Med & Health Mar 2024; 19(1): 82-98 https://doi.org/10.17576/MH.2024.1901.05

ORIGINAL ARTICLE

Demographic, Clinical and Language Characteristics of Malaysian Patients with Aphasia: A Retrospective Study

AZIZ MAA[1,2], RAZAK AR[3], FARID AHM[4], HAMID BA[4], TAHA NA[5], GARRAFFA M[6], ALISAPUTRI ML[2]

[1]Speech Pathology Program, School of Health Sciences, Universiti Sains Malaysia (Health Campus), 16150 Kubang Kerian, Kelantan, Malaysia
[2]Department of Audiology and Speech-Language Pathology, Kuliyyah of Aliead Health Sciences, International Islamic, University Malaysia, 25200 Kuantan, Pahang, Malaysia
[3]Faculty of Social Science & Liberal Arts, UCSI University, 56000 Kuala Lumpur, Malaysia
[4]Speech Science Program, Centre for Rehabilitation & Special Need Studies, Faculty of Health Sciences, Universiti Kebangsaan Malaysia, 50300 Kuala Lumpur, Malaysia
[5]Faculty of Pharmacy, University of Cyberjaya, 63000 Cyberjaya, Selangor, Malaysia
[6]Faculty of Health Sciences, University of East Anglia, Norwich NR4 7TJ, United Kingdom

Received: 20 June 2023 / Accepted: 29 November 2023

ABSTRAK

Kajian yang telah dilakukan di Malaysia tentang ciri-ciri pesakit afasia adalah terhad. Bagi mengatasi jurang ini, kajian retrospektif telah dijalankan di Hospital Rehabilitasi Cheras (HRC). Kajian ini bertujuan untuk memprofilkan ciri-ciri demografi, klinikal dan bahasa bagi pesakit yang menjalani terapi pertuturan untuk afasia. Rekod perubatan dari tahun 2014 hingga 2017 telah disemak, memfokuskan pada 1,259 pesakit dewasa yang dirujuk ke Unit Terapi Pertuturan. Analisis yang dijalankan termasuklah demografi, aspek klinikal dan ciri-ciri linguistik. Western Battery of Aphasia- Revised (WAB-R), alat penilaian yang komprehensif digunakan untuk menilai kebolehan bahasa. Antara fail pesakit yang dianalisis, sebanyak 211 mengandungi keputusan ujian WAB-R. Profil demografi menunjukkan nisbah pesakit lelaki lebih tinggi berbanding dengan wanita, di mana majoritinya adalah pesakit Melayu, diikuti oleh Cina dan India. Taburan umur termasuk 41.7% orang dewasa yang lebih tua (berumur lebih dari 55 tahun), 37.9% pertengahan umur (berumur 36-55 tahun) dan 20.4% orang dewasa yang lebih muda (berumur 15-35 tahun). Sebanyak 44.5% telah menamatkan pendidikan sekolah menengah. Secara klinikal, hemiparesis sebelah kanan adalah lazim iaitu 67.8% daripada

Address for correspondence and reprint requests: Mohd Azmarul A Aziz. Speech Pathology Programme, School of Health Sciences Universiti Sains Malaysia (Health Campus), 16150 Kubang Kerian, Kelantan, Malaysia. Tel: +609-7677662 Email: azmarul@usm.my

pesakit, manakala 14.7% mempunyai hemiparesis sebelah kiri. Penyebab utama afasia ialah strok, menyumbang kepada 71.1% kes, dengan kebanyakannya adalah strok iskemia (56.9%). Terdapat 50.2% kes afasia lancar, berbanding dengan 49.3% afasia tidak lancar. Afasia jenis anomik ialah yang paling banyak (35.5%), diikuti oleh afasia global (27.5%) dan afasia jenis Broca (17.5%). Profil bahasa memberikan penerangan terperinci, merangkumi aspek linguistik yang berkaitan dengan jenis afasia yang berbeza. Penemuan awal ini menghasilkan pandangan yang berharga dan mempunyai implikasi yang signifikan terhadap pengurusan klinikal pesakit afasia di Malaysia.

