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Investigating Factors Associated to Speech and Language Development Problem Among Under-five Children in Bangladesh: A Cross-Sectional Study

Farhana Afrin Duty[1,*]

Abstract

Speech and Language Delay (SLD) is a developmental disorder characterized by a lag in a child's acquisition and use of spoken language compared to typical developmental milestones. It is a significant developmental concern with profound implications for cognitive, social, and academic outcomes. The objective of this study is to explore the factors associated to SLD in children and early intervention of the problem to support the children who need special care. This study investigates the factors associated with speech and language delay (SLD) in children in Bangladesh, a context where comprehensive national data on this issue is scarce. The research utilizes a sample of 128 children, assessing several variables and found the significant factors such as gender, breastfeeding duration, neurodevelopmental issues, and the achievement of age-specific milestones. Significant factors associated with Speech and Language Delay are identified with the help of various statistical methods, such as chi-square tests, t-tests, and logistic regression analyses. Key findings reveal that males, shorter breastfeeding durations, presence of neurodevelopmental issues, higher income family, smaller family structure, and lower achievement of developmental milestones significantly increase the risk of SLD. The research emphasizes on the need for timely support and specialized assistance in reducing the risk of SLD in children, offering essential guidance for healthcare providers and caregivers. For this purpose, the checklists are recommended for developmental milestones for communication developed by American Speech-Language-Hearing Association in 2023 which is found to be highly associated with the observed speech delay problem among children. This research contributes to the understanding of SLD in the Bangladeshi context, laying a foundation for tailored interventions to promote optimal communication development.

Keywords: Speech and Language Delay (SLD), Age-specific milestones, cognitive development, communication development, developmental Disorder, specialized assistance

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INTRODUCTION

The development of communication and language skills is a critical part of early childhood, laying the foundation for social interaction, cognitive development, and later academic success [1,2]. During these formative years, children generally acquire essential language abilities through exposure to rich linguistic environments, social interactions, and observational learning, which help them build vocabulary, comprehension, and expression skills. However, some children experience delays or difficulties in reaching typical language milestones, a condition commonly termed

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as developmental delay, which refers to the inability to achieve expected developmental markers for a given age [3]. In the context of speech and language, such delays are apparent when children fail to reach expected levels of language understanding and production within an anticipated timeframe, impacting their overall development and well-being [4].

Language delays can be categorized as either primary, with no specific underlying cause, or secondary, often associated with identifiable conditions such as hearing impairments, neurological disorders, or other developmental challenges [5]. In Bangladesh, healthcare professionals estimate that approximately 4% of children experience delayed speech development by age three underscoring the importance of early identification and intervention. Globally, developmental disabilities affected around 8.4% of children under five in 2016, with the highest rates in South Asia, a region facing unique socio-economic challenges that may contribute to developmental delays [6].

Untreated speech and language delays can have a range of negative outcomes for children. For example, children with reduced language skills may struggle with fast mapping, the ability to quickly learn and retain new words, which is essential for vocabulary expansion. Research shows that although age and vocabulary size predict better word retention and generalization, delays in these areas can hinder these essential language learning processes [7]. Studies by speech and language pathologists have further identified that early language delays often lead to difficulties in verbal communication, academic performance, social relationships, and sustained attention. These challenges can have long-term consequences, affecting educational success, peer relationships, and emotional health throughout the child's life [8,9].

Previous research indicate that various factors contribute to speech and language delays, with both biological and environmental influences playing significant roles. Common risk factors include hearing impairment, family history of language delays, prolonged use of sucking habits (e.g., pacifiers), oropharyngeal anomalies, and complications during birth. Additionally, environmental factors such as poor home environments and birth order have been associated with higher risks of language delays, with second-born children sometimes showing slower language development compared to their first-born siblings [10]. While a number of studies on speech and language delays have been conducted in various countries, there is a scarcity of research in Bangladesh, primarily due to availability of insufficient data. It's critical to assess the existing state of affairs and look into the causes.

Therefore, the purpose of this study is to find predictors of language delay and examine the factors associated with speech and language deficits in children. The findings may help raise awareness among parents and enable professionals to implement early interventions by considering the potential risk factors.

METHODS AND MATERIALS

Study Design

This study adopts a cross-sectional research design to examine factors associated with delayed language development among children. A structured questionnaire was developed to collect data on socio-demographic, biological, developmental, and environmental risk factors linked to speech and language delays. Data collection took place in Savar Upazila, Dhaka, Bangladesh, particularly from specialized schools providing speech and language therapy. A convenience sampling method was used to select participants.

