e-ISSN: 0975-1556, p-ISSN:2820-2643

Available online on www.ijpcr.com

International Journal of Pharmaceutical and Clinical Research 2023; 15(8); 1673-1679

Original Research Article

Effects of Demographic Profiles on Stroke Rehabilitation Outcomes

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Received: 10-12-2022 / Revised: 30-12-2022 / Accepted: 24-01-2023
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Conflict of interest: Nil

Abstract:

Introduction: This paper aims to explore the impact of demographic profiles on the rehabilitation of stroke patients. It seeks to understand how age, gender, education, socioeconomic status, and stroke characteristics affect patient recovery.

Methods: The study encompassed 60 patients undergoing therapy for one month, subsequently evaluated after six months. Variables such as age, gender, education level, socioeconomic status, and stroke specifications were considered in the research.

Results: Findings demonstrated significant improvements among younger patients, male patients, and those with a high level of education. Socioeconomic status also influenced the progress rate within the rehabilitation program. Patients with right hemiplegia and hemorrhagic stroke showed a higher level of recovery compared to the rest.

Conclusion: Our results underscore the necessity to consider demographic factors when planning rehabilitation goals. Future research is suggested to reinforce these findings and provide more comprehensive strategies for stroke rehabilitation.

Keywords: Demographic, Stroke, Rehabilitation, Outcomes

Introduction

No two stroke patients are the same. Every patient demands a different level of approach from the rehabilitation team. This of course is very individualized and is influenced by many important patient characteristics. Demographic profiles, including age, gender, race/ethnicity, educational status, socioeconomic status of the patient, laterality, cause of stroke and duration of stroke, have been found to impact rehabilitation outcomes in stroke patients.[1-12]

Several studies have investigated the impact of demographic variables on stroke rehabilitation outcomes. For instance, the duration of stroke, or the time elapsed since the onset of symptoms, is another important factor. Patients who receive early rehabilitation intervention typically have better outcomes compared to those who start later [13]. Age has been identified as a significant factor influencing functional recovery after stroke. Older individuals tend to have a slower and more limited recovery compared to younger patients [14]. Laterality of stroke has been studied in relation to stroke rehabilitation outcomes[15][16]. Furthermore, gender has also been found to play a role in stroke rehabilitation outcomes. Women generally have poorer recovery and higher disability rates compared to men, possibly due to hormonal differences or differences in lifestyle factors [17]. Other demographic variables such as socioeconomic status has been shown to affect the accessibility of healthcare services, particularly in rural areas [18]. Previous research has indicated that individuals with lower income and educational attainment in rural areas have reduced access to essential stroke care, leading to more severe outcomes and disabilities [18]. It is also worth mentioning that the cause and duration of stroke play a crucial role in rehabilitation outcomes [20]. For example, a stroke caused by a clot (ischemic stroke) may have different rehabilitation needs compared to a stroke caused by bleeding in the brain (hemorrhagic stroke) [19].

Overall, the demographic profile of a stroke patient can significantly influence rehabilitation outcomes. It is essential for healthcare providers and rehabilitation teams to consider these factors when developing individualized treatment plans for stroke patients.

Subjects And Methods

The study aimed to evaluate the impact of various demographic factors on the rehabilitation outcomes of stroke patients in terms of.

1. Motor recovery (Brunstorms Score BS) [21][22].

2. Spasticity (Modified Ashworths Score MAS) [23].

3. Self-care items of functional independence (Barthels Index BI) [24] [25] [26] [27].

Type of study: Prospective Observational study. Inclusion Criteria: 1 First episode of unilateral stroke of 3 months duration.2. Brunnstrom score between stages I and IV for the upper extremity.3. Normal hand function before the stroke.4. Willingness to participate in the study. Exclusion criteria: 1. Any deviation from the inclusion criteria. 2. Patients having difficulty in attending therapy sessions on daily basis. Data Collection: Demographic data including age, gender, race/ethnicity, educational status, socioeconomic status, laterality of stroke, cause of stroke, and severity of stroke were collected for all participants. Data on motor recovery, spasticity, and self-care items of functional independence were also collected for each patient at the 0, 1 and 6 months follow-up. Data Analysis: Descriptive statistics were used to summarize the demographic characteristics of the study population. The study was conducted in the outpatient department of PMR SKIMS. Patients were given comprehensive rehabilitation for a duration of one month every day for 3 hours on a 6 days per week basis. After completion of data collection from each patient enrolled in the study the data was analyzed with SPSS version 18 using. Repeated measure ANOVA. Furthermore, multivariate analysis was performed to identify the independent effects of each demographic variable on rehabilitation outcomes.

