Factors Related to Health Status among Ischemic Stroke Patients with Dysphagia*

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Abstract

Purpose: To examine the relationships between severity of stroke, level of dysphagia, nutritional status, and health status among ischemic stroke patients with dysphagia (ISPD).

Design: Descriptive correlational design.

Methods: The sample composed of 115 ischemic stroke patients with dysphagia who were admitted to the Neurology Department, Bach Mai Hospital, Hanoi, Vietnam. Data were collected using the patients' hospital records and 4 questionnaires: 1) the NIH Stroke Scale (NIHSS), 2) the Gugging Swallowing Screen Scale (GUSS), 3) the Nutritional Risk Screening 2002 Scale (NRS-2002), and 4) the 12-item Short Form Survey (SF-12v2). Spearman's Rho was employed to test the relationships among studied variables.

Main findings: The findings revealed that severity of stroke and level of dysphagia were negatively correlated with physical health (r_s = - .45, r_s = - .31, p < .05); and mental health (r_s = - .54, r_s = - .71, p < .05); whereas nutritional status was positively correlated with both physical and mental health (r_s = .42, r_s = .23, p < .05).

Conclusion and recommendations: Severity of stroke, level of dysphagia and nutritional status affected physical and mental health of ischemic stroke patients with dysphagia. In order to improve health status for this group of patients, nurses should assess and detect dysphagia symptoms and nutritional status among patients with ischemic stroke. Nutritional programs should be developed and implemented as appropriate.

Keywords: ischemic stroke, dysphagia, health status, nutritional status, stroke severity

J Nurs Sci. 2017;35 Suppl 2:38-47

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ปัจจัยที่มีความสัมพันธ์กับภาวะสุขภาพในผู้ป่วยโรคหลอดเลือดสมองตีบที่มีภาวะกลืนลำบาก*

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บทคัดย่อ

วัตถุประสงค์: เพื่อศึกษาความสัมพันธ์ระหว่างความรุนแรงของโรคหลอดเลือดสมอง ระดับการกลืนลำบาก ภาวะโภชนาการ และภาวะสุขภาพในผู้ป่วยโรคหลอดเลือดสมองตีบที่มีภาวะกลืนลำบาก

รูปแบบการวิจัย: การศึกษาเชิงสหสัมพันธ์

วิธีดำเนินการวิจัย: กลุ่มตัวอย่างเป็นผู้ป่วยโรคหลอดเลือดสมองตีบที่มีภาวะกลืนลำบาก จำนวน 115 คน ที่เข้ารับการรักษาที่แผนกระบบประสาท โรงพยาบาลแบคมาย กรุงฮานอย ประเทศเวียดนาม เก็บข้อมูลโดยใช้แบบสอบถาม จำนวน 4 ชุด ได้แก่ 1) แบบประเมินระดับความรุนแรงของโรคหลอดเลือดสมอง the NIH Stroke Scale (NIHSS), 2) แบบประเมินภาวะการกลืน the Gugging Swallowing Screen Scale (GUSS), 3) แบบประเมินภาวะความเสี่ยงทางโภชนาการ the Nutritional Risk Screening 2002 Scale (NRS-2002), และ 4) แบบประเมินภาวะสุขภาพ the 12-item Short Form Survey (SF-12v2) วิเคราะห์ความสัมพันธ์โดยใช้สถิติ Spearman's rho

ผลการศึกษา: ผลการวิจัยพบว่าความรุนแรงของโรคหลอดเลือดสมองและระดับการกลืนลำบาก มีความสัมพันธ์ทางลบกับสุขภาพกาย (r_s = - .45, r_s = - .31, p < .05) และสุขภาพจิต (r_s = - .54, r_s = - .71, p < .05) ขณะที่ภาวะโภชนาการมีความสัมพันธ์ทางบวกกับสุขภาพกายและสุขภาพจิต (r_s = .42, r_s = .23, p < .05)

