

## Speech and Language Therapy for Post-Surgical Cleft Palate Children

Md. Jahangir Alam\*

**Abstract** : *Introduction*: Cleft lip and palate is one of the major public health concerns in Bangladesh, where 3.9 out of every 1000 newborn babies born with a cleft lip and/or palate, making it one of the most common birth defects in Bangladesh (Ghani, Mannan, Sen, Uzzaman, and Harrison, 2006). Cleft Palate (CP) care in Bangladesh is directed by lack of a coordinated multidisciplinary (MDT) management where speech and language therapists can play an important role. There is no study conducted in Bangladesh on speech difficulties after CP surgery and the necessity of speech and language therapy. The aim of this study was to identify the common speech difficulties of post-surgical cleft palate Bangla speaking children and the importance of speech and language therapy services. *Methods and Procedures*: 25 children with post-surgical CP and 4 plastic surgeons (currently conducting cleft surgeries) were selected as participants using nonrandom purposive sampling procedure. A mixed methods research design was used in the study where the data was generated through assessing the children's post-operative CP speech and semi structured face-to-face interviews. Data gathered from the assessment was analysed using descriptive statistics. The interviews were analysed thematically following content analysis. *Results*: Common speech difficulties in post palatal surgery were hyper nasality, dentalization, palatalization, backing, glottal stop, misarticulation of sounds, omission of sounds, velopharyngeal incompetence. Among the 25 participants, 14 (56%) participants were in high priority for speech therapy, 4 (16%) participants were in low priority, and for 7 (28%) participants speech therapy was not necessary. The qualitative analysis revealed that speech difficulties are common for children with post-surgical CP and speech and language therapists have a significant role to play in CP care team after the palate fixation.

## Introduction

A cleft is a sub-division in the body's natural structure, often formed before birth. The palate is the roof of the mouth. It has 2 parts: the hard palate at the front which is made of bone. The back part of the palate is soft palate which is made of muscle. Cleft palate (CP) is a condition in which the two plates of the skull (both hard and soft palate) are not completely joined. Palate cleft can occur as complete (soft and hard palate, possibly including a gap in the jaw) or incomplete (a hole in the roof of the mouth, usually as a cleft in soft palate) (Berkowitz, 2013). The palate is important, both for swallowing and speech production. There are some sounds in Bangla language that are produced by the palate (soft/hard palate); for example, palato-alveolar plosive/stop (/c/, /ch/, /j/, /jh/), fricative (/s/) and flap (/r/), velar plosive/stop (/k/, /kh/, /g/, /gh/) (Haq, 2002).

Cleft lip, with or without cleft palate (CP) and isolated CP are serious birth defects which affect approximately 1 in every 600 newborn babies worldwide. A child is born with a cleft somewhere in the world approximately every 2½ minutes (World Health Organization, 2000 and 2001). Approximately one in every 700 children in the United States is born with cleft lip and/or CP, making it the country's fourth-most common birth defect (Berkowitz, 2013). According to Dechongkit, Manochiopinig, and Prathanee (2006) cleft lip/palate is one of the most common birth defects, especially in developing countries where high risk is associated with deficiencies or poor maternal vitamin and nutritional supplements or mother's environmental exposure. Another study of Ravishanker (2006) says that the worldwide incidence of cleft lip/palate is between 0.30 and 2.65/1,000 live births; cleft lip and palate with an incidence of 1:700 and CP with an incidence of 1:1600-4200 live births in Asian countries and 1:3200 in Tamilnadu, India is a common congenital anomaly.

Ghani, Mannan, Sen, Uzzaman and Harrison (2006) reported that cleft lip/palate is indeed a major public health concern in Bangladesh, where 3.9 out of every 1000 newborn babies are affected by a cleft lip or palate, making it one of the most common birth defects in Bangladesh. Ghani, et al. (2006) mentioned that "there are approximately 300,000- cases with cleft lip and palate in Bangladesh amongst a population of 150 million. The vast majority of these patients cannot afford and do not have access

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\* Lecturer, Department of Communication Disorders, University of Dhaka

to even basic surgical repairs or cleft related services. Cleft lip and palate care in Bangladesh is compromised by the lack of a coordinated Multidisciplinary (MDT) care package and a shortage of adequately trained surgeons". Arzu (2007) reported that approximately 5,000 children are born with cleft lip and palate in Bangladesh every year.