Results

All patients of stroke with hemiplegia were assessed according to inclusion and exclusion criteria. 70 patients qualified for the study and were randomly allocated into either study or control group. Of the total of 70 patients enrolled in the study, 60 patients completed one month of therapy and all of those who completed one month came for the third evaluation at 6 months.

Table 1

Total patient enrolled	70
Lost to first follow-up	10
Lost to second follow-up	0
Completed total study period	60

Age: The age range of the study population was diverse, ranging from 19 to 82 years old, with a mean age of 47.97±13.99. Maximum number of patients were in middle age (40-60yrs), followed by young stroke (<40years) and least were more than 60 years.

Table 2:

AGE	Number(%)
Young Stroke < 40 Yrs	10 (16.6%)
Middle Age 40-60 Yrs	42 (70%)
Elderly Stroke > 60 Yrs	8 (13.3%)
Total	60 (100%)

Gender

Men were more common 48(80%) than women 12 (20%).

Socio-economic status Patients were divided into groups depending upon the family income into three major groups, poor (<10000R/month), middle class (10000-30000 R/month) and upper middle class (>30000/month). Majority of patients were poor.

Table 3:

ECONOMIC STATUS	Number(%)
Poor	34 (56.6%)
Middle class	22 (36.6%)
Upper middle class	4 (6.6%)
Total	60 (%)

Educational status The educational status of the patients varied from no education to post-graduation level.

Table 4:

Literacy Level	Number (%)
Illiterate	16 (26.7%)
Primary school	7 (11.7%)
Secondary school	2 (3.33%)

Higher secondary school	21 (35%)
Graduate	12 (20%)
Postgraduate	2 (6.7%)
Total	60(100%)

Laterality

Right hemiplegia was more common than the left hemiplegia.

Table 5:

Side Affected	Number(%)
Right	34 (56.6%)
Left	26 (43.3%)
Total	60(100%)

Type of Stroke

Ischemic stroke was more common cause of stroke.

Table 6:

Type of Stroke	Number (%)
Ischemic Stroke	52(86.7%)
Hemorrhagic Stroke	8(13.3%)
Total	60(100%)

Duration since stroke

Patients were divided into sub-acute (3-12 months) or chronic stroke (>12 months). Among the patients seen sub-acute duration was more prevalent however in chronic groups some extremes of duration were seen resulting in wide variation. The duration of stroke varied among the participants, with a range of 3 months to 156 months, the mean stroke duration was 18.37± 30.88 months.

Table 7:

Duration Since Stroke	Number (%)
Subacute Stroke	41(68.3%)
Chronic Stroke	19(11.6%)
Total	60(100%)

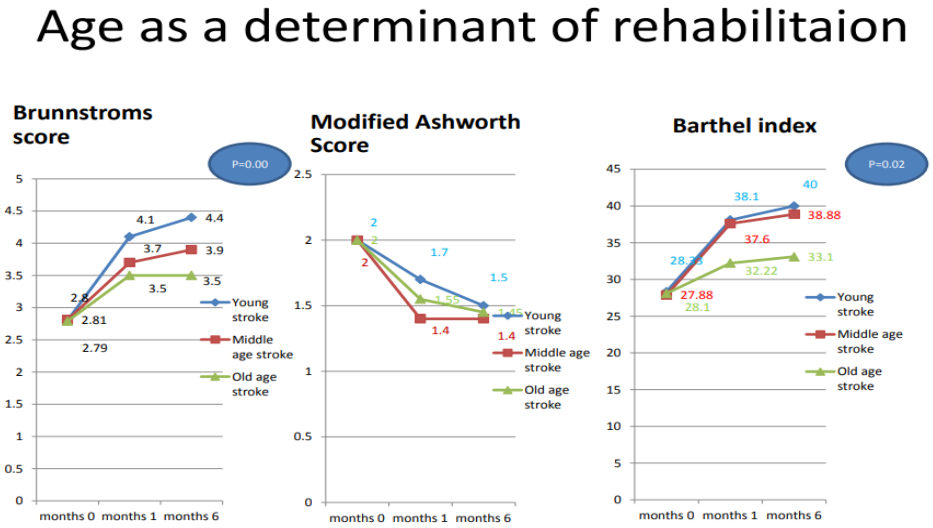


Figure 1:

Young stroke patients < 40 yrs had statistically significant improvement in BS compared to middle age stroke patients 40-60yrs, and older age stroke > 60yrs. There was a statistically significant difference in BI. However no significant improvement was seen in MAS.

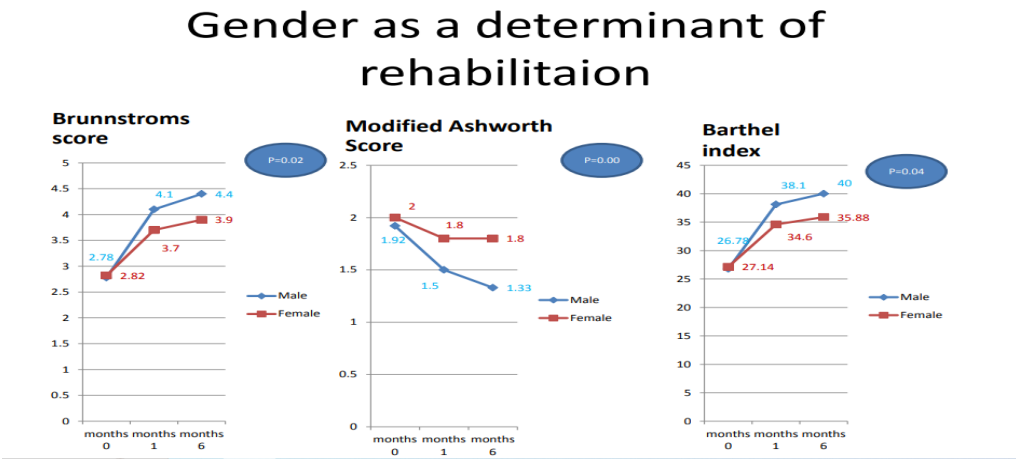


Figure 2:

Men had statistically significant improvement in all measures compared to females.

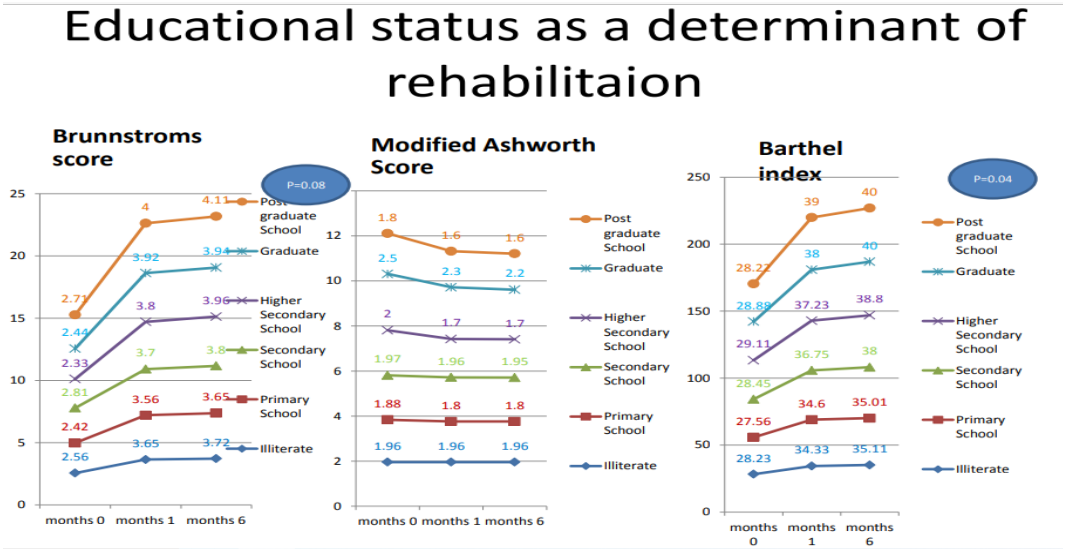


Figure 3:

More educated patients were easy to manage compared to uneducated patients. Though they showed more improvement, however statistically significant difference was seen only in BI.

