



CORRELATION OF PHYSICAL IMPAIRMENT AND DISABILITY ON QUALITY OF LIFE IN SUBACUTE AND CHRONIC STROKE PATIENTS: A CROSS SECTIONAL STUDY

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ABSTRACT

BACKGROUND: Stroke is the sudden loss of neurological function caused by an interruption of blood flow to brain. Chronic disabilities related to impairments in body structure and function, such as changes in motor function, limitation in certain activities, changes in mobility, increased risk of falling during functional activities, and restriction of participation. It is also one of the leading causes of functional impairment. Stroke results in Physical Impairment and Disability and also affects the level independence in Activities of Daily Living and Quality of Life.

OBJECTIVES: To find a correlation of Physical Impairment and Disability on Quality of Life in Subacute and Chronic Stroke.

METHODOLOGY: This cross-sectional study included 55 patients of Subacute and Chronic stroke according to inclusion and exclusion criteria. Then Physical Impairment was evaluated by Chedoke McMaster Stroke Assessment impairment inventory (CMSA), Disability by Chedoke McMaster Stroke assessment activity inventory (CMSA) and Chedoke Arm and Hand Inventory (CAHAI) and Quality of Life was evaluated by Stroke Impact Scale 3.0 (SIS 3.0). Statistical analysis was done by using SPSS software (version 15). Spearman's Rank correlation test was applied.

RESULT: Spearman's Rank correlation showed highly significant correlation in Subacute and Chronic Stroke between CMSA, CAHAI and SIS 3.0 as their p values were <0.01.

CONCLUSION: The study reveals that the Physical Impairment, Disability as well as Quality of Life are positively correlated with each other.

Keywords: Physical Impairment, Disability, Quality of Life, Subacute stroke, Chronic stroke

INTRODUCTION

Stroke was defined by World Health Organization (WHO) criteria as 'rapidly developing clinical signs of focal, at time, global disturbance of cerebral function lasting for more than 24 hours or leading to death with no apparent cause other than vascular origin'¹

The physical effect of stroke is variable and may include impairment in motor, emotional and sensory systems, language, perception and cognitive function.² Secondary impairments involve system of body other than the neurological system and composite impairments are the combined effects of the primary and secondary impairments, motor recovery treatment and behavioral factor.³ Because of impairment, the affected person may be unable to carry out certain activities considered normal for his age, sex etc.⁴

Impairments that interfere with functional movements are: Changes in muscle strength results in paralysis or weakness of muscles. Changes in muscle tone can be hypotonicity and hyper-tonicity or spasticity, Abnormal synergy pattern, Abnormal reflexes, Changes in muscle activation cause inappropriate activation of muscles, difficulty in sequencing the movement, inappropriate timing

of firing and altered force production by muscles, Changes in sensation (contralateral side), Changes in muscle and soft tissue length and Pain.⁵ Weakness (paralysis) is found in 80 to 90 percent of all patients after Stroke and is a major factor in Disability.

WHO defines quality of life as an individual's perception of their position in life in the context of the culture and value system in which they live and in relation to their goals, expectation, standard and concerns. QOL is a broader instrument who measure quality as well as quantity of the further life.⁶

Measuring QOL can be used to distinguish different patients, to predict patient outcomes, and to evaluate therapeutic interventions. QOL instruments can be divided into generic and disease specific scales: generic scale address general health concept not specific to any age, disease or treatment, enable comparisons of the relative burden of different disease and the relative benefits of different treatments.⁶ Disease specific scales do not allow cross-disease comparison, but may be more sensitive to a specific population.⁷ Higher QOL is associated with greater independence in daily living and mobility, a higher education level and better socioeconomic level and social support. Conversely worse QOL is associated with anxiety, depression and fatigue.

AIMS OF THE STUDY

To find out correlation of physical impairment and disability on Quality of life in subacute and chronic stroke patients.

