

LANGUAGE ASSESSMENT IN CHILDREN WITH STUTTERING

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ABSTRACT:

Background: *The incidence rate of stuttering is 5% among preschool children and about 1% among adults. Although the cause of stuttering has not been identified, a multifactorial hypothesis of stuttering has gained acceptance.*

Aim of the work: *To evaluate and to assess language in children with stuttering.*

Patients and Methods: *This analytical (observational) cross sectional study was carried out at the outpatient clinic of Phoniatics unit, ENT department, Ain Shams University Hospitals, included 30 children with stuttering as a case group, in addition to 30 healthy age and sex matched controls. Each child in the studied group was subjected to the protocol of assessment of fluency disorders and language disorders.*

Results: *In the current study, there was no statistically significant difference in the severity of stuttering between boys and girls with stuttering included in the current study. There was high statistically significant difference between the studied two groups regarding phonology and syntax. There was a statistically significant strong positive correlation between chronological age with receptive language age ($p < 0.001$), expressive language age and total language age ($p < 0.001$). There was a statistically significant strong positive correlation between receptive language age and expressive language age and total language age ($p < 0.001$).*

Conclusion: *Language is markedly affected among stuttering children in comparison to healthy control group.*

Keywords: *Stuttering, language, development, children, fluency*

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INTRODUCTION:

Stuttering is a speech fluency disorder, characterized by involuntary interruptions in the speech flow. It is successfully treated in 70% of diagnosed children; however, the remaining 30% continue to suffer this problem for a long time. The rate of incidence of this disorder is 5% among preschoolers and around 1% among adults. A multifactorial hypothesis of stuttering has gained acceptance even though the cause of stuttering has not been identified yet [1].

The etiology of stuttering is multifactorial, as the result of a dynamic

interaction between a wide and nonlinear spectrum of risk factors caused during child development. Understanding these risk factors is essential to diagnose it early and correctly and so, to provide a more effective intervention for children who stutter [2].

Several scholars have noted that stuttering commonly starts between ages 2 and 4 years, coincides with the critical period of marked development in children receptive and expressive language [3].

Stuttering appears in the form of disturbance in the speech flow, characterized by prolongations, repetitions, blocks and

interjections. Also, may be associated with avoidance and listener's negative reaction causing dysprosody of speech^[4].

Phoniatricians reported different methods for assessing the severity of stuttering. Meanwhile, clinicians encounter confusion about the suitable unit of measuring the severity of stuttering and whether it is appropriate to count events of stuttering or events of dysfluency^[5].

It is unknown whether the delays in language observed in children who stutter are an etiologic factor, an adaptive reaction, or a combination of both. While the literatures contain several discussions suggesting the existence of differences between the receptive and expressive language competencies of stutterers, few studies that document such discrepancies are reported^[6].

The current study was designed to evaluate and to assess language in children with stuttering.

AIM OF THE WORK:

Is to evaluate and to assess language in children with stuttering;

PATIENTS AND METHODS:

This analytical (observational) cross sectional study was carried out at the outpatient clinic of Phoniatrics unit, ENT department, Ain Shams University Hospitals, included 30 children with stuttering as a case group, in addition to 30 healthy age and sex matched controls.

Each child in the studied groups was subjected to the protocol of assessment of fluency disorders in Ain Shams Hospital^[7] which included:

A. **History taking:** Prior to the administration of the assessment for

determining stuttering severity, medical history was taken from parents.

B. Examination:

a) **Auditory perceptual assessment (APA).**

b) **The associated physical symptoms.**

Clinical diagnostic aids:

A. **Speech documentation:** By audio recording a speech sample.

B. **Mental status examination:** It is done for both groups A and B by Stanford-Binet Intelligence Scale (5th edition)^[8] to provide the intelligence quotient (IQ) and the mental age.

C. **Assessment of stuttering severity:** That was done to determine the child's level of stuttering severity by:

Stuttering Severity Instrument for Children and Adults-Arabic version (ASSI): It was applied on children by asking them to describe pictures and the clinician calculated the stuttering severity index^[9].

The total scores of three parameters (frequency of stuttered words per 100 words, duration of the three longest blocks, the physical concomitants that can be observed) are included in this index. The following grading system is used:

- Very Mild: (0–19).
- Mild: (20–22).
- Moderate: (23–30).
- Severe: (31–33).
- Very severe: (34–45).

D. Assessment of Language skills and problems:

Was done to determine the effect of stuttering on language skills in the studied group. It was conducted using the Arabic language test^[10]. This test was used to evaluate the language of children speaking Arabic aged from 2 to 8 years.

Ethical considerations:

- 1) Consent was taken from all parents before the children were involved in this study.
- 2) Ain Shams Institute's Ethical Committee of Human Research had approved the study protocol.