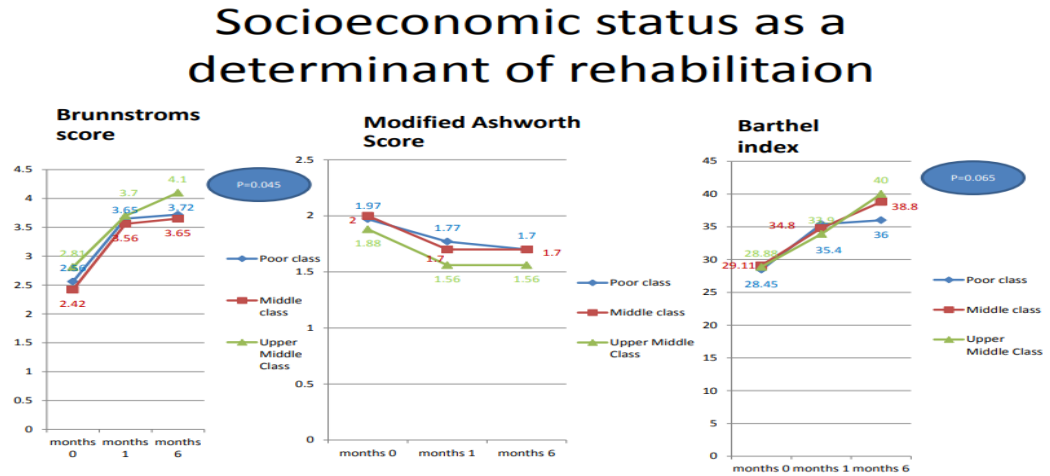


Figure 4:

All socioeconomic classes showed improvement when in rehabilitation program. However more affluent class had a progressive improvement on 6 months follow up that was statistically signficant for BS and BI.

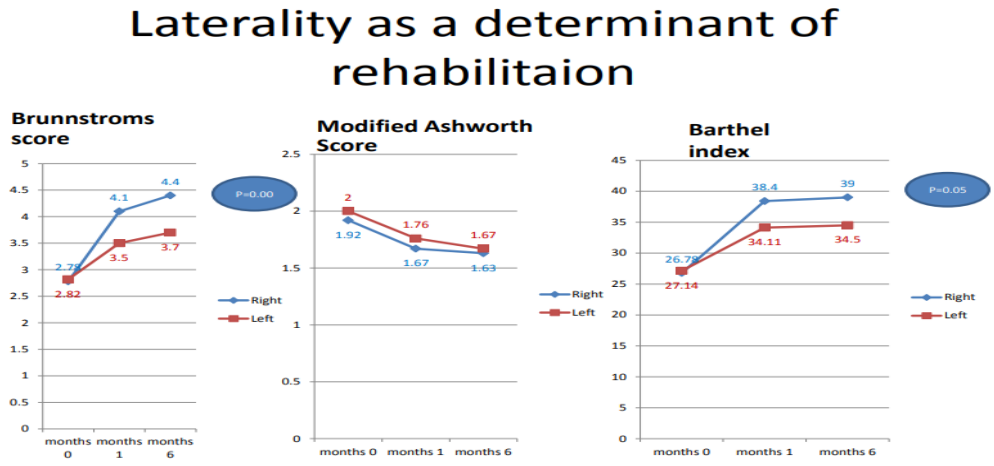
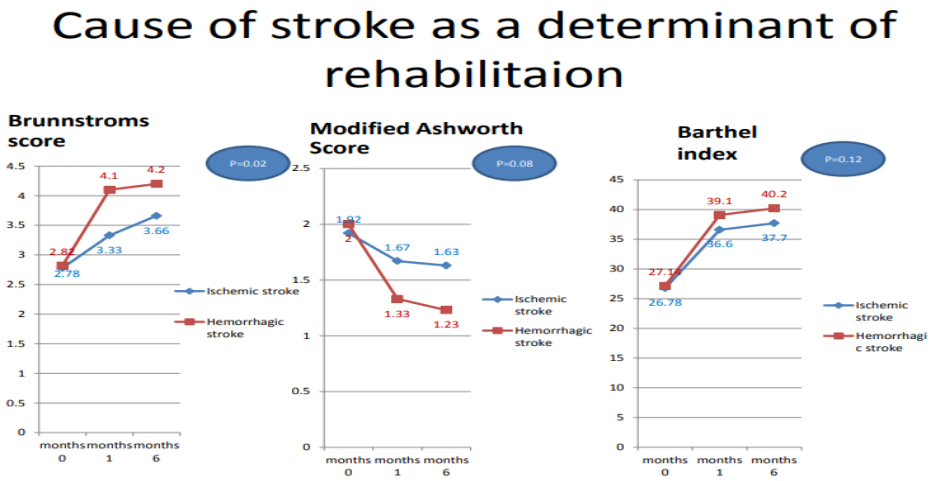


