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Outcomes of Intervention in Children with Language Difficulties in Bangladesh

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ABSTRACT

Background: Both clinical audits within hospitals, and population-based surveys of childhood disability in Bangladesh, have shown that large numbers of children have speech and language difficulties. This study determined the improvement of language skills of children presenting with difficulties to the Speech, Language and Communication (SLC) clinic of the Child Development Center (CDC) in Dhaka Shishu (Children) Hospital (DSH).

Methodology: This is a retrospective study where records of children enrolled from April 2009 to March 2014, who had visited the SLC Clinic at least 3 times over a span of 6 months were analyzed. Preverbal language skills, comprehension, and expressive language levels were measured informally based upon play and interactive sessions and observation of function. Interventions involved training parents on informal intervention techniques following some international standard guidelines. Pre and post-intervention observations on preverbal, comprehensive, and expressive language skills were recorded to determine outcomes.

Results: Of the 706 enrolled children 11.0%, 79.2%, 9.5%, .3% were 0-<2 years, 2-<5 years, >5-9 and 10-16 years old, respectively. 69.5% of children were males. Preverbal skills (attention span, awaiting, eye contact, attention sharing, turn-taking, copying), comprehension, and expressive language status showed significant improvement between the first and last visit (p= 0.000)

Conclusions: Interactive play, music, books, etc. are important means of improving communication between parents and children. Professionals working with developmentally delayed children need to be trained to utilize these strategies, with the provision of appropriate facilities within clinical settings. A large majority of children can be assisted to overcome delays and optimize their potential.

Keywords: Clinical Audits, Speech Difficulties, Language Disorders, Preverbal Language, Language Comprehension, Expressive Language

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INTRODUCTION

The ability to learn a language and communicate accurately and fluently is a highly valued skill in any society. Most children learn to read and communicate without great difficulty. However, each year a portion of children experience significant problems learning to read (Snow et al., 1998). Reading is a language-based skill, and thus, deficits in language development can negatively affect reading achievement. In early studies, children with a history of language

difficulty (LD) were located later in childhood or adulthood and their academic achievement at that time was compared to their earlier speech-language abilities, as indicated in clinical records (Aram et al., 1984; Hall and Tomblin, 1978; King et al., 1982). More recently, longitudinal prospective studies have identified children with LD in early years and have investigated their developments (Beitchman et al., 1996; Naucler and Magnusson, 1998; Menyuk et al., 1991). In a population-based survey in Bangladesh the prevalence of expressive language impairment was 56/1000*.

**Survey of Autism and Neurodevelopmental Disorders in Bangladesh. The survey was conducted by Non Communicable Diseases Control (NCDC), Director General of Health Services (DGHS), MOHFW, Bangladesh.*

Very few institutes provide intervention for language impaired children in Bangladesh. A substantial number of children are deprived of formal and/or informal intervention to optimize their language skill. The Speech, Language and Communication (SLC) clinic was established in 2007 in the Child Development Center (CDC), Dhaka Shishu (Children) Hospital (DSH) to provide specific intervention to children with the aim of developing their language skills. Immediate before establishment of SLC clinic, three developmental therapists of DSH were trained on intervention programs in the Great Ormond Street Hospital for Children, London, UK. Their clinical work was reinforced by several visits of experts from GOSH to DSH in subsequent years. LDs are on the rise. A clinical audit in the outpatient department of the Child Developmental Centre (CDC), Department of Pediatric Neuroscience, and Dhaka Shishu (Children) Hospital (DSH) in the years 1991 to 2000 observed that 36% of children presented with speech and language difficulties. Whereas this percentage rose to 56% in the years 2001 to 2006 (figure 1) (CDC Report, 2007).

