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SPEECH AND LANGUAGE CHALLENGES IN INDIAN CHILDREN WITH DOWN SYNDROME

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ABSTRACT

The Down syndrome individuals often show speech and language deficits. We have evaluated speech and language milestones, oro-motor and vegetative skills in them. The mean age for cooing and babbling was 6 ± 3.3 and 8 ± 2.95 months. The delay in first word was observed in 73% individuals. In 82% patients expressive language was delayed. Genetic study showed trisomy 21 in 85.7% cases. Our results reinforce delay in acquisition of speech and language milestones which may be due to the structural and functional abnormalities of oral structures and mental retardation. Another reason may be lack of awarness and limited availabilty of facilities. Hence we aim early and proper intervention which can help in improving the speech and language milestones.

Key Words: *Down syndrome, Speech and Language*

Introduction:

Down Syndrome (DS) is the most common aneuploidy with a wide spectrum of clinical manifestations. A large number of individuals with this syndrome show speech and language deficit (Jones, 2006). In such children the pre-linguistic and linguistic stage of language development is affected. Majority of them encounter difficulty when learning to talk and in speech production. Many areas of communication are impaired in them (e.g., delays in babbling, poor articulation and poor expressive language). The aim of the study was to find the developmental profile of speech and language milestones, oro-motor skills and vegetative skills in children with Down syndrome.

Methods:

A retospective study on speech and language evaluation was performed in 37 Indian children with Down syndrome. The patients attending the Department of Neurology, Audio, speech and Languge Pathology and department of Psychology, Institute of communicative and Cognotive neurosciences, Shoranur, were enrolled in the study. The informed consent form was taken for all cases. All of them underwent consultation by a physician. Detailed speech and language evaluation including case history and rate of language development assessement using Receptive and Expressive Emergent Language Scale (REELS) was carried out for all patients. Children were assessed for the oromotor speech mechanism examination, vegetative skills, and speech and language development. The data regarding acqisition of speech and language milestones were either unavailable or not attained in some cases. The oral cavity examination could not be done in 10 cases. The genetic study was performed using conventional cytogenetic technique using heparinized blood sample. In each case, GTG banding was performed and 20 cells were routinely analyzed and karyotyped. In instances of mosaicism, nearly 100 metaphases were analyzed.

Results:

The male and female ratio for 37 individuals was 1.04:1. All children had delayed speech and language development. The mean age for cooing and babbling was found to be 6 ± 3.3 and 8 ± 2.95 months respectively. The mean age for acquisition of first word in total cases was found to be 1.7 ± 0.74 years. A delay in production of first word was observed in 73% patients (mean age of 2.0 ± 0.7 years), whereas 27% have acquired the first word following the normal pattern of language developmental. As far as Receptive and expressive language skills are concerned, expressive language age was delayed than receptive language age in about 82% individuals, whereas in 18% cases receptive language age and expressive language age were same. All children except two demonstrated verbal mode of communication. Only one patient had communication through differential cry. One patient was reported to have self talk.

With regard to Speech skills, 13.5% individuals with DS had misarticulation. In connection with Oro-motor skills, 74% cases were reported to have high arched palate, 10 cases had macroglossia, 2 patients showed micrognathia, one had bifid tongue, two dental abnormalities like missing of teeth and misalignment and decayed teeth and protruded tongue noticed in 4 cases. The Vegetative skills like blowing, biting and chewing were affected in 17% cases. The Table 1 shows acquisition of speech and language milestones in individuals with Down syndrome. In addition to the data shown in the table, one patient had attained cooing at the age of 24 months. Another patient had first word at the age the 48 months and phrase level at the age of 84 months. The genetic study showed 85.7% individuals with pure trisomy of chromosome 21, translocation Down in 5.7% and mosaicism observed in 8.6% cases.

Discussion:

Speech and language milestones

The speech and Language development of children with Down syndrome is found to be delayed when compared to typically developing children. The milestones including cooing, babbling, first word, phrase level and sentence level are reported to be delayed in children with DS. Canonical babbling is regarded as a significant step in the language acquisition process. In the current study all children had delayed speech and language development, since, ours is an institute for communicative and cognitive Neurosciences. The canonical babbling was found to be delayed when compared to typically developing children (table1). However it is observed that the event of babbling is typical but not common in infants with DS, there is overlaps in the onset of canonical babbling in DS and typically developping children, but in downs it can be rather delayed, the delays in babbling are noticeable much less than delays in gross motor skills like crawling and walking (Kent and Vorperian, 2013).

One of the earlier study reports that the development of speech is deviant and not delayed in DS (Sommers et al., 1988). In comparison with previous studies (Layton, 2004; Bowen, 1998), our patients showed more delay in acqusition of speech and language milestones (Table 1). This delay in speech and language characteristic may be due to the associated mental retardation, another cause for this may be lack of awarness and limited availabilty of facilities for speech therapy in developing country.