METHODOLOGY

Study Design: Cross sectional study

Study Population: Patients with subacute and chronic stroke (Duration of 1-6 months: Subacute stroke and >6 months: Chronic stroke)

Study Settings: Hospital and Physiotherapy OPD of Surat city.

Study Duration: 1 year

Study Size: Sample size was calculated by using OpenEpi, Version 3 software at 95% confidence level with 4.87% prevalence. Calculated sample size was 55

Sampling Method: Convenient Sampling

INCLUSION CRITERIA

- Patients with age between 18 to 50 years.
- Duration of stroke > 1 months
- Both male and female patient.
- Had experienced a first-ever stroke.
- Stroke with either side of involvement.
- No severe cognitive impairment (Mini Mental Scale Examination ≥ 24)

EXCLUSION CRITERIA

- Any orthopedic condition which causes impairment or disability.
- Neurological condition other than stroke.
- Unstable vitals.
- Patient who is not willing to be a part of the study.

MATERIALS & METHOD

- Chedoke-McMaster Stroke Assessment form
- Chedoke-Arm and Hand Activity Inventory
- Stoke Impact Scale 3.0
- Paper
- Pen & pencil
- Foot stool
- Pillows
- 2-meter line marked on floor
- Plastic cup
- Stop watch

- Exercise table
- Grab bar
- Chair with arm rest
- Floor mat
- Ball (2.5-inch diameter)
- 1 little plastic pitcher with water
- Ramps
- Curbs
- 200g jar of coffee
- Push-button telephone
- 12"/30cm ruler
- 8.5" × 11" paper
- 250 ml plastic cup
- Wash cloth
- Wash basin

OUTCOME MEASURES

- Chedoke-McMaster Stroke Assessment impairment inventory
- Chedoke-McMaster Stroke Assessment activity inventory
- Chedoke Arm and Hand Activity inventory
- Stroke Impact scale (SIS) version 3.0

PROCEDURE

The data collection will be done in 4 phases **Phase I:** In this phase socio-demographic data were taken. **Phase II:** Stroke Impact Scale will be filled to for assessment of Quality of Life of the patients. **Phase III:** Physical impairment will measure by using impairment inventory of Chedoke-McMaster Stroke Assessment. **Phase IV:** Disability will measure by using activity inventory of Chedoke-McMaster Stroke Assessment form and Chedoke Arm and Hand Activity inventory.

A. Chedoke McMaster stroke assessment impairment inventory:

Chedoke-McMaster stroke assessment assess is a two-part measure made of both a physical impairment inventory and disability inventory. It has six dimensions in impairment inventory each measured on 7-point scale. These dimensions include shoulder pain, postural control, the arm, the leg, and the foot.

1. Shoulder pain

When assessing the stage of shoulder pain, consider any pain that is present and its relationship to functional activities, even those not involving the shoulder or arm. In the Chedoke Assessment, the term, "interfering with function", is defined as "a limitation in the ability to carry out a functional activity thought to be due to the shoulder pain, not due to the paresis of the arm or hand".

Steps in the Shoulder Assessment: 1. ask questions regarding pain and function, 2. test range of motion, and 3. examine the shoulder and scapula.

Start the assessment of shoulder pain by noting the state of the prognostic indicators. These indicators were identified from a pool of 13 variables thought to predict shoulder pain. Through multiple regression analyses we found these indicators to be the most significant.

- The arm is in a low stage of recovery, Stage 1 or 2.
- The scapula is misaligned. It can be elevated, depressed, abducted or adducted.
- Loss of range of shoulder movement with flexion or abduction less than 90°, or external rotation less than 60°.

Observe the position of the scapula and the passive range of motion of the shoulder and based on patient's pain enter the score accordingly.

2. Postural control

Testing begins at Stage 4 for postural control. Standard starting positions are indicated at the top of each page of the Score Form. You may assist a client into the starting position.

