



(RESEARCH ARTICLE)



## Risk factors identification of speech and language delay in children in a tertiary level hospital: A pilot study

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### Abstract

Difficulties in the development of speech and language in children are considered as a common paediatric disability and it may have long-lasting effects on social skills, behavior, emotion, education and employment. There are several factors associated with speech and language delay in children which are very crucial to identify for raising awareness among parents as well as for the professional to provide early intervention by looking into them. The aim of this study is to identify risk factors of speech and language delay in children less than 6 years of age within the period of one year in a tertiary level hospital of Bangladesh. A cross-sectional study conducted with 150 children with primary speech and language delay and their parents who attended for speech and language therapy at Outdoor Patient (OPD) of Institute for Paediatric Neurodisorder and Autism (IPNA) in Bangabandhu Sheikh Mujib Medical University (BSMMU) for one year of period. This study found that the aspects being male gender, parental age, use of electronic devices, gestational age at birth, low birth weight and child's attention problem are most common risk factors of speech and language delay in children. These findings help to monitoring the children who have these risk factors and that should draw the attention for early screening, assessment and intervention.

**Keywords:** Risk factors; Speech and language delay; Tertiary level hospital

### 1. Introduction

Speech and language delay in children aged 2 to 5 years old is communal with a probable prevalence between 2 percent and 12 percent. A speech and language delay define that the child is developing his/her speech and language in the correct sequence but at a slower rate than expected [1]. Child is diagnosed as speech delay or language delay when his/her speech is delayed or unintelligible than would be expected for his or her age or is characterized by speech sound error patterns not appropriate for his/her age [2]. The consequences of speech and language delay are many including delayed phonation, childhood stuttering, articulation problem, developmental verbal dyspraxia, unusual voice quality and so on. The children with speech delay need to be diagnosed early as well as intervened into early, because frequently it is seen to be associated with poor intelligence and affected children are at high risk of later academic, behavioral, social difficulties and emotional difficulties[3]. There are several factors associated with speech delay including gender, prematurity, low birth weight, inadequate sleep, low income and low parental education , electronics device ,lack of prenatal communication with child, poor nutrition ,relatives marriage, positive family history , nuclear family in urban area etc [4]. To be aware about the risk factors in children aged less than 6 years old with changes in speech-language development as well as implementing early intervention will decrease the impact on various sectors of their life [5]. So, this particular study was designed to identify the risk factors of children with speech delay less than six years of age in a tertiary level of hospital which might be helpful for raising awareness among parents of children as well as for the professional to provide early intervention by looking into the possible risk factors.

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The objective of the study is to identify the risk factors of speech and language delay in children less than 6 years of age within the period of one year in a tertiary level hospital.

## 2. Material and methods

A cross-sectional study was conducted with 150 children with speech and language delay and their parents who attended for speech and language therapy at Outpatient Department (OPD) of Institute for Paediatric Neurodisorder and Autism (IPNA) in Bangabandhu Sheikh Mujib Medical University (BSMMU) from May 2018 to May 2019 and all of the parents/people in charge of the children signed the informed consent. The sample was selected by using purposive sampling. The inclusion criteria for selecting sample were the children with speech and language delay under 6 years of age. The children more than 6 years of age and having speech and language delay related to neurodevelopment disability were excluded from the study.

A semi-structured questionnaire was used to identify risk factors of children with speech and language delay. The questionnaire was developed by the authors specifically for this research, based on previous studies concerning the risk factors for communication, speech and language delay. Questionnaire for Risk Factors of Speech and Language Delay (QRSLD) (Appendix-1) is a form with 20 items. The parents/responsible parties of children who attended at screening were asked to answer the (QRSLD) form, individually.

Data were tabulated and analyzed using SPSS statistical software version 19, using  $\chi^2$  test for association of speech and language delay with variables and descriptive analysis. P-value of 0.05 as considered significant.

## 3. Results

**Table 1** The frequency of children with speech and language delay

Speech and Language Delay	Frequency	Percentage (%)
Speech and language delay	111	74%
Childhood stuttering	24	16%
Speech delay with hearing problem	15	10%
Total	150	100%

A total number of 150 children attended to OPD IPNA, BSMMU reporting speech and language delay participated in this study. Children with childhood stuttering (n=24, 16%) and speech delay with hearing impairment (n=15, 10%) excluded from this study. So, the final participants were 74% (n=111) children with speech and language delay (Table=1)

**Table 2** Age distribution of children with speech and language delay

Child age	Frequency	Percentage (%)
0-2 years	25	22%
2-4 years	62	55%
4-6 years	24	21%
Total	111	100%

**Table 3** Distribution of information provider

Information provider	Frequency	Percentage (%)
Mother	96	86.5%
Father	10	9.0%
Others	5	4.5%
Total	111	100%

(Table=2) The study classified the age of children with speech and language delay into three categories: 0-2 years (n=25, 22%), 2-4 years (n=62, 55%) and 4-6 years (n=24, 21%). The majority number of information provider was mother (n=96, 86.5%) shown in Table 3.

