

Phonological Process of 4-5 Years Old Typically Developing Bangla Speaking Children

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**In partial fulfillment of the requirements for the degree of
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Declaration

I am Sumaia Afrin; want to confirm that any single discussion of my research project will not be harmful to other. All the sources used in this study have been cited correctly. All errors or inaccuracies are my own.

Signature & Date

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Dedication

Dedicated To.....
.....My Honorable Parents and all Family Members

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Glossary

CLAP: Cleft Lip and Palate

HL: Hearing Loss

IPA: International Phonetic Alphabet

NIDCD: National Institute on Deafness and other Communication Disorder

PD: Phonological Disorder

PP: Phonological Process

PPs: Phonological Processes

SAHIC: Social Assistance for Hearing Impaired Children, Bangladesh

SLT: Speech and Language Therapy

SLTs: Speech and Language Therapists

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Executive Summary

Title: “Phonological process of 4-5 years old typically developing Bangla speaking children”.

Purpose: The purpose of this study is to identify the patterns of phonological process of 4-5 years old typically developing Bangla speaking children.

Method: Considering the aim and objectives of the study investigator used cross sectional design. The sample for this study was selected by using purposive sampling method. Data was collected by “phonological process checklist” that was developed by the investigator. Data was collected from different schools at Savar Upazilla where 51 typically (4-5 years) developing Bangla speaking children were participated. Data was analyzed using descriptive statistical analysis method using SPSS software.

Result: Investigator found that 13 phonological processes are seen within 4-5 years old typically developing Bangla speaking children. These processes are initial cluster reduction, medial cluster reduction, final cluster reduction, weak syllable deletion, final consonant deletion, velar fronting, alveolar fronting, stopping fricative, backing, depalatalization, gliding of liquids, consonant assimilation and insertion schwa between cluster two consonants.

Conclusion: Phonological process of Bangla speaking children is different than other country at the age of 4-5 years. This study will be helpful for clinical speech and language therapist for setting goal and identify the patterns of phonological process of Bangla speaking children.

Key words: Phonological Process , Typically Developing.

1.1 Introduction

The persons with disabilities percentage share of different types of impairments are hearing 18.6%, visual 32.2%, speech 3.9%, physical 27.8%, intellectual 6.7% and multiple 10.7% (Titumir & Hossain, 2005). Recent prevalence of children with speech problem is 16.3/1000 in Bangladesh (Tabib, 2009). Speech production is a vehicle for carrying language. Language is generally considered to consist of five sets of rules: pragmatics, semantics, morphology, syntax and phonology (Nancy, Parley & Wayne, 1989). Phonological processes are the patterns that young children use to simplify adult speech. All children use these processes while their speech and language are developing and as they mature, they stop using these patterns to simplify words (Ranjan, 2009). Phonological disorder is one kind of parts of whole communication disorder (Bleile, 2004). Speech and Language Therapist assess and treat children with communication disorders (Shipley & McAfee, 2004). SLTs should have knowledge about normal phonological process development of Bangla speaking children for assessing and treating children with phonological disorders.

Phonological processes are very important for oral language and literacy development. Phonological skills include phonological awareness, phonological memory, and rapid naming. Phonological processing skills are referred to as the decoding component of reading. These skills as well as comprehension are essential for reading success (Shipley & McAfee, 2004).

Phonological processes are classified into ten types. They are context sensitive voicing, word final devoicing, final consonant deletion, velar fronting, palatal fronting, consonant harmony, weak syllable deletion, cluster reduction, gliding of liquids and stopping (Bowen, 1999). Different phonological processes disappear at different age. According to Bowen (1999) some phonological processes (Gliding, Stopping, Cluster Reduction, and Weak Syllable Deletion) disappear within 4-5 years of age. According to Shipley & McAfee (2004) seven phonological processes (cluster reduction, epenthesis, gliding of liquids, vocalization, stopping, depalatalization and word final devoicing) exist after age three.

According to Anam (1996) in Bangla language these are many phonological processes (word final devoicing, backing of alveolar sound, consonant assimilation, initial and final cluster

reduction, gliding of liquids, palate-alveolar fronting, alveolar fronting, and velar fronting) disappear before and after 3 years of age and these process can be seen after 4 years of age (Chowdhury, 2011). The purpose of this study was to find out the patterns of phonological process of 4-5 years Bangla speaking children. This information would develop SLT's understanding of child phonology by adding to body of knowledge regarding the appearance, productive duration and disappearance of phonological processes in the critical preschool period.

1.2 Background and Literature Review

Speech is the most frequently used vehicle for communication. Approximately 5%-10% people have some type of communication disorder involving speech, language and hearing (Nancy, Parley & Wayne, 1989). The term phonological processes used to describe regularities in children's errors when dealing with the process of learning the phonological rule. They are the reflection of the individual process each child uses to develop phonological rules (Nancy, Parley & Wayne, 1989).

A universal group of articulator simplifications that children learn to speak and apply to the new words they listen and normal speech errors are known as phonological processes (Bou, 2008). Phonological development implies the acquisition of a sound system intricately connected to the child's overall growth in language. Phonological processes are the variations in the way phonemes are combined (Nancy, Parley & Wayne, 1989). The articulatory and phonological development range from the babbling stage of a child's so called pre-linguistic development to the near completion of the child's phonological system during the early school years (Bailoor, Rai & Krishnam, 2014). Processes that commonly develop in normal children across language are called natural processes. Processes that never occur or occur rarely in normal child phonology are called unusual processes. Phonological processes provide a means for describing but not explaining the error patterns evident in young children's speech (Bailoor, Rai & Krishnam, 2014).

Phonological processing is an auditory processing skill. It relates to words, but occurs in the absence of print. It involves detecting and discriminating differences in phonemes or speech sounds under conditions of little or no distraction or distortion (Nancy, Parley & Wayne, 1989).

Phonological disorder is characterized by a static speech sound system, variability without gradual improvement, persisting phonological processes, chronological mismatch, idiosyncratic rules, restricted use of contrast (Bowen, 2011).

There are many school-aged children who have articulation problem; some children have difficulty with one sound, while others have difficulty with a whole group of sounds (Tabib, 2009). By age 5, the majority of children stop using phonological processes and their speech sounds more like the adult speech. As children stop using phonological processes, their speech becomes more understandable. This allows them to become better communicators and it's called intelligibility. When children continue to apply these processes or patterns to their speech and learn new words at the same time, their speech can become very difficult to understand (Ranjan, 2009). Some children do not stop using these processes and develop phonological disorder (Robyn, 2001).

According to Bleile (2004) 92% of clinician treats clients with articulation and phonological disorders among their all clients. The sound system of a language involves suppressing a number of innate simplifying processes. As these processes are eliminated, the child develops an increased number of contrasts and eventually acquires the full set of sounds of the adult model. A number of authors have described the phonological processes that characterize child speech (Nancy, Parley & Wayne, 1989).

