Correlation between stuttering severity and pragmatic development in Egyptian children who stutter

Sabah Mohammed Hassan[a], Yossra Abdel Naby Sallam[b], Mona Sameeh Khodeir[a], Ola Shaaban Mahmoud[b,c]

[a]Unit of Phoniatrics, Department of Otorhinolaryngology, Faculty of Medicine, Ain Shams University, [b]Unit of Phoniatrics, Department of Otorhinolaryngology, Faculty of Medicine for Girls, Al Azhar University, [c]Faculty of Medicine, Al Azhar University, Cairo, Egypt

Correspondence to Mona Sameeh Khodeir, MD (Phoniatrics), Lecturer of Phoniatrics, Unit of Phoniatrics, Department of Otorhinolaryngology, Faculty of Medicine, Ain Shams University, Cairo, 11566, Egypt; Tel: (+202)-25400230; Mob: +201065002688; e-mail: mona.khodeir@med.asu.edu.eg

Received 21 July 2017
Accepted 21 August 2017

The Egyptian Journal of Otolaryngology
2017, 33:670–678

Background
Few studies have been carried out concerning the relation between stuttering behaviors and language pragmatics in children who stutter (CWS). The correlation between stuttering severity and pragmatic development in CWS is scarce in the literature so far.
Aim
This research aimed to study the relationship between stuttering severity and pragmatic language development in the Egyptian Arabic-speaking CWS.
Patients and methods
This study is an analytical cross-sectional study carried out at the Phoniatrics Clinics of El-Demerdash Hospital (Ain Shams University) and El-Zahraa Hospital (Al Azhar University). A total of 60 Egyptian CWS in the age range between 4 years 1 day and 9 years 11 months 31 days were selected conveniently based on inclusion and exclusion criteria. Selected children underwent the Ain Shams assessment protocol for fluency disorders, including assessment of stuttering severity by Bloodstein (BLS) classification and the Stuttering Severity Instrument for Children and Adults – Arabic version (ASSI). The standardized Egyptian Arabic Pragmatic Language Test has been used to assess the pragmatic language development.
Pearson's correlation coefficient has been used to correlate the total pragmatic language age and degree of stuttering severity by BLS classification and the ASSI.
Results
Upon application of the Egyptian Arabic Pragmatic Language Test, all the participating children had no pragmatic language delay. They had scores either at and/or above their fifth percentiles in all the test items except in the paralinguistic aspect. There was no statistically significant correlation between grades of BLS classification or ASSI and the total pragmatic language age.
Conclusion
CWS had no pragmatic language delay except in the paralinguistic aspects.

Keywords:
Egyptian Arabic Pragmatic Language Test, pragmatic assessment, stuttering severity index

Egypt J Otolaryngol 33:670–678

1012-5574

Introduction

Stuttering is a disorder affecting fluency of speech through interruption of the flow of speech by certain obstacles: repetitions, prolongations, blocks, interjection, and others. A negative reaction of the speaker to these interruptions in the form of avoidance and struggle together with the negative reaction of the listener cause variable degrees of dysprosody with resultant poor intelligibility of speech [1].

Although a variety of theories have been proposed to explain its etiology, the exact cause of stuttering is still unknown [2]. The relation between stuttering and language is intuitive in young children. Several scholars have noted that stuttering onset, typically between ages 2 and 4, coincides with the critical period of accelerated expansion in children's expressive and receptive language [3]. The possible stuttering–language link has become a focus of scientific interest, reflected in several stuttering models with psycholinguistic viewpoints. Among these are the Demands–Capacity Model [4], the Covert–Repair Hypothesis [5], the Trade-Off Hypothesis [3], and the Cognitive Interference Model [6].

Investigators have focused their studies on five distinct linguistic variables: (a) phonological aspects, (b) loci of stuttering, (c) language complexity, (d) pragmatics, and

(e) language skills. Research concerned with the phonological aspects has provided evidence that stuttering increases as a function of language complexity [6,7].

A simple but functional definition of pragmatics is that it is the language use or the set of sociolinguistic rules one knows and uses in determining who says what to whom, how, why, when, and in what situation [8].

Swiney [9] indicated, based on his clinical observations of children and young adults who stutter, that both often have situational speaking fears associated with their fluency disorder in addition to pragmatic weakness. This coincides with reports by Blood and Seider [10] who indicated that 68% of the children who stutter (CWS) have at least one concomitant disorder.

Therefore, pragmatics have a bidirectional role in CWS. These children often show pragmatic language disorders that either influence or complicate their speaking fears. The demands and capacities model, as explained by Starkweather [4], indicates that dysfluency can occur when speech demands exceed a child's motor, linguistic, and/or emotional capacities. Consequently, it is easy to understand how the linguistic and cognitive demands of dealing with the spontaneity of pragmatics, the most complex of language tasks, can increase dysfluency in CWS [9].

