Comparing Mean Length of Utterances (MLU) of Typically Developing Bangla-Speaking Children with the Children with Down Syndrome

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ABSTRACT

This study investigated the Mean Length of Utterance in words (MLUw), Mean Length of Utterance in morphemes (MLUm), and the use of Lexical Morphemes (LM) and Grammatical Morphemes (GM) in Bangla-speaking children with Down Syndrome (DS) in comparison with Typically Developing (TD) children. A total of forty Bangla-speaking children participated in this study. Twenty were TD children of age 4 to 6 years, twenty were children with DS aged 7 to 11 years. Each was divided into two age groups. The study adopted a quantitative approach and narrative data was collected using the Picture-Narrative Task and the utterances were audio recorded. The first 50 intelligible utterances from each child were transcribed and analyzed considering: MLUw, MLUm, Lexical Morphemes (nouns, verbs, and adjectives), and Grammatical Morphemes (pronouns, prepositions, and conjunctions). The results suggested that there was a significant difference between TD and DS. The TD participants had a higher mean score than DS in each group. The between-group comparisons suggested that the higher the age the higher the MLU and the MLUw and MLUm had a positive correlation for TD and DS. Overall, children with DS have significantly lower MLUw and MLUm in comparison with TD children which indicates language deficits in children with DS. This study may provide guidelines to assist Speech and Language Pathologists (SLPs) in formulating assessment and intervention strategies for Bangla-Speaking children with DS and children who are at risk of language impairments. Furthermore, this study may also assist clinicians working with Bangla-speaking bilingual children.

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Introduction

Language acquisition is a neuro-psychological and subconscious process that helps children acquire their first language (Maslo, 2007). All TD children who have different native languages follow the same natural stages of language acquisition, and this process until five years of age is known as the golden age (Hutauruk, 2015). The process of language acquisition can be identified by calculating the MLU, which points to the number of morphemes the child produces in a single utterance (Voniati, 2016). The findings of MLU analysis can be used as an indicator of language deficit (Marques & Limongi, 2011; Rice et al., 2010) and the MLU rates of typical and atypical utterances are widely varied (Arif & Bol, 2008). Down syndrome is a genetic condition that is caused by an extra part of chromosome 21 or one full extra chromosome 21 and has a prevalence of 1 in 1100 children (WHO, 2017). Receptive and expressive language disability is common in children with DS as they lag behind their TD peers in receptive language acquisition and cognitive development (del Hoyo Soriano et al., 2018). Children with DS produce their first words at a much older age than TD children (Bergland et al., 2001) and their expressive language abilities are more impaired than their receptive language skills (McDuffie et al., 2018). Studies showed significantly lower levels of MLUw and MLUm in children with DS compared with typical children, also the relationship between age and MLU is significant in many studies (Marques & Limongi, 2011). Calculating the MLU of TD children, and children with DS may provide a valid understanding of the variation among these two groups in language acquisition ability. However, there is an overall lack of research regarding MLU analysis in children with DS in Bangladesh.

Methodology

In total, forty participants (twenty TD, twenty DS) participated in this study. They were all from the capital city of Bangladesh, Dhaka, and were selected through purposive sampling. Each participant group was further divided into two equal sub-groups based on their chronological age. Nonverbal intelligence tests including the Primary Test of Nonverbal Intelligence (PTONI), have been adopted to evaluate the mental age of children with DS in various studies (Loveall et al., 2019; Marques & Limongi, 2011) as mental age is important to get a proper comparison in this type of study. In Bangladesh, these kinds of tests are not widely available, so the participant's age group has been selected based on the literature. Demographic information about the participant's ages is summarized in Table 1.

Table 1: Age of the participants of Group 1 and Group 2

		Number of Participants	Range	Mean	SD
Group 1	TD	10	4.00 – 5.00	4.47	0.34
	DS	10	7.00 – 9.00	8.02	0.40
Group 2	TD	10	5.00 – 6.00	5.46	0.32
	DS	10	9.00 – 11.00	10.43	0.60

Children with TD were included based on typical language development, Bangla as first language, admitted to Bangla medium school, and an age range of 4 to 6 years with no additional impairments. This age range was selected so that a comparable range of MLU could be found. Here, Bangla-speaking children were included because this research was based on children of Bangladesh. Children with DS were included based on a diagnosis of DS, Bangla as first language, ability to produce at least two-word sentences, and an age range of 7 to 11 years with no additional impairments. This age range had been preordained to maintain a similar mental age range between these two groups of participants (Lee et al., 2017; Næss et al., 2015;). Children with other comorbid disorders or associated hearing disorders were excluded as they may not produce enough speech that will give a good insight into the speech features of DS.