Study Area and Population

The study was conducted in various specialized schools in the Savar area from March to April 2024. Participants included children under the age of five, both with and without delayed language development, who resided in the Savar Upazila. Specially data was collected from several specialized schools (“Shanirvor”, “Prattasha”, etc.) where the language and speech therapy is provided for the children. In addition, data for children with typical language development were collected from the general population in Savar to serve as a comparative group.

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Inclusion Criteria and Participant Recruitment

Participants were included based on the following criteria:

- Children under the age of five, residing in Savar Upazila.
- Both children with and without speech-language delays.
- Children brought in for speech therapy by caregivers.

A total of 128 participants were enrolled, comprising 65 children with speech delays and 63 without. Written informed consent was obtained from each child's guardian before participation.

Data Collection Tools and Study Variables

Data were collected using a structured questionnaire filled out by caregivers and accompanied by a checklist of developmental milestones for speech and language skills in children aged birth to five years. This checklist was adapted from the American Speech–Language–Hearing Association's guide, "How Does Your Child Hear and Talk?"

Dependent Variable: The dependent variable, speech and language development status, was dichotomous and indicated the presence or absence of speech and language development issues in children, as diagnosed by a specialist.

Independent Variables: The questionnaire included several explanatory variables were considered to examine their potential impact on speech and language development delays among children. These variables include the child's gender, breastfeeding duration, and any neurodevelopmental issues, such as Down syndrome, Autism Spectrum Disorder (ASD), and Attention-Deficit/Hyperactivity Disorder (ADHD). Additionally, family-related factors were analyzed, including family type (nuclear or extended), monthly family income, birth order, and parental education levels (mother's and father's educational attainment). Further, maternal occupation, maternal health conditions, delivery mode (natural or cesarean), and any postnatal complications were also examined. The study also considered family medical history, specifically regarding hearing impairments, developmental communication disorders (DCD), and speech delays, as these may be influential.

To complement the clinical diagnosis, age-specific developmental milestones were reviewed to determine whether they corroborated the specialist's diagnosis. This approach could be valuable for parents, allowing them to make preliminary observations at home that might support an early identification of developmental issues.

Data Collection Procedures

Primary data collection involved structured interviews with parents or guardians and a review of medical records, where available. Interviews focused on gathering demographic details and developmental histories relevant to language development. All data were recorded on a standardized data collection sheet, and children's speech and language milestones were reviewed during the initial contact.

Data Entry and Analysis

Data were entered into Microsoft Excel 2010 for initial organization, while Jupyter Notebook with Python was used for data preprocessing and cleaning. Final analysis was conducted using SPSS software, version 16. The following statistical analyses were performed:

- *Descriptive statistics:* To summarize demographic characteristics and other variables.
- *Chi-square tests:* To examine associations between categorical variables (e.g., gender, breastfeeding duration) and the presence of speech delays.
- *Independent sample t-tests:* To compare average scores of continuous variables (e.g., age-specific milestone achievements) between children with and without speech delays.
- *Logistic regression analysis:* To identify significant predictors of speech delay, examining the relative contribution of various factors to the likelihood of speech delay in children.

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- *Model-1:* Included demographic, socioeconomic, and health-related variables as predictors.
- *Model-2:* Focused on the percentage of age-specific milestones achieved as the predictor variable.

- *Model Performance Comparison:* To assess the predictive accuracy of both models, performance metrics including sensitivity, specificity, overall accuracy, Cox & Snell R Square, and Nagelkerke R Square values were calculated.

A p-value of less than 0.05 was considered statistically significant, indicating the strength of associations between risk factors and speech delays.

ANALYSIS AND RESULTS

This chapter presents the analysis and interpretation of the collected data. A total of 128 respondents provided primary data, which were coded and analyzed using SPSS version 26. The statistical methods employed in this study include frequency distribution, descriptive statistics, chi-square tests, t-tests, logistic regression analysis, and others.

The participants of the study include 128 sample of respondents who were basically the children. Individual caregiver or guardian was the unit of analysis in the study. The sample consists of children from both with speech delay problem and without speech delay. The demographic characteristics are shown in the following Table 1.

Table 1. Frequency distribution of the study variables.

