Valid Percent | Cumulative Percent | | | | | |
| Valid | Right | 32 | 52.5 | 52.5 | 52.5 | | | | | |
| | Left | 29 | 47.5 | 47.5 | 100.0 | | | | | |
| | Total | 61 | 100.0 | 100.0 | | | | | | |

4.1.2.3 Impaired brain structure

As presented in table 4.6 the majority of patients around 65% of the patients had either MCA or Basal Ganglia stroke

| Impaired brain structures | | | | | | | | | |
|---------------------------|---------------|-----------|---------|---------------|------------|--|--|--|--|
| | | Frequency | Percent | Valid Percent | Cumulative | | | | |
| | | | | | Percent | | | | |
| Valid | MCA | 23 | 37.7 | 37.7 | 37.7 | | | | |
| | Basal Ganglia | 16 | 26.2 | 26.2 | 63.9 | | | | |
| | Cerebellum | 9 | 14.8 | 14.8 | 78.7 | | | | |
| | Brain stem | 6 | 9.8 | 9.8 | 88.5 | | | | |
| | Others | 7 | 11.5 | 11.5 | 100.0 | | | | |
| | Total | 61 | 100.0 | 100.0 | | | | | |

Table 6 Impaired brain structure

4.1.2.4 Stroke type

As presented in table 4.7 Ischemic stroke patients were the highest percentage (73.8%), while 26.2 % of the patients had hemorrhage stroke

Table 7 stroke type

| Stroke Type | | | | | | | | | |
|-------------|------------|-----------|---------|---------------|------------|--|--|--|--|
| | | Frequency | Percent | Valid Percent | Cumulative | | | | |
| | | | | | Percent | | | | |
| Valid | Ischemic | 45 | 73.8 | 73.8 | 73.8 | | | | |
| | Hemorrhage | 16 | 26.2 | 26.2 | 100.0 | | | | |
| | Total | 61 | 100.0 | 100.0 | | | | | |

4.1.2.5 Sensory extension test for neglect

As presented in table 4.8 the Negative extension sensory test for neglect were 80.3% while the positive

sensory neglect was positive in only 19.7%.

Table 8 sensory extension test for neglect

| Sensory extension test for neglect | | | | | | | | | |
|------------------------------------|----------|-----------|---------|---------------|------------|--|--|--|--|
| | | Frequency | Percent | Valid Percent | Cumulative | | | | |
| | | | | | Percent | | | | |
| Valid | Negative | 49 | 80.3 | 80.3 | 80.3 | | | | |
| | Positive | 12 | 19.7 | 19.7 | 100.0 | | | | |
| | Total | 61 | 100.0 | 100.0 | | | | | |

4.1.2.6 Urinary incontinence

As Presented in table 4.9, around 90 had urinary incontinence while only 9.8% of the patients did not have urinary incontinence

Table 9 Urinary incontinence

| urinary | incontinence | | | | |
|---------|--------------|-----------|---------|---------------|------------|
| | | Frequency | Percent | Valid Percent | Cumulative |
| | | | | | Percent |
| Valid | Yes | 55 | 90.2 | 90.2 | 90.2 |
| | No | 6 | 9.8 | 9.8 | 100.0 |
| | Total | 61 | 100.0 | 100.0 | |

4.1.3 Comorbidity

4.1.3.1 Cardiovascular disease

As presented in table 4.10 55.7% of the total sample had cardiovascular disease while 44.3% did not have cardiovascular disease

Table 10 Cardiovascular disease

| cardiovascular disease | | | | | | | | | |
|------------------------|-------|-----------|---------|---------------|------------|--|--|--|--|
| | | Frequency | Percent | Valid Percent | Cumulative | | | | |
| | | | | | Percent | | | | |
| Valid | Yes | 34 | 55.7 | 55.7 | 55.7 | | | | |
| | No | 27 | 44.3 | 44.3 | 100.0 | | | | |
| | Total | 61 | 100.0 | 100.0 | | | | | |

4.1.3.2 Diabetes

As presented in table 4.11 that 83.6 of the sample had diabetes, while 16.4 did have diabetes

Table 11 Diabetes prevalence

| Diabetes | | | | | | | | | |
|----------|-------|-----------|---------|---------------|------------|--|--|--|--|
| | | Frequency | Percent | Valid Percent | Cumulative | | | | |
| | | | | | Percent | | | | |
| Valid | Yes | 51 | 83.6 | 83.6 | 83.6 | | | | |
| | No | 10 | 16.4 | 16.4 | 100.0 | | | | |
| | Total | 61 | 100.0 | 100.0 | | | | | |

4.1.3.3 Cholesterol

-

As presented in table 4.12 55.7%, of the sample have cholesterol while 44.3 did not have cholesterol

Table 12 Cholesterol

| cholesterol | | | | | | | | | |
|-------------|-------|-----------|---------|---------------|------------|--|--|--|--|
| | | Frequency | Percent | Valid Percent | Cumulative | | | | |
| | | | | | Percent | | | | |
| Valid | Yes | 34 | 55.7 | 55.7 | 55.7 | | | | |
| | No | 27 | 44.3 | 44.3 | 100.0 | | | | |
| | Total | 61 | 100.0 | 100.0 | | | | | |

4.1.4 Inpatient Rehabilitation variables

4.1.4.1 Pre rehabilitation period category

As presented in table 4.13, 21% came to rehabilitation in less than 3 weeks pre rehabilitation Period, 27.9% had a 4-7 weeks, 27.9% had come 8-13 weeks while 23% came after more than 14 weeks of a pre rehabilitation period

| Pre rehabilitation period C | | | | | | | | |
|-----------------------------|--------------|-----------|---------|---------------|------------|--|--|--|
| | | Frequency | Percent | Valid Percent | Cumulative | | | |
| | | | | | Percent | | | |
| Valid | Less than 3 | 13 | 21.3 | 21.3 | 21.3 | | | |
| | weeks | | | | | | | |
| | 4-7 weeks | 17 | 27.9 | 27.9 | 49.2 | | | |
| | 8-13 weeks | 17 | 27.9 | 27.9 | 77.0 | | | |
| | More than 14 | 14 | 23.0 | 23.0 | 100.0 | | | |
| | weeks | | | | | | | |
| | Total | 61 | 100.0 | 100.0 | | | | |