Statistical analysis:

Analysis of the data was done using IBM SPSS software package version 24

(Armonk, NY, IBM Corp.). Numbers and percentages were used to describe the qualitative data. The Kolmogorov-Smirnov test was used to prove the distribution's normality. Range as well as mean and standard deviation were used to describe quantitative data. The three groups were then compared according to categorical variables using the Chi-squared test. The significance of the results obtained (P value) was judged at a level of 5%.

RESULTS:

Table 1: Demographic data of the study groups:

		Groups				Test of significance	P value
		Cases group (N=30)		Control group (N=30)			
Chronological age (In years)		6.18 ± 0.83		6.31 ± 0.84		t = - 0.596	0.554
Gender	Boys	21	70 %	19	63.3 %	χ ² = 0.503	0.478
	Girls	9	30 %	11	36.7 %		

Table 1 showed the mean age in the cases 6.18 ± 0.83 years while in the control group, was 6.31 ± 0.84 years, enrolled 21 boys (70%) and 9 girls (30%) in cases group

while control group enrolled 19 boys (63.3%) and 11 girls (36.7%) with no significant statistical difference (p>0.05).

Table 2: Comparison between language ages in the two study groups:

	Groups		Test of significance	P value
	Cases group (N=30)	Control group (N=30)		
Receptive language age (In years)	5.50 ± 0.91	6.51 ± 0.83	t = - 4.459	< 0.001*
Expressive language age (In years)	4.78 ± 1.06	6.27 ± 0.82	t = - 6.063	< 0.001*
Total language age (In years)	5.11 ± 0.98	6.36 ± 0.78	t = - 5.491	< 0.001*

Highly significant*

Table 2 showed that the mean receptive language age in cases group was 5.50 ± 0.91 years, the mean expressive language age in cases group was 4.78 ± 1.06 years, the mean

total language age in cases group was 5.11 ± 0.98 years, that was significantly lower statistically as compared with the control group (p< 0.001).

Table (3): Comparison of the semantics between the two study groups:

	Groups				Test of significance	P value
	Cases group (N=30)		Control group (N=30)			
Semantic						
Normal	30	100 %	30	100 %	FET= 0	1
Affected	0	0 %	0	0 %		

Table 3 showed that regarding the semantic aspect of language as demonstrated while using language test, all the subjects in two groups showed normal study.

Table (4): Comparison of the pragmatics between the two study groups:

	Groups				Test of significance	P value
	Cases group (N=30)		Control group (N=30)			
Pragmatics						
Normal	5	16.7 %	27	90 %	FET= 32.411	< 0.001*
Affected	25	83.3 %	3	10 %		

Highly significant*

Table 4 showed that regarding the pragmatics, there were 5 subjects (16.7%) normal, and 25 subjects (83.3%) affected in cases group while there were 27 subjects (90%) normal and 3 subjects (10%) affected in control group, with high significant statistical differences between the two groups (p< 0.001).

Table (5): Comparison of the phonology between the two study groups:

	Groups				Test of significance	P value
	Cases group (N=30)		Control group (N=30)			
Phonology						
Normal	8	26.7 %	29	96.7 %	FET= 31.093	< 0.001*
Affected	22	73.3 %	1	3.3 %		

Highly significant*

Table 5 showed that regarding the phonology, there were 8 subjects (26.7%) normal, and 22 subjects (73.3%) affected in cases group while there were 29 subjects (96.7%) normal and 1 subject (3.3%) affected in control group, with high statistically significant difference between the two groups (p< 0.001).

Table (6): Comparison of the syntax between the two study groups:

	Groups				Test of significance	P value
	Cases group (N=30)		Control group (N=30)			
Syntax						
Normal	3	10 %	28	93.3 %	FET= 41.713	< 0.001*
Affected	27	90 %	2	6.7 %		

Highly significant*

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Table 6 showed regarding the syntax, there were 3 subjects (10%) normal and 27 subjects (90%) affected in cases group while there were 28 subjects (93.3%) normal and 2 subjects (6.7%) affected in cases group, with high statistically significant difference between the two groups ($p < 0.001$).

Fig 1 showed that according to the severity of stuttering, there were 4 cases (13.3%) with very mild stuttering, 5 cases (16.7%) with mild stuttering, 15 cases (50%) with moderate stuttering, 4 cases (13.3%) with severe stuttering and 2 cases (6.7%) with very severe stuttering.

