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# Oral Motor Difficulties and Speech Intelligibility in Bangla Speaking Children with Down syndrome

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**Abstract**
Background: Many children with Down syndrome have low intelligibility due to oral motor problems and some related factors. Purposes: The present study was conducted to find out the oral motor difficulties and speech intelligibility in Bengali speaking children with Down syndrome. Methods: A cross sectional study was carried out by a structured parental questionnaire with an Intelligibility Context Scale (ICS). Among 82 children with DS comprising 42 boys and 40 girls took part in this study. Results: The Maximum (41.5%) age range was 9-13 years old (41.5%) where a greater percentage (82.9%) of children with DS had delayed speech and most of them developed one word at 3 years old. The majority (40.7%) of the DS was reported with large or big tongue. Results also indicated that a high percentage of the children with DS had not a good oral motor movement. However, there were significant relationship (P=.019<0.05, .010<0.05, .003<0.05) between oral motor difficulties with lip, tongue, and jaw movement, but there was not a significant relationship between gender and intelligibility scale. Highly significant relationship (P= 0.000<0.05) was found between oral motor difficulties and speech intelligibility and positive co-relation (P= 0.040<0.05) initiated between age and speech intelligibility score. Conclusion: A high prevalence (72%) of oral motor difficulties was found in Bangla speaking children with DS & oral motor control, speech delay and oral cavity structure were the responsible factors to interrupt speech intelligibility.

**Keywords:** Down syndrome, Intelligibility context scale (ICS), Oral motor difficulties, Oral cavity structure, Speech delay

## 1. Introduction

Bangladesh is a densely populated country. About 160 million people currently live in this country & 15% population is involved with disabilities, according to the World Bank estimates (Universal periodic Review of Bangladesh 2013). Down syndrome is one of that & most common identifiable chromosomal disorder in Bangladesh (Afrin, 2015). It is an intellectual disability occurring approximately 1 in 700 in live birth. A person of any race, socio-economic status or geographic location can have a child with DS (Parver, 2010). Speech intelligibility refers to the understandability of speech, the match between the intension of the speaker & the response of the listener & the ability to use speech to communicate effectively in everyday situations (Pascoe, 2017). Many children with DS have difficulty with speech intelligibility. Speech intelligibility depends on oral motor skill and verbal apraxia (Kumin, 2006). Children with DS have difficulties of oral motor activities & apraxia of speech. Oral motor skill is considered by oral structure & its fruitful function that refers to the movement of muscles of the face & oral area, especially the movements related to speech. Individual with DS has anatomical & physiological differences in the mouth & throat area which make more difficult to make precise movement. Structural anomalies like a small oral cavity with a relatively large tongue & a narrow high arched palate are mostly seen in a DS. This affects feeding, cup drinking, chewing & swallowing solid foods & speech. Some anatomical differences that are seen include low muscle tone & weak oral facial muscle. Two

factors like oral motor skills & oral motor planning skills (childhood verbal apraxia) affects speech intelligibility. Oral motor planning (OMP) skills refer to the ability to combine & sequence sounds into words, phrases & sentences. Difficulty with OMP skill is referred to as childhood verbal apraxia. Symptoms like inconsistency in phoneme, a limited repertoire of phoneme, presence of automatic phases, difficulty in spontaneous speech, difficulty combining & sequencing phonemes, struggling production of speech & non speech tasks & speech rhythm difficulties are present in children with DS (Kumin, 2006). Speech sound disorder includes articulation disorders in which a child has trouble physically producing a sound or sounds. By age 5 most of the child's speech should be understood and by age eight, children should be able to say all sounds correctly (Human hearing speech center). Articulation errors are described as a substitution, omission, addition & a distortion (Albertini, 2010). Parents reported evidence of difficulties classified as oral motor skills, motor programming skills and specific speech skills. Children experienced greater difficulty with sentence and in conversing than with single words. Intelligibility problems were more frequent when the child was conversing with unfamiliar adults. All individual with DS may be difficult to understand at least some of the time. It is also possible that poor speech intelligibility affects productive language performance (Kumin, 1994). Speech intelligibility is measured by a promising scale. The ICS shows potential new measure of functional intelligibility. Parents completed the 7-items ICS which rates the degree to which children's speech is understood by different communication partners (Parents, immediate family, extended family, friends, acquaintances, teachers and strangers) on a 5 point scale (McLeod et al., 2012). On the contrary, there is neither an assessment tool in Bengali language nor any research on OM or SI, although there is a huge demand not only for individuals with DS but also for normally developing children. There is an insufficient article in this area in Bangladesh on my topic. There is a need for more research in order to understand the nature of speech disorders observed in individuals with DS & to design appropriate therapy methods. Thus, I have selected this topic to find out the status of the intelligibility of speech among the children with DS and the relevant factors that influencing the intelligibility of speech. This research examined to determine OM difficulties and SI in children with DS through a study about parent's opinion.

