



ORIGINAL ARTICLE

doi: <http://dx.doi.org/10.3329/mediscope.v5i1.36722>

The nature of language problem in Bangladeshi children with cerebral palsy: an observation using neurolinguistic approach

F Ferdous^{1✉}, MF Alam², MMR Chisty³, JI Ali⁴, NMW Rahman⁵

Abstract

Cerebral palsy (CP) is the leading cause of childhood disability affecting function and development. The objective of the study was to look into the language problems in Bangladeshi children with CP on the basis of neurolinguistic approach and was conducted during the period of April 2014 to December 2014 at the Department of Linguistics, University of Dhaka among children aged between 3 to 18 years. In the study, a total of 10 children with CP were enrolled purposively from two tertiary care hospitals in Dhaka (Children Development Centre of Sir Salimullah Medical College and Mitford Hospital and National Institute of Mental Health). The mean±SD age was 8.9±4.8 years. Male was predominant (60.0%). History of prolonged labour was 100%, and home attended by untrained birth attendants in 70.0%. The 90.0% of the children understood simple meaningful sentences using two words. The children were unable to understand complex sentences. The 80.0% children did not want to play or make friendship with other children; 40.0% did not understand others' speech, 50.0% did not express their own speech, and 10.0% did not understand & express their own speech. All the children had deep thong articulation changed to mono thong in case of semi vowel articulation. In case of history of delayed crying at birth, phoneme omission occurred when the children tried to articulate any word. To the best of knowledge, this was the first study done on the neurolinguistic approach in Bengali children, but the limitation of the study were that it was with small sample size, city based and short duration. Therefore, generalization of the results would be difficult. Further studies using larger sample would be better to visualize the extent of the issue in order to insert the children with CP in their social context and to give them quality of life.

Key words: neurolinguistic approach, cerebral palsy, Bangladesh.

Introduction

Children with cerebral palsy (CP) frequently demonstrate difficulties in communication as a result of impaired language skills, which are often influenced by motor speech disorders.¹ The etiology of CP most likely is multifactorial, arising directly from the motor impairment and linked to the cognitive and/

or sensory processing deficits associated with CP.² In contrast, several studies have demonstrated average verbal abilities of higher-functioning in children with CP and even children with early left-sided brain damage may exhibit sparing of language skills.^{1,2-5} The prevalence of CP is approximately 2.5 per 1000 live births in countries

1. F Ferdous, Assistant Professor, Department of Psychiatry, ZH Sikder Womens' Medical College, Dhaka.

Email: ferdous_fahmida@yahoo.com

2. MF Alam, Professor and Director, National Institute of Mental Health and Hospital, Dhaka

3. MMR Chisty, Senior Lecturer, Department of Anatomy, Dhaka National Medical College, Dhaka

4. JI Ali, Professor and Director General, International Mother Language Institute, Dhaka

5. NMW Rahman, Associate Professor, Department of Microbiology, Gazi Medical College, Khulna

with neonatal intensive care facilities.⁶⁻⁸ Prevalence is higher in children born with very low birth weight. However, a decline in prevalence in this group from 60.6 (99.0%, CI 37.8-91.4) per 1000 live births in 1980 to 39.5 (28.6-53.0) per 1000 in 1996 has been observed in Europe.⁹

Communication difficulties can be associated with any type of CP and may relate to limitations in the production of movements for speech, gesture and facial expression; receptive or expressive language, hearing, vision or a combination of limitations in these functions. Speech impairments are estimated to affect approximately 36.0% of children with CP and communication difficulties are observed in around 42.0%.¹⁰ Prevalence of speech, language and communication impairment increases with severity of motor and intellectual impairment.¹⁰⁻¹³ Children may experience communication difficulties from early infancy and, as CP is a persistent condition, communication impairments are chronic and children may require long term intervention. Previous study revealed that 75.0% of participants had clinical speech and/ or language impairments.¹⁴

Communication challenges of any kind can lead to educational and social isolation and can have a detrimental impact on nearly all aspects of development.^{15,16} Thus, identifying and treating specific speech and language problems at the earliest possible age is of the utmost importance. To date, research on speech and language development in children with CP has been limited, in part due to the extreme heterogeneity of this population. The range of possible speech, language, and communication problems is considerable. The language problem in CP children is still under attended though we have huge population with a significant portion of growing children. Therefore, in the present study, it was aimed to look into the language problems in Bengali children with CP on the basis of neurolinguistic approach.