Variables	Categories	Frequency	Percentages
Gender	Male	80	62.5
	Female	48	37.5
Age of children	0<1 year	4	3.1
	1<2	11	8.6
	2<3	26	20.3
	3<4	19	14.8
	4 or more	68	53.1
Birth Order	1	80	62.5
	2	38	29.7
	3 or higher	10	7.8
Delivery Mode	Normal	24	
	C-section	104	
Postnatal complications like oxygen deficiency, jaundice etc.	No	51	39.8
	Yes	77	60.2
Neurodevelopmental Issues	No	91	71.1
	Yes	37	28.9
Breastfeeding duration	less than 12 months	61	47.7
	12 months or more	67	52.3
Family Type	Nuclear	73	57.0
	Extended	55	43.0
Family’s monthly income	60k or less	91	71.1
	more than 60k	37	28.9
Mother’s Occupation	Housewife	116	90.6

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	Contractual Job	2	1.6
	Permanent Job	7	5.5
	Student or others	3	2.3
Father’s Occupation	Unemployed	1	.8
	Contractual Job	27	21.1
	Permanent Job	60	46.9
	Business or others	40	31.3
Mother's Education	Primary or Secondary	14	10.9
	SSC or HSC	54	42.1
	Graduate or more	60	46.8
Father's Education	Primary or Secondary	14	10.9
	SSC or HSC	44	34.3
	Graduate or more	70	54.6
Father’s Occupation (permanent source of income)	No	28	21.9
	Yes	100	78.1
Mother’s Health Issue (Diabetes, Hypertension, Hypothyroidism etc.)	No	58	45.3
	Yes	70	54.7
Father’s Health Issue (Diabetes, Hypertension, Hypothyroidism etc.)	No	95	74.2
	Yes	33	25.8
Mother’s Mental Health Issue (Stress, Depression or Anxiety etc.)	No	51	39.8
	Yes	77	60.2
Mother’s Health Issue (Stress, Depression or Anxiety etc.)	No	89	69.5
	Yes	39	30.5
Family history of developmental communication disorder	No	120	93.8
	Yes	8	6.3
Family history of hearing impairment	No	117	91.4
	Yes	11	8.6
Family history of speech and language delay	No	116	90.6
	Yes	12	9.4
Neurodevelopmental Issues	No	91	71.1
	Yes	37	28.9

The descriptive statistics elucidate a multifaceted portrait of the children and families under study. Predominantly, the sample skews towards older children, with a notable representation of males. First-born children are the most prevalent, followed by second-born, with nuclear families slightly outnumbering extended ones. Maternal occupation predominantly involves homemaking, while fathers are mostly engaged in permanent employment or business endeavors, reflecting the socioeconomic landscape. Both parental physical and mental health issues are notable, suggesting potential influences on child well-being. Cesarean section deliveries were prevalent, and postnatal issues like oxygen deficiency or jaundice, following childbirth were experienced by a significant proportion of children.

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Breastfeeding duration varies, with roughly equal proportions breastfeeding for less than 12 months and 12 months or more. A minority of families reported a history of developmental communication disorders (6.3%), hearing impairment (8.6%), and speech delay (9.4%). Lastly, 28.9% of the children experienced neurodevelopmental issues, while 71.1% did not. These data give us a comprehensive understanding of the study population's characteristics and associated factors.

Table 2. Results of chi-square tests for independence between speech delay and the other variable in the study

Variables	Categories	Frequency	Chi-square	df	p-value
Gender	Male	80	4.049	1	0.044
	Female	48			
Breastfeeding Duration	Less than 12 months	61	11.128	1	0.001
	12 months or more	67			
Neurodevelopmental Issues	No	91	37.42	1	<0.001
	Yes	37			
Family Type	Nuclear	73	4.279	1	0.039
	Extended	55			
Monthly Family Income	60K or less	91	4.884	1	0.027
	More than 60K	37			
Birth Order	1	80	0.033	1	0.855
	2 or higher	48			
Mother's Education	Up to Secondary	14	0.569	1	0.752
	SSC or HSC	54			
	Graduate or more	60			
Father's Education	Primary or Secondary	14	1.253	1	0.534
	SSC or HSC	44			
	Graduate or more	70			
Mother's Occupation	Housewife	116	0.698	1	0.403
	Working	12			
Mother's Health Issue	No	58	1.286	1	0.257
	Yes	70			
Delivery Mode	Normal	24	1.043	1	0.307
	C-section	104			
Postnatal Issues	No	51	1.106	1	0.366
	Yes	77			
Family history of hearing impairment	No	116	1.358	1	0.244
	Yes	12			
Family history of DCD	No	118	0.033	1	0.855
	Yes	10			
Family history of Speech Delay	No	115	2.083	1	0.224
	Yes	13			