Different phonological processes disappear in different time like- liquid gliding disappear within 4; 06 years, fronting within 4; 06 years, stopping within 5; 00 years, weak syllable deletion within 4; 00 years, final consonant deletion within 4; 06 years, deaffrication within 5; 00 years and cluster reduction within 4; 00-5; 00 years (Dodd, Holm, Hua & Crosbie, 2003). Phonological processes that persisted in 4 to 5 years old children are cluster reduction, final consonant deletion and strident deletion. The phonological processes which decreased as age advanced from 3 to 5 years are diphthong reduction, vowel change, initial consonant deletion, backing of vowel, deaffrication, assimilation, fronting and gliding. The phonological processes which disappear by 4 to 5 years of age are apicalization and diminution. The phonological processes which observed at only 4-5 years of age are stops replacing glide, affrication and assimilation (Ranjan,

2009). Some authors also reported that different phonological processes disappear in different times and a table is given below with authors on previous study and present study:

Table-1: Previous Study and Present Study

Authors	Haelsig & Madison (1986)	Roberts, Burchinal & Footo (1990)	Present study
Age Range	2;10-5;02	2;06-8;11	4;00-5;00
Phonological process			
Liquid gliding	4;06	5;00	>5;00
Backing	4;06	3;06	4;00-5;00
Stopping	5;00	3;00	>5;00
Weak syllable deletion	5;00	< 2;06	<5;00
Cluster reduction	5;00	7;00	>5;00
Final consonant deletion	4;06	< 2;06	<5;00

(Phoon, 2010)

The advantage of using phonological processes approach to speech therapy is that through this approach SLT can identify patterns of phonological process and can target those patterns to resolve more than one sound at a time, for example if a child shows “final consonant deletion” pattern then SLT may choose to target all final consonants in general for therapy rather than choosing less number of sounds in the final position. About 3 % of pre-school children and 2% children age 6-7 have phonological disorder (Shipley & McAfee, 2004). Phonological disorder is among the most prevalent speech disorders, affecting approximately 10% of the preschool and school age population. This disorder is more common in girls than boys (Phoon, 2010). Phonological disorders are related to hearing loss, cleft lip or palate, cerebral palsy (CP) and others (Shipley and McAfee, 2004). To serve these large numbers of children SLTs need knowledge about the development of phonological process in typically developed children.

There is relationship between phonological disorders and language impairment including-expressive language, word finding difficulty, reading disorders (Amayreh, 2003). Evidence indicates that children with speech sound disorders have difficulty with other phonological task later reading difficulties and spelling difficulties (Bax, Hart & Jenkins, 1980). 32% of all communication disorders are articulation and phonological disorders (Bleile, 2004).

A study was conducted in Bangladesh on 2;0-4;0 years of typically developing Bangla speaking children and the investigator found that some phonological processes (word final devoicing, backing of alveolar sound, consonant assimilation, initial and final cluster reduction, gliding of liquids, palate-alveolar fronting, alveolar fronting, velar fronting) seen after 4 years of age in Bangla speaking children (Chowdhury, 2011).

A study was conducted in England on English-speaking children they reported that girls are generally thought to perform better than boys in phonological development. McCormack and Knighton (1996) reported that 2.5 year old girls had more accurate phonological output than boys, they found that gender accounted for approximately only 1% of the variance in language acquisition. The only exception was in the area of speech production, where girls were observed to perform better than boys (Dodd, Holm, Hua & Crosbie, 2003).

According to Bowen (1998) all phonological processes disappear within 5 years of age. Already a study was conducted on development of phonological process within 2-4 years of Bangla speaking children. So people of Bangladesh and clinical SLTs known development patterns of phonological process of 2;0-4;0 years of Bangla speaking children.

1.3 Rationale of the Study

In Bangladesh all clinical speech and language therapist use English language based age normative data to identify the patterns of phonological processes during assessment and treatment for Bangla speaking children because typical phonological process is unknown in Bangladesh. As children learn differently in different languages and their learning environment varies from culture to culture, they learn different sounds or words in various times according to their needs in the context. For that reason their expected performance also varies from 1 another in the different speech and language skills. Age of typical phonological acquisition is necessary for specific language. In Bangladesh, currently there is no data available on phonological process development of 4;0-5;0 years of Bangla speaking children. Investigator conducted this study to identify the phonological process of 4;0-5;0 years old typically developing Bangla speaking children and it would help the local SLTs to identify either it is a speech or phonological difficulties or typical phonological process. This study would help to identify the different phonological performance among children from Bangladesh and other country. After assessment SLTs will be able to set SMART goal based on the Bangla phonological process development for 4;0-5;0 years children with phonological disorder in Bangladesh.

1.4 Operational Definition

Key word: Phonological Processes, Typically Developing.

Phonological Process:

Phonological processes are techniques used by children to simplify speech when trying to produce the adult model and it is systematic changes in sound, sound classes simplifications, sound sequences simplifications or simplification in syllable structure (Bou, 2008). In this study through “phonological process” investigator wanted to mention that phonological process disappeared within 4;0-5;0 years old Bangla speaking children according to English language based age normative data or not.

Typically Developing:

In this study, through “typically development” the investigator wanted to mention that according to child’s age phonological process is typically developed or not within 4;0-5;0 years old Bangla speaking children.

1.5 Aim and Objectives**Aim**

The aim of the study is to identify the patterns of phonological processes of 4-5 years old typically developing Bangla speaking children.

Objectives

- To identify the phonological processes among 4;0-4;6 years and 4;7-5;0 years old typically developing Bangla speaking children.
- To find out the comparison between 4-5 years old boys and girl’s phonological performance of typically developing Bangla speaking children.

2.1 Study Design

The investigator used cross sectional study design to conduct the study. Cross-sectional design is one of the most commonly used research design (Shaughnessy, Zechmeister and Zechmeister, 2003). Cross sectional design gives information and idea about a large population from a smaller sample and this design provides quantitative & qualitative information on the current status of a particular situation (Bailey, 1997). Cross sectional design is cheaper and quicker than other methods (Hicks, 2000). Cross-sectional study design is a descriptive analytical design study that obtains the health and disease profile of a resident population of an area, they also added that cross-sectional represents a snap-shot view of the frequency and distribution of disease in a community (Dharr and Robbani, 2006). The main aim of this study was to identify the patterns of phonological processes of 4-5 years old typically developing Bangla speaking children and sample size was 51. The design was particularly appropriate for this study because the findings from 51 children regarding phonological process represented of a large group of children in Savar and there were 2 age groups to identify the patterns of phonological process in different ages.

2.2 Study Settings

The investigator selected three schools at Savar Upazilla. These were William and Marie Tailor School, Radio Colony Model School and Chapain New Model High School. Investigator selected these schools because investigator got available children from these schools.

2.3 Study Population

The investigator selected 4-5 years old typically developing Bangla speaking children as population of this study to investigate the phonological process of (4;0-4;6 and 4;7-5;0 years) this groups.

