Gender Differences in Aphasia Outcomes: Evidence from the AphasiaBank

Saryu Sharma, Heather Harris Wright & Charles Ellis

Communication Equity and Outcomes Lab
Aging and Adult Language Disorders Lab
Department of Communication Sciences and Disorders
College of Allied Health Sciences
East Carolina University
Greenville, North Carolina 27858

INTRODUCTION

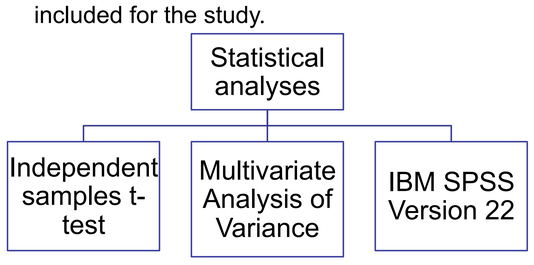
- Stroke is the fifth leading cause of death among American individuals [1]
- On average, 55,000 more women have a stroke each year compared to men [2]
- Each year, 100,000 individuals are diagnosed with aphasia following a stroke [3]
- Women may experience different aphasia outcomes than men due to differences in the underlying mechanisms that cause stroke

RESEARCH QUESTIONS

1. Are there gender differences in the type of aphasia experienced with stroke?
2. Are there gender differences in the severity of aphasia as measured by the WAB-R Aphasia Quotient (AQ)?
3. Are there gender differences in the individual subtests of the WAB-R AQ?

METHOD

- *Participants:*
  - 300 PWA (175 men, 125 women)
  - Mean age: 61.9 years
  - Mean duration of aphasia: 5.2 years
  - Mean years of SLP treatment: 3.2 years
- *Data source:* AphasiaBank
- *Aphasia outcomes:*
  - WAB-R AQ
  - WAB-R AQ subtest scores
  - Aphasia types included: anomic, Broca's, Wernicke's, global, conduction aphasia, transcortical (motor, sensory, isolation) and other.
- Participants with WAB-R AQ > 93.8 were included for the study.



RESULTS

Table 1. Univariate comparisons of WAB-R AQ and WAB-R AQ Subtest scores by gender

	Total	*Men*	*Women*	*p-value*
WAB-R AQ (Mean/SD)	70.8 (19.9)	67.4 (21.3)	75.6 (16.6)	<.001
Aphasia Severity (%)				.001
• Severe aphasia	4.8	8.1	0.0	
• Moderate Aphasia	26.5	27.3	25.4	
• Mild Aphasia	58.8	58.7	59	
• No Aphasia	9.9	5.8	15.6	
Spontaneous Speech (Mean/SD)				
• Information Content	7.7 (2.3)	7.3 (2.5)	8.2 (1.8)	<.001
• Fluency	6.3 (2.5)	5.9 (2.6)	6.8 (2.3)	.002
Repetition (Mean/SD)	65.3 (26.9)	61.28 (28.7)	70.8 (23.3)	<.001
Naming (Mean/SD)				
• Object Naming	44.4 (16.8)	43.0 (17.8)	46.4 (15.2)	.082
• Word Fluency	7.9 (5.2)	7.6 (5.3)	8.3 (5.0)	.289
• Sentence Completion	8.0 (2.7)	7.6 (2.9)	8.6 (2.3)	.002
• Responsive Speech	7.8 (3.1)	7.3 (3.4)	8.5 (2.5)	.002
Comprehension (Mean/SD)				
• Yes/No	55.7 (5.3)	54.7 (5.9)	57.0 (4.0)	<.001
• Auditory Word Recognition	53.4 (9.5)	52.0 (10.3)	55.4 (7.8)	.002
• Sequential Commands	53.8 (22.6)	50.2 (23.1)	58.6 (21.0)	.002

Table 2. Estimated marginal means of multivariate comparisons of WAB-R AQ and subtest scores by gender