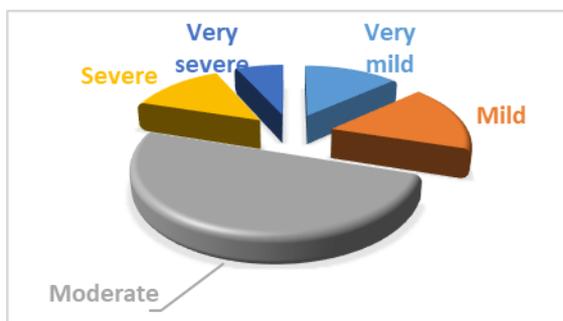


Fig (1): Severity of stuttering in the cases in the study:

Table (7): Cross correlation between the different ages in the study patients.

Items	Chronological age		Receptive language age		Expressive language age		Total language age	
	r	P	r	P	r	P	r	P
Chronological age			0.849	<0.001*	0.751	<0.001*	0.787	<0.001*
Receptive language age	0.849	<0.001*			0.892	<0.001*	0.960	<0.001*
Expressive language age	0.751	<0.001*	0.892	<0.001*			0.933	<0.001*
Total language age	0.787	<0.001*	0.960	<0.001*	0.933	<0.001*		

Highly significant*

Table (7) showed there was a statistically significant positive strong correlation between chronological age with receptive language age ($p < 0.001$), expressive language age ($p < 0.001$) and total language age ($p < 0.001$). There was a statistically significant strong positive correlation between receptive language age and expressive language age ($p < 0.001$) and total language age ($p < 0.001$). There was a statistically significant strong positive correlation between expressive language and total language age ($p < 0.001$). The highest degree of positive correlation was detected between receptive language age and total language age ($p < 0.001$) followed by

association between expressive language and total language age ($p < 0.001$).

Fig (2) showed that: In boys' group, there were 3 cases (14.3%) with very mild stuttering, 4 cases (19%) with mild stuttering, 10 cases (47.6%) with moderate stuttering, 3 cases (14.3%) with severe stuttering and 1 case (4.8%) with very severe stuttering. In the girls' group, there were 1 case (11.1%) with very mild stuttering, 1 case (11.1%) with mild stuttering, 5 cases (55.6%) with moderate stuttering, 1 case (11.1%) with severe stuttering and 1 case (11.1%) with very severe stuttering.

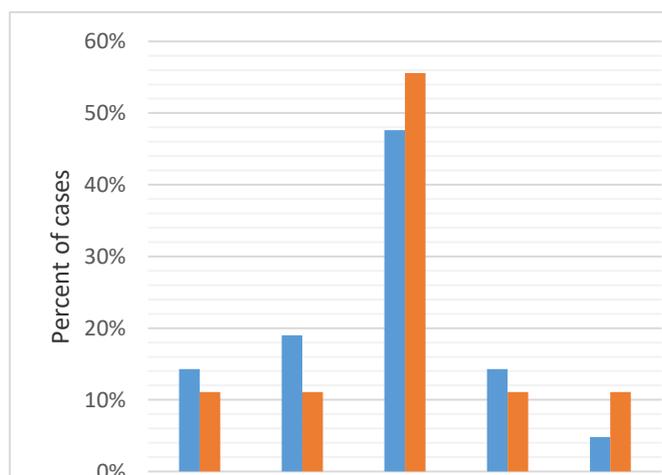


Fig (2): Severity of stuttering according to sex in the patients' study group:

DISCUSSION:

This study was conducted to assess language in children with stuttering. The current study included 30 children with stuttering as a control group, in addition to 30 healthy age and sex matched controls.

In the current study, the mean chronological age in cases group was 6.18 ± 0.83 years while in control group, it was 6.31 ± 0.84 years with no statistically significant difference between the two groups.

Regarding the gender distribution in cases with stuttering, males represented 70% and female represented 30%. This agreed with **Zaky et al.**^[11] who included 52 children with stuttering in their study and an equal number of healthy controls. In their study, males represented (77.5%) of subjects, while females represented (22.5%).

This corresponds to various studies that reported male predominance. Stuttering and gender are strongly associated and is more commonly found and prevalent in male individuals^[12]. And also more natural recovery^[13].

Our results go with **Khodeir**^[5] and **Shaheen et al.**^[14] that most cases have

severity of moderate degree

In the current study, regarding the phonology, there were 8 subjects (26.7%) normal and 22 subjects (73.3%) affected in the cases group while there were 98 subjects (96.7%) normal and 1 subject (3.3%) affected in cases group, with high statistically significant difference between the two groups. This agreed with **Zaky et al.**^[11] who showed there was high percentage of articulation disorders among cases. This result could be explained by overlapping between the age of onset of stuttering (between 2 and 4 years of age) with the period when a child is developing very rapidly in phonology and language that affect the development of speech and language during this period. This is in accordance with **Wolk et al.**^[15] who reported poor phonological development in stuttering children and 30%-40% of children who stutter have an associated phonological disorder.

