



Original Article

Health science students' perceptions of motor and sensory aphasia caused by stroke

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Abstract. [Purpose] This study explored health science students' perceptions of motor aphasia and sensory aphasia caused by stroke to provide basic material for the improvement of rehabilitation practitioners' perceptions of aphasia. [Subjects and Methods] The subjects of this study were 642 freshmen and sophomores majoring in health science. Perceptions of aphasia were surveyed on a semantic differential scale using the Anchoring Vignette Method and the difference in perception of the two types of aphasia was analyzed using multi-dimensional scaling. [Results] The analysis revealed that motor aphasia and sensory aphasia have mutually corresponding images. Motor aphasia had high levels of 'quiet', 'passive', 'dumb', 'unstable' and 'gloomy' images, while sensory aphasia had high levels of 'noisy', 'unstable', 'cheerful', 'sensitive', 'fluctuating in emotions', 'active', 'dumb' and 'gloomy' images. [Conclusion] A systematic education is required to be implemented in the future to improve health science students' negative perceptions of the aftereffects of stroke such as aphasia.

Key words: Motor aphasia, Sensory aphasia, Stroke

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INTRODUCTION

Stroke is a generic term for both cerebral infarction which stops the flow of oxygen or blood due to blockage of cerebral blood vessels and cerebral hemorrhage caused by the rupture of cerebral blood vessels, and it accounts for 70% of cerebrovascular diseases¹⁾. Stroke is one of the three major causes of death in Korea as of 2013 and was reported to be the number one cause of death as a single disease²⁾. As the prevalence rate of stroke is increasing with the aging trend, special attention should be paid to stroke during the aging process. According to estimates of population computed by Statistics Korea, it is expected that there will be 350,000 stroke patients in the year 2030, which is more than twice the number of 2004²⁾.

When the cerebrum is damaged by stroke, the patient dies or suffers from various aftereffects such as motor disorder, physical paralysis, cognitive impairment, dysphagia or dysphasia depending on the damaged part of the brain³⁾. Among them, damage to the sprachzentrum, such as Broca's area, or Wernicke's area, severely impairs communication functions, and this condition is known as aphasia⁴⁾. According to the National Stroke Association, it is estimated that there are 80,000 new aphasia patients each year in the U.S.⁵⁾, and approximately half of stroke patients suffer from aphasia⁶⁾.

Aphasia from stroke is largely classified into motor aphasia (Broca's aphasia) and sensory aphasia (Wernicke's aphasia). Patients with motor aphasia, which is caused by damage to Broca's area in the rear of the inferior frontal lobe related to in speaking production of speech, show normal level of understanding of speech but lack of fluency due to difficulty with linguistic expression⁶⁾. On the other hand, sensory aphasia, which is caused by damage to Wernicke's area, which is located in the rear of superior temporal gyrus related to understanding of speech, results in fluent speech irrelevant to the themes, which is defined as dysphasia, a lack of linguistic understanding⁶⁾.

Although there were strong negative perceptions in the past that aftereffects of stroke such as aphasia cannot be cured, perceptions have changed to the positive one that patients with aftereffects can be rehabilitated⁷⁾. Most subjects of studies

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of perception of the disabled have been students, since they are not only the main pillars of future society, but they are also the generation which should form cooperative relationship with the disabled⁸⁾. However, even though studies on perceptions and attitudes toward disabilities have been regularly conducted^{9, 10)}, there have been few studies of aftereffects of stroke¹¹⁾.

This study explored health science students' perceptions of motor aphasia and sensory aphasia caused by stroke to provide basic material for the improvement of rehabilitation practitioners' perceptions of aphasia.

SUBJECTS AND METHODS

The subjects of this study were 642 freshmen and sophomores majoring in health science from 5 universities in Seoul, Suwon and Gwangju who understood the contents of this study and agreed to participate. This study was approved by the Institutional Review Board of Nambu University and was conducted in accordance with the ethical standards of the Declaration of Helsinki. The survey was conducted using a convenience sample. As the minimum number of samples calculated by power analysis was 107 for a significance level (α)=0.05, effect size of 0.15, and power of test (1- β error)=0.95 on the standard of t-distribution, the number of samples in this study was adequate. The general characteristics of the subjects are presented in Table 1.

Perceptions of aphasia were surveyed on a semantic differential scale using the Anchoring Vignette Method (AVM) and the difference in perceptions of the two types of aphasia were analyzed using multi-dimensional scaling. The AVM presented the characteristics of motor aphasia and sensory aphasia and the subjects selected adjectives which explained the symptoms¹⁰⁾. First, the subjects watched a 5-minute video reflecting the characteristics of motor aphasia and sensory aphasia, then, they replied to the questions of the structured questionnaire.