Table 13 Pre rehabilitation period category

4.1.4.2 Rehabilitation period category

As presented in table 4.14, 23% of the sample had less than 5 weeks in rehabilitation period category, 21.3% had between 6-8 weeks, 31.1% had between 9-11 weeks while 24.6% have more than 12 weeks in rehabilitation period category

| Rehabili | Rehabilitation period category | | | | | | | | |
|----------|--------------------------------|-----------|---------|---------------|------------|--|--|--|--|
| | | Frequency | Percent | Valid Percent | Cumulative | | | | |
| | | | | | Percent | | | | |
| Valid | Less than 5 weeks | 14 | 23.0 | 23.0 | 23.0 | | | | |
| | 6 - 8 weeks | 13 | 21.3 | 21.3 | 44.3 | | | | |
| | 9-11 weeks | 19 | 31.1 | 31.1 | 75.4 | | | | |
| | More than 12 | 15 | 24.6 | 24.6 | 100.0 | | | | |
| | weeks | | | | | | | | |
| | Total | 61 | 100.0 | 100.0 | | | | | |

 Table 14 Rehabilitation period category

4.1.4.3 Rehabilitation sessions rate category

As presented in table 4.15, 34.4% of the target sample take rehabilitation sessions rate C for less than 6 session per week, 34.4 Coleman % took between 6-10 sessions per week, while 31,1% took more than11 sessions per week

| Table 1 | 5 | Rehabilitation | session | rate | category |
|----------|---|----------------|----------|------|----------|
| I able I | J | Kenabintation | 26221011 | Tale | category |

| Rehabi | Rehabilitation sessions rate | | | | | | | | |
|--------|------------------------------|-----------|---------|---------|--------------------|--|--|--|--|
| | | Frequency | Percent | Valid | Cumulative Percent | | | | |
| | | | | Percent | | | | | |
| Valid | Less than 6 session per | 21 | 34.4 | 34.4 | 34.4 | | | | |
| | week | | | | | | | | |
| | 6-10 sessions per week | 21 | 34.4 | 34.4 | 68.9 | | | | |
| | More than 11 sessions | 19 | 31.1 | 31.1 | 100.0 | | | | |
| | per week | | | | | | | | |
| | Total | 61 | 100.0 | 100.0 | | | | | |

4.1.4.4 Descriptive Statistics

As presented in table 4.16 patients received Pre rehabilitation period recorded Mean of 8.21 weeks , while the minimum was 0 weeks and the maximum mean was 18weeks , patients had been under rehabilitation period of A minimum OF 2 weeks and a maximum of 15 weeks while the Mean period was 8.59 weeks, total therapeutic sessions recorded a mean of 73 sessions, with a mean rehabilitation rate of 8.9 /week

Table 16 Funactional tests at discharge

| Descriptive Statistics | | | | | | | | | |
|---------------------------------|----|---------|---------|---------|-----------|--|--|--|--|
| | Ν | Minimum | Maximum | Mean | Std. | | | | |
| | | | | | Deviation | | | | |
| Pre rehabilitation period | 61 | 0 | 18 | 8.21 | 5.080 | | | | |
| Rehabilitation period | 61 | 2 | 15 | 8.59 | 3.388 | | | | |
| Total # of therapeutic sessions | 61 | 15.00 | 164.00 | 73.1311 | 40.51192 | | | | |
| Rehabilitation sessions rate | 61 | 5 | 14 | 8.49 | 3.005 | | | | |

4.1.5 Stroke outcome at discharge

4.1.5.1 Outcomes

As presented in table 4.17 the 6-meter walking test recorded an average of 293 meters, MRI of

26.4 and 10MWT average was 0.35 m/second at discharge .

| Descriptive Statistics | | | | | | | | |
|------------------------|----|---------|---------|---------|----------------|--|--|--|
| | Ν | Minimum | Maximum | Mean | Std. Deviation | | | |
| 6MWT | 61 | .0 | 690.0 | 293.115 | 224.6178 | | | |
| MRMI T.40.1 | 61 | 10 | 38 | 26.43 | 8.158 | | | |
| 10MWT | 61 | .00 | 1.20 | .5111 | .35027 | | | |
| Valid N | 61 | | | | | | | |
| (listwise) | | | | | | | | |

Table 17 Outcome measures pf stroke patients at discharge from inpatient settings

4.1.6 Follow up after discharge

Survival

4.1.6.1 Average days between discharge and follow up

As presented in table 4.19 number of days between discharge and follow ups were 403 in its

minimum score while the maximum score were 492 and the mean is 441.17

Table 18Days Between Discharge and follow up

| | Minimum | Maximum | Mean | Std. Deviation |
|-------------------------|---------|---------|--------|----------------|
| Days Between | 403 | 492 | 441.17 | 30.027 |
| Discharge and follow up | | | | |
| Valid N (listwise) | | | | |

4.1.6.2 Surviving patients

As presented in table 4.20 49/61 of the sample targeted patients recorded alive with percent of

80.3% while 12/61 recorded not alive with 19.7% percent

Table 19

| does the patient alive | | | | | | | | |
|------------------------|-------|-----------|---------|---------|--------------------|--|--|--|
| | | Frequency | Percent | Valid | Cumulative Percent | | | |
| | | | | Percent | | | | |
| Valid | yes | 49 | 80.3 | 80.3 | 80.3 | | | |
| | no | 12 | 19.7 | 19.7 | 100.0 | | | |
| | Total | 61 | 100.0 | 100.0 | | | | |

As presented in table 4.21 the days between death and discharge of patients recorded 35 in its minimum score 35 days while the maximum score recoded 357 days with of a Mean of 177.17

Table 20 Days between Death And discharge

| | Minimum | Maximum | Mean | Std. Deviation |
|--------------------|---------|---------|--------|----------------|
| | | | | |
| Days between | 35 | 357 | 177.17 | 155.817 |
| Death And | | | | |
| discharge | | | | |
| Valid N (listwise) | | | | |

4.1.7 Difference between discharge and follow up upon Functional status

4.1.7.1 10MWT between discharge and follow up



As presented in figure 1, there was a decline of 10MWT as measured by meter/second