**Table 4** Gender distribution of children with speech and language delay

Gender	Frequency	Percentage (%)	<i>p-value</i>
Male	76	68.5%	
Female	35	31.5%	0.022
Total	111	100%	

Gender distribution listed in Table 4. The number of speech and language delay found more in male (n=76, 68.5%).The association between sex and speech delay was significant (*p-value*=0.022).Male gender considered as risk factor for speech and language delay shown in Table 4.

**Table 5** Distribution of living place of children with speech and language delay

Area	Frequency	Percentage (%)	<i>p-value</i>
Rural	70	63.1%	
Urban	41	36.9%	0.318
Total	111	100%	

Table 5 shown that 63.1% (n=70) participants came from rural area and 36.9 % (n= 41) came from urban area. There is no significant relation found of living place with speech and language delay in this study.

**Table 6** Distribution of father and mother age on child birth

Parental age		Frequency	Percentage	<i>p-value</i>
Father	Under 20 years	0	0%	
	21-29 years	17	15.3%	
	30 to 39 years	61	55.0%	0.020
	More than 40 years	33	29.7%	
	Total	111	100%	
Mother	Under 20 years	15	13.5%	
	21-29 years	64	57.7%	
	30 to 39 years	28	25.2%	0.048
	More than 40 years	4	3.6%	
	Total	111	100%	
<b>Age of parents</b>				
	Normal range	63	56.8%	
	Under 20 or over 40 years	48	43.2%	0.014
	Total	111	100%	

The age of child's father and mother were at high risk for speech and language delay in children. Table 6 showed the association of father's age (*p-value* 0.020) and mother's age (*p-value* 0.048) separately with speech and language delay. The estimate of parental age together under 20 or over 40 years old found 43.2% (n=48) which shown more significant (*p-value* 0.014). Under 20 years old or over 40 years old, both are considered as a risk factors for children with speech and language delay. Distribution of parental literacy level shown in Table 7, there were no association between father (*p-value* 0.263) and mother (*p-value* 0.186) literacy level with speech delay children (Table 7).

**Table 7** Distribution of parental education level

Parental education		Frequency	Percentage	<i>p-value</i>
Father	Illiterate	15	13.5%	0.263
	Primary	15	13.5%	
	Secondary	15	13.5%	
	Higher Secondary	21	18.9%	
	Higher degree	45	40.5%	
	Total	111	100%	
Mother	Illiterate	16	14.4%	0.186
	Primary	13	11.7%	
	Secondary	23	20.7%	
	Higher Secondary	23	20.7%	
	Higher degree	36	32.4%	
	Total	111	100%	

**Table 8** Distribution of types of family and parental socio-economic status

		Frequency	Percentage (%)	<i>p-value</i>
Family type	Nuclear family	66	59.5%	0.259
	Joint family	45	40.5%	
	Total	111	100%	
Socio-economic status	Lower class	29	26.1%	0.110
	Middle class	59	53.2%	
	Higher class	23	20.7%	
	Total	111	100%	

Table 8 indicated the distribution of family type of child; nuclear family (n=66, 59.5%), joint family (n=45, 40.5%) and parental socio-economic status; lower class (n=29, 26.1%), middle class (n=59, 53.2%), higher class (n=23, 20.7%). Parents of children with speech and language delay participated in this study living in nuclear family (n=66, 59.5%) more than joint family (n=45, 40.5%). There was no association (*p-value* 0.259) found between speech and language delay with family type of child. No association (*p-value* 0.110) also found between parental socio-economic status and speech and language delay.

Association of speech and language delay with child's attendant in home was not significant (*p-value* 0.256). 74.8% mother (n=83) took care of their children in home. 39.6% parents didn't communicate with their child properly in home and significant level (*p-value* 0.120) shown in Table 9.