Along with other problems, a child with CP may have communication difficulties. McWilliams, Morris, and Shelton (1994) mentioned that children with craniofacial anomalies are at high risk for speech and language disorders. Some of the common speech difficulties children with post-operative CP are: hyper/hyponasality, nasal emission, nasal turbulence, dentalization, lateralization, backing to velar, glottal stop, palatal fricatives etc. Jobe, D'Mello, and Kumar (2007) claimed that children with CP require surgical and dental management to establish a mechanism that is adequate for normal speech production. A large percentage of children with CP require speech-language intervention after surgical and dental management. Jobe et al. (2007) and Peter (2006) reported that, approximately 20-50% of CP children require the services of speech therapists and thus speech therapist play an important role before and after surgery to facilitate functional communication.

Speech and Language Therapy (SLT) is a newly introduced health care profession in Bangladesh. Some of the hospitals (e.g central, city hospital) and organizations (e.g operation cleft, Interplast, smile train) are providing free CP surgery in Bangladesh but the post-operative children are not receiving adequate speech therapy support and this is impacting upon proper rehabilitation of CP management. These huge numbers of children are not able to access sufficient speech therapy services after their surgery even though the research indicates that a large population of these children would benefit from speech therapy service.

So far the investigator's knowledge goes, no study so far explaining different speech difficulties after CP surgery and the need for speech therapy service in Bangladesh. The aim of this study was to address these difficulties and help to evaluate and design speech and language therapy intervention in comparing Bangladesh with the international standard. This study would be helpful in making speech therapists aware of the importance of addressing CP speech characteristics in speech therapy intervention and would assist to make current speech

therapy practice more holistic, client centered and effective for thousands of children with CP in Bangladesh. This study might provide a clear reflection of the number of children who need speech therapy after surgery. The findings would also be useful for different organizations and hospitals working in this area for including speech therapy service in their program for delivering a comprehensive treatment service. Thus, the study might create a future prospect of speech and language therapy profession in Bangladesh. Moreover, this study would help to establish a collaborative treatment approach for children with CP and will help to improve the referral system of SLT services in Bangladesh.

#### *Aim of the Study*

Identify the need of speech therapy services for post-surgical cleft palate children

#### *Objectives of the Study*

- To classify the common features of speech difficulties after cleft palate surgery
- To identify the number of children with cleft palate need speech therapy services after surgery
- To recognize the perception of cleft lip and palate surgeons about the needs of Speech therapy services after surgery

#### **Methods of the Study**

A mixed methods research design was used to attain the aim of the research. The study was conducted at Center for the Rehabilitation of the Paralyzed (CRP), Savar, Queens's Hospital, Jessore and department of plastic surgery, Dhaka Medical College and Hospital (DMCH), Dhaka. Post-operative cleft palate (CP) children were recruited from the paediatric unit of Queens's Hospital, Jessore and department of speech and language therapy (SLT), CRP. The plastic surgeons were selected from the department of plastic surgery, DMCH, Dhaka. All the children were assessed in a quiet room and semi-structure face to face interview was conducted with the surgeons at DMCH. The population of this study was post-operative CP children (n = 25) and plastic surgeons (n = 4). A non-random purposive sampling method was used for sample selection. Both boys and girls between 2 years to 7 years old were selected. Moreover, the surgeons who are currently conducting CP surgery in Bangladesh were

selected as participants. All the participants were of Bangladeshi background and spoke Bangla as their first language.

In this study, children's post-operative speech characteristics were identified using GOS.SP.ASS.'98: (Great Ormond Street Speech Assessment), an assessment for speech disorders associated with CP and/or VPI. This is a detailed speech assessment which is now complemented by the Cleft Audit Protocol for Speech (CAPS), a tool recommended for clinical audit (Sell, Harding, and Grunwell, 1999). The assessment form was modified (the phonemes, words and the conversational sentences) to find out the post-surgical CP speech features. A tape recorder was used to record the speech sample from the children and the interview from the surgeons. A mirror was used to investigate whether any air was coming from the nose or not and torch light was used to examine the presence of palatal fistula and palatal movement.