Data collection was conducted by a picture narrative task in the presence of the children's parents or the SLP or teacher. The data collection task took place in a quiet room of the selected schools and therapy centers. Each child had been engaged in the narrative task for 20 minutes where they narrated action pictures from children's story books (Le Normand et al., 2008). The 20 minutes of the narrative task were audio recorded using Sony UX570 Digital Voice Recorder. The researcher observed how the children described or talked about those pictures that sequentially point to well-known children's stories in Bangla and daily activities so that narrative data could be collected. The SLPs, teachers, or parents sometimes participated in activities to encourage the child to describe the provided pictures in detail so that the child produces more utterances.

For transcription, the researcher primarily relied on auditory perceptual realization. 50 to 100 contiguous intelligible utterances from a sample are sufficient for calculating the MLU (Le Normand et al., 2008), and generally, 50 utterances are considered adequate for analysis (Heilmann et al., 2010).

So, from the whole audio recording, first 50 complete and intelligible utterances from each child were selected and transcribed using standard Bangla orthography. MLUw and MLUm were calculated as the total number of words/morphemes divided by total number of utterances. The analysis also considered: the number of lexical morphemes regarding nouns, verbs, and adjectives and grammatical morphemes regarding pronouns, prepositions, and conjunctions. Descriptive statistics were computed for age, MLUw, MLUm, LM, and GM. After that data were statistically analyzed using the following tests: Paired t-test, and Correlation test. The significance level was adopted at 0.05. For reliability analysis of the transcribed data interjudge agreement had been done. Two authors independently scored transcripts for all participants and the point-to-point interjudge agreement between the analysis was 85%.

Literature Review

Language development is the way children learn language through acquiring phonological, lexical, grammatical or morphosyntactic, and pragmatic language abilities and using these linguistic features appropriately (Hoff, 2013). Vehkavuori et al. (2021) analyzed the association between early receptive and expressive lexical skills with later language skills of Finnish-speaking TD children aged between 1.6 and 2 years and found a significant association between the early receptive and expressive skills with the later language and pre-literacy skills. However, this study did not consider the long-term association of delayed early receptive and expressive literacy skills with later syntax and pragmatics skills or how this will vary for children with language difficulties. Bravo et al. (2020) investigated the morphosyntactic abilities in TD children aged from 2 to 4 years and findings showed that morphosyntactic ability in TD children increases with age without differentiating how the morphosyntactic characteristics develop in children with any kind of language disorder. According to these studies, it can be inferred that the early receptive and expressive language development and literacy skills are related to the later syntactic and morphosyntactic development of TD children and these skills improve with age.

Children with DS face challenges in the acquisition of receptive and expressive language with specific deficits in receptive grammar and verbal short-term memory (Næss et al., 2011). Zampini & D'Odorico (2013) evaluated the vocabulary size and lexical development of children with DS at 3 and 4 years of age suggesting significantly poorer vocabulary than TD children at similar developmental ages along with lagging in cognitive development. Næss et al. (2015) compared the language development of 43 children with DS of 6

to 8 years with 57 TD children indicating significantly slower development in vocabulary, grammar, and verbal short-term memory in children with DS with similar age and similar development in non-verbal mental ability. Results indicated significant growth in receptive vocabulary for participants aged between 10 to 20 years in a period of 2 years with no increase or decrease in receptive grammar, expressive grammar, and phonological memory (Conners et al., 2018). Carr (2000) found that expressive vocabulary did not change in the adult years as no significant change in expressive vocabulary between 21 to 40 years old DS children was found. However, Chapman et al. (2002) who used narrative discourse, found steady significant growth in expressive grammar in children with DS over 6 years suggesting that the narrative is more likely to bring out more complex grammatical structures and is better at detecting the improvement of expressive skills with age. School-age children with DS showed greater difficulties in pragmatic abilities like executive function, theory of mind, cognitive, communicative, and structural language ability in parent reports, standardized assessment, and direct assessment in a study of 22 boys and 24 girls compared to their TD peers (Lee et al., 2017).