**Table 9** Distribution of attendant of child in home and parental communication with parents

		Frequency (n)	Percentage (%)	<i>p-value</i>
<b>Attendant of child</b>	Mother	83	74.8%	0.256
	Grandparents	13	11.7%	
	Maid	9	8.1%	
	Others	6	5.4%	
	Total	111	100%	
<b>Parent-child interaction</b>	Yes	67	60.4%	0.120
	No	44	39.6%	
	Total	111	100%	

**Table 10** Distribution of the number of positive family history, history of consanguineous marriage in family and number of language use in home

		Frequency (n)	Percentage (%)	<i>p-value</i>
<b>Positive family history</b>	No	59	53.2%	0.078
	Parents	15	13.5%	
	Siblings	9	8.1%	
	Others	28	25.2%	
	Total	111	100%	
<b>Consanguineous marriage</b>	Yes	10	9%	0.252
	No	101	91%	
	Total	111	100%	
<b>Use of different language</b>	No	78	70.3%	0.280
	English	26	23.4%	
	Others	7	6.3%	
	Total	111	100%	

Table 10 showed the distribution of family history, consanguineous marriage and number of language used in home environment. No significant association found between speech and language delay with all of them. Positive family history showed significant level (*p-value* 0.078) which were 13.5% related to parental history (n=15) of speech and language delay, 8.1% with siblings (n=9) and 25.2% with other family members. 9% parental marriage was consanguineous marriage (*p-value* 0.252). 70.3% family members used only Bangla language in home with child (*p-value* 0.280) and 23.4% used English and 6.3% used other language mixed with Bangla.

The use of electronic devices like mobile, TV and others showed significant association with speech and language delay (*p-value* 0.043). Mobile was extremely used by 51.4% children (n=57) under age of 6 and 10.8% children (n=12) was addicted to watch TV. Parental complaining of attention problem in child also showed the significant association (*p-value* 0.053) with speech and language delay. 29.7% complained that their child didn't sleep enough which didn't consider as a risk factor of speech delay and its significant level was (*p-value* 0.301).

**Table 11** Distribution of using electronic device in home by child, parental complain of child attention problem and less sleeping

		Frequency (n)	Percentage (%)	<i>p-value</i>
<b>Use of electronic devices</b>	No	38	34.2%	
	Mobile	57	51.4%	
	TV	12	10.8%	0.043
	Others	4	3.6%	
	Total	111	100%	
<b>Attention problem of child</b>	Yes	49	44.1%	
	No	62	55.9%	0.053
	Total	111	100%	
<b>Less sleeping</b>	Yes	33	29.7%	
	No	78	70.3%	0.301
	Total	111	100%	

**Table 12** Distribution of birth history, low birth weight and nutritional status of child

		Frequency (n)	Percentage (%)	<i>p-value</i>
<b>Gestational age at birth</b>	Normal	58	52.3%	
	Pre-maturity	41	36.9%	
	Post-maturity	12	10.8%	0.041
	Total	111	100%	
<b>Low Birth Weight</b>	Normal	61	55%	
	Low birth weight	44	39.6%	
	Very low birth weight	6	5.4%	0.054
	Total	111	100%	
<b>Poor nutrition</b>	Yes	73	65.8%	
	No	38	34.2%	0.078
	Total	111	100%	

Distribution of birth history, low birth weight and poor nutrition are illustrated in table 12. Birth history were categorized into 3 parts; normal birth history (n=58, 52.3%), history of pre-maturity (n=41, 36.9%), history of post-maturity (n=12, 10.8%) and birth weight were also divided into 3 category; normal birth weight (n=61, 55%), history of low birth weight (n=44, 39.6%), history of high birth weight (n=6, 5.4%). Birth history and birth weight were considered as risk factors for speech delay because the association between speech and language delay with birth history was significant (*p-value* 0.041) as well as birth weight also showed significant association (*p-value* 0.054) with speech and language delay. 65.8% children (n=73) with poor nutrition attended this study and there was no significant association (*p-value* 0.078) found between poor nutrition with speech and language delay.

#### 4. Discussion

We first targeted to establish the pre-existing risk factors which are significantly associated with primary speech and language delay in children under 6 years of age and to find out the most common risk factors among these. The most common variables identified as risk factors were; male gender, parental age, and use of electronic devices, gestational

age at birth, low birth weight and child's attention problem. There are wide-ranging studies on speech and language delay available in western literature but there are lacks of similar data in Bangladesh.