Each child was asked to provide a standardized speech sample, which involved counting from 1 to 20, repetition of Bangla words and a sample of conversational speech. The words were used to evaluate the full range of consonants considered vulnerable to the CP condition. The conversational speech was elicited using a predefined set of six open questions and recorded on tape recorder for analysis. Nasality (hypernasality and hyponasality) and nasal emission were judged from the recording of the child counting from 1 to 20. Resonance severity was rated on a four-point scale: 0 = not present; 1 = mild; 2 = moderate; 3 = severe consistent.

Word and phoneme repetition was used for consonant error analysis. A transcription of each target phoneme in word initial, medial and word final position was made. Based on the transcriptions, each consonant error was classified according to categories of consonant error types often associated with a history of clefting and palatal anomalies—also known as “speech cleft type characteristics” Sell, Harding and Grunwell (1999). The consonant errors were divided into “minor” errors or “serious” errors. “Minor” errors (lateralization/lateral, Palatalization/palatal, or both) are those that may occur “within the range of normal non cleft speech” and do not require intervention. “Serious errors” of consonant production (pharyngeal and glottal articulation, backing to uvular, backing to velar, active nasal fricatives, absent pressure consonants, nasal realizations, and weak nasalized consonants) are

considered to require therapy, surgery, or both. Need for speech therapy service was rated on a three point scale: 1 = low priority; 2 = medium priority; 3 = high priority. This was rated based on the types of speech difficulties, nasality, presence/absence of fistula and VPI. VPI was assessed using psychological scale (presence/absence).

Finally, Data gathered from the assessment form was analysed using descriptive statistics. The interviews were analysed thematically following content analysis.

### Results of the Study

The result of this study is divided into two sections. The first section demonstrates different speech features of post-operative cleft palate children and the second part discuss the need of SLT service after palatal fixation from the interviews.

Among the 25 children 10 (40%) were boys and 15 (60%) children were girls. The percentage of children with both cleft lip and palate was 36%, unilateral complete CP 16%, unilateral incomplete CP 32%, bilateral complete CP 8% and bilateral incomplete CP was 8%.

#### *Types of speech difficulties*

##### Resonance

Among all the children 40% demonstrated mixed resonance, 20% had hypernasal consistent, 8% children demonstrated hypernasal inconsistent and hyponasal consistent, hyponasal inconsistent had only 1 participant (4%) and 5 participants (20%) didn't demonstrated any resonance difficulties (Figure: 1).

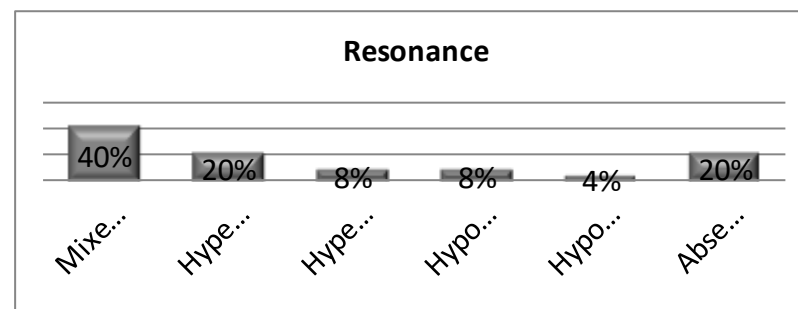


Figure 1: Resonance of the children after palatal repair

*Nasal emission, dentalization, palatalization, backing, glottal stop and omission of sound*

Table 01: Types of different post-operative cleft palate speech

Types of speech characteristics	Present	Absent
Nasal emission	44%	56%
Dentalization	64%	36%
Palatalization	56%	44%
Backing	44%	56%
Glottal stop	60%	40%
Omission of sound	48%	52%

Table 01 demonstrates different types of speech difficulties after palate surgery. Dentalization (64%) and Glottal stop (60%) was found higher in percentage, in contrast nasal emission and backing (44%) was lowest in percentage. Moreover, palatalization and omission of sound was present with 56% and 48% children respectively.