Figure 1 decline in 10WT on follow up

Table 21 presents a statistically significant decline of 10 MWT between Discharge and follow up

Table 21same sample t test in between 10WT at discharge and follow up

| Paired Samples Test | | | | | | | |
|---------------------|----------|-------------|-------|-----------------|------|--|--------|
| | Paired I | Differences | t | df | Sig. | | |
| | Mean | Std. | Std. | 95% | | | (2- |
| | | Deviatio | Error | Confidence | | | tailed |
| | | n | Mean | Interval of the | | |) |
| | | | | Difference | | | |

| | | | | | Lowe | Uppe | | | |
|-----|------------|-------|--------|-------|-------|-------|------|---|------|
| | | | | | r | r | | | |
| Pai | 10MWT - | .3796 | .53461 | .0756 | .2276 | .5315 | 5.02 | 4 | .000 |
| r 1 | Follow10MW | 0 | | 0 | 7 | 3 | 1 | 9 | |
| | Т | | | | | | | | |

4.1.7.2 6MWT between discharge and follow up

As presented in Figure 2 there is a 227 meters decline in 6 MWT in between Discharge and follow

up



Figure 2 6MWT between discharge and follow up

Table 22 presents a statistically significant decline on 6MWT in between discharge and follow up

| Pair | Paired Samples Test | | | | | | | | | |
|------|---------------------|--------|---------|--------|------------|---------|-----|----|-------|--|
| | Paired Differences | | | | | | | d | Sig. | |
| | | Mean | Std. | Std. | 95% Con | fidence | | f | (2- | |
| | | | Deviati | Error | Interval o | f the | | | taile | |
| | | | on | Mean | Differenc | | | d) | | |
| | | | | | Lower | Upper | | | | |
| Pa | 6MWT - | 227.40 | 310.12 | 43.858 | 139.26 | 315.53 | 5.1 | 4 | .000 | |
| ir | Follow6M | 000 | 973 | 97 | 211 | 789 | 85 | 9 | | |
| 2 | WT | | | | | | | | | |

Table 22 same sample t test 6MWT between discharge and follow up

4.1.7.2 MRI between discharge and follow up

Figure 3 presents a decline of MRMI from 24.74 to 20.47



Figure 3 MRI between discharge and follow up

Table 23 presents a none statistically significant decline in MRMI between discharge and follow up

Table 23 same sample t test of MRI between discharge and follow up

| Paired Samples Test | | | | | | | | | |
|---------------------|----------|--------------------|----------|--------|-------------|----------|-----|------|--------|
| | | Paired Differences | | | | t | df | Sig. | |
| | | Mean | Std. | Std. | 95% Cor | nfidence | | | (2- |
| | | | Deviatio | Error | Interval of | of the | | | tailed |
| | | | n | Mean | Difference | | | |) |
| | | | | | Lower | Upper | | | |
| Pai | MRMI | 4.2631 | 22.1204 | 5.0747 | - | 14.9248 | .84 | 1 | .412 |
| r 3 | T.40.1 – | 6 | 8 | 9 | 6.3985 | 9 | 0 | 8 | |
| | Follow | | | | 7 | | | | |
| | MRMItot | | | | | | | | |
| | al | | | | | | | | |

4.1.8 Factors predicting with better improvement in functional status

4.1.8.1 10MWT predictors

As shown in tables (24,25,26) using stepwise regression, a statistically significant model (p < 0.05) showed that age and sensory neglect were the main predictors of decline in 10 MWT, with a model explaining 43% of the variation in the 10 MWT in between discharge and follow up.

Table 2410MWT predictors

| Model | Summary ^c | | | |
|-------|----------------------|----------|------------|----------------------------|
| Mod | R | R Square | Adjusted R | Std. Error of the Estimate |
| el | | | Square | |
| 2 | .661 ^b | .437 | .413 | .40969 |

a. Predictors: (Constant), Age

b. Predictors: (Constant), Age, Sensory extension test for

neglect

c. Dependent Variable: imp.10mwt

Table 25 Anova Test for 10MWT predictors

| ANO | VA ^a | | | | | |
|-------|-----------------|---------|----|-------------|--------|-------------------------|
| Model | | Sum of | df | Mean Square | F | Sig. |
| | | Squares | | | | |
| 2 | Regressi | 6.116 | 2 | 3.058 | 18.218 | <u>.000^c</u> |
| | on | | | | | |
| | Residual | 7.889 | 47 | .168 | | |
| | Total | 14.004 | 49 | | | |

a. Dependent Variable: imp.10mwt

b. Predictors: (Constant), Age

c. Predictors: (Constant), Age, Sensory extension test for neglect

Table 26 coofecients 10MWT predictors

| Coeffic | Coefficients ^a | | | | | | | |
|---------|---------------------------|--------------|------------|-------------|--------|------|--|--|
| Model | | Unstandardi | zed | Standardize | t | Sig. | | |
| | | Coefficients | | d | | | | |
| | | | | Coefficient | | | | |
| | | | | | | | | |
| | | В | Std. Error | Beta | | | | |
| | Age | 025 | .005 | 517 | -4.674 | .000 | | |
| | Sensory extension | 500 | .160 | 347 | -3.136 | .003 | | |
| | test for neglect | | | | | | | |

a. Dependent Variable: imp.10mwt

4.1.8.2 6MWT predictors

As shown in tables (27,28,29) using stepwise regression, a statistically significant model (p< 0.05) showed that age and sensory neglect were the main predictors of decline in 6MWT, with a model del explaining 41% of the variation in the 10 MWT in between discharge and follow up.