The chi-square tests for independence reveal significant associations between speech and language delay (SLD) and several key variables [Table-2]. Gender shows a significant relationship with SLD ($\chi^2 = 4.049$, $p = 0.044$), with males more likely to experience SLD than females. Breastfeeding duration is also significantly associated with SLD ($\chi^2 = 11.128$, $p = 0.001$), where children breastfed for less than

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12 months are more prone to SLD. Neurodevelopmental issues present a highly significant association (χ^2 = 37.42, p < 0.001), indicating that children with these issues are much more likely to have SLD. Family type and monthly family income are other significant factors; children from nuclear families (χ^2 = 4.279, p = 0.039) and those from lower-income families (χ^2 = 4.884, p = 0.027) are more likely to have SLD. Conversely, variables such as birth order, parental education, mother's occupation, mother's health issues, delivery mode, postnatal issues, and family histories of hearing impairment, developmental communication disorder, or speech delay do not show significant associations with SLD. These findings suggest that while certain demographic and health factors are significantly linked to SLD, others may not play a substantial role.

Table 3. Independent sample t-tests for with and without speech delay.

	t	**df**	**Sig. (2-tailed)**	**Mean Difference**	**Std. Error Difference**	**95% CI of the Difference**	
						Lower	***Upper***
Percentage of milestones*	10.35	95	<.0001	55.077	5.31868	44.518	65.639
Family Members	-.963	126	.337	-.141	.146	-.430	.148
No of Children At Home	1.328	126	.187	.531	.400	-.261	1.323
*Age specific milestones achieved by the children. Bold: P value <0.05 is statistically significant							

The independent sample *t*-tests comparing children with and without speech and language delay (SLD) reveal a highly significant difference in the percentage of age-specific milestones achieved (t = 10.35, df = 95, p < 0.0001), with children without SLD achieving a significantly higher percentage of milestones, indicating a mean difference of 55.077 (95% CI: 44.518 to 65.639) [Table-3]. However, there are no significant differences in the number of family members (t = -0.963, df = 126, p = 0.337, mean difference = -0.141, 95% CI: -0.430 to 0.148) or the number of children at home (t = 1.328, df = 126, p = 0.187, mean difference = 0.531, 95% CI: -0.261 to 1.323) between the two groups. These results indicate that while SLD is significantly associated with lower developmental milestone achievement, it is not significantly related to family size or the number of children in the family [Table 3].

Table 4: Results of logistic regression using various study variables for modeling speech delay problem (model -1)

Variables	**B**	**OR (95% CI)**	**P value**
Gender of the children (Female)	-0.426	0.653 (0.247, 1.729)	0.391
Birth Order (2nd or higher)	.869	2.385 (.791, 7.194)	.123
Delivery Mode (C-section)	.063	1.065 (.303, 3.746)	.922
Postnatal complication (Yes)	1.987	7.296 (2.381, 22.354)	<0.001
Breastfeeding duration (12 months or more)	.186	1.205 (0.440, 3.298)	.717
Number of children at home	.040	1.041 (0.528, 2.052)	.908
Family's Monthly Income (tk60,000 or more)	.654	1.924 (0.670, 5.523)	.224
Family type (Extended)	-.053	0.949 (0.351, 2.560)	.917
Family history of Developmental Communication Disorder (Yes)	-.655	0.520 (0.017, 16.145)	.709
Family history of hearing impairment (Yes)	1.727	5.622 (0.226, 140.166)	.293
Family history of Speech and Language Delay (Yes)	1.375	3.957 (0.358, 43.753)	.262
Neurodevelopmental Issues (Yes)	3.472	32.193 (7.725, 134.157)	<0.0001
Mother's Occupation (Working)	-.287	.750 (0.154, 3.646)	.722
Constant	-2.736	.065	.010

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The logistic regression analysis (Model 1) investigates the factors associated with speech and language delay (SLD) in children. The model's results, presented in Table 4, indicate reveals that postnatal complications (B = 1.987, OR = 7.296, 95% CI: 2.381 to 22.354, $p < 0.001$) and neurodevelopmental issues (B = 3.472, OR = 32.193, 95% CI: 7.725 to 134.157, $p < 0.0001$) are significant predictors of speech and language delay (SLD) in children, indicating that those with postnatal complications and neurodevelopmental issues are substantially more likely to experience SLD.

