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Assessment of Language Impairment Management of Post Stroke at Erbil Public Hospitals

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Abstract

Background: Stroke is the most common cause of aphasia which need to be managed because it postpones stroke recovery and causes psychological and social problems for the patients and their families. Researchers have observed that the issue of language disorder in post-stroke patients has been poorly addressed in Kurdistan Region.

Objective: This neurolinguistic study aims at presenting a comprehensive scale study about the demography of stroke and aphasic patients at Rizgary hospital over a period of two months in2024.

Patients and Methods: This cross-sectional study is carried out at Rizgary Public hospital in Erbil-Kurdistan Region. Demographic for all the patients who were registered at Erbil hospitals during the two months in 2024. Then the process of diagnosing aphasia and dysarthria as language impairments are carried out.

Results: Among 234 subjects, the mean age of post stroke patients is 33.4 ± 22.038001years .15.3% of patients were not paralyzed, meanwhile 44.8% got right side body paralysis, followed by left side 38%, and both side 1.7%. The highest risk factor is hypertension (68.8%), followed by diabetes mellitus (41.4%), and ischemic heart disease (21.7%).

Conclusion: Language disorders is about (71.4%) which is a high range among post-stroke patients. Language disorders does not only affect stroke management but it also impair the individual's quality of life. If language impairments are screened earlier in patients, it is possible to intervene in language skills and work through speech therapy.

Keywords: Language impairment, stroke, dysarthria.

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Introduction

One of the vital characteristics of humans is language but when the nervous system is affected for any reason, it will cause language impairment and behavioral problems (1). Moreover, early identification of the phases of stroke is also needed because it is correlated with language recovery process evaluation (2). Thus, stroke phases are identified into acute (the first few hours to days following a stroke), subacute (initial weeks following stroke), and chronic (begins months to years), which are defined according to time from stroke onset (3). One of the common consequences following stroke is cognitive impairment which includes deficits in attention, working memory, and executive functions (4). One of the causes of stroke is atrial fibrillation which rises the risk of

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mortality of stroke patients (5, 6). Obesity as an indirect effect on stroke, since it increases the amount of blood volume, makes filling pressure to be higher, and also increases the sympathetic activation, which ultimately leads to raised stroke volume (7, 8). Aphasia is one of the most prominent disabilities caused by stroke, which is defined as an impairment of language that is caused by brain damage (9). Ferdous and other colleagues refer to the strong correlation between stroke and aphasia and indicate that "sometimes language problems may lead to complicated clinical presentation and poor response to treatment" (p,2) (1). Stroke is not the only cause of aphasia, other causes of aphasia are; traumatic brain injury, neurodegenerative disease, brain tumor, and brain infection (10, 11). However, it is unconditioned for all stroke patients to have aphasia since it is developed in one-third of patients with stroke (12). Aphasia results in disruption of communication, decreased social activity, depression, low job possibility, and severe disability (13). The most common current methods for aphasia treatment are speech and language therapy (SLT), medical therapy, transcranial direct current stimulation, and recurrent low-frequency transcranial magnetic stimulation (14). SLT consists of impairment-based therapies that target the underlying linguistic deficits (phonological, morphological, lexical, semantic, or syntactic level) and aim at improving functional communication (15). In deciding which therapy to be used in the recovery process, combinations of different therapeutic approaches are commonly used by SLT pathologists in an attempt to tailor the language treatment to each patient (16). Relatively, however, whatever approach is used, there is good evidence that patients' receptive, expressive language and their functional communication are improved compared to no SLT (17). Zumbansen and Thiel argue that there is good evidence that SLT benefits patients' functional communication, receptive and expressive language compared to no SLT (18).

Patients and Methods

This cross-sectional study is carried out at Rizgary Public hospital in Erbil-Kurdistan Region. All the public hospitals and centers in Erbil send neurological cases , including stroke patients ,to Rizgary since it is the only public hospital that treats neurological conditions in Erbil. Demographic data, including ; age , gender , hemisphere , paralyzed side , risk factors , and social communication are collected for all the patients who were registered at Erbil hospitals during the TWO months of February and April(We couldn't collect data on March because of administrative regulation of the hospital) in 2024 . A total of 234 stroke patients were included for stroke demographic data collection , after excluding other neurological cases. Meanwhile , only 167 subjects suffered from language impairment and are included for aphasia assessment. The research uses Boston Classification system for aphasia classification . After obtaining consent from the administrative staff of the hospital and the patients or their families , socio-demographic data are obtained , then the collected data are classified, cleared and analyzed. Then the process of diagnosing aphasia and dysarthria as language impairments are carried out.