Table 27Model Summary

| Model Summary ^c | | | | | | | |
|----------------------------|-------------------|--------------|-------------------|-------------------|--|--|--|
| Model | R | R Square | Adjusted R Square | Std. Error of the | | | |
| | | | | Estimate | | | |
| 2 | .645 ^b | . <u>416</u> | .391 | 241.92791 | | | |

a. Predictors: (Constant), Age

b. Predictors: (Constant), Age, Sensory extension test for

neglect

c. Dependent Variable: imp.6mwt

Table 28ANOVA*

| ANOVA ^a | | | | | | | | |
|--------------------|----------|----------------|----|-------------|--------|-------|--|--|
| Mode | 1 | Sum of Squares | df | Mean Square | F | Sig. | | |
| 2 | Regressi | 1961973.769 | 2 | 980986.884 | 16.761 | .000° | | |
| | on | | | | | | | |
| | Residual | 2750868.231 | 47 | 58529.111 | | | | |
| | Total | 4712842.000 | 49 | | | | | |

a. Dependent Variable: imp.6mwt

b. Predictors: (Constant), Age

c. Predictors: (Constant), Age, Sensory extension test for neglect

Table 29 Coefficients

| Coeff | ïcients | | | | | |
|-------|-------------------|-------------|------------|-------------|--------|------|
| Mode | 1 | Unstandard | ized | Standardize | t | Sig. |
| | | Coefficient | 8 | d | | |
| | | | | Coefficient | | |
| | | | | S | | |
| | | В | Std. Error | Beta | | |
| 2 | (Constant) | 1450.306 | 215.186 | | 6.740 | .000 |
| | Age | -14.401 | 3.106 | 522 | -4.636 | .000 |
| | Sensory extension | -263.172 | 94.234 | 314 | -2.793 | .008 |
| | test for neglect | | | | | |

a. Dependent Variable: imp.6mwt

4.1.8.3 MRI predictors

As shown in tables (30,31,2) using stepwise regression, a statistically significant model (p< 0.05) showed that age and sensory neglect were the main predictors of decline in 6MWT, with a model del explaining 55% of the variation in the 10 MWT in between discharge and follow up.

Table 30 Model Summary

| Model Summary | | | | | | |
|---------------|-------------------|----------|-------------------|----------------------------|--|--|
| Model | R | R Square | Adjusted R Square | Std. Error of the Estimate | | |
| 1 | .744 ^a | .553 | .527 | 15.21530 | | |

a. Predictors: (Constant), Age

b. Dependent Variable: imp.mrm

Table 31 ANOVA^a

| ANOVA ^a | | | | | | | | |
|--------------------|----------|----------------|----|----------|--------|-------------------|--|--|
| Mode | 1 | Sum of Squares | df | Mean | F | Sig. | | |
| | | | | Square | | | | |
| 1 | Regressi | 4872.094 | 1 | 4872.094 | 21.045 | .000 ^b | | |
| | on | | | | | | | |

| Residual | 3935.590 | 17 | 231.505 | |
|----------|----------|----|---------|--|
| Total | 8807.684 | 18 | | |

a. Dependent Variable: imp.mrm

b. Predictors: (Constant), Age

Table 32 Coefficients

| Coeff | ïcients | | | | | |
|-------|------------|--------------|----------------|------|--------|------|
| Model | | Unstanda | Unstandardized | | t | Sig. |
| | | Coefficients | | ed | | |
| | | | | | | |
| | | | | s | | |
| | | В | Std. Error | Beta | - | |
| 1 | (Constant) | 135.45 | 28.810 | | 4.702 | .000 |
| | | 6 | | | | |
| | Age | -1.928 | .420 | 744 | -4.588 | .000 |

a. Dependent Variable: imp.mrm

4.1.9 Rehabilitation services after discharge from inpatient rehabilitation

4.1.9. 1 Occupational therapy After Discharge

As presented in table 4.33 82% of the sample received OT services while 18% did not receive the

OT service.

Table 33 Decribtive statistics of ocupational therapy after discharge

| ΟΤ | | | | | | | | |
|---------|--------|-----------|---------|---------------|--------------------|--|--|--|
| | | Frequency | Percent | Valid Percent | Cumulative Percent | | | |
| Valid | no | 50 | 82.0 | 100.0 | 100.0 | | | |
| Missing | System | 11 | 18.0 | | | | | |
| Total | | 61 | 100.0 | | | | | |

4.1.9.2 Psychological support therapy After Discharge

As presented in table 4.34 82% of the sample received psychological support services while 18% did not receive the psychological support

Table 34 Decribtive statistics of psychological support after discharge

| Psychological | | | | | | | | |
|---------------|----|-----------|---------|---------------|--------------------|--|--|--|
| | | Frequency | Percent | Valid Percent | Cumulative Percent | | | |
| Valid | no | 50 | 82.0 | 100.0 | 100.0 | | | |

| Missing | System | 11 | 18.0 | |
|---------|--------|----|-------|--|
| Total | | 61 | 100.0 | |

4.1.9.3 Speech therapy After Discharge

As presented in table 4.35 82% of the sample received speech services while 18% did not receive

the speech therapy service

| .Speech therapy | | | | | | | | | |
|-----------------|--------|-----------|---------|---------------|--------------------|--|--|--|--|
| | | Frequency | Percent | Valid Percent | Cumulative Percent | | | | |
| Valid | no | 50 | 82.0 | 100.0 | 100.0 | | | | |
| Missing | System | 11 | 18.0 | | | | | | |
| Total | | 61 | 100.0 | | | | | | |

Table 35 Decribtive statistics of speech therapy after discharge

4.1.9.4 Physiotherapy After Discharge

As presented in table 4.36, 57% of participants did not receive physiotherapy per week, 2 patients received once a week, 6 received twice a week, 9 received 3 times a week.

Table 36Decribtive statistics of Physiotherapy after discharge

| how many times a week received physiotherapy | | | | | | | | | |
|--|---|-----------|---------|---------------|-----------------------|--|--|--|--|
| | | Frequency | Percent | Valid Percent | Cumulative Percent | | | | |
| Valid | 0 | 35 | 57.4 | 67.3 | 67.3 | | | | |
| | 1 | 2 | 3.3 | 3.8 | 71.2 | | | | |
| | 2 | 6 | 9.8 | 11.5 | 82.7 | | | | |
| | 3 | 9 | 14.8 | 17.3 | 100 | | | | |

| | Total | 52 | 85.2 | 100 | |
|---|-------|---------|---------|---------|-------------------|
| | Ν | Minimum | Maximum | Mean | Std. Deviation |
| how many times a week received physiotherapy | 52 | 0 | 3 | 0.7885 | 1.21003 |
| how long were the sessions | 17 | 45 | 60 | 54.7059 | 7.38888 |
| Valid N (listwise) | 0 | | | | |

4.1.10 Why you did not take physiotherapy or rehabilitation

As shown in tables (37,38,39) using stepwise regression, a statistically significant model (p< 0.05) showed that sensory neglect was the main predictors of using physiotherapy services on follow up , with a model del explaining around 9% % of the variation in the 10 MWT in between discharge and follow up.