2.4 Participants of the study

According to Hicks (2000) usually it takes large number of sample for conducting a survey because a large sample is more likely to be representative of the population than a smaller one. Depoy and Gitlin (1998) suggested, a large sample is not always the best policy and is often inessential. Hicks (2000) point out that there is no easy way of establishing the standard size of sample since this decision mainly depends on the investigator. Sample size depends on data collection techniques, procedures of recruitment and the costs of conducting the study (Depoy & Gitlin, 1998). Investigator took 51 children of 4;0-5;0 years old typically developing Bangla speaking children to conduct the study and the children were divided into two different groups (4;0-4;6 and 4;7-5;0 years).

2.5 Sampling Technique

Investigator used purposive sampling method to select the participants of the study because this is one of the easiest, cheapest and quickest methods of sample selection (Bailey, 1997). It is a judgmental sampling process where individuals are selected purposely based on the study (Depoy & Gitlin, 1998).

2.6 Inclusion Criteria

- i. Age range was between 4-5 years.
- ii. Typically developing Bangla speaking school going children were included.
- iii. The child and his/her parent's first language was Bangla.
- iv. Hearing and visual skill was within normal limit.
- v. No other disabilities detected.
- vi. Children had no immediate family members with disability.
- vii. Children who had no illness on the date of data collection.

2.7 Exclusion Criteria

- i. The child who did not respond for first fifteen minutes and not motivate to involve himself/ herself in the task then he / she was excluded.

2.8 Reason for Inclusion and Exclusion Criteria

Bowen (1998) reported that children under 3 years develop intelligibly of their phonological pattern 50%-75%. Clinically 80% intelligibility is granted for typical development (Bleile, 1995). Moreover there are some phonological processes that normally disappear after 3 years. According to Bowen (1998), all phonological processes disappear within 5 years of age, and already a study was conducted on development of phonological process within 2-4 years of Bangla speaking children. That's why investigator took 4-5 years of Bangla speaking children. Any problem of hearing, vision, language and disability may affect 'normal language' development and any illness, demotivated and inattentive mind may affect children's performance (Anam, 1996).

2.9 Data Collection Procedure

Investigator used face to face interview technique for collecting the data. During data collection investigator assessed individual child in the quite room of the school. At that time child's mother were present in the room. Before starting assessment investigator mentioned about the activity and purpose of the study. Selected pictures [annexure-2] showed in-front of the child according to the target Bangla sounds and a tape recorder was used to record the child's response. When child did not respond and faced difficulty to identify the picture then investigator provided semantic cue to the child. Investigator transcribed each response in IPA according to the child's performance and the child got a score. There were two scoring system in the checklist; 0 for no error and 1 for error.

2.10 Data Collection Tool

Investigator used “Phonological Process Checklist” [annexure-1] for collecting data and this checklist was developed by the investigator with the help of supervisor, two clinical SLTs and supported a Linguists. As investigator did not get standard tool for assessing the phonological process of Bangla language, for that reason investigator developed a checklist for Bangla speaking children. In the checklist there were 39 words according to the context of Bangladesh and followed by the IPA chart of Bangla sound and field test. According to two clinical SLTs, investigator, linguists, supervisor’s decision 13 phonological processes were selected for collecting data according to context of Bangladesh and followed by the English language based age normative data. Investigator did little change in one process to facilitate the analysis task and the change was division of cluster reduction into three classifications (initial, medial and final). Only stopping of affricate and deaffrication was rejected from the list, because according to “IPA chart of Bangla sound” that was given by Haque (2002), there is no Bangla affricate sound in the chart. So there is no possibility to occur stopping of affricate and deaffrication in Bangla language. But investigator selected stopping fricative process because in “IPA chart of Bangla sound” there are some fricative sounds (e.g. /ʃ/, /s/, /z/). The “IPA chart of Bangla sound” is given below-

Table 2: IPA chart of Bangla sound

উচ্চারণের স্থান > উচ্চারণের রীতি v	Bilabial	Labio Dental	Dental	Alveolar	Palate- Alveolar	Velar	Glottal
Stop/plosive	p, p^h, b, b^h	f, ø^h	t, t^h, d, d^h	t, t^h, d, d^h	c, c^h, j, j^h	k, k^h, g, g^h	
Affricate							
Fricative	B			s, z	ʃ	x, ʁ	H
Nasal	M			N			
Lateral				L			
Trill				R			
Flap					ɾ	ɾ^h	
Glid	W				y		

So, followed by the English language development and considering to context of Bangladesh and field test investigator selected 13 phonological processes to conduct the study and these were-

1. Initial Cluster Reduction
2. Medial Cluster Reduction
3. Final Cluster Reduction
4. Weak Syllable Deletion
5. Final Consonant Deletion
6. Velar Fronting
7. Alveolar Fronting
8. Stopping Fricative
9. Backing
10. Depelatalization
11. Gliding of Liquids
12. Consonant Assimilation
13. Insertion of Schwa between Cluster of two Consonants

2.11 Pilot study

A pilot study is necessary to conduct before starting data collection because it helps the investigator to improve their data plans (Momin, 2003). This study is also necessary because it ensures whether the total procedure of the project is in right tract or not (Hicks, 2000). The pilot study suggests as a way to check on the feasibility of varies components of the project. It is a preliminary trial of the study, or a mini-study, and should be performed before the final study. Most of the steps in the final study should be included in the pilot study, but on a smaller scale. It provides an evaluation of the proposed process and may be used to remove flaws (Bailey, 1997). Investigator used this study because it gave an idea about the whole study and helped to modify the proposal if needed. Before conducting the final study, investigator conducted pilot study on 2-3 children who were not present in the final study. After continuing the pilot study, investigator found that all words were appropriate to elicit target phonological processes.

2.12 Data Analysis Process

Investigator used descriptive statistics technique for analyzing the collected data because it is good to give percentage for all the characteristics under the study so that the reader could understand of the subjects and variables (Bailey, 1997). The data analysis was done using statistical package for social science (SPSS) version 17 to reduce the impact of the missing value and increase the reliability of the analysis. According to Hicks (2000) descriptive statistics are commonly used to make sense of survey data. Bailey (1997) suggested that descriptive statistics are those that describe, organize, and summarize data. They include such things as frequencies, percentages. This procedure allow for the description of all the individual scores in a sample on one variable by using one or two numbers (Bailey, 1997). According to Bailey (1997) there are many useful ways to illustrate descriptive data, such as tables, charts and graphs.

2.13 Ethical Consideration

Essential parts of informed consent is describing the whole process to the participants and asking for permission to participate to ensure participation (Depoy & Gitlin, 1998). The investigator maintained ethical consideration in all aspect of the study. Investigator took permission from the approval committee of department of speech and language therapy and obtained permission from Bangladesh Health Professions Institute (BHPI) an academic institute of CRP to conduct the research project. After getting permission from academy investigator took letter and gave to the principal of selected schools. After getting all permission from supervisor, school and parents investigator selected 51 children as participants. During data collection Bangla consent form gave to the selected child's mother and also took signature of a witness. All parents were informed about aim and objective of the study. Investigator confirmed that confidentiality must be maintained and their information would use in the study according to study needs. Investigator also confirmed that if they want then they can withdraw their child's name at any point of the study without any explanation and by this study they and their child would not be harmed.

