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Disability Levels and Associated Factors of Functional Dependence among Stroke Survivors in South-South, Nigeria

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Authors' contributions

This work was carried out in collaboration between both authors. Both authors read and approved the final manuscript.

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ABSTRACT

Background: Cerebral Stroke remains a public health problem impacting a wide range of human functionality. It continues to be a leading cause of adulthood disability world-wide. This study aimed to identify disability levels and factors associated with functional dependence among survivors of stroke in south-south, Nigeria.
Material and Methods: A descriptive cross-sectional design was used to recruit stroke survivors receiving physiotherapy from two tertiary hospitals in South-south Nigeria. The World Health Organization Disability Assessment Schedule (WHODAS 2.0) was used to identify disability levels. Data was analysed using student ANOVA and Pearson correlational coefficient analysis, with significance set at P=0.05.
Results: Significant difference in disability levels occurred across the age ($p < 0.001$) and marital status ($p < 0.001$) of the respondents. From the analysis of variance (ANOVA) in Table 3, The co-morbidities - diabetes and hypertension were significantly associated with higher disability (diabetes $F = 4.80$($P < 0.030$); hypertension $F = 22.41$($P < 0.001$)), Having a previous stroke ($F=8.08$($P < 0.005$) and the type of stroke- haemorrhagic ($F = 12.28$; $P < 0.001$) were associated with higher disability levels. Higher disability levels were associated with all aspects of the at-home care.

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Conclusion: The results of this study demonstrate that advancing age, a previous stroke, type of stroke (hemorrhagic) and the presence of co-morbidities of hypertension and diabetes presented with statistically significant higher disability levels among our patients.

Keywords: Disability level; stroke survivors; functionality.

1. INTRODUCTION

Stroke continues to be a public health problem impacting a wide range of human functions. There is no doubt that advancements in medical science have resulted in reduction in mortality, remarkable improvement in stroke management and rehabilitation [1]. However stroke remains a leading cause of acquired adult disability [2,3]. Disability has been described as any restriction limiting one's ability to perform an activity within the range considered normal for that human being [4]. This broad term comprises impairments, activity limitations and participation restrictions. Stroke-related disability are far reaching, affecting the physical and psychological aspects of the individual including paralysis, sensory disturbances, aphasia, cognitive and emotional disturbances [5]. Outcome of stroke is disparate, and post-stroke disability could be severe, moderate, or mild [6]. Globally, it is estimated that 25% to 74% of the 50 million stroke survivors globally have disability, require some assistance or are fully dependent on caregivers and assistive devices [7]. In order to be functionally independent, the cognitive (e.g., reasoning, planning), motor (e.g., balance, dexterity), and perceptual (including sensory) functions are core assets but these are sometimes severely and permanently compromised by a stroke [8].

The burgeoning stroke-related deaths and disability-adjusted life years occurring in low- and middle-income countries (about 87%) [9-12] brings to light the urgent need to develop robust, effective and sustainable plan to assess, keep trustworthy records and intervene in post-stroke situations in developing countries such as Nigeria. Birabi and colleagues in studying burden of post stroke conditions in Nigeria noted a high direct and indirect cost of managing stroke. A cost that is usually too much for the family and community to surmount [13]. In Consideration of general resource allocation aimed at improving health outcomes after a stroke, research in stroke consequences covering physical and neuro-psychological functioning along with activity limitations and participation is very relevant. It will provide essential information required for long-term rehabilitation and service planning. It also requires that a watchful eye be kept on all factors contributing to its occurrence as well as predictors of long term disability in order to mitigate their adverse effects on all concerned. This study thus aimed to identify disability levels and associated factors of dependence among chronic stroke survivors in the South-South region of Nigeria.

2. MATERIALS AND METHODS

2.1 Study participants

122 adult stroke patients participated in this cross-sectional study conducted in two tertiary hospitals located in Rivers State, Nigeria. They were recruited from the physiotherapy clinics of the University of Port Harcourt Teaching Hospital (UPTH) and the Rivers State University Teaching Hospital (RSUTH) during their physical rehabilitation sessions. These two government-owned tertiary hospitals are foremost referral centres for physical rehabilitation in this part of Nigeria. Inclusion criteria for the study required participants to be adults recovering from a cerebral stroke and in stable condition. Excluded individuals were stroke patients who had suffered a transient ischemic attack, recurrent persistent deficits, underlying psychotic and mental disorders, those who were handicapped before the stroke event, and patients with significant chronic co-morbidities such as heart failure, chronic kidney disease, and so on. The latter were excluded as the disease conditions were capable of significantly affecting their quality of life and could bias the study findings. Stroke patients unable to respond to individual interview questions or completing self-report questionnaires due to cognitive impairments were also excluded.