Conversely, other factors, including gender, birth order, delivery mode, breastfeeding duration, number of children at home, family income, family type, family history of developmental communication disorder, family history of hearing impairment, family history of SLD, and mother's occupation, do not show significant associations with SLD, as evidenced by their p-values greater than 0.05. This analysis underscores the critical influence of postnatal health and neurodevelopmental conditions on SLD, while demographic and familial factors appear less impactful.

Table 5. Result of logistic regression using percentage of age-specific milestone achieved (model-2)

Variable	**Coefficient (B)**	**OR (95% C.I.)**	**p-value**
Percentage of age specific milestones achieved	-0.109	.897 (0.855, 0.940)	<0.0001
Constant	4.635	103.044	<0.0001

The logistic regression analysis employing Model-2 highlights the significant impact of percentage of age-specific milestones achieved on the likelihood of speech and language delay (SLD) in children. The coefficient for percentage of age-specific milestones achieved is -0.109, indicating that for every one-unit increase in the percentage of milestones achieved, the odds of SLD decrease by a factor of 0.897 (OR = 0.897, 95% CI: 0.855 to 0.940, $p < 0.0001$). This suggests that achieving a higher percentage of developmental milestones is associated with a decreased risk of SLD [Table 5].

Table 6. Comparing the model's performance using accuracy.

<table>
<tr><th rowspan="3"></th><th rowspan="3">Observed</th><th colspan="4">Predicted</th><th colspan="3"></th></tr>
<tr><th colspan="3">Speech Delay</th><th rowspan="2">Percentage Correct</th><th rowspan="2">Overall accuracy</th><th rowspan="2">Cox & Snell R Square</th><th rowspan="2">Nagelkerke R Square</th></tr>
<tr><th></th><th>No</th><th>Yes</th></tr>
<tr><td rowspan="2">Model-1:</td><td rowspan="2">Speech Delay</td><td>No</td><td>51</td><td>12</td><td>0.81</td><td rowspan="2">78.10</td><td rowspan="2">.377</td><td rowspan="2">.503</td></tr>
<tr><td>Yes</td><td>16</td><td>49</td><td>75.40</td></tr>
<tr><td rowspan="2">Model-2:</td><td rowspan="2">Speech Delay</td><td>No</td><td>55</td><td>5</td><td>91.7</td><td rowspan="2">88.7</td><td rowspan="2">.608</td><td rowspan="2">.827</td></tr>
<tr><td>Yes</td><td>6</td><td>31</td><td>83.8</td></tr>
</table>

In Table 6, Model-1 and Model-2 are compared based on their performance in predicting speech delay in children. Model-1 exhibits a sensitivity of 81%, indicating that it correctly identifies 81% of children with speech delay (true positive rate). The specificity of Model-1 is 75.4%, meaning it accurately identifies 75.4% of children without speech delay (true negative rate). The overall accuracy of Model-1 is 78.1%, representing the proportion of correctly classified cases out of the total observations. Additionally, the Cox & Snell R Square and Nagelkerke *R* Square values for Model-1 are reported as 0.377 and 0.503, respectively. These values serve as measures of the model's goodness-of-fit, with higher values indicating a better fit of the model to the data. In contrast, Model-2 demonstrates improved performance metrics compared to Model-1. The sensitivity of Model-2 is notably higher at 91.7%, indicating that it correctly identifies 91.7% of children with speech delay. Similarly, the specificity of Model-2 is higher at 83.8%, indicating accurate identification of 83.8% of children without speech delay. Consequently, Model-2 achieves a higher overall accuracy of 88.7% compared to Model-1. Moreover, the Cox & Snell R Square and Nagelkerke R Square values for Model-2 are substantially higher at 0.608 and 0.827, respectively. These higher values suggest that Model-2 provides

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a better fit to the data compared to Model-1, indicating superior predictive capabilities for identifying speech delay in children.