Standard Starting Position: No shoes and socks. No standard position. Encourage good sitting posture (i.e., with hips and knees at 90°) during testing when indicated.

3. Stage of Arm

Standard Starting Position: Sitting with the forearm in the lap or supported on a pillow in the lap in a neutral position, wrist at 0° and fingers slightly flexed. Sitting either unsupported over the side of the bed or plinth, or supported in a chair or wheelchair. Feet should be supported. Encourage good sitting posture during testing (i.e., with hips and knees at 90°). Start the assessment at Stage 3.

4. Stage of Hand

Standard sitting position: Sitting with the forearm in the lap, or supported on a pillow, in a neutral position, wrist at 0° and fingers slightly flexed. The client can sit either unsupported on the side of the bed or plinth, or supported in a chair or wheelchair. Feet should be supported. Encourage good sitting posture for testing (i.e., with hips and knees at 90°). Start the assessment at Stage 3.

5. Stage of Leg

Standard starting position: Lying on back with knees bent and feet flat, with hands resting on stomach, shoes and socks off, and pants rolled up. Start assessment at Stage 4.

6. Stage of Foot

Standard Starting Position: No standard position. Test all tasks in one position before the client moves to another position, i.e., in lying before sitting. Encourage good sitting posture (i.e., with hips and knees at 90°) during testing when indicated. Remove socks and shoes. Start at Stage 3 with the client supine.

B. Chedoke McMaster Stroke Assessment Activity Inventory:

The purpose of the Activity Inventory is to assess the client's functional level, not the precise way in which the task is achieved. Therefore, while testing, focus on task accomplishment not quality of movement. A score of ONE is given for any task in which the client requires total assistance, requires the assistance of 2 people, or if it is felt to be unsafe to attempt that task (except for Item 15). Because this assessment is designed to be used in conjunction with the Uniform Data System for Medical Rehabilitation (UDSMR) and the Functional Independence Measure (Adult FIM), a scoring key similar to the Adult FIM is used. Observe each task and score in the boxes provided. Sum the scores to determine the Gross Motor Function Index, the Walking Index, and the total score of the Activity Inventory.

The validity and reliability of postural control in impairment inventory is ($r=0.84, p<0.01$), the arm and hand are ($r=0.95, p<0.001$), the leg and foot have ($r=0.93, p<0.001$) shoulder pain is ($r=0.76, p<0.01$). The total score of impairment inventory shows ($r=0.95, p<0.001$). The total score of Disability inventory ($r=0.79, p<0.05$).

C. Chedoke Arm and Hand Activity Inventory:

The purpose of this measure is to evaluate the functional ability of the hemiplegic arm and hand to perform tasks that have been identified as important by stroke survivors.

Standard starting position Posture: Seated in chair without armrests or in wheelchair with armrests removed, encourage erect posture, feet flat on the floor

- **Height of table:** At the level of the last costal rib
- **Distance from table:** Client's elbow comes to the table edge.

Variations from the standard starting position will be indicated at the top of the task page

Scoring

Score the performance of the affected upper limb using the 7-point Activity scale.

D. Stroke Impact Scale version 3.0

The stroke impact scale (SIS) is a new stroke specific outcome measure that is comprehensive measure of health outcome. The SIS version 3.0, include 59 items and assess 8 domains (strength, hand function, activity of daily living (ADLs)/instrumental activities of daily living (IADL), Mobility, communication, emotion, memory and thinking, participation). SIS performance is self-reported or therapist reported according to the difficulty experienced by the subject.

The domains are unidirectional, have good reliability, and have a wide range of items that capture the difficulties that most individual with stroke experience in physical and role function.

The SIS domain has communication, memory, and emotional domains. These domains may provide additional information in research as well for clinical purpose. SIS version 3.0 has good psychometric characteristic and will be useful in future clinical practice and research.

The SIS has good validity and reliability compared to other quality of life measures of stroke.

ETHICAL CONSIDERATION:

Ethical clearance has given by Human Research Ethics committee, Government Medical College, Surat.

STATISTICAL ANALYSIS

The availed data were tabulated in Microsoft Excel. The statistical analysis was done using SPSS-version 15 software. As the data was not following normal distribution which checked by Kolmogorov-Smirnov test, so non-parametric tests were applied on the data. Spearman's rank correlation tests were used. Level of significance was set at $p < 0.05$ and $p < 0.01$.

Table 1. Descriptive characteristics of different variables of subacute stroke

VARIABLE	MEAN ± STANDARD DEVIATION
IMPAIRMENT	
SHOULDER PAIN	3.82 ±1.86
POSTURAL CONTROL	4.32 ±1.41
ARM	4.39 ±2.34
HAND	3.78 ±2.09
LEG	4.39 ±1.74
FOOT	4 ±2.01
DISABILITY	
UPPER LIMB DISABILITY	44.67 ±29.50
LOWER LIMB DISABILITY	55.25 ±16.34
QUALITY OF LIFE	
STRENGTH	8.32 ±3.41
MEMORY AND THINKING	33.21 ±2.72
MOOD AND EMOTION	33.21 ±5.98
COMMUNICATION	30.89 ±4.65
ADL	28.21 ±11.50
MOBILITY	30.28 ±9.52
HAND FUNCTION	11.17 ±7.67
SOCIAL PARTICIPATION	28.03 ±9.62

Table 2. Descriptive characteristics of different variables of chronic stroke

VARIABLE	MEAN ± STANDARD DEVIATION
IMPAIRMENT	
SHOULDER PAIN	3.55 ±1.60
POSTURAL CONTROL	3.88 ±1.36
ARM	3.33 ±2.11
HAND	3.11 ±2.00
LEG	4.14 ±1.58
FOOT	3.55 ±1.73
DISABILITY	
UPPER LIMB DISABILITY	36.51 ±25.10
LOWER LIMB DISABILITY	53.77 ±18.93
QUALITY OF LIFE	
STRENGTH	6.77 ±3.05
MEMORY AND THINKING	32.44 ±4.43
MOOD AND EMOTION	28.03 ±5.86
COMMUNICATION	28.81 ±6.83
ADL	25.85 ±11.54
MOBILITY	24.55 ±10.02
HAND FUNCTION	9 ±5.64
SOCIAL PARTICIPATION	24.22 ±8.91

Table 3. Correlation between impairment and quality of life in subacute stroke

VARIABLES		r	p -value
SHOULDER PAIN	MOOD AND EMOTION	0.46*	0.03
POSTURAL CONTROL	MOBILITY	0.32	0.08
ARM AND HAND	ADL	0.72	0.6
	HAND FUNCTION	0.84**	0.0004
LEG AND FOOT	MOBILITY	0.68*	0.04

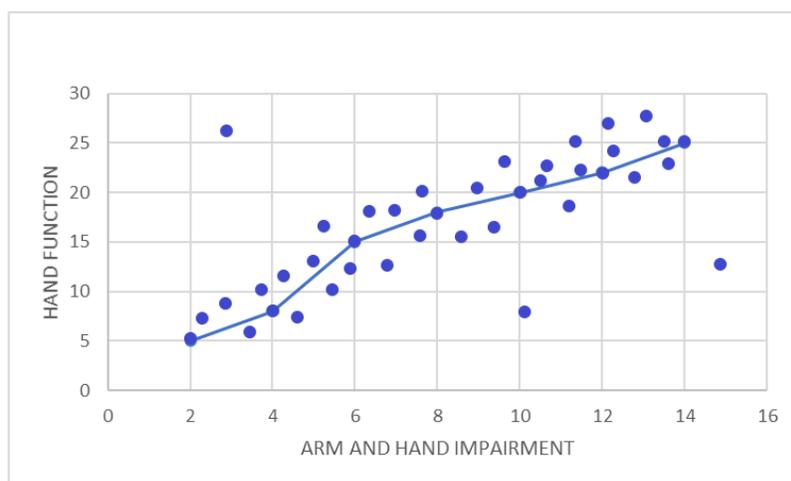
Table 4. Correlation between impairment and quality of life in chronic stroke

