

# Prevalence of speech disorders among elementary school children In Al-Hilla city, Iraq, 2014

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## Abstract:

**Background:** One of the neglected problems in Iraq is the speech disorder among children, which is not uncommon public health, lifelong problem that may affect their social, emotional well-being, cognition, and behavior and may be associated with lowered school performance.

**Objectives:** To determine the prevalence of speech disorder (specifically speech sound disorders and stuttering) among a sample of first class elementary school children in Al-Hilla City, Iraq, 2014, and to identify some of contributing factors of this disorder.

**Subjects and Methods:** This is a cross-sectional study carried on first class pupils in a randomly selected sample from 16 elementary schools (8 male and 8 female schools, 50% of studied schools were from rural area). The study was conducted during the academic year 2013-2014. The number of male pupils was 532 while the number of female pupils was 529. The data were collected by using teacher reports, questionnaire, and simplified screening tests.

**Results:** The overall prevalence of school children with speech sound disorders was 11.4%, while the prevalence of stuttering was 1.2%. The prevalence of speech disorder was significantly higher among male children as compared to female, the male to female ratio was 1.8:1. There was a significant relationship between the level of education of parents and speech disorder. There was a significant correlation between stuttering and school performances of students, stutters were low school performers.

**Conclusion:** Speech disorders are highly prevalent in first class primary schools in our community, compared to other developed countries.

**Keywords:** Stuttering, speech disorders, primary school children, Iraq, Hilla City

## Introduction:

Speech is the verbal communication of language. Communication disorders are among the most common disabilities in the world. A child's overall future and success can be improved greatly through the early identification of communication disorders, establishment of their causes, and subsequent intervention<sup>(1)</sup>.

There are three particular communication disorders: speech-sound production disorders (SSD), disorders of fluency (stuttering), and voice disorders. These three types traditionally called speech disorder<sup>(2)</sup>.

**Speech-sound production disorders** are difficulties in production of speech sounds occurring due to a variety of causes that are characterized by substitutions, omissions, and additions of speech sounds<sup>(3)</sup>. **Stuttering or stammering** is characterized by repetition of sounds, syllables, words, or phrase; sound prolongations; pauses (hesitation); and word substitution<sup>(4,5)</sup>. **Voice disorders** are impairments, often physical, that involve the function of the larynx or vocal resonance and take the form of abnormal production and/or absence of vocal quality, pitch, loudness, resonance, and/or duration, which is inappropriate for the child's age and sex<sup>(6)</sup>.

The reason of studying this problem is to prepare a data base in our country owing to speech disorder for further prospective studies. This is because untreated speech and language delay in children around this age group (six years) has shown variable persistence rates, with most studies reporting 40% to 60%<sup>(7)</sup>. Children of this age group whose speech and language delays are untreated may exhibit diminished reading skills in grade school, poor verbal and spelling skills, behavior problems, and impaired psychosocial adjustment. In turn, these problems may lead to overall academic

underachievement and a lower IQ that may persist into young adulthood<sup>(3)</sup>.

Stuttering has a high familiar incidence and more common in males. The World Health Organization (WHO) announced the prevalence rate of this disorder one percent<sup>(8)</sup>. Both genetic and environmental factors can affect the incidence of stuttering in predisposed children<sup>(9)</sup>.

There is strong evidence for association between speech disorder and psychiatric disorders<sup>(10,11)</sup>. The most common psychiatric disorders co-occurring with speech and communication disorders are attention-deficit hyperactivity disorder and then anxiety disorders<sup>(12)</sup>. This study was conducted to determine prevalence of speech disorders (specifically speech sound disorder (SSD) and stuttering) in the 1st class primary school students and to identify their correlates.

## Subjects and Methods:

The objectives and methodology of this study were explained to teachers and students parents to gain their consents. The acceptance of school management authorities was also obtained.

This is a descriptive cross-sectional study carried out in Al-Hilla City-Babylon province, Iraq. The period of the study extended from the beginning of Feb. till the end of May 2014. Out of (171) primary schools in Al-Hilla City and its villages, 16 primary schools (8 from rural and 8 from urban area) have been selected by simple random sampling method. From these 16 schools, 1061 students of first class have been screened and examined. Children with other medical problems such as hearing deficit, mental sub-normality or craniofacial abnormality, were not included in this study.

Data collected using a structured questionnaire which included questions about sex, birth order, paternal and maternal educational levels (illiterate, primary, secondary, and tertiary “high school”) according to Education System in Iraq<sup>(13)</sup>, number of family members and consanguinity. The school performance was evaluated by teachers depending on the score of the last mid-year exam. The researcher asked the pupils to read their books, counting, and to recite poetry that they learned. Direct (face-to-face screening and diagnostic techniques) method employed for determining speech disorder (stuttering, and speech sound disorders) in the present investigation.