Kata kunci: Afasia; demografi; ciri-ciri klinikal; Malaysia; profil bahasa

ABSTRACT

Limited research has been conducted in Malaysia on the characteristics of patients with aphasia. To address this gap, a retrospective study was conducted at Hospital Rehabilitasi Cheras (HRC). The study aimed to profile the demographic, clinical, and language characteristics of patients who underwent speech therapy for aphasia. Medical records from 2014 to 2017 were reviewed, focusing on 1,259 adult patients who were referred to the Speech Therapy Unit. Analysis included demographics, clinical aspects, and linguistic features. The Western Battery of Aphasia-Revised (WAB-R), a comprehensive assessment tool, was used to evaluate the language abilities. Among the patients' files analysed, a total of 211 contained WAB-R test results. The demographic profile revealed a higher proportion of male patients compared to females, with Malay patients comprising the majority, followed by Chinese and Indians. Age distribution included 41.7% older adults (aged 55 and above), 37.9% middle-aged (aged 36-55), and 20.4% younger adults (aged 18-35). Notably, 44.5% had completed high school education. Clinically, right- sided hemiparesis was prevalent as noted with 67.8% of patients, while 14.7% had left-sided hemiparesis. The primary cause of aphasia was stroke, accounting for 71.1% of cases, with ischemic stroke being the dominant subtype (56.9%). Fluent aphasia was presented in 50.2% of the cases, compared to 49.3% of non-fluent aphasia. Anomic aphasia was the most common subtype (35.5%), followed by global aphasia (27.5%) and Broca's aphasia (17.5%). The language profile provided a detailed description, encompassing linguistic aspects relevant to different aphasia types. These preliminary findings yielded valuable insights and hold significant implications for the clinical management of aphasia patients in Malaysia.

Keywords: Aphasia; clinical characteristics; demographic; language profile; Malaysia

INTRODUCTION

Aphasia, a language impairment caused by neurological damage, exhibits significant variations in its incidence and prevalence worldwide. In the United States, for example, different types of aphasia have shown to have varying rates of occurrence (Yourganov et al. 2015). In Tuzla, Bosnia and Herzegovina, global aphasia emerged as the most prevalent subtype, affecting approximately 29.96% of patients (Vidovic et al. 2011). Interestingly, age has been identified as a risk factor for aphasia in Toronto, Canada, where it was found to independently predict prolonged hospital stays, irrespective of stroke severity, gender, other health conditions, and stroke subtype (Dickey et al. 2010). In Basel, Switzerland, no significant correlation was observed between gender and the frequency, severity, or quality of aphasia-related speech, while the likelihood of developing aphasia increased with age (Engelter et al. 2006). Demographic characteristics, however, seemed to have no direct impact on the type or severity of aphasia. In Denmark, within the first year of stroke, aphasia gradually transitioned into less severe forms, with the severity of language impairment serving as a predictor for increased demand in language function. This progression was influenced by the initial severity of aphasia and stroke but not by age, gender, or specific aphasia type (Pedersen et al. 2004). Surprisingly, Malaysia has seen a dearth of documented aphasia profiles. Existing studies have primarily focused on the demographics and severity of problems faced by patients (Aziz et al. 2016), neglecting in-depth linguistic evaluations encompassing spontaneous speech, auditory comprehension, repetition, naming, reading, and writing. The study addresses the lack of demographic and clinical data on patients with aphasia (PWAs) in Malaysia. It explored demographics and aphasia types, with 85 participants, mostly males from older age groups. Malays were the majority ethnicity, followed by Chinese and Indians. Most PWAs predominantly had an educational background up to the secondary level, with tertiary and primary levels following in frequency. The investigation highlighted a prevalent 1-3 year post-stroke onset period, 53% with fluent aphasia and 47% with non-fluent aphasia. Anomic aphasia was the most frequent subtype. This study is the first study to provide insights into Malaysian PWAs, focusing on the need for context-specific data to support rehabilitation efforts. Our study aimed to build upon this foundation, shedding light on the linguistic characteristics of PWAs in Malaysia. Additionally, we sought to address the gap in knowledge regarding the classification of aphasia based on severity and types.

Through this comprehensive retrospective investigation, our research aimed to provide a detailed description of the demographic, clinical, and linguistic profiles of different types of aphasia in Malaysian patients. By unravelling the intricate tapestry of aphasia, we hoped to enhance our understanding of this complex condition and pave the way

for improved diagnosis, treatment, and support which is tailored to the unique needs of individuals with aphasia in Malaysia.