DISCUSSION

This study sheds light on various factors associated with speech delay in children, offering valuable insights for healthcare professionals and caregivers. The analysis reveals significant associations between speech delay and factors such as gender, breastfeeding duration, neurodevelopmental issues, and the achievement of age-specific milestones. Moreover, logistic regression models demonstrate the predictive power of certain variables.

In our study the majority of cases were 2 to 5-year-old children. The majority of participating children with speech delays were between the ages of two and five, according to another study on risk factors for speech-language pathology in toddlers. Delgado et al (2005) found the average age of children with speech delay at diagnosis was 3 years 10 months [11]. These findings were similar to our study. Studies also supported our finding of male preponderance [12]. According to similar findings, boys are 2.6 times more likely than females to be diagnosed with speech-language difficulties. A delay in communication skills is often the first sign for autism spectrum disorder and other neurodevelopmental disorders in children [13]. Our analysis showed similar results that neurodevelopmental disorder had strong association with delayed speech development.

Concerning birth-related factors some of our findings were consistent with that of other previous research while some findings showed disagreement. The birth order, mother's health, delivery method, and postnatal complications (such as low birth weight, jaundice, oxygen shortage, etc.) did not significantly correlate with children's speech delays, according to this study. Mondal (2016) also demonstrated no significant association of speech delay with low birth weight, low Apgar score and higher birth order [14]. Nevertheless, other research revealed that any mother medical history, birth order, and postnatal complications such as preterm birth, low birth weight, etc. were important risk factors for speech impairment.

Speech delay was not linked to a positive family history of hearing impairment, developmental communication disorder, or speech delay, according to our analysis of the risk associated with early biological and environmental factors. In the contrary, other studies have shown a greater prevalence of affected relatives among children with speech/language deficits than among children in control groups, finding disagreement with present study

In our study, we observed that the majority of participants were children aged 2 to 5 years. This finding aligns with another investigation into the risk factors of speech-language pathology, which reported a similar age distribution among children with speech delays. Additionally, Delgado et al. (2005) noted that the average age at which children were diagnosed with speech delays was approximately 3 years and 10 months, further supporting our results [11].

Moreover, our findings indicate a notable male preponderance in speech delays, which is consistent with previous research [12]. Specifically, Molini-Avejonas (2017) found that boys are 2.6 times more likely to be identified with speech-language disorders than girls [15]. This gender disparity could be significant, as delays in communication skills are often among the earliest indicators of autism spectrum disorder and other neurodevelopmental disorders in children [13]. Our analysis confirmed a strong association between neurodevelopmental disorders and delayed speech development, highlighting the need for further investigation in this area.

When examining birth-related factors, our findings corroborated some previous studies, while conflicting with others. We found that factors such as birth order, maternal health conditions, delivery methods, and postnatal complications (including low birth weight, jaundice, and oxygen deficiency) did

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not demonstrate a significant association with speech delays in children. This aligns with Mondal (2016), who also reported no significant relationship between speech delays and factors like low birth weight or higher birth order [14]. Conversely, some research has indicated that birth order, postnatal complications such as prematurity and low birth weight, and maternal medical history may serve as significant risk factors for speech impairments.

Furthermore, our analysis of early biological and environmental risk factors revealed that a positive family history of speech delays, hearing impairments, and developmental communication disorders did not correlate with speech delays in the children studied. This contrasts with other studies that found a higher prevalence of affected relatives among children with speech and language deficits compared to control groups. These discrepancies emphasize the complexity of the factors influencing speech and language development and suggest that further research is needed to clarify these relationships.

In summary, our study highlights significant associations between age, gender, and neurodevelopmental disorders with speech delays, while also identifying inconsistencies in the impact of birth-related factors and family history. These findings underscore the importance of a multifaceted approach to understanding speech-language development in children, as well as the need for targeted interventions that consider these diverse influences.