2.2 Sample Size Determination

The sample size was determined using the Fischer formula:

$n = (Z\alpha^2)\ (pq)/e^2$

Where:

n = minimum sample size

Zα = Standard Normal Deviate corresponding to the level of significance

p = Proportion of stroke in south-south region of Nigeria (Onwuchekwa et al., 2013) = 0.085

q = 1-p = 0.915

e = 95% confidence interval

n = (1.96)2 (0.085 x 0.915)/ (0.05)2

n = (0.298656/0.0025

n = 119.4 = 119

Sample size was increased by 10% to take care of drop out participants

(0.10) (119) = 11.9 = 12

Sample Size = 119+ 12 = 131

2.3 Data Collection

Data collection was carried out during the physiotherapy sessions. Interviewer-administered semi-structured questionnaire was used to collect demographic and clinical data. The questionnaire consisted of three sections covering the socio-demographic data (age, religion, gender, educational qualification, income, marital status, employment status and residential area), clinical history (type of stroke, duration, side of hemiparesis, dominant hand, co-morbidities including diabetes mellitus and hypertension), home care (primary care giver, who shoulders the cost of care, distance to and from the hospital, presence or absence of assistive devices at home) and follow-up visits. The World Health Organization Disability Assessment Schedule (WHODAS 2.0) [14] was adopted to assess the disability levels.

The **WHODAS**-2.0 sum score measuring general disability showed good reliability (Cronbach's alpha = 0.89).

Pre-testing of the schedule was carried out at the physiotherapy unit of a secondary level health facility. The WHO-DAS 2.0 is a 36-item already validated disability assessment tool based on the International Classification of Functioning, Disability and Health. It examines the life difficulties and challenges experienced by an individual in the previous month as a result of a health condition such as stroke. Six domains of life were taken into account. They are - understanding and communicating, getting around, self-care, getting along with people, life activities (divided into household and work), and participation in society. Respondents were required to answer questions in each domain regarding how much physical difficulty they experienced in the last 30 days as a result of their disability. Answers were rated on a 5-point Likert scale, with scores assigned to each of the items—"none" (0), "mild" (1), "moderate" (2), "severe" (3), and "extreme" (4). The "item-response-theory" (IRT)–based scoring was done which took into account multiple levels of difficulty for each WHO-DAS 2.0 item. The scoring had three steps: summing of recoded item scores within each domain followed by the summing of all six domain scores and finally conversion of the summary score into a metric ranging from 0 to 100 (where 0 = no disability; 100 = full disability).

2.4 Data Analysis

The Statistical Package for Social Sciences (SPSS) version 20.0 was used to collate and analyze the data. Tables were used to present the summary of the socioeconomic, demographic, clinical and follow-up visit variables of the participants in percentages and mean age. The one-way Analysis of variance (ANOVA) was used to determine the difference in disability levels across the socio-demographic, clinical and follow-up visit variables of the participants. Correlation between specific socio-demographic variables and the different domains of the WHO-DAS 2.0 were assessed using the Pearson correlation test. Correlations less than 0.30 were considered weak, values from 0.30 - 0.59 were termed moderate and values 0.60 or greater were considered as having strong correlation. The relationship between the clinical factors and the 6 domains of the WHO-DAS 2.0 schedule was assessed using the chi-squared test while the impact of the follow-up variables on the domains of the disability level was tested using the linear regression analytical test. Significance level was set at $p<0.05$ for all analyses.