MATERIALS AND METHODS

Study Design and Setting

In this retrospective study, we reviewed the medical records of 1,259 adult patients who had been referred to the Speech Therapy Unit, Hospital Rehabilitasi Cheras, (HRC), Ministry of Health Malaysia, a national rehabilitation hospital in Malaysia, from 2014 to 2017. The study adhered to the Declaration of Helsinki and was approved by the the Medical Research and Ethics Committee of Universiti Kebangsaan Malaysia (UKM1.21.3/244/NN-2017-161) and the Medical Research Ethics Committee of the Ministry of Health Malaysia (NMRR-17- 883-35713). The study employed a purposive sampling method, where all cases that met the inclusion and exclusion criteria were selected. The selected cases were included based on all adult new cases referred to the speech therapy unit and who had undergone a complete aphasia assessment using the Western Aphasia Battery-Revised (WAB-R) (Kertesz 2006). The WAB-R was employed as the primary measurement tool in this investigation. This battery effectively evaluated language and non-linguistic abilities commonly impacted by aphasia, while also providing valuable information for differential diagnosis. The components of WAB-R included four components i.e. spontaneous speech, auditory verbal comprehension, repetition, naming, and word-finding. Spontaneous speech evaluation measured the ability to express thoughts coherently. The spontaneous speech scores were collected based on verbal responses to six personal questions and a picture description task. Auditory verbal comprehension assessed the understanding of spoken language. In the auditory-verbal comprehension subtest, individuals with aphasia were assessed based on "Yes or No" questions related to personal, environmental, and general topics. They were also asked to point to items or execute commands of increasing length and difficulty (e.g., "Angkat tangan'/ "Raise your hand,", and "Tunjuk kerusi kemudian pintu"/ "Point to the chair then the door"). Repetition involved repeating words or phrases, revealing the ability to mimic and reproduce language. Naming measured the capability to identify and label objects. Word-finding assessment explored lexical retrieval and language fluency. Even though the WAB-R included additional components such as sentence comprehension, writing, and reading, however, these components were excluded in determining the type and severity of aphasia. This comprehensive battery provided insights into an individual's language abilities across different domains, aiding in diagnosing and managing aphasia. One of the notable strengths of the WAB-R is its adaptability, allowing for administration in various settings such as hospitals and clinics. Furthermore, it establishes

a performance baseline against which changes can be evaluated over time.

Data Collection Procedure

The researcher examined the case files of all adult patients with a brain injury diagnosis at the speech therapy unit. The speech therapy unit had six bilingual Malay speech-language therapists (SLTs) who were proficient in both Malay and English. The SLTs routinely conducted the assessments as part of their job responsibilities. The outcomes of these assessments were documented in the patient's case file, and the researcher subsequently extracted the relevant data from these files. The selection process prioritised only files that had language assessments conducted using the WAB-R. Finally, a total of 211 patients' files with WAB-R test results were included in the study. Since the WAB-R is in English, the attending SLTs took on the effort of translating the assessment into Malay language for the benefit of Malay and Indian patients who were unable to communicate in English. In cases where patients did not comprehend either Malay or English, the SLTs typically requested the assistance of a family member or caregiver to interpret the test instructions into the patient's native language, such as Mandarin. Subsequently, the patient's responses would be translated into either Malay or English by the family member or caregiver. In cases where the attending SLTs did not speak the patient's language i.e. Mandarin then this method of translation was warranted. The main aim of this method was to get at the word/meaning of the word used by the patient in response to a particular item. In addition, it served as an initial evaluation to help the SLT to identify potential language difficulties and determine whether further, more detailed evaluations were warranted. Since the WAB-R is not currently available in the local languages of Malaysia, therefore, for practical reasons, this method is the best method to be used thus far. Translation method was an accepted method by local SLTs in Malaysia (Aziz et al. 2020; Hassan et al. 2023).

The extracted data encompassed various aspects, including demographic information such as age, gender, ethnicity, and level of education. Additionally, clinical profiles were documented, which consisted of details regarding hemiparesis, medical diagnosis, type of stroke, site of lesion, post- brain injury onset, and severity. Information regarding aphasia subtypes and types was also recorded. Language-related data, such as spontaneous speech, auditory verbal comprehension, repetition, naming, and word-finding, were meticulously documented. The Aphasia Quotient derived from the WAB-R, which had been recorded in the patient's file, was employed to assess the severity and type of aphasia.

Data Analysis

Statistical analyses were performed using the Statistical Package for Social Science Software (SPSS) version 22.0 for Windows (IBM Corp. Armonk, NY). To assess the normality of the data,

skewness and kurtosis normality tests were employed. Descriptive statistics, including frequencies, percentages, and means, were utilised to examine the demographic and clinical characteristics of the participants. Chi-square tests of independence were conducted to explore the relationship between the severity of aphasia and demographic factors.

RESULTS

Demographic Profile

A total of 211 patients with aphasia (PWA) were identified in the study, with a mean age of 50.21 years (SD = 15.82). The age range of the participants varied from 18 to 91 years old. Among the different age groups, the older adult category accounted for the highest proportion of referrals, comprising 41.7% of the total. In terms of gender distribution, males exhibited a higher prevalence of aphasia, representing 71.1% of the PWA group, while females constituted 28.9%. Regarding to the ethnicity, Malays constituted the majority of PWAs, comprising 63.5% of the participants. Chinese individuals accounted for 26.0% of the PWA group, followed by Indians at 10.0%. On average, PWAs had completed approximately 11.66 years of education (SD = 3.67), equivalent to a secondary level of education, with 44.5% completed secondary school. The demographic profiles of Malaysian PWAs were presented in Table 1.