## 2. Methodology

It was a descriptive Cross-sectional study conducted among 82 parents of DS children & data was collected from different Government and Non government institute situated in Dhaka city. Study was carried out over five months from October 2017 to February 2018. In this research parents were asked to describe speech properties according to the ICS scale (McLeod et al., 2012) which is translated & adapted into Bangla with the help of the department of communication disorders, University of Dhaka under supervision of a respective Professor. Seven ICS items to be answered on a four scale Likert type grading & ranging from always, frequently, sometimes to never. Purposive sampling technique was used and data were collected through face to face interview with the interviewer-administered structured questionnaire. Higher scores for the scales indicate better speech intelligibility. Investigator took an academic permission letter which was approved by the chairman of the Communication Disorders Department, University of Dhaka. Permission was also taken from the study area of Beautiful Mind, Uttara; Tory Foundation, Lalmatia; Sid Trust, Shaymoli; Jatiya Protibondhi Unnayan Foundation (JPUF) situated in northern Dhaka city. After getting permission from the authority, the investigator started data collection from the Parents of children with DS. The collected data were checked thoroughly and strictly for any error or information missing and then analyzed by using the statistical software named "Statistical Package for Social Science" (SPSS-22).

## 3. Results

**Table 1: Socio demographic characteristics of the sample (N=82).**

Analysis of the socio-demographic characteristics and table 1 shows that age range 9 to 13 years old were maximized (n=34, 41.5%) & mean age of the children with DS was 10.73 (±3.7688). Among them (N=82) male & female DS were nearly same & the majority of the participant's religion was Islam (n=77, 93.9%) & most of the participants (n=75, 91.5%) lived with single family having less than 5 family members (n=75, 87.8%).

| Variables | (n) | (%) |
|---|---|---|
| **Age of the children with DS** | | |
| 4-8 Years | 25 | 30.5 |
| 9-13 Years | 34 | 41.5 |
| 14-18 Years | 23 | 28.0 |
| **Mean Age±SD=10.73±3.7688** | | |
| **Gender** | | |
| Male | 42 | 51.2 |
| Female | 40 | 48.8 |
| **Religion** | | |
| Islam | 77 | 93.9 |
| Hindu | 3 | 3.7 |
| Christian | 1 | 1.7 |
| Buddhism | 1 | 1.7 |
| **Family Member** | | |
| <5 member | 75 | 87.8 |
| ➢ 5 member | 10 | 12.2 |
| **Family Types** | | |
| Single Family | 75 | 91.5 |
| Nuclear Family | 7 | 8.5 |

**Table 2: Information related variables to speech (N=82).**

Regarding the analysis of information related to speech, maximum (n=68, 82.9%) children had no hearing problem, more than two third (n=68, 82.9%) of the children with DS had history of speech delay, more than one third (n=27, 32.9) of the participants first speaking age was 3 years, followed by 19.5% in 5 years & 22.0% was greater than 5 years. More than half (n=56, 68.3%) of the children was reported slow speech rate & a greater percentage (56.9%) of the children had absent swallowing, sucking, eating, & drinking difficulty during their infant as shown in table 2.

| Variables | (n) | (%) |
|---|---|---|
| **Hearing problem** | | |
| Present | 5 | 6.1 |
| Absent | 68 | 82.9 |
| Undiagnosed | 9 | 11.0 |
| **Speech Delay** | | |
| Yes | 68 | 82.9 |
| No | 14 | 17.1 |
| **First Speaking Year** | | |
| 2 Years | 4 | 4.9 |
| 3 Years | 27 | 32.9 |
| 4 Years | 17 | 20.7 |
| 5 Years | 16 | 19.5 |
| ➢ 5 Years | 18 | 22.0 |
| **Speech Speed** | | |
| Fast Speech | 12 | 14.6 |
| Slow speech | 56 | 68.3 |
| Normal speech | 14 | 17.1 |
| **Following Difficulty in Infant** | | |
| Sucking Difficulty | 14 | 12.8 |
| Swallowing Difficulty | 15 | 13.8 |
| Eating Difficulty | 16 | 14.8 |
| Drinking Difficulty | 2 | 1.8 |
| No Difficulty | 62 | 56.9 |