**Table 13** Questionnaire for Risk Factors of Speech and Language Delay (QRSLD)

Sr. no.	Questionnaire
1	Complaint of speech and language age problem
2	Age
3	Information provider
4	Gender
5	Area of living
6	Parental age
7	Parental education
8	Family type
9	Socio-economic status
10	Attendant of child at home
11	Parent-child interaction
12	Positive family history
13	Consanguineous marriage
14	Different language use in home
15	Use of electronic device
16	Attention problem of child
17	Less sleeping
18	Gestational age of birth
19	Low birth weight
20	Poor nutrition

However, in our study 86.5% informers were mothers and maximum speech and language delay occurred in two to four years of age. A recent study on risk factors of speech-language problem in children has found the predominant age group of the participating children with speech delay was between 2 and 5 years of age [6]. Another study found the average age of children with speech and language delay at diagnosis was 3 years 10 months [7]. A study done in Bangladesh also showed the majority of children with speech delay were 2 to 4 years of age [3]. Several studies found the association of speech-language delay with gender was significant and male was a risk factor of delay [4,8-13]. In this investigation, most of the participants were male (68.5%) which is almost similar to the study done by one author which showed 69.4% male participants [5]. This finding is also corroborating with other national and international literature. The fact of being male was considered as an important risk factor and the family with a positive history of unclear speech, stuttering, late speaking and poor vocabulary, had nearly more possibilities to have a child with primary speech and language delay according to different investigators [4,8]. But our study didn't show any significant association as  $p$ -value was 0.078 ( $P$  value >0.05) between positive family history with primary speech and language delay. It may tend to increase if sample size increased. Older maternal age at birth is a risk factor for speech and language delay in children [14]. Another study reported that the age of the parents is considered as risk factors for speech and language delay in children [5]. Our study also supports this statement and significant relationship ( $p$ -value 0.014) found between parental age and speech and language delay in children. Though several authors stated that there is an effect of low parental education on speech development [12,15,16], but one other study didn't find any significant association between the level of paternal or maternal education and specific language impairment [19]. Poor SES is a risk factor for primary speech and language delay in children reported by many authors [5,12,15,18], which is disagreed by Choudhury et al [17]. Our study failed to

show an association between speech and language delay with parental education and low SES which is similar to a study done by Kumar [19].

A study depicted that language problems typically co-occurred with problems of attention in children [20]. Previous studies also observed the co-occurrence of intentional difficulties with speech and language impairment but the nature of relationship was unclear in a study done by Redmond et al [21]. According to Hammer et al, attention problem in children is a risk factor for children with speech and language delay. Our study found a significant association as *p-value* was 0.053 (*P value* >0.05) between intentional problem with primary speech and language delay in children. Our study didn't find disturbance in sleep can causes speech and language difficulties in children which contradict with some study. That study showed this is evident that children with sleep disorders are at risk for speech and language problems [24,25].

Some studies demonstrated that there is a strong association of using electronic devices with development of speech and language delay [3,26,30-32]. This finding is also supported by our study. We considered that using electronic devices is risk factors for primary speech and language delay as *p-value* found (0.043). No statistical association also found with primary speech and language delay with children with malnutrition (*p-value* 0.078)

This study found that gestational age and child birth weight during birth has a strong association with speech and language delay in children. Some studies showed that prematurity [33], low birth weight [11] and very low birth weight [35] were significant risk factors for speech impairment [27,28,35-39,40,41]. In contrast, another study demonstrated no significant association of speech delay with low birth weight and higher birth order [8]. According to Smithers et al, early term or post-term gestational age at birth may explain the higher risk of vulnerability on the Language skills domain compared with other domains [42].

Our findings contradict with few studies that found parent-child interaction has an influence on delayed speech and language development of child [3,29]. Our study also demonstrated that 25.2% children with speech and language delay had attended by grandmother, maid and other relatives in home as *p-value* found (0.256) as well as 29.7 % family used more than one language in home. One literature [29] depicted that consanguineous marriage has a little effect on speech and language delay but our study didn't support that statement. We didn't find any association of consanguineous marriage with primary speech and language delay. Children living in the type of family and primary speech and language delay were not found to be statistically significant as *p-value* was (0.259) as against some studies [6,20]. we didn't find significant association of speech and language delay with child's area of living [7].

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## 5. Conclusion

Speech and language development is an useful indicator of child's overall development. Data from our study suggests that the aspects being male gender, parental age, and use of electronic devices, gestational age at birth, low birth weight and child's attention problem considered as most common risk factors of speech and language delay in children. This study helps to exclude the common and associated risk factors which is responsible for speech and language delay in our country context, also helps to increase awareness and consciousness among parents about their child. These results thus justify the need for monitoring of children who have these risk factors, early screening and assessment of child's developmental milestones and implementation of intervention.

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## Compliance with ethical standards

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### *Disclosure of conflict of interest*

The authors declare that there is no conflict of interests regarding the publication of this paper.

### *Statement of informed consent*

Informed consent was obtained from all individual participants included in the study.



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