*Misarticulation of sound*

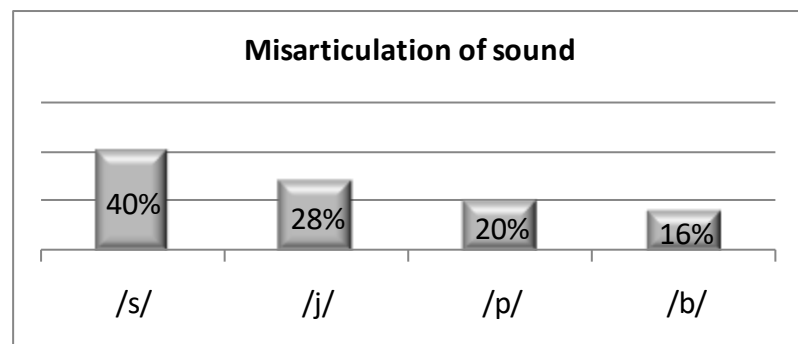


Figure 2: Misarticulation of sound of children with post-operative cleft palate

Figure 2 demonstrates the percentage of misarticulation of sound of children after their palatal fixation. The percentage of misarticulation of lingua-alveolar fricative (/s/) was higher (40%) than the other sounds. Conversely, the percentage of misarticulation of bilabial plosive (/b/) was lowest (16%) among the four sounds. The percentage of

misarticulation of lingual palatal approximant (/j/) and bilabial plosive (/p/) was 28% and 20% respectively.

*Other features*

Table 2: Percentage of palatal fistula and VPI of post- surgical cleft palate children

Features	Present	Absent
Palatal fistula	30	70
Velopharyngeal incompetence (VPI)	64	36

Table 2 shows the percentage of palatal fistula and Velopharyngeal incompetence (VPI) of post- surgical cleft palate children. The percentage of VPI and palatal fistula was 64% and 30% respectively.

*Speech therapy priority*

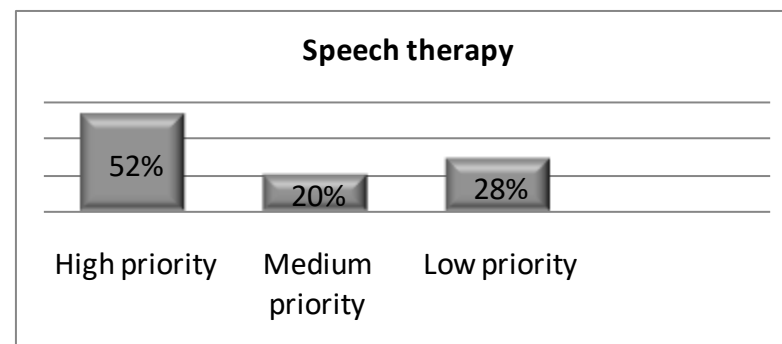


Figure 3: Speech therapy priority of post-surgical cleft palate children

Figure 3 demonstrates the percentage of children need speech therapy service after palatal surgery. The figure illustrates that 52% children were in high priority group for speech therapy service. The percentage of children in medium and low priority group was 20% and 28% respectively.

The qualitative data from the interview identified three different themes. These were: common speech difficulties for children with post-surgical CP, speech therapist’s role in cleft palate team after palatal surgery and need of speech therapy services for post-surgical CP children.

## Discussion

This study was conducted to identify the speech features of post-operative cleft palate Bangla speaking children and to determine the role of speech and language therapists in the management of post-operative cleft palate speech. This study found different post-operative cleft palate speech difficulties which are similar to children speak other languages. Moreover, it was also recognized that a speech therapist can play a significant role in the cleft palate care team.