Weiss [11] reported that CWS produce much more dysfluent utterances in unstructured versus structured conversations, and neither partner nor number of conversation participants results in a significant difference in the number of dysfluent utterances produced. CWS were more likely to produce dysfluencies as the length and complexity of their utterance increased. Accordingly, increasing a client's pragmatic skills improves narratives and expository discourse and, thus, all fluency therapy eventually covers these types of conversational interactions.

Among pragmatic skills that affect conversation is eye contact. Eye contact is a form of nonverbal communication and has a large influence on social behavior. Many stutterers as reported by Fraser [12] do not look people squarely in the eye when they talk to them particularly when they are stuttering or anticipating a block. By doing so, their shame or embarrassment feelings about their difficulties tend to increase.

Shaheen *et al.* [13] declared that CWS have a significantly lower total language score with a significant deficiency in pragmatic skills compared with fluent children.

Although many studies concerned with the relation between stuttering behaviors and language pragmatics in CWS exist, absence of enough information about the relation between stuttering severity and pragmatic language development, especially in Arabic-speaking societies, was the motive to design this study.

This research aimed to study the relationship between stuttering severity and pragmatic language development in the Egyptian Arabic-speaking CWS to uncover part of the mysterious association between language and stuttering.

Patients and methods

Patients

This study is an analytical cross-sectional study carried out at the Phoniatrics Unit of El-Demerdash Hospital (Ain Shams University) and El-Zahraa Hospital (Al Azhar University), between October 2016 and May 2017. A total of 60 Egyptian CWS in the age range between 4 years 1 month 1 day and 9 years 12 months 31 days were included and divided into three age groups as follows:

(1) Group I: 4 years 1 month 1 day to 5 years 12 months 31 days.
(2) Group II: 6 years 1 month 1 day to 7 years 12 months 31 days.
(3) Group III: 8 years 1 month 1 day to 9 years 12 months 31 days.

A convenience sample has been used to select the participants based on the following inclusion and exclusion criteria.

Inclusion criteria

(1) CWS more than 6 months' duration.
(2) Children with average intelligence quotient (IQ).

Exclusion criteria

Children with delayed language development and or any speech or voice disorder that might affect speech intelligibility were excluded.

All parents of the participating children provided informed consent and the study protocol was approved by the Ain Shams Institute's committee of human research.

Methods

The Ain Shams assessment protocol of fluency disorders [1] has been applied to all participating children, with assessment of pragmatic language carried out as follows:

Elementary diagnostic procedures

(1) Parents and child's interview: complete assessment of the personal, family, and developmental histories, including information about:
   (a) Ages at which the family has noticed stuttering symptoms and ages at which the child has noticed it and started suffering from it.
   (b) What increases or decreases stuttering?
   (c) Any especially difficult situations, sounds, or words, avoidance and replacement of difficult words with synonyms.
   (d) Whether the child is aware and frustrated by his or her dysfluencies and to what extent.
(2) Auditory perceptual assessment: describes the pattern of dysfluencies: repetition of a phrase, word, or syllable, prolongations, blocks, interjections, and word or sound avoidance.
(3) Visual perceptual assessment: observe the child for any associated involuntary movements, eye contact, associated reactions to the speaking situation, avoiding certain expressions, or a certain overt emotion.
(4) Oral–aural tract examination.

Clinical diagnostic aids

Documenting the voice and speech using an audiorecording of a speech sample.

Additional instrumental measures

(1) Stanford Binet Intelligence Scale (5th ed.) [11]: to assess the IQ.
(2) Assessment of the stuttering severity using:
   (a) Bloodstein classification (BLS) [14]: it depends on the child's awareness, sensitization, and avoidance and has four grades: BLS I, unaware; BLS II, aware, but not annoyed, no avoidance; BLS III, aware, annoyed, sensitized, partial avoidance, no struggle; and BLS IV, fully aware and suffering.
   (b) Stuttering Severity Instrument for Children and Adults – Arabic version (ASSI) [15]: it gives a single numerical representation of severity index (Stuttering Severity Instrument) from 0 to 45 that includes the sum of scores of three parameters (frequency of stuttered words per 100 words, duration of the three longest blocks, and observable physical concomitants). It uses the following grading system: 0–19, very mild stuttering; 20–22, mild stuttering; 23–30, moderate stuttering; 31–33, severe stuttering; 34–45, very severe stuttering.
(3) Assessment of the child's language using subjective language test to exclude any language delay.
(4) Assessment of language pragmatics using the standardized Egyptian Arabic Pragmatic Language Test (EAPLT) [16]: it assesses the nonverbal, paralinguistic, and verbal skills. Depending on the child's chronological age, the 5th and 95th percentile ranks of the child's total score and his or her scores in each subset of the EAPLT were calculated. The fifth percentile rank indicates that the child developed the skill, whereas the 95th percentile rank implies that the child mastered it. Scores below the fifth percentile rank indicated pragmatic language delay.