The relationship between demographic data and the severity of aphasia was examined through the use of a chi-square test. The results of the analysis indicated that there were no significant associations between the severity of aphasia and the following factors: gender, X^2 (4, N = 211) = 3.96, p> .05; ethnicity, X^2 (12, N = 211) = 13.06, p> .05; and education, X^2 (12,

TABLE 1: Demographic profiles of patients with aphasia (PWA)

Demographic characteristics	Number of patients (n)	Percentage (%)
Age		
15-35	43	20.4
36-55	80	37.9
>55	88	41.7
Gender		
Male	150	71.1
Female	61	28.9
Ethnicity		
Malay	134	63.5
Chinese	55	26.0
Indian	21	10.0
Others	1	0.5
Level of Education		
Primary	26	12.3
Secondary	94	44.5
Tertiary	88	41.7
Not available	3	1.4

Mean ± age is 50.21 (SD: ±15.82), and length of education is 11.66 (SD: ±3.67).

N = 211) = 10.62, p> .05. However, it was noteworthy that a significant relationship was identified between age and aphasia severity, X^2 (8, N = 211) = 15.94, p = 0.04.

Clinical Profile

Table 2 presented the clinical profiles of patients who were diagnosed with aphasia.

Hemiparesis and Medical Diagnosis

A total of 67.8% of PWAs were found to have right hemiparesis, indicating a significant association, X^2 (16, N = 211) = 38.36, p< .05. It was observed that right hemiparesis was linked to more severe aphasia compared to left hemiparesis. Among the various diagnoses, stroke emerged as the most prevalent cause of aphasia, accounting for 71.1% of cases.

Types of Stroke and Post-stroke Onset

Ischemic stroke accounted for 56.9% of patients with aphasia, while hemorrhagic stroke was responsible for aphasia in 37.9% of PWAs. The average time it took for patients to be diagnosed with aphasia was 19.91 months (SD = 24.83). The majority of PWAs (43.6%) experienced post-stroke symptoms within the first three years, with only 1.9% experiencing symptoms after ten years.

Medical Diagnosis

The majority of PWAs cases (71.1%) were caused by stroke, traumatic brain injury (TBI) accounted for 11.4%, while neurological diseases, brain infections, and tumors each contributed to a smaller percentage of cases. A notable portion (13.7%) fell under the category of "Not available," suggesting that the cause of aphasia was not specified or documented for these cases.

Severity, Fluency, Type of Aphasia

Among PWAs, 31.8% exhibited mild severity of aphasia, 21.8% had moderate severity, 19.4% experienced severe aphasia, and 26.5% faced very severe aphasia. In terms of the fluency of aphasia, 50.2% of PWAs had fluent aphasia, while 49.3% had non-fluent aphasia.

The most common subtype of aphasia observed was anomic aphasia, accounting for 35.5% of cases. This was followed by global aphasia (27.5%), Broca's aphasia (17.5%), and conduction aphasia (8.5%). The categories of aphasia were reflected by these parameters namely the patterns of speech impairment, the ability to comprehend and produce language as well as the fluency or non-fluency of speech. These parameters were crucial for accurate diagnosis, customised treatment plans and a deeper understanding of the underlying neurological impairments.

Language Profile

The language profiles of patients with aphasia were listed in Table 3.

(i) Spontaneous speech

TABLE 2: Clinical profiles of Malaysian stroke patients with aphasia (PWA)

Clinical characteristics	Number of patients (n)	Percentage (%)
Hemiparesis		
Right	143	67.8
Left	31	14.7
Both	5	2.4
None	28	13.3
Not available	4	1.9
Medical Diagnosis		
Cerebrovascular accident (CVA)	150	71.1
Traumatic brain injury (TBI)	24	11.4
Neurological diseases	3	1.4
Brain infections	2	0.9
Tumor	3	1.4
Not available	29	13.7
Type of stroke		
Ischemic	120	56.9
Hemorrhagic	80	37.9
Not available	11	5.2
Post-stroke onset		
<1 year	83	39.3
1-3 years	92	43.6
4-6 years	19	9.0
7-9 years	4	1.9
>10 years	4	1.9
Not available	9	4.3
Severity of Aphasia		
Mild (76-100)	67	31.8
Moderate (51-75)	46	21.8
Severe (26-50)	41	19.4
Very severe (0-25)	56	26.5
Not available	1	0.5
Fluency		
Fluent	106	50.2
Non fluent	104	49.3
Not available	1	0.5
Type of Aphasia		
Broca's	37	17.5
Transcortical motor	8	3.8
Global	58	27.5
Wernicke's	8	3.8
Transcortical sensory	4	1.9
Conduction	18	8.5
Anomia	75	35.5
Isolation	2	0.9
Not available	1	0.5

Mean $\pm$ post stroke onset is 19.91 months ($\pm$24.83).