3.1 Demographic Characteristics of the Participants

Table 3: Demographic information of the children

Age	Gender	Frequency	Percentage	Class level
4;00-4;06 years	Boys	7/16	43.75%	Play and nursery class
	Girls	9/16	56.25%	
4;07-5;00 years	Boys	18/35	51.43%	
	Girls	17/35	48.57%	

Table 3 demonstrates the demographic characteristics of the participants. It shows that among the 51 participants. There were 16 children in the age range of 4;0-4;6 years and 35 children in the group of 4;7-5;0 years. In the first age group there were 43.75% (7) boys and 56.25% (9) girls. On the other age group there were 51.43% (18) boys and 48.57% (17) girls.

3.2 Frequency statistics of each phonological process of 4;0-5;0 years

Table 4: Frequency statistics of each phonological process of 4;0-5;0 years

Phonological process	Frequency	Percentage of error	Percentage of no error
Initial cluster reduction	51	80.4%	19.6%
Medial cluster reduction	51	21.6%	78.4%
Final cluster reduction	51	96.1%	3.9%
Weak syllable deletion	51	27.4%	72.6%
Final consonant deletion	51	19.6%	80.4%
Velar fronting	51	4.0%	96.0%
Alveolar fronting	51	51.0%	49.0%
Stopping fricative	51	78.4%	21.6%
Backing	51	21.6%	78.4%
Depalatalization	51	11.8%	88.2%
Gliding of liquids	51	64.7%	35.3%
Consonant assimilation	51	76.5%	23.5%
Insertion schwa between cluster two consonants	51	90.1%	9.9%

Table 4 demonstrates the frequency statistics of each phonological process of 4;0-5;0 years among the 51 participants. Each children shows different percentage in each process most of the children showed error and there were initial cluster reduction 80.4%, medial cluster reduction 21.6%, final cluster reduction 96.1%, weak syllable deletion 27.4%, final consonant deletion 19.6%, velar fronting 4.0%, alveolar fronting 51.0%, stopping fricative 78.4%, backing 21.6%, depalatalization 11.8%, gliding of liquids 64.7%, consonant assimilation 76.5%, insertion schwa between cluster two consonants 90.1%. Out of 51 children, the highest error pattern found at final cluster reduction (96.1%) and the lowest error pattern found at velar fronting (4.0%).

3.3 Phonological Performance among 4;0-4;6 years of Bangla Speaking Children

Table 5: Phonological performance among 4;0-4;6 years of Bangla speaking children

Phonological process	Percentage	
	Error	No error
Initial cluster reduction	70.83%	29.17%
Medial cluster reduction	2.08%	97.92%
Final cluster reduction	87.5%	12.5%
Weak syllable deletion	12.5%	87.5%
Final consonant deletion	4.17%	95.83%
Velar fronting	4.17%	95.83%
Alveolar fronting	27.08%	72.92%
Stopping fricative	25.0%	75.0%
Backing	10.42%	89.58%
Depalatalization	2.08%	97.92%
Gliding of liquids	27.08%	72.92%
Consonant assimilation	31.25%	68.75%
Insertion schwa between cluster two consonants	91.67%	8.33%

Table 5 demonstrates the phonological performance among 16 Bangla speaking children under the age group of 4;0-4;6 years. The children showed different percentage in each process. Most of the children showed error and there were initial cluster reduction 70.83%, medial cluster reduction 2.08%, final cluster reduction 87.5%, weak syllable deletion 12.5%, final consonant deletion 4.17%, velar fronting 4.17%, alveolar fronting 27.08%, stopping fricative 25.0%, backing 10.42%, depalatalization 2.08%, gliding of liquids 27.08%, consonant assimilation 31.25%, insertion schwa between cluster two consonants 91.67%. Among 16 children, the highest error pattern (91.6%) found at insertion schwa between cluster two and the lowest error pattern (2.08%) found at both medial cluster reduction and depalatalization.

3.4 Phonological Performance among 4;7-5;0 years Bangla Speaking Children

Table 6: Phonological performance among 4;7-5;0 years Bangla speaking children

Phonological process	Percentage	
	Error	No error
Initial cluster reduction	63.81%	36.19%
Medial cluster reduction	12.38%	87.62%
Final cluster reduction	73.33%	26.67%
Weak syllable deletion	11.43%	88.57%
Final consonant deletion	5.71%	94.29%
Velar fronting	0.95%	99.05%
Alveolar fronting	13.33%	86.67%
Stopping fricative	26.67%	73.33%
Backing	8.57%	91.43%
Depalatalization	4.76%	95.24%
Gliding of liquids	30.48%	69.52%
Consonant assimilation	36.19%	63.81%
Insertion schwa between cluster two consonants	72.38%	27.62%

Table 6 demonstrates the phonological performance among 35 Bangla speaking children under the age group of 4;7-5;0 years of Bangla speaking children. The children shows different percentage in each process most of the children shows error and there were initial cluster reduction 63.81%, medial cluster reduction 12.38%, final cluster reduction 73.33%, weak syllable deletion 11.43%, final consonant deletion 5.71%, velar fronting 0.95%, alveolar fronting 13.33%, stopping fricative 26.67%, backing 8.57%, depalatalization 4.76%, gliding of liquids 30.48%, consonant assimilation 36.19%, insertion schwa between cluster two consonants 72.38%. Out of 35 children, the highest error pattern found at final cluster reduction (73.33%) and the lowest error pattern found at velar fronting (0.95%).

3.5 Comparison of Phonological Performance between Boys & Girls

Table 7: Comparison of phonological performance between boys & girls

Phonological process	Boy's performance		Girl's performance		Comment
	Error	No error	Error	No error	
Initial cluster reduction	80.0%	20.0%	80.8%	19.2%	Similar performance in both
Medial cluster reduction	20.0%	80.0%	23.1%	76.9%	Low performance in girls
Final cluster reduction	100%	0%	92.3%	7.7%	Low performance in boys
Weak syllable deletion	32.0%	68.0%	23.1%	76.9%	Low performance in boys
Final consonant deletion	20.0%	80.0%	19.2%	80.8%	Similar performance in both
Velar fronting	8.0%	92.0%	0%	100%	High performance in girls
Alveolar fronting	56.0%	44.0%	46.2%	53.8%	Low performance in boys
Stopping fricative	80.0%	20.0%	76.9%	23.1%	Low performance in boys
Backing	24.0%	76.0%	19.2%	80.8%	Low performance in boys
Depalatalization	20.0%	80.0%	3.8%	96.2%	Similar performance in both
Gliding of liquids	60.0%	40.0%	69.2%	30.8%	Low performance in girls
Consonant assimilation	80.0%	20.0%	73.1%	26.9%	Low performance in boys
Insertion schwa between cluster two consonants	88.0%	12.0%	92.3%	7.7%	Low performance in girls

Table 7 demonstrates the comparison of phonological performance between boys & girls there were 25 boys and 26 girls presented as participants in the study. Boys and girls show different performance in each process. This table demonstrates that girls showed lower performance in 4 phonological processes where the boys showed lower performance in 6 phonological processes and both are showed similar performance in 3 phonological processes.