**Table 3: Oral Motor Control Related Variables**

Revealed that maximum (n=48, 40.7%) children with DS had large or bigger tongue & more than one third (n=29, 35.4%) of the children was reported with low facial muscle tone as shown in table 3.

| Variables | (n) | (%) |
|---|---|---|
| **Oral Cavity Structure** | | |
| Small Oral cavity | 18 | 15.3 |
| Large or Big tongue | 48 | 40.7 |
| Narrow arch plate | 3 | 2.5 |
| High arch plate | 21 | 17.8 |
| No problem | 28 | 23. |
| **Low Facial Muscle Tone** | | |
| Yes | 29 | 35.4% |
| No | 40 | 48.8% |
| Not Diagnosed | 13 | 15.9% |

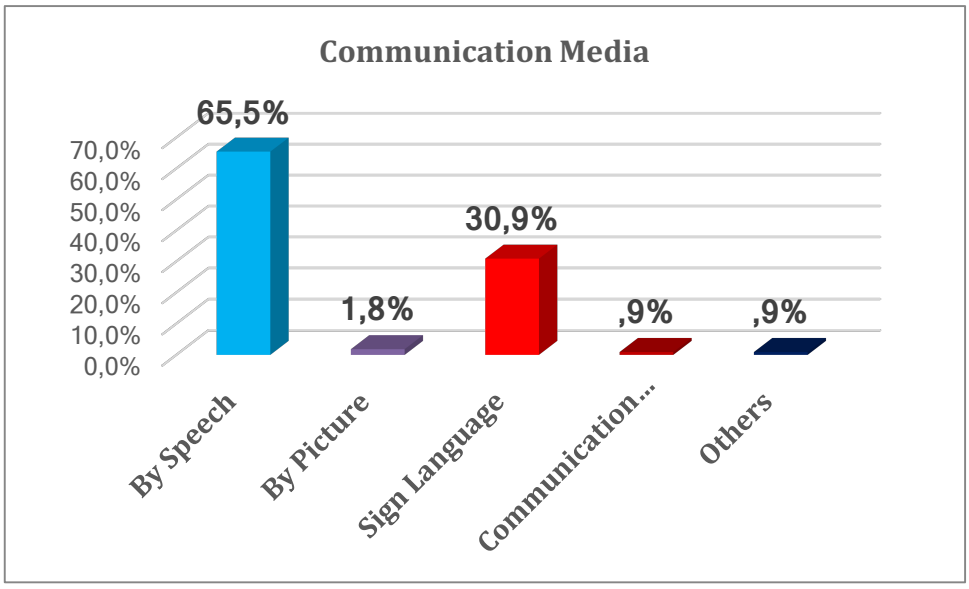


**Figure 1: Communication media of the children with DS**

Regarding communication media of the children with DS, Maximum (65.5%) had speech communication & some of them (30.9%) had a communication by sign language where 1.8% by picture, 0.9% by communication Board, & 0.9% by others as shown in figure1.