The following discussion will focus on different types of speech difficulties after palate surgery. The possible underlying reasons for these difficulties are explained below:

Hyper or hypo nasality is a very common speech features for children with post-operative cleft palate which is also evident in this study where 80% of the children identified with either hyper, hypo or mixed resonance problem. The probable reason might be the abnormality in the structure of palate or pharynx. The tissues of the pharynx and palate do not close correctly and increase the air to flow through the nose while speaking (Harding and Grunwell, 1996). Hypernasal speech occurs when there is escape of airflow and acoustic energy into the nasal cavity during speech, commonly due to dysfunction (mechanical or neuromuscular) of the velopharyngeal valving mechanism. Hyponasal speech, by contrast, is caused by reduced nasal cavity resonance during speech, usually due to anatomical obstruction of the nasal cavity (Krik, 2012). Resonance difficulties were found in many other studies; for example: 43.1% participants (out of 1000 participants) were diagnosed with hypernasal speech (Harding and Grunwell, 1996); in the study of Sell et al. (1999) 18% of children in each age cohort (5y & 12y) had consistent mild, moderate, or severe hypernasal resonance and hyponasality was found after pharyngeal flap surgery in 5% to 75% of patients (Scott, Michael, Lucy, John, 2005).

Nasal emission is another cleft speech characteristics following the primary cleft repair. Orgun, et al., (2005) in their study 27 participants were selected as samples who had undergone primary palatoplasty (Veau-Wardill-Kilner technique) and represented nasal emission. After Furlow's palatoplasty still 8 (29.6%) made substantial recovery, but there was no change in 3 participants (11%). This is due to abnormal passing of oral air through a palatal cleft, or from some other type of velopharyngeal inadequacy (VPI), during the production of a consonant that requires a buildup of oral air pressure for proper pronunciation.

The escaping air tends to reduce the oral air pressure and impede the proper production of the consonant.

Dentalization is also a common speech characteristic after palatal fixation and was found highest in number in this study. Dentalization occurs when the dental sounds are not pronounced correctly. This can occur due to complete (unilateral or bilateral) cleft palate where the dental occlusion affects the correct production of dental sounds. In the study of Sell et al. (1999) the most frequently occurring characteristics for both age groups (5y & 12y) was dentalization where out of 238 participants of five years old 114 (47.9%) had dentalization. Dentalization was also evident with 81 (37.2%) participants who were 12 years of age.

Palatalization is another noticeable speech feature of children after the palate surgery. In the study of Sell et al. (1999) palatalization was second most frequently occurring speech difficulties in both age groups along with backing to velar. Palatalization was found with 37.9% and 14.3% (age group 5 and 9 years respectively) children in the study of Sell et al. (1999). Palatalization or palatization refers to a way of pronouncing a consonant in which part of the tongue is moved close to the hard palate. As the palate persists with a cleft in cleft palate, the palatalization occurs.

Backing occurs when alveolar sounds are substituted with velar sounds is a common speech difficulty occurs with post-operative cleft palate children. In Sell et al. (1999, p. 33)'s study out of 238 participants of five years old 64 (26.9%) had backing to velar. Backing was present with 31 (14.3%) participants among the total participants of 218 who were 12 years of age. Backing to velar was second most frequently occurring speech difficulties in both age groups along with Palatalization.

Glottal stop is also a common speech characteristic after palatal fixation and was found second highest in number in this study. The glottal stop is a typical articulation disorder among patients with cleft palate. Published literature in both English and Chinese suggest that the occurrence rate of the glottal stop in cleft patients is 60-90% (Havstam, Lohmander and Persson, 2005). The existence of glottal stop will make the speech unintelligible. The glottal stop compensatory articulation occurs when there is inadequate intraoral air pressure for the production of pressure consonant due to the existence of

velopharyngeal inadequacy (VPI). The CP speakers learn to move anterior sound production position posteriorly where there is a greater amount of air pressure. The speech with the glottal stop is perceived as a brief choking or popping sound in the throat (Kuehn, 2003). Glottal stop was found with 15.2% and 5.6% (age group 5 and 9 years respectively) children in the study of Sell et al. (1999).

Omission of sound is another speech problem that can often persist after cleft palate surgery. In this problem, children with cleft palate omit a required sound in a word position and thus the target word is produced incorrectly. This is because the children with cleft palate generally find it difficult to maintain the proper place of articulation to produce a particular sound. Omission of sound was counted as 29% of cleft palate children between 5 and 14 years of age (McWilliams, Moris and Shelton, 1994).