Initial Cluster Reduction

From the analysis it has been found that most of the children (80.4%) made error in initial cluster reduction for some causes such as environmental facility, support of the family, cultural system, educational facility etc. This finding reflects that in Bangla language, 4-5 years children use initial cluster reduction and perhaps appear even after five years. This finding shows dissimilarities with other languages; such as in English language any cluster reduction disappear within 4 to 5 years (Dodd, Holm, Hua & Crosbie, 2003).

Medial Cluster Reduction

From the analysis it has been found that most of the children (21.6%) made error in medial cluster reduction for some causes such as environmental facility, support of the family, cultural system, educational facility etc. This finding reflects that in Bangla language, 4-5 years children use medial cluster reduction and perhaps appear even after five years. This finding shows dissimilarities with other languages; such as in English language any cluster reductions disappear within 4 to 5 years (Dodd et al., 2003).

Final Cluster Reduction

From the analysis it has been found that most of the children (96.1%) made error in final cluster reduction for some causes such as environmental facility, support of the family, cultural system, educational facility etc. This finding reflects that in Bangla language, 4-5 years children use final cluster reduction and perhaps appear even after five years. This finding shows dissimilarities with other languages; such as in English language any cluster reductions disappear within 4 to 5 years (Dodd et al., 2003).

Weak Syllable Deletion

From the analysis it has been found that most of the children (27.4%) made error in weak syllable deletion for some causes such as environmental facility, support of the family, cultural system,

educational facility etc. This finding reflects that in Bangla language, 4-5 years children use weak syllable deletion and perhaps appear even after five years. This finding shows dissimilarities with other languages; such as in English language weak syllable deletion disappear within 4 years (Dodd et al., 2003).

Final Consonant Deletion

From the analysis it has been found that most of the children (19.6%) made error in final consonant deletion for some causes such as environmental facility, support of the family, cultural system, educational facility etc. This finding reflects that in Bangla language, 4-5 years children use final consonant deletion and perhaps appear even after five years. This finding shows dissimilarities with other languages; such as in English language final consonant deletion disappear within 4;06 years (Dodd et al., 2003).

Velar Fronting

From the analysis it has been found that some of the children (4.0%) made error in velar fronting for some causes such as environmental facility, support of the family, cultural system, educational facility etc. This finding reflects that in Bangla language, 4-5 years children use velar fronting and perhaps appear even after five years. This finding shows dissimilarities with other languages; such as in English language velar fronting disappear within 4;06 years (Dodd et al., 2003).

Alveolar Fronting

From the analysis it has been found that most of the children (51.0%) made error in alveolar fronting for some causes such as environmental facility, support of the family, cultural system, educational facility etc. This finding reflects that in Bangla language, 4-5 years children use alveolar fronting and perhaps appear even after five years. This finding shows dissimilarities with other languages; such as in English language alveolar fronting disappear within 4;06 years (Dodd et al., 2003).

Stopping Fricative

From the analysis it has been found that most of the children (78.4%) made error in stopping fricative for some causes such as environmental facility, support of the family, cultural system, educational facility etc. This finding reflects that in Bangla language, 4-5 years children use stopping fricative and perhaps appear even after five years. This finding shows dissimilarities with other languages; such as in English language stopping fricative disappear within 5;0 years (Dodd et al., 2003).

Backing

From the analysis it has been found that most of the children (21.6%) made error in backing for some causes such as environmental facility, support of the family, cultural system, educational facility etc. This finding reflects that in Bangla language, 4-5 years children use backing and perhaps appear even after five years. This finding shows dissimilarities with other languages; such as in English language backing disappear within 5;0 years (Bowen, 2011).

Depalatalization

From the analysis it has been found that some of the children (11.8%) made error in depalatalization for some causes such as environmental facility, support of the family, cultural system, educational facility etc. This finding reflects that in Bangla language, 4-5 years children use depalatalization and perhaps appear even after five years. This finding shows dissimilarities with other languages; such as in English language depalatalization disappear within 5;0 years (Bowen, 2011).

Gliding of Liquids

From the analysis it has been found that most of the children (64.7%) made error in gliding of liquids for some causes such as environmental facility, support of the family, cultural system, educational facility etc. This finding reflects that in Bangla language, 4-5 years children use gliding of liquids and perhaps appear even after five years. This finding shows dissimilarities with other languages; such as in English language gliding of liquids disappear within 4;06 years (Dodd et al., 2003).

Consonants Assimilation

From the analysis it has been found that most of the children (76.5%) made error in consonants assimilation for some causes such as environmental facility, support of the family, cultural system, educational facility etc. This finding reflects that in Bangla language, 4-5 years children use consonants assimilation and perhaps appear even after five years. This finding shows dissimilarities with other languages; such as in English language consonants assimilation disappear within 3;0 years (Bowen, 2011).

Insertion schwa between cluster two consonants

From the analysis it has been found that most of the children (90.1%) made error in insertion schwa between cluster two consonants for some causes such as environmental facility, support of the family, cultural system, educational facility etc. This finding reflects that in Bangla language, 4-5 years children use insertion schwa between cluster two consonants and perhaps appear even after five years. This finding shows dissimilarities with other languages; such as in English language insertion schwa between cluster two consonants disappear within 4;0-5;0 years (Dodd et al., 2003).

Comparison between boys and girl's phonological performance

Form the result investigator found that overall girl's phonological performance is better than boys in Bangla speaking children. For some causes such as environmental facility, support of the family, cultural system, educational facility, financial support etc. boys and girls showed different performance of phonological processes. A study was conducted in England on English-speaking children they reported that girls are generally thought to perform better than boys in phonological development. McCormack and Knighton (1996) reported that 2.5 year old girls had more accurate phonological output than boys; they found that gender accounted for approximately only 1% of the variance in language acquisition.

Summary

From the above discussions it can be summarized that 13 phonological processes are highly seen in 4-5 years old typically developing Bangla speaking children. These processes are initial cluster reduction, medial cluster reduction, final cluster reduction, weak syllable deletion, final consonant deletion, velar fronting, alveolar fronting, stopping fricative, backing, gliding of liquids, depalatalization, consonant assimilation and insertion schwa between cluster two consonants. These processes could be seen after 5 years of age in Bangla speaking children. These findings showed that development patterns of phonological process of Bangla speaking children are different from English speaking children. There is no similarity of Bangla language with English language normative data. In Bangladesh, girl's phonological performance is better than boys.

During conducting the study investigator faced some difficulties and limitations. Investigator completed the study within short period of time. Due to lack of financial support, investigator did not move different area of Bangladesh for increasing the number of sample. Investigator took 51 children as sample which is not sufficient to conduct a survey. Investigator did not found any standardize data collection tool to collect data.