Regarding the pragmatics of cases in the current study, there were 5 subjects (16.7%) normal and 25 subjects (83.3%) affected in cases group while there were 27 subjects (90%) normal and 3 subjects (10%) affected in control group, with high statistically significant difference between

the two groups. These findings were in accordance with **Shaheen, et al.**^[16] who found pragmatic deficit in stuttering children except in object functions skills with more affection in preverbal skills in cases of severe stuttering. Also, children who stutter may not know when to modify their message by restatement, explanation, or revision and may have difficulty using and benefiting from language in different situations; even when a breakdown is identified. These findings were in the same line with those of **Roseberry and Hedge**^[17] who reported that impairment in pragmatic language have been linked to an increase in children's stuttering. For instance, parents using questions to communicate with their children tends to increase stuttering in children. An explanation could be that these children are affected by the reaction of their parent especially during role playing in conversation, if the parent gave unfavorable reaction, this will render the response of the child

Also, there was significant decrease in the preverbal communication which affected the score of pragmatics, it can be explained that the increase in stuttering severity is associated with decrease in eye contact, improper use of voice volume, and exaggerated facial movements, which lead to a decrease in the preverbal communication. So, we would recommend Pragmatic enhancement to be included in the rehabilitation program for stuttering children.

In the current study, the mean receptive language age, mean expressive language age and mean total language age in cases group were statistically significantly lower as compared with the control group. This was consistent with **Zaky et al.**^[11] who showed that highly statistical significant difference were observed between the two groups as regards to the receptive language score, expressive language score and total language score with higher scores in the control

groups.

This was in accordance with **Shaheen et al.**^[14] who showed that the stuttering children scored highly significantly lower in the total language score than the control group. The mean language scores was 87.08 (3.59) in the stuttering group and 90.40 (2.39) in the control group. The difference was highly significant.

The significant lower total language score of the stuttering group than the control group in this study is in agreement with **Ratner**^[18], who considered deficit in language as a risk factor for occurrence of stuttering; the link between both is instinctive in young children.

These deficits in the language in stuttering children could be explained that stuttering onset is usually from 2-7 years of age, which coincides with the period of distinctive development in receptive and expressive language in children. Also, children in this period may attempt to cope with stuttering by simplifying verbal responses.

Despite stutterers being afraid of the listener's negative reaction, they need more effort to be perceived more expectedly and cause an inability to communicate effectively in daily life^[19].

Conclusion:

Language is markedly affected among stuttering children in comparison to healthy control group.

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This paper has not been published in its current form or substantially similar form elsewhere including on a web and it has not been accepted for publication elsewhere

Conflict of interest:

There is no conflict of interest.

Ethics approval and consent to participate:

All participants in this study have given their written consent and the study protocol has been approved by the Ain Shams Institute's Ethical Committee of Human Research.

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تقييم اللغة في الأطفال المصابين بالتلعثم

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الخلفية: معدل حدوث التلعثم هو ٥٪ بين أطفال ما قبل المدرسة وحوالي ١٪ بين البالغين. على الرغم من أنه لم يتم تحديد سبب التلعثم، إلا أن فرضية متعددة وجود عوامل متعددة للتلعثم اكتسبت قبولا. الهدف: تقييم اللغة لدى الأطفال المصابين بالتلعثم.

الأساليب: أجريت هذه الدراسة في العيادة الخارجية لوحدة أمراض التخاطب بقسم الأنف والأذن والحنجرة بمستشفيات جامعة عين شمس، وشملت ٣٠ طفلا يعانون من التلعثم، بالإضافة إلى ٣٠ طفل مطابق في العمر والجنس. خضع كل طفل في المجموعة المدروسة لبروتوكول تقييم اضطرابات الطلاقة واضطرابات اللغة

النتائج: في الدراسة الحالية، لم يكن هناك فرق ذي دلالة إحصائية في شدة التلعثم بين الأولاد والبنات. وجود فروق ذات دلالة إحصائية عالية بين المجموعتين المدروستين فيما يتعلق بالعمر اللغوي. كانت هناك علاقة إيجابية قوية ذات دلالة إحصائية بين العمر الزمني وعمر اللغة الاستقبالية ($p < 0.001$) وعمر اللغة التعبيرية وإجمالي عمر اللغة ($p < 0.001$)

كانت هناك علاقة إيجابية قوية ذات دلالة إحصائية بين عمر اللغة الاستقبالية وعمر اللغة التعبيرية وإجمالي عمر اللغة ($p < 0.001$). الاستنتاج: تتأثر اللغة بشكل ملحوظ بين الأطفال المتلعثمين مقارنة بالمجموعة الغير مصابة بالتلعثم.