สรุปและข้อเสนอแนะ: ความรุนแรงของโรคหลอดเลือดสมอง ระดับการกลืนลำบาก และภาวะโภชนาการมีผลต่อสุขภาพกายและสุขภาพจิตในผู้ป่วยโรคหลอดเลือดสมองตีบที่มีภาวะการกลืนลำบาก เพื่อส่งเสริมภาวะสุขภาพของผู้ป่วยพยาบาลควรมีการตรวจสอบภาวะการกลืนลำบาก และภาวะโภชนาการในผู้ป่วยโรคหลอดเลือดสมองตีบ และควรมีการพัฒนาโปรแกรมการส่งเสริมภาวะโภชนาการและนำไปใช้อย่างเหมาะสมในผู้ป่วยโรคหลอดเลือดสมองตีบ

คำสำคัญ: โรคหลอดเลือดสมองตีบ ภาวะกลืนลำบาก ภาวะสุขภาพ ภาวะโภชนาการ ความรุนแรงของโรคหลอดเลือดสมองตีบ

J Nurs Sci. 2017;35 Suppl 2:38-47

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Background and Significance

Stroke was defined as the rapid development of clinical signs of cerebral function focal disturbance, sometimes causing inability to move particular parts of the body[1]. Ischemic stroke made up 87% of all strokes[2]. Stroke was a harmful disease with negative effects on 15 million individuals in the world annually with subsequent death frequently recorded[3]. Severity of stroke was a major cause increased limit of capacity to do activity of daily living, and finally affected health status of patients[4]. Higher level of severity in relation to neurological deficit led to higher severity of daily activities' deficit; resulted in decreasing of patients' health status[5].

A study of Basri, et al.[6] found that stroke caused a high number of deaths in ASEAN nations. According to the Vietnam Breaking News published in 2013; 200,000 people suffered from stroke each year, and half of these people died[7]. The long-lasting negative impacts of stroke have been realized recently and concentration has been formed to take proper measures in order to evaluate people's living standards. Human lives were affected considerably in several aspects including physical and mental function, memory and thinking, communication and role function. Stroke also affected social participation[8]. Many factors affecting health status of ischemic stroke patients have been described.

Dysphagia was frequently encountered in stroke patients, its frequency varied from 19% to 81%[9-12]. According to a recent study, dysphagia after stroke was found approximately 81% in Vietnam[13]. There were numerous conditions that undermined persons' health status such as biological, psychological, and social problems. Moreover, other severe diseases occurring in stroke patients could negatively affect disability[14]. Long-time dysphagia imposed change in body language and lifestyle, leading to suffering and negative impact on patients' recovery as they were unable to eat safely. All ischemic stroke patients with dysphagia might have many complications which have negative impacts on their health status[15]. Symptomatic dysphagia was recorded in approximately one fourth to one third of stroke patients. An increased risk for pulmonary complications was connected to the presence of dysphagia and even mortality[16]. Level of dysphagia affected health status of patients in terms of increased likelihood of pressure sores, reduced stamina, increased risk of anxiety or depression, reduced wound healing, and reduced physical recovery[17].

Nutritional status was known as the balance between energy emanating from nutritional intake and energy from rest, which was used for the metabolism process. The metabolism process combined with energy storage used to do activities and improve a person's health status. As a result, lower health status could occur in patients at high risk for malnutrition. Nutritional status could be used to estimate food and fluid intake to manage dysphagia in stroke patients[16].

In Vietnam, little if any research was found in relation to health status of ischemic stroke patients. Therefore, this study aimed to examine the relationships between severity of stroke, level of dysphagia, nutritional status, and health status among ischemic stroke patients with dysphagia. The results from this study would benefit nurses and health care team to manage care for this group of patients appropriately.

Objectives

To examine the relationships between severity of stroke, level of dysphagia, nutritional status, and health status among ischemic stroke patients with dysphagia.

Hypotheses

1. Severity of stroke and level of dysphagia were negatively correlated with health status in ischemic stroke patients with dysphagia.