Rice et al. (2010) examined the validity of MLUw as a measure of estimating the language development in children from 3 to 9 years of age who spoke English and found MLUw reliable and useful for both typical and atypical language. It is intended to obtain data about morphological and syntactical aspects of language in TD children and children with any kind of language deficits (Parker & Brorson, 2005). The MLUw and MLUm both can be used as reliable measures to analyze the morphosyntactic, grammatical, and overall language development of children with speech difficulties like DS (Chapman, 2006). Previous studies have also shown that MLUw and MLUm are strongly correlated in languages like English, Dutch, and Irish (Arlman-Rupp, 1976; Hickey, 1991) which indicates the efficacy of both measures. Previous studies had also differently investigated MLUw and MLUm of children who have speech impairments to get a better understanding of the different parts of language structure development (Carvalho et al., 2014).

There is a positive correlation between age and MLU in TD children as MLU increases with age (Gouda et al., 2020). Portratz et al. (2022) examined the range of MLU (MLUw and MLUm) and lexical diversity in two age groups of TD children in elementary school, and results showed a significant relationship between MLU and age suggesting MLU as a valid measure of syntactic development. MLUm is expected to progress at a rate of 1.24 morphemes per year up to 5 years of age and at 4 and 5 years of age, the expected MLUm was 4.4 and 5.63 consecutively (Miller & Chapman, 1981). Voniati (2016)

examined the MLUw in Cypriot Greek-speaking TD children between 36 to 48 months following a longitudinal study method. Results were similar to the previous study with an increase in MLUw score between the age. However, this study only evaluated the MLUw score which entails the longer utterances but the type of words they used was not investigated. However, some studies have found that MLU differs based on gender and girls perform better until 3 or 4 years of age (Le Normand et al., 2008; Arif & Bol, 2008). Several studies have used the MLU of TD children to identify the severity of speech and language impairment of children who have language difficulties (Lindgren et al., 2009).

MLU has been confirmed as a valid effective tool or measurement to assess language in children with DS. Channell et al. (2015) found that the MLU in children with DS was significantly lower than the TD children and they also exhibited lower receptive syntax ability in a study of narrative skills of children with DS, Fragile X-syndrome (FXS) and TD children (n= 68). The results also found a lower rate of using verbs, adverbs, and conjunctions in the narratives of children with DS than in the TD participants with no difference in using conjunctions between TD and DS children. Næss et al. (2011) found that children with DS who were matched with a control TD group regarding non-verbal mental age showed poor expressive vocabulary, receptive grammar, and verbal short-term memory. Carvalho et. (2014) found that children with DS had poor performance than the TD and SLI groups along with poorer performance in using grammatical items and deficits or distorted use of lexical morphemes in a study of MLUw, MLUm, lexical and grammatical morphemes of Brazilian children with DS. The narrative skills of children with DS aged 5 to 13 years (n=25) analyzed by MLUm showed that the range of MLUm was low (2.67) in DS and older children demonstrated higher MLUm but the regression analysis showed no significant relationship between age and MLUm (van Bysterveldt et al., 2012). This may be because of the broad age range and the small number of participants. Loveall et al. (2019) investigated the production of verbs by individuals with DS during narration and compared them with TD children and found deficits in verbal short-term memory in children with DS which creates difficulties in understanding and using verbs than their peers of TD children.

Bangla Language is embedded with rich morphology and complex morphological processes (Chowdhury et al., 2004). The morphology consists of two types of free morphemes: Lexical morphemes including nouns, verbs, and adjectives; Grammatical morphemes including pronouns, prepositions, and conjunctions and two types of bound morphemes: Derivational; Inflectional (Maniruzzaman, 2013; Chaki, 1996). Like various languages, MLU is also used to identify the morphological and morphosyntactic ability of Bangla-speaking children. Gouda et al. (2020) investigated the MLUw and MLUm

in 3 to 5 years old native Bengali-speaking TD children. The results showed that the MLUw and MLUm increase with age and MLUm was always higher in score than the MLUw in all age groups. Speech and language acquisition deficits are common characteristics in children with DS (del Hoyo Soriano et al., 2018; McDuffie et al., 2018).

