Factors Related to Functional Status among Patients with Ischemic Stroke*

Pham Thi Nga[1], Wallada Chanruangvanich, RN, DNS[1],

Wimolrat Puwanawuttipanit, RN, PhD[1]

Abstract

Purpose: To examine the relationships between age, co-morbidity, stroke severity, and functional status among patients with ischemic stroke.

Design: Descriptive correlational design.

Methods: The sample was 115 patients with ischemic stroke who were treated at the Thai Binh General Hospital, Vietnam. Data were collected from the patients' hospital records and interviewed with 3 research instruments: 1) the National Institute of Health Stroke Scale (NIHSS), 2) Co-morbidity index, and 3) the Modified Barthel Activities of Daily Living Index. Spearman's rho was employed to test the relationship among studied variables.

Main findings: The results supported the proposed hypothesis that age, co-morbidity, and stroke severity were negatively related to functional status after two weeks of treatment ($r_s = -.42$, $r_s = -.35$, $r_s = -.90$, $p < .05$, respectively).

Conclusion and recommendations: Nurses should assess and manage patients' stroke severity, and try to control their co-morbidities. Standard guidelines should be developed and implemented to promote the transition from stroke illness to an independent functional status.

Keywords: age, co-morbidity, ischemic stroke, functional status, stroke severity

ปัจจัยที่มีความสัมพันธ์กับภาวะการทำหน้าที่ของผู้ป่วยโรคหลอดเลือดสมองตีบ*

Pham Thi Nga[1] วัลย์ลดา ฉันท์เรืองวณิชย์, พย.ด.[1] วิมลรัตน์ ภู่วราวุฒิพานิช, พย.ด.[1]

บทคัดย่อ

วัตถุประสงค์: เพื่อศึกษาความสัมพันธ์ระหว่างอายุ โรคร่วม และความรุนแรงของโรคหลอดเลือดสมอง กับภาวะการทำหน้าที่ของผู้ป่วยโรคหลอดเลือดสมองตีบ

รูปแบบการวิจัย: วิจัยเชิงสหสัมพันธ์

วิธีดำเนินการวิจัย: กลุ่มตัวอย่างเป็นผู้ป่วยโรคหลอดเลือดสมองตีบ จำนวน 115 คน ที่พักรักษาในโรงพยาบาลไทบิง เจนเนอรัล ประเทศเวียดนาม อายุตั้งแต่ 18 ปี และมีคะแนนการรู้คิดจากแบบวัด MMSE 23 คะแนน ขึ้นไป เก็บรวบรวมข้อมูลจากแฟ้มประวัติ และประเมินด้วยแบบวัด 3 ชุด ได้แก่ 1) ประเมินความรุนแรงของโรคหลอดเลือดสมองด้วย the National Institute of Health Stroke Scale (NIHSS) 2) ประเมินโรคร่วมด้วย Co-morbidity index, และ 3) ประเมินภาวะการทำหน้าที่ของผู้ป่วยโรคหลอดเลือดสมองตีบด้วย the Modified Barthel Activities of Daily Living Index วิเคราะห์ข้อมูลโดยใช้สถิติ Spearman's rho

ผลการวิจัย: พบว่าอายุ โรคร่วม และความรุนแรงของโรคหลอดเลือดสมอง มีความสัมพันธ์เชิงลบกับภาวะการทำหน้าที่อย่างมีนัยสำคัญทางสถิติ ($r_s = -.42$, $r_s = -.35$, $r_s = -.90$, $p < .05$, ตามลำดับ)

สรุปและข้อเสนอแนะ: พยาบาลควรประเมินและจัดการกับปัญหาความรุนแรงของโรคหลอดเลือดสมอง พยายามควบคุมโรคร่วมให้สงบ และพัฒนาแนวปฏิบัติที่เป็นมาตรฐานสำหรับหน่วยงาน ตลอดจนใช้แนวปฏิบัตินั้นส่งเสริมให้ผู้ป่วยสามารถเปลี่ยนผ่านจากภาวะความเจ็บป่วยสู่ภาวะการทำหน้าที่ได้โดยไม่ต้องพึ่งพา นอกจากนั้นควรมีการวิจัยเพื่อประเมินประสิทธิภาพของแนวปฏิบัตินี้