By conducting the study investigator found that the phonological error patterns do not eliminate within 4-5 years old Bangla speaking children. Investigator selected 51 children as sample. For conducting a further study regarding development of phonological process, the number of the sample should increase. Investigator collected data around Dhaka district. Strong and effective result will come if data collected around the whole Bangladesh. Investigator used purposive sampling process to select sample. Randomization should use for further study. For conducting similar study in future investigator should use standard data collection tool.

The implications of the results of this study can be useful in clinical areas such as diagnosis and treatment of phonological disorders. This study can help SLTs and parents to understand the development pattern of phonology among 4-5 years old children. This study can help SLTs to provide a comprehensive and effective treatment for children with speech and language delay and disorder. As there is no established data on how Bangla is acquired from early age, it will help to understand the characteristic of phonological development and how it differs from other language.

Deficient phonological acquisition can be identified only if typical phonological patterns appearance, usage and development are understood. Most Speech and Language Therapists currently rely on normative data of phonological patterns in English Language. During development of speech sound all children more or less use phonological processes. From different research on phonological process development it is quite clear that as age is increases children reduce to use processes and start to adopt adult model of speech.

51 Bangla speaking children involving in this cross sectional study design between the ages of 4-5 years go through a definite sequence and progression of speech development. Finally investigator found that 13 phonological processes are seen within 4-5 years old typically developing Bangla speaking children. These processes are initial cluster reduction, medial cluster reduction, final cluster reduction, weak syllable deletion, velar fronting, alveolar fronting, stopping fricative, backing, gliding of liquids, consonant assimilation and insertion schwa between cluster two consonants. The results may be helpful in evaluating the appropriateness of a child's phonological skills.

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Annexure: 1 Checklist for Data Collection

Phonological Process Checklist

Name:

Age:

Gender:

Date:

Examiner's name:

School's name:

S.N:

S.N	Phonological Processes	Target Bangla Words	Child's response	Score
01	Initial Cluster Reduction	ট্রেন-/tren/		0 1
		ব্রাশ-/braʃ/		0 1
		বৃষ্টি-/brɪʃti/		0 1
02	Medial Cluster Reduction	কল্লিশ-/collɪʃ/		0 1
		স্যান্ডেল-/sændel/		0 1
		বন্দুক-/bonduk/		0 1
03	Final Cluster Reduction	শাট-/ʃɑt/		0 1
		প্যান্ট-/pænt/		0 1
		বেল্ট-/belt/		0 1
04	Weak Syllable Deletion	বোতল-/botol/		0 1
		চানাচুর-/canacur/		0 1
		চিরুনি-/ciruni/		0 1
05	Final Consonant Deletion	আপেল-/apel/		0 1
		কুকুর-/kukur/		0 1
		বিড়াল-/biʃal/		0 1
06	Velar Fronting	গরু-/goru/		0 1
		কলা-/kɔla/		0 1
		কলম-/kɔlom/		0 1
07	Alveolar Fronting	ডিম-/dim/		0 1
		ঠোঁট-/tʰot/		0 1
		টাকা-/taka/		0 1

08	Stopping Fricative	সাগর-/ʃagor/		0	1
		সালাদ-/salad/		0	1
		শশা-/ʃʃa/		0	1
09	Backing	বাস-/bas/		0	1
		তালা-/tala/		0	1
		তরমুজ-/tormuj/		0	1
10	Depalatalization	সাপ-/ʃap/		0	1
		ছাতা-/c ^h ata/		0	1
		চুল-/cul/		0	1
11	Gliding of Liquids	রংপেন্সিল-/ronpensil/		0	1
		রংধন-/ronɔ ^h onu/		0	1
		বেলুন-/belun/		0	1
12	Consonant Assimilation	চকলেট-/coklet/		0	1
		বিস্কুট-/biskut/		0	1
		রিঝা-/rikja/		0	1
13	Insertion of schwa between clusters two consonants	গ্লাস-/glas/		0	1
		ফ্রিজ-/p ^h rij/		0	1
		প্লেট-/plet/		0	1

(N.B: 0=No error and 1=error)

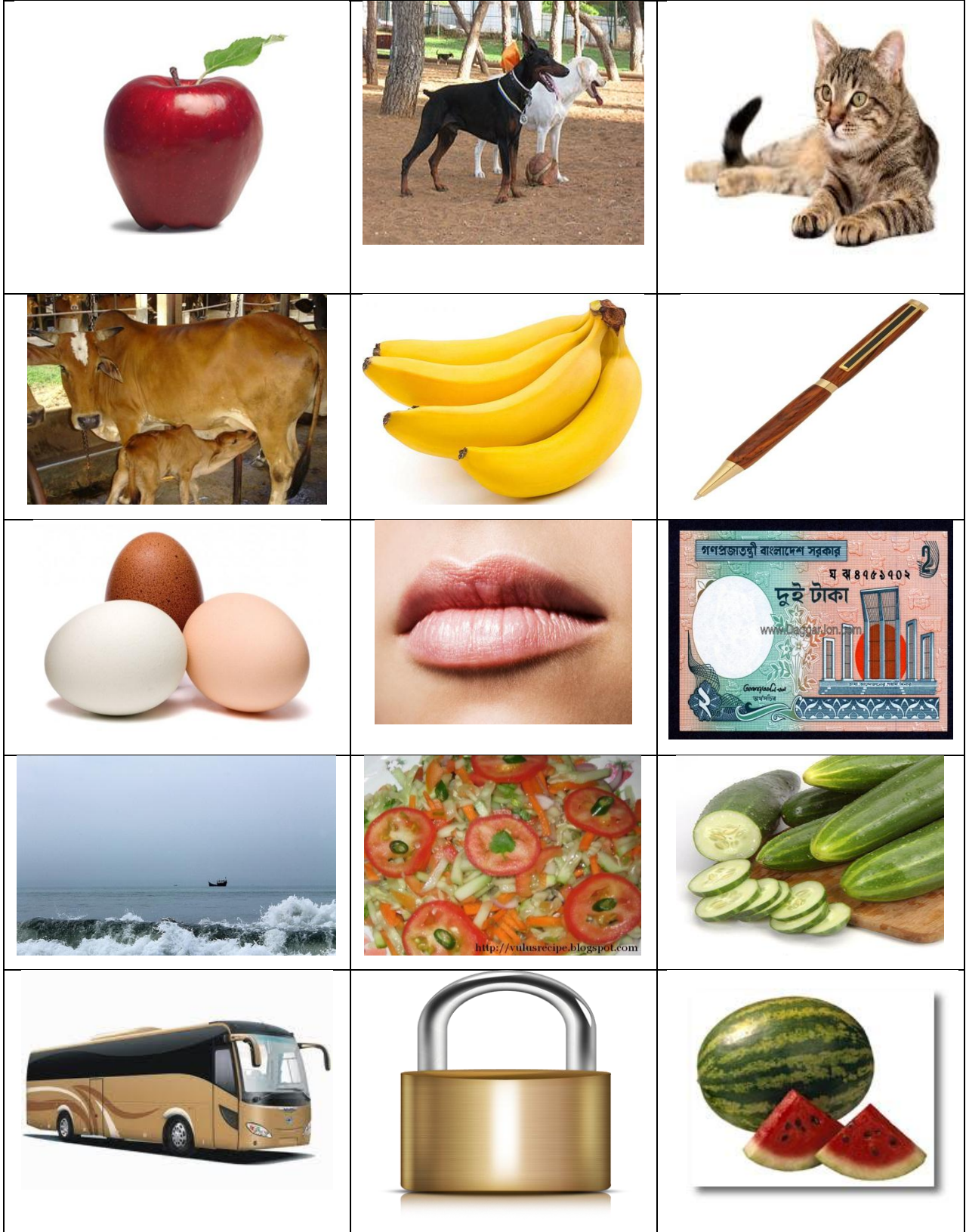
Total score= No error: /39 Error: /39

Comments:

Signature and date:

Annexure: 2 Pictures for the select words







Annexure: 3 Permission Letter for Research Project Conduction

Permission Letter for Research Project Conduction

Date: 15th October, 2014

To
Head (Acting),
Department of Speech and Language Therapy
Bangladesh Health Professions Institute (BHPI)
CRP-Chapain, Savar, Dhaka- 1343

Subject: Prayer for seeking permission to conduct the research project.

Sir,

I beg most respectfully to state that, I am a 4th year student of Speech and Language Therapy Department of BHPI, the academic institute of CRP. I am sincerely seeking permission to conduct my research project as the partial fulfillment of therequirements for the degree of B. Sc in Speech and Languagetherapy course under the medicine faculty of Dhaka University. I will have to conduct a research project in this academic year which is a part of my academic curriculum. The title of my research project is **“Development of Phonological Processes of 4-5 years old Bangla Speaking Children”**. The aim of the study is to identify the patterns of phonological process of 4-5 years old Bangla speaking children.

Now I am seeking your kindness to approve me to start the research project and would like to assure that anything of my research project will not be harmful for the participants.

I therefore, pray and hope that you would be kind enough to grant my appeal by giving the permission to conduct the study which will help me to complete a successful study as a part of my course and oblige thereby.

Sincerely yours,

Sumaia Afrin
Roll no- 17, Session: 2010-2011
4th year student ofSpeech and Language Therapy
Bangladesh Health Professions Institute (BHPI)
CRP-Chapain, Savar, Dhaka- 1343

Approved by	Comment &Signature
Md. Jahangir Alam Head (Acting) Department of Speech and Language Therapy Bangladesh Health Professions Institute (BHPI) CRP-Chapain, Savar, Dhaka- 1343	You are allowed to conduct the above mentioned study. Good Luck ! <i>Jahangir</i> 15/10/14

Annexure: 4 Permission Letter for Data Collection

Permission Letter for Data Collection

Date: 15th October, 2014

To
Head (Acting),
Department of Speech and Language Therapy
Bangladesh Health Professions Institute (BHPI)
CRP-Chapain, Savar, Dhaka- 1343

Subject: Prayer for permission to start data collection.

Sir,

I beg most respectfully to state that, I am a 4th year student of Speech and Language Therapy Department of BHPI, the academic institute of CRP. I am sincerely seeking permission to conduct the data collection of the research project as the partial fulfillment of the requirements for the degree of B.Sc in speech and language therapy course under the medicine faculty of Dhaka University. The title of my research project is **“Development of Phonological Process of 4-5 Years old Bangla Speaking Children”**. The aim of the study is to identify the patterns of phonological process of 4-5 years old Bangla speaking children.

Now I am seeking your kindness to allow me to start the data collection for the research project and I would like to assure that anything of my research project will not be harmful for the participants.

I therefore, pray and hope that you would be kind enough to grant my appeal by giving the permission to data collection to conduct the study which will help me to complete a successful study as a part of my course and oblige thereby.

Sincerely yours,

Sumaia Afrin
Roll no- 17, Session: 2010-2011
4th year student of Speech and Language Therapy
Bangladesh Health Professions Institute (BHPI)
CRP-Chapain, Savar, Dhaka- 1343

Approved by	Comment & Signature
Md. Jahangir Alam Head (Acting) Department of Speech and Language Therapy Bangladesh Health Professions Institute (BHPI) CRP-Chapain, Savar, Dhaka- 1343	You can proceed for data collection. <i>Jahangir</i> 25/10/14

Annexure: 5 Consent Form

সম্মতি পত্র

গবেষক সুমাইয়া আফরিন বাংলাদেশ হেলথ প্রফেশন্স ইন্সটিটিউটের বি. এস. সি. ইন স্পীচ এন্ড ল্যাঙ্গুয়েজ থেরাপি বিভাগের চতুর্থ বর্ষের ছাত্রী। এই গবেষণা স্পীচ এন্ড ল্যাঙ্গুয়েজ থেরাপি বিভাগের অধ্যয়নের একটি অংশ। তার গবেষণার বিষয়ঃ বাংলাদেশে ৪ থেকে ৫ বছরের স্বাভাবিক বাচ্চাদের ফনোলোজিক্যাল প্রক্রিয়ার নমুনা।

এই গবেষণায় আমার সন্ধান.....একজন অংশগ্রহণকারী এবং আমি এই গবেষণার উদ্দেশ্য পরিষ্কার ভাবে জানতে পেরেছি। আমি যে কোন সময় এবং গবেষণার যে কোন পর্যায়ে আমার সন্ধানের অংশগ্রহণ প্রত্যাহার করতে পারি। এ জন্য আমি কারো কাছে জবাবদিহি করতে বাধ্য নই। এই গবেষণায় অংশগ্রহণ করলে তা আমার সন্ধানের বর্তমান ও ভবিষ্যতে কোন প্রকার প্রভাব ফেলবেনা।

সাক্ষাতের সকল তথ্য যেগুলো গবেষণার কাজে ব্যবহৃত হবে, সেগুলো সম্পূর্ণভাবে গোপন থাকবে। শুধুমাত্র গবেষক এ তথ্যগুলো ব্যবহারের অধিকার পাবে। আমি গবেষণার পদ্ধতি, জটিলতা অথবা সাফল্যের ব্যাপারে গবেষকের সাথে আলোচনা করতে পারব।

আমি উপরোক্ত সকল তথ্যগুলো সম্পর্কে জানি এবং আমি আমার সন্ধানের এই গবেষণায় অংশগ্রহণে সম্মতি জ্ঞাপন করছি।

অংশগ্রহণকারীর বাবা/মায়ের সাক্ষরঃ	তারিখঃ
গবেষকের সাক্ষরঃ	তারিখঃ
সাক্ষীর সাক্ষরঃ	তারিখঃ

Annexure: 6 Permission Letter from School (WMTS)



বাংলাদেশ হেল্থ প্রফেশন্স ইনষ্টিটিউট (বিএইচপিআই)
BANGLADESH HEALTH PROFESSIONS INSTITUTE (BHPI)
(The Academic Institute of CRP)