Statistical Analysis

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Data analysis was performed using SPSS version 25.0. Descriptive statistics were used to summarize sociodemographic characteristics, and clinical manifestations.

Results

Concerning the **(**Demographic Distribution of Stroke Participants **),**a total of 385 patients , with neurological condition ,were transferred from all the public patients in Erbil districts to Rizgari public hospital during February and April of 2024 . On the same day of transferring, Cerebral computed tomography (CT) scan was performed and were re-evaluated by a neuroradiologist with knowledge of the type of aphasia. Magnetic resonance imaging(MRI) is used by radiologist to estimate the volume of the lesion and its location assess the different types of aphasia. After the primary assessment ,non-stroke neurological condition (n=119**)** or clinical status of medically unstable patients (n=32**)** were excluded and totally 234 stroke patients were included. After taking patients' consent or their caregivers' , a special form was designed to collect demographic data about the patients . The demographic data included ; sex, age, stroke lesion, hemiplegic side, and risk factors. The data are presented in Table (1).

Table (1): The Profile of (234) subjects.

1. Demographic information(n=234)		
Age	Frequency (n)	Percentage
21-30	2	0.9
31-40	6	2.6
41-50	24	10.3
51-60	55	23.5
61-70	52	22.2
71-80	61	26.1
>80	34	14.5
Mean ±SD	33.4 ± 22.038001	
b. GENDER	Frequency (n)	Percentage
Male	115	49.1
Female	119	50.9
2.Stroke related information		
A.Paralysis	Frequency (n)	Percentage
1.Right side of the body	105	44.9
2.Left side of the body	89	38.0
3.Both side of the body	4	1.7
4.No weakness	36	15.4
B. Hemisphere affected due to stroke	Frequency (n)	Percentage
1. Right hemispheric lesion	99	42.3
2. Left hemispheric lesion	102	43.6
3. Both hemispheric lesion	33	14.1
3. Risk Factors		
Factors	Frequency (n)	Percentage
1.Diabetes mellitus	97	41.5
2.Hypertension (HTN)	161	68.8
3. Ischemic heart disease (IHD)	51	21.8
4.Smoking	34	14.5

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5.obesity	5	2.1
Mean ±SD	69.6±*54.57*325354	
6. sociolinguistic disorder (Behavior toward family members)n=234		
sociolinguistic disorder	Frequency	Percentage
1.Destructive	176	75.2%
2.Constructive	58	24. 8.%

The results of the collected data in Table (1) indicate that among 234 subjects ,the mean age of post stroke patients is 33.4 ± 22.038001years and males (49.1%) are more prevalent than females (50.8)..15.3% of patients were not paralyzed , meanwhile 44.8% got right side body paralysis, followed by left side 38% , and both side 1.7%. The highest risk factor that caused stroke is Hypertension (68.8%), followed by Diabetes mellitus (41.4%), and Ischemic heart disease (21.7%). Meanwhile , smoking (14.5) and obesity(2.1) are the lowest risk factors consequently. Concerning sociolinguistic disorder , due to stroke, 75.2% showed destructive behavior toward their family members. Concerning Language and Speech Evaluation (Aphasia and Dysarthria),in order to have a comprehensive assessment of aphasia as a language impairment, it was crucial to assess dysarthria since the co-occurrence of dysarthria with aphasia was observed in the majority of aphasic cases.

1.Aphasia

Among the 234 stroke patients, for aphasia classification and assessments, patients with normal language function (n=67) were excluded , so totally 167 subjects are included. The most common classification of Aphasia is Boston Classification system which includes eight types of aphasia ;(1) Broca's, ;(2)Transcortical Motor aphasia ;(3) Global ;(4)Mixed Transcortical;(5) Wernicke's;(6) Transcortical Sensory;(7) Conduction (8), and Anomic. These types are characterized by a specific profile of symptoms based on fluency of verbal expression (i.e., fluent vs. non-fluent speech), language comprehension skills, and repetition abilities . According to the results, only Five types of aphasia were detected ; maximum of patients 82 % with Broca's aphasia ; followed by 61% had Wernick's Aphasia; 26.3% had Conduction Aphasia;13.8% got Global Aphasia ; and 20.4% were observed with Anomic Aphasia . Due to the inability to use language , 56.3%showed destructive and 43.7% constructive behavior toward their family members Table 2

Table (2): aphasia classification based on characteristics (19).