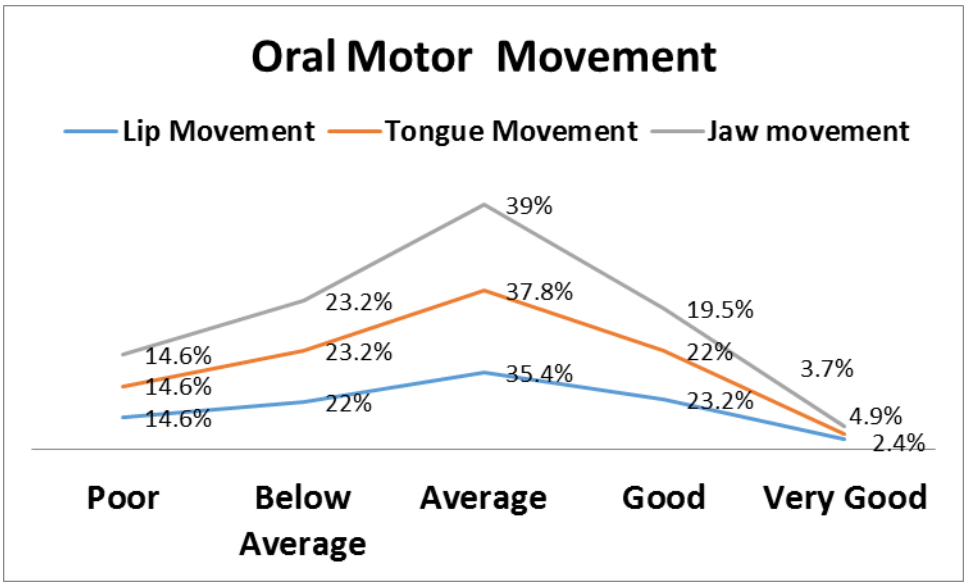


**Figure-2: Oral Motor Movement of the children with DS.**

Figure 2 revealed that among the children (N=82), the maximum was reported average level of lip (39%), tongue (37.8%), & jaw movement (35.4%) whereas very few (3.7%, 4.9%, 2.4%) of them were very good in oral motor movement that measured by Likert scale.

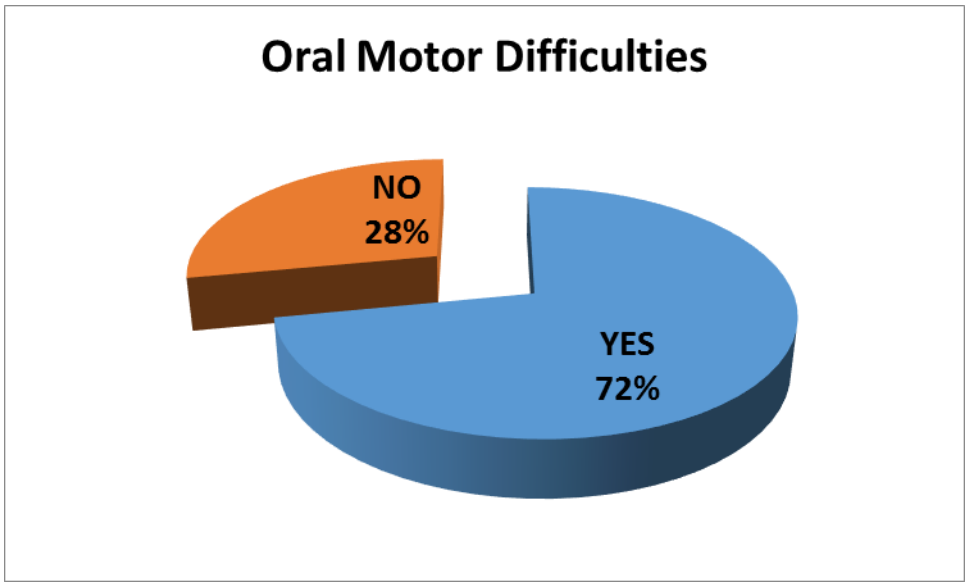


**Figure-3: Prevalence of oral motor difficulties**

The current study found 72% prevalence of oral motor difficulties among the children with DS.

**Table 4 Intelligibility in Context Scale (ICS Scale)**.

According to ICS scale (McLeod et al. 2012) based on parents perception, maximum parents usually (30.5%) & always (35.4%) understand of his/her child, whereas most of the DS was reported sometimes (30.5%, 32.9%) understand by immediate & extended members of the individual family. The majority of the children (30.5%) with DS were indicated sometimes understand by his/her friend & rarely (32.9%) understand by other acquaintances. About 43.9% teachers understand to speech usually & less than half (40.2%) of the strangers never understand to the speech as shown in table 4.

