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CLINICAL FEATURES AND DAILY ACTIVITY DEPENDENCE IN STROKE PATIENTS: A BARTHEL INDEX-BASED STUDY AT HA TINH REHABILITATION HOSPITAL IN 2024

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ABSTRACT

Aims: Stroke is a leading cause of disability worldwide, significantly affecting patients' ability to perform daily activities. In Vietnam, stroke survivors often face prolonged dependence on others for daily care. This study aimed to describe the clinical characteristics and assess the level of dependence in daily activities among stroke patients at Ha Tinh Rehabilitation Hospital.

Methods: A descriptive cross-sectional study was conducted on 117 stroke patients undergoing rehabilitation at Ha Tinh Rehabilitation Hospital from March to September 2024. Patients were assessed using the Barthel Index, which measures independence in 10 basic activities of daily living. Data were collected through medical record reviews, patient observations, and interviews. Statistical analysis was performed using SPSS 25.0, with chi-square tests for differences between proportions.

Results: The average Barthel Index score was 50.44 ± 32.42, indicating moderate dependence. Only 16.2% of patients were fully independent, while 49.6% were completely dependent. Factors such as age, educational level, social support, smoking, and clinical conditions like aphasia and dysphagia were significantly associated with levels of independence ($p < 0.05$).

Conclusion: The majority of stroke patients at Ha Tinh Rehabilitation Hospital demonstrated a high level of dependence in daily activities. Interventions targeting social support, lifestyle changes, and early rehabilitation may enhance patient independence and improve outcomes.

Keywords: Stroke, Barthel Index, Daily activities, Dependence, Ha Tinh Rehabilitation Hospital.

1. INTRODUCTION

Stroke (or cerebrovascular accident) is one of the most critical global health issues due to its high prevalence, mortality rate, and significant risk of severe disability. It ranks as the third leading cause of death worldwide, after cardiovascular diseases and cancer, and imposes a substantial burden on families and society, particularly in developing countries. According to the World Stroke Organization (WSO), in 2022, approximately 12.2 million new cases of stroke occurred globally, with over 16% affecting individuals aged 15 to 49 years. Stroke causes around 6.5 million deaths annually, with more than 6% occurring in young adults. This number is projected to rise to 7.8 million by 2030 [1,2].

In Vietnam, there are approximately 200,000 new cases of stroke each year, with a mortality rate as high as 20%. Furthermore, around 90% of stroke survivors face neurological and motor deficits that severely impact their ability to perform daily activities [3]. Motor impairments, including deficits in hand and leg function, often render patients dependent on others for basic daily tasks, leading to reduced quality of life, shortened lifespan, and diminished opportunities for social reintegration.

Assessing the level of independence in daily activities among stroke patients is a crucial factor in developing care plans, rehabilitation strategies, and guiding self-care practices. The Barthel Index is a widely used and effective tool for evaluating the degree of dependence in activities of daily living. Therefore, this study aims to describe the clinical features and determine the level of independence in daily activities based on Barthel Index scores among stroke patients at Ha Tinh Rehabilitation Hospital in 2024.

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2. MATERIALS AND METHODS

2.1. Study design

Descriptive cross-sectional study.

2.2. Place and time

From March 2024 to September 2024 in Ha Tinh Rehabilitation hospital in Vietnam.

2.3. Study population

Patients with stroke undergoing rehabilitation treatment at Ha Tinh Rehabilitation Hospital.

- *Inclusion criteria:* Patients who meet the World Health Organization (WHO) clinical criteria for stroke diagnosis: a sudden onset of clinical signs of focal or global neurological dysfunction in the brain, lasting more than 24 hours or leading to death, with no apparent cause other than a vascular origin [4]. Patients must be classified as level II or level III care (as prescribed by the physician), have passed the acute phase of treatment, and have a stable condition. Additionally, patients must be able to communicate and possess cognitive awareness.

- *Exclusion criteria:* Patients with traumatic brain injury, those with existing psychiatric disorders, or patients who do not consent to participate in the study.

2.4. Sample size and sampling methods

The study employed a total sampling approach, using a convenient sampling method. All stroke patients receiving treatment at Ha Tinh Rehabilitation Hospital during the study period who meet the inclusion criteria were invited to participate in the study.

2.5. Variables

General characteristics of the study population: Gender, age, ethnicity, educational level, occupation, marital status, place of residence, and economic status; Clinical characteristics: Stroke classification (ischemic stroke/ hemorrhagic stroke), side of weakness/paralysis; Level of independence in daily activities based on the Barthel Index, which includes 10 basic functional activities: eating, bathing, grooming, dressing, bowel control, bladder control, transferring, mobility on flat surfaces, and stair climbing [5].

The minimum score of the Barthel index is 0 and the maximum is 100. The interpretation of the Barthel index score is as follows, independent (90-100), dependent (0-89), and fully dependent (0–49). Data were analyzed using frequency distribution.

2.6. Data Collection

- Medical Record Review: Personal information, including weight, height, age, address, occupation, type of brain injury, paralyzed limb, medical diagnosis, and comorbidities were collected from patient records.

- Observation and Interview: The main investigators, who were rehabilitation technicians trained in data collection, explained the purpose of the assessment to the patients. The patients performed the required activities under observation. Investigators could also observe patients during natural activity. Interviews were conducted during or after therapy sessions, where patients were invited to complete a questionnaire, or assisted if unable. Investigators created a friendly and open atmosphere to help patients communicate comfortably. Ample time was provided to ensure accurate responses.

The questionnaire was based on previous studies on daily independence in stroke patients [6,7,8].

2.7. Statistical analysis

The data were cleaned and entered using Microsoft Excel 2016. Descriptive statistics were performed and reported by frequency and proportion. Chi square test was used to test for differences between proportions. Statistical analyses were carried out using SPSS 25.0.

2.8. Ethics

This study was conducted under the approval of Decision No. 101/QĐ-BVPHCN dated April 11, 2024, issued by the Director of the Ha Tinh Rehabilitation Hospital. Patients and their families were fully informed of the research objectives and methods before deciding to participate. Participation was entirely voluntary, with the right to decline or withdraw at any time without explanation. All data collected were used strictly for scientific purposes, and personal information was kept confidential.

3. RESULTS

This study used complete data collected from 117 stroke patients in the analysis phase; 6 incomplete questionnaires were excluded. One hundred and seventeen stroke patients participated in this study, only 16.2% (19) were classified as independent in activities of daily living based on the results of the Barthel index instrument. The following provides specific details on the personal and clinical characteristics and the significant mobility, continence, and self-care functions that were related to the activities of daily living status of stroke patients.

Table 1. Baseline Socio-demographic characteristics of stroke patients attending Ha Tinh Rehabilitation Hospital (n=117)

Variables		Frequency	
		n	%
Age group (years)	≤ 40	4	3.4
	41-59	39	33.3
	≥ 60	74	63.2
	64.43 ± 12.71		
Gender	Female	43	36.8
	Male	74	63.2
Residence	Urban areas	31	26.5
	Suburb areas	86	73.5
Education	Primary school	31	26.5
	Secondary school	57	48.7
	High school	20	17.1
	College/university and above level	9	7.7
Marital status	Married	91	77.8
	Not married	8	6.8
	Widowed/Divorced	18	15.4
Support from social organizations	Yes	56	47.9
	No	61	52.1
Social connections*	Yes	72	61.5
	No	45	38.5
Smoking history	Yes	79	67.5
	No	38	32.5
Drinking history	Yes	43	36.8
	No	74	63.2

** Friends, colleagues, and partners...*

The study was conducted on 117 patients, of which 63.2% were male. Most patients were aged 60 and above, with an average age of 64.43 ± 12.71 years. More than half of the participants did not receive support from social organizations, and 61.5% had multiple social connections, including friends, colleagues, and partners. Regarding health-related behaviors, 79 patients (67.5%) reported having smoked or currently smoking, while nearly two-thirds of the participants did not consume alcohol.

Table 2. Clinical Characteristics of Stroke Patients attending Ha Tinh Rehabilitation Hospital (n=117)

Variables		Frequency	
		n	%
BMI	Underweight: < 18.5 kg/m^2	24	20.5
	Normal: 18.5–24.99 kg/m^2	68	58.1
	Overweight: 25–29.99 kg/m^2	17	14.5
	Obesity: ≥ 30 kg/m^2	8	6.8
Paralysis side	Right	41	35.0
	Left	63	53.9
	Both	13	11.1
Type of stroke	Ischemic Stroke	70	59.8
	Hemorrhagic Stroke	47	40.2
Length of stay	Over 1 month	78	66.7
	≤ 1 month	39	33.3
History of stroke	No	80	68.4
	Yes	37	31.6
Aphasia	Yes	39	33.3
	No	78	66.7
Dysphagia	Yes	57	48.7
	No	60	51.3
Insomnia	Yes	91	77.8
	No	26	22.2

The majority of patients had a normal nutritional status, only 6.8% being classified as obese. Notably, the rate of chronic energy deficiency among the participants was relatively high at 20.5%. More than half of the patients had ischemic stroke (59.8%). The proportion of patients with right-sided hemiplegia was lower than those with left-sided hemiplegia (35.0% compared to 53.9%), with 11.1% experiencing bilateral hemiplegia. Most patients had no history of stroke (first-time stroke at 68.4%). Additionally, 66.7% of patients could communicate normally, while 77.8% reported frequent insomnia.

Table 3. Independence level of 10 daily activities of stroke patients according to Barthel scale at Ha Tinh Rehabilitation Hospital

Daily activities	Independent [n (%)]	Dependence [n (%)]	Total Dependence [n (%)]
Feeding	46 (39.3)	15 (12.8)	56 (47.9)
Bathing	0 (0.0)	41(35.0)	76 (65.0)
Grooming	13 (11.1)	34 (29.1)	70 (59.8)
Dressing	40 (34.2)	14 (12.0)	63 (53.8)
Bowels	50 (42.7)	7 (6.0)	60 (51.3)
Bladder	44 (37.6)	7 (6.0)	66 (56.4)
Toilet	50 (42.7)	12 (10.3)	55 (47.0)
Transfer	59 (50.4)	11 (9.4)	47 (40.2)
Walking	49 (41.9)	16 (13.7)	52 (44.4)
Stair	47 (40.2)	8 (6.8)	62 (53.0)

At the time of discharge, none of the patients were completely independent in personal hygiene activities, and only a small percentage could perform personal care independently (11.1%). In this study, most daily activities demonstrated a higher rate of complete dependence compared to total independence. Notably, the proportion of patients requiring assistance in daily activities was very low.

Table 4. Distribution of independence level in daily activities of stroke patients according to Barthel scale at Ha Tinh Rehabilitation Hospital

Level of independence activity	Frequency	
	n	%
Mean ± SD: 50.44 ± 32.42		
Independent	19	16.2
Dependence	40	34.4
Total Dependence	58	49.6
Total	112	100.0

The average Barthel score of the patient group was 50.44 ± 32.42. Only 16.2% of the patients were completely independent, while nearly half of the study subjects (49.6%) were completely dependent on caregivers for daily activities.

Table 5. Factors associated with Activities of Daily Living of Stroke Patients attending Ha Tinh Rehabilitation Hospital

Variables	Level of independence activity			p-value
	Independent [n (%)]	Dependence [n (%)]	Total Dependence [n (%)]	
Age group				
≤ 40	1 (25.0)	3 (75.0)	0 (0.0)	0.18
41-59	5 (13.2)	16 (42.1)	17 (44.7)	
≥ 60	13 (17.3)	21 (28.0)	41 (54.7)	
Gender				
Male	12 (16.2)	21 (28.4)	41 (55.4)	0.19
Female	7 (16.3)	19 (44.2)	17 (39.5)	
Residence				
Urban areas	3 (9.7)	10 (32.3)	18 (58.1)	0.41
Suburb areas	16 (18.6)	30 (34.9)	40 (46.5)	
Education				
Primary school	9 (29.0)	12 (38.7)	10 (32.3)	0.02
Secondary school	4 (7.0)	22 (38.6)	31 (54.4)	
High school	5 (25.0)	2 (10.0)	13 (65.0)	
College/ university and above level	1 (11.1)	4 (44.4)	4 (44.4)	
Social connections				
No	3 (6.7)	21 (46.7)	21 (46.7)	0.02
Yes	16 (22.2)	19 (26.4)	37 (51.4)	
Smoking history				
Yes	7 (8.9)	24 (30.4)	48 (60.8)	0.00
No	12 (31.6)	16 (42.1)	10 (26.3)	

Variables	Level of independence activity			p-value
	Independent [n (%)]	Dependence [n (%)]	Total Dependence [n (%)]	
Drinking history				
Yes	3 (7.0)	13 (30.2)	27 (62.8)	0.04
No	16 (21.6)	27 (26.5)	31 (41.9)	
Paralysis side				
Right	6 (14.6)	16 (39.0)	19 (46.3)	0.85
Left	10 (15.9)	21 (33.3)	32 (50.8)	
Both	3 (23.1)	3 (23.1)	7 (53.8)	
Aphasia				
Yes	3 (7.7)	6 (15.4)	30 (76.9)	0.00
No	16 (20.5)	34 (43.6)	28 (35.9)	
Dysphagia				
Yes	6 (10.5)	14 (24.6)	37 (64.9)	0.005
No	13 (21.7)	26 (43.3)	21 (35.0)	
Insomnia				
Yes	12 (13.2)	29 (31.9)	50 (54.9)	0.07
No	7 (26.9)	11 (42.3)	8 (30.8)	

The study results indicate a statistically significant relationship ($p < 0.05$) between the factors of educational level, social relationships, smoking status, alcohol consumption, and clinical symptoms such as aphasia and dysphagia with the level of independence in daily activities.

4. DISCUSSION

This research was conducted on 117 patients after a stroke in Ha Tinh province in 2024 to identify some clinical characteristics and the level of limitation in activities of daily living (ADL) of stroke patients using the Barthel Index. In addition, we assessed the contributory factors associated with participants' level of ADL. We found that the ratio of male to female patients was 1.72/1. Our findings align with those of several other studies, such as Salhadin Mohammed (2023) and Hongyan Yang (2021), have reported similar results [9,10]. This disparity is attributed to the severity of the disease at the time of hospital admission, along with the presence of comorbidities. Additionally, men are more likely to engage in cardiovascular risk factors such as higher consumption of alcohol, tobacco, and stimulants. The average age of stroke patients in our study was 64.43 ± 12.71 years, which is consistent with findings from other authors [7,11,12,13]. These results indicate that strokes tend to increase with age, particularly between 60 and 70 years, due to associated risk factors such as hypertension, diabetes, and atherosclerosis.

4.1. The clinical characteristics of stroke patients

Our study recorded that the proportion of patients with left-sided paralysis was the highest at 53.9%, followed by those with right-sided weakness (hemiparesis), and patients with bilateral weakness/paralysis accounted for 11.1%. This result is consistent with the study by Hien NTT et al. (2019), which reported 43.2% of patients with right-sided paralysis, lower than those with left-sided paralysis at 54.1%, with only 2.7% of patients experiencing bilateral paralysis [13]. However, other studies report different results, such as Ha NTV and Minh PV (2021), which found a higher rate of right-sided paralysis (51.4%) compared to left-sided (48.6%) [14], and in the study by Thu NTT (2021), 18 patients (60%) had right-sided paralysis, while 12 patients (40%) had left-sided paralysis [12]. The location of weakness in stroke patients can vary depending on the site and extent of brain damage. Additionally, the severity of weakness, whether mild or severe, also affects limb movement, leading to difficulties in mobility, coordination, and fine motor skills.

In our study, the proportion of patients with ischemic stroke was higher than that of those with hemorrhagic stroke (59.8% and 40.2%, respectively). Many other studies have shown that the incidence of ischemic stroke typically ranges from 60% to 80% among stroke cases [11,14,15]. Similar results were found in studies by authors in Vietnam, such as Cao Phi Phong (2013), where ischemic stroke constituted 77.1%, higher than hemorrhagic stroke at 22.9% [8]. Global studies also reported similar findings, such as Li Pei (2016), where ischemic stroke accounted for 84.2% compared to 15.8% for hemorrhagic stroke [16]. K.H. (2014) found a rate of 64.1% for ischemic stroke versus 35.9% for hemorrhagic stroke [15], while Salhadin Mohammed (2023) reported 70.7% for ischemic stroke and only 29.3% for hemorrhagic stroke [9]. These results are consistent with the epidemiological and pathophysiological factors of these two types of stroke. Additionally, the higher degree of damage and increased mortality risk in the hemorrhagic stroke group partially explains the lower occurrence of hemorrhagic stroke in our study population.

The study results indicate that the majority of stroke patients have normal nutritional status; however, a

significant proportion suffers from chronic energy deficiency (20.5%). This may be due to the pathological processes and complications following a stroke that affect their ability to eat and absorb nutrients, coupled with reduced physical activity preventing patients from maintaining necessary muscle mass and energy levels. Additionally, 6.8% of patients are obese, which may be related to risk factors such as hypertension, diabetes, and a sedentary lifestyle. Nevertheless, the lower obesity rate compared to other studies might reflect different demographic characteristics or dietary habits of the study population [17,18]. The combination of high rates of chronic energy deficiency and obesity in a small group emphasizes the importance of assessing and managing nutritional status in stroke patients. This is crucial for optimizing recovery and reducing the risk of recurrence, as both nutritional deficiencies and obesity adversely affect long-term treatment outcomes.

Most patients in the study had not experienced a stroke previously (68.4%), suggesting that primary prevention plays a vital role in minimizing stroke risk. The majority of patients still have normal communication abilities (66.7%), which may be related to the relatively mild central nervous system damage or partial recovery of language functions. However, up to 77.8% of patients experience frequent insomnia, reflecting the impact of stroke on sleep quality due to stress, pain, or neurological damage. Prolonged insomnia not only hampers recovery, leading to reduced independence, but also increases the risk of stroke recurrence and other health issues such as hypertension, diabetes, and mental decline.

The study results indicate that no patients are fully independent in bathing, and only 11.1% are able to perform personal hygiene tasks independently. This reflects a severe dependency in daily activities, suggesting that strokes can significantly impact patients' self-care abilities and quality of life. The inability to carry out basic personal activities such as bathing and hygiene may lead to negative emotions like shame and lack of confidence, reducing their engagement in social activities and interactions with family. This situation not only affects mental health but can also lead to other health issues, such as infections or skin diseases.

4.2. Level of activity of daily living of stroke patients according to the Barthel scale

Our study findings reveal a predominant rate of complete dependency in daily living activities, particularly in bathing (65.0%) and personal hygiene (59.8%). This indicates a significant limitation in patients' independence. Compared to the study by Hien NTT (2020), which reported a dependency rate of 67.9% for bathing and 55.4% for personal hygiene, our results show no substantial difference, indicating that dependency in personal activities remains a common issue among stroke patients [13]. In contrast, Hien NTT (2020) reported that most patients achieved complete independence in bowel (62.5%) and bladder control (69.6%) upon discharge, while our study found these rates to be significantly lower at 42.7% and 37.6%, respectively [13]. This disparity may be attributed to differences in the extent of neurological damage and recovery rates, as our study included 11.1% of patients with bilateral paralysis and two-thirds had been hospitalized for over one month, whereas only 2.7% of patients in Hien NTT's study experienced bilateral paralysis [13].

Understanding which daily activities have high or low independence levels and which require assistance can assist healthcare professionals, patients, and their families in planning for discharge. To address these issues, it is essential to develop rehabilitation programs focusing on enhancing self-care abilities and providing psychological support for patients. Early and effective intervention measures can help improve patients' independence in daily activities, enhance quality of life, and facilitate better recovery post-stroke.

The average Barthel score of the patient group in our study was 50.44 ± 32.42, indicating a limited level of independence in daily activities. Only 16.2% of patients were completely independent, while nearly half (49.6%) were entirely dependent on caregivers. These results are similar to those reported by Hien NTT (2020), which showed an average Barthel score of 55.00 ± 28.18 and 42.9% of patients needing assistance in daily activities [13]. In comparison, Pham reported an average score of 54.4 (19.8) [11], and Joseph indicated an average score of 58.9 (24.7) [19], suggesting that our patients may face more severe challenges in functional recovery, possibly related to the severity of their injuries or post-stroke care conditions.

4.3. Factors associated with activities of daily living

Our study demonstrated a statistically significant correlation between the level of independence in daily activities and factors such as educational level, social relationships, smoking habits, alcohol consumption, and certain clinical symptoms like aphasia and dysphagia ($p < 0.05$).

These results suggest that patients with higher educational levels and strong social connections tend to have better recovery and independence in daily activities. This may be attributed to their access to information and support from family, friends, and the community, which can improve their psychological and physical conditions post-stroke.

Smoking and alcohol consumption habits were also associated with levels of independence. This aligns with Rui She's (2022) study, which indicated that approximately 40.3% of patients were smokers, showing statistical significance ($p < 0.05$) [20]. These unhealthy behaviors can increase the risk of recurrence and negatively affect the recovery process.

Patients exhibiting symptoms such as aphasia and dysphagia often face challenges in self-care, resulting in higher levels of dependency in daily activities. Our findings are consistent with Haruyo Matsuo's (2020) results, which showed that dysphagia is associated with functional ability as measured by the Barthel index at discharge ($p < 0.05$) [21]. Dysphagia complicates eating and medication intake, leading to higher reliance on family for adherence to medication. Limitations in dietary intake may result in inadequate energy-protein provision, putting patients at risk for malnutrition and nutrition-related complications, thus hindering functional recovery after stroke.

This study is the first to evaluate the difficulties faced by stroke patients in their daily activities at our facility and has highlighted factors that require further investigation. However, the study had some limitations. First, the small sample size makes it difficult to generalize the results to the entire stroke patient population, potentially not reflecting the true impact of stroke on patients' daily lives. Though the differences we observed were statistically significant, they were generally small and may not be clinically meaningful. Second, the use of non-probability sampling and the selection of only inpatient patients may introduce bias, as we do not capture the conditions of patients in the community. The assessment of independence in daily activities based on patient self-reports may be influenced by their perceptions and those of the researcher. Finally, the cross-sectional study design limits the ability to determine causal relationships among the variables.

5. CONCLUSIONS

In conclusion, this study provides valuable insights into the clinical characteristics, functional limitations, and daily living challenges faced by stroke patients at our facility. The findings indicate that most patients have significant dependence on daily activities, particularly in areas like personal hygiene and mobility. Several factors, including educational level, social relationships, smoking, alcohol use, and clinical symptoms like aphasia and dysphagia, were found to be associated with independence in daily activities. These data also suggest that targeted rehabilitation strategies and further studies are needed to address these critical issues in stroke care.

CONFLICT OF INTEREST

The authors declare that there is no conflict of interest.

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