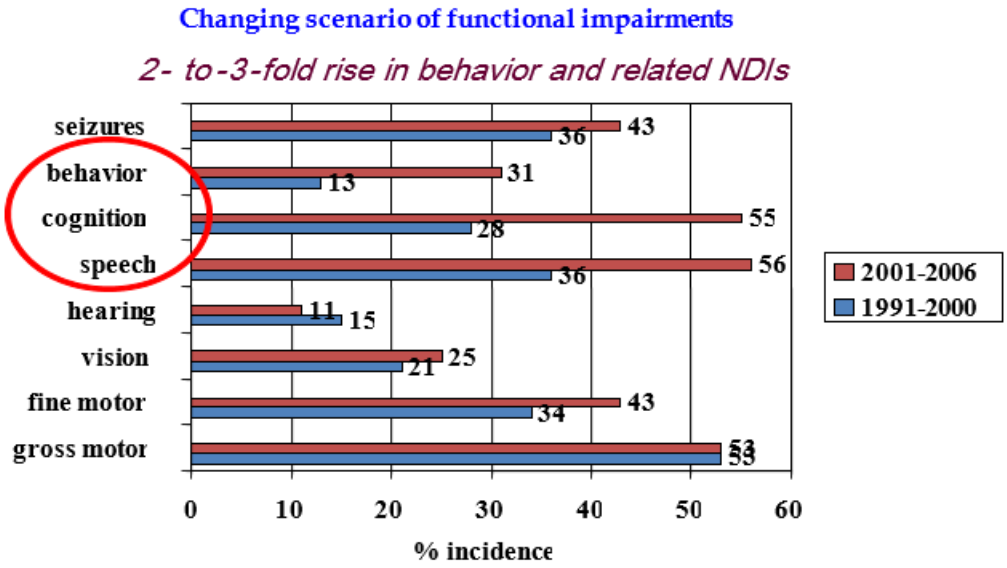

Figure 1: Child Development center, Dhaka Shishu (Children) Hospital, Report, 2007

This study determined improvements among children with LDs who had attended the Speech Language and Communication (SLC) Clinic and provided appropriate interventions in several sessions.

METHODOLOGY

This was a retrospective study carried out for a period of April, 2009 to November, 2014 where children were enrolled from SLC clinic, CDC, DSH**.** The inclusion criteria were (1) those who presented with speech and/or language difficulties (2) who had attended the SLC clinic for at least 3 follow-up sessions after 1st contact, over a minimum period of 3 months. (3) Parents had been trained on informal intervention techniques following some international standard guidelines (Cooke & Williams, 1985). Exclusion criterion included children with pervasive developmental disorders, eg/ Autism Spectrum Disorders. SLC clinic was conducted by Developmental Therapists, ie, generic therapists trained in speech language and communication; occupational; physio therapy, within a developmental framework. All were Masters in Home Economics with Child Development as their main subject.

Each child was provided with a one-on-one intervention session for a minimum period of 30 minutes. A SLC form was used to collect information in detail about children focusing on complaints, birth history, milestone of development , feeding history (food consistency, time taken for feeding/eating), hearing, oro motor function (drooling, chewing, swallowing, tongue movement, tongue protrusion, blowing, rinsing of mouth), use of non-verbal gestures to communicate. The following areas were assessed through informal sessions: attention span, awaiting, eye contact, turn taking, and copying were assessed using activities such as action rhymes, songs, storytelling, interactive play, pretend play, imitative games. Responses of activities were observed. Outcome of each preverbal skill was measured based on

criteria (Appendix 1). Comprehension and expressive language were assessed following the sequence of language development described in a neurodevelopmental assessment tool (Khan et al., 2010; Khan et al., 2014; Khan et al., 2013). Outcome of comprehension was measured by comprehension of word label of spoken language and expressive language was measured by acquisition of word/phrase. Children aged > 2 years were advised to attend day care/regular school, or inclusive/special school considering their age and language skills.

Intervention was offered to children using activities in the following areas- attention span, eye contact, turn taking, awaiting, attention sharing, copying, comprehension and expressive language (Appendix 2). Children were re-tested at each session and outcome was recorded according to appendix 1. Preverbal skills (attention span, eye contact, turn taking, awaiting, attention sharing, copying) was considered improved if a child showed one step better than the previous level (Appendix 1). Comprehension and expressive language were considered improved when a child achieved advanced sequence of language development (Appendix 2).

Operational definitions of diagnoses

Language delay - when a child's language is developing in the right sequence, but at a slower rate (http://www.med.umich.edu/yourchild/topics/speech.htm).

Speech delay - slow development of speech. Immature way of pronouncing words (Barbara, 2013).

Phonological processes - are patterns of sound errors that typically developing children use to simplify speech as they are learning to talk (Barbara, 2013).