| ICS Question | Never | Rarely | Sometimes | Usually | Always |
|---|---|---|---|---|---|
| ***Do you understand your child*** | *1(1.2%)* | *12 (14.6%* | *15 (18.3%)* | *25(30.5%)* | *29 (35.4%)* |
| ***Do Immediate members of your family understand your child*** | *11 (13.4%)* | *13 (15.9%)* | *25 (30.5%)* | *22 (26.8%)* | *11 (13.4%* |
| ***Do Extended members of your family understand your child*** | *12 (14.6%)* | *23 (28.0%)* | *27 (32.9%)* | *13 (15.9%)* | *7 (8.5%)* |
| ***Do your child's friend understand your child*** | *17 (20.7%)* | *21 (25.6%)* | *25 (30.5%)* | *10 (12.2%)* | *9 (11.0%)* |
| ***Do other acquaintances understand your child*** | *22 (26.8%)* | *27 (32.9%)* | *19 (23.2%)* | *10 (12.2%)* | *4 (4.9%)* |
| ***Do your child's teacher understand your child*** | *10 (12.2%)* | *6 (7.3%)* | *16 (19.5%)* | *36 (43.9%)* | *14 (17.1%)* |
| ***Do Strangers understand your child*** | *33 (40.2%)* | *29 (35.4%)* | *12 (14.6%)* | *4 (4.9%)* | *4(4.9%)* |

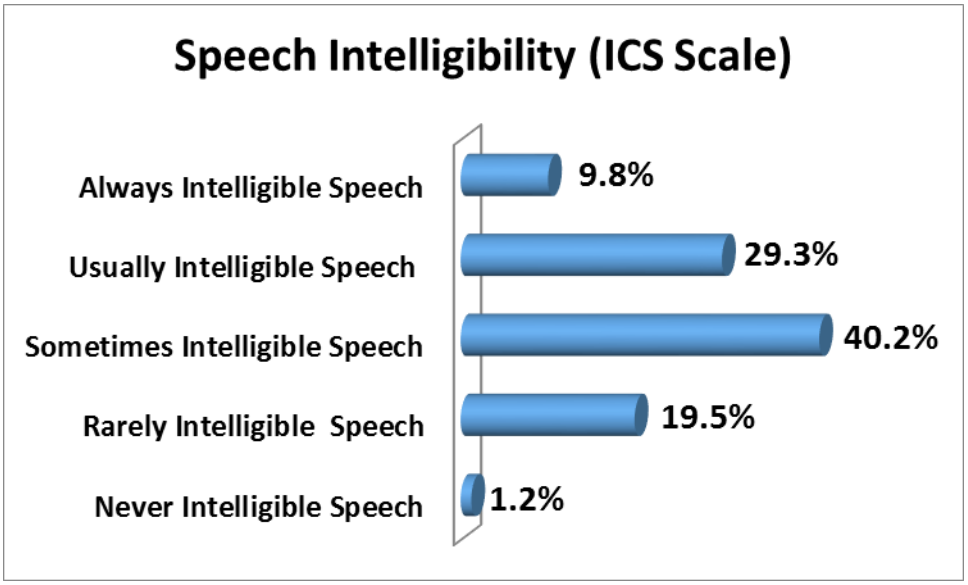


**Figure-4: Speech Intelligibility of the children with DS.**

The Study revealed that the majority (40.2%) of the children with DS was reported to sometimes speech intelligible as shown in figure 4.

**Table 5- Distribution of Total Intelligibility Context Scale (ICS)**

| Total Score (ICS) | Number (n) | Percent (%) |
|---|---|---|
| *7* | *1* | *1.2* |
| *8* | *4* | *4.9* |
| *10* | *2* | *2.4* |
| *11* | *3* | *3.7* |
| *12* | *3* | *3.7* |
| *13* | *3* | *3.7* |
| *14* | *1* | *1.2* |
| *15* | *4* | *4.9* |
| *16* | *2* | *2.4* |
| *17* | *6* | *7.3* |
| *18* | *1* | *1.2* |
| *19* | *6* | *7.3* |
| *20* | *4* | *4.9* |
| *21* | *10* | *12.2* |
| *22* | *2* | *2.4* |
| *23* | *5* | *6.1* |
| *24* | *2* | *2.4* |
| *25* | *8* | *9.8* |
| *26* | *3* | *3.7* |
| *27* | *4* | *4.9* |
| *30* | *1* | *1.2* |
| *33* | *3* | *3.7* |
| *35* | *4* | *4.9* |
| *Total* | *82* | *100.0* |
| | *Mean±SD= 20.23±6.904* | |

In this study, among 82 children with DS, mean total score was 20.23 (±6.904) out of 35 where score 21 was the highest number (n=10, 12.2%) and minimum score was 7 (n=1, 1.2%) as shown in table 5.