คำสำคัญ: ความรุนแรงของโรคหลอดเลือดสมอง อายุ โรคร่วม โรคหลอดเลือดสมองตีบ ภาวะการทำหน้าที่

Background and Significance

Cerebrovascular disease or stroke was one of the major health problems throughout the world. There were two types of stroke: hemorrhagic stroke and ischemic stroke which accounted for 80% of stroke patients[1]. It was the third leading cause of death globally only after ischemic heart disease and cancer[2], and the leading cause of adult disability. Approximately 90% of stroke survivors had some types of disability[3], which led to loss of manpower both at individual and national levels. Sixty percent of patients with stroke were dead or disabled at discharge[4]. Currently, it was estimated that there were 900,000 people in England who were living with stroke effects; and half of them depended on other people for helping with daily activities[5]. East Asia comprised 6% of the world's mortality due to stroke[6]. A study in 12 Asian countries showed a rising in the percentage of ischemic stroke and decreasing in hemorrhagic stroke[6]. A study at Da Nang Hospital in Vietnam indicated that total 754 patients with stroke; 37% accounted for mortality at day 28th[7], while stroke survivors lived with declined functional status[8]. This was higher than in 2000-2008 with 26.6% mortality rate estimated in low and middle-income countries and 19.8% in high-income countries[7].

Functional status was a major concern for patients with ischemic stroke; it could change positively or negatively from hospital admission to discharge. However, most stroke patients experienced poor transition of functional status due to limitation in physical function at discharge; which almost half of them remained in a wheelchair[8]. From the literature review, there were a number of factors related to functional status of stroke patients; such as age, stroke severity, and co-morbidities[9-12].

Stroke was a major disease in elderly[13]. The greater one's age, the more negative outcomes affected[14]. Furthermore, the stroke severities, such as neurological severity, hemiparesis severity, and impairment of deep sensation, were the important factors that affected functional

recovery[9]. Thus, age and stroke severity were important independent variables which had a strong correlation with functional status[9,12]. In addition, medical co-morbidities; such as hypertension, previous stroke, and diabetes mellitus; were common in patients suffering from ischemic stroke and associated with poorer functional status after acute stroke[11,12].

However, there was little, if any, research in Vietnam studied functional status among patients with ischemic stroke and its relationships with these factors. Therefore, this study was designed to find the relationships between age, stroke severity, co-morbidities, and functional status among ischemic stroke patients. The result of the study might be able to help nurses and health care personnel to develop a proper program for promoting functional recovery for ischemic stroke patients.

Objective

To identify the relationships between age, co-morbidity, stroke severity, and functional status of patients with ischemic stroke.

Hypothesis

Age, co-morbidity, and stroke severity were negatively related to functional status of ischemic stroke patients after two-weeks of treatment.

Methodology

This study was a descriptive correlational research.

Population and Sample

The population of this study included ischemic stroke patients both males and females with the age of 18 years or older, who were admitted at the Department of Neurology, Thai Binh General Hospital, Thai Binh Province, Vietnam.

The sample was selected from the population with the level of consciousness > 23 score using the Mini-Mental State Examination (MMSE) as the inclusion criteria. The exclusion criteria was pregnant and hemorrhage stroke.

The termination criteria was any sudden decreased of two scores on the Glasgow Coma scale.

The sample size was calculated using G*Power Program with α = .05; Power 1- β = .9; and medium effect size = R = .3[15]. The minimum number of participants needed was 109[16]. Additional 5% was added to cover missing value, therefore the total sample was 115 ischemic stroke patients.

Research Instruments

The instruments used for data collection included 5 questionnaires as follows:

1. The Mini-Mental State Examination (MMSE) was used to screen level of consciousness of patients before recruiting to the study. The total scores were 30, scores from 24 to 30 were considered within the normal range[17].

2. Demographic data and illness information were collected from patients' hospital records including age, gender, marital status, current address, medical payment method, disease diagnosis, and date of treatment.