The present study will analyze the variation in the use of MLU among TD children and children with DS. Variations among these children regarding the MLUw, MLUm, LM, and GM will be analyzed and compared to identify the expressive language ability of these children. Most of the SLPs in Bangladesh are dependent on English-based normative data to identify the lexical, morphosyntactic, and syntactic deficits in the expressive language of children with DS because the production of MLU is not well documented in Bangladesh. Given the lack of research regarding the MLU of children with DS in Bangladesh, this study aims to understand the morphosyntactic and syntactic difficulties faced by Bangla-speaking children with DS by analyzing and comparing the MLUw, MLUm, LM, and GM to TD children. The following research questions were formulated:

a) What is the range of MLU in Bangla-speaking Bangladeshi TD children, and children with DS regardless of age?

b) What is the significance level of the similarities and differences in the MLU range between these two groups?

c) To what extent do lexical and grammatical morpheme usage differ between these groups?

d) Is there any correlation between the MLUw and MLUm in these children?

Results

Results were compared between and within groups and differences were found and presented in this section.

Table 2: Descriptive characteristics obtained by participants of Group 1 and Group 2

	Group 1		Group 2	
	TD	**DS**	**TD**	**DS**
	Mean(SD)	**Mean(SD)**	**Mean(SD)**	**Mean(SD)**
Chronological Age	4.47 (0.34)	8.02 (0.40)	5.46 (0.32)	10.43 (0.60)

MLUw	3.00 (0.26)	1.89 (0.11)	3.75 (0.16)	2.25 (0.14)
MLUm	4.76 (0.52)	2.51 (0.21)	6.20 (0.31)	3.07 (0.16)
LM	167.30 (18.39)	96.60 (9.03)	204 (7.72)	1 1 1 . 3 0 (9.12)
GM	70.70 (9.75)	28.90 (4.48)	106 (15.18)	42 (6.83)

Notes: MLUw = mean length utterance in words; MLUm = mean length utterance in morphemes; LM = lexical morphemes; GM = grammatical morphemes; TD = typically developing; DS = down syndrome; SD = standard deviation

From Table 2, differences were found regarding MLUw, MLUm, LM, and GM of TD and DS participants of Group 1. The mean of TD participants in each part was greater than the DS participants in both groups.

Table 3: Comparisons of MLUw, MLUm, LM, and GM between TD and DS of Group 1

	Paired Differences: TD G1 - DS G1			95% Confidence Interval of the Difference				
	Mean	Std. Deviation	Std. Error Mean	Lower	Upper	t	df	Sig. (2-tailed)
MLUw	1.11	.16	.06	0.99	1.23	22.20	9	.000*
MLUm	2.25	.43	.14	1.95	2.56	16.62	9	.000*
LM	70.70	16.56	5.24	36.55	58.85	13.50	9	.000*
GM	41.80	8.85	2.80	35.47	48.13	14.93	9	.000*

*The mean difference is significant at the 0.05 level – Paired Sample T-test

Notes: G1 = group 1; df = degree of freedom

From Table 3, there was a significant difference between TD participants of Group 1 and DS participants of Group 1 regarding the range of MLUw, MLUm, LM, and, GM ($p < 0.001$).

Table 4: Comparisons of MLUw, MLUm, LM, and GM between TD and DS of Group 2

	Paired Differences: TD G2 – DS G2			95% Confidence Interval of the Difference				
	Mean	Std. Deviation	Std. Error Mean	Lower	Upper	t	df	Sig. (2-tailed)
MLUw	1.49	.11	.04	1.42	1.58	42.548	9	.000*
MLUm	3.13	.25	.07	2.95	3.31	39.31	9	.000*
LM	92.70	13.45	4.25	83.08	102.32	21.79	9	.000*
GM	64.00	13.74	4.35	54.17	73.83	14.73	9	.000*

*The mean difference is significant at the 0.05 level – Paired Sample T-test

Notes: G2 = group 2; df = degree of freedom

From Table 4, a significant level of difference ($p < 0.001$) regarding MLUw, MLUm, LM, and GM has been found between TD and DS participants of Group 2. That means TD participants mean MLUw, MLUm, LM, and GM were greater than DS participants in Group 2.