Table 37 stepwise regression for predictors of using physiotherapy

| Model Summary ^b | | | | | | | | |
|----------------------------|-------|----------|------------|----------------------------|--|--|--|--|
| Model | R | R Square | Adjusted R | Std. Error of the Estimate | | | | |
| | | | Square | | | | | |
| 1 | .298ª | .089 | .070 | 1.16668 | | | | |

a. Predictors: (Constant), Sensory extension test for neglectb. Dependent Variable: how many times a week recived

physiotherapy

Table 38 Anova For the stepwise regression model

| ANOVA ^a | | | | | | | | | |
|--------------------|----------|----------------------|----|-------------|-------|-------------------|--|--|--|
| Model | | Sum of df Squares | | Mean Square | F | Sig. | | | |
| 1 | Regressi | 6.616 | 1 | 6.616 | 4.861 | .032 ^b | | | |
| | on | | | | | | | | |
| | Residual | 68.057 | 50 | 1.361 | | | | | |
| | Total | 74.673 | 51 | | | | | | |

a. Dependent Variable: how many times a week received physiotherapy

b. Predictors: (Constant), Sensory extension test for neglect Table 39 Coefficients of the regression model

| Coef | Coefficients | | | | | | | | | |
|-------|---------------------------------------|-------------|--------------|-------------|-------|------|--|--|--|--|
| Model | | Unstandard | ized | Standardize | t | Sig. | | | | |
| | | Coefficient | Coefficients | | | | | | | |
| | | | | Coefficient | | | | | | |
| | | | | | | | | | | |
| | | В | Std. Error | Beta | | | | | | |
| 1 | (Constant) | 352 | .542 | | 650 | .519 | | | | |
| | Sensory extension test for neglect | .989 | .448 | .298 | 2.205 | .032 | | | | |

a. Dependent Variable: how many times a week received physiotherapy

we need to know at what age where the decline started ??and what the gender was ?

1.1.11 Gender and age categories variation of improvement

Female

Gender

As presented in table (40) gender was not a significant variable for any of the outcome measure at follow up (P > 0.05)

| | Gender | Ν | Mean | Std. Deviation | Std. Error Mean |
|----------------|--------|----|---------|----------------|-----------------|
| Follow10MWT | Male | 38 | .1632 | .31595 | .05125 |
| | Female | 12 | .0708 | .24537 | .07083 |
| Follow6MWT | Male | 38 | 81.5789 | 156.52521 | 25.39174 |
| | Female | 12 | 33.3333 | 115.47005 | 33.33333 |
| Follow up MRMI | Male | 16 | 19.0000 | 16.67733 | 4.16933 |

3

28.3333

17.61628

10.17076

Table (40) Independent sample t test for gender differences upon outcomes

Age categories

total

Age as shown as in table 41, contributed to less improvement and prognosis at follow up. Where with more age les prognosis was achieved (p > 0.05)?

Table 41: Anova test for age categories upon different outcome measures

ANOVA

| Sum of | df | Mean | F | Sig. |
|---------|----|--------|---|------|
| Squares | | Square | | |

| Follow10MW | Between Groups | 1.184 | 2 | .592 | 8.563 | .001 |
|-------------------------|-------------------|-------------|----|------------|-------|------|
| Т | Within Groups | 3.249 | 47 | .069 | | |
| | Total | 4.433 | 49 | | | |
| | Between Groups | 264261.438 | 2 | 132130.719 | 7.666 | .001 |
| FOILOWOIVIWI | Within Groups | 810138.562 | 47 | 17236.991 | | |
| | Total | 1074400.000 | 49 | | | |
| Follow up MRMI total | Between Groups | 1814.010 | 2 | 907.005 | 4.537 | .027 |
| | Within Groups | 3198.727 | 16 | 199.920 | | |
| | Total | 5012.737 | 18 | | | |

4.2 Discussion

The study showed that the number of males is higher than the females, where the percentage of males 70%. and the females were 29.5%, this finding contradicts with the findings of Appelros P. et al (2009) that showed that the incidence of stroke was higher in females than males. This variation may not necessarily reflect a variation in gender incidence, but this may reflect a gender difference in use of care related to males versus females.

The mean age of participants in this study was around 63 years, this mean age reflects a younger age than the mean stroke, age reported by the study of the study of Appelros (2009) who reported an average age of 68-72 years old. This increase in international age of incidence of stroke may be justified by the better health services and screening on developed countries , and it is younger than the mean age reported by sweileh et al (2008) that reported an average age of stroke of 69 years., and Amro(2018) that reported average age of 67 years. This variation may be attributed to the fact that Sweleh in his research has included both 1st ever stroke, and recurrent strokes in his study.

This average also indicates the importance of investigating current and recent epidemiology of stroke in Palestine in order to decrease the stroke incidence, or increase the age of stroke if it has to

be. Through the concentration on decreasing the risk profile of stroke risk factors, which opens an opportunity for future research to investigate this scope of stroke research.

The majority of the patients had ischemic stroke (73.8%) this result is consistent with the findings of Sridharan,S.E. et al (2009), who reported the ischemic stroke parentage to be as 74>8%, of the different types of stroke, this percentage is also consistent with other international statistics about the percentage of Ischemic chemic stroke versus Hemorrhagic strokes around the world.

The percentage of neglect was 19.7%, which mean that the majority of patient had a negative result of sensory extension test. And 55 of the patients suffering from urinary incontinence. Both findings actually are representing an indicator of severity of stroke, as the it is well known that the essence of neuroplasticity in rehabilitation is depending on the sensory motor experiences that patients may feel and perform, during functional rehabilitation and training of ADL, where in patients with sensory neglect, the prognosis and the stroke rehabilitation outcome could be challenging, this argument was supported by Chen (2015) who spatial neglect is a negative predictor of rehabilitation outcome

More Half of our participants had diabetes, and increased cholesterol, and cardiovascular diseases (including hypertension), this high prevalence of CVD supports the argument of Suzuki .et al., (2011) about the significance of CVD as a predictor of stroke. And reflects a high-risk profile, that still threats the participants in a future recurrent stroke, and it highlights the importance of proper medical follow-up to prevent tis recurrence, which in its turn, will affect stroke prognosis after discharge from the inpatient rehabilitation setting.