Figure 5:

Right hemiplegic were seen to have better response to rehabilitation compared to left hemiplegics. With a statistically significant difference in BS and BI.

Figure 6



Hemorhagic stroke showed more improvement compared to ischemic stroke, how ever statistically significant difference was seen only for BS.

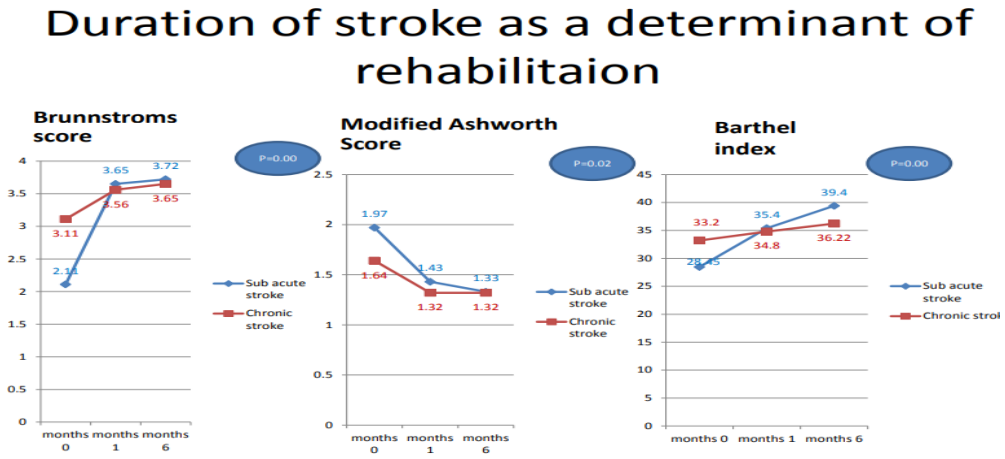


Figure 7:

Both subacute and chronic stroke patients showed improvement in BS, MAS as well as BI. However only subacute stroke showed a statistically significant improvement in all measures of Rehab. Though chronic had statistically significant improvement in BS but was significantly less than sub acute stroke patients.

Discussion

Many studies have found that younger patients do better than older patients. Randie et al. examined the effect of increasing age on FIM score gain, length of stay, length of stay efficiency and home discharge in 979 stroke patients and found a strong negative correlation of increasing age and outcome in all measures of rehabilitation[14]. Association of right or non-dominant hemisphere stroke is associated with hemineglect and agnosia that might have an implication on outcomes of stroke rehabilitation. Pedersen et al. found that the presence of hemineglect was associated with severity of the stroke and rehabilitation outcome was poor[15][16]. Women who survive stroke have less favorable outcomes than their male counterparts. Women are less likely to be discharged home than men and are more likely to have physical impairments. Women experience more mental impairment, depression, and fatigue and lower overall quality of life (QOL) than men after stroke[17]. The incidence of fatal and non-fatal strokes shows an inverse gradient over socioeconomic groups[18]. Patients with a lower SES are at greater risk for stroke morbidity and stroke mortality compared with higher SES groups[18]. Putman et al. found during inpatient stay patients with a low educational level were less likely to improve on the Barthel Index (BI) and the Rivermead Motor Assessment (RMA) arm. For this period, no differences in recovery were found between income groups. After discharge, patients with a low equivalent income were less likely to improve on the RMA: gross function, however no differences were found for educational levels[18]. About one half of all patients with primary ICH die within the first month after the acute event. However regarding recovery, it is generally believed that hemorrhagic stroke survivors have better neurological and functional prognoses than non hemorrhagic stroke survivors [19] . Paolucci et al. showed that short onset admission interval (OAI) subgroup had significantly higher effectiveness of treatment than did the medium and the long OAI groups. Beginning treatment within the first 20 days was associated with a significantly high probability of excellent therapeutic response (OR = 6.11; 95% confidence interval [CI], 2.03-18.36), and beginning later was associated with a similar risk of poor response (OR = 5.18; 95% CI, 1.07-25.00) [19][20].