The presence or absence of speech sound disorders, in our study, was detected by using a simple modified screening test produced by Al-Beblawi E (2006)<sup>(14)</sup>. This test aims to diagnose speech disorder in children in the Arabic environment, where standardized measures for efficient pronunciation in the Arabic environment are not available. Author benefited from some foreign standards such as test of pronunciation for each of (Goldman M) and Arizona Test to measure the skill of pronunciation by Fudala<sup>(14)</sup>.

We used a stuttering screening test by Yarrus et. al.(1998) “Real-Time Analysis of Speech Fluency”<sup>(15)</sup> translated by Alsaed MT (2008)<sup>(16)</sup>.

Grading System in Iraq<sup>(17)</sup>

90.00 - 100.00	(Excellent)
80.00 - 89.99	(Very Good)
70.00 - 79.99	(Good)
60.00 - 69.99	(Medium)
50.00 - 59.99	(Pass)
0.00 - 49.99	(Fail)

The questionnaire was given to the student with cover letter after examining him/her and screening about speech disorder, and asked to bring it again in the next day after filling it by his or her parent.

Statistical analysis was carried out by using SPSS 17. Categorical variables were presented as frequencies and percentages. Pearson Chi square ( $\chi^2$ ) test and Fisher exact test were used to find the

association between the categorical variables.  $P \leq 0.05$  was considered significant.

**Results**

Out of 1061 students participated in this study, 50.1% (532 Males) and 49.9% (529 Females), 121 students were identified as having speech sound disorders (SSD), the estimated prevalence was (11.40%) (Figure1).

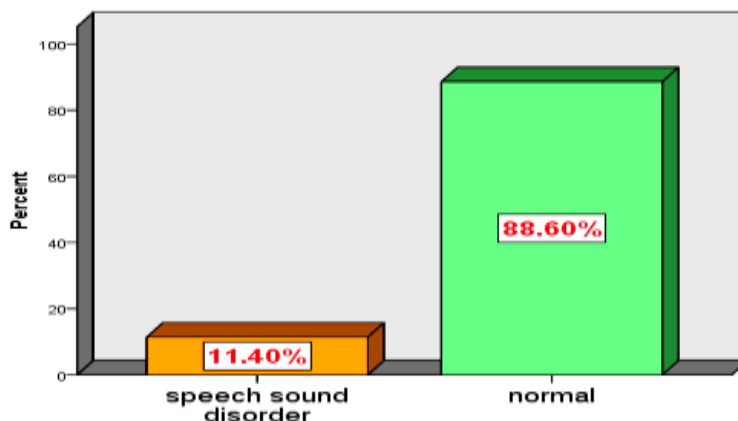


Figure1: Prevalence of speech sound disorder

Thirteen students identified as having stuttering, the prevalence was (1.23%) (Figure 2).

Table 1 shows the Percentage of speech disorder by gender. There was a higher prevalence of the two

speech disorders in males as compared to females. Table 2 shows the prevalence of speech disorder by paternal education level. Speech disorder is more prevalent in students of low educated fathers ( $P=0.001$ ).

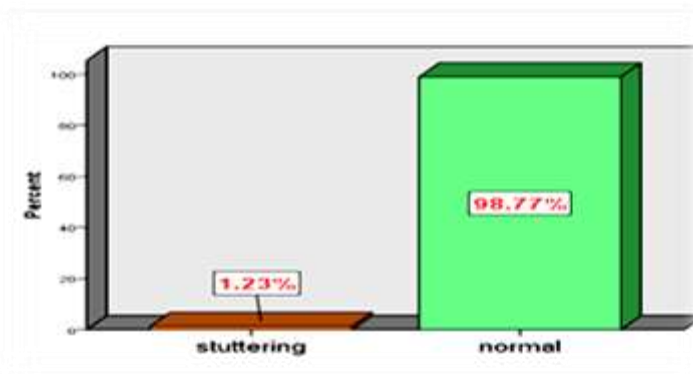


Figure 2: Prevalence of stuttering

Table 1: Percentage of Speech Disorder according to gender

Speech Disorder	Male	Female	Total	$\chi^2$	df	P value
Stuttering	9 (69.2%)	4 (30.8%)	13 (100%)	4.5	1	0.001
SSD*	76 (62.8%)	45 (37.2%)	121 (100%)	8.7	1	0.003

\*Speech sound disorders P- value  $\leq 0.05$  is significant

Table 2: Prevalence of speech disorder by paternal education (n=1061)

Paternal education level	No.	Speech disorder (No.)	Prevalence (%)	$\chi^2$	df	P value
Illiterate & primary school	600	76	56.6	19.8	2	0.001*
Secondary school	288	42	27.1			
Higher education	173	3	16.3			

P value  $\leq 0.05$  is significant

Table 3 shows the prevalence of speech disorder by maternal education level. Speech disorder was more prevalent in students of low educated mothers (P=0.001).