Expressive language disorder -

A. The scores obtained from standardized individually administered measures of expressive language development are substantially below those obtained from standardized measures of both nonverbal intellectual capacity and receptive language development. The disturbance may be manifested clinically by symptoms that include having a markedly limited vocabulary, making errors in tense, or having difficulty recalling words or producing sentences with developmentally appropriate length or complexity (American Psychiatric Association, 1994).
B. The difficulties with expressive language interfere with academic or occupational achievement or with social communication (American Psychiatric Association, 1994).
C. Criteria were not met for Mixed Receptive-Expressive Language Disorder or a Pervasive developmental Disorder[15].

Mixed Receptive-Expressive -

A. The scores obtained from a battery of standardized individually administered measures of both receptive and expressive language development are substantially below those obtained from standardized measures of nonverbal intellectual capacity. Symptoms include those for Expressive Language Disorder as well as difficulty understanding words, sentences, or specific types of words, such as spatial terms (American Psychiatric Association, 1994).
B. The difficulties with receptive and expressive language significantly interfere with academic or occupational achievement or with social communication (American Psychiatric Association, 1994).
C. Criteria are not met for a Pervasive developmental Disorder (American Psychiatric Association, 1994).

Dysarthria - Defect in the muscular control of the speech apparatus (lips, tongue, palate, or pharynx). Word may be nasal, slurre, onidistrnct. Causes: motor lesions of the central or peripheral nervous system, parkinsonism, and cerebellar disease.

Developmental verbal dyspraxia - Is an inability to utilize motor planning to perform movements necessary for speech during a child's language learning process (Morgan and Vogel, 2009).

Stammering or stuttering - Is a relatively common speech problem that can occur in childhood and persist into adulthood.

- Stammering is characterized by the repetition of sounds or syllables (such as saying 'mu-mu-mu-mummy'), prolonging sounds (mmmmmmummy) and pausing or 'blocking' (when a word gets stuck or doesn't come out at all.
- It usually occurs at the beginning of speech, and people will often avoid certain words or speaking situations to try to hide it.

Data analysis

Data was analyzed in SPSS program. Outcome was measured by cross tabulation of pre and post assessment findings.

RESULTS

706 children were assessed aged between 2 to 16 years. Significant number of children were between 2 to 5years (79.2%), among them 69.5% were males (Table 1). As described in table 1, the demographic information (parent's education and socio economic status) showed 9.1% children were from the lower income group and 31.2% were from the higher income group families. Regarding parent's education, 29.6% mothers were below SSC (Class 10) whereas fathers' education below SSC was 20.3%. Attendance of school was 34.4% in regular, 9.8% in inclusive school and special school was 3.4%. Attendance to day care center was 12.9% and 39.5% children did not attend any school.

In table 2, it was observed that significant improvement was achieved in the following areas: attention span (31.02%), eye contact (22.24%), turn taking (24.36%), waiting (29.32%), and attention sharing (34.14%), and copying (32.72%). Table 3 shows improvement of comprehension. Among children who had one-word comprehension level, 59.55% improved to two-word level and 3.97% improved to three-word level. 36.48% did not show improvement. Improvement from two-word level was 58.14% to three-word level; and 3.49% to four-word level. 31.4% remained same. 34.78% moved from three-words to four-word level; while 65.22% remained unchanged. Children whose comprehension level was for four words remained at the same level. Children who did not comprehend even one word showed improvement to one-word level in 66.84%; while 3.16% moved to two-word level. 30% did not improve.

Among total children 63.74% showed significant improvement (p-0.000). In Table 4, significant improvement in expressive language had been observed. Among children who vocalized one meaningful word, 60.6% improved to two-words phrases, 9.24 % improved to three-word phrases, while 30.43% showed no improvement. Children who had two words phrase, 44.44% improved to three-words phrases, 13.89% improved to four-word phrases, and 41.67% did not improved. Of the children who vocalized three-word phrases in the initial state, 60% improved to four-word phrases, while 40% remained unimproved. 10 children having four-word phrases in the initial assessment remained same in their post intervention status. Of the 190 children who did not vocalize any meaningful word initially 72% improved to one-word vocabulary, 9.82% to two-word phrases, 1% to three-word phrases, and 13.89% to four-word phrases. 16.36 % did not improve. Among total children 73.23% showed significant improvement (p-0.000). Table 5 described the diagnosis of speech and language difficulties. Major difficulties were found in comprehensive and expressive language delay (42.2%), comprehensive and expressive language disorder (31.6%) and dysarthia with language difficulties (22.1%).