Data management and analysis

The data were collected and introduced to a personal computer (Released 2011; IBM Corp., Armonk, New York, USA), and were analyzed using the program IBM statistical package for the social sciences (SPSS) for Windows version 20.0. (IBM Corp.). Data analysis was performed according to the type of data obtained for each variable.

The statistical tests used in this study are a one-way analysis of variance, the χ^2-test, and Pearson's correlation coefficient test.

Results

This study was conducted on 60 Egyptian CWS with no history of delayed language development or any other speech or voice disorders that might affect speech intelligibility. The mean age of the participating children was 8.06±1.48 years, with male participants representing 88.3%. All the participating patients were right-handed, with a mean IQ of 92.02±2.68. Of the participating patients, 43.3% had a family history of stuttering (Table 1).

The medical history revealed that the mean age of onset of stuttering symptoms was 4.57±0.95 years, whereas the mean age at which the family noticed the stuttering symptoms was 5.54±1.2 years, whereas the mean age at which the child started to notice the stuttering symptoms was 6.59±1.15 years and the mean age at which the child started to suffer was 7.34±1.146 years (Table 2).

Upon detailed analysis of the stuttering symptoms, 40% of the participated children linked stuttering symptoms

Table 1 Demographic data of participating children

Demographic data	Number of children [*n* (%)] (total=60)
Age (years)	
Range (minimum–maximum)	4.33–9.92
Mean±SD	8.06±1.48
Sex	
Female children	7 (11.7)
Male children	53 (88.3)
IQ	
Range (minimum–maximum)	90–105
Mean±SD	90.02±2.68
Family history of stuttering	
Children with negative family history	34 (56.7)
Children with positive family history	26 (43.3)
Handedness	
Right-handed children	60 (100)
Left-handed children	0 (0.0)

IQ, intelligence quotient.

to specific situations. Overall, 30% of the participating children linked stuttering symptoms to school situations. Only 5% of the participating children correlated the appearance or the increase of their stuttering with a specific spoken sound and/or word (Table 3).

The auditory perceptual assessment of the speech of the participating children revealed that 65% of the automatic speech was free from any dysfluency, whereas all of them have affected spontaneous speech. Word repetitions constituted the most common core behavior. Intraphonemic disruption and blocks were the second most common speech behaviors noticed in 63.3 and 48.3%, respectively, followed by interjections and prolongations with percentages of 20 and 15%, respectively (Table 4).

BLS classification and the ASSI were used to evaluate the severity of stuttering symptoms. According to the BLS classification, 70% of children were BLS III with moderate degree of stuttering, whereas 25% of them were Bloodstein (BLS) II (mild degree stuttering), and only 5% were BLS IV (severe degree of stuttering) (Table 5).

According to the ASSI, 38.3% exhibited a very mild degree of stuttering, 31.7% were mild, 26.7% were moderate, and only 3.3% exhibited a severe degree of stuttering (Table 6).

After exclusion of any language delay, the EAPLT was applied. All the participating children showed no pragmatic language delay. In all, 93.3% of children have a total score above their fifth percentile and 6.7% children have total score at their fifth percentile. Analysis of the scores of the

Table 2 Age of onset of stuttering symptoms, age at which the family noticed the stuttering symptoms, age the child start to notice the stuttering symptoms, and age the child started to suffer from stuttering symptoms

	Age range (minimum–maximum)	Mean±SD
Age of onset of the stuttering symptoms (years)	3–7	4.57±0.95
Age at which family started to notice the stuttering symptoms (years)	3.6–8.5	5.54±1.20
Age the child started to notice the stuttering symptoms (years)	4.3–9	6.59±1.15
Age the child started to suffer from the stuttering symptoms (years)	0–9.5	7.34±1.46

Table 3 Symptoms of stuttering related to a special situation and/or to a specific spoken sound and/or word

	Number of children [*n* (%)] (total=60)
Situations related to the stuttering symptoms	40 (66.6)
At home	3 (5.0)
New situation	2 (3.3)
At school	18 (30.0)
At school and home	12 (20.0)
While speaking to strangers	4 (6.7)
While speaking to friends	1 (1.7)
Sounds/words of difficulty	3 (5.0)

Table 4 Analysis of the auditory perceptual analysis of the automatic and spontaneous speech of participating children

Auditory perceptual analysis of speech	Number of children [*n* (%)] (total=60)
Automatic speech	21 (35.0)
Spontaneous speech	60 (100.0)
Repetitions of words	60 (100.0)
IPDs	38 (63.3)
Blocks	29 (48.3)
Prolongations	9 (15.0)
Interjections	12 (20.0)

IPD, intra-phonemic disruption.

EAPLT subsets showed that 16 (26.7%) children have scores below their fifth percentile in the paralinguistic aspect (Table 7).

Tables 8–10 showed no statistically significant correlation between the stuttering severity measured by BLS classification and the pragmatic language development among the three age groups. Also, there was no statistically significant correlation between the stuttering severity measured by ASSI

Table 5 Number and percentage of participating children in each degree of Bloodstein classification

Bloodstein classifications	Number of children [*n* (%)] (total=60)
BLS I	0 (0.0)
BLS II	15 (25)
BLS III	42 (70)
BLS IV	3 (5)

BLS, Bloodstein.

Table 6 Score range, mean score, and degree of the Stuttering Severity Instrument for Children and Adults – Arabic version, for participating children

The Stuttering Severity Instrument for Children and Adults – Arabic version	
Score range (minimum–maximum)	10–32
Mean±SD of the total score	20.67±4.12
Number of children [*n* (%)] (total=60)	
Very mild stuttering	23 (38.3)
Mild stuttering	19 (31.7)
Moderate stuttering	16 (26.7)
Severe stuttering	2 (3.3)

and the pragmatic language development among the three age groups (Tables 11–13).

Tables 14 and 15 showed that the correlation between BLS degree or ASSI degree and total pragmatic language age of the three age groups was nonsignificant ($P<0.005$).

Discussion

The literature is deficient in answering questions about the correlation between stuttering severity and pragmatic language development. This could be due to many conflicts regarding measuring stuttering severity and pragmatic development, especially in the Arabic-speaking Societies.

Sheehan [17] linked stuttering to an iceberg, with visible overt symptoms above the water representing the dysfluent speech, and the

Table 7 Scores of the standardized Egyptian Arabic Pragmatic Language Test and the percentile ranks among the studied age groups

EAPLT subsets	Score range (minimum–maximum)	Mean±SD	Number of patients [*n* (%)]		
			Below fifth percentile[a]	At fifth percentile[b]	Above fifth percentile[c]
Nonverbal aspect	8–10	9.75±0.54	0 (0)	0 (0)	60 (100)
Paralinguistic aspect	5–10	8.65±1.35	16 (26.7)	14 (23.3)	30 (50)
Inferences	6–13	10.00±1.66	0 (0)	3 (5)	57 (95)
Story comprehension	20–32	28.12±2.85	0 (0)	1 (1.7)	59 (98.3)
Story telling	12–16	13.73±0.78	0 (0)	0 (0)	60 (100)
Wh question comprehension	18–25	22.88±1.87	0 (0)	0 (0)	60 (100)
What do you say if	3–6	4.30±0.53	0 (0)	21 (35)	39 (65)
What do you feel if	3–5	4.97±0.26	0 (0)	1 (1.7)	59 (98.3)
Understanding manners	9–10	9.92±0.28	0 (0)	0 (0)	60 (100)
Total Pragmatic language age	98–124	112.32 ±6.19	0 (0)	4 (6.7)	56 (93.3)

EAPLT, Egyptian Arabic Pragmatic Language Test. Ranks of fifth percentile: [a]Skill is not developed. [b]Skill is developed. [c]Skill is mastered.

Table 8 Relation between stuttering severity measured by Bloodstein classification and pragmatic language development in children in age group I (4 years 1 month 1 day to 5 years 12 months 31 days) using independent sample *t*-test

EAPLT subsets	BLS degrees		*t*-Test	*P*-value*
	II (*n*=5)	III (*n*=1)		
Nonverbal aspect	10.00±0.00	10.00±0.00	0.000	1.000
Paralinguistic aspect	7.80±1.30	7.00±0.00	0.314	0.605
Inferences	8.00±2.00	8.00±0.00	0.000	1.000
Story comprehension	24.80±2.28	28.00±0.00	1.641	0.269
Story telling	12.60±0.89	12.00±0.00	0.375	0.573
Wh question comprehension	19.40±1.67	20.00±0.00	0.107	0.760
What do you say if	4.00±0.00	4.00±0.00	0.000	1.000
What do you feel if	5.00±0.00	5.00±0.00	0.000	1.000
Understanding manners	9.40±0.55	9.00±0.00	0.444	0.541
Pragmatic language age	101.00±2.74	103.00±0.00	0.444	0.541

BLS, Bloodstein; EAPLT, Egyptian Arabic Pragmatic Language Test. *$P<0.05$, significant.

Table 9 Relation between stuttering severity measured by Bloodstein degree and pragmatic language development in children in age group II (6 years 1 month 1 day to 7 years 12 months 31 days) using independent sample *t*-test

EAPLT subsets	BLS degrees		*t*-Test	*P*-value*
	II (*n*=6)	III (*n*=13)		
Nonverbal aspect	10.00±0.00	9.62±0.65	2.033	0.172
Paralinguistic aspect	9.33±0.82	8.77±1.64	0.623	0.441
Inferences	9.33±1.51	9.69±2.14	0.136	0.717
Story comprehension	24.50±4.42	27.92±2.63	4.532	0.048
Story telling	13.83±0.75	14.00±0.41	0.401	0.535
Wh question	21.50±1.64	22.92±1.71	2.919	0.106
What do you say if	4.00±0.00	4.15±0.55	0.447	0.513
What do you feel if	5.00±0.00	4.85±0.55	0.447	0.513
Understanding manners	9.83±0.41	10.00±0.00	2.326	0.146
Pragmatic language age	107.33±7.79	111.92±5.14	2.370	0.142

BLS, Bloodstein; EAPLT, Egyptian Arabic Pragmatic Language Test. *$P<0.05$, significant.

Table 10 Relation between stuttering severity measured by Bloodstein degree and pragmatic language development in children in age group III (8 years 1 month 1 day to 9 years 12 month 31 days) using independent sample analysis of variance test

EAPLT subsets	BLS degrees			*F*	*P*-value*
	II (*n*=4)	III (*n*=28)	IV (*n*=3)		
Nonverbal aspect	10.00±0.00	9.75±0.52	9.00±1.00	3.274	0.051
Paralinguistic aspect	8.50±1.00	8.79±1.34	7.67±0.58	1.071	0.355
Inferences	11.25±0.96	10.54±1.10	10.00±1.00	1.212	0.311
Story comprehension	28.75±1.71	29.36±1.66	29.33±2.31	0.221	0.803
Story telling	13.75±0.96	13.82±0.72	14.00±0.00	0.108	0.898
Wh question	22.75±1.71	23.82±1.02	23.67±1.15	1.627	0.212
What do you say if	4.50±0.58	4.50±0.58	4.00±0.00	1.097	0.346
What do you feel if	5.00±0.00	5.00±0.00	5.00±0.00	0.000	1.000
Understanding manners	10.00±0.00	10.00±0.00	10.00±0.00	0.000	1.000
Pragmatic language age	114.50±4.73	115.57±3.51	112.67±3.06	0.959	0.394

BLS, Bloodstein; EAPLT, Egyptian Arabic Pragmatic Language Test. *$P<0.05$, significant.

Table 11 Relation between stuttering severity measured by Stuttering Severity Instrument for Children and Adults – Arabic version, and pragmatic language development in children in age group I (4 years 1 month 1 day to 5 years 12 months 31 days) using independent sample *t*-test

EAPLT subsets	ASSI degrees		*t*-Test	*P*-value*
	Very mild (*n*=5)	Moderate (*n*=1)		
Nonverbal aspect	10.00±0.00	10.00±0.00	0.000	1.000
Paralinguistic aspect	7.80±1.30	7.00±0.00	0.314	0.605
Inferences	8.00±2.00	8.00±0.00	0.000	1.000
Story comprehension	24.80±2.28	28.00±0.00	1.641	0.269
Story telling	12.60±0.89	12.00±0.00	0.375	0.573
Wh question comprehension	19.40±1.67	20.00±0.00	0.107	0.760
What do you say if	4.00±0.00	4.00±0.00	0.000	1.000
What do you feel if	5.00±0.00	5.00±0.00	0.000	1.000
Understanding manners	9.40±0.55	9.00±0.00	0.444	0.541
Total pragmatic language age	101.00±2.74	103.00±0.00	0.444	0.541

ASSI, Stuttering Severity Instrument for Children and Adults – Arabic version; EAPLT, Egyptian Arabic Pragmatic Language Test. *$P<0.05$, significant.

predominant aspects of the disorder representing the secondary behaviors that remain invisible. These secondary behaviors include physical involuntary movements, interjections, together with feelings and thoughts of frustration, anxiety, anger, and expectation of difficulty in talking, which lead to avoidance behavior. These secondary behaviors impair the ability to communicate effectively and aggravate problems that result from primary behaviors [18].

Because stuttering shows task-dependent severity, the overt symptoms of stuttering have been assessed during different speech tasks including

Table 12 Relation between stuttering severity measured by Stuttering Severity Instrument for Children and Adults – Arabic version, and pragmatic language development in children in age group II (6 years 1 month 1 day to 7 years 12 months 31 days) using independent sample analysis of variance test

EAPLT subsets	ASSI degrees			*F*	*P*-value*
	Very mild (*n*=8)	Mild (*n*=7)	Moderate (*n*=4)		
Nonverbal aspect	9.88±0.35	9.71±0.49	9.50±1.00	0.574	0.574
Paralinguistic aspect	9.00±1.41	9.29±0.76	8.25±2.36	0.648	0.536
Inferences	9.75±1.58	10.14±2.27	8.25±1.71	1.334	0.291
Story comprehension	25.13±3.91	28.86±1.07	26.75±4.57	2.359	0.127
Story telling	14.00±0.53	14.00±0.58	13.75±0.50	0.332	0.722
Wh question comprehension	21.75±1.49	23.57±1.40	22.00±2.31	2.503	0.113
What do you say if	4.00±0.53	4.14±0.38	4.25±0.50	0.404	0.674
What do you feel if	5.00±0.00	4.71±0.76	5.00±0.00	0.842	0.449
Understanding manners	9.88±0.35	10.00±0.00	10.00±0.00	0.662	0.530
Total pragmatic communication	108.38±7.27	114.43±3.41	107.75±5.56	2.621	0.104

ASSI, Stuttering Severity Instrument for Children and Adults – Arabic version; EAPLT, Egyptian Arabic Pragmatic Language Test.
*$P<0.05$, significant.

Table 13 Relation between stuttering severity measured by Stuttering Severity Instrument for Children and Adults – Arabic version, and pragmatic language development in children in age group III (8 years 1 month 1 day to 9 years 12 months 31 days) using independent sample analysis of variance test

EAPLT subsets	ASSI degrees				*F*	*P*-value*
	Very mild (*n*=10)	Mild (*n*=12)	Moderate (*n*=11)	Severe (*n*=2)		
Nonverbal aspect	9.80±0.42	9.75±0.45	9.73±0.65	9.00±1.41	1.144	0.347
Paralinguistic aspect	9.30±0.67	8.92±1.16	8.00±1.55	7.50±0.71	2.937	0.049
Inferences	10.70±1.06	10.67±1.30	10.27±0.90	11.00±1.41	0.431	0.733
Story comprehension	28.80±1.32	29.67±2.10	29.09±1.38	30.50±2.12	0.880	0.462
Story telling	13.40±0.70	14.00±0.60	14.00±0.77	14.00±0.00	1.845	0.160
Wh question comprehension	23.60±0.84	23.42±1.51	23.91±0.94	24.50±0.71	0.715	0.551
What do you say if	4.70±0.67	4.25±0.45	4.55±0.52	4.00±0.00	1.831	0.162
What do you feel if	5.00±0.00	5.00±0.00	5.00±0.00	5.00±0.00	0.000	1.000
Understanding manners	10.00±0.00	10.00±0.00	10.00±0.00	10.00±0.00	0.000	1.000
Total pragmatic communication	115.30±3.37	115.67±4.58	114.55±3.14	115.50±2.12	0.180	0.909

ASSI, Stuttering Severity Instrument for Children and Adults – Arabic version; EAPLT, Egyptian Arabic Pragmatic Language Test.
*$P<0.05$, significant.

Table 14 Correlation between Bloodstein degrees and total pragmatic language age in each age group using Pearson's correlation coefficient

Total pragmatic language age	Bloodstein degrees	
	r	*P*-value*
4 years 1 month 1 day to 5 years 12 months 31 days	0.316	0.541
6 years 1 month 1 day to 7 years 12 months 31 days	0.350	0.142
8 years1 month 1 day to 9 years 12 months 31 days	–0.086	0.622

*$P<0.05$, significant.

Table 15 Correlation between degrees of the Stuttering Severity Instrument for Children and Adults – Arabic version, and total pragmatic language age in each age group, using Pearson's correlation coefficient

Total pragmatic language age	ASSI degrees	
	r	*P*-value*
4 years 1 month 1 day to 5 years 12 month 31 days	0.528	0.282
6 years 1 month 1 day to 7 years 12 months 31 days	–0.052	0.831
8 years 1 month 1 day to 9 years 12 months 31 days	–0.042	0.810

ASSI, Stuttering Severity Instrument for Children and Adults – Arabic version. *$P<0.05$, significant.

reading, reciting, and spontaneous speech [19]. The avoidance behavior and the child's feelings and thoughts were evaluated throughout the parents' and the child's interview. Stuttering severity was graded by both qualitative (BLS classification) and quantitative (ASSI) measures of stuttering severity.

ASSI is an objective, valid, and reliable measure that offers a holistic way of evaluating stuttering severity and suits the Arabic environment socially, linguistically, and culturally [20].

The EAPLT [16] used to assess the pragmatic development is a valid and reliable test that provides reliable information about the language pragmatics of Arabic-speaking Egyptian children from 2 years 1 month 1 day to 9 years 12 months 31 days compared with the protocol of pragmatic assessment designed in Cairo University of Egypt that focuses only on preverbal communication, conversation, and narrative skills [21], the EAPLT is a holistic test for assessing the three domains of pragmatic language: skills, functions, and factors [16]. Moreover, Alduais *et al.* [22] designed an Arabic version of Test of Pragmatic Language-2, which needs changes to suit the Arabic participants.

During the EAPLT, all participating children showed no pragmatic language delay with a total pragmatic test score either at and/or above their fifth percentile. This coincides with findings in the study by Anderson and Conture [23] who agreed with many parents' reports that their child showed a spurt in language development just before the onset of stuttering, speaking in longer sentences, and using new words.

The results are in contrast with those of Ratner [3] who considered language as a risk factor for stuttering and that there is a link between stuttering and language, especially in young children. This is because the onset of stuttering, typically between the ages of 2 and 4 years, coincides with the critical period of accelerated expansion in children's expressive and receptive language. Moreover, a few current articles have supported the idea that stuttering is basically a disorder of language development [14].

Watkins and Johnson [24] reported that this discrepancy could be due to factors such as the age of the participants, the age of stuttering onset, time elapsed between onset and data collection for a study, the socioeconomic background of participants, time since the onset of stuttering, the types of language skills measured, and the tools used to measure it.

Further, 26.7% of children participating in this study had scores below their fifth percentile in the paralinguistic aspects (speech loudness, rate, intelligibility, fluency, and intonation). This explained that the score of the paralinguistic aspects involves scores of both speech fluency and intelligibility, which are affected to varying degrees in the CWS because of their stuttering.

This study concluded that there is no correlation between stuttering severity and pragmatic language development. There are two ways to explain this. First, language has three areas – form, content, and function (pragmatic) – and language delay would affect the three areas in any combination [25]. In this study, delayed language development was one of the exclusion criteria for participating CWS; accordingly, development of language pragmatics, as one of the language domains, should not be delayed as well.

The second explanation is that stuttering severity correlates more obviously with the role-playing of the person who stutters, which necessitates constant self-monitoring. When the latter is reduced, the stuttering symptom and, consequently, its severity would reduce markedly [1]. Taking this into consideration while assessing CWS – who are mostly unaware or annoyed by their stuttering symptoms, and whose parents alone are the sufferers – together with showing full acceptance of the child's stuttering, made children adapted to the examiner and the assessment situation and, consequently, the stuttering symptoms and severity decreased.

The current study revealed that, typically, stuttering symptoms appeared more during a school situation, and only 5% of the participating children demonstrated a correlation between the appearance or the increase of stuttering symptoms with a specific spoken sound and/or word. This finding coincides with the results of Weiss [11] who reported that most language skills are learned by interactions. In terms of pragmatics, normally developing speakers can differentiate between the demands of different communication partners in different situations.

This can be explained by the fact that young children make assumptions about a listener's knowledge level and adjust their speaking style to suit the listener. Consequently, putting a stuttering child under some type of pressure causes him or her to become aware of problems with his or her speech. Further, stuttering becomes increasingly chronic involving repetitions, prolongations, and blocks. Consequently, as stuttering progress, feelings of embarrassment and shame develop and secondary motor behaviors could appear during moments of stuttering or frustration, together with fear and avoidance of sounds, words, people, or speaking situations.

In contrast, Weiss and Zebrowski [26] reported that stories told by CWS, during a story-retelling task, were shorter than those told by children who do not stutter, irrespective of listeners.

Swiney and Reeves [27] referred the academic failure of CWS to the pragmatic weakness they could have. This is because CWS could have communication breakdown in the form of inability to seek repetition or clarification. Moreover, they are unable to know when to restate, explain, or revise their message leading to difficulty in using and benefiting from language in the classroom. In addition, they may have word avoidance behaviors as a sequel to their stuttering.

Conclusion

According to the EAPLT, all participating children had no pragmatic language delay. They had scores either at and/or above their fifth percentiles in all the test items except in the paralinguistic aspect. There is no statistically significant correlation between the grades of BLS classification and/or ASSI and the pragmatic language age.

Financial support and sponsorship

Nil.

Conflicts of interest

There are no conflicts of interest.

References

1 Kotby MN, Youssef M, Rifaie N. Fluency disorders. In: Kotby MN, Baraka M, Youssef M, Bassiouny S, Rifaie N, Abdel Haleem EK, *et al.* editors. Disorders of speech and swallowing for phoniatrics and communication disorders. Cairo: El Hariry Print; 2015. pp. 85–115.

2 Guitar B. Stuttering: an integrated approach to its nature and treatment. 2nd ed. Baltimore, MD: Williams & Wilkins; 1998.

3 Ratner N. Stuttering: a psycholinguistic perspective. In: Curlee RF, Siegel GM, editors. Nature and treatment of stuttering: new directions. 2nd ed. Boston, MA: Allyn & Bacon; 1997.

4 Starkweather CW. Fluency and stuttering Englewood cliffs Englewood Cliffs, NJ: Prentice Hall 1987.

5 Postma A, Kolk H. The covert repair hypothesis: pre-articulatory repair in normal and stuttered disfluencies. J Speech Hear Res 1993; 36:472–487.

6 Bosshardt H. Effects of concurrent cognitive processing on the fluency of word repetition: comparison between persons who do and do not stutter. J Fluency Disord 2002; 27:93–114.

7 Logan K, Conture E. Relationships between length, grammatical complexity, rate and fluency of conversational utterances in children who stutter. J Fluency Disord 1995; 20:35–61.

8 Muma J. Language handbook: concepts, assessment and intervention. Englewood Cliffs, NJ: Prentice Hall. 1978.

9 Swiney KA. Differentiating speaking anxiety from pragmatic language disorder in children who stutter. A paper presented to the annual convention of the Texas Speech-Language-Hearing Association; 24 March 2006; Grapevine, TX.

10 Blood GW, Seider R. The concomitant problems of young stutterer. J Speech Hear Disord 1981; 46:31–33.

11 Weiss AL. Why we should consider pragmatics when planning treatment for children who stutter. Lang Speech Hear Serv Sch 2004; 35:34–35.

12 Fraser M. Self-therapy for the stutterer. 11th ed. Memphis, TN: Stuttering Foundation of America; 2010.

13 Shaheen EA, Anter AA, Hussin NF. Pragmatic assessment in Egyptian stuttering children. Egypt J Otolaryngol 2012; 28:127–135.

14 Bloodstein O. A handbook on stuttering. Chicago, IL: The National Easter Seal society; 1969.

15 Rifaie N. Arabicizing and standardizing the Stuttering Severity Instrument (SSI) on the Arabic environment. Ain Shams Med J 1999; 50:7–9: 907–914.

16 Khodeir M, Hegazi M, Saleh M. Development and standardization of a test of pragmatic language skills in Egyptian Arabic: the Egyptian Arabic Pragmatic Language Test (EAPLT). Folia Phoniatr Logop; 2017.

17 Sheehan J. Conflict theory and avoidance-reduction therapy. In: Eisenson J, editor. Stuttering: a second symposium. New York, NY: Harper and Row; 1975.

18 Etchell AC, Johnson BW, Sowman PF. Behavioral and multimodal neuroimaging evidence for a deficit in brain timing networks in stuttering: a hypothesis and theory. Front Hum Neurosci 2014; 8:1–10.

19 Tasko SM, McClean MD. Variations in articulatory kinematics with change in speech task. J Speech Lang Hear Res 2004; 47:85–100.

20 Rifaie NAA, Saber AS, Kheir El-Din ST, Sallam YANM, Algamal AMAS. Efficacy of the Arabic Modified Fluency Shaping Program in the treatment of stuttering. Egypt J Otorhinolaryngol 2016; 32:306–321.

21 El Hoshy ZH, Khaled AM, Shohdi S, Mostafa D, Anter AAS. Pragmatic profile of a group of typically developing Egyptian children aged from two to eight years old. Egypt J Otolaryngol 2011; 27:160–172.

22 Alduais AMS, Shoeib RM, Al-Hammadi FS, Al-Malki KH. Testing the usability of an Arabic version of TOPL-2 in measuring pragmatic language impairment in children and adolescents with developmental dysphasia. Int J Ling 2012; III:193–214.

23 Anderson J, Conture E. Language abilities of children who stutter: a preliminary study. J Fluency Disord, 2000; 25:283–304.

24 Watkins RV, Johnson BW. Language abilities in children who stutter: toward improved research and clinical applications. Lang Speech Hear Serv Sch 2004; 35:82–89.

25 American Speech-Language and Hearing Association (ASHA). Definitions of communication disorders and variations. 1993. Available at: http://www.asha.org/policy/RP1993-00208.htm. [Last accessed 2017 Jul 29].

26 Weiss AL, Zebrowski PM. The narrative productions of children who stutter: a preliminary view. J Fluency Disord 1994; 19:39–63.

27 Swiney K, Reeves N. Treating pragmatic language weaknesses and speaking fears in children who stutter (CWS). San Antonio, TX: TSHA Annual Convention; 2008.