Table 4 There was significant inverse association between stuttering and school performance (p=0.005),

while no such association was present between speech sound disorders and school performance.

Table 5 reveals that there was no statistical significant association between speech disorder and the following variables: consanguinity, numbers of family members, and birth order of the child (P>0.05).

Table 3: Prevalence of speech disorder by maternal education (n=1061)

Maternal education level	No.	Speech disorder (No.)	Prevalence (%)	$\chi^2$	df	P value
Illiterate & primary school	696	98	81.0	19.8	2	0.001
Secondary school	246	18	14.9			
Higher education	119	5	4.1			

P value  $\leq 0.05$  is significant

Table 4: The association between stuttering and school performance

Academic performance	Stuttering		$\chi^2$	df	P value
	Yes	Normal			
Excellent	0(0%)	221	18.2	5	0.005
Very good	2(15.4%)	198			
Good	1(7.7%)	197			
Medium	2(15.4%)	197			
Acceptable	2(15.4%)	122			
Weak	6(46.2%)	113			
Total	13(100%)	1048			

P value  $\leq 0.05$  is significant

**Table 5: The association between speech disorder and consanguinity, birth order & number of family members**

Variables	SSD*	Stuttering	Normal	$\chi^2$	df	P value
<b>Consanguinity</b>						
Yes	50(44.6%)	5(45.5%)	424(43.5%)	0.063	2	0.993
No	62(55.4%)	6(54.5%)	514(56.5%)			
<b>Number of family members</b>						
2-4	20(17.9%)	2(18.2%)	151(16.1%)	3.26	4	0.493
5-7	83(74.1%)	8(72.7%)	657(70.0%)			
$\geq 8$	9(8.0%)	1(9.1%)	130(13.9%)			
<b>Child order in the family</b>						
1st	32(28.6%)	1(9.1%)	284(30.3%)	3.465	6	0.756
2nd	28(25.0%)	3(27.3%)	233(24.8%)			
3rd	24(21.4%)	4(63.0%)	189(20.1%)			
$\geq 4$ th	28(25.0%)	3(27.3%)	232(24.1%)			
Total	112(100%)	11(100%)	938(100%)			
*SSD= Speech sound disorder P value $\leq 0.05$ is significant						

**Discussion:**

The objective of this study was to estimate the prevalence of speech sound disorders and stuttering in first class primary school children. Prevalence refers to "the proportion or percentage of cases in a given population at a specified time"<sup>(18)</sup>.

The prevalence rates vary according to the method used<sup>(2)</sup>. Lower prevalence rates are typically obtained from questionnaire or survey methods (including Parent or teacher reports) in comparison to direct screening techniques<sup>(9)</sup>.

The lower prevalence rates at older ages (older than 6 to 8 years) are consistent with evidence that speech sound disorders may resolve over time<sup>(19)</sup>.

In our study, analysis of 1061 first class elementary school children the results of this study demonstrated that 11.4% of those pupils were suffering from speech sound disorders (SSD), and 1.2% of them suffering from stuttering. This result is closest to the result of a study done in Iran, in which the prevalence was 13.1% for speech sound disorders<sup>(2)</sup>, that is higher than the findings of other studies: 1.06% in children from kindergarten to grade six in McKinnon *et al.* study<sup>(3)</sup>, 3.8% in 6-year-old children in Shriberg study<sup>(9)</sup>, 1.7% in Keating<sup>(20)</sup>, and 6.4% in Ottawa studies<sup>(21)</sup>.

Law *et al.* concluded that underreporting of the prevalence of speech disorders was more likely when studies did not include both a screening and a follow-up assessment and probably different methods for identifying of these cases<sup>(22)</sup>.

Law *et al.* (2000) conducted a systematic review of the prevalence of children with speech and language impairment. The prevalence of speech impairment was between 2.3-24.6 %<sup>(22)</sup>.

In this study the prevalence of stuttering (stammering) was 1.2%, that is lower than Manson (4.99%)<sup>(23)</sup> and Proctor (2.52%)<sup>(24)</sup> studies, and higher than McKinnon (0.33%)<sup>(3)</sup> and Craig (0.72%) studies<sup>(25)</sup>.