Many children with post-surgical cleft palate demonstrate misarticulation of sounds. This is due to the cleft either in soft or hard palate or in both palates. McWilliams, Moris and Shelton, (1994) reported that, the most frequently misarticulated sounds were /s/ (63%), /j/ (61%). Bilabial /p/ and /b/ were misarticulated 11% and 9% respectively. The authors also mentioned that /s/ is the speech sound that is most frequently misarticulated by individuals with cleft palate. Similar result was also found in this study where the percentage of misarticulation of /s/ and /j/ was 40 and 28 respectively. The reason behind it /s/ is articulated by the tongue and gum ridge and /j/ is articulated by the tongue and hard palate.

Palatal fistula and velopharyngeal inadequacy (VPI) are also common with post-operative cleft palate children. Palatal fistula was recorded higher in number in past when the surgery for cleft palate was initiated (approximately 70-80%). However, the number reduced gradually (15% for unilateral and 20% for bilateral cleft palate) as time passed (McWilliams, Moris and Shelton, (1994). The number of palatal fistula also depends on the types of surgery. McWilliams, Moris and Shelton, (1994) found 47% fistula of a group of Danish children who had V-Y procedures and only 18% fistula was found who went through with Von Langenbeck procedures. However, in this study the type of surgery was not determined as it was not in the objective of the study.

Velopharyngeal incompetency or inadequacy (VPI) is very common after the CP surgery which is also evident in this study (64%). Berkowitz (2013) found good velopharyngeal function when the score averaged less than 20%, and poor velopharyngeal function was suggested when the score averaged more than 40% and exceeded 80% on producing high-pressured sentence. Peter (2006) reported that “speech impairments specific to VPI include the inability to produce sibilant consonants, including the sounds /s/, /sh/, /jh/, and /ch/; /j/ or soft /g/; and the intraoral pressure consonants /p/, /b/, /t/, /d/, /k/, and hard /g/”. VPI after palatal fixation can fluctuate from 5 to 40 (McWilliams, Moris and Shelton, 1994).

The similar findings about the post-operative cleft palate speech were evident from the interview of the surgeons. All the surgeons informed that they found different speech difficulties when the client comes for the follow up after the palatal surgery. Some of the participants mentioned that speech difficulties after the surgery are: hypernasality, nasal air emission, imprecise consonant, misarticulation, glottal stop. Most of the participants viewed that they found these speech difficulties very common after fixation of the palate. Moreover, all the participants were agreed that hypernasality is the most common speech difficulties after the palatal surgery. Among them one of the surgeons clearly stated “*hypernasality is mostly common after the surgery children with palatal cleft. From my experience I have found many children with nasality when they come for follow up or with any other difficulties*”. Another participant mentioned that- “*sometimes hypernasality occurs due to velopharyngeal insufficiency (VPI) and may need a secondary surgery.*”

The following discussion will focus on speech therapist’s role in cleft palate team and need of speech therapy services for post-surgical CP children:

Speech and Language Therapy (SLT) is a new but growing health care profession in Bangladesh. Many children in Bangladesh with CP have been treated with surgical management and speech therapist can play a significant role in the CP team for proper rehabilitation of these children. All the surgeons informed that speech therapist has a great role in the cleft palate team after the palatal surgery. One of the participants viewed that- “*speech therapist is an important member in the cleft palate team as most of the client needs speech therapy after the surgery*”. Another two

participants also supported this view. A child with cleft palate needs to consult with variety of specialists in order to receive comprehensive management. Speech therapist is an essential professional in the team to evaluate and treating the speech difficulties (Barbara 2005). One of the participants mentioned that- *"I believe a multidisciplinary team can provide more effective treatment for children with post-surgical cleft palate and speech therapist play an important role here"*. Peter (2006) mentioned that, current standards of cleft care include comprehensive multidisciplinary management by a qualified CP team where a speech therapist plays an important role.

After the CP surgery, speech therapist has to work on the development of normal speech (Gajiwala, 2007). McWilliams, et al. (1994) said that *"diagnosis and treatment of craniofacial disorders including cleft lip and palate is provided more effectively and efficiently by an interdisciplinary team that includes a variety of specialist"*.

One of the surgeons stated that- *"speech therapist's role is to provide speech therapy and training/ counseling to the parents/childrenafter surgery"*. According to Cleft Palate Foundation (2006), the speech therapist on the CP team has many responsibilities and should assess child's speech and language development as well as provide speech therapy according to child's need.