Conclusion

In conclusion, our study highlights the intricate relationship between demographic characteristics and the rehabilitation outcomes of stroke patients. Our data illustrates that young age, male gender, and higher education significantly correlate with positive rehabilitation outcomes. Interestingly, even the socioeconomic status played a role in the progress of stroke rehabilitation, favoring the more affluent classes, demonstrating the importance of resource availability in recovery. In terms of stroke specifics, patients with right hemiplegia showed better responsiveness towards rehabilitation than those with left-sided impairment, and hemorrhagic stroke patients demonstrated a higher level of recovery compared to their ischemic counterparts. This points to the significance of stroke characteristics when considering rehabilitation potential. Moreover, our results also shed light on improved recovery rates in both subacute and chronic stroke patients undergoing therapy, with especially marked improvement noted in the subacute population of stroke survivors. These findings suggest that a targeted, individualized approach to stroke rehabilitation, factoring in the demographics and clinical characteristics of patients, could potentially optimize functional recovery and improve the quality of life in these individuals. Besides, it underscores the importance of socioeconomic support, suggesting the need for policies that aid the lower-income categories. While this study has delivered insightful findings, further research in this field with larger populations is recommended to solidify these conclusions, helping to advance our understanding and practice of neurorehabilitation strategies.

References

1. Santos A, Balabanski A, Katzenellenbogen J, Thrift A, Burchill L, Parsons M. A narrative review of stroke incidence, risk factors and treatment in Indigenous Peoples of the world. Vessel Plus. 2021;5:21.
2. Klomjai W, Aneksan B. A randomized sham-controlled trial on the effects of dual-tDCS “during” physical therapy on lower limb performance in sub-acute stroke and a comparison to the previous study using a “before” stimulation protocol. BMC Sports Sci Med Rehabil. 2022 Apr 15;14(1):68
3. Reuter B, Gumbinger C, Sauer T, Wiethölter H. Access, timing and frequency of very early stroke rehabilitation – insights from the Baden-Wuerttemberg stroke registry. Reuter et al. BMC Neurology. 2016; 16:222.
4. Bosch P, Karmarkar A, Roy I, Fehnel C, Burke R, Kumar A. Association of Medicare-Medicaid Dual Eligibility and Race and Ethnicity With Ischemic Stroke Severity. JAMA Netw Open. 2022 Mar 1;5(3).
5. Chau J, Thompson D, Twinn S, Chang A and Woo J. Determinants of participation restriction among community dwelling stroke survivors: A path analysis. BMC Neurology. 2009; 9:49.
6. Mohan U, Karthik B, Vijaya Kumar V, Suresh B, Misri Z , Chakrapani M. Effectiveness of mirror therapy on lower extremity motor recovery, balance and mobility in patients with acute stroke: A randomized sham-controlled pilot trial. Ann Indian Acad Neurol. 2013;16:634-9.