In terms of period between stroke and rehabilitation, there was a delay in the starting point of rehabilitation after stroke, as more than 50% of our participants had been coming to the rehabilitation in the inn patient rehabilitant setting in periods between 8 – more than 14 weeks, while literature supported early rehabilitation as a predictor of a better prognosis in stroke rehabilitation outcome as was reported by Coleman (2017) as having the rehabilitation starting within the first 2 weeks as an optimal period for starting rehabilitation. this delay in the start of rehabilitation may affect the prognosis, since the patients may develop pathological patterns, and secondary complications may start to evolve, making proper prognosis more challenging

In terms of the rehabilitation period it sems that there is a big variation in terms of length of stay category in the inpatient rehabilitation seating, as only less than quarter of the patients stayed for periods above 12 weeks, with around 23% of the patients stayed for less than 5 weeks, which is a very short period of rehabilitation, tat should be extended for further periods and longer length pf stay according to different literature from different countries where it may be a round 43 days as reported by Feigenson(2005). Also, in terms of intensity of inpatient rehabilitation it seems that there is a fair distribution of sessions of physiotherapy per week where 75% of the participants received around 6-10 sessions- more than 11 sessions per week, which is as reported by Jette (2005) a positive predictor of stroke rehabilitation, in terms of weekly intensity. And this may be one of the main reason behind the motivation to use the inn patient rehabilitation, aiming to the ability to receive more intensive physiotherapy intervention than in other settings, where severity could prevent those patients from the ability to receive such intensity of services .

On follow up of the patients the average days between discharge and follow up was 441 days, which is around 1 year and 3 months, this extended period of follow up of stroke patients, was dictated by by the fact of the COVID19 restrictions of movement, that had obligated extended period of follow up, during which we found that there were 1/5 0f those patients (19.7%) already were dead by this time, with an average of death of 6 months after being discharged from Inpatient rehabilitation setting. This percentage of loss of patients is which is less than the death percentage after 1 year of stroke that was reported by Jorgensen (1999) that was reported as 32%. This percentage in tie study of Jorgensen was reported as 1 year after stroke, while in our study the follow up was based on after discharge from inpatient setting. As tis percentage might be accepted for an extended period after stroke .

Regarding the major question of this thesis related to the current functional status of stroke patients compared to their own functional status at discharge, the outcomes showed a statistically significant decline in the follow up, of 6MWT decline from 297.4 to 70.0, 10MWT decline from .5206 to .1410, and MRMIT decline from 24.74 to 20.473. and this may be the most significant value and findings of this study. this decline can be understood and justified by the fact of loss of opportunity to get proper rehabilitation in out of the inpatient setting, represented in the diversity of rehabilitation services in terms of type of services (OT, Pt, Speech, and psychological counselling) and in terms of intensity. As those services my be challenged by the fact of severity f strokes preventing patients from going outside the home to receive them and on the other hand the expensive cost of such services that may be challenging for stroke unemployed patients to afford. This finding is consistent with the findings of Granger et all (1992) who reported functional decline of stroke patients after discharge.

The decline in the 3 outcome measures used in this research, was mainly predicted by age and sensory neglect. For the 6MWT and the 10 WT, and by the age alone on the MRI. This finding is pointing towards a dynamic variable which= is age, that is increasing with time, times the continuous impairment after stroke, which may be accompanied by the development of further secondary complications related to increased tone, increased possibility of beds sores, shortening, stiffness, and further complications of bed rest. In addition to the sensory neglect that represents a severity form one point view, and it also represents a hinder of a proper rehabilitation that depends largely on sensory motor experience, this also can be justified by the lack of rehabilitation services targeting the prevention of such complications, and developing the neuroplasticity leading to better prognosis in those patients. As it was obvious that there was a severe decline not just on functional abilities, but also in the level of rehabilitation services received after discharge from the inpatient rehabilitation setting. These findings support the conclusions of predictors of functional status of stroke as Age and Severity reported by Keren O, et al, (2004); Saxena, S at all (2006. And contradicts with Bode R. et al (2004) who concluded that the length of stay was a positive predictor of a better self-care and functional outcome. At the same time, it supports the findings of. Chen et all in (2015) that stated that spatial neglect is a negative predictor of stroke rehabilitation outcome. One final point to be mentioned here that studies looked at functional outcome of stroke rehabilitation, usually investigated tis outcome in an average of 1 year after stroke, while this study highlighted the outcome by 1,3 years after discharge from In-patient rehabilitation.

Another significant finding of this study, that there were no hours of speech therapy, occupational therapy, and psychological support for patients after discharge from the Inpatient setting, and in relation to physiotherapy, the fact that 57% of participants did not get any rehabilitation service.

What is the in terms of the 3rd question of this study regarding the stroke patients use of care and rehabilitation settings after discharge from the inpatient rehabilitation, finding that more than half of our patients did not receive any physiotherapy, and none of them got any chance to receive OT, speech or occupational therapy is considered an alarming singe , and sheds light on the shortages of services or their affordability, and lights a red light regarding the functional abilities of those stroke patients. This lack of services and shortage of physiotherapy, may justify the decline in functional status of patients after discharge from inpatient facility, and could highlight economic challenges, and shortages of services in community level , which underlines the importance of raising awareness about the importance of such services after discharge, and the importance of social welfare and health department involvement in making those services available and affordable for stroke patients in need for those services . and it seems that the more severe that patient is, the more possibility he/she will be getting a physiotherapy. Which comes consistent with findings of Amro et al (2017) the predictors of using or using physiotherapy care was dependent on both age and severity .