**Table 6: Average Score of Intelligible Context scale (ICS)**

| Average Score | Number (n) | Percent (%) |
|---|---|---|
| **1 to 2 AS** | 17 | 20.7 |
| **2 to 3 AS** | 33 | 40.2 |
| **3 to 4 AS** | 24 | 29.3 |
| **4 to 5 AS** | 8 | 9.8 |
| | **Mean±SD=2.86±.994** | |

In this study, among N=82 children with DS, the mean average score was 2.86 out of 5 which indicated that children with DS had sometimes intelligible (McLeod et al. 2012) of speech by others as shown in table 6.

**Table 7- Association between Oral Motor Difficulty and Related Variables**

| Variables | Oral Motor Difficulty | | $\chi^{\surd}$ | df | P value |
|---|---|---|---|---|---|
| **Age (In Years)** | Yes | No | | | |
| *4-8 Years* | *18(72.0%)* | *7(28.0%)* | *.107* | *2* | *.948* |
| *9-13 Years* | *25(73.5%)* | *9(26.5%)* | | | |
| *14-18 years* | *16(69.6%)* | *7(30.4%)* | | | |
| **Sex** | | | | | |
| *Male* | *31(73.8%)* | *11(26.2%)* | *1.47* | *1* | *.701* |
| *Female* | *28(70.0%)* | *12(30.0%)* | | | |
| **Child's speech delay** | | | | | |
| *Yes* | *53(77.9%)* | *15(22.1%)* | *7.08* | *1* | *.008** |
| *No* | *06(42.9%)* | *08(57.1%)* | | | |
| **Lip Movement** | Yes | No | *11.76* | *4* | *.019** |
| *Poor* | *11(91.7%)* | *1(8.3%)* | | | |
| *Below Average* | *17 (94.4%)* | *1 (5.6%)* | | | |
| *Average* | *18(62.1%)* | *11(37.9%)* | | | |
| *Good* | *10(52.6%)* | *9(47.4%)* | | | |
| *Very Good* | *3(75.0%)* | *1(25.0%)* | | | |
| **Tongue Movement** | | | | | |
| *Poor* | *12(100.0%)* | *0(0.0%)* | *13.1* | *4* | *.010** |
| *Below Average* | *17(89.5%)* | *2(10.5%)* | | | |
| *Average* | *20(64.5%)* | *11(35.5%)* | | | |
| *Good* | *9(50.0%)* | *9(50.0%)* | | | |
| *Very Good* | *1(50.0%)* | *1(50.0%)* | | | |
| **Jaw Movement** | | | | | |
| *Poor* | *12(100.0%)* | *0(0.0%)* | *15.93* | *4* | *.003** |
| *Below Average* | *18(94.7%)* | *1(5.3%)* | | | |
| *Average* | *19((59.4%)* | *13(40.6%)* | | | |
| *Good* | *8((50.0%)* | *8(50.0%)* | | | |
| *Very Good* | *2(66.7%)* | *1(33.3%)* | | | |

p-value reached from chi-square. Mark represents a significant association of Oral Motor Difficulties with speech delay (p-value .008), lip (p-value 0.019), tongue (0.010), & jaw (0.003) movement

**Table 8- Association between Intelligibility Context Scale & Oral Motor Difficulties.**

| ICS Scale | Oral Motor Difficulties | | $\chi^{\surd}$ | df | P Value |
|---|---|---|---|---|---|
| | **Yes** | **No** | | | |
| ***Never Intelligible Speech*** | *1 (100.0%)* | *0(0.0%)* | | | |
| ***Rarely Intelligible Speech*** | *15(93.8%)* | *1(6.3%)* | *23.093* | *4* | *.000** |
| ***Sometimes Intelligible Speech*** | *28(84.8%)* | *5(15.2%)* | | | |
| ***Usually Intelligible Speech*** | *14(58.3%)* | *10(41.7%)* | | | |

| | | |
|---|---|---|
| ***Always Intelligible Speech*** | *1(12.5%)* | *7(87.5%)* |

Mark (*) represents that there was highly significant relation between OMD with SI (p-value 0.000).