The mean score for the spontaneous speech section, encompassing information content, fluency, grammatical competence, and paraphasia, was 9.04 (SD = 7.09), ranging from 0 to 20. Furthermore, the mean scores for information content and fluency were 5.16 (SD = 3.61) and

TABLE 3: Language performance of patients with aphasia (PWA) based on Western Aphasia Battery-Revised (WAB-R) (Kertezs 2006)

Language functions	Mean (%)	(SD)	Total score
Spontaneous Speech	9.04 (45.21)	±7.09	20
Information content	5.16 (51.33)	±3.61	10
Fluency, grammatical competence, and paraphasia	3.93 (39.10)	±3.70	10
Auditory Verbal Comprehension	129.80 (65.55)	±60.52	200
Yes/No question	47.41 (78.64)	±15.95	60
Auditory word recognition	42.14 (69.91)	±19.61	60
Sequential commands	40.86 (50.84)	±30.81	80
Repetition	51.04 (50.80)	±38.64	100
Naming and Word Finding	48.41 (48.64)	±36.61	100
Object naming	32.68 (54.21)	±23.86	60
Word fluency	5.19 (25.83)	±5.93	20
Sentence completion	5.14 (51.18)	±4.32	10
Responsive speech	5.40 (53.79)	±4.47	10
Aphasia Quotient	**50.99**	**±32.70**	**100**

3.93 (SD = 3.70), respectively.

(ii) Auditory verbal comprehension

The mean score for the overall auditory verbal comprehension section was 129.80 (SD = 60.52). Specifically, the mean scores for the yes/no question, auditory word recognition, and sequential command parts were 47.40 (SD = 15.95), 42.14 (SD = 19.61), and 40.86 (SD = 30.81), respectively.

(iii) Repetition

The mean score for repetition was 50.80 (SD = 38.71), with a range of 0 to 100.

(iv) Naming and Word-finding

The mean score for the overall naming and word-finding section was 48.41 (SD = 36.61). Specifically, the mean score for object naming was 32.68 (SD = 23.90), word fluency was 5.19 (SD = 5.93), sentence completion was 5.14 (SD = 4.32), and responsive speech was 5.40 (SD = 4.47).

(v) Aphasia quotient

The mean score for the aphasia quotient was 50.99 (SD = 32.70), ranging between 0-100.

Aphasia Type and Severity after Stroke

Based on the aphasia quotient, the severity of aphasia was determined for different types. Broca's aphasia had a mean aphasia quotient of 31.81 (SD = 18.03), transcortical motor aphasia had a mean of 65.11 (SD = 15.30), global aphasia had a mean of 14.67 (SD = 13.75), Wernicke's aphasia had a mean of 14.67 (SD = 11.24), transcortical sensory aphasia had a mean of 50.71 (SD = 15.17), conduction aphasia had a mean of 66.02 (SD = 14.09), anomic aphasia had a mean of 85.04 (SD =

11.21), and isolation aphasia had a mean of 33.50 (SD = 8.91). The types and severities of aphasia in the patients were summarised in Table 4.

DISCUSSION

In this study, we provided an analysis of the demographic, clinical and language characteristics of Malaysian patients with aphasia who were receiving speech therapy at the HRC, a prominent national rehabilitation facility in Malaysia.

It is estimated that approximately 24% of all stroke patients will experience aphasia post- stroke (Gronberg et al. 2020). Based on the previous studies, aphasia is reported to affect 18% to 38% of stroke patients (Pedersen et al. 2004). However, in our study, we found that the incidence of aphasia among adult patients in Malaysia was 16.76%. This rate is not only lower than what was reported by Pedersen et al. (2004), but it also falls below the figures reported in many other countries, which ranged from 26% to 40%. For instance, in the US, approximately one-third (30%) of the stroke population experienced aphasia in 2016 (National Aphasia Association 2016). Another study conducted at the Royal Perth Hospital reported that 37.2% of acute stroke patients were diagnosed with aphasia (Worral 2017). However, our findings aligned with a study conducted in Chile, which reported a lower incidence of 19.7% among patients with cerebral infarction (Gonzalez et al. 2017). Despite the comparatively lower percentage in Malaysia, the number of individuals with aphasia is expected to rise given the increasing number of stroke patients annually, for example,