One participant told that- *"speech therapist should share his/her ideas in the team and communicate with other members of the team"*. According to McWilliams, et al. (1994) interdisciplinary team should have strong organizational structure and meets face-to-face on a regular basis. The writers also mentioned that good communication and respect among team members are vital to the creation and maintenance of an effective clinical program.

Cleft palate team is essential for the proper management of children with CP. Speech therapist is an important member in this team. Speech therapists play their role by assessing speech and language development, providing speech therapy, providing training to the clients or parents and sharing ideas in the team.

All the participants mentioned that speech therapy service for post-surgical CP children is necessary. One of them mentioned- *"for most of the post-surgical cleft palate children speech therapy service*

*isrequired"*. Another participant stated more strongly- *"obviously speech therapy is necessary after the palate repair and speech therapist should provide speech therapy according to the child's need"*. Moreover, one participant gave reason for such importance. He mentioned that-*"surgeons fix up the anatomical abnormality but speech therapy is needed for the functional outcome of it"*.

Many studies supported this comment. Carla and Nadine (2003) did a study with 397 children with non-syndromic clefts. From these, 56 (14%) received articulation therapy and among the 56 children, 45 did overcome their problems after speech therapy. McWilliams, et al. (1994) mentioned that the main cause for performing surgery of a CP is to create a velopharyngeal valving mechanism that is capable of separating the oral from the nasal cavities during speech. But still after the surgery some children might have speech difficulties and needed speech therapy. Hodgkinson et al, (2005) audited outcomes of 457 children aged 5 or 12 years who had been treated for unilateral cleft lip and palate in the UK. Approximately 33% of 5 year olds and 14% of 12 year olds presented with serious consonant articulation errors. McWilliams, et al. (1994) stated *"articulation therapy is the key speech therapy service for patients with cleft palate who misarticulate"*.

A basic problem for individual who have palatal clefts is VPI even after the surgical correction (McWilliams, et al. 1994). One of the participants stated that- *"speech therapy can be helpful for the post-surgical cleft palate children associate with velopharyngeal incompetency. Speech therapist can improve the function of velopharynx if it is minor"*. The other surgeon viewed that- *"speech therapy is needed to teach the child for correct articulation"*. McWilliams, et al. (1994) listed four goals of speech therapy for cleft patients. Among them the 3rd one is *"teaching correct articulation of all consonants and vowels and the ability to use those sounds in all position on words and in blends as well"*.

Speech therapy is a new profession in Bangladesh. There are lots of children have been treated surgically but are not getting sufficient speech therapy services. So, speech therapy is needed after the surgery to treat the child's speech difficulties.

### Limitation of the study

The study has some limitations. First of all, the number of participants was small. Moreover, the participants were selected using non-random purposive sampling that may not represent all the two to seven years old post-operative cleft palate children in Bangladesh. Moreover Socio-economic status (SES), which could not be controlled in this study, may confound the results. Thirdly, no psychological assessment was conducted to identify the cognitive ability of CP children. Moreover, instrumental materials to assess velopharyngeal function were not available to the researcher which might impact on the overall findings of the study. Finally, some other influential factors for children's speech difficulties were not measured and controlled in systematic way such as children's phonological abilities, literacy skills, communicative environment and parent's education.

### Conclusion

This was an initial exploratory study on necessity of speech therapy services for post-surgical cleft palate children in Bangladesh. The results of the study provide a reflection of post-surgical cleft palate children's speech characteristics, as well as the role and importance of speech therapists in cleft palate management. It has been found through this study that most of the children represented with different CP speech difficulties (such as: hyper or hypo nasality, nasal emission, dentalization, Palatalization, backing, glottal stop, misarticulation of sounds, omission of sounds, velopharyngeal incompetence) after their palatal surgery and speech therapy was required for a high number of children. Moreover, the interview from the surgeons determined that speech therapists are the important members in the cleft palate care team and speech therapy is needed after the surgery to treat the child's speech difficulties. Although the study findings might not be representative for the whole population due to limited number and non-randomization of the participant's selection, in this context, this study can be used as a baseline document for further insight study on cleft palate children's overall communication skills and their management.

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