VARIABLES		r	p - value
SHOULDER PAIN	MOOD AND EMOTION	0.3	0.11
POSTURAL CONTROL	MOBILITY	0.67**	0.0001
ARM AND HAND	ADL	0.4*	0.036
	HAND FUNCTION	0.73*	0.025
LEG AND FOOT	MOBILITY	0.33**	0.002

*Correlation is significant at the 0.05 level (2 -tailed)

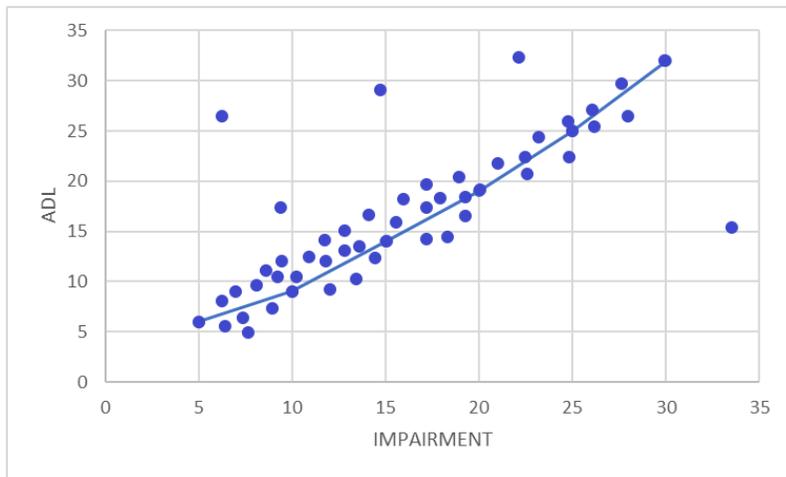
**Correlation is significant at the 0.01 level (2 -tailed)

Graph 1. Correlation between Arm and Hand Impairment with Hand Function in subacute stroke



Graph 1 shows there was positive correlation between arm and hand impairment with hand function in subacute stroke patients. It means as the Score of arm and hand impairment increase then score of hand function would be increase or vice versa.

Graph 2. Correlation between Arm and Hand Impairments and ADL in chronic stroke



Graph 2 shows there was positive correlation between arm and hand impairments and ADL in chronic stroke patients. It means as the score of arm and hand impairments increase then score of ADL would be increase or vice versa.

Table 5. Correlation between Disability and Quality of life in subacute stroke

VARIABLES		r	p -value
UL DISABILITY	HAND FUNCTION	0.34**	0.01
LL DISABILITY	MOBILITY	0.39*	0.04
	SOCIAL PARTICIPATION	0.31**	0.01

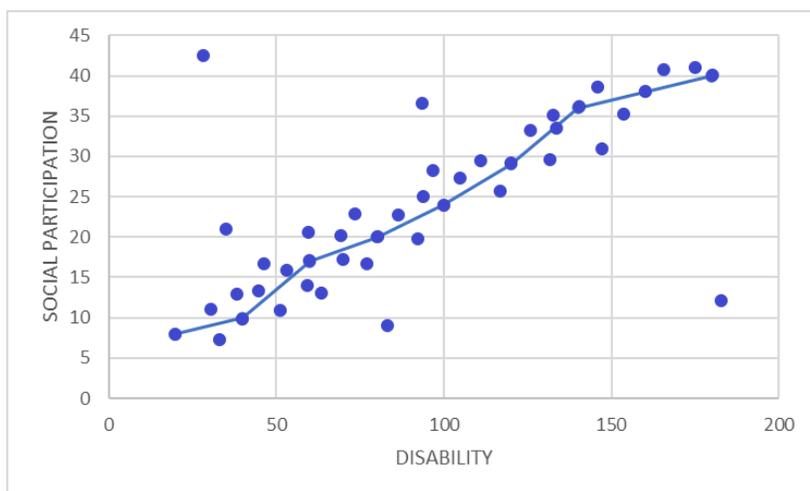
Table 6. Correlation between Disability and Quality of life in chronic stroke