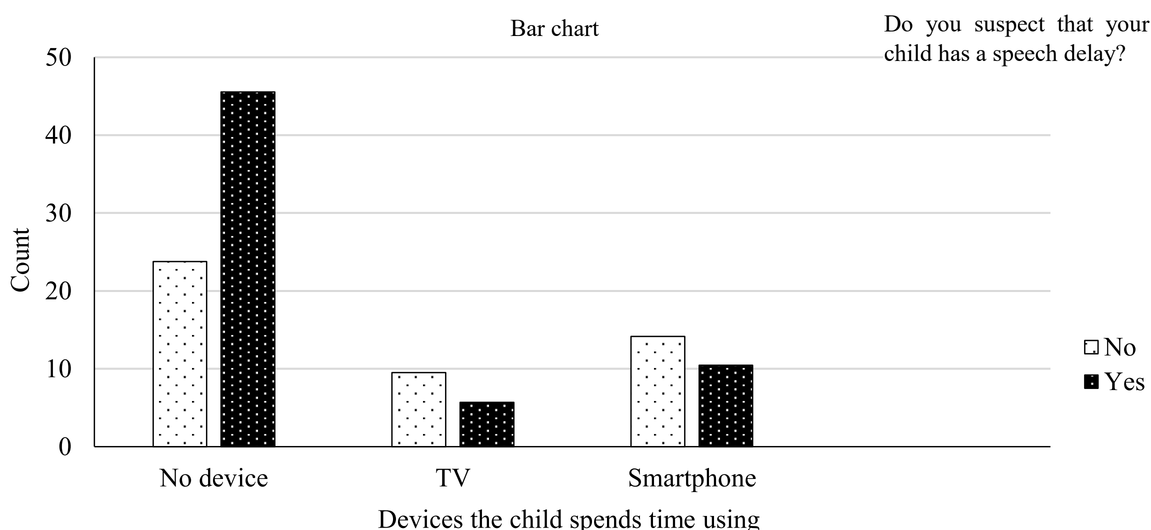

Figure 1. Bar chart for the number of children use devices at the time of survey.

Sharifa (2018) demonstrated that more Screen-on time had strong association with development of speech delay [12]. Other reports that there is weak association of screen time and speech development [16]. However, this study uncovered a different aspect: children with speech delay are less likely to have screen time on TV or smartphones as shown in Figure 1. This unusual scenario may be sign of caregiver’s awareness after identifying the speech delay problem and following specialist prescriptions.

Chiu et al. (2011) found that prolonged nursing periods have a positive effect on young children's neurodevelopment, especially in the areas of language, fine and gross motor skills, and personal and social skills [17]. Consistent with these findings, our study also revealed that longer breastfeeding duration is associated with a reduced risk of speech delay in children. This highlights the potential benefits of extended breastfeeding for supporting speech and language development.

Numerous studies demonstrate that children's speech and language delays are not significantly correlated with their economic position [18,19]. Other found that Children from families with low socioeconomic status have higher levels of communication delay [20]. However, our research found that children from higher income family have greater risk of having speech delay [Table-2].

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Additionally, our findings revealed that the working status of mothers did not significantly affect children's language and speech development, which aligns with the results reported by [16]. This study also confirmed that socioeconomic status and maternal employment had no impact on children's speech development [16]. However, a notable contradiction in our findings is that children from nuclear families were more likely to experience speech delays, as shown in [Table-2]. This complexity suggests that family structure may significantly influence speech development, highlighting the need for further investigation.

Multivariate logistic regression was employed by Sharifa (2018) to predict speech delay problem in children using several factors from study variable [12]. In this study a binary logistic regression model is used to identify speech delay in children from the various factors in this study with 78.1% of overall accuracy [Table-4]. In addition, we found that the speech delay can be identified using the percentage of age-specific milestones achieved by the children with a greater accuracy of 88.7%. [Table-6]. Therefore. we would like to recommend the checklist of developmental milestones offered by ASHA (2023) for early identification and intervention to support children's language development.

CONCLUSION

This study identifies key factors linked to speech delay in children, offering crucial insights for healthcare professionals and caregivers. Significant associations are found with gender, breastfeeding duration, economic status of family, family type/structure, neurodevelopmental issues, and milestones achievement. Logistic regression models highlight the predictive power of certain variables like neurodevelopmental disorder and postnatal complication after birth. The findings also emphasize the need for early intervention and targeted support, focusing on monitoring developmental milestones and addressing health issues. Overall, the study enhances understanding of speech delay and supports tailored interventions to promote optimal communication development in children.

Limitation And Future Work

This study utilizes a cross-sectional design with a limited number of respondents selected through convenience sampling. A larger sample size could enhance the robustness of the logistic regression analysis. Additionally, conducting longitudinal studies would allow for a more accurate examination of the associations between risk factors and speech delay. Furthermore, a relevant factor, hearing impairment of children was not inspected in this study.

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Conflicts of Interest

There are no conflicts of interest

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