TABLE 4: Aphasia type and severity after stroke

Parameters	**Spontaneous Speech** (0-20)	Auditory Verbal Comprehension (0-200)	Repetition (0-100)	Naming and Word Finding (0-100)	Aphasia Quotient (%)
Broca's	3.95 ±4.26	128.68 ±29.09	30.08 ±31.53	28.62 ±29.06	31.81 ±18.03
Transcortical motor	9.38 ±6.14	155.63 ±36.81	87.00 ±5.43	67.00 ±22.59	65.11 ±15.30
Global	2.00 ±2.85	55.43 ±42.61	13.51 ±21.51	11.12 ±20.05	14.67 ±13.75
Wernicke's	11.13 ±3.00	95.50 ±28.21	39.87 ±31.71	42.75 ±27.79	46.81 ±11.24
Transcortical Sensory	13.00 ±2.00	125.00 ±8.49	67.00 ±45.42	48.75 ±23.13	50.71 ±15.17
Conduction	12.61 ±4.53	167.78 ±20.74	48.44 ±19.80	73.56 ±15.68	66.02 ±14.09
Anomic	15.89 ±3.56	181.60 ±19.08	88.01 ±14.27	81.13 ±15.87	85.04 ±11.21
Isolation	5.50 ±3.54	131.00 ±77.78	33.00 ±33.94	14.00 ±14.14	33.50 ±8.91

due to unhealthy lifestyle and poor eating habit (Aziz & Sidek 2017).

Regarding age, older and middle-aged adults are more likely to have aphasia compared to younger adults (Engelter et al. 2006). Advanced age has been associated with an increased risk of aphasia in the middle to late stages of life (Dickey et al. 2010). However, our study, similar to previous research, demonstrated that aphasia can occur across all age groups. Post-stroke aphasia can occur across all age groups because stroke is a primary cause of aphasia, and can affect individuals of varying ages. Stroke can result from factors like blocked or ruptured blood vessels in the brain, leading to damage in language-related areas (Kuriakose & Xiao 2020). Since stroke can happen to people of different ages due to factors like lifestyle (i.e. smoking, eating habits), genetics (Donkor 2018), and underlying health conditions (i.e. hypertension, heart disease, diabetes), aphasia due to stroke is also not limited to a specific age group. Regardless of the person's age at the time of the stroke, the impact of the stroke on language centres in the brain could lead to aphasia.

Previous studies have proposed that aphasia affects men and women equally (National Stroke Foundation Australia 2016). However, our study diverged from these findings, indicating a higher number of male patients with aphasia. This could be attributed to secondary factors that increase the risk of stroke in men, such as smoking habits, hypertension, and vasoconstriction. The Annual Report of the Malaysia Stroke Registry 2009-2016 documented a higher incidence of stroke in men (55%) compared to women (45%) across most age groups in Malaysia (Aziz & Sidek 2017). In Malaysia, the average lifespan for females is 77.4 years, whereas for males, it is 72.7 years. Further exploration is warranted to better understand this finding.

Our findings also revealed that aphasia can affect individuals from all ethnic groups in multicultural Malaysia. Malays, Chinese and Indians, the major ethnic groups, were all found to be affected by aphasia. Interestingly, Malays had the highest number of PWAs compared to other ethnic groups. This reflected the ethnic composition of the population in Malaysia. According to Department of Statistics Malaysia (2023), Malaysia's population in the first quarter 2023 was estimated at 33.2 million. *Bumiputera*/sons of the soil (consisting of ethnic Malays and other indigenous ethnic groups such as the Orang Asli in Peninsular Malaysia and the tribal people in Sabah and Sarawak) is 70.1%, and forms the majority, followed by ethnic Chinese at 22.6% and ethnic Indians at 6.6%. Those who are not falling within these groups are categorised as 'Other'. This phenomenon requires further investigation, as there might be a relationship between ethnicity and aphasia due to language, culture, and world view factors (Hamid et al. 2018; Jin et al. 2014). Understanding the ethnic and linguistic subgroups can help in planning effective management for individuals with aphasia, including the use of appropriate language in interventions, culturally appropriate

therapy materials, and assessment tools.

Additionally, the present study found that individuals who completed secondary and university education were more likely to be affected by aphasia than those who completed only primary education. High work-induced stress in white-collar occupations compared to blue-collar occupations may contribute to this finding. However, this contrasts with a study that found a greater initial severity of aphasia among subjects with lower educational levels. Regardless of educational background, any job associated with high stress levels can increase the risk of stroke and subsequent aphasia.

In the present study, we observed a higher number of patients with right hemiparesis and left hemisphere damage compared to those with left hemiparesis. We found a significant association between hemiparesis and the severity of aphasia, with patients experiencing right- sided hemiparesis tended to have more severe aphasia than those with left-sided hemiparesis. The left hemisphere of the brain is known to play a crucial role in auditory speech processing and language (Ocklenburg et al. 2018), and thus damage to this hemisphere can have a greater impact on language abilities.

Stroke is the most common cause of aphasia, accounting for approximately 85% of cases (Owens 2016). The present study had yielded similar results, indicating that stroke was the primary cause of aphasia in comparison to other causes which are related to brain injury. Studies have reported that around one in three individuals experience some degree of aphasia after a stroke (Hallowell & Chapey 2018; Yourganov et al. 2015). The remaining 15% of cases are attributed to surgical trauma, traumatic brain injury, degenerative diseases, infections, and tumors (Owens 2016). Patients with aphasia following a stroke are at higher risk of mortality, although some individuals may also exhibit rapid spontaneous recovery within the first few months. Given that stroke emerges as the predominant cause of aphasia, this data highlighted the significance of tailored interventions and prognostic considerations in managing patients with this communication disorder.

Ischemic stroke is more prevalent than hemorrhagic stroke, and a similar pattern was observed in the present study. Stroke severity may influence the severity and types of aphasia (Pedersen et al. 2004), although this aspect was not specifically examined in the present research. Aphasia following a stroke is a common and debilitating manifestation that leads to long-term disability (Kang et al. 2010; Kim & Paik 2018). It can result in longer hospital stays, increased need for rehabilitation therapy, reduced chances of returning home, and lower quality of life and social participation (Hilari 2011).

In general, we found that the frequency of post-stroke onset in individuals with aphasia ranged from one to three years, contrary to best practice that patients are seen within the six months post-stroke due to neuroplasticity and spontaneous recovery. According to Salter et al. (2006), early identification, diagnosis

and treatment of language deficits are important steps in maximising rehabilitation gains. However, in general, identification of aphasia often occurs late, possibly due to variations in the timing of language assessments, differences in assessment tools, examiner competency, and a shortage of speech-language therapists specialising in stroke-related aphasia (Al-khawaja et al. 1996; O'neill et al. 1990). As a result, many stroke patients are left without appropriate speech and language intervention. This situation, in turn, can curtail the capacity to conduct thorough assessments by SLTs for a broader spectrum of patients. It is crucial for prompt identification of aphasia in stroke patients as it plays a significant role in in predicting outcomes and planning timely interventions (El Hachioui 2017).

Regarding the types of aphasia, the present study found a nearly equal distribution between fluent and non-fluent types. However, many patients were reported to have mild or very severe aphasia. Anomic aphasia was the most prevalent type in the present study, although another study found global aphasia to be the most common regardless of age, sex, or type of stroke (Yourganov et al. 2015). Determining the severity of aphasia is crucial for predicting prognosis and developing appropriate intervention plans (Fridriksson & Hillis 2021). Recovery from aphasia is influenced by the location and extent of the brain injury, as well as the type and severity of aphasia. Prognosis depends on the underlying cause, with many post-stroke aphasia cases show varying degrees of improvement (Engelter et al. 2006). The severity of initial aphasia strongly correlates with long-term deficits, with milder cases at onset are more likely to achieve complete recovery (Bakheit et al. 2008; Pedersen et al. 2004).

A low score in spontaneous speech task in WAB-R indicates that individuals with aphasia have difficulties in correctly answering questions that are consisted of simple sentences as well as sentences of increasing complexity. Specifically, in this study PWAs scored 45.21% on spontaneous speech, 51.33% on information content, and 39.10% on fluency, grammar competence, and paraphasia. The low scores in aspects of fluency, grammatical competence, and paraphasia in the spontaneous speech subpart indicated that most individuals with aphasia experienced issues with halting speech, telegraphic speech using mostly single words, paraphasia, occasional unintended prepositional phrases, and severe word-finding difficulties. They produced no more than two complete sentences, apart from their spontaneous responses (e.g. *Oh, saya tak tahu*/ Oh, I don't know), which is characteristic of agrammatic non-fluent aphasia. However, individuals with aphasia scored higher on day-to-day phatic communion social expressions, such as greetings, "*Apa khabar hari ini*? "/"How are you today?", and basic personal information,"*Adakah anda pernah datang sini sebelum ini*?" / "Have you been here before?".

Our findings showed that individuals with aphasia were able to understand

verbal commands and scored 50.84% on this subtest, indicating their ability to comprehend instructions and carry out tasks accordingly. However, less than half of the individuals were able to retain personal orientation, environmental information, and general knowledge. Similar patterns were observed in the auditory word recognition subpart, indicating their abilities to comprehend single words. The sequential command subpart was the most challenging comprehension task, with the individuals with aphasia demonstrated more severe deficits which were reflected in the low mean scores. This could be attributed to the increasingly complex commands presented.