7. Punia V, Fitzgerald Z, Zhang X, Huynh H. Electroencephalographic biomarkers of epilepsy development in patients with acute brain injury: a matched, parallel cohort study. Annals of Clinical and Translational Neurology. 2019; 6(11): 2230–2239.
8. Yagi M, Yasunaga H, Matsui H, Morita K, Fushimi K, Impact of Rehabilitation on Outcomes in Patients With Ischemic Stroke. Stroke. 2017;48:740–746.
9. McDonald MHayward K, Rosbergen I, Jeffers M, Corbett DIs Environmental Enrichment Ready for Clinical Application in Human Post-stroke Rehabilitation? Front. Behav. Neurosci. 2018; 12: 135.
10. Ottenbacher K, Campbell J, Kuo Y, Deutsch A, Ostiz G, Granger C. Racial and Ethnic Differences in Postacute Rehabilitation Outcomes. Stroke 2008 May;39(5):1514-9.
11. Eva Elgh and Xiaolei Hu. Subjective and Objective Assessments of Executive Functioning among Persons 10 years after Stroke. J. Neuroscience and Neurological Surgery: 2021 Dec Volume 10(1)-219.
12. Krishnan R, Yi Yeo E, Lim C. Chua K. The Impact of Stroke Subtype on Recovery and Functional Outcome after Inpatient Rehabilitation: A Retrospective Analysis of Factors. Life (Basel). 2022 Sep; 12(9): 1295.
13. Paolucci S, Antonucci G, Grasso MG, Morelli D, Troisi E, Coiro P, Bragoni M. Early versus delayed inpatient stroke rehabilitation: A matched comparison conducted in Italy. Arch Phys Med Rehabil. 2000 June; 81:695-700.
14. Randie M, Black-schaffer, Winston C. Age and functional outcome after stroke. Topics in Stroke rehabilitation. 2004; Spring: 23-32.
15. Pedersen PM, Jørgensen HS, Nakayama H, Raaschou H, Olsen TS. Hemineglect in acute stroke-incidence and prognostic implications: The Copenhagen Stroke Study. American Journal of Physical Medicine and Rehabilitation. 1997 March/April; 76(2): 122-127.
16. Jenny K. Rinehart JK, Singleton RD, Adair JC, Sadek JR, Haaland KY. Arm Use After Left or Right Hemiparesis Is Influenced by Hand Preference. Stroke. 2009; 40:545-550.
17. Gargano JW, Reeves MJ, Coverdell P. Sex Differences in stroke recovery and stroke-specific quality of life results from a statewide stroke registry. Stroke. 2007; 38:2541-2548.
18. Putman K, De WitL, Schoonacker M, Baert I, Beyens H. Effect of socioeconomic status on functional and motor recovery after stroke: a European multicentre study. J Neurol Neurosurg Psychiatry. 2007; 78:593–599.
19. Paolucci s, Antonucci G, Grasso MG, Bragoni M. Functional Outcome of Ischemic and Hemorrhagic Stroke Patients After Inpatient Rehabilitation: A Matched Comparison. Stroke. 2003; 34:2861-2865.
20. Bayona NA, Bitensky J, Foley N, Teasell R. Intrinsic factors influencing post stroke brain reorganization. Topics in Stroke Rehabilitation. 2005; Summer: 27-36.
21. Safaz I, Yılmaz B, Yasar E, Alaca R. Brunnstrom recovery stage and motricity index for the evaluation of upper extremity in stroke: analysis for correlation and responsiveness. International Journal of Rehabilitation Research. 2009; 32(3):228-31.
22. Gowland, Carolyn A. Staging motor impairment after stroke. Stroke. 1990; 21(suppl II):19-21.
23. Bohannon RW, Smith MB. Interrater reliability of a Modified Ashworth Scale of muscle spasticity. Phys Ther. 1987; 67:206-207.
24. Quinn TJ, Langhorne P, Stott DJ. Barthel Index for Stroke Trials : Development, properties, and application. Stroke. 2011; 42:1146-1151.
25. Kawakkel G, Veerbeek JM, Harmeling-van er Wel BC, Wegen EV. Diagnostic Accuracy of the Barthel Index for measuring Activities of daily living outcome after ischemic hemispheric stroke does early post stroke timing of assessment matter? Stroke. 2011; 42:342-346.
26. Hsueh IP, Lin JH, Jeng JS, Hsieh CL. Comparison of the psychometric characteristics of the functional independence measure, 5-item Barthel index, and 10 item Barthel index in patients with stroke. Journal of Neurology, Neurosurgery & Psychiatry - BMJ Journals. 2002 August; 73(2):188–190.
27. Wallace D, Duncan PW, Lai SM. Comparison of the responsiveness of the Barthel Index and the Motor Component of the Functional Independence Measure in stroke. The impact of using different methods for measuring responsiveness. Journal of Clinical Epidemiology. 2002; 55: 922–928.