The last question in this study was regarding the motivation and main factors affecting the stroke outcome among stroke patients after discharge from inpatient rehabilitation, which was summarized by two main indicators related to the severity of the stroke, and to the age of the patients, where with the increase of both it seems that the chance to receive such a services declined, may be it would be connected with the possibility of family and care givers loosing hope in further development and prognosis of their patients , which is consistent with findings of Amro et al (2017), where sevirty at baseline and age were 2 main indicators for loss of use of rehabilitation services.

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Chapter 5 conclusion and recommendation

5.1 Conclusion

5.2 Recommendation

5.1 Conclusion

This prospective cohort study, investigated the functional status and use of care of patients discharged from Bethlehem Arab society, based on their discharge summary as baleen for this study. Same outcome measures that were used at discharge where reimplemented at follow up including Modified Rivermead mobility index, 6 MWT, and 10 seconds walking test.

After the patients were followed up the researcher found that that after an average of 1.3 years around one out of five were dead, patient's functional ability declined as compared by their discharge notes and as tested by 10MWT, 6MWT and MRI. Patients did not receive any kind of speech, occupational or psychological therapy, and more than half did not receive any physiotherapy, the main motivation of using physiotherapy services was the severity represented by sensory neglect in this study, and age, where with both variables predicted less use of care with older ages and more severe cases . here was a double male using the in patient rehabilitation setting as compared to female. But this may represent the variation in use of care rather than variation of incidence of stroke in Palestine.

Gender was contributing to any of the variations of the outcome measures between discharge and follow up, while age was a main determinant of decline of functional status on all outcome measures.

5.2 Recommendations

Based on the findings of this study, the researcher recommends the following

1. For further researchers

- a. Investigating the availability of the other rehabilitant services in the community level (PT, speech, and psychological support)
- b. Investigating the reasons behind delay in inpatient admissions

2. For clinicians and physiotherapist

- a. Raising awareness about the importance of home based and outpatient interventions after discharge from the inpatients setting
- b. Training the family to be an active member in the rehabilitation process f the patients with stroke after discharge from inpatient rehabilitation setting as a source of affordable, motivated and available source of rehabilitation
- c. Stressing the importance of early rehabilitation start, as there was a delay for our patient's admission to inpatient rehabilitation
- d. Strengthen the reprograms of community-based rehabilitation, to provide guidance and clinical support for care givers and community volunteers helping stroke patients after discharge

e. Calling for further investment in the inpatient rehabilitation institutions, as the there was a delay for the admissions, and a fast discharge for many patients

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Appendixes

Appendix 1 Consent form

عزيزي المشارك /المشاركة:

توقيحك انذاء على نموذج الموافقة هذا هو بموجب موافقة مكتوبة وموقمة على المشاركة في دراسة بحقية التيبتقوم بها الباحثه أ. عبد المهدي رضوان "تكثير تقنية بريدم للعلاج اليدوي مع الحركة بالمقارنة بالإبر الجافة المعتملة شبه المنحرفة في علاج اضطرابات الرقب النتائج الوظيئية المتوقعة لمرضى الجلطات الدماغية المقيمين بمراكز التأاهيل بد انتهاء فترة اقامتهم داخل المستشغيات ". و هو إقرار بإنه قد تم رح أهداف البحث و طريقة المتحص و التخل العلاجي للبحث، وانه قد ثم شرح حقوقك المتضمنة.

- سرية المطومات التي تصرح بها وعدم إطلاع اي شخص عليها و تغزينها في مكان امن لا يصل اليه سرى الباحث.
 - إخفاء هوية المشارك في تحليل البحث والنتائج.
 - استخدام المعلومات للاغراض العلمية فقط.
- حرية إنسحابك في اي وقت من الدراسة ومن دون الحاجة لإبداء الأسباب ودون اية عواقب شخصية او مالية.
 - حقك في الإطلاع على نتيجة فحوصائك ونتائج البحث النهائية.

وأنه في حال كان لديك أسنلة حول الدراسة او حول اي معلومة متعلقة بها, برجى الاتصال بالباحث: عبد المهدي رضوان على *ولم الثلفون:* 5987787789

موافقة المشارك

لقد تم وصف الدراسة البحثية لى شفيها، وبما فع المطومات المدرجة اعلام، وأوافق على المشاركة بهذه الدراسة البحثية، سوف أحصل على نسخة موقمة من هذا النموذج للاحتفاظ بها في سجلائي، أوافق على المشاركة بهذة الدراسة.

| الرباعي | المشارك | اسم |
|---------|---------|-----|
| | | |

توقيع المشارك:_____ التاريخ:_____



جامعة القدس كلية المهن الصحية دانرة العلاج الطبيعي

Informed consent to participate in Research

نموذج الموافقة على المشاركة في البحث

اسم البحث: النتائج الوظيفية المتوقعة لمرضى الجلطات الدماغية بعد انتهاء اقامتهم في مراكز التأهيل

ا**سم الباهث** : عبد المهدي رضوان

| Patient name: | | |
|-------------------|------------------|--|
| Patient code: | | |
| Evaluator name: | | |
| Date of evaluatio | n and signature: | |

Appendix 2 ethical committee approval

Al-Quds University Jerusalem Deanship of Scientific Research



جامعة القدس القدس عمادة البحث العلمي

Research Ethics Committee Committee's Decision Letter

Date: March 13, 2021 Ref No: 175/REC/2021

Dear Dr. Akram Amro,

Thank you for submitting your application for research ethics approval. After reviewing your application entitled "Stroke patients' use of care and functional outcome predictors after discharge from the in-patient rehabilitation settings", the Research Ethics Committee confirms that your application is in accordance with the research ethics guidelines at Al-Quds University.

We would appreciate receiving a copy of your final research report/ publication.

Thank you again and wish you a productive research that serves the best interests of your subjects.

PS: This letter will be valid for two years.