CRP-Chapain, Savar, Dhaka, Tel: 7745464-5, 7741404, Fax: 7745069
BHPI-Mirpur Campus, Plot-A/5, Block-A, Section-14, Mirpur, Dhaka-1206. Tel: 8020178,8053662-3, Fax: 8053661

তারিখ : ০৯.১০.২০১৪

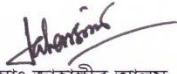
প্রতি
অধ্যক্ষ
উইলিয়াম এন্ড মেরি টেইলর স্কুল
সিআরপি, সাভার, ঢাকা।

বিষয় : রিসার্চ প্রজেক্ট (dissertation) প্রসঙ্গে।

জনাব,
বিএইচপিআই*র ৪র্থ বর্ষ বিএসসি ইন স্পীচ এন্ড ল্যাঙ্গুয়েজ থেরাপি কোর্সের ছাত্রী সুমাইয়া আফরিনকে তার রিসার্চ সংক্রান্ত কাজের জন্য আগামী ১১.১০.২০১৪ তারিখ থেকে ৩০.১১.২০১৪ তারিখ পর্যন্ত সময়ে আপনার নিকট প্রেরণ করা হলো।

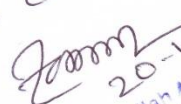
তাই তাকে সার্বিক সহযোগীতা প্রদানের জন্য অনুরোধ করছি।

ধন্যবাদান্তে


মোঃ জাহাঙ্গীর আলম
বিভাগীয় প্রধান
স্পীচ এন্ড ল্যাঙ্গুয়েজ থেরাপি বিভাগ
বিএইচপিআই।



Permitted for
Data collection.


20-10-14
Md. Aboullah Al Zubayer
Principal (Acting)
William & Mary Taylor School (WMTS)
(The Inclusive School of CRP)
CRP, Savar, Dhaka-1206

Annexure: 7 Permission Letter from School (CNMHS)



বাংলাদেশ হেল্থ প্রফেশন্স ইনষ্টিটিউট (বিএইচপিআই)
BANGLADESH HEALTH PROFESSIONS INSTITUTE (BHPI)
(The Academic Institute of CRP)

CRP-Chapain, Savar, Dhaka, Tel: 7745464-5, 7741404, Fax: 7745069
BHPI-Mirpur Campus, Plot-A/5, Block-A, Section-14, Mirpur, Dhaka-1206. Tel: 8020178, 8053662-3, Fax: 8053661

তারিখ : ১৪.১০.২০১৪

প্রতি
প্রধান শিক্ষক
চাপাইন নিউ মডেল হাই স্কুল
সাভার, ঢাকা।

বিষয় : রিসার্চ প্রজেক্ট (dissertation) এর জন্য আপনার প্রতিষ্ঠান সফর প্রসঙ্গে।

জনাব,

আপনার সদয় অবগতির জন্য জানাচ্ছি যে, পক্ষাঘাতগ্রস্তদের পুনর্বাসন কেন্দ্রে-সিআরপি'র শিক্ষা প্রতিষ্ঠান বাংলাদেশ হেল্থ প্রফেশন্স ইনষ্টিটিউট (বিএইচপিআই) ঢাকা বিশ্ববিদ্যালয় অনুমোদিত বিএসসি ইন স্পীচ এন্ড ল্যান্ডুয়েজ থেরাপি কোর্স পরিচালনা করে আসছে।

উক্ত কোর্সের ছাত্রছাত্রীদের কোর্স কারিকুলামের অংশ হিসাবে বিভিন্ন বিষয়ের উপর রিসার্চ ও কোর্সওয়ার্ক করা বাধ্যতামূলক।

বিএইচপিআই'র ৪র্থ বর্ষ বিএসসি ইন স্পীচ এন্ড ল্যান্ডুয়েজ থেরাপি কোর্সের ছাত্রী সুমাইয়া আফরিন তার রিসার্চ সংক্রান্ত কাজের জন্য আপনার সুবিধামত সময়ে আপনার প্রতিষ্ঠানে সফর করতে আশ্রয়ী।

তাই তাকে আপনার প্রতিষ্ঠান সফরে সার্বিক সহযোগিতা প্রদানের জন্য অনুরোধ করছি।

ধন্যবাদান্তে

মোঃ জাহাঙ্গীর আলম
বিভাগীয় প্রধান
স্পীচ এন্ড ল্যান্ডুয়েজ থেরাপি বিভাগ
বিএইচপিআই।



মোঃ জাহাঙ্গীর আলম
এস.এ. এম.এস (স্ব.স্ব.)
প্রধান শিক্ষক/সহকারী
চাপাইন নিউ মডেল হাই স্কুল
সাভার, ঢাকা।

Annexure: 8 Permission Letter from School (RCMS)



বাংলাদেশ হেল্থ প্রফেশন্স ইনষ্টিটিউট (বিএইচপিআই)
BANGLADESH HEALTH PROFESSIONS INSTITUTE (BHPI)
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তারিখ : ১৪.১০.২০১৪

প্রতি
প্রধান শিক্ষক
রেডিও কলোনী মডেল স্কুল
সাভার, ঢাকা।

স্বাক্ষর
প্রধান শিক্ষক
রেডিও কলোনী মডেল স্কুল
সাভার, ঢাকা

বিষয় : রিসার্চ প্রজেক্ট (dissertation) এর জন্য আপনার প্রতিষ্ঠান সফর প্রসঙ্গে।

জনাব,

আপনার সদয় অবগতির জন্য জানাচ্ছি যে, পক্ষাঘাতগ্রস্তদের পুনর্বাসন কেন্দ্রে-সিআরপি'র শিক্ষা প্রতিষ্ঠান বাংলাদেশ হেল্থ প্রফেশন্স ইনষ্টিটিউট (বিএইচপিআই) ঢাকা বিশ্ববিদ্যালয় অনুমোদিত বিএসসি ইন স্পীচ এন্ড ল্যান্ডুয়েজ থেরাপি কোর্স পরিচালনা করে আসছে।

উক্ত কোর্সের ছাত্রছাত্রীদের কোর্স কারিকুলামের অংশ হিসাবে বিভিন্ন বিষয়ের উপর রিসার্চ ও কোর্সওয়ার্ক করা বাধ্যতামূলক।

বিএইচপিআই'র ৪র্থ বর্ষ বিএসসি ইন স্পীচ এন্ড ল্যান্ডুয়েজ থেরাপি কোর্সের ছাত্রী সুমাইয়া আফরিনা তার রিসার্চ সংক্রান্ত কাজের জন্য আপনার সুবিধামত সময়ে আপনার প্রতিষ্ঠানে সফর করতে আগ্রহী।

তাই তাকে আপনার প্রতিষ্ঠান সফরে সার্বিক সহযোগিতা প্রদানের জন্য অনুরোধ করছি।

ধন্যবাদান্তে



মোঃ জাহাঙ্গীর আলম
বিভাগীয় প্রধান
স্পীচ এন্ড ল্যান্ডুয়েজ থেরাপি বিভাগ
বিএইচপিআই।



নতুন প্রিন্ট
সকাল ৮ টায়
দেখা যাবে
০৬/১১/১৪