2. Nutritional status was positively correlated with health status in ischemic stroke patients with dysphagia.

Methodology

This study was a descriptive correlational design.

Population and Sample

The population was ischemic stroke patients with dysphagia (ISPD) who were admitted to the Department of Neurology of Bach Mai Hospital, which is the biggest center for neurologic patients in the north of Vietnam, from August 2016 to October 2016.

The sample was selected from the population according to the inclusion criteria: 1) was confirmed by the GUSS test with the Glasgow Coma Score > 12 points, 2) aged ≥ 18 years, 3) able to communicate in Vietnamese language, and 4) were treated in the Department of Neurology for at least 1 week. Those with unstable conditions such as stupor, dyspnea, and alteration of homeostasis; tracheostomy/ endotracheal tubes, and/or mechanical ventilation; co-morbidities such as myocardial infarction, Wernicke's aphasia, dementia; no teeth; any swallowing disorders at admission due to other diseases such as myasthenia, previous stroke event; were excluded.

The sample size was calculated using G*Power Program with $\alpha = .05$; Power $1- \beta = .9$; and medium effect size = $R = .3$[18]. The minimum number of participants needed for a correlational design with 3 independent variables was 109[19]. Additional 5% was added to cover attrition or missing value, therefore the total sample was 115 ischemic stroke patients.

Research Instruments

Data were collected using research instruments as follows:

1. Demographic data were recorded from patients' hospital records.

2. The 12-item Short Form Survey (SF-12v2) was used to measure health status of the patients with the following eight dimensions: physical role, emotional role, physical function, social function, mental health, vitality, pain, and general health. The score of each subscale ranged from 0-100 with higher score indicating less dysfunction or impairment. The test-retest (2-week) reliability was observed in the general US population for the Physical Component Summary and the Mental Component Summary with .89 and .76, respectively[20].

3. The NIH Stroke Scale (NIHSS) was used to measure the severity of stroke. The NIHSS composed of 15 items, the total score ranged from 0 to 42[4]. A higher score reflected greater stroke severity.

The inter-rater reliability (calibrated among 6 raters) of this scale was excellent, with an intra-class correlation coefficient of .82[21].

4. The NRS-2002 scale was used to assess nutritional status of subjects[22]. The NRS score is the sum score of all items ranged from 0 to 7. The score between 0-2 indicated that the patients should be re-screened on a weekly basis, the score equal to or more than 3 indicated that the patients were at risk for malnutrition.

The trustworthiness of the NRS-2002 has been reported well[23].

5. The Gugging Swallowing Screen (GUSS) scale[24]. The GUSS was used to assess the severity of dysphagia; consisted of two parts: the Preliminary Investigation/Indirect Swallowing Test and Direct Swallowing Test. The total score ranged from 0 to 20; a higher score indicated a milder swallowing disorder. The inter-rater reliability between 2 raters was .84[25].

All instruments were back translated from English to Vietnamese language. Content validity was reviewed and approved by five experts including three nurses, one nutritionist and one neurologist. The content of the Vietnamese version of scale was considered to be valid if CVI is at least .80.

Protection of Human Subjects

The proposal for this study was approved from the IRB of the Faculty of Nursing, Mahidol University (COA No.IRB-NS2016/338.0205), and the IRB of the School of Medicine and Pharmacy, Vietnam National University. Data were collected according to the standard process suggested by the IRB. Issues of voluntary participation after receiving all related information, anonymity, and confidentiality

were concerned by the researcher.

Data Collection

Data were collected as follows:

1. After obtaining permission for data collection, the researcher met the chief of the Neurology Department to explain the purposes of the study and data collection process. The chief of the department introduced the researcher and the research assistants to the target population.

2. The research assistants explained details of the study to potential subjects and invited them to join the study voluntarily; then, asked those who were willing to participate in the study to sign the consent form.

3. The researcher collected data from the subjects by interviewing with the SF-12v2 scale; and assessed nutritional status with the NRS scale, stroke severity with the NIHSS, and dysphagia with the GUSS. The entire data collection process took approximately 30-35 minutes.