3. RESULTS

One hundred and twenty-two (122) stroke patients (67 men and 55 women)aged 27-

74years participated in the study.A summary of their demographical characteristics are presented in Table 1. The mean age (in years) of participants was 59.0±9.12). Age group 55-60 years(30%) was in the majority. More than half of the participants were males (55%), majority were married(87%), had post secondary education (75%) and were actively employed before the stroke (81%).Clinically, more participants (70%) had infarction stroke subtype. Almost half (46%) of the participants had a previous stroke. Majority of them were hypertensive (88%) and diabetic (64%).Stroke affected the right side of the brain in more than half of the participants (53%).Almost half of the participants had their spouses as their primary caregiver (47%).Majority of the participants reported they were always treated with dignity at home (60%), and didn't use assistive devices at home (60%). Family members took care of the hospital bill of more than half of them (61%).

Table 1. Socio-demographic, clinical and at home care profile

Variables	Frequency (n)	Percent (%)
Age (years)		
• 26-35	5	3
• 36-45	4	3
• 46-55	24	19
• 56-65	64	54
• 66-75	25	21
Mean Age (standard deviation): 59.0 (9.12)		
Gender		
Male	67	55
Female	55	45
Marital Status		
Married	105	87
Single	7	6
Divorced	2	1
Widowed	8	6
Education		
None	2	1
Lower education	7	24
Higher education	91	75
Clinical Factors		
Type of stroke		
Infarction	84	70
Haemorrhagic	38	30
Duration of Stroke		
Less than 12 months	28	23
12 months and above	94	77
Dominant hand affected		
Left	65	53
Right	57	47
Side of brain affected		
Left	57	47
Right	65	53
History of previous stroke		
No	50	52
Yes	46	48
Comorbid diabetes		
No	43	36
Yes	75	64
Comorbid hypertension		
No	15	12
Yes	106	88

From the analysis of variance (ANOVA) in Table 2, significant difference in disability levels occurred across the age ($p<0.001$) and marital status ($p<0.001$) of the participants. The co-morbidities - diabetes and hypertension also influenced the stroke-related disability ($p<0.030$; $p<0.001$ respectively), Difference in disability levels was also found to exist in relation to having a previous stroke ($p<0.005$) and the type of stroke experienced ($p<0.001$). The disability levels were influenced by all aspects of the at-home care.

3.1 Association between Disability Levels and Socio-demographic Characteristics of Participants

As seen in Table 2, none of the socio-demographic details of the participants was significantly associated with the disability levels.

Variable	WHO-DAS score			Chi-squared (df)	p-value
	0-35	36-70	71-100		
Gender				**3.074 (2)**	**0.546**
• Male	22 (64.3%)	40 (52.6%)	5 (71.4%)		
• Female	13 (35.7%)	36 (47.4%)	2 (28.6%)		
• Total	35 (100.0%)	76 (100.0%)	7 (100.0%)		
Marital status					
• Married	31 (88.6%)	62 (81.6%)	6 (85.7%)	0.886 (2)	0.642
• Not married	4 (11.4%)	14 (18.4%)	1 (14.3%)		
• Total	35 (100.0%)	76 (100.0%)	7 (100.0%)		
Educational status					
• Low	8 (22.9%)	20 (26.3%)	2 (28.6%)	0.190 (2)	0.91
• High	27 (77.1%)	56 (53.7%)	5 (71.4%)		
• Total	35 (100.0%)	76 (100.0%)	7 (100.0%)		
Occupation					
• Employed	26 (74.3%)	55 (72.4%)	4 (57.1%)	3.078 (2)	0.545
• Unemployed	7 (25.7%)	21 (27.6%)	3 (42.9%)		
• Total	35 (100.0%)	76 (100.0%)	7 (100.0%)		

From the analysis of variance (ANOVA) in Table 3, The co-morbidities - diabetes and hypertension influenced the stroke-related disability (diabetes $F= 4.80$($P <0.030$); hypertension $F = 22.41$($P <0.001$)), While the side of lesion ($F =3.04$; $P< 0.084$) and duration of the stroke ($F =0.824$; $P = 0.366$) did not affect disability levels significantly. Having a previous stroke ($F=8.08$($P <0.005$) and the type of stroke ($F= 12.28$; $P <0.001$) were associated with higher disability levels. The disability levels were affected by all aspects of the at-home care.