The outcome of interventions like increase in canonical vocalization can result in better social communication. Since the linguistic and pre-linguistic period is affected, early intervention is warranted in the first year of life (Abbeduto et al., 2007). The first three years of life is an important stage for speech and language development when the brain is developing and maturing. Besides the data shown in the table 1, we have noticed that one patient had attained cooing at an age of 24 months, the reason for which may be moderate level of retardation. Another patient had first word at the age the 48 months and phrase level at the age of 84 months, the etiology behind such a delay may be profound level of retardation.

Oro-motor skills

Literature reports small oral cavity, narrow, high arched palate, protruded tongue, dental abnormalities, hypotonia, open mouth posture and macroglossia as the core structural and functional anomalies in children with DS. Poorly differentiated and multiple facial muscle anomalies have also been reported which can be attributed to the reduced speed, range of movements and coordination of articulators in children with DS resulting in poor speech intelligibility (Miller, 1999). The current study shows 74% individuals with high arched palate, 10 cases had macroglossia, 2 patients had micrognathia, 1had bifid tongue, 2 dental abnormalities like missing of teeth and misalignment and decayed teeth and 4 cases had protruded tongue. The speech production requires accurate and proper coordination of different oro-facial muscles and oral structures. Reduced or limited range of movement, speed of movement and accuracy of movement of articulators results in imprecise consonant production. Speech impairment in children with DS is attributed to structural and functional abnormalities of oral structures (Roberts et al., 2007). Therefore such children should be included in speech-training program.

Receptive and expressive language skills

In the current study, expressive language age was found to be delayed than receptive language age in about 82% of children. Another study also indicates that receptive language is typically stronger than expressive language [Laws & Bishop, 2003]. Both receptive and expressive language skills should be evaluated in order to have a comprehensive intervention plan for such children.

Speech skills

Speech anomalies including voice, speech sound, fluency, prosody and intelligibility are reported in children with DS (Kent and Vorperian, 2013). In the current study, 13.2% children with DS had misarticulation which may be due to high arched palate. Children with DS have delayed articulatory and phonological development and atypical pattern of errors. Both consonant and vowels are found

to be affected in children with DS. A few researches have proposed that anatomical and physiological anomalies such as hypothyroidism, absence of facial sinus or anomalies in laryngeal structure contribute to the speech anomalies (Benda,1949; Leddy, 1999; Novak, 1972).

Conclusions:

The currents study shows delay in acqusition of speech and language milestones in Indian children with Down syndrome, which may be due to the structural and functional abnormalities of oral structures and associated mental retardation. Another reason can be lack of awarness and limited availabilty of facilities for speech therapy in developing and underdeveloped countries. The paper indicates need for early intervention which can help in improving the speech and language milestones in children with Down syndrome and necessity for speech therapy facility in underdeveloped and developing countries.

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References:

1. Abbeduto, L., Warren, S.F., Conners, F.A. (2007) Language development in Down syndrome: from the prelinguistic period to the acquisition of literacy. Ment Retard Dev Disabil Res Rev. 13(3), 247–61.
2. Benda, (1949) Mongolism and cretinism. New York: Grune and Stratton.
3. Bowen, (1998) Ages and Stages Summary: Language Development 0-5 years. Retrieved from http://www.speech-language-therapy.com.
4. Jones (2006). Recognizable patterns of human malformation. Elsevier Saunders, Philadelphia.
5. Kent, R.D. and Vorperian H.K., 2013. Speech Impairment in Down Syndrome: A Review. J Speech Lang Hear Res. 56(1), 178–210.
6. Layton, (2004) Developmental Scale for Children with Down Syndrome. Durham, NC: Extraordinary Learning Foundation.
7. Laws, G., & Bishop, D.V.M. (2003) A comparison of language abilities in adolescents with Down syndrome and children with specific language impairment. Journal of Speech, Language, and Hearing Research. 46, 1324–1339.
8. Leddy M. (1999) The biological bases of speech in people with Down syndrome. In: Miller, JF.; Leddy, M.; Leavitt, LA., editors. Improving the communication of people with Down syndrome. Baltimore, Paul H. Brookes, pp. 61-80.
9. Miller JF. (1999) Profiles of language development in children with Down syndrome In: Miller JF, Leddy M, Leavitt LA, editors. Improving the communication of people with Down syndrome. Baltimore, Paul H. Brookes, pp. 11–39.
10. Novak, (1972) The voice of children with Down's syndrome. Folia Phoniatrica (Basel). 24, 182–194.
11. Roberts, J.E., Price, J., & Malkin, C. (2007) Language and communication development in Down syndrome. Mental Retardation and Developmental Disabilities Research Reviews. 12, 26-35.
12. Sommers, R. K., Reinhart, R.W., & Sistrunk, D.A. (1988) Traditional articulation measures of Down syndrome speakers, ages 13–22. Communication Disorders Quarterly, 12, 93–108.

Table 1: Acquisition of speech and language milestones in DS

Milestones	**Age range in months**		
	TD children^{o}	**Down syndrome***	**Present study**
cooing	0-3	0-5	2-12
babbling	4-6	10-12	3-12
First word	7-12	11-15	12-48
Phrase level	12-24	36-40	18-72
Sentence level	24-36	41-59	36-60

TD- Typically developing, **º**Bowen, 1998, *****Layton, 2004.