By referring to preceding studies^{9, 10)}, adjectives used for the questions were constructed in semantic differential scale of 5 points. In total, there were 15 adjectives: 'sensitive', 'dull', 'gloomy', 'cheerful', 'quiet', 'noisy', 'brilliant', 'dumb', 'passive', 'aggressive', 'stable', 'unstable', 'fluctuating in emotions', 'impassive' and 'active'. Cronbach's alpha, which shows the overall reliability of questions, was 0.87.

Multiple logistic regression analysis and multi-dimensional scaling were used as statistical tests in order to investigate the effect of the 15 adjectives used for the images of the two types of aphasia.

RESULTS

Multiple logistic regression analysis with the two types of aphasia as dependent variables and the 15 adjective items as independent variables, revealed that 10 items among 15 adjectives were significant images explaining aphasia; they were 'sensitive', 'gloomy', 'cheerful', 'quiet', 'noisy', 'dumb', 'passive', 'unstable', 'fluctuating in emotions', 'impassive' and 'active' ($p<0.05$).

The results of property fitting (PROFIT) of multi-dimensional scaling performed using the mean values of the 10 image items identified by the regression model are presented in Table 2. Our analysis shows that motor aphasia and sensory aphasia had mutually corresponding images. Motor aphasia had high levels of 'quiet', 'passive', 'dumb', 'unstable' and 'gloomy' images, while sensory aphasia had high level of 'noisy', 'unstable', 'cheerful', 'sensitive', 'fluctuating in emotions', 'active', 'dumb' and 'gloomy' images. 'Dumb', 'gloomy' and 'unstable' were images commonly perceived in both aphasias. The stress value of Euclidean distance was 0.02, which shows the analysis results had excellent appropriateness.

Table 1. Characteristics of the subjects (n=642)

Age, mean \pm SD	21.3 \pm 2.1
Gender, n (%)	
Male	227 (35.1)
Female	415 (64.9)
Major, n (%)	
Speech and language pathology	59 (9.2)
Physical therapy	238 (37.1)
Occupational therapy	125 (19.5)
Nursing	220 (34.2)
Grade	
1	362 (56.4)
2	280 (43.6)

Table 2. The results of multi-dimensional scaling

Images	Motor aphasia	Sensory aphasia
Dumb	0.7135	0.5078
Passive	1.1321	-0.8537
Quiet	1.0876	-1.0823
Fluctuating in emotions	-0.1231	0.7541
Cheerful	-1.0713	0.6837
Sensitive	-0.9564	1.1213
Gloomy	0.3541	0.3431
Noisy	-1.0309	0.5583
Active	-0.9805	1.1385
Unstable	0.1355	0.5387

DISCUSSION

Aphasia is a major aftereffect of stroke which limits social participation and thus, it is important to improve perceptions of the disorder for patients' successful rehabilitation and return to local communities. The present investigation of health science students' perceptions of motor aphasia and sensory aphasia using multi-dimensional scaling, found that motor aphasia and sensory aphasia had mutually corresponding images. Motor aphasia had high levels of 'quiet', 'passive', 'dumb', 'unstable' and 'gloomy' images, while sensory aphasia had high levels of 'noisy', 'unstable', 'cheerful', 'sensitive', 'fluctuating in emotions', 'active', 'dumb' and 'gloomy' images. Although it is difficult to make a direct comparison with this study, the speech of patients with language disorders was perceived as more unstable, less intelligent¹¹⁾ and more negative than that of normal people without speech disorders^{9, 10)}.

Regarding the clinical characteristics of aphasia, motor aphasia generally has complete/incomplete paralysis on the right side of body, due to damage in the descending pyramidal tract, and it is characterized by slow and short speech which lacks fluency but still has good understanding¹²⁾. On the other hand, as sensory aphasia does not accompany physical paralysis and recognize language problems, patients with sensory aphasia do not experience frustration due to failure of communication but have impaired understanding and thus, produce semantically meaningless speech¹²⁾.

Despite these general characteristics of aphasia, the characteristics perceived in practice by health science students were different. Especially, in this study, both motor aphasia and sensory aphasia were perceived in negative images such as 'gloomy', 'dumb' and 'unstable'. Even though not only linguistic but also cognitive problems are found in aphasia patients⁷⁾, and some cases of motor aphasia accompany catastrophic reaction¹³⁾, they do not necessarily accompany cognitive impairment or depression. Hence, it is necessary to seek out systematic measures to reduce prejudice and improve negative perceptions toward aphasia.

This study had some limitations. First, as the subjects were from only 3 cities, the results of the study cannot be generalized. Second, the subjects of the study were limited to freshmen and sophomores of universities. Future studies are required to conduct research to determine the perceptions of aphasia based on students' major and grade.

Both motor aphasia and sensory aphasia perceptions of health science students displayed negative images such as 'gloomy', 'dumb' and 'unstable'. A systematic education is required to be implemented in the future to improve health science students' negative perceptions of aftereffects of stroke such as aphasia.

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