In the repetition subpart, individuals with aphasia were assessed based on their ability to repeat words, phrases, and sentences of increasing difficulty. They scored 50.8% on this subtest, suggesting that, on average, half of the individuals were able to process, retain, and repeat simple information heard. This subtest is crucial for distinguishing between conduction, and transcortical motor or sensory aphasia.

For the naming and word-finding subpart, individuals with aphasia were assessed on their ability to name objects, complete sentences, and answer questions. The mean score of 48.64% indicated that approximately half of the individuals were able to produce words from their receptive vocabulary. Difficulties in naming nouns and verbs, which are essential elements in constructing utterances during conversations (Connor et al. 2001), contribute to communication challenges in individuals with aphasia. In another study, researchers examined a group of 11 non-brain-damaged Malay subjects and 10 Malay subjects with non-fluent aphasia. The findings revealed that both comprehension and production tasks exhibited more pronounced deficits in verb-related tasks compared to noun-related tasks (Aziz et al. 2013). Consequently, the participants faced challenges in combining words to form meaningful phrases and sentences.

The mean score performance for each type of aphasia in spontaneous speech, auditory- verbal comprehension, repetition, and naming reflected the characteristic features of each type. For example, the lower mean scores in each language subpart (see table IV) were indicative of the characteristics of the global type, characterised by non-fluent spontaneous speech, poor auditory-verbal comprehension, repetition, naming, and word-finding difficulties. Conversely, for anomic aphasia, higher mean scores were observed in all language subparts except naming, meeting the criteria for the anomic type, which is characterised by fluent spontaneous speech, good auditory-verbal comprehension, and repetition but poor naming and word-finding abilities.

Overall, the insights gained from this study can guide and inform the development of more effective aphasia services and interventions. Currently, aphasia services in Malaysia are limited due to various factors, such as a scarcity of SLTs specialising in aphasia management, particularly for

Chinese-speaking patients who rely on translation services provided by bilingual Malay SLTs in government hospitals under the Ministry of Health Malaysia (Shin et al. 2019). Moreover, there is a lack of local assessment tools specifically designed for PWAs, adding to the challenges faced in accurately evaluating their condition. According to Aziz and Chern (2016), there was a noticeable rise in the number of patients with acquired communication disorders, including aphasia, attended government hospitals. The number of attendance among patients increased from 2801 in 2011 to 7446 in 2015. The mentioned data indicated an increasing number of individuals with aphasia each year can serve as a crucial basis for the Ministry of Health Malaysia to plan and allocate additional resources. This includes the creation of more job opportunities for SLTs, the establishment of specialised facilities and centers for stroke patients, and the involvement of NGOs that specialise in post- stroke care, rehabilitation, and support systems for individuals with aphasia. These efforts are particularly important in light of the growing elderly population in Malaysia. By addressing these needs and allocating appropriate resources, stakeholders can enhance the quality of care and support provided to individuals with aphasia in Malaysia, ultimately improving their overall well-being and quality of life. While waiting for the number of SLTs to increase and the growth of speech-language therapy centres and resources, this study's data benefits PWAs. It informs healthcare providers and policymakers about PWAs' needs, guides interventions, and provides support services. Additionally, understanding aphasia types helps SLTs in customised therapy while raising awareness among caregivers, families, and communities. While immediate service expansion may be pending, this data lays the groundwork for informed decisions, improved therapies, and greater awareness, ultimately enriching the lives of PWAs. Several limitations were presented in this study. Firstly, the research was carried out at a tertiary rehabilitation hospital and this might potentially limit the generalisability of the findings to a broader population. Additionally, the study focused solely on referred PWAs to the tertiary rehabilitation hospital therefore excluding individuals with milder aphasia or those who were not referred but might have aphasia. The retrospective nature of the study focused on available information in the patients' files and as such files which were incomplete or whose documentation were not reported in a consistent manner had to be excluded. We recognised that the use of an impromptu translated assessment tool, while practical, might be a limitation to the validity of the results in this study. However, this is depicting the practice of SLTs in Malaysia. Despite these limitations, the study provided valuable insights into the characteristics of aphasia patients in the context of a tertiary hospital setting in Malaysia.

CONCLUSION

The findings of this study contribute to a deeper understanding of the

demographic characteristics of individuals with aphasia in Malaysia, as well as the specific language and communication difficulties they face. This valuable information has implications for various stakeholders, including healthcare providers, non-governmental organisations, caregivers, families, and the wider community who are involved in the rehabilitation of aphasia in Malaysia.

ACKNOWLEDGEMENT

The authors would like to acknowledge the Director General, Ministry of Health Malaysia, the Director of HRC, and Head of Department of Rehabilitation Medicine HRC for allowing this research to be conducted at HRC and staff of the Speech Therapy Unit, HRC for the cooperation given during the data collection process.

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