Journal of Nursing Research, Patient Safety and Practise
ISSN: 2799-1210
Vol: 03, No. 02, Feb - Mar 2023
http://journal.hmjournals.com/index.php/JNRPSP
DOI: https://doi.org/10.55529/jnrpsp.32.27.36

Comparative Study on the Clinical Manifestations of Left and Right-Sided Stroke Survivors in University of Medical Sciences Teaching Hospitals, Ondo

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Received: 20 October 2022 **Accepted:** 06 January 2023 **Published:** 20 February 2023

Abstract: ***Stroke is a global issues that accounts for most death in humans. It is a type of acquired brain injury that can result in long-term impairments to cognitive, affective, motor, sensory, and language functions. The purpose of this study was to compare the clinical signs of stroke survivors who had suffered right- and left-sided strokes. The National Institute of Health stroke scale was used to record the demographics, stroke side, stroke severity, physical (motor, sensory, and autonomic) and cognitive functions, quantitative and qualitative speech function, and social functions. The result showed that the mean duration of onset of left and right-sided stroke patients was 8.57 ± 7.77 and 5.43 ± 4.50 months while the mean stage of recovery of left and right-sided stroke patients were 2.55 ± 1.13 and 3.3 ± 0.49 on Brunstrom grading. There was significant difference in the level of consciousness (t = 1.73, p= 0.05), visual loss (t = 2.39, p = 0.04), limbs motor function (t = -6.31, p = 0.00 and t = -6.69, p = 0.00, t = -5.29, p = 0.00, and t = 7.85, p = 0.00 respectively). There were also significant differences in the best language (aphasia) (t = 2.92, p = 0.01). However, there were no significant differences in the dysarthria and total NHIS score between the left and right-sided stroke participants. There were significant differences in some sub-scale scores on the NHIS Scale between the left and right-sided stroke participants, although, there were no significant differences in the dysarthria and overall NIHSS score of the two groups of stroke survivors.***

Keywords: Stroke, Clinical Manifestation, Survivors, Brain.

1. INTRODUCTION

Stroke is a clinically defined syndrome of quickly escalating symptoms with signs of localized loss of brain function usually caused by acute vascular injury to part of the brain

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[1]. Symptoms persist for longer than 24 hours and may result in death. This vascular injury may be a result of a lack of adequate blood supply to a part of the brain known as ischemic stroke or a spontaneous effusion of blood into parts or over the surface of the brain. The degree of severity of stroke varies from recovery in a day, through incomplete recovery to severe disability, to death [1].

Stroke is the third most prevalent cause of death globally it's one of the leading causes of long-term disability (Lancet). According to Easton (1997), older adults over 65 years old accounted for more than 70 percent of stroke hospitalizations. However, the incidence of stroke is common among the people who are lesser than 65 years has increased over the last few decades with the incidence increasing worldwide by 25% among adults aged 29 to 64 years and especially in low and middle-income countries [2]. Globally, women experience strokes at a higher rate than men because atrial fibrillation and hypertension, which affect more women than men, are both significant risk factors [2].

One of the first things doctors do when diagnosing a stroke is to find where the damage in the brain is. Lacunar infarcts, for example, usually happen in the deeper parts of the brain, and certain types of strokes tend to happen in specific areas of the brain [3]. Normally, symptoms of a stroke can be categorized by the part of the brain that is affected and the side that is involved. This is easiest to understand by splitting the brain into two parts, the left and right sides, brain stem, and back part [4]. The brain is highly specialized, with various neurologic functions distributed between the two hemispheres and the brainstem [4].

Strokes can affect the right side of the brain as much as the left, but most of the attention goes to left side strokes. This can cause bias in how severe the stroke is seen and in the medical care given. Foerch and his team did a research on 20,000 patients. They found that when people have severe symptoms or sudden big changes like from a hemorrhagic stroke, they are just as likely to have a right-sided stroke as a left-sided one. But, it's hard to notice mild symptoms of a stroke on the right side of the body. When adults have a stroke on the right side of their brain, they may not go to the doctor until their symptoms get really bad. The National Institutes of Health Stroke Scale is often used in the United States and around the world [5]. It is a 42-point scale designed to evaluate cognitive, linguistic, motor, and sensory abilities.

The opposite side of the body's motions and sensations are coordinated by each half of the brain. All the same, the brain's hemispheres serve a variety of unique purposes. There might be more than one primary site of brain damage, which could compound the symptoms even if there might only be one main area of tissue loss. Thinking about where things are and making decisions are two activities that the right side of the brain assists us with. Having problems perceiving and interpreting space, experiencing intense emotions, and having communication difficulties are among the symptoms. Between 22% and 46% of patients with acute right hemisphere stroke demonstrate unilateral neglect, according to Teasell et al. (2020). The most obvious issue related to right hemisphere stroke [6]. According to an estimate by [7], only 25% of patients with the right hemispheric stroke initially present with unilateral neglect.

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Language symbol learning and usage are specialized functions of the left brain. The clinical manifestations are apraxia, aphasia, and potentially emotional disturbances. The left hemisphere is almost entirely responsible for language function. [3].

Upon leaving a rehabilitation facility, acute stroke survivors may benefit from programs that emphasize that rehabilitation is a lifetime process. Interventions to enable stroke victims to follow a self-directed wellness program could significantly improve the quality of life for stroke victims. Managing the acute stage of stroke recovery and assessing the efficacy of relatively short-term rehabilitation programs have been the main clinical and scientific priorities in stroke care to date [8].

Statement of Problem

Depending on the kind of stroke and where it occurs in the brain, there can be a variety of symptoms. Treatment options will vary depending on whether the condition affects the left or right side of the brain. Strokes on the left side of the brain are more common than those on the right, according to numerous research conducted in hospitals.[9]. According to many experts, strokes that happen in hospitals are perceived as being more serious and are easier to identify. [10]. Left-sided strokes are noticed than right-sided strokes due to the fact that they do cause clearer symptoms like trouble speaking. Right-sided strokes may cause less obvious symptoms like neglecting one side of the body or feeling lost in space [4]. This study wants to find out if left-sided strokes happen more often or if doctors just notice them more often than right-sided strokes. Furthermore, this study discovered a correlation between having a left side stroke and age, the severity of the stroke, and the time it took for symptoms to appear. It might be challenging to identify the signs of a right-sided stroke, which makes it challenging to provide patients with the optimal care during the crucial initial hours following a stroke. Because it illustrates the difficulties in treating strokes according to the side of the brain afflicted, this study is significant.

Objectives of Study

The objectives of the study were to;

i. Investigate the clinical presentations of left-sided stroke survivors in University of Medical Sciences Teaching Hospitals, Ondo state within the weeks of study.
ii. Investigate the clinical manifestations of right-sided stroke in University of Medical Sciences Teaching Hospitals, Ondo state within the weeks of study.
iii. Analyze the clinical manifestations of left and right-sided stroke survivors.

2. RELATED WORKS

A stroke can cause death or severe disability and is a common reason for both around the world. A stroke can be divided into two types based on what causes it: ischemic or hemorrhagic. Most strokes (about 90%) happen because of a sudden loss of blood supply to the brain, caused by blood clots or blockages. Brain bleeding due to burst blood vessels is responsible for about 10% of strokes [11]. Blockages in the blood vessels cause about 85% of deaths in stroke patients, while the rest are caused by bleeding inside the brain. Blockage in

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the blood vessels causes blood clots and other problems in the brain. [2]. Thrombosis happens when blood can't flow properly because the blood vessels are narrow from atherosclerosis. Plaque build-up in your blood vessels can narrow them and cause blood clots, leading to a stroke. A blood clot in the brain can cause a stroke. This means the brain doesn't get enough blood and can make the cells die. When cells die, their outer layer breaks apart, their internal parts get bigger, and their insides leak out into the surrounding area [12], and loss of neuronal function. Other important things that can cause stroke are inflammation, loss of energy, imbalance in the body, too much acid in the body, high levels of calcium inside cells, damage from free radicals, harmful chemicals from the immune system, trouble with the brain barrier, activation of certain brain cells, and damage from oxygen and white blood cells [12]. A hemorrhagic stroke is around 10-15% of all strokes and often leads to death. In this situation, pressure in the brain tissue and damage inside the brain can make blood vessels break. It harms the blood vessels and can cause a heart attack [13]. It is divided into bleeding inside the brain and bleeding in the space around the brain. In ICH, blood vessels break and lead to an unusual buildup of blood in the brain. High blood pressure, blood vessel issues, and overuse of blood thinners are the main causes of ICH. Blood can accumulate in the area surrounding your brain if you have had a head injury or have a weak blood artery in your brain. We refer to this as a subarachnoid hemorrhage. [12].

3. METHODOLOGY

This study was a comparative study. The purposive sampling method was used to select the participants for this study. The sample was determined using

$$n = \frac{In(1 - \Upsilon)}{In(1 - \pi)}$$

Where n = number of participants

Υ= level of confidence = 0.95

π= Probability = 0.139

$$n = \frac{In(1 - 0.95)}{In(1 - 0.139)} = \frac{-2.996}{-0.150}$$

$$n = 19.97 \simeq 20$$

20 participants will be used for this study. [14], [15]

Ethical clearance to carry out the research was obtained from the Ethical and Health Research Committee of the University of Medical Sciences Teaching Hospital, Ondo, Ondo State (Appendix II). Permission for data collection was obtained from the Head of Department General Outpatient, University of Medical Sciences, Ondo State (Appendix III). The National Institute of Health stroke scale was used to assess the stroke severity in patients. Brunstrom's stages of recovery were used to monitor the patient's recovery. Version 23.0 of the statistical program for social sciences was used to analyze the data. Data was summarized using descriptive statistics such as mean and standard deviation. Inferential statistics of independent t-tests were used to compare the clinical manifestations of right and left-sided stroke.

The alpha level would be set at $p<0.05$.

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4. RESULTS AND DISCUSSION

Clinical Manifestation of Left-Sided Stroke

The finding of this study showed that the mean level of consciousness (general) of left-sided stroke patients who participated in the study was 0.27±0.46. The mean level of consciousness (response to questions) of the left-sided stroke participants was 0.46±0.69 and the mean level of consciousness (response to commands) was 0.73±0.47. Also, the mean "best gaze" (the ability to establish eye contact) of the patients was 0.64±0.51, the mean "visual loss" (inability to see) of the patients was 0.36±0.51, the mean facial palsy (asymmetry of the face) of the patients was 1.09±0.83. Furthermore, the mean left "motor arm" of the patients was 0.27±0.47, while the mean right "motor arm" of the patients was 2.36±0.92. The mean left "motor leg" of the patients was 0.36±0.67, while the mean right "motor leg" of the patients was 2.27±0.65. The mean "limb ataxia" (incoordination of the limbs) of the patients was 1.18±0.60, while the mean "sensory loss" of the patients was 0.91±0.54. The mean "best language" (aphasia) of the patients was 0.82±0.60, while the mean "dysarthria" of the patients was 0.55±0.52. The mean "extinction and inattention" of the patients was 0.36±0.51. The mean total (severity of stroke) was 12.64±6.83 out of a maximum point of 42.

Clinical Manifestation of Right-Sided Stroke

The finding of this study showed that the mean level of consciousness (general) of right-sided stroke patients who participated in the study was 0.00±0.00, meaning that all the right-sided stroke participants were fully conscious. The results also showed that the mean level of consciousness (response to questions) of the right-sided stroke participants was 0.00±0.00 and the mean level of consciousness (response to commands) was 0.29±0.49. Also, the mean "best gaze" (the ability to establish eye contact) of the patients was 0.43±0.54, the mean "visual loss" (inability to see) of the patients was 0.00±0.00, the mean facial palsy (asymmetry of the face) of the patients was 0.86±0.69. The mean left "motor arm" (ability to hold left arm against gravity) of the patients was 2.14±0.69, while the mean right "motor arm" (ability to hold right arm against gravity) of the patients was 0.00±0.00. Furthermore, the mean left "motor leg" (ability to hold left leg against gravity) of the patients was 2.00±0.58, while the mean right "motor leg" (ability to hold right leg against gravity) of the patients was 0.14±0.38. The mean "limb ataxia" (incoordination of the limbs) of the patients was 0.86±0.38, while the mean "sensory loss" of the patients was 0.57±0.54. The mean "best language" (aphasia) of the patients was 0.14±0.38, while the mean "dysarthria" of the patients was 0.71±0.76. The mean "extinction and inattention" of the patients was 0.00±0.00. The mean total (severity of stroke) was 8.14±3.53.out of a maximum point of 42.

Consciousness of Right and Left-Sided Stroke

The findings indicated that there was no statistically significant variation in the general state of awareness between the research participants who had right-sided and left-sided strokes. In a similar vein, there was no discernible difference between stroke survivors on the left and right sides with regard to consciousness levels (in response to commands). However, the result showed that there was a significant difference in the level of consciousness (in response

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to a question) between the left and right-sided stroke participants (t = 1.73, p= 0.05). This comparison is shown in Table 1.

Table 1: Level of Consciousness in Left and Right-Sided Stroke Participants

Variables		Mean	SD	t	p
Level of consciousness (General)	Left side	0.27	±0.46	1.52	0.15
	Right side	0.00	±0.00		
Level of consciousness (Question)	Left side	0.46	±0.69	1.73	0.05*
	Right side	0.00	±0.00		
Level of consciousness (Command)	Left side	0.73	±0.47	1.92	0.08
	Right side	0.29	±0.49		

The Best Gaze (The Ability to Move the Eye Normally), Visual Loss, Facial Palsy of Left and Right-Sided Stroke

The study's findings demonstrated that there was no discernible difference between subjects with left- and right-sided strokes in terms of their optimal gaze. The degree of facial palsy in patients with left- and right-sided strokes did not significantly differ from one another either. However, there was a significant difference in the visual loss between left and right-sided stroke participants (t = 2.39, p = 0.04). Table 2 shows the comparison.

Table 2: Best Gaze, Visual Loss, Facial Palsy in Left and Right-Sided Stroke Participants Comparison

Variables		Mean	SD	t	p
Best gaze	Left side	0.64	±0.51	0.83	0.42
	Right side	0.43	±0.54		
Visual loss	Left side	0.36	±0.51	2.39	0.04*
	Right side	0.00	±0.00		
Visual loss	Left side	1.09	±0.83	0.62	0.53
	Right side	0.86	±0.69		

The Motor Arm and Motor Leg of Left and Right-Sided Stroke

The findings indicated that the motor arm (left) of the patients with left- and right-sided strokes differed significantly (t = -6.31, p = 0.00). Similarly, there was a significant difference in the motor arm (right) between the left and right-sided stroke participants (t = -6.69, p = 0.00). Furthermore, there was a significant difference in the motor leg (left) between the left and right-sided stroke participants (t = -5.29, p = 0.00). Also, there was a significant difference in the motor arm (right) between the left and right-sided stroke participants (t = 7.85, p = 0.00). The comparison of these motor abilities is shown in Table 3.

Table 3: Comparison of the Motor Arm and Motor Leg in Left and Right-Sided Stroke Participants

Variables		Mean	SD	t	p
Motor Arm left:	Left side	0.27	±0.47	-6.31	0.00*
	Right side	2.14	±0.69		

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Motor arm right:	Left side	2.36	±0.92	-6.69	0.00*
	Right side	0.00	±0.00		
Motor leg left:	Left side	0.36	±0.67	-5.29	0.00*
	Right side	2.00	±0.58		
Motor leg right:	Left side	2.27	±0.65	7.85	0.00*
	Right side	0.14	±0.38		

The Limb Ataxia and Sensory Loss of Left and Right-Sided Stroke

The result shows that there was no significant difference in limb ataxia between the left and right-sided stroke participants. Similarly, there was no significant difference in the sensory loss between the left and right-sided stroke participants as shown in Table 4.

Table 4: Comparison of the Limb Ataxia and Sensory Loss of Left and Right-Sided Stroke

Variables		Mean	SD	t	p
Limb ataxia:	: Left side	0.27	±0.47	1.27	0.22
	: Right side	0.86	±0.38		
Sensory loss:	: Left side	0.91	±0.54	1.30	0.38
	: Right side	0.57	±0.54		

Language and Dysarthria of Left and Right-Sided Stroke

There was a significant difference in the best language (aphasia) between the left and right-sided stroke participants. However, no significant difference in the dysarthria between the left and right-sided stroke participants was displayed as shown in Table 5.

Table 5: Comparison of the Best Language and Dysarthria of Left and Right-Sided Stroke

Variables		Mean	SD	t	p
Aphasia	: Left side	0.82	±0.60	2.92	0.01*
	: Right side	0.14	±0.38		
Dysarthria	: Left side	0.55	±0.52	-0.52	0.58
	: Right side	0.71	±0.76		

Extinction and Inattention of Left and Right-Sided Stroke

The result showed that there was a significant difference in the extinction and inattention between the left and right-sided stroke participants ($t = 2.39$, $p = 0.04$) as shown in Table 6.

Table 6. Extinction and Inattention, Total National Institute of Health Stroke Scale Score of Left-Sided and Right-Sided Stroke Participants

Variables		Mean	SD	t	p
Extinction and inattention	: Left side	0.36	±0.51	2.39	0.04*
	: Right side	0.00	±0.00		
Total NIHSS score	: Left side	0.36	±0.51	1.56	0.09
	: Right side	12.00	±8.00		

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Comparison of Total National Institute of Health Stroke Scale Score of Left-Sided and Right-Sided Stroke Participants (Severity of Stroke)

The result showed that there was no significant difference in the total score of left and right-sided stroke participants (t = 1.56, p = 0.09) as shown in Table 7.

Table 7. Extinction and Inattention, Total National Institute of Health Stroke Scale Score of Left-Sided and Right-Sided Stroke Participants

Variables		Mean	SD	t	p
Extinction and inattention	: Left side	0.36	±0.51	2.39	0.04*
	: Right side	0.00	±0.00		
Total NIHSS score	:Left side	0.36	±0.51	1.56	0.09
	: Right side	12.00	±8.00		

Assessment of clinical manifestation of left and right-sided stroke is important in the diagnosis and management of stroke patients. The objective of the current investigation was to ascertain how left- and right-sided stroke manifest clinically differ from one another. It also determined the distinct rehabilitation program for the left and right sided stroke lesion, as well as the severity of the clinical presentation of stroke is special to each stroke side in a survivor. The outcome of this study showed that there was no significant difference in the level of consciousness (general) between left and right-sided stroke participants. This implied that loss of consciousness is not specifically influenced by whether the stroke occurs on the left or right side of the brain. A stroke can potentially result in a loss of consciousness or alterations in consciousness, depending on the severity and location of the stroke within the brain [16]. The level of consciousness primarily depends on the overall impact of the stroke on the brain's vital structures and the extent of damage to the reticular activating system, which is responsible for regulating wakefulness and alertness. This is not specifically influenced by whether the stroke occurs on the left or right side of the brain. Similarly, the best gaze of participants with left- and right-sided strokes did not significantly differ from one another. A person's pre-existing eye movement patterns and visual ability, the location and severity of the stroke, the precise brain areas damaged, and other factors can all have an impact on their gaze behaviors[17]. The parts of the brain injured by the stroke will determine the particular kind and degree of gaze impairment. The degree of vision loss varied significantly across individuals who had right- and left-sided strokes, though. When it comes to visual loss, the location of the stroke within the brain is a critical factor in determining the specific visual deficits that may occur. While both left-sided and right-sided strokes can lead to visual impairments, the manifestations can differ based on the affected hemisphere. When the left side of the brain gets a stroke, it can cause problems with seeing on the right side. But if the right side of the brain gets a stroke, it can cause problems with seeing on the left side.howeverThe loss of vision in both eyes on the same side of the visual field, is the term used to characterize these deficiencies [18]. The right side of the body usually experiences motor deficiencies following a left-sided stroke, which is caused by damage to the left hemisphere of the brain. This may cause paralysis, weakness, or trouble controlling movement in the right leg, right arm, or both [17]. The severity of the motor impairment can vary depending on the size and location of the stroke. Contrarily, in a right-sided stroke

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affecting the right hemisphere of the brain, the motor deficits will typically affect the left side of the body. This can lead to weakness, paralysis, or difficulty controlling movement in the left limbs [18]. The outcome demonstrated a statistically significant difference in extinction and inattention between the individuals who had right-sided and left-sided strokes. Left-sided neglect can occur in people who have right-sided strokes, which impact the left side of the brain. Their left side may be difficult for them to attend to or see objects, people, or events [19]. On the other hand, neglect is less common or, if it does occur, is typically less severe in cases of left-sided strokes, which affect the right side of the brain. This is so because spatial attention and awareness are mostly controlled by the right hemisphere of the brain.

5. CONCLUSION

It can be concluded from this study that using the National Institute of Health stroke scale, there were significant differences in the level of consciousness in response to the question, visual loss, motor arm right, motor arm left, motor leg right, motor leg left, aphasia and in extinction and distinction scale in left and right-sided stroke participants. However, there were no significant differences in other clinical parameters. A comprehensive evaluation by the physiotherapist is necessary to assess the clinical manifestations of stroke. Also, other members of the rehabilitative team should be actively engaged to give appropriate therapy for comprehensive and holistic management.

Acknowledgment
I wish to acknowledge the input of Dr. R.S Olojuolawe.

6. REFERENCES

1. J. D. Easton, “Epidemiology of stroke recurrence,” Cerebrovascular Diseases, vol. 7. pp. 2–4, 1997. doi: 10.1159/000108229.
2. R. Teasell et al., “Canadian Stroke Best Practice Recommendations: Rehabilitation, Recovery, and Community Participation following Stroke. Part One: Rehabilitation and Recovery Following Stroke; 6th Edition Update 2019,” Int. J. Stroke, vol. 15, no. 7, pp. 763–788, 2020, doi: 10.1177/1747493019897843.
3. E. S. Donkor, “Stroke in the 21st Century: A Snapshot of the Burden, Epidemiology, and Quality of Life,” Stroke Res. Treat., vol. 2018, 2018, doi: 10.1155/2018/3238165.
4. C. Foerch, B. Misselwitz, M. Sitzer, K. Berger, H. Steinmetz, and T. Neumann-Haefelin, “Difference in recognition of right and left hemispheric stroke,” Lancet, vol. 366, no. 9483, pp. 392–393, 2005, doi: 10.1016/S0140-6736(05)67024-9.
5. S. Di Legge, J. Fang, G. Saposnik, and V. Hachinski, “The impact of lesion side on acute stroke treatment,” Neurology, vol. 65, no. 1, pp. 81–86, 2005, doi: 10.1212/01.wnl.0000167608.94237.aa.
6. P. Azouvi et al., “Sensitivity of clinical and behavioural tests of spatial neglect after right hemisphere stroke,” J. Neurol. Neurosurg. Psychiatry, vol. 73, no. 2, pp. 160–166, 2002, doi: 10.1136/jnnp.73.2.160.
7. J. Johnson, V. Pearson, and L. McDivitt, “Stroke rehabilitation: assessing stroke

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http://journal.hmjournals.com/index.php/JNRPSP
DOI: https://doi.org/10.55529/jnrpsp.32.27.36

survivors' long-term learning needs.," Rehabil. Nurs., vol. 22, no. 5, pp. 243–248, 1997, doi: 10.1002/j.2048-7940.1997.tb02110.x.

8. M. L. P. Portegies, M. Selwaness, A. Hofman, P. J. Koudstaal, M. W. Vernooij, and M. Arfan Ikram, "Left-sided strokes are more often recognized than right-sided strokes: The Rotterdam study," Stroke, vol. 46, no. 1, pp. 252–254, 2015, doi: 10.1161/STROKEAHA.114.007385.
9. M. L. P. Portegies, M. Selwaness, A. Hofman, P. J. Koudstaal, M. W. Vernooij, and M. Arfan Ikram, "Left-sided strokes are more often recognized than right-sided strokes: The Rotterdam study," Stroke, vol. 46, no. 1, pp. 252–254, 2015, doi: 10.1161/STROKEAHA.114.007385.
10. S. Muehlschlegel, "Subarachnoid Hemorrhage," Contin. Lifelong Learn. Neurol., vol. 24, no. 6, pp. 1623–1657, 2018, doi: 10.1212/CON.0000000000000679.
11. J. Anrather and C. Iadecola, "Inflammation and Stroke: An Overview," Neurotherapeutics, vol. 13, no. 4, pp. 661–670, 2016, doi: 10.1007/s13311-016-0483-x.
12. M. L. Flaherty et al., "Racial variations in location and risk of intracerebral hemorrhage," Stroke, vol. 36, no. 5, pp. 934–937, 2005, doi: 10.1161/01.STR.0000160756.72109.95.
13. W. Viechtbauer et al., "A simple formula for the calculation of sample size in pilot studies," J. Clin. Epidemiol., vol. 68, no. 11, pp. 1375–1379, 2015, doi: 10.1016/j.jclinepi.2015.04.014.
14. S. A. Randolph, "Ischemic Stroke," Work. Heal. Saf., vol. 64, no. 9, p. 444, 2016, doi: 10.1177/2165079916665400.
15. R. Côté, V. C. Hachinski, B. L. Shurvell, J. W. Norris, and C. Wolfson, "The Canadian neurological scale: A preliminary study in acute stroke," Stroke, vol. 17, no. 4, pp. 731–737, 1986, doi: 10.1161/01.STR.17.4.731.
16. F. Herpich and F. Rincon, "Management of Acute Ischemic Stroke," Crit. Care Med., vol. 48, no. 11, pp. 1654–1663, 2020, doi: 10.1097/CCM.0000000000004597.
17. A. W. Alexandrov, "What is a stroke?," Stroke Nurs. Second Ed., pp. 19–51, 2019, doi: 10.1002/9781119581161.ch2.
18. P. Lyden, L. Claesson, S. Havstad, T. Ashwood, and M. Lu, "Factor analysis of the National Institutes of Health Stroke Scale in patients with large strokes," Arch. Neurol., vol. 61, no. 11, pp. 1677–1680, 2004, doi: 10.1001/archneur.61.11.1677.