A.Broca's Aphasia (production disorder) (n=16	Frequency	Percentage
1. Expressive Language Disorder(*producing* no fluent speech that has reduced phrase length, impaired melody) .Comprehension of syntactica complex sentences (e.g., passive sentences) is of impaired .	74	44.3%
2. Agramatism (their sentences consist mostly content words with few, if any, function words	37	22.2%
3. Unable to read and write properly	26	15. 6%

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TOTAL	137	82%
B.Wernick's Aphasia(comprehension disorder)		
4.Comprehension is impaired. ,i.e. unable to understand any speech of other people . (Concept Disorder) .	48	28.7%
5.Their speech is fluent but is empty of meanin with a mix of sentence constructions (par agrammatism. Language output contains many aphasias including semantic paraphasia (e.g., say "train" for the target word "bus") and neologism (non words like "fluffertump").	37	22.2%
6. Error awareness is often poor due to limited auditory comprehension.	9	5.4%
7.Reading and writing are frequently significant impaired.	8	4.8%
TOTAL	102	61.1%
C. Conduction Aphasia (repetition disorder)		
8. Repetition skills are disproportionally impaired relative to comprehension a expression. Having fluent speech with phonemic distortions, relatively good comprehension, and mild t moderate naming deficits.	38	22.8%
9.Mild to moderate namin deficits.	6	3.5%
TOTAL	44	26.3%
A. Global Aphasia (production and comprehension)		
10. Comprehension is significantly impaired even the single word level, spok output is severely limited	17	10.2%
1.Spontaneous speech, nam and repetition are constraine recurring utterances.	6	3.6%
Total.	23	13.8%
E. Anomic Aphasia(namin disorder)		
12.Having difficulty with naming but no other profou comprehensive and expressi deficits.	28	16.8%
13.Speech is fluent with th exception of intermittent pau and hesitations resulting fro word finding difficulties.	6	3.6%

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TOTAL	34	20.4%
2. sociolinguistic disorder (Behavior toward family members)		
sociolinguistic disorder	Frequency	Percentage
1.Destructive	94	56.3%
2.Constructive	73	43.7%

There is no perfect aphasia classification system because aphasic patients do not fit neatly within any of the well-defined neoclassical aphasia syndromes. Besides, patients within the same subtype aphasia may differ quite significantly from other patients who have the same syndrome. This study attempts to assess aphasia focusing on abnormal verbal expression, including, understanding spoken or written language, repetition, naming, reading, and writing and linguistic disorders such as semantic, pragmatic, phonological, or syntactic disorders (table3). During conversation, (44.3%) were unable to accurately produce the correct words or phrases during speech, 32.9%. were unable to understand the speech of others, 26.3 % were unable to repeat words and phrases, and 13.8% got Comprehension and speech production impairments. Meanwhile, linguistic disorder was present in 28.1% of the patients presented: (i) pragmatic disorder (use of language in a specific situation and context); (ii) Agrammatism in 22.2% (grammatical part of the sentences and disorder in the formation of the sentences); (iii) 20.4% could not remember the correct names and numbers of words (Anomia) during speech; (iv) and only 16.2% did not know how to read properly. When viewing the images, 23.4 could not describe the events (Vocabulary and Cognitive Linguistic Disorder).

Table (3): Verbal Linguistics Behavior and Linguistic Impairments of Language (1).

A. Language impairment of verbal abilities (n =167)	**Frequency (n)**	**Percentage**
1.Unable to accurately produce the correct words or phrases during spe (expressive language disorder)	74	44.3
2.Unable to understand any speech of other people (receptive/concept disorder)	55	32.9
3. Unable to repeat words and phrases.	44	26.3
4. Comprehension and speech production are impaired	23	13.8

B. Linguistic Disorder(n=167)	**Frequency**	**percentage**
1. use of language in a specific situation and context (pragmatic disorder)	47	28.1%
2. having disorder of sentence formation or grammar (Agramatism)	37	22.2%
3. Unable to remember the names and numbers of the correct words (Anomia) during speech	34	20.4%
4.Unable to read properly (Phonetics and Phonological Disorder)	27	16.2%
5. When viewing the images unable to describe the events (Vocabulary and Cognitive Linguistic Disorder)	39	23.4%

