

A Networking of Community-Based Speech Therapy: Borabue District, Maha Sarakham

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Background: Most children with cleft lip and palate have articulation problems because of compensatory articulation disorders from velopharyngeal insufficiency. Theoretically, children should receive speech therapy from a speech and language pathologist (SLP) 1-2 sessions per week. For developing countries, particularly Thailand, most of them cannot reach standard speech services because of limitation of speech services and SLP. Networking of a Community-Based Speech Model might be an appropriate way to solve this problem.

Objective: To study the effectiveness of a networking of Khon Kaen University (KKU) Community-Based Speech Model, Non Thong Tambon Health Promotion Hospital, Borabue, Maha Sarakham, in decreasing the number of articulation errors for children with CLP.

Material and Method: Six children with cleft lip and palate (CLP) who lived in Borabue and the surrounding district, Maha Sarakham, and had medical records in Srinagarind Hospital. They were assessed for pre- and post- articulation errors and provided speech therapy by SLP via teaching on service for speech assistant (SA). Then, children with CLP received speech correction (SC) by SA based on assignment and caregivers practiced home program for a year.

Results: Networking of Non Thong Tambon Health Promotion Hospital, Borabue, Maha Sarakham significantly reduce the number of post-articulation errors for 3 children with CLP. There were factors affecting the results in treatment of other children as follows: delayed speech and language development, hypernasality, and consistency of SC at local hospital and home.

Conclusion: A networking of KKU Community-Based Speech Model, Non Thong Tambon Health Promotion Hospital, Borabue, and Maha Sarakham was a good way to enhance speech therapy in Thailand or other developing countries, where have limitation of speech services or lack of professionals.

Keywords: Networking, Cleft palate, Speech therapy

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Even though some children with cleft lip and palate (CLP) can acquire normal articulation after cleft lip and palate repair, most of them have maladaptive speech disorders, including compensatory articulation disorders, delayed speech and language development, voice abnormality, resonance disorders and from abnormal articulators⁽¹⁾. They commonly have compensatory articulation from velopharyngeal insufficiency⁽²⁻⁵⁾. Our retrospective study found that children with clefts had speech abnormalities 88.56% [95% confident interval (CI) = 84.47-92.65]⁽⁶⁾.

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Articulation patterns were composed of functional articulation disorders (23.31%; 95% CI = 17.87-28.74), compensatory articulation disorders (11.02%, 95% CI = 6.99-15.04), functional and compensatory articulation disorders (53.39%, 95% CI = 46.98-59.80) as well as organic articulation disorders 0.85% (95% CI = -0.33-2.03), respectively⁽⁶⁾. Analysis of articulation patterns in current research revealed that velar, glottal, and pharyngeal characteristics were common types in characteristics of cleft palate speech^(7,8). For early intervention for children aged <3-4 years old, speech and language pathologist (SLP) provides the information for parents or caregivers to exaggerate articulation for being good models, thus children correctly imitate articulation. For children aged older than 3-4 years, assessment of articulation and speech

therapy (ST) should be provided in a formal schedule. SLP usually provides formal speech therapy based on normal articulation development. Speech therapy generally focuses on solving articulation, resonance, and voice production to be normal or nearly normal as soon as possible for the prevention of habitual compensatory articulation disorders⁽⁹⁻¹¹⁾.

ST is generally received with continuous therapy 1-2 sessions a week in developed countries while only 1 session in 1-6 months in Thailand or any developing countries, where speech services were limited, and 1-2 sessions/year from a interdisciplinary team or none in countries where speech services were not available⁽¹²⁻¹⁸⁾. This results in delayed speech therapy leading to a need for a longer duration of treatment from habitual compensatory articulation disorders.

Community-based speech therapy model and networking was developed in 2003, then has been conducted and implemented in various areas in Thailand^(15,19). Results revealed that this model significantly reduced the number of articulation errors^(20,21). Khon Kaen University (KKU) Community-Based Speech Therapy Model was one model that was implemented in Maha Sarakham Province. This established networking for 6 districts, including Mueng, Borabue, Kosum Phisai, Kantharawichai, Wapi Pathum, Chiang Yuen, for 3 years. The objective of this study was to determine the effectiveness of Non Thong Tambon Health Promotion Hospital, Borabue networking, a site of Khon Kaen University (KKU) Community-Based Speech Therapy Model, in reduction of the number of articulations errors for children with CLP. This study was approved by Khon Kaen University Ethic Committee. According to the Helsinki Declaration (Phase I: HE531358; Phase II: HE55116; and Phase III: HE561402), the Ethics Committee of Khon Kaen University reviewed and approved the research protocols.

Material and Method

Study design

This prospective community-based study was a part of Khon Kaen University community-based speech therapy model for clefts. Non Thong Tambon Health Promotion Hospital, Borabue was only for networking in a primary health care unit at Tambon level.

Participants

Children with CLP aged 3; 6-15 years who lived

in Borabue district and surrounding area and could easily access Non Thong Tambon Health Promotion Hospital. They already had repaired cleft lip and palate and had medical history in Srinagarind Hospital. There were 2, 3, and 2 children with CLP enrolled in the 1st, 2nd, and 3rd year projects, respectively. Unfortunately, a girl withdrew from the 3rd year project, thus, six children were included in this study.

A comprehensive meeting for health care providers at the beginning of each year's project was conducted. Children were formally assessed by qualified SLPs for baseline parameters and post treatment including:

Oral examination and facial grimace.

Speech abnormality with perceptual assessment of speech for cleft using the Thai Universal Parameters of Speech Outcomes for People with Cleft Palate⁽²²⁾. Outcomes were summarized by consensus between two qualified SLPs. Speech characteristics were assessed as follows: Articulation, Resonance, Voice, Intelligibility, Nasal emission/turbulence.

Language screening test: Adapted Thai Early Language Milestone: ELM⁽²³⁾ for children aged ≤ 4 years old and UTAH test of language development⁽²⁴⁾ for children aged >4 years old.

Speech correction (SC) by a speech assistant (SA), a nurse who worked in Non Thong Tambon Health Promotion Hospital, was monitored via teaching on service by SLP as follows:

1) The 1st year project: Teaching on service was conducted by SLP in a 3-day speech camp, followed by a 1-day follow-up speech camp at Maha Sarakham Hospital every 2-months. SC was performed by SA at home, every week, for 9 months.

2) The 2nd year project: Teaching on service was conducted by SLP in a 1-day speech camp at Maha Sarakham Hospital. There was a 1-day follow-up service and site visit at Non Thong Tambon Health Promotion Hospital. SC by SA was conducted at a local hospital, twice a month, for 9 months. Counseling between SLP and SA could be done any time.

3) The 3rd year project: Teaching on service was conducted by SLP in a 1-day speech camp at Srinagarind Hospital. There were a 1-day follow-up service and a site visit. SC by SA was conducted twice a month, for 9 months. Counseling between SLP and SA could be done any time.

Assessment and demonstration was also conducted in each speech camp and follow-up activities. SLP assigned individual home programs for SA and caregivers. Children were provided speech

therapy approximately 3-4 45-minute sessions by SLP in each speech camp and follow-up service. Caregivers also carried on SC for children approximately 3-4 30-minute sessions a week. Manual of Speech Correction for Children with Cleft Palate: Paraprofessionals and Caregivers⁽²⁵⁾ and Exercises for Articulation Correction⁽²⁶⁾ was used for reference. Daily Home Record of Speech Correction⁽²⁷⁾ was monitored for giving feedback for both SA and caregivers in a follow-up camp by SLP. This article was a part of the effectiveness of networking of Khon Kaen University Community-Based Speech Model.

Formal assessment of post-perceptual speech abnormality by using the Thai Universal Parameters of Speech Outcomes for People with Cleft Palate⁽²²⁾ was performed to quantify the effectiveness of Community-Based Speech Model for decreasing the number of articulation errors in local site of Non Thong Tambon Health Promotion Hospital.

Analysis

The main outcome was the number of articulation defects calculated from pre- and post-speech camps. Perceptual assessments were also scored: resonance as normal (0), hyponasality (-1), mild hypernasality (+1), moderate hypernasality (+2), severe hypernasality (+3); nasal emission/turbulence as none and present; voice as normal and abnormal; language was scored as pass and delay.

Descriptive analysis was performed for general children's characteristics and satisfaction assessment. Paired-test was used to demonstrate the effectiveness of "Networking of KKU Community-Based Speech Therapy Model: site of Non Thong Tambon Health Promotion Hospital" by comparing the number of pre- and post-articulation errors in children with cleft palate (these data were part of total of 44 children with clefts, who enrolled the main project that were tested by

Shapiro-Wilk and indicated they were in normal distribution).

Results

Characteristics of six children with CLP in the study are presented in Table 1. Children with CLP in this study were diagnosed as left cleft lip and cleft palate (33.33%) and cleft palate (66.67%) and ratio of male: female was 1:1.

For children with CLP's speech and language skills, descriptive data are displayed in Table 2. A boy (No. 4) had no articulation errors at the beginning of the project and did not receive any intervention. He was only followed-up for long-term speech results. Therefore, his speech outcome was not recruited for comparison between the number of pre- and post-articulation errors. The number of children included in the comparison was five cases. Paired t-test showed that there were no significant decreases in the number of articulation errors (Table 3).

Discussion

All children were aged between 5 and 8 years. These children lately received speech therapy because of limitation of speech services and many reasons including low economic status, lack of referral system, etc⁽¹⁵⁾. Therefore, some children (numbers 5 and 6) still had remaining articulation errors. They were used to incorrectly articulate for a long time, which usually requires a prolonged period of speech therapy^(9,28,29).

A boy who did not receive any intervention in this project (No. 4) had appropriate language skill by UTAH language test for children aged 8 year old at the beginning of project but he did not pass the language skill for children aged 9 year old, particularly on the items of direction, time, and details of current date at the end of project that result in delayed speech and language development. From our experience, it is

Table 1. Characteristics of 6 children with CLP

No.	Age (year: month)	Gender	Projects			Diagnosis
			The 1 st	The 2 nd	The 3 rd	
1	7:7	Male	✓			Cleft palate
2	7:8	Female	✓			Left cleft lip and cleft palate
3	8:1	Male		✓		Cleft palate
4	8:7	Male		✓		Cleft palate
5	8:8	Female		✓		Left cleft lip and cleft palate
6	5:8	Female			✓	Cleft palate

Table 2. Speech and language skills

No.	Language	Resonance		Understandability*		Acceptability**		Voice		Number of articulation			
		Pre	Post	Pre	Post	Pre	Post	Pre	Post	Word		Sentence	
										Pre	Post	Pre	Post
1	Delayed	Pass	0	0	N/A	Normal	N/A	Normal	Normal	6	0	6	0
2	Pass	Pass	+2	+2	N/A	Mild	N/A	Abnormal	Abnormal	19	10	16	9
3	Delayed	Delayed	0	0	Normal	Normal	Normal	Normal	Normal	1	2	3	2
4	Pass	Delayed	0	0	Normal	Normal	Normal	Normal	Normal	0	0	0	0
5	Pass	Pass	+2	+2	Mild	Mild	Mild	Abnormal	Normal	5	4	8	7
6	Pass	Pass	0	0	Mild	Mild	Mild	Normal	Normal	10	3	7	5

* Normal = Within normal limits; Speech is always easy to understand; Mild = Speech is occasionally hard to understand; Moderate = Speech is often hard to understand; Severe = Speech is hard to understand most or all of the time

** Normal = Within normal limits; Speech is always easy to understand; Mild = Speech deviates from normal degree; Moderate = Speech deviates from normal to a moderate degree; Severe = Speech deviates from normal to a severe degree
N/A: Data were not available

common that most Thai children who had delayed speech and language failed in these language skills. It might be possible that these aspects were not focused in formal Thai education, thus, most children did not pass these language skills.

For voice assessment, 2 girls (No. 2 and 5) had voice disorders; one of them had voice improvement at the end of the project. This was an additional outcome, which focused on an articulation remedy. It might be claimed that voice abnormality resulted from compensatory velopharyngeal insufficiency and compensatory articulation disorders^(6,30-33); therefore, voice quality might be improved via articulation correction.

Paired t-test did not show significant difference between the number of pre- and post-articulation errors after remedy (Table 3). This negative effect might be caused by 1) a child who had no improvement at word level and only one articulation error was corrected at sentence levels (No. 3). He was diagnosed as delayed speech and language development, thus, he might have difficulty in learning new articulation because of a linguistic system characterized by absent phonological representation for target sounds⁽³⁴⁾. For more details, his caregivers received good co-operation for SC at home; however, he mostly visited SA at the local hospital, but only once a month and could not imitate four syllable phrases or sentences. Therefore, he had the least improvement; 2) a girl who had decreased the number of articulation errors in only one sound, