Psychological status of school-aged children and adolescents with dyslalia

Eman S. Hassan[a], Alaa El-Din M. Darweesh[b], Reham A. Ibrahim[a], Walaa M. Zareh[c]

Departments of [a]ENT, [b]Neurology and Psychiatry, Faculty of Medicine, Assiut University Hospital, [c]Department of Phoniatrics, Assiut Health Insurance Hospital, Assiut, Egypt

Correspondence to Walaa M. Zareh, BSC, Phoniatrics Unit, Assiut Health Insurance Hospital, Assiut, Egypt.
Zip Code: 71515; Fax: 0882327546;
Tel: +20 100 677 3118;
e-mail: walaamomenzareh@gmail.com

Received 29 August 2019
Revised 17 September 2019
Accepted 10 October 2019
Published 16 May 2020

Journal of Current Medical Research and Practice
2020, 5:217–224

Background
Many researches cited that dyslalia is often associated with behavioral problems. However, the exact behavioral problems in the dyslalia children needs more researches.

Aim
The present study aimed to assess the different behavioral and psychological problems among children with dyslalia to help to provide an effective therapeutic strategy for these children.

Methods
The study was conducted on 80 children with different types of dyslalia diagnosed by Arabic Articulation Test (study group) and on 50 normal children (control group). The children's behavioral profile was assessed via the Child Behavior Check List (CBCL).

Results
Results of the study showed that there were significantly higher percentage of children with dyslalia had delinquent behavior, lower competence level, activities level and school performance level. Also, there were significantly higher mean scores in nearly all the domains of the CBCL except for anxious/depression and social scores in the dyslalia group however, their scores did not reach the abnormal range.

Conclusion
Articulation problems showed broad relations to behavioral problems (especially externalizing problems and competence levels). These findings suggests that psychologists and other mental health professionals can play many roles in working directly with families of children with dyslalia. Increased collaboration with phoniatricians and specialists can facilitate effective phoniatric and psychiatric care.

Keywords:
articulation disorders, phonology disorders, speech sound disorders, behavioral disorders, dyslalia

J Curr Med Res Pract 5:217–224

2357-0121

Introduction

The persistence of an isolated phonological error in a relatively late period of language development is referred to as dyslalia [1]. It is the most common speech defect in children [2].

Many research studies have reported on the strong relationship between dyslalia and behavioral disorders in children and adolescents [3–5].

So far, many research studies on the relations between dyslalia and behavioral problems have not considered dyslalia independently from other comorbid conditions, for example, language impairment, as well as the age and sex of the patients, cognitive abilities such as IQ, and the effect of the type of dyslalia on the behavioral problems.

The present study investigated different behavioral problems among children with different types of dyslalia attending the outpatient clinics of Assiut University Hospital in the absence of other affecting factors, for example, language impairment and low IQ.

Patients and methods

Study design

The present work is a case–control study that included all patients with dyslalia who attended the outpatient clinic of phoniatrics at Assiut University Hospital during 1 year (80 patients) and who fulfilled the predetermined inclusion criteria (age: ≥6 to 18 years, IQ ≥ 85, and free from other speech, language, or physical disorders).

The study also included 50 children and adolescent as controls. Children serving as controls were free from speech, language, or physical disorders. They were recruited from the relatives of the studied children.

All participants were evaluated by the following protocol of assessment:

(1) Elementary diagnostic procedures:
   (a) Patients' and parents' interview, including name, age, sex, and level of education.
   (b) Auditory perceptual assessment of speech for both automatic and spontaneous speech.
   (c) General and full ENT examination.

(2) Clinical diagnostic aids:
   (a) Audiological assessment: by pure tone, audiometry to exclude any hearing problem.
   (b) Language assessment: using the Arabic language test to exclude language delay [6].
   (c) Articulation test: each participant was asked to repeat after the examiner the words of the locally developed Arabic Articulation Test [7].
   (d) Psychometric evaluation of intelligence using Stanford–Binet Intelligence Scale, 4th version, 2nd edition.
   (e) Psychological and behavioral evaluation by child behavior checklist (CBCL).

In the present study, CBCL and profile for age 4–18 years (parent form)[8] was used and more specifically anxious-depressed behavior, withdrawn behavior (internalizing syndromes), social problems (noninternalizing nonexternalizing syndromes), delinquent behavior, and aggressive behavior (externalizing syndromes), and lastly, all the competence scales were assessed.

Total scores were computed for social competence, behavior problems, internalizing problems, and externalizing problems, plus scores for each of the eight syndrome scales.

Raw scores were converted to age-standardized scores (*T* scores having a mean = 50 and SD = 10) that can be compared with scores obtained from normative samples of children within the same broad age range [8].

Ethical consideration

The study was approved by the Reviewers of the Ethical Committee of Faculty of Medicine of Assiut University.

(1) Privacy and confidentiality of all the information were assured during all the steps of the study.
(2) Informed oral consent was obtained from those who were welcomed to participate in the study.
(3) As the study did not include invasive maneuver, it was designed to be done by using questionnaires, and there was no risk to the participant in the study.

Statistical analysis

The statistical package for the social science, version 20 (IBM Corp., Armonk, New York, USA) was used for data entry and analysis. Descriptive statistics were calculated (e.g. frequency, percentage, mean, and SD).

Quantitative continuous data were compared using independent samples *t* test and one-way analysis of variance, whereas qualitative variables were compared using χ^2 test. Spearman correlation coefficient test was used to test the correlation between variables. A significant *P* value was considered positive if it was equal or less than 0.05.

Results

Sociodemographic characteristics of the dyslalia and control groups

The study included 80 children with dyslalia with a mean age of 8.75 ± 3.60 years and ranged between 6 and less than 10 years old. Males represent 61.3% of the dyslalia group.

It also included 50 children as control group, with a mean age of 9.7 ± 3.84 years, and 66% of them were females.

Comparison between sociodemographic data of the dyslalia and control group showed no statistically significant difference between them.

Behavioral problems among the dyslalia and control groups according to child behavioral checklist (parent form)

Frequency of behavioral problems among studied children

There were nonsignificant higher percentages of children with dyslalia who had abnormal total score (20%, *P* = 0.055), total internalizing score (22.5%, *P* = 0.113), and total externalizing score (16.25%, *P* = 0.105) than the control group (12, 10, and 10%, respectively) (Table 1).

Moreover, there were nonsignificant higher percentages of children with dyslalia who had abnormal withdrawn and anxious/depressed behavior scores (7.5 and 6.3%, respectively) than control group (2 and 4%, respectively) (Table 2).

There were nonsignificant higher percentages of children with dyslalia who had abnormal social problems scores (1.3%) than control group (0%) (Table 3).

In addition, there was a significant higher percentage of children with dyslalia who had abnormal delinquent behavior scores (10%) than control group (0%). The study also shows a nonsignificant higher percentage of children with dyslalia who had abnormal aggressive behavior scores (5%) than control group (4%) (Table 4).

Table 1 Frequency of types of total behavioral problems scores according to child behavior checklist (parent form) among children with dyslalia and control groups

CBCL total scores	Cases (*n*=80) [*n* (%)]	Control (*n*=50) [*n* (%)]	χ^2	*P*
Total score				
Normal	55 (68.8)	43 (86)	5.801	0.055
Borderline	9 (11.3)	1 (2)		
Abnormal	16 (20)	6 (12)		
Total internalizing				
Normal	56 (70)	43 (86)	4.364	0.113
Borderline	6 (7.5)	2 (4)		
Abnormal	18 (22.5)	5 (10)		
Total externalizing				
Normal	59 (73.75)	44 (88)	4.501	0.105
Borderline	8 (10)	1 (2)		
Abnormal	13 (16.25)	5 (10)		

CBCL, child behavior checklist. χ^2 test.

Table 2 Frequency of internalizing behavioral problems (internalized syndromes) according to child behavior checklist (parent form) among children with dyslalia and control groups

CBCL internalizing syndrome	Cases (*n*=80) [*n* (%)]	Control (*n*=50) [*n* (%)]	χ^2	*P*
Withdrawn				
Normal	65 (81.3)	47 (94)	4.221	0.121
Borderline	9 (11.3)	2 (4)		
Abnormal	6 (7.5)	1 (2)		
Anxious depressed				
Normal	69 (86.3)	47 (94)	2.225	0.329
Borderline	6 (7.5)	1 (2)		
Abnormal	5 (6.3)	2 (4)		

CBCL, child behavior checklist. χ^2 test.

There were significant higher percentages of children with dyslalia who had abnormal total competence scale score, activities score, and school score (92.5, 80, and 7.5%, respectively) than control group (70, 50, and 2%, respectively). In addition, it shows nonsignificant higher percentage of children with dyslalia who had abnormal social scores (2.5%) than control group (2%) (Table 5).

Mean scores of behavioral problems among studied children

There were significantly higher mean scores of total score, total internalizing score, and total externalizing score (54.95 ± 10.18, 56.14 ± 10.52, and 53.58 ± 10.16, respectively) among the children with dyslalia than the control groups (48.68 ± 11.38, 49.9 ± 9.59, and 49.22 ± 9.63, respectively). Still, these mean values were below the abnormal range.

In addition, there were significantly higher mean scores in the withdrawn domain of the internalizing syndromes among the children with dyslalia (58.1 ± 7.81) than the control groups (53.92 ± 5.7). Still, these mean values were below the abnormal range.

Table 3 Frequency of noninternalizing and nonexternalizing behavioral problems according to child behavior checklist (parent form) among children with dyslalia and control groups

CBCL noninternalizing nonexternalizing syndromes	Cases (*n*=80) [*n* (%)]	Control (*n*=50) [*n* (%)]	χ^2	*P*
Social problems				
Normal	77 (96.3)	49 (0.716)	0.668	0.716
Borderline	2 (2.5)	1		
Abnormal	1 (1.3)	0		

CBCL, child behavior checklist. χ^2 test.

Table 4 Frequency of externalizing behavioral problems (externalized syndromes) according to child behavior checklist (parent form) among children with dyslalia and control groups

CBCL externalizing syndrome	Cases (*n*=80) [*n* (%)]	Control (*n*=50) [*n* (%)]	χ^2	*P*
Delinquent behavior				
Normal	63 (78.8)	48 (96)	7.984	0.018*
Borderline	9 (11.3)	2 (4)		
Abnormal	8 (10)	0 (0)		
Aggressive behavior				
Normal	70 (87.5)	47 (94)	1.940	0.379
Borderline	6 (7.5)	1 (2)		
Abnormal	4 (5)	2 (4)		

CBCL, child behavior checklist. χ^2 test. **P* value less than 0.05

In addition, there were nonsignificant differences in the mean scores of noninternalized and nonexternalized syndromes in the domain of social problems among the children with dyslalia (52.79 ± 5.22) than the control groups (52.46 ± 4.60). These mean values were below the abnormal range.

Moreover, the results showed that children with dyslalia had significantly higher mean scores of delinquent behavior (56.59 ± 8.05) and aggressive behavior (55.99 ± 7.23) than control group (52.9 ± 3.63 and 53.92 ± 6.18, respectively). Still, these mean values were below the abnormal range.

There were significantly lower mean scores of total competence scores (29.38 ± 4.97), activities (25.26 ± 5.75), social (37.08 ± 4.80), and school (44.42 ± 8.23) of the dyslalia group than control group (35.56 ± 6.76, 29.62 ± 8.22, 42.3 ± 6.22, and 48.38 ± 6.60, respectively). These mean values were above the abnormal range, except the mean scores of the total competence scores (of both groups) and activities scores (in the dyslalia group only) (Table 6).

Behavioral profile in different types of dyslalia

Frequency of behavioral problems among children with different types of dyslalia

The results showed that children with a lack of distinction between voicing and devoicing and children with mixed types of dyslalia had

Table 5 Frequency of different types of scores in competence scale according to child behavior checklist (parent form) among children with dyslalia and control groups

CBCL competence scores	Cases (*n*=80) [*n* (%)]	Control (*n*=50) [*n* (%)]	χ^2	*P*
Total competence score				
Normal	4 (5)	7 (14)	12.093	0.002**
Borderline	2 (2.5)	8 (16)		
Abnormal	74 (92.5)	35 (70)		
Activities score				
Normal	8 (10)	14 (28)	12.967	0.002**
Borderline	8 (10)	11 (22)		
Abnormal	64 (80)	25 (50)		
Social score				
Normal	71 (88.8)	47 (94)	1.130	0.568
Borderline	7 (8.8)	2 (4)		
Abnormal	2 (2.5)	1 (2)		
School score				
Normal	65 (81.3)	49 (98)	8.338	0.015*
Borderline	9 (11.3)	0 (0)		
Abnormal	6 (7.5)	1 (2)		

CBCL, child behavior checklist. χ^2 test. **P* value less than 0.05, ***P* value less than 0.01

Table 6 Mean scores of behavioral problems (in the problem and competence scales) according to child behavior checklist (parent form) among children with dyslalia and control group

CBCL total scores	Cases (*n*=80) Mean±SD	Control (*n*=50) Mean±SD	*t*	*P*
Total score	54.95±10.18	48.68±11.38	3.26	0.001**
Total internalizing score	56.14±10.52	49.9±9.59	3.40	0.001**
Total externalizing score	53.58±10.16	49.22±9.63	2.43	0.017*
Withdrawn	58.1±7.81	53.92±5.7	3.25	0.001**
Anxiety/depression	57.21±7.68	54.98±7.16	1.65	0.050
Social problems	52.79±5.22	52.46±4.60	0.36	0.358
Delinquent behavior	56.59±8.05	52.9±3.63	3.05	0.001**
Aggressive behavior	55.99±7.23	53.92±6.18	1.67	0.048*
Total competence score	29.38±4.97	35.56±6.76	−5.99	<0.001**
Activities	25.26±5.75	29.62±8.22	−3.56	<0.001**
Social	37.08±4.80	42.3±6.22	6.53	<0.001**
School	44.42±8.23	48.38±6.60	−2.87	0.002**

CBCL, child behavior checklist. Independent samples *t* test. Clinical total scores *T*≥64, borderline total scores *T*≥60 up to 64. Clinical scores of subscales *T* more than or equal to 70, borderline scores of subscales ≥67 up to 70. Clinical total competence score *T*≤36, subscales scores T≤29, borderline total competence score *T*≥37 up to 41, subscales scores T≥30 up to 33. **P* value less than 0.05, ***P* value less than 0.01

significantly high frequency of abnormal withdrawal scores (18.75%), which was similar to that of the mixed groups ($P = 0.015$). Otherwise, there are nonsignificant differences among types of dyslalia regarding other items of problem scale (Table 7).

Moreover, the study showed that there are nonsignificant differences among different types of dyslalia regarding frequencies of abnormal score of competence scale; however, children with a lack of distinction between anterior and posterior sounds had the highest percentage of abnormal total competence score (100%), activities score (87.5%), and school score (18.75%) (Table 8).

Mean scores of behavioral problems among children with different types of dyslalia

Regarding the mean scores of problem scale in children with different types of dyslalia, the study shows that children with mixed types of dyslalia had significantly higher mean score of withdrawal (62.31 ± 9.12) and nonsignificant higher internalizing score (60.88 ± 14.19) than other types of dyslalia. The remaining scores were within the normal values (Table 9).

In addition, regarding the mean scores of problem scale in children with different types of dyslalia, there were nonsignificant differences among types of dyslalia regarding total competence score and its subscales.

Note that all the mean scores of the total competence scale and activities subscale in this table were within the clinical range, whereas those of social and school subscales were within the normal range (Table 10).

Discussion

Sociodemographic characteristics

Age

According to the studied children's age, the highest percentage of the studied children with dyslalia was between 6 and less than 10 years old, with the mean age of 8.75 ± 3.60 years.

These results are slightly older than that reported by others. Manso and García[3] and Baptista *et al*.[9] found that most children with dyslalia in their studies were approximately a chronological age of 6 years.

The reported age in our study might be explained by the following: at this age, children were advised by their teachers to follow a therapeutic program for their articulation defects.

Sex

The results of the present study showed that dyslalia is more prevalent in males (61.3%) than females (38.8%). This is owing to greater cultural pressures on boys than girls.

Our results were consistent with Manso and García [3], Hitchcock *et al.* [10], Baptista *et al*. [9], and Gumus *et al.*[11] who documented in their studies

Table 7 Frequency of behavioral problem scores in problem scale among children with different types of dyslalia

	Type of dyslalia					χ^2	*P*
	Stigmatism (*n*=16) [*n* (%)]	Rhoticism (*n*=16) [*n* (%)]	Lack of distinction between anterior and posterior sounds (*n*=16) [*n* (%)]	Lack of distinction between voicing and devoicing sounds (*n*=16) [*n* (%)]	Mixed (*n*=16) [*n* (%)]		
Total problem score							
Normal	13 (81.25)	11 (68.75)	12 (75)	9 (56.25)	10 (62.5)	9.312	0.317
Borderline	2 (12.5)	3 (18.75)	0	1 (6.25)	3 (18.75)		
Abnormal	1 (6.25)	2 (12.5)	4 (25)	6 (37.5)	3 (18.75)		
Internalizing score							
Normal	14 (87.5)	13 (81.25)	11 (68.75)	9 (56.25)	9 (56.25)	13.413	0.098
Borderline	2 (12.5)	2 (12.5)	0	1 (6.25)	1 (6.25)		
Abnormal	0	1 (6.25)	5 (31.25)	6 (37.5)	6 (37.5)		
Externalizing score							
Normal	11 (68.75)	14 (87.5)	13 (81.25)	11 (68.75)	10 (62.5)	5.396	0.715
Borderline	2 (12.5)	1 (6.25)	0	2 (12.5)	3 (18.75)		
Abnormal	3 (18.75)	1 (6.25)	3 (18.75)	3 (18.75)	3 (18.75)		
Withdrawn							
Normal	16 (100)	15 (93.75)	11 (68.75)	12 (75)	11 (68.75)	18.915	0.015*
Borderline	0	1 (6.25)	5 (31.25)	1 (6.25)	2 (12.5)		
Abnormal	0 (0)	0 (0)	0 (0)	3 (18.75)	3 (18.75)		
Anxious/depressed							
Normal	15 (93.75)	15 (93.75)	12 (75)	13 (81.25)	14 (87.5)	5.159	0.740
Borderline	1 (6.25)	1 (6.25)	2 (12.5)	1 (6.25)	1 (6.25)		
Abnormal	0	0	2 (12.5)	2 (12.5)	1 (6.25)		
Social problems							
Normal	15 (93.75)	16 (100)	15 (93.75)	15 (93.75)	16 (100)	7.078	0.528
Borderline	1 (6.25)	0	0	1 (6.25)	0		
Abnormal	0	0	1 (6.25)	0	0		
Delinquent behavior							
Normal	12 (75)	12 (75)	13 (81.25)	13 (81.25)	13 (81.25)	2.401	0.966
Borderline	2 (12.5)	3 (18.75)	1 (6.25)	2 (12.5)	1 (6.25)		
Abnormal	2 (12.5)	1 (6.25)	2 (12.5)	1 (6.25)	2 (12.5)		
Aggressive behavior							
Normal	14 (87.5)	16 (100)	13 (81.25)	14 (87.5)	13 (81.25)	9.595	0.295
Borderline	0	0 (0)	2 (12.5)	1 (6.25)	3 (18.75)		
Abnormal	2 (12.5)	0	1 (6.25)	1 (6.25)	0 (0)		

χ^2 test. highest frequency scores significant results. **P* value less than 0.05

Table 8 Frequency of behavioral problem scores in the competence scale among children with different types of dyslalia

	Type of dyslalia					χ^2	*P*
	Stigmatism (*n*=16) [*n* (%)]	Rhoticism (*n*=16) [*n* (%)]	Lack of distinction between anterior and posterior sounds (*n*=16) [*n* (%)]	Lack of distinction between voicing and devoicing sounds (*n*=16) [*n* (%)]	Mixed (*n*=16) [*n* (%)]		
Total competence score							
Normal	0	2 (12.5)	0	1 (6.25)	1 (6.25)	6.689	0.571
Borderline	1 (6.25)	0	0	0	1 (6.25)		
Abnormal	15 (93.75)	14 (87.5)	16 (100)	15 (93.75)	14 (87.5)		
Activities							
Normal	2 (12.5)	2 (12.5)	1 (6.25)	1 (6.25)	2 (12.5)	3.125	0.926
Borderline	1 (6.25)	3 (18.75)	1 (6.25)	2 (12.5)	1 (6.25)		
Abnormal	13 (81.25)	11 (68.75)	14 (87.5)	13 (81.25)	13 (81.25)		
Social							
Normal	15 (93.75)	14 (87.5)	14 (87.5)	13 (81.25)	15 (93.75)	4.054	0.852
Borderline	1 (6.25)	1 (6.25)	2 (12.5)	2 (6.67)	1 (6.25)		
Abnormal	0	1 (6.25)	0	1 (6.67)	0		
School							
Normal	14 (87.5)	13 (81.25)	11 (68.75)	14 (87.5)	13 (81.25)	4.906	0.768
Borderline	2 (12.5)	2 (12.5)	2 (12.5)	1 (6.25)	2 (12.5)		
Abnormal	0	1 (6.25)	3 (18.75)	1 (6.25)	1 (6.25)		

χ^2 test. Highest frequency scores.

Table 9 Mean scores of behavioral problems (in the problem scale) among the children with different types of dyslalia

	Type of dyslalia						
	Stigmatism (*n*=16) Mean±SD	Rhoticism (*n*=16) Mean±SD	Lack of distinction between anterior and posterior sounds (*n*=16) Mean±SD	Lack of distinction between voicing and devoicing sounds (*n*=16) Mean±SD	Mixed (*n*=16) Mean±SD	*f*	*P*
Total score	50.63±8.82	55.31±7.21	55.81±11.12	56.81±11.09	56.19±11.97	0.95	0.443
Internalizing score	51.44±6.05	53.75±6.99	57.19±10.57	57.44±11.3	60.88±14.19	2.02	0.101
Externalizing score	51.13±11.65	53.19±6.84	53.63±11.5	55.38±10.55	54.56±10.31	0.39	0.816
Withdrawn	52.94±3.47	56±5.28	59.88±6.63	59.38±9.83	62.31±9.12	4.06	0.005*
Anxious depressed	53.81±5.27	55.88±6.66	59.25±8.50	58.75±8.49	58.38±8.48	1.47	0.219
Social problems	52.13±5.08	52.63±4.05	52.06±6.12	54±6.53	53.12±4.30	0.37	0.832
Delinquent behavior	55.75±8.27	58±8.41	56.88±8.47	55.5±7.42	56.81±8.45	0.24	0.916
Aggressive behavior	55.38±8.12	54.94±4.86	56±8.60	57.06±7.76	56.56±6.96	0.22	0.928

One-way analysis of variance test. Clinical total scores *T* more than or equal to 64, borderline total scores *T* more than or equal to 60 up to 64. Clinical scores of subscales T more than or equal to 70, borderline scores of subscales more than or equal to 67 up to 70. All this mean scores still within the normal range except internalizing score in the mixed type of dyslalia. Highest mean scores, significant results. **P* value less than 0.05

Table 10 Mean scores of behavioral problems (in the competence scale) among the children with different types of dyslalia

	Type of dyslalia						
	Stigmatism (*n*=16) Mean±SD	Rhoticism (*n*=16) Mean±SD	Lack of distinction between anterior and posterior sounds (*n*=16) Mean±SD	Lack of distinction between voicing and devoicing sounds (*n*=16) Mean±SD	Mixed (*n*=16) Mean±SD	*f*	*P*
Total competence score	30±3.58	29.75±5.85	27.38±3.61	29.5±6	30.25±5.35	0.85	0.497
Activities	24.88±4.70	25.94±5.87	23.69±5.26	25±4.27	26.81±8.09	0.66	0.621
Social	37.75±4.27	38.56±7.58	35.81±1.91	36.75±5.89	36.5±1.51	0.81	0.524
School	44.25±6.44	43.88±7.59	42.25±10.12	46.5±8.65	45.25±8.34	0.58	0.677

One-way analysis of variance test. Clinical total competence score T less than or equal to 36, borderline total competence score T more than or equal to 37 up to 41. Clinical scores of subscales T less than or equal to 29, borderline scores of subscales T more than or equal to 30 up to 33. Highest mean scores.

the significantly higher rate of boys with defective articulation than girls.

Behavioral profiles

Problem scale (internalizing, externalizing, and noninternalizing nonexternalizing behavioral problems)

The results of the present study showed that there was a significantly higher percentage of children with dyslalia who have abnormal delinquent behavior. Moreover, nonsignificant higher percentage of children with dyslalia have abnormal total behavioral score, internalizing behavioral problems (withdrawn and anxiety/depression), externalizing behavioral problems (aggressive behavior), and noninternalizing nonexternalizing problems (social) among children in the study group than in the control AW1 group. These nonsignificant results may be owing to small sample size of the study.

The results showed also significant higher mean scores of most of the behavioral problems (except anxious/depression and social problems) among children in the study group than in the control group. Still, these mean values were below the abnormal range.

One explanation of these results might be that the dyslalia group contained children with varying types of dyslalia, some of which may be perceived by the patient without knowing he/she was actually producing a defective sound (e.g. interdental stigmatism patients) and other types may be socially accepted (such as roticism type).

In addition, these results may be owing to that the mean age group was 8 years, and they are not yet aware of their problem. The awareness of the problem can affect (in a certain way) the personality.

The results of the present study were in accordance with Cantwell and Baker [12], who reported that 30% of children with isolated speech disorders had emotional and behavioral disorders. Moreover, Perello[13] maintains that dyslalia is more frequent in children with certain characteristics of the personality. According to him, these children during the examination are uneasy, unconscious, distracted, shy, sometimes apathetic, and lacking interest in learning.

Bruno and Sanchez[14] and Massana and Artal[15] suggested that among the factors favoring the appearance and/or maintenance of the dyslalia are the psychological characteristics of the child such as lack of acceptance, low self-esteem, and emotional disturbances.

Manso and García [3] found that many of personality traits were manifested in children with dyslalia (shyness, anxiety, fear of speaking, aggressiveness, reduction of social interactions, social isolation, etc.).

Zhao *et al.*[4] using Achenbach CBCL found that the incidence of behavioral problems in children with functional articulation disorder (37.9%) was significantly higher than that (13.3%) in control group. The boys had higher levels in withdraw, immaturity, disobedience, and total score. The girls had higher levels of depression/anxiety, withdraw, aggression, hyperactivity, and the total score.

Nevertheless, Song *et al.*[5] found that the incidence of behavioral problems in children with articulation disorder was higher than that of controls, but the difference was not significant. In addition, the scores in those children were higher than the normal children.

Competence scale (activities, social peer relationship, social functioning, and academic functioning)

The results of the study showed that significant higher percentage of children with dyslalia were found in total competence, activities, and school scores. The nonsignificance of the results between study and control groups regarding the social scores may be owing to the small sample size.

The results showed also significantly lower mean scores of the total competence score, activities, social, and school domains among the children with dyslalia than control groups. These mean values were above the abnormal range, except mean scores of the total competence scores (of both groups) and activities scores (in the dyslalia group only).

The explanation of these lower but not clinical mean scores may be also owing to the small sample size. In addition, it may be owing to that the mean age group was 8 years, and they are not yet aware of their problem.

These findings of total competence score, social, and activities scores are in agreement with Hall [16] and Silverman and Falk [17], who found that articulatory disorders result in negative attitudes from peers toward persons with articulatory errors.

McCormack *et al.*[18] also cited in their review that speech impairments are associated with difficulty with initiation and maintenance of peer relationships, increased parental anxiety, and more difficulty forming a nurturing parent–child relationship, and have negative effect on sibling relationships.

Another study by Manso and García[3] found that children with dyslalia have difficulties to relate to others; they are shy, inhibited, very sensitive, cautious, and reserved in social interactions (they do not like to act in a group), moving away of contact with colleagues.

In addition, McLeod *et al.*[19] and Hitchcock *et al.*[10] found that children may experience social challenges in connection with speech-sound disorder.

Finding of poor school functioning of the dyslalia group may be owing to that these patients may have reading and spelling difficulties due to the speech-sound defect. These findings are consistent with previous findings that children with speech-sound disorders are at heightened risk for literacy difficulties [20]. In addition, Catts *et al.*[21] found that children with speech-sound disorders are at increased risk of having difficulties learning to read. In fact, between 30 and 77% of children with speech-sound disorders struggle with reading.

McCormack *et al.*[18] cited in their review that speech impairments are associated with lowered academic expectations.

In addition, Hitchcock *et al.*[10] found that children may experience social, emotional, and/or academic challenges in connection with speech-sound disorder.

Behavioral profile in different types of dyslalia

In the present study, we compared the behavioral and adaptive functioning of different dyslalia cases aged 6–18 years. The type of dyslalia is not affecting the behavioral profile of children with dyslalia, except in the withdrawal domain. There was a significant higher percentage of children with lack of distinction between voicing and devoicing sounds and mixed types of dyslalia having abnormal withdrawn scores than other types of dyslalia.

In addition, there was significantly higher mean scores among mixed type of dyslalia than other types of dyslalia. This may indicate that presence of two types of articulatory defects can affect more the behavioral profile of the children with dyslalia, especially withdrawn syndrome. Such results are not surprising as children with two types of dyslalia do not communicate effectively, which in turn causes the children to be frustrated in trying to accomplish their wants and needs, resulting in withdrawn behavior.

The results also indicate that the behavioral profile in the competence scale of the patient with lack of distinction between voicing and devoicing sounds may be more affected than other types of dyslalia.

In parallel to the present study, Zhao *et al.*[4] found that the incidence of behavioral problems in severe group (group having more than two phonemes affected) was higher than that of mild group.

On the contrary, there are other studies which found that the effect of the articulatory defects is not limited to

children with a high level of severity or unintelligibility. Studies have found that even mild articulatory disorders result in negative attitudes from peers toward persons with one or more misarticulations. For example, Hall[16] conducted a study that evaluated the attitudes of fourth and sixth graders elicited by videos of peers with and without certain speech errors (rhoticism or sigmatism). Attitudes toward speaking ability, the speaker as a peer, and what the speaker would be like as a teenager were measured through the use of semantic differential instruments. Significantly, more negative attitudes were found toward the peers who exhibited articulatory errors. Similar results occurred in a study dealing with attitudes of college students toward peers who have a/w/for/r/substitution. The data suggest that college students were likely to react negatively to peers who have a/w/for/r/substitution [17].

The differences between the results of our study and those studies may be owing to that they do not compare the clinical types of dyslalia in the study.

Conclusion and recommendation

From the previous results, we can conclude the following:

(1) There are significantly higher percentage of children with dyslalia who have abnormal delinquent behavior, lower competence level, activities, and school performance level.
(2) There are significantly higher mean scores in nearly all the domains of the CBCL (except for anxious/depression and social scores). However, their scores (the scores of the dyslalia group) did not reach the abnormal range.
(3) There is a significant higher percentage of children with lack of distinction between voicing and devoicing sounds and mixed types of dyslalia having more withdrawal than other types of dyslalia.
(4) There is significantly higher mean scores of withdrawn among mixed type of dyslalia than other types of dyslalia.

Overall, the findings from this study suggest that children with dyslalia showed behavioral problems more than normal children; however, these behavioral problems do not reach to the abnormal range. These behavioral problems could be easily controlled by early diagnosis and treatment of these articulation problems.

Acknowledgements

The authors thank Prof. Emad Kamel Abdel Haleem, Professor and Father of Phoniatrics in Phoniatric Unit, ENT Department, Faculty of Medicine, Assiut University, who, although no longer with us, continues to inspire us by his example and dedication to his job over the course of his career.

Financial support and sponsorship

Nil.

Conflicts of interest

There are no conflicts of interest.

References

1 Kotby M, Barakah M. Patterns of dyslalia in Egypt. Folia Phoniatr (Basel) 1979; 31:125–128.
2 Honová J, Jindra P, Pesák J. Analysis of articulation of fricative praealveolar sibilant S in control population. Biomed Papers 2003; 147:239–242.
3 Manso JMM, García MRM. A study on the interrelation between dyslalia and the child's personality. Electr J Res Educ Psychol 2005; 3:133–150.
4 Zhao YJ, Hua TY, Zhao YR, Ma XM, Song HQ. Behavioral problems in children with functional articulation disorder. Chin J Child Health Care 2006; 14:125–127.
5 Song HQ, Zhao YR, Hua TY. Study on neuropsychological characteristics of children with functional articulation disorder. Matern Child Health Care China 2007; 22:2506–2508.
6 Rifaie N, Hassan S. The Arabic language test-revised. Benha Med J 2004; 21:205–216.
7 Kotby MN, Bassiouny S, El-Zomor M, Mohsen E. Standardization of an Articulation Test (In Arabic). Proceedings of the 9th Annual Ain Shams Medical Congress, Cairo, Egypt, 1986; 3:45–49 .
8 Achenbach TM. *Manual for the child behavior checklist 4-18 and 1991 profile*. Burlington, VT: Department of Psychology, University of Vermont; 1991.
9 Baptista MGG, Novaes BCAC, Favero ML. Epidemiology of communication disorders in childhood phoniatric clinical practice. Braz J Otorhinolaryngol 2015; 81:368–373.
10 Hitchcock ER, Harel D, Byun TM, eds. *Social, emotional, and academic impact of residual speech errors in school-age children: a survey study. Seminars in speech and language*. New York: USA. NIH Public Access; 2015.
11 Gumus NM, Eryilmaz S, Ünsal S, Yildirim A, Yuksel S, Yuksel M, *et al*. Research on the relationship between articulation levels and social skills of Turkish children between the ages of 4 and 5 years. Int J Disabil Human Dev 2017; 16:217–224.
12 Cantwell DP, Baker L. *Psychiatric and developmental disorders in children with communication disorder*. Washington, DC: American Psychiatric Press; 1991.
13 Perello J. Dislalia. In: Perello J, ed. *Trastornos del habla*. Barcelona: Masson; 1990. 283–348.
14 Bruno C, Sanchez M. Dyslalias. In: Peña-Casanova J, ed. *Manual de logopedia*. 2nd ed ed. Barcelona: Masson; 1994. 153–172.
15 Massana M, Artal M. Dislalias. In: Sanclemente MP, ed. *Casos clínicos en logopedia*. Barcelona: Masson; 1997. 215–243.
16 Hall BJC. Attitudes of fourth and sixth graders toward peers with mild articulation disorders. Lang Speech Hear Serv Schools 1991; 22:334–340.
17 Silverman FH, Falk SM. Attitudes of teenagers toward peers who have a single articulation error. Lang Speech Hear Serv Schools 1992; 23:187.
18 McCormack J, McLeod S, McAllister L, Harrison LJ. A systematic review of the association between childhood speech impairment and participation across the lifespan. Int J Speech Lang Pathol 2009; 11:155–170.
19 McLeod S, Daniel G, Barr J. 'When he's around his brothers… he's not so quiet': the private and public worlds of school-aged children with speech sound disorder. J Commun Disor 2013; 46:70–83.
20 Raitano NA, Pennington BF, Tunick RA, Boada R, Shriberg LD. Pre literacy skills of subgroups of children with speech sound disorders. J Child Psychol Psychiatry 2004; 45:821–835.
21 Catts HW, Fey ME, Zhang X, Tomblin JB. Estimating the risk of future reading difficulties in kindergarten children: a research-based model and its clinical implementation. Lang Speech Hear Serv Schools 2001; 32:38–50.