Table3. One way ANOVA between clinical factors, home care and disability levels (WHO-DAS2.0) at P < 0.05

	WHODAS 2.0	
Variables	***F***	**P**
Clinical Factors		
Duration of stroke	**0.825**	**0.366**
Type of stroke	**12.28**	**0.001**
Side of lesion	**3.04**	**0.084**
Previous stroke	**8.08**	**0.005**
Diabetes	**4.80**	**0.030**
Hypertension	**22.41**	**<0.001**
At home care		
Primary care giver	**7.69**	**<0.001**
Treated with respect	**17.2**	**<0.001**
Assistive devices	**41.23**	**<0.001**
Hospital bill	**7.02**	**<0.001**

Table 4. Chi-square association of independence: Disability level and clinical factors

Clinical factors		Disability Level		X^2	P< 0.05
		High Disability (51.0-100.0)%	Low Disability (0.00 - 50.99)%		
DURATION	<12MTH	7(23%)	20(77%)	3.48	0.061
	12MTH	40(42%)	55(58%)		
PATHOLOGY	INFARCTION	24(29%)	60(71%)	9.578	0.002
	HAEMORRAGE	22(58%)	16(42%)		
LIMB AFFECTED	LEFT	24(37%)	40(67%)	0.002	0.961
	RIGHT	22(38%)	36(62%)		
HEMIPARESIS	LEFT	23(39%)	36(61%)	0.079	0.778
	RIGHT	23(38%)	39(62%)		
PREVIOUS STROKE	YES	32(54%)	28(46%)	12.277	<0.005
	NO	14(23%)	48(77%)		
DIABETES	YES	36(47%)	41(53%)	8.719	0.003
	NO	10(22%)	35(78%)		
HYPERTENSION	YES	46(43%)	61(57%)	10.352	0.001
	NO	0(0%)	15(100%)		

Table 5. Linear regression of at-home care factors and disability

	Disability Level (R)	P< 0.05
AT HOME CARE		
CAREGIVER	0.243	<0.001
ASSISSTIVE DEVICES	0.495	<0.001
TREATED WITH DIGNITY	0.321	<0.001

On analysis of the clinical factors and disability levels, low disability level was observed in majority of the participants with stroke duration less than 12 months (77%) than those 12 months and above (58%). More than half of the participants with hemorrhagic stroke (58%) had higher disability levels, against (29%) of ischemic stroke participants. A little over half (54%) of those who had previous stroke were highly disabled. For diabetes and hypertension, 47% and 43% had high disability levels respectively. All participants without hypertension had lower disability. Limb affected and hemiparesis had no significant influence on disability levels. This is shown in Table 4.

The at-home care consists of care givers, assistive device and treatment with dignity. Linear regression analysis between these factors and disability levels (Table 5) revealed caregiver and treatment with dignity were associated with association with lower disability levels. ((R = 0.243 and R= 0.321 respectively) while assistive devices may be associated with moderate disability levels (R = 0.495).

4. DISCUSSION

Disability almost always occurs after a stroke event [15]. The severity of the disability sustained after the event and the factors contributing to the severity were examined in this research. Majority were male which tallied with other studies [16,17]. The commonest age group was 56-60 years. This age group is younger than what is observed in the industrialized countries where stroke tended to be more prevalent in persons aged over 66 years and are retired [18]. The mean age 59.0(±9.12) is similar to what was obtained in various studies in Nigeria [19,20,21]. The import of the young age when stroke occurs is that they are still part of the decision making and active workforce so stroke and disability tend to limit participation in these activities. Males were more affected than females. The tendency for men to take up unhealthy lifestyles such as smoking and alcohol consumption known for creating conditions that enable the occurrence of a stroke explains the higher prevalence of stroke in males than in females [22]. Majority of the respondents were gainfully employed pre-stroke, had a post-secondary education and married which explained reason Spouses were the primary care givers among most of the respondents [23,20]. Children were more often relied upon to bring them to the hospital and many of them were treated with respect at home and majority did not have assistive devices.

In assessing the disability level of stroke survivors in this study, six (6) domains of WHO-DAS 2.0 were employed; understanding and communication, getting around, self-care, getting along with people, life activities (home), life activities(work/school) and participation. The mean disability level (WHODAS 2.0 Score) obtained was 44.0(+/-17.45) which tallied with moderate disability. This finding is higher than the mean score of 25.9 observed by Cerniauskaite and colleagues in their work among stroke survivors in high income countries [24]. The lower score observed in high income countries maybe due to the prompt ambulance service, faster and better quality emergency clinical care available in the developed countries which invariably play a major role in stroke outcomes. Our result is a clear call to action for a more articulated program for stroke mitigation and rehabilitation in Nigeria. The finding in our study is also, comparable with another study within Nigeria [23] that reported a score of 41.1 (+/-20.5).