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Dysarthria is another case of language disorder which is defined as an articulator deficiency Language pathologists (SLPs), clinically, assess dysarthria to measure articulation and speech intelligibility. Since there is no speech-language pathologist (SLP) in Rigzary hospital, the researcher, as a physician, did a physical exam to diagnose dysarthria by checking; patient's ability to coordinate breathing, voice, the quality of voice, the ability to move lips, tongue, jaw and face. Besides, doing MRI and CT scan tests to check abnormality that may affect the speech. This study focused also on Dysarthria since it may co-occur with aphasia in post stroke patients which makes stroke management harder. (table 4):

Table (4) Assessment of dysarthria.

1.Dysarthria(n=234)	Frequency	Percentage
Flaccid	13	5.6
Spastic	10	4.3
Ataxic	27	11.5
Hypokinetic	61	26.1
Mixed	14	5.9
Total	125	53.4
2.No Dysarthria	109	46.6
3.Both dysarthria and aphasia	91	38.9

In this study, (53.4 %) of the subjects got dysarthria; (i) Hypokinetic (26.1 %); Ataxic (11.5%); Mixed (5.9 %); Flaccid (5.6%); and Spastic (4.3 %). Among those patients who got dysarthria, (38.8%) of them suffered from co-occurrence of aphasia, meanwhile, (46.6 %) didn't have dysarthria. Results are presented in Discussion The results of the collected demographic data of atroke patients (table -1) indicate that among 234 subjects, the mean age of post stroke patients is 33.4 ± 22.038001years and males (49.1%) are more prevalent than females (50.8). Concerning the effect of gender on language recovery, there is an assumption about a quicker language recovery by females since their brain activation is more diffuse and involves both the left and right inferior frontal gyrus, meanwhile, only left inferior frontal gyrus is lateralized for brain activities in males (20). However, studies concluded no differences in language recovery between sexes (21, 22). Evidences supporting the theory of gender differences has been found to be weak and further researches need to be conducted (23).15.3% of patients were not paralyzed, meanwhile 44.8% got right side body paralysis, followed by left side 38%, and both side 1.7%. The highest risk factor that caused stroke is Hypertension (68.8%), followed by Diabetes mellitus (41.4%), and ischemic heart disease (21.7%). Meanwhile, smoking (14.5) and obesity (2.1) are the lowest risk factors consequently. Concerning sociolinguistic disorder, due to stroke, 75.2% showed destructive behavior toward their family members. There is no perfect aphasia classification system because aphasic patients do not fit neatly within any of the well-defined

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neoclassical aphasia syndromes. Besides , patients within the same subtype aphasia may differ quite significantly from other patients who have the same syndrome classification patients. For example, one patient with Broca's aphasia may have mild-moderate reading comprehension deficits, while another does not (1). Because of these concerns, Because of these concerns, some researchers (24,25, 26). Gordon, advocate focusing on identifying the precise points of impairment in language processing, such as semantic, morphological, pragmatical, phonological, or syntactic disorders. advocate focusing on identifying the precise points of impairment in language processing, such as semantic, morphological, pragmatical, phonological, or syntactic disorders. Accordingly, (19) state that a comprehensive aphasia assessment includes each component of language (e.g., syntax, semantics, pragmatics---etc.), in every modality (comprehending spoken or written language and expressing spoken language, written language, and gestures) since aphasia manifests almost all verbal abilities, such as, abnormal verbal expression, difficulties in understanding, repetition, naming, reading, and writing. Therefore, Focusing on underlying linguistic deficits (phonological, morphological, lexical semantic or syntactic level) is the target of impairment-based therapies, as SLT method, which uses, for example , morphological decision tasks at the word, sentence or text level to improve morphological deficits (15). This research recommends using assessments, such as The Boston Diagnostic Aphasia Examination, 3rd edition (BDAE) [24], and the Western Aphasia Battery – Revised (WAB-R) (27) are the most common comprehensive aphasia assessments. Comprehensive Aphasia Test (CAT) (28), for diagnosing types of aphasia and also emphasizes on linguistic disorder assessment for ASL management. Dysarthria is another oral communication dysfunction which need to be differentiated from aphasia. Dysarthria is defined as a neurologic motor speech impairment causing the speech musculature to be slow, weak and/or imprecise (29). 20% to 30% of stroke survivors are affected by Dysarthria (28). Accordingly, dysarthria and aphasia may co-occur together Ali and colleagues reported that 29.6% of their stroke patients had both (30).