Materials and Method

This is cross-sectional descriptive study with a neurolinguistic approach conducted during the period of April 2014 to December 2014 at the Department of Linguistics, University of Dhaka among the Bangladeshi children aged between 3 to 18 years. A total of 10 children with CP were enrolled in the study

from two tertiary care hospitals in Dhaka (Children Development Centre of Sir Salimullah Medical College and Mitford Hospital and National Institute of Mental Health) on the basis of the inclusion criteria i.e., children had hearing abilities within normal limits as documented by either formal audiological evaluation or distortion product otoacoustic emission screening and children who got previous interventions were excluded.

Purposive sampling was done to consecutively select the children from the above mentioned tertiary care hospitals. Informed consent was taken from all the parents or attendants before enrollment in the study. Data were collected using a semi-structured questionnaire. The questionnaire composed of 8 questions to find out the linguistics output in children with CP. Among the questions, 1 covered the receptive language development, 1 covered the social communication, and other 6 questions covered the expressive language development. The data analysis was done by using Statistical Package for Social Sciences (SPSS), version 16.¹⁷

Results

Table 1 shows the distribution of demographic variables of the CP patients. It was observed that almost three fourth (70.0%) patients were found 5-7 years and rest 30.0% as >7 years. Within 4-5 years basic language development occurs in a normal child. If any children had problem in basic language development after 7-11 years the child became 'mute' or articulation disorder present in language development. It was observed that male was found 6 (60.0%) and female was 4 (40.0%). The respondents' relation to patients was mother 7 (70.0%), father 1 (10.0%) and others were 2 (20.0%). History of prolonged labour was found in 10 (100.0%), no history of preterm delivery in for 8 (80.0%) and home attained by untrained birth attendants in 7 (70.0%). History of delayed crying at birth was found in 7 (70.0%). The mean±SD age of the children was 8.9±4.8 years.

Receptive language development

Does your child understand your all speech? (-আপনার শিশু আপনার সব কথা কি বুঝতে পারে?- -apnar shishu apnar shob kotha ki bujte pare?-). On observations and history taking from care

Table 1. Distribution of demographic variables of the patients

Demographic variable	Frequency	%
Age in years		
5-7	7	70.0
>7	3	30.0
Sex		
Male	6	60.0
Female	4	40.0
Guardians		
Mother	7	70.0
Father	1	10.0
Others	2	20.0
History of prolonged labour		
Yes	10	100.0
No	0	0.0
History of preterm delivery		
No	8	80.0
Did not remember	2	20.0
Place of delivery		
Home attained by untrained birth attendants	7	70.0
Hospital, normal vaginal delivery	3	30.0
History of delayed crying at birth		
Yes	7	70.0
Did not remember	3	30.0

giver the linguistics output of the children with CP revealed that, the 90.0% of the children understood simple meaningful sentences using two words (for example- -give me- -আমাকে দাও- -amake dao-; -let's go- -চল যাই- -cholo jai-; -come with- -নিয়ে আস- -nie aso-). The children were unable to understand complex sentence (for example- -being in the maternal grandfather's house, we played very interesting game that was very joyful for us, -আমরা নানা বাড়িতে এত মজার খেলা খেলেছিলাম যে আমাদের খুব আনন্দ হয়েছিল- -amra nana barite eto mojar khela khelesilam je amader khub anondo hoyesilo-).

Social communication

Does your child want to play or friendship with other children? (-আপনার শিশু কি অন্য শিশুদের সাথে খেলা করতে অথবা বন্ধুত্ব করতে চায়?- -apnar shishu ki oinno shishuder shathe khela korte othoba bondhutto korte chay?-). The study revealed

that the 80.0% children did not want to play or make friendship with other children; 40.0% did not understand others' speech, 50.0% did not express their own speech, and 10.0% did not understand & express their own speech.

Expressive language development

Does any letter (phoneme) omission occur when your child articulates any word? (-আপনার শিশু কি শব্দ উচ্চারণ করলে কোন ধ্বনি বাদ পড়ে?- -apnar shishu ki shobdo uccharon korle kono dhoni bad pore?-). All the parents told that phoneme omission and substitution occurred when their child tried to articulate any word.

Does any speech substitution occur when your child articulates any word? (-আপনার শিশু কি মনে হয় আপনার শিশু শব্দ উচ্চারণ একটির ক্ষেত্রে আরেকটি উচ্চারণ করে?- -apnar ki mone hoy apnar shishu shobdo uccharon ektir khetre arekti uccharon kore?-). All the parents told that word omission and substitution occurred when their child tried to articulate any word (for

example- -up- -উপর- -upor-, -ওফর- -ofor-; -doing- -করছ- -korso-, -কছও- -koso-; substitution of occurred in initial and middle stage).

How can your child articulate the following words (vowel)? (-আপনার শিশু নিম্নোক্ত শব্দগুলো (স্বরধ্বনি) কিভাবে বলে?- -apnar shishu nimnokto shobdogulo (shorodhoni) ki vabe bole?-). -brick- -ইট- -it-, the child articulates- -ই-ট- -i-t- (slowly); -many- -অনেক- -onek-, the child articulates- -অ-এ- -a-e- (slowly); -potato- -আলু- -alu-, the child articulates- -আ-এ- -aa-e- (slowly). On observation, all the children had articulation disorder when they tried to articulate vowel words (during articulation of vowel words, the findings were, the vowel words were changed to semi-vowel, glide like semi-vowel or consonant like vowel).

How can your child articulate the following words (semi-vowel)? (-আপনার শিশু নিম্নোক্ত শব্দগুলো (অর্ধ-স্বরধ্বনি) কিভাবে বলে?- -apnar shishu nimnokto shobdogulo (ordho-shorodhoni) ki vabe bole?-). -leg of something- -পায়া- -paya-, the child articulates- -পা-আ- -pa-a- (slowly); -sweet rice ball- -মোয়া- -moa-, the child articulates- -মো-আ- -mo-a- (slowly); -piu is a girl name with meaning beloved- -পিউ- -piu-, the child articulates- -পি-উ- -pi-u- (slowly). On observation, all the children had deep thong articulation changed to mono thong in case of semi-vowel articulation.

How can your child articulate the following alphabets? (আপনার শিশু নিম্নোক্ত বর্ণধ্বনিগুলো কিভাবে বলে?) (-প- -pa-, -চ- -cha-, -ব- -ba-, -ই- -e-, -স- -sa-, -ঝ- -jha-, -জ- -ja-, -ত- -ta-). On observation, all the children had problem to articulate initial stop phoneme.

How can your child articulate the following words? (আপনার শিশু নিম্নোক্ত শব্দগুলো কিভাবে বলে?) (-leaf- -পাতা- -pata (with soft t)-, the child articulates- -পাটা- -pata (with not soft t)-; -crow- -কাক- -kak-, the child articulates- -আক- -ak-; -net- -জাল- -jal-, the child articulates- -আল- -al-). On observation, all the children had articulation disorder, especially substitution of dental -ত- -ta (with soft t)- by alveolar -ট- -ta-. Deletion of consonant to vowel initial position of word was found. On the other hand, -give- -দান- -dan-, the child articulates- -দা- -da-; -good- -ভালো- -valo-, the child articulates- -ভা- -va-; -no relation- -পর- -por-, the child articulates- -প- -pa-. On observation, all the children had articulation

disorder. Deletion in the final position was found.

Discussion

The objective of the study was to look into the language problems in Bangladeshi children with CP on the basis of neurolinguistic approach and was conducted during the period of April 2014 to December 2014 at the Department of Linguistics, University of Dhaka. In this study, the mean±SD age of the children with CP was 8.9±4.8 years. Other studies reported a group of children with mean±SD age at assessment 5.4±0.5 years, ranged 3-6.5 years, and also a group with mean age of 3.8 years ranged from 1 to 7.6 years (9 children were seen at <1.9 years).¹²⁻¹⁴ It was a male predominant study. In two studies, the authors reported children with CP were male 61.9% and 49.0% respectively.^{12,13} Regarding the birth history of CP children, it was observed in this study that history of prolonged labour was found in all cases, no history of preterm delivery was 80.0% and home attained by untrained birth attendants was 70.0%. History of delayed crying at birth was found in 70.0%. Most (90.0%) of the parent of CP children mentioned that their children omitted any letter (phoneme) when they tried to articulate any word.

It is noteworthy and a concern that only a few children in this study were established talkers who appeared to be developing speech and language skills that were roughly commensurate with age expectations. Conversely, 85% of the children in this study showed clear evidence of a clinical speech and/ or language delay at 2 years of age. The previous work of the investigators on a similar group of children indicates that by 4.5 years of age, 75.0% of children had evidence of a clinical speech and/ or language impairment.¹⁸ Taken together with their previous work, it appears that approximately 10.0% of the children with CP may outgrow speech/ language problems later in the preschool years. However, it is unclear whether these children catch-up on their own or any intervention leads to advancement in skill development that brings children in line with developmental expectations.¹⁹

Speech & language therapy typically begins shortly after a child is diagnosed with CP.

The role of the speech therapy is to help children speak clearly, communicate effectively & control the muscles involved in speaking. The first step of the speech therapist is to conduct a thorough assessment of a child's physical & cognitive functionary. This assessment will determine the nature of a child's speech and communication abilities, identify causative factors and determine the best approach to therapy. Speech intelligibility is a main problem for the people who have CP. The motor disorder which characterizes CP can affect the function of the muscles involved in the production of speech. Under the speech articulator disabilities, there are CP, hyperkinetic dysarthria, Parkinson's disease and multiple sclerosis.

In general, most children CP patients have less articulator precision. Simple 'steady-state' phonemes like vowels are the easiest to produce since they do not require dynamic movement of the articulator structures. In contrast, phonetic transitions such as consonants are the most difficult to produce since they require fine motor control. Fine motor control is used to precisely move the articulators. Usually, mildly impaired and also impaired speakers differ in degree of disability rather than the quality. It is most prominently characterized by disruption in the speech prosody.²⁰ When a child has an articulation disorder, he or she has difficulty in making certain sounds. These sounds may be left off, added, changed or distorted making it hard for people to understand the child. Of course, leaving out or changing certain sounds is common when young children are learning to talk. A good example of this is saying 'wabbit' for 'rabbit'.

The incorrect articulation is not necessarily a cause for concern unless it continues in the age where children are expected to produce such sound correctly. It is not that the muscles of tongue, lips, and jaw are weak. The difficulty lies in the brain and how it communicates to the muscles involved in producing speech. Speech disorders which refers to impairment in the articulation of speech sounds, fluency and voice as well as language disorders consequently to impair-

ments in the use of the spoken (or signed or written) system and may involve the form of language (grammar & phonology), the content of language (semantics) & the function of language (pragmatics). These may also be described more generally as communication disorders which are typically classified by their impact on a child's receptive skills (with the ability to understand what is said or to decode, integrate, and organize what is heard) and expressive skills (with the ability to articulate sounds, to use appropriate rate & rhythm during speech, to exhibit appropriate vocal tone and resonance and to use sounds, words and sentences in meaningful contexts).

Language has an importance with meanings, rather than sounds. A language disorder refers to an impaired ability to understand and/or use words in context. A child may have an expressive language disorder (difficulty in expressing ideas or needs), a receptive language disorder (difficulty in understanding what others are saying) or a mixed language disorder (which involves both).

Conclusion

In case of history of delayed crying at birth in the CP children, phoneme omission commonly occurred when the children tried to articulate any word understand others speech. When CP children tried to articulate vowel, it was observed that alveolar was substituted by velaric, on glide deep thong end deletion. To the best of knowledge, this was the first study done on the neurolinguistic approach in Bangladeshi children, but the limitation of the study were that it was with small sample size, city based and short duration. Therefore, generalization of the results would be difficult. Further studies using larger sample would be better to visualize the extent of the issue in order to insert the children with CP in their social context and to give them quality of life.

References

1. Straub K, Obrzut JE. Effects of cerebral palsy on neuropsychological function. *J Dev Phys Disabil* 2009;21:153-67.
2. Pennington L, Goldbart J, Marshall J.

- Direct speech and language therapy for children with cerebral palsy: findings from a systematic review. *Dev Med Child Neurol* 2005;47:57-63.
3. Pirila S, van der Meere J, Korhonen P, et al. A retrospective neurocognitive study in children with spastic diplegia. *Dev Neuropsychol* 2004;26(3):679-90.
 4. Sigurdardottir S, Eiriksdottir A, Gunnarsdottir E, Meintema M, Arnadottir U, Vik T. Cognitive profile in young Icelandic children with cerebral palsy. *Dev Med Child Neurol* 2008;50:357-62.
 5. Lidzba K, Staudt M, Wilke M, Krageloh-Mann I. Visuospatial deficits in patients with early left-hemispheric lesions and functional reorganization of language: consequence of lesion or reorganization? *Neuropsychologia* 2006;44:1088-94.
 6. Colver AF, Gibson M, Hey EN, Jarvis SN, Mackie PC, Richmond S. Increasing rates of cerebral palsy across the severity spectrum in north-east England 1964-1993. *Arch Dis Child Fetal Neonatal Ed* 2000;83(1):7-12.
 7. Yeargin-Allsopp M, Van Naarden BK, Doernberg NS, Benedict RE, Kirby RS, Durkin MS. Prevalence of cerebral palsy in 8-year-old children in three areas of the United States in 2002: a multisite collaboration. *Pediatrics* 2008;121(3):547-54.
 8. Himmelmann K, Hagberg G, Uvebrant P. The changing panorama of cerebral palsy in Sweden. X. Prevalence and origin in the birth-year period 1999-2002. *Acta Pædiatrica* 2010;99(9):1337-43.
 9. Platt MJ, Cans C, Johnson A, et al. Trends in cerebral palsy among infants of very low birth weight (<1500 g) or born prematurely (<32 weeks) in 16 European centres: a database study. *Lancet* 2007;369:43-50.
 10. Parkes J, Hill N, Platt MJ, Donnelly C. Oromotor dysfunction and communication impairments in children with cerebral palsy: a register study. *Dev Med Child Neurol* 2010;52:1113-9.
 11. Kennes J, Rosenbaum P, Hanna SE, et al. Health-status of school aged children with cerebral palsy: information from a population-based sample. *Dev Med Child Neurol* 2002;44:240-7.
 12. Bax M, Tydeman C, Flodmark O. Clinical and MRI correlates of cerebral palsy. The European Cerebral Palsy Study. *JAMA* 2006;296:1602-8.
 13. Sigurdardottir S, Vik T. Speech, expressive language, and verbal cognition of preschool children with cerebral palsy in Iceland. *Dev Med Child Neurol* 2011;53(1):74-80.
 14. Hustad KC, Gorton K, Lee J. Classification of speech and language profiles in 4-year-old children with cerebral palsy: a prospective preliminary study. *J Speech Lang Hear Res* 2010;53(6):1496-513.
 15. Sevcik RA, Ronski MA, Adamson LB. Research directions in augmentative and alternative communication for preschool children. *Disab Rehab* 2004;26:1323-9.
 16. Light JC, Drager KD. AAC technologies for young children with complex communication needs: state of the science and future research directions. *Augment Altern Commu* 2007;23(3):204-16.
 17. Statistical Package for Social Sciences (SPSS) version 16 for Windows. Chicago: SPSS; 2008.
 18. Ferdous F, Monte-Serrat DM, Chisty MMR, Alam MF. A fourth-generation methodological practice on a study of speech dysfunction of children with cerebral palsy. *International Journal of Perceptions in Public Health* 2017;2(1):11-23.
 19. Hustad KC, Allison K, Mcfadd E, Riehle K. Speech and language development in 2-year-old children with cerebral palsy. *Dev Neurorehabil* 2014;17(3):167-75.
 20. Darley FL, Aronson AE, Brown JR. Clusters of deviant speech dimensions in the dysarthrias. *J Speech Hear Res* 1969;12(3):462-96.

Suggestion for citation of the above:

Ferdous F, Alam MF, Chisty MMR, Ali JI, Rahman NMW. The nature of language problem in Bangladeshi children with cerebral palsy: an observation using neurolinguistic approach. Mediscope 2018;5(1):22-7.