**Table 9: Correlation between Age and ICS total score**

| | | Age of the children with DS | Total Score (ICS Scale) |
|---|---|---|---|
| **Age of the children with DS** | ***Person Correlation*** | *1* | *.227* |
| | ***Significant (2- tailed)*** | | *.040** |
| | ***N*** | *82* | *82* |
| **Total_Score** | ***Person Correlation*** | *.227* | *1* |
| | ***Significant (2-tailed)*** | *.040** | |
| | ***N*** | *82* | *82* |

***Correlation is significant at the 0.05 level (2-tailed)**

Here p= (.040<0.05) indicated that there is a positive correlation between age and ICS total score.

**Table 10-Treatment Related Variables**

Revealed that more than half (56.1%) of the children with DS did not take speech therapy & those who were taken (63.9%) speech therapy had better prognosis than before as shown in table 10.

| Taken Speech Therapy | (n) | % |
|---|---|---|
| ***Yes*** | *36* | *43.9* |
| ***No*** | *46* | *56.1* |
| **Status after taking speech Therapy (n=36)** | | |
| ***No Change*** | *13* | *36.1* |
| ***Better than Before*** | *23* | *63.9* |

## 4. Discussion

Many Children with DS have difficulty with speech understanding and fluency. The present study based on parent's perspective to learn more about some specific factors that affects speech intelligibility. Reduced speech intelligibility brings an extensive problem for the children with DS (Bacley, 2000). The study revealed that more than half (72%) of the children with DS were affected by oral motor difficulties where male suffered more than female, but earlier study found that 60.2% of parents had been given a diagnosis of oral motor difficulties (Kumin, 2006) which is similar to compare this study & Togramm (2015) found that one third (37.9%) of the children with DS were diagnosed OMD by their families. The present study revealed that most of the children with DS produced first word at 3 & >5 years of old which indicated their delayed onset of speech and more than half (68%) of children were reported for delaying speech by their parents. Almost all parents had been living with single family (91%) where members of each family had <5 (88%) which might be a reason of child's delayed speech. More than half (68.3%) of the children with DS had slow speech rate and less than one fourth (17.1%) was found normal speech. Previous study (Berglund, 2001) found that only 12% of children with DS produced one word at one year old. However, another study found 90% of three years old & 94% of five years old produced one or more words and 73% of five years old children produced 50 or more words which are very similar to this study. Kumin (2001) stated that lower intelligibility found those children who began to speak after age 5. Another study Togram (2015) found the beginning of the speech of DS was 17.6% present at 3 years onwards, 14.1% at 4 years onwards, 6% stated 5 years onwards & 3.1% answered 6 years onward. About 32.9% of children did not speak & the mean age of first speaking word was 2.4 years. Families of children with DS stated that the onset of speech was late for their children (around 5 years). But in this study, the mean age of first speaking words was 3.21 years, which was minor dissimilarity from previous study. Previous study (Kumin,