Conclusions

Language disorders does not only affect stroke management but it also impair the individual's quality of life. If language impairments are screened earlier in patients, along with screening for neurological disorders, it is possible to intervene in language skills and work through speech therapy. Unfortunately, language -speech pathologists are not available in neither in the public nor in the private hospital in Kurdistan Region. Social and economical policy, need to be adopted by the government, in order to improve health care services and providing equitable post-stroke medical care. Generally, it can be concluded that Stroke and language problem in post-stroke patients is significant, but this domain is poorly addressed in Kurdistan Region. This is the first neurolinguistic study investigating the case of post-stroke patients in Erbil District. Large-scale studies are needed to better visualize the extent of the problem. A paucity of good –quality epidemiological studies on stroke and language impairment is needed in Kurdistan region.

Recommendations

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Opening a modern Neurological hospital or Center where Neurologists ,Psychologists ,Radiologists , and Language –Speech Pathologists work as a team. The study also recommends opening special training in LSA for the physiotherapists and trainers at the hospital by professional people in the field from the neighborhood countries (Iran , Turkey , Jordon –etc.). A Long term solution , is putting language and speech pathology in the curriculum of Physiotherapy Department at Polytechnic and Medical Colleges in Kurdistan Region to be taught as a separate subject during the academic years.

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Ethical Clearance: This study was conducted according to the approval of Rizgary hospital –Erbil –Kurdistan Region, Iraq (Document no. 2024AHK887).

Conflict of Interest: Non

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تقييم إدارة ضعف اللغة بعد السكتة الدماغية في مستشفيات أربيل العامة

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الملخص

خلفية الدراسة: السكتة الدماغية هي السبب الأكثر شيوعا للحبسة والتي تحتاج إلى علاج لأنها تؤجل الشفاء من السكتة الدماغية وتسبب مشاكل نفسية واجتماعية للمرضى وعائلاتهم. لاحظ الباحثون أن مشكلة اضطراب اللغة لدى مرضى ما بعد السكتة الدماغية لم تتم معالجتها بشكل جيد في إقليم كردستان.

اهداف الدراسة: تهدف هذه الدراسة اللغوية العصبية إلى تقديم دراسة شاملة حول التركيبة السكانية لمرضى السكتة الدماغية وفقدان القدرة على الكلام في مستشفى رزكاري على مدى شهرين في عام ٢٠٢٤. إلى جانب الكشف عن الانتشار والوفيات في المستشفى.

المرضى والطرائق: أجريت هذه الدراسة المقطعية في مستشفى رزكاري العام في أربيل - إقليم كردستان. ديموغرافية لجميع المرضى الذين تم تسجيلهم في مستشفيات أربيل خلال الشهرين في عام ٢٠٢٤. ثم يتم تنفيذ عملية تشخيص فقدان القدرة على الكلام وعسر التلفظ مع ضعف اللغة.

النتائج: من بين ٢٣٤ شخصا، كان متوسط عمر مرضى ما بعد السكتة الدماغية ٣٣,٤ ± ٢٢,٠٣٨٠٠١ سنة .١٥,٣٪ من المرضى لم يصابوا بالشلل، بينما أصيب ٤٤,٨٪ بشلل في الجسم الأيمن، يليه الجانب الأيسر ٣٨٪، وكلا الجانبين ١,٧٪. أعلى عامل خطر هو ارتفاع ضغط الدم (٦٨,٨ ٪)، يليه داء السكري (٤١,٤ ٪)، وأمراض القلب الإقفارية (٢١,٧ ٪).

الاستنتاجات: تبلغ نسبة الاضطرابات اللغوية حوالي (٧١,٤٪) وهي نسبة عالية بين مرضى ما بعد السكتة الدماغية. لا تؤثر اضطرابات اللغة على إدارة السكتة الدماغية فحسب، بل إنها تضعف أيضا نوعية حياة الفرد. إذا تم فحص إعاقات اللغة في وقت مبكر في المرضى، فمن الممكن التدخل في المهارات اللغوية والعمل من خلال علاج النطق.

الكلمات المفتاحية: ضعف اللغة, السكتة الدماغية , عسر التلفظ.

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