Age in the present study was observed to be a strong predictor of disability levels as disability levels increased with advancing age. This corroborates previous studies [25,26,27] that reported that advancing age was related to increased physical and psycho-social morbidity among stroke survivors. However, it contradicts the reports by Hamzat in Nigeria [21] and Lee [28] in Taiwan. They noted no significant influence of age on disability among stroke survivors.

Our study showed gender to have no predictive value on disability levels as there was no gender difference in the prevalence and level of post-stroke disability. This finding is in accord with some studies that reported that the degree of disability among stroke survivors could not be attributed to gender differences [29,30,25,23]. However, some other studies have reported that gender has a statistically significant influence on the level of post-stroke disability, with females having worse outcomes [31,32,27].

In assessing the contribution of the stroke subtype on disability levels, we observed that participants with ischemic stroke achieved a better functional recovery than the haemorrhagic stroke subtype. Greesea, Henriksson and Gbiri [33,34,26] all worked separately on level of activities of daily living as well as cardiovascular risks after stroke and showed that the type of stroke was an important predictor of disability, although in their studies, those who had haemorrhagic stroke had better outcomes. Some studies in Nigeria [23,21] found no association in their own studies.

In this study, the limb affected had no significant influence on the level of disability. This supports other studies [26,32] that found the affected limb had no significance in functional outcome, though contradicts previous studies [21,35]. Reason for our own finding in this study may be due to the fact that the participants were already undergoing rehabilitation which had the main objective of improving functionality irrespective of the side of limb that is affected [36].

The use of Assistive Devices was strongly associated with disability levels as persons with severe disabilities tended to use more assistive devices. This observation was corroborated by Sumathipalaand colleagues [37]. Many people with disabilities depend on assistive devices to enable them carry out routine activities, thus facilitating their physical functioning and independence [38].

We observed that the availability of caregivers was significantly related to lower disability levels. Assistive devices play an important role in ameliorating the level of disability experienced by stroke patients which explains our finding that persons with higher disabilities tended to use more assistive devices. This observation corroborates that of Gbiri and colleagues [20], that noted that social support usually provided by assistive devices, spouses, family members and associates helped alleviate physical and psychological challenges associated with impairment in chronic illnesses, including stroke. A study on informal caregivers' burden and strain of caring for stroke survivors [26] further stressed the importance of spousal and family support in reducing physical and psychological stresses associated with disability.

5. CONCLUSION

The results of this study demonstrate that age, marital status, a previous stroke, type of stroke (hemorrhagic) and the presence of co-morbidities of hypertension and diabetes are positively associated with higher disability levels. The finding has significant implications on the rehabilitation and clinical management of stroke survivors in our environment.

This study provided insight to the extent of disability which translates to functionality of stroke patients which was moderately high indicating the need for improved care at the acute phase of the stroke to stem the level of disability they have to cope with in the long run.

6. STUDY LIMITATION

The generalization of the results was limited because it was a cross-sectional study design, therefore it does not provide causality of changes in functional evaluation of stroke patients over time. Secondly, the study was hospital based therefore stroke survivors in the community are not well represented. In epidemiology, this hospital-generated result is likened to the tip of the iceberg.

ETHICAL APPROVAL AND CONSENT

Approval for the study was obtained from the Ethics Committee of the hospitals (UPH/CEREMAD/REC/MM61/066). Participants and their families were properly informed about the study with emphasis on their freedom to withdraw at any stage of the process.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

REFERENCES

1. Obiako OR, Oparah SK, Ogunniyi A. Prognosis and outcome of acute stroke in the University College Hospital Ibadan, Nigeria. Niger J Clin Pract. 2011;14(3):359–362.
2. Hofstad H, Næss H, Gjelsvik BE, Eide GE, Skouen JS. Subjective health complaints predict functional outcome six months after stroke. Acta Neurologica Scandinavica. 2017;135(2):161-9.
3. Harrison M, Ryan T, Gardiner C, Jones A. Psychological and emotional needs, assessment, and supportpost-stroke: A multi-perspective qualitative study. Top Stroke Rehabil Internet. 2017;24.
4. World Health Organisation. The global burden of stroke. Available:http://www.who.int/cardiovascular_ diseases/en/cvd_atlas_15_burden_stroke.pdf?ua=1 Accessed August 31, 2019
5. Jeon NA, Kwon KM, Kim YH, Lee S. The factors associated with health-related quality of life in stroke survivors age 40 and older. Ann Rehabil Med. 2017;41(5):743-752.
6. Skolarus LE, Burke JF, Brown D, Freedman VA. Understanding stroke survivorship: Expanding the concept of post-stroke disability. Stroke. 2014.;45(1):224e230.
7. Miller EL, Murray L, Richards L, Zorowitz RD, Bakas T, Clark P, et al. Comprehensive O verview of nursing and interdisciplinary Rehabilitation care of the stroke Patient: a scientific statement from the American Heart Association, Stroke. 2010;41:2402-244.
8. Mlinac ME, Feng MC. Assessment of activities of daily living, self-care, and independence. Archives of Clinical Neuropsychology. 2016;31:506-516.
9. Feigin VL, Roth GA, Naghavi M, Parmar P, Krishnamurthi R, Chugh S, Mensah GA, Norrving B, Shiue I, Ng M, Estep K, Cercy K, Murray CJL, Forouzanfar MH. Global Burden Of Stroke And Risk Factors In 188 Countries, During 1990–2013: A Systematic Analysis For The Global Burden Of Disease Study 2013. The Lancet Neurology. 2016;15:913–924.
10. Ezejimofor MC, Uthman OA, Maduka O, Ezeabasili AC, Onwuchekwa AC, Ezejimofor BC, Asuquo E, Chen Yen-Fu, Stranges S, Kandala N. Stroke survivors in Nigeria: A door-to-door prevalence survey from the Niger Delta region. Journal of the Neurological Sciences. 2017;372:262–269
11. Enwereji KO, Nwosu, MC, Ogunniyi A, Nwani PO, Asomugha AL, Enwereji EE. Epidemiology of stroke in a rural community in southeastern Nigeria, Vasc. Health Risk Manag. 2014;10:375–388.
12. Owolabi MO, Akarolo-Anthony S, Akinyemi R, Arnett D, Gebregziabher M, Jenkins C, Tiwari H., Arulogun O, Akpalu A, Sarfo FS, Obiako R, Owolabi L, Sagoe K, Melikam K., Adeoye AM., Lackland D, Ovbiagele B. The burden of stroke in Africa: a glance at the present and a glimpse into the future CVJAFRICA. 2015;26:S27–S38
13. Birabi BN., Oke KI, Dienye PO, Okafor UC. Cost burden of post stroke condition in Nigeria: A pilot study. Global Journal of Health Science. 2012;4(6):17.
14. World Health Organization. World Health Organization task force on stroke and

other cerebrosvascular disorders. Recommendation on stroke prevention, diagnosis and therapy. Stroke. 1999;20(10):1407-1431.