3. The Modified Barthel Activities of Daily Living Index was used to assess functional status. This instrument assessed 10 activities of daily living including feeding, bathing, grooming, dressing, bowels, bladder, toilet use, transfers (bed to chair and back), mobility (on level surface), stairs. The scores ranged from 0 to 100 and a high score indicated better functional status and Koositamongkol, et al.[9] reported Cronbach's alpha coefficient of .86 in stroke patients.

4. The National Institute of Health Stroke Scale (NIHSS)[18], was used to assess severity of neurological deficit. The NIHSS was composed of 13 items as follows: assessment of level of conscious, level of conscious-questions, level of conscious-commands, best gaze, visual fields, facial palsy, motor arms, motor legs, limb ataxia, sensory, best language, dysarthria and extinction and inattention, and formerly neglect. The scores ranged from 0 to 42; and categorized for neurological deficit as follows: 0-6 = mild,

7-15 = moderate, and 16-42 = severe[19].

5. The Co-morbidity Index[9], was used to assess co-morbid diseases by creating a sum score of 17. The higher score indicated poorer health status.

Instrument validity

The Modified Barthel Activities of Daily Living Index, the NIHSS, and the Co-morbidity Index were translated from English to Vietnamese language using back translation technique; and verified by 5 experts in neurological area. After reviewing the instruments, all members agreed to use for study. The content validity was inspected and suggestions were made accordingly.

Instrument reliability

The Modified Barthel Activities of Daily Living Index and the NIHSS were tested with 30 patients who had similar characteristics to the sample, the scores were analyzed for reliability with Cronbach's alpha coefficient = .88 and .90, respectively. After completion with 115 subjects, Cronbach's alpha coefficients of the Modified Barthel Activities of Daily Living Index and the NIHSS were .84 and .95, respectively.

Protection of Human Subjects

The research proposal obtained ethical approval from the Institutional Review Board (IRB) of Faculty of Nursing, Mahidol University (COA No.IRB-NS2016/345.0205) and the IRB of Vietnam National University. Data were collected following the standard procedure suggested by the IRB. The researcher strictly concerned the issues of voluntary participation, informed consent, anonymity, and confidentiality of the studied subjects.

Data Collection

Data were collected as the following process.

1. After receiving permission to collect data from the studied hospital, the researcher met the head of department and the head nurse of Department of Neurology to explain the purpose of the research and details of data collection.

2. To prevent coercion, the researcher invited a registered nurse from the Neurological Department to be a research assistant in this study. All patients who met the inclusion criteria were invited to participate in the study. The research assistant explained objectives of the study and all details of data collection according to the participant information sheet; if the patient voluntarily agreed to participate in the study, he/she was invited to sign the consent form.

3. The research assistant collected demographic data and illness information from the patients' hospital records. Then, the research assistant introduced the researcher to voluntary subjects.

4. The researcher met the subjects, introduced herself, and established a relationship with the subjects. Then, the researcher interviewed and assessed the subjects with 3 questionnaires. The time used to complete data collection was about 30-40 minutes.

5. All subjects were assessed two times. The first time was on the day of admission. The second time was either on the day of discharge (if the subject was discharged before 2 weeks) or on day 14th, if the subject was still under treatment in the hospital.

Data Analysis

Data were analyzed using the computer statistical package with the level of significance at .05 as follows:

1. Descriptive statistics included frequency, percentage, range, mean, and standard deviation.

2. The studied variables were tested for normal distribution according to the assumption of the Pearson's Product Moment Correlation. However, none of the studied variables were normal distributed. Therefore, the Spearman's rho was employed to test correlation among the studied variables.

Findings

The results indicated that 58.26% of the subjects were males and 41.74% were females; the mean age was 66.9 years (SD = 10.9) with the range from 34 to 91 years; 80% were married; 63.48% finished primary education; 74.78% were farmers and 16.52% were retired; 72.17% had income < 100 USD/month.

Regarding illness information; 67.83% were first-time admission; 60.00% were admitted with paralysis; 59.13% had dysphagia; 77.39% had co-morbidity, mostly with one (33.04%) or two (31.30%) diseases; the highest percentage of co-morbid diseases was hypertension (56.52%).

Stroke severity as measured by the NIHSS; 30.43% of the subjects had moderate to severe stroke; while 69.57% had mild physical and psychological symptoms.