Table 1: Demographic Information (N=706)

Child and family characteristics		%
Age of the child	0-<2 year	11.0
	>2-5year	79.2
	>5-9 year	9.5
	10-16 year	.3
	Total	100.0
Gender of the child	Male	69.5
	Female	30.5
	Total	100.0
Mothers' education	Primary or below	29.6
	SSC	22.9
	HSC	17.6
	Graduate	12.0
	Masters	17.8
	Total	100.0
Fathers' education	Primary or below	20.3
	SSC	16.4
	HSC	16.4
	Graduate	18.4
	Masters	28.5
	Total	100.0
Socio economic status	lower income	9.1
	Low Middle Income	30.5
	Middle	29.3
	Upper Income	31.2
	Total	100.0

Residence	Urban	72.1
	Urban rural	23.2
	Rural	4.7
	Total	100.0
Schooling of children	Regular school	34.4
	Inclusive	9.8
	Special	3.4
	Daycare center	12.9
	No schooling	39.5
	Total	100.0

Table 2: Pre and **Post** Intervention Status in Pre-Verbal Skills, ie, attention, eye contact, turn taking, waiting, attention sharing, and copying. (N=706)

Attention	Pre Intervent Status; number of children	%	Post Intervention Status; number of children	%	Improvement (%)	Chi-square
						P-value
Good	363	51.42	582	82.44	31.02%	.000
Fair	47	6.66	117	16.57	9.91%	
Very brief attention	278	39.38	6	0.85	-38.53%	
Never	18	2.55	1	0.14	-2.41%	
Eye contact						
almost always	498	70.54	655	92.78	22.24%	.000
Sometimes	29	4.11	18	2.55	-1.56%	
Poor	167	23.65	33	4.67	-18.98%	
Never	12	1.70	0	0.00	-1.7%	
Turn Taking						
Good	464	65.72	636	90.08	24.36%	.000
Sometimes	195	27.62	65	9.21	-18.41%	
Never	47	6.66	5	0.71	-5.95%	
Awaiting						
Good	422	59.77	629	89.09	29.32%	.000
Poor	225	31.87	73	10.34	-21.53%	
Never	59	8.36	4	0.57	-7.79%	
Attention sharing:						
Always	434	61.47	675	95.61	34.14%	.000
Sometimes	207	29.32	25	3.54	-25.78%	
Never	65	9.21	6	0.85	-8.36%	
Copying						
Good	439	62.18	670	94.90	32.72%	.000
Sometimes	180	25.50	32	4.53	-20.97%	
Never	87	12.32	4	0.57	-11.75%	

Table 3: Pre and Post Intervention Status in Levels of Comprehension (N=706)

Pre Intervention status; (number of children)	Post Intervention Status (%)					Total improvement (%)	p-value
	One word label (%)	Two words label (%)	Three word label (%)	Four word label (%)	None (%)		
One-Word (N=403)	36.48	59.55	3.97			63.74	0.000
Two-Word Phrases (N=80)		31.40	58.14	3.49			
Three-Word Phrases (N=23)			65.22	34.78			
Four-Word Phrases (N=10)				100			
None(N=190)	66.84	3.16			30		

Table 4: Pre and Post Intervention Status on Levels of Expressive Language (N=706)

Pre state; (number of children)	Post Intervention status (%)					Total improvement (%)	p-value
	One word phrase (%)	Two words phrase (%)	Three words phrase (%)	Four words phrase (%)	None (%)		
One-word phrase (N=403)	30.43	60.60	9.24	13.89		73.23	0.000
Two-word phrases(N=86)		41.67	44.44	60			
Three-word phrases (N=23)			40	100			
Four-word phrases (N=10)				0.73			
None(N=190)	72	9.82	1.09	13.89	16.36		

Table 5: Diagnosis of speech and language difficulties (N=706)

Diagnosis	%
Comprehensive & Expressive Language Delay	42.2
Expressive Language Disorder	.4
Comprehensive & Expressive Language Disorder	31.6
Speech delay	2.1
Developmental Verbal Dyspraxia	.8
Dysarthia with language difficulties	22.1
Stammering	.7
Total	100.0

DISCUSSION

In this study children's speech and language skills (comprehensive and expressive language) improved in significant proportions of enrolled subjects, along with improvement of attention, eye contact, turn taking, awaiting, sharing, and copying. Attention and socialization are two main precursors of language development (PLS 3) (Zimmerman et al., 1992). Most improvement of comprehension was found in shifting from one-word to two-word level (36.48 to 59.55 respectively). For expressive language, most improvement occurred from single words to two-word phrases (30.43 to 60.6 respectively). Due to unavailability of similar type of published study in Bangladesh, it was not possible to compare the study findings with others.

Many children had associated neurological co morbidities (e.g. cerebral palsy and seizures) which were not shown. 22.1% children had dysarthria, a speech disorder involving abnormal strength, speed, and accuracy of movement of the speech system (Hustad et al., 2010; Pennington et al., 2013), who also had poor oromotor functions. Of these children 35% had cerebral palsy. Most of the children were urban resident (72.1%). In a population based Survey of Autism and Neurodevelopmental Disorders in Bangladesh in 2013 26% urban children had language impairment (expressive language) compared to 18% rural children (Khan et al., 2010). In the same study 31.2% of children belonged to upper income familyand a large proportion of children with expressive language impairment belonged to highest Wealth Quintile[5].The socio-demographic factors related to language development in rapidly urbanizing communities needs to be explored in the Bangladesh context.

Limitations

Factors responsible for limitation include (a) children were not assessed by a formal language scale, (b) Structural problems (rules of grammar) were not assessed due to lack of formal assessment tools validated for Bangladesh, (c) Intellectual function was not measured by standardized tools and (d) limited non-verbal intelligence was assessed by age appropriate activities informally and these findings were not mentioned in this study.

CONCLUSIONS

Practitioners and researchers are becoming increasingly interested in the early identification of speech and language disabilities (Snow et al., 1998; Scarborough, 1998). Research demonstrating the long-term stability of language problems has led to an emphasis on early intervention (Morgan and Vogel, 2009). To provide such intervention, at risk

children need to be identified as early as possible. Our results indicated that the presence of language impairment should be taken as an important sign of risk for language disabilities. Thus, these children should be candidates for special attention on early intervention, whether that attention is provided through inclusive/special education resources or through the regular education system. Professionals working with children with LD should ensure that these children are identified as at risk and that they receive appropriate early intervention services. Interactive play, music, books etc. are important means of improving communication of children. Professionals working with language delayed children need to be trained on appropriate intervention to optimize their potential. Formal language assessment scales need to be developed which can be scaled up for use by professionals across Bangladesh.

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Appendix 1: Assessment Form

Area	Grading of observed functions
Attention span	• Good: Attentive to almost full rhyme or story=1 • Fair: Attentive sometime=2 • Poor: Very brief attention=3 • Never: No attentive at all =4
Eye contact:	• Almost always: Present and sustained=1 • Sometimes: Infrequently present, not sustainable=2 • Poor: Very seldom=3 • Never=4
Attention sharing:	• Always: look at all 3 objects When request=1 • Sometimes: At least look at one object=2 • Never=3
Take a turn:	• Good: always participate in the play by take a turn=1 • Sometimes: take one or two turns=2 • Never=3
Copying:	• Good: Imitate almost all actions attempted=1 • Sometimes: copy one or two actions attempted=2 • Never=3
waiting:	• Good: wait till self turn=1 • Poor: wait sometime=2 • Never: Did not wait =3
Comprehension	• Outcome was measured by acquisition of word label
Expressive	• Outcome was measured by acquisition of word/phrase

Appendix 2: Areas of Intervention

Area	• Activities applied for stimulation
Attention span	• Action rhymes and story had been told to the child[2]. 1:1 was applied.
Eye contact:	• Action rhymes and songs had been told to the children[4]. • Interactive play[2] (e.g. peek a boo, tickle, rocking boat, play with a ball etc)
Attention sharing:	• Always: look at all 3 objects When request=1 • Sometimes: At least look at one object=2 • Never=3
Take a turn:	• Turn taking play with a ball, car • Pretend play[2] (making tea) • Peek a boo game[2]
Copying:	• Action rhymes • Pat a cake • Jumping
Awaiting:	• Activities; A magic bag containing few toys was given to the child and asks to take a toy out of the bag in turn. Then a rhyme was recited related to the toy.
Comprehension	• One word label (Food. Toys. Clothing's, everyday objects, Animals, Body parts, transport, Relatives. • Two words phrase • Three words phrase • Four words phrase
Expressive	• One word label (food. toys. clothing's, everyday objects, animals, body parts, transport and relatives). • Two words together • Three words together (sentence) • Four words to together (sentence)

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