1994) found that the children with DS experience conductive hearing loss which directly influenced their speech and language difficulties, but the present study initiated that maximum (82.9%) children with DS had no hearing problem & 11.0% children with DS was undiagnosed with hearing problem. Another study (Kumin, 2006) found that about half of children with DS had never found hearing difficulty. On the other hand Togram (2015) found almost all the children (90.3%) were not to have any hearing problems by reporting with their families. It is known that a greater intelligibility is associated with increased chronological age, (Pascoe, 2017) but present study revealed that there is a weak positive correlation found between age and SI. There was no significant relationship between sexes with SI. Earlier study found (Togram, 2015) that there was a significant relationship found between speech intelligibility and age ($r= 0.317$, $p< 0.01$) which indicated that older children were better levels of speech intelligibility. There were some influencing factors for speech intelligibility, such as low muscle tone, oral cavity structure, oral motor control etc. Study also revealed that about half of children with DS had no facial muscle tone and about one fourth of children had not diagnosed their low facial muscle tone & previous study revealed the same result. In this study, about 23.4% of the children with DS did not have low muscle tone. The study also initiated that female is sometimes more intelligible speech than male, on the other hand Timmins (2009) stated that the DS intelligibility bigger from 72%-76% & from 59%-65% of female and male participant correspondingly which is similar with this study. More than half of the children with DS had no difficulty in sucking, swallowing, eating and drinking difficulty & very few of them (1.8%) had a drinking problem, less than one fourth of the children had eating, swallowing, & sucking difficulty, but the other study found that babies with DS do not experience any difficulties during swallowing both liquid and solid foods and nearby half if the subjects were noted not to go through any troubles while eating (Togram, 2015). In this study, oral motor control measured by lip, tongue, and jaw movement. Current study found that the lip movement status of the children with DS had 14.6% of poor, 22% of below average, 35.4% of average, 23.2% of good, and 2.4% of very good. On the other hand, tongue movement status was 14.6% of poor, 23.2% of below average, 37.8% of average, 22.2% of good, & 2.4% of very good. Study also stated that jaw movement of the children with DS had 14.6% poor, 22.0% below average, 35.4% average, 23.2% good & 4.9% very good. All oral movements were assessed on a Likert scale. Highest percentage showed in the average movement of lip, tongue, and jaw movement. Results of this study indicated that children with DS had been suffering with their oral motor control & there was a significant relationship initiated between OMD with lip, tongue & jaw movement (P=.019*, 010*, .003*). On the other hand, there was no significant relationship found between OMD with age (P= .948> 0.05) and (P= .701> 0.05) gender. Another study stated that speech problem is embedded in such factors like anatomy and motor control (Kent, 2012). Communication media of the most children with DS was by speech (65.5%) and by sign language. An Earlier study found (Togram 2015), speaking (47% n=150), mimes and gestures (46.7% n=149) and others (63% n=20) communication forms used by children with DS. Past study (Martin, 2009) stated that individual with DS speech production related to differences in oral structure like a small oral cavity with a relatively large tongue & a narrow high plate. Current study found that among the children with DS, most of them had large or big tongue (40.7%), less than one fourth (15.3%) had a small oral cavity, very few (2.5%) had a narrow arch plate, 17.8% had a high arch palate and 23.7% did not have any oral cavity problem. Study revealed that there was a significant relationship was found between oral motor difficulties and Speech Intelligibility. From this association it could be said that those who had an oral motor problem had been suffering speech intelligibility. In this study, Intelligibility Context scale (ICS) showed that only parents understand their child's speech always (35.4%) & most of the time (30.5%**)** comparing to the others parameters in Likert scale. Immediate members like Brother, Sister, Grandfather, Grandmother understands their child sometimes and most of the time & it is about 30.5% & 26.8%. Uncle and Cousin of their family understand your child sometime and rarely & it is about 32.9% & 28.0%. Friends sometimes & rarely understand their child and it is about 30.5% and 25.6%. Other acquaintances never and rarely understand their child and it is about 26.8% and 32.9%. On the other hand teachers usually understand their child and it is about 43.9%. Strangers understand their child rarely (35.4%) and never (40.2%). In this study, parents and teachers understood most of their child's speech and it was always 30.5% and usually 35.4% compared to the other group. Study revealed a mean total score was 20.23 along with 35 and the mean average score was 2.86 among 5 which indicated that the children with DS sometimes speech intelligible with others. According to ICS Scale (McLeod et al. 2012) it could be said that DS had speech intelligibility trouble and it was very difficult to understand for strangers, but conversely close relation to the children who always track them, easily understand about their speech. ICS Scale (McLeod et al., 2012) is a subjective measurement scale by which easily measured children with DS intelligibility speech. Study revealed that near about half of the children with DS did not treat with speech

therapy. Most of them who was taken speech therapy got outcome better than before (63.9%). On the other hand previous study mentioned that most individuals with DS were benefited more from therapy focusing on motor planning training (Science Daily 2016).

## 5. Conclusion

It is concluded that children with DS has the highest prevalence of OMD as well as difficulty with understandable speech. Maximum children with DS have not good lip, tongue and jaw movement. There was a highly significant relationship found between OMD with SI. Some factors are responsible for OMD and speech intelligibility. A large number of children with DS were reported by the parents that sometimes of their children's speech understandable by others, but parent understanding status was fairly good than others. A positive correlation found between the ages with SI which indicated as speech intelligibility brings better according to their chronological age. A number of children did not take speech therapy and those who were treated with speech therapy were reported better prognosis.

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**Abbreviation**

**DS:** Down syndrome
**SI:** Speech Intelligibility
**OM:** Oral Motor Planning
**OMD:** Oral Motor Difficulties
**ICS Scale:** Intelligibility in Context Scale

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