Regarding functional status as measured by the Modified Barthel Activities of Daily Living Index; the average score was 65.20 (SD = 29.10); 60.87% of the subjects were dependent in ADL (score ≤ 80) after two weeks of treatment.

The relationships between age, co-morbidity, stroke severity, and functional status

The results supported the proposed hypothesis that age, co-morbidity, and stroke severity were negatively related to functional status after two weeks of treatment ($r_s = -.42$, $r_s = -.35$, $r_s = -.90$, p < .05, respectively. (Table 1)

Table 1: The relationships between age, co-morbidity, stroke severity, and functional status

	1	2	3	4
1. Age	1.00			
2. Co-morbidity	.11	1.00		
3. Stroke severity	.35*	.37*	1.00	
4. Functional status	- .42*	- .35*	- .90*	1.00

* p < .05

Discussion

The results supported the hypothesis that age was negatively related to functional status of patients with ischemic stroke (r_s = - .42, p < . 05); which meant that the higher patients' age, the lower the functional recovery they had. Many previous researchers have pointed out that age had a strong relationship with unfavorable functional status as ADL[20,21]. The finding was similar to the study of Pohl and colleagues that participants whose age was higher than 77.7 years when being discharged from the hospital had to be in residential care because of dependent functional status[21]. Carod-Artal, et al.[19] also indicated that the greater the age, the worse their functional status. It could be explained that elder people often had atherosclerotic plaques which caused thrombosis; and it was found that thrombosis occupied one third of causes in ischemic stroke[22]. The mean age of subjects in this study was 66.9 years which was counted as elderly; and 60.87% of the subjects were dependent in ADL (score ≤ 80) after two weeks of treatment; resulted in the negative relationship between age and functional status.

It was also found that co-morbidity was negatively related to functional status (r_s = - .35, p < . 05). According to the study of Lim and Cheon[12] in Korean, found that high co-morbidity was associated with poorer functional status after acute stroke. Furthermore, a study in Da Nang Hospital, Vietnam, showed that 96.5% of patients had hypertension and many of them were unaware of causal factors related to stroke such as current tobacco smoker (40.6%), high cholesterol (36.0%), DM (31.0%), and heart disease (7.2%)[7]. Co-morbidity was common with stroke patients[11]; and was defined as a prognostic factor of poor outcomes of functional status[19]. The findings from this study found that 77.39% of the subjects had co-morbidity, mostly with one (33.04%) or two (31.30%) diseases; the highest percentage of co-morbid diseases was hypertension (56.52%), and 12.17% had 3 major diseases of

hypertension, previous stroke, and DM. Stroke depended on mean arterial pressure to maintain normal cerebral blood flow so increasing or decreasing blood pressure suddenly could be harmful and related to unfavorable outcome of patients. Therefore, most of the subjects had poor functional status and were dependent in ADL.

The findings also found a high negative relationship between stroke severity and functional status (r_s = - .90, p < . 05), which meant that the higher stroke severity score, the lower functional status of patients with ischemic stroke. This was similar to the study of Li, et al.[23] that stroke severity scores and functional status scores had linear relationship with β = -3.35 (p < .001). Many previous studies also revealed that the decreased stroke severity score was a strong prognostic factor of a favorable outcome[9,14,23,24]. In Vietnam; it was frequent delay in referral stroke patients to hospital; usually, patients will not go to hospital when they had mild or transient symptoms[24]; they also did not know how to manage and waited until the symptoms became too severe for full recovery[24]; resulted in poorer functional status as found in this study (60.87% were dependent in ADL).

Conclusion and Recommendations

The results found that age, co-morbidity, and stroke severity had negative relationships with functional status. Therefore, nurses should prevent factors that caused declined functional status and improved independence in daily activities of patients with ischemic stroke. Standard guidelines should be developed and implemented to promote the transition from stroke illness to an independent functional status. The research should also be done to include other risk factors that related to functional status, such as weight loss, anxiety and depression, irritability, dementia and quality of life in Vietnamese stroke survivors. Stroke patients often have difficulty in achieving independence. So, the research should be a

follow up study at multiple times such as 3, 6 and 12 months after stroke to follow symptoms and functional recovery.

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