Data Analysis

Data were analyzed using the computer statistical program with the significant level .05 as the following details:

1. The descriptive statistics used to describe the characteristics of the subjects and studied variables: frequency, percentage, range, mean, and standard deviation.

2. The studied variables were tested for normal distribution to meet the assumption of the Pearson's Product Moment Correlation; it was found that none of them were normal distributed. Therefore, the Spearman's Rho correlation was used to examine the correlation among studied variables.

Findings

The results found that 60.87% of subjects were males, 39.13% were females; the mean age was 66 (SD = 10.4 years) with range of 40-88 years; 99.13% were married; 63.48% finished secondary education, 24.35% finished college and bachelor degree; 53.04% were farmers, 26.08% were retired; 45.22% had health insurance.

Regarding clinical information, 46.96% of subjects were admitted within the first 24 hours after stroke, 80.00% experienced hemiplegia alone and 17.39% experienced hemiplegia accompanied by other focal neurological signs, 40.00% affected the right side of the body, 44.34% affected the left side of the body. More than half of subjects had co-morbidities: 29.56% had hypertension and 26.96% had hypertension with other diseases such as diabetes, hyperlipidemia, etc. The mean of length of hospital stay was 10.9 days (SD = 4.1 days) with the range of 7-28 days. (Table 1)

Table 1: Clinical information of ischemic stroke patients (n = 115)

Clinical Information	Number	Percentage (%)
Time of admission after stroke		
within 24 hours	54	46.96
> 24 hours to 48 hours	16	13.91
> 48 hours to 72 hours	12	10.43
> 72 hours	33	28.70
Chief complaint		
Hemiplegia	92	80.00
Hemiplegia & others	20	17.39
Headache	3	2.61

Table 1: Clinical information of ischemic stroke patients (n = 115) (cont.)

Clinical Information	Number	Percentage (%)
Paralyzed status		
On the left side of the body	5	4.35
On the left side and other symptoms	46	40.00
On the right side of the body	6	5.22
On the right side and other symptoms	51	44.34
Hemiplegia on both side	5	4.35
Cranial nerve palsy	1	0.87
None	1	0.87
Co-morbidity		
Hypertension	34	29.56
Hypertension and other diseases	31	26.96
Diabetes	4	3.48
Hyperlipidemia	1	0.87
Prior Stroke/Prior TIA	5	4.35
Other diseases	10	8.70
None	30	26.08
Length of hospital stay		
7 days	18	15.65
8 to 14 days	78	67.83
15 to 21 days	16	13.91
> 21 days	3	2.61
Minimum: 7, Maximum: 28, Mean = 10.9, SD = 4.1		

Stroke severity, nutritional status, level of dysphagia, and health status

It was found that 51.30% of the subjects suffered from moderate stroke; 88.70% were at-risk for malnutrition; and 66.09% had slight dysphagia. Regarding to health status, it was measured by two components: physical health and mental health; mean of three physical health domains (Physical Functioning, Physical Role, General Health) fell into the impaired range (< 40). Similarly, score for two mental health domains (Social Functioning, Emotional Role) also fell into the impaired range (28.9 and 30.5 respectively).

Correlation between severity of stroke, nutritional status, levels of dysphagia, and health status among ischemic stroke patients with dysphagia

Hypothesis 1: Severity of stroke and level of dysphagia were negatively correlated with health status in ischemic stroke patients with dysphagia.

The results supported hypothesis 1 that severity of stroke and level of dysphagia were negatively correlated with physical health (r_s = - .45, r_s = - .31, p < .05); and mental health (r_s = - .54, r_s = - .71, p < .05). (Table 2)

Hypothesis 2: Nutritional status was positively correlated with health status in ischemic stroke patients with dysphagia.