Sincerely,

Suheir Ereqat, PhD Associate Professor of Molecular Biology

Research Ethics Committee Chair

Cc. Prof. Imad Abu Kishek - President Cc. Members of the committee Cc. file

Abu-Dies, Jerusalem P.O.Box 20002 Tel-Fax: #970-02-2791293

research@admin.alquds.edu

أبوديس، القدس ص.ب. 20002 تلفاكس: 2791293-02-970# **Appendix 3 Data collection sheet**



Al – Quds University

Faculty of health professions

Physiotherapy department

Stroke patients' use of care and functional outcome predictors after

discharge from the in-patient rehabilitation settings

النتائج الوظيفية المتوقعة لمرضى الجلطات الدماغية بعد إنتهاء اقامتهم فى مراكز التأهيل

الدراسة تخص رسالة ماجستير للطالب عبد المهدي رضوان من دائرة العلاج الطبيعي في جامعة القدس

| Participant Name: | |
|--------------------|--|
| Participant Code: | |
| Date of Signature: | |

Section I: Personal Data

| 1. | Name of participant: |
|----|--------------------------|
| 2. | Phone number: |
| 3. | Gender : ■ Female ■ Male |
| 4. | Age: |
| 5. | Education |

• None

| • Elementary sc | hool | | |
|-----------------------------|---------------------|--------------|------------|
| High school | | | |
| • College | | | |
| Graduate / pre | ofessional degree | | |
| 6. Occupation | | - | |
| 7. Number of family me | mbers (spouse an | nd children) | |
| 8. Type of stroke | hemorrhagic | 2 | □ ischemic |
| 9. Date of the stroke | | | |
| 10. Duration of in-patien | t rehabilitation in | a days | |
| 11. Recurrent stroke | 🗖 yes | □No | |
| 12. If the patient died , d | ate of death | | |
| a. days of death | after discharge _ | | |

Section II: use of care at outpatient setting

| Outcome measures | How many times a | For how many | Duration |
|--------------------------|------------------|--------------|-----------------------|
| | week | weeks | (length per session) |
| Physiotherapy | | | |
| Occupational therapy | | | |
| Speech therapy | | | |
| Psychological counseling | | | |

Section III: use of care at home rehabilitation setting

| Outcome measures | How many times a | For how many | Duration |
|--------------------------|------------------|--------------|-----------------------|
| | week | weeks | (length per session) |
| Physiotherapy | | | |
| Occupational therapy | | | |
| Speech therapy | | | |
| Psychological counseling | | | |

Section III: family involvement in exercises

Who was involves

| □Spouse | daughter | □ son | □ brother | □ sister |
|---------|----------|-------|-----------|----------|
| | | | | |

Did any of the previously mention relatives receive any training

□Yes □no

If yes who provided the training ______

| | Duration | How many | How many times | For how many |
|------------|--------------------------|----------------|----------------|--------------|
| | (length per session) | sessions a day | a week | weeks |
| Exercise / | | | | |
| Yes / no | | | | |

Section IIII: self-performed exercises

| | Duration | How many | How many times | For how many |
|------------|--------------------------|----------------|----------------|--------------|
| | (length per session) | sessions a day | a week | weeks |
| Exercise / | | | | |
| Yes / no | | | | |

Section III: Outcome Measures

| Outcome measures | At discharge | Now at home |
|--------------------------|--------------|-------------|
| | | |
| Barthel index | | |
| 10 meters walking test | | |
| Rivermead mobility index | | |

Appendix 4. 10 meter Walking test

Timed 10-Meter Walk Test

General Information:

- individual walks without assistance 10 meters (32.8 feet) and the time is
- measured for the intermediate 6 meters (19.7 feet) to allow for acceleration and deceleration
 - start timing when the toes of the leading foot crosses the 2-meter mark
 - o stop timing when the toes of the leading foot crosses the 8-meter mark
 - assistive devices can be used but should be kept consistent and documented from test to test
 - if physical assistance is required to walk, this should not be performed
- can be performed at preferred walking speed or fastest speed possible
 o documentation should include the speed tested (preferred vs. fast)
- collect three trials and calculate the average of the three trials

Set-up (derived from the reference articles):

- measure and mark a 10-meter walkway
- · add a mark at 2-meters
- · add a mark at 8-meters



Patient Instructions (derived from the reference articles):

- Normal comfortable speed: "I will say ready, set, go. When I say go, walk at your normal comfortable speed until I say stop"
- Maximum speed trials: "I will say ready, set, go. When I say go, walk as fast as you safely can until I say stop"

Downloaded from www.rehabmeasures.org

Page 1

Appendix 5: Six minutes walking test

6 Minute Walk Test Score Sheet

Subject Name/Number:

Assistive Device and/or Bracing Used:_____

Date:_____

Distance ambulated in 6 minutes: ______ Date: _____

Distance ambulated in 6 minutes: _____ Date: _____

Distance ambulated in 6 minutes:

Date:_____ Distance ambulated in 6 minutes: ______

Appendix 5 : Modified Rivermead Mobility Index RMI

| RIVERMEAD MOBILITY | PATIENT'S NAME: |
|---|---------------------------|
| INDEX | |
| COPVRIGHT: RIVERMEAD REHABILITATION CENTRE, ABINGDON ROAD, OXFORD OXI 4XD. (Reproduce freely but acknowledge source.) | HOSPITAL NUMBER: |
| Score 0 = No 1 = Yes | DATE |
| 1. Do you turn over from your back to your side with | out help? |
| 2. From lying in bed, are you able to get up to sit on t the bed on your own? | he edge of |
| Could you sit on the edge of the bed without holdin 10 seconds? | ng on for |
| Can you (using hands and an aid if necessary) star a chair in less than 15 seconds, and stand there for | nd up from 15 seconds, |
| 5. Observe patient standing for 10 seconds without an | ny aid. |
| Are you able to move from bed to chair and back any help? | without |
| Can you walk 10 metres with an aid if necessary by standby help? | ut with no |
| 8. Can you manage a flight of steps alone, without hel | p? |
| 9. Do you walk around outside alone, on pavements? | |
| 10. Can you walk 10 metres inside with no caliper, spl and no standby help? | int or aid |
| If you drop something on the floor, can you manag metres to pick it up and walk back? | e to walk |
| 12. Can you walk over uneven ground (grass, gravel, d or ice) without help? | lirt, snow |
| 13. Can you get in and out of a shower or bath unsuper wash yourself? | rvised, and |
| 14. Are you able to climb up and down four steps with using an aid if necessary? | no rail but |
| Could you run 10 metres in 4 seconds without limp (A fast walk is acceptable.) | ping? |
| 1 | IOTAL |