Table 5: Comparison between MLUw, MLUm, LM, and GM in two groups of TD

	Paired Differences: TD G2 - TD G1			95% Confidence Interval of the Difference				
	Mean	Std. Deviation	Std. Error Mean	Lower	Upper	t	df	Sig. (2-tailed)
MLUw	.74600	.14238	.04502	.64415	.84785	16.569	9	.000*
MLUm	1.43600	.37188	.11760	1.16997	1.70203	12.211	9	.000*
LM	36.70000	16.53985	5.23036	24.86810	48.53190	7.017	9	.000*
GM	35.30000	14.29880	4.52168	25.07126	45.52874	7.807	9	.000*

*The mean difference is significant at the 0.05 level – Paired Sample T-test

From Table 5, there was a significant difference between TD participants of Group 1 and Group 2 regarding the range of MLUw, MLUm, LM, and, GM ($p < 0.001$). That means the range of MLUw, MLUm, LM, and GM increases with age in the TD participants.

Table 6: Comparison between MLUw, MLUm, LM, and GM in two groups of DS

| | Paired Differences: DS G2 – DS G1 | | | 95% Confidence Interval of the Difference | | | | |
	Mean	Std. Deviation	Std. Error Mean	Lower	Upper	t	df	Sig. (2-tailed)
MLUw	.36000	.08641	.02733	.29819	.42181	13.175	9	.000*
MLUm	.55600	.19179	.06065	.41880	.69320	9.168	9	.000*
LM	14.70000	10.77085	3.40604	6.99500	22.40500	4.316	9	.002*
GM	13.10000	5.50656	1.74133	9.16084	17.03916	7.523	9	.000*

*The mean difference is significant at the 0.05 level – Paired Sample T-test

From Table 6, the p-value for MLUw was 0.000, MLUm was 0.000, LM was 0.002, and GM was 0.000 (<0.05) which means there were some significant differences between participants with DS in Group 1 and Group 2 indicating that the range of MLUw, MLUm, LM, and GM increased with age in participants with DS.

Table 7: Correlation between MLUm and MLUw in TD, and DS of Group 1 and Group 2

		Correlation	p-value
Group 1	TD	94.3%	0.0008
	DS	67.1%	0.034*
Group 2	TD	74.6%	0.013*
	DS	72.6%	0.017*

*The mean difference is significant at the 0.05 level – The correlation test

From Table 7, a high degree of positive correlation coefficient between MLUm and MLUw (94.3%) with a highly significant P-value ($p = 0.000$) was found for the Group 1 TD participants. The positive correlation coefficient between MLUm and MLUw was also found in the Group 1 DS participants (67.1%.) and the corresponding p-value was also highly significant ($p = 0.034$). In terms of Group 2 TD participants, a high degree of positive correlation coefficient between MLUm and MLUw was found (74.6%). The p-value of the correlation coefficient was also highly significant ($p = 0.013$) at a 5% level of significance. The Group 2 DS participants also showed a high degree of positive correlation coefficient between MLUm and MLUw (72.6%) with a highly significant p-value ($p = 0.017$). Thus, when the MLUm increased, the MLUw also increased in Group 1 and Group 2 TD and DS participants.

Discussion

The results of the present study suggested that DS children performed lower than TD children in each domain. The children with DS had significantly lower MLUw than the TD participants in both age ranges. The finding is corroborated by previous research based on children with DS where lower performance in terms of MLUw, and MLUm in comparison with TD children are found (Channell et al., 2015; Marques and Limongi, 2011; Salem et al., 2021). This is due to poor expressive vocabulary skills as research has consistently found lower receptive and expressive vocabulary in the DS population than in their mental age-matched TD peers (Næss et al., 2015). They faced difficulty in both phonological and lexical information encoding. Consequently, the poorer performance of delayed speech recalling skills in children with DS grows with age but significantly ranges lower than in the TD (Koizumi et al., 2020). Among the participants of Group 1, the DS group had significantly lower MLUm than the TD participants which was also supported by previous research (Salem et al., 2021). Both the verbal short-term memory and verbal long-term memory of DS children might be more significantly damaged than the ID, and TD (Koizumi et al., 2020). Also, children with DS have difficulties in using grammatical items as well as they perform poorer regarding MLUm and MLUw than their TD peers (Carvalho et al., 2014). In Group 2 the average of MLUm for TD children was the highest. The deficits in verbal short-term memory in children with DS create difficulties in understanding and using verbs and they tend to produce less lexical verb density than their peer TD children (Loveall et al., 2019; Channell et al., 2015). Besides, they have deficits in using lexical morphemes (Carvalho et al., 2014). The present study also found that the use of lexical morphemes including the use of verbs, nouns, and adjectives differs significantly and typically developing participants' performance was better than DS participants in both groups. In both Group 1 and Group 2, the mean number of using nouns, verbs, and adjectives of typically developing children was the highest than the DS group. This research found that the mean number of grammatical morphemes (pronouns, prepositions, and conjunctions) significantly varies among TD and DS children in both age ranges. In Group 1, the highest average was for TD than DS children. Children with DS face difficulties in understanding and using grammatical morphemes (Koizumi & Kojima, 2022). The syntactic ability, morphosyntactic ability, and verbal memory of TD children increase with age (Bravo et al., 2020 ; Koizumi et al., 2020). MLUm increases with age at an average rate of 1.2 morphemes per year (Miller & Chapman, 1981). The range of MLUw, MLUm, and lexical skills develops as the children get older up to 8 years of age (Portratz et al., 2022). This recent study also found a significant difference between the two age