The results also supported hypothesis 2 that nutritional status was positively correlated with both physical and mental health (r_s = .42, r_s = .23, p < .05). (Table 2)

Table 2: Correlation between severity of stroke, nutritional status, dysphagia, and health status among ischemic stroke patients with dysphagia (n = 115)

Variable		1	2	3	4	5
1. Severity of stroke		1.00				
2. Nutritional status		- .56*	1.00			
3. Dysphagia		.76*	- .49*	1.00		
Health status	4. Physical	- .45*	.42*	- .31*	1.00	
	5. Mental	- .54*	.23*	- .71*	- .12	1.00

* $p < .05$

Discussion

The findings indicated that health status of the subjects was impaired both physical health (M = 35.12, SD = 7.25) and mental health (M = 37.27, SD = 12.45); which might be explained that 68.70% of the subjects aged over 60 years with the mean age of 66.1 years; hence, physical and mental health were declined with the aging process. This finding was consistent with the findings of Arnold, et al. among 118 Switzerland stroke patients with dysphagia[25]. Overall, ischemic stroke patients with swallowing disorders experienced many unexpected risks on physical and mental health. Most of the patients' daily activities as well as others (individual and social activities) were limited at different levels due to physical disabilities. This will make the patients feel more anxious, fearful, depressed, leading to the impairment of mental health.

Severity of stroke was negatively correlated with physical health and mental health (r_s = - .45, r_s = - .54, $p < .05$). Patients with more severe of stroke would have poorer health status. This finding was similar to the study of Gajurel, et al.[26] in Nepal, found that none of the patients with moderately severe and severe strokes had good health status. Hence the researchers asserted that the health status of patients with more severe stroke condition was significantly lower than that in patients with less severe conditions[26]. Consistent with the findings of the study conducted in Spain among 131 ischemic stroke patients which found that patients' six-month health status to be impaired within a certain range after ischemic stroke[27]. A stroke study done in Nepal by Shrestha, et al.[28] concluded that baseline severity of stroke scale by one unit increased the odds of poor outcome of health status by 1.56 times (p = .001). Therefore, it could be concluded that more stroke severity led to lower health status.

Level of dysphagia was negatively correlated with physical health and mental health (r_s = - .31, r_s = - .71, $p < .05$); which meant that patients who had high level of dysphagia were more likely to have poor health status both physical and mental health. This finding was supported by the study of Al-Khaled, et al.[29] which demonstrated that ischemic stroke patients with dysphagia had a greater likelihood for 3-month disability than those without dysphagia, also the study by Arnold, et al. that ischemic stroke patients with dysphagia had a negative impact on clinical outcome[25].

Nutritional status was positively correlated with physical health and mental health (r_s = .42, r_s = .22, $p < .05$). Patients who had good nutritional status would have good health status both physical and mental health. The results reported that 88.70% of patients were nutritionally at-risk, thereby indicating the need for a special diet recommended by dieticians. By using different assessment tools, the previous studies identified that the frequency of malnutrition ranged from 6% to 62%[27] Another study conducted by Poels, et al.[30] conducted among 69 stroke patients in the Netherlands found that 73% of patients had malnourished at admission[30]. It could be said

that establishing a patient's malnutrition status is not always easy, because there was no universally accepted definition of malnutrition or golden standard for malnutrition status assessment[31]. The high rate of malnutrition among stroke patients on admission in the present research indicated a need for a schedule to be given by physiotherapists, neurologists, occupational therapists, stroke nurses, pharmacists and dieticians to manage malnutrition in this population.

Conclusion and Implications for Practice and Further Study

The findings of the present study revealed that severity of stroke; level of dysphagia; and nutritional status were correlated with health status among ischemic stroke patients with dysphagia. In order to enhance health status in ischemic stroke patients with dysphagia, the following measures should be performed by nurses or health care team: assessment of severity of stroke, dysphagia, and nutritional status as soon as possible in order to promote suitable diets to improve patients' health status.

For further study, clinical practice guidelines aimed to improve health status among ischemic stroke patients with dysphagia should be developed and tested for effectiveness by research before implementation.

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