The prevalence rate of stammer in American school children stands at around 0.3 to 2.12 %, while it varies from 0.5 to 5.18 percent across the world<sup>(26)</sup>. In

another study on stammer in Kermanshah, the prevalence rate that has been reported was 2.15 %<sup>(27)</sup>.

In studying types of speech disorders in Isfahan, the disorders rate was obtained 16.55%, according to which the maximum and minimum rates stood at 9.05% and 2.59% in production disorders and stammer, respectively<sup>(28)</sup>.

This wide gap between the percentages may be due to the different age ranges and source of collection of data that in their study based on report of employed teacher and parent<sup>(2)</sup>, in the present study we employed face-to-face assessment in addition to the teacher reports. In our study there was a significant correlation between both types of speech disorder and gender of students. The prevalence rate was higher in males (7.3%) than females (4.4%). This finding is consistent with the finding of other studies in which the prevalence of speech disorder was higher in males (16.7%) as compared to females (12.7%)<sup>(2)</sup> and other study results in the world<sup>(29,30,31)</sup>.

Males are more likely to exhibit co-occurring speech disorder than females, especially in articulation and phonology<sup>(32)</sup>. In our study the ratio of male to female in stuttering was 2.25:1. This ratio is nearly similar to the finding of Craig *et al.* study which was (2.3:1) in primary school-aged children<sup>(25)</sup>, and lower than the result of McKinnon *et al.* who found the ratio of 7.5:1<sup>(3)</sup>. In Bloodstein study, male to female ratio was 3:1 in stutterers of school-age<sup>(33)</sup>. Again, this wide variation in the results may be due to the variation in the methodologies used in different studies or may be due to other unexplained factors that need to be clarified.

When reviewing our findings about speech disorder and their relationship to the educational level of the child's father, we found that the largest proportion of pupils are from fathers with primary education or no education at all ( $p=0.001$ ). This matter was also applicable to students with illiterate mothers or women with primary education ( $P=0.003$ ), similar finding was found in a study done in Tehran which reported that speech disorder has direct relationship with variables of education and job of parents<sup>(34)</sup>. Some

studies considered parental education level as a low risk factor and reported less consistently<sup>(35,36)</sup>.

Another study concluded the significant effects of low maternal education on speech sound disorders<sup>(8)</sup>.

In our study there was no significant correlation between SSD and birth order of student ( $P=0.756$ ). This result agrees with the result of a study done in Iran (2013)<sup>(37)</sup>.

There was no statistical significance association between speech disorder and parental consanguinity ( $P=0.993$ ), this finding is consistent with the findings of other studies done in Iran<sup>(2)</sup> and other countries<sup>(38)</sup>.

Our study showed that the academic performance of students is unaffected by speech sound disorders and this may be due to the fact that our study was limited to speech disorders and did not involve the language disorders. Studies of language delay alone reported prevalence rates of 2.3% to 19% which may be attributed to the deterioration of the school performance. Another possible cause is the fact that the most common errors in children who have SSD are substitutions of phonemes, not distortions<sup>(39)</sup>. So, the teacher-student communication will not be affected too much, in addition, those students suffering from SSD are mentally normal, and so the academic performance will not be affected. In contrast the academic performance, in this study, showed a significant reverse relationship between stuttering and school performance, ( $P=0.005$ ). About half of stutterers have weak performance, distortion that happens because of stuttering and weakens the communication and mutual understanding between the student and the teacher?

The current study showed that there was non-significant correlation between speech disorder and family size, This result does not agree with other studies<sup>(2)</sup>.

In conclusion, speech sound disorders and stuttering in general are common in first class primary school children in Al-Hilla City compared to the developed countries. There was a higher prevalence of the two types of speech disorder (SSD and stuttering) in males as compared to females. Speech disorder is more prevalent in students of low educated mothers and fathers. There was significant association between stuttering and low school performance, while no such association was identified between speech sound disorders and school performance.

It is recommended for creation of an effective program starting from neonatal period, extending to the time of registration of a child in the first grade of primary school including kindergarten, consisting of specialists in the field of speech and language, and a specialist in educational psychology, and initial survey for speech disorders, and referral of suffering students to the relevant departments, such as audiologists, speech-language pathologists (SLPs), training teachers especially of Arabic language and education school counselors the correct methods of pronouncing letters and sounds in order to properly correct pronunciation of students as much as possible and providing

psychological supports to affected children, attention should be paid the Directorate of Education in the province to address this problem.

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