15. Haghgoo HA, Pazuki ES, Hosseini AS, Rassafiani M. Depression, activities of daily living and quality of life in patients with stroke. Journal of The Neurological Sciences. 2013;328(1-2):87-91.
16. Okoye EC, Odole AC, Odunaiya NA, Akosile CO, Akinpelu AO. Crosscultural adaptation and validation of the Maleka stroke community reintegration measure among Igbo stroke survivors. Int J Health Sci Res. 2016;6:254-63.
17. Gbiri, Caleb A, Akinpelu, Aderonke O. Relationship between post-stroke functional recovery and quality of life among Nigerian stroke survivors. The Nigerian Postgraduate Medical Journal. 2015;20(1):29-33.
18. O'Donnell MJ, Xavier D, Liu L, et al. on behalf of the INTERSTROKE investigators. Risk factors for ischaemic and intracerebral haemorrhagic stroke in 22 countries (the INTERSTROKE study): A case-control study. Lancet. 2010;376:112-123.
19. Oni OD, Aina OF, Ojini IF, Olisah VO. Quality of life and associated factors amongpoststroke clinic attendees at a University Teaching Hospital in Nigeria Niger Med J. 2016;57:290-298.
20. Gbiri Caleb A, Akinpelu, Aderonke O.Relationship between post-stroke functional recovery and quality of life among Nigerian stroke survivors. The Nigerian Postgraduate Medical Journal. 2015;20(1):29-33.
21. Ashiru Mohammad Hamza, Nabilla Al-Sadat, Siew Yim Loh, Nowrozy Kamar Jahan. Predictors of postroke health-related quality of life in Nigerian stroke survivors: A 1-year follow-up study. BioMed Research International. 2014;Article ID 350281:7.
22. Copstein L, Fernandes JG, Bastos GA. Prevalence and risk factors for stroke in a population of Southern Brazil. Arquivos de Neuro-psiquiatria. 2013;71(5):294-300.
23. Oyewole OO, Ogunlana MO, Oritogun KS, Gbiri CA. Post-stroke disability and its predictors among Nigerian stroke survivors. Disability and Health Journal. 2016;9:616-623.
24. Cerniauskaite M, Quintas R, Koutsogeorgou E, Meucci P, Sattin D, Leonardi M, Raggi A. Quality-of-life and disability in patients with stroke. Am J Phys Med. Rehabil. 2012;91(suppl):S39YS47.
25. Li Pei, Xiao-Ying Zang, Yan Wang, Qian-Wen Chai, Jun-Ying Wang, Chun-Yan Sun, Qing Zhang. Factors associated with activities of daily living among the disabled elders with stroke. International Journal of Nursing Sciences. 2016;3:29-34.
26. Bettger JP, Zhao X, Bushnell C. The association between socioeconomic status and disability after stroke: findings from the Adherence Evaluation after Ischemic stroke Longitudinal (AVAIL) registry. BMC Public Health. 2014;14:281.
27. Coutts SB, Modi J, Patel SK. What causes disability after transient ischemic attack and minor stroke? Results from the CT and MRI in the Triage of TIA and minor cerebrovascular events to identify high risk patients (CATCH) study. Stroke. 2012;43:3018e3022.
28. Lee Y, Chen D, Chen Y, Chuang Y, Liao S, Lin C, et al. Firstever ischemic stroke in Taiwanese elderly patients: Predicting functional independence after a 6-month followup. Arch Gerontol Geriatr. 2009;49:S26e31.
29. Scott KM, Collings SCD. Gender differences in the disability (functional limitations) associated with cardiovascular disease: a general population study. Psychosomatics. 2012;53(1):38e43.
30. Kwakkel G, Kollen BJ. Predicting activities after stroke: What is clinically relevant? Int J Stroke. 2013;8(1):25e32.
31. Chi W-C, Chang K-H, Escorpizo R. Measuring disability and its predicting factors in a large database in Taiwan using the World Health Organization Disability Assessment Schedule 2.0. Int J Environ Res Public Health. 2014;11:12148e12161.
32. Ojagbemi A, Owolabi M. Predictors of Functional Dependency after Stroke in Nigeria. Journal of Stroke and Cerebrovascular Diseases. 2013;22(8):e381-e387.
33. Greesea D, Whitiana V, Aih C. Level of activity daily living in post stroke patients. Althea Medical Journal. 2017;4(2):261–6.
34. Henriksson KM, Farahmand B, Asberg S, Edvardsson N, Terent A. Comparison of cardiovascular risk factors and survival in patients with ischemic or hemorrhagic stroke. Int J Stroke. 2012;7(4):276–81.
35. Oyewole OO, Ogunlana MO, Oritogun KS, Gbiri CA. Post-stroke disability and its

predictors among Nigerian stroke survivors. Disability and Health Journal. 2016;9; 616-623

36. Sang YP, In HL. The influence of age, lesion of stroke and location on rehabilitation outcome after stroke. Journal Physical Therapy Science. 2011;23(5):817-819.
37. Sumathipala K, Radcliffe E, Sadler E, Wolfe CDA, McKevitt C. Identifying the long-term needs of stroke survivors using the International Classification of Functioning, Disability and Health. Chronic Illness. 2011;8(1):31–44.
38. Pettersson I, Appelros P, Ahlström G. Lifeworld perspectives utilizing assistive devices: Individuals, lived experience following a stroke. Canadian Journal of Occupational Therapy. 2007;74(1):15-27.

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