ranges in the performance of TD children regarding MLUw, MLUm, LM, and GM. The 5 to 6-year-old groups' MLUw, MLUm, LM, and GM were higher than the 4 to 5-year-old TD children. Similarly, Gouda et al. (2020) in a study on Bengali-speaking typically developing children found that the MLUw and MLUm increase with age in both boys and girls. This research suggested that participants of age 7 to 9 years old with DS showed a lower average regarding MLUw, MLUm, LM, and GM than the participants of age 9 to 11 years old. And the difference was significant. In contrast, no significant correlation between age and MLU in DS children was found but the older participants with DS had higher MLU than the younger (van Bysterveldt et al., 2012). It should be kept in mind that the age range of participants with DS in the current study was narrow and they are younger which may contribute to the variation of results. Also, significant development of expressive grammar with age was found in younger children with DS (Chapman et al., 2002; Conners et al., 2018). But in adult groups, expressive grammar did not develop significantly with age (Carr, 2000; Conners et al., 2018). In contrast, younger children also did not show significant development of expressive language skills when the data were collected using the conversational method (Bird et al., 2000). This suggests that the result varies in adults and the younger group of participants with DS and the narrative, and the conversational discourse can provide different results. The narrative is more likely to bring out more complex grammatical structures, and is, therefore, better at detecting the improvement of expressive skills with age (Chapman et al., 2002). The results showed a positive correlation between the use of words and morphemes in children with TD and DS. Marques and Limongi (2011) also found a highly significant positive correlation between MLUw and MLUm in children with DS of 5 to 12 years. The present study suggested that in both age ranges of TD children, there was a high degree of positive correlation between MLUw and MLUm. In DS groups, the 7 to 9 years age range result showed a positive correlation, while the 9 to 11 years age range result showed a highly positive correlation between MLUw and MLUm. Similarly, Rice et al. (2010) calculated the MLUw and MLUm in TD children and children with Specific Language Impairments of the age of 2.6 to 9 years. In both groups, the MLUw and MLUm are strongly correlated. This finding will help to establish the efficacy of both MLUw and MLUm as measures of expressive language skills in TD children and in children with speech and language difficulties.

Conclusion

This study aimed to investigate the MLUw, MLUm and use of lexical and grammatical morphemes of children with DS and compared them with TD children. The results revealed that children with DS performed lower than their TD peers indicating expressive language deficits in both DS groups. The outcome also shows age-related variations as a significant positive relationship between age and MLUw, MLUm, LM, and GM has been found. Further findings indicated that the MLUw and MLUm are also correlated in each group of participants which recommends that both MLUw and MLUm can be used as effective measurement tools for the investigation of expressive language deficits especially lexical and morphosyntactic skills of children with DS along with typically developing Bangla-speaking children. This study is the much-needed first step toward understanding the expressive language development of TD children and children with DS in the Bangla language context. Particularly to understand the pattern of lexical and morphosyntactic deficits in children with DS. Besides, it will provide guidelines to the special educators and SLPs of Bangladesh to formulate intervention plans for children with DS focusing particularly on their expressive language ability development. However, due to time constraints, this study has followed a cross-sectional method to investigate language skill by MLU. Further studies following the longitudinal method with these children who receive speech and language therapy for developing expressive language skills may help to build knowledge about the nature of these language deficits after proper intervention management.

Consent to Participate

Written informed consent forms were signed by the parents and/or caregivers of all participants.

Competing Interests

No potential conflict of interest was described by the authors.

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