VARIABLES		r	p - value
UL DISABILITY	HAND FUNCTION	0.59**	0.0008
LL DISABILITY	MOBILITY	0.89*	0.05
	SOCIAL PARTICIPATION	0.44**	0.01

*Correlation is significant at the 0.05 level (2 -tailed)

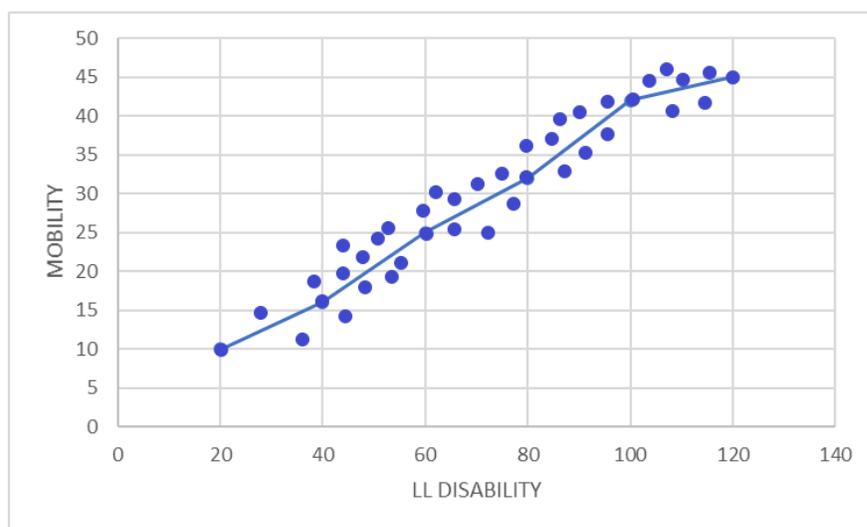
**Correlation is significant at the 0.01 level (2 -tailed)

Graph 3. Correlation between LL Disability and Social participation in subacute stroke



Graph 3 shows there was positive correlation between LL disability and social participation in subacute stroke patients. It means as the score of LL disability increase then score of social participation would be increase or vice versa.

Graph 4. Correlation between LL Disability and Mobility in chronic stroke



Graph 4 shows there was positive correlation between LL disability and mobility in chronic stroke patients. It means as the score of LL disability increase then score of mobility would be increase or vice versa.

DISCUSSION: Result of the present study support that was positive correlation to physical impairment and disability on Quality of Life in subacute and chronic stroke patients. The patients who had good physical performance showed good Quality of Life.

LIMITATIONS: Although findings were significant, but few limitations exist: • Only patients with subacute stroke and chronic stroke were taken into the study. • Cognitive impairments also have an effect on Quality of Life, but it was not considered in the study.

CLINICAL IMPLICATION: This study will help in detail assessment of specific component of the physical impairment and disability. This will help in goal setting and specific treatment protocol including physical impairment and disability which help to improve functional capacity and functional independence among stroke patients so, this detail study will help to improve physical function and QOL among stroke patients.

FURTHER SCOPE OF STUDY: This study should be carried out with larger sample size and by considering cognitive factor which has a big role in affecting the quality of life in stroke population among Indian set up.

CONCLUSION: The result of the present study on 28 Subacute and 27 Chronic Stroke patients have rejected the Null hypothesis of this study, so accepting the Alternative hypothesis we can state that there is significant correlation of physical impairment and QOL in subacute and chronic stroke and correlation of disability and QOL in subacute and chronic stroke patients.

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