	Mean (95% Confidence Interval)		
	Men	*Women*	*p-value*
WAB-R AQ	66.8 (63.4, 70.2)	75.1 (71.2, 79)	.002
WAB-R Info Content	7.3 (6.9, 7.7)	8.2 (7.8, 8.6)	.002
WAB-R Fluency	5.7 (5.3, 6.2)	6.7 (6.2, 7.2)	.004
WAB-R Repetition	61.4 (56.9, 65.9)	70.9 (65.8, 76.1)	.001
WAB-R Object Naming	42.2 (39.3, 45.1)	45.9 (42.5, 49.2)	.008
WAB-R Word Fluency	7.4 (6.5, 8.2)	8.0 (7.0, 9.0)	.010
WAB-R Sentence Completion	7.5 (7.1, 8.0)	8.4 (7.9, 9.0)	.007
WAB-R Responsive Speech	7.2 (6.7, 7.8)	8.4 (7.8, 9.0)	.107
WAB-R Yes/No	54.5 (53.6, 55.3)	56.7 (55.7, 57.8)	.332
WAB-R Auditory Word Recognition	51.7 (50.1, 53.3)	55.1 (53.2, 56.9)	.013
WAB-R Sequential Commands	49.6 (45.7, 53.4)	57.4 (52.9, 61.8)	.007

DISCUSSION

Findings:

- More men were classified as having Broca's aphasia than women. Atherosclerosis is common in Broca's aphasia which is found mostly in men [4]
- Men exhibited greater aphasia severity than women
  - ➢ Women engage bilateral hemispheres for language processing whereas men engage one hemisphere [5] which may predispose them to more severe disorders (i.e., aphasia) because of unilateral involvement post-stroke
- Men had poorer outcomes on WAB-R subtests than women with exception of responsive speech and comprehension of yes/no questions

Limitations:

- The total sample of individuals with aphasia in AphasiaBank have high levels of education which may not be representative of typical patients with aphasia
- The data included in AphasiaBank were not originally designed for the comparisons completed in this study

REFERENCES

1.Benjamin EJ, Virani SS, Callaway CW, et al. Heart disease and stroke statistics. American Heart Association; 2018. DOI: https://doi.org/10.1161/CIR.0000000000000558
2. Bejamin EJ, Blaha MJ, Chiuve SE, et al. Heart Disease and Stroke Statistics-2017 Update A report from the American Heart Association. Circulation. 2017;135(10):e146-e603.
3.Ellis C, Dismuke C, Edwards KK. Longitudinal trends in aphasia in the United States. Neurorehabilitation. 2010;27(4): 327-333.
4.Hier DB, Yoon WB, Mohr JP, et al. Gender and aphasia in the stroke data bank. Brain Lang. 1994;47(1):155-167.
5.Bitan T, Lifshitz A, Breznitz Z, et al. Bidirectional Connectivity between Hemispheres Occurs at Multiple Levels in Language Processing but Depends on Sex. J Neurosci. 2010;30(35):11576-11585.

CONTACT

Saryu Sharma, Doctoral student
Email: **sharmas16@students.ecu.edu**

Total Sample Demographic Characteristics and Aphasia Type by Gender

	Total (N=300)	**Men**	**Women**	**p-value**
Age-Years (Mean/SD)	61.9 (12.5)	62.8 (11.5)	60.7 (13.8)	.142
Education-Years (Mean/SD)	15.4 (2.8)	15.6 (2.9)	15.2 (2.7)	.133
Handedness # (%)				
• Right	90.0	90.0	90.4	.750
• Left	6.0	6.9	4.8	
• Ambidextrous/Unknown	4.0	3.1	4.8	
Aphasia Type (%)				.057
• Anomic	33.3	33.7	32.8	
• Broca's	24.3	27.4	19.2	
• Wernicke's	8.0	9.1	6.4	
• Global	1.3	2.3	0.0	
• Conduction	17.7	16.6	19.2	
• Transcortical Motor	3.3	2.9	4.0	
• Transcortical Sensory	0.7	0.0	1.6	
• Unknown	1.7	1.7	1.6	
• No Aphasia[+]	9.9	5.8	15.6	
Aphasia Duration-Years (Mean/SD)	5.2 (4.7)	5.4 (5.0)	4.8 (4.2)	.216
Years of SLP Treatment (Mean/SD)	3.2 (3.7)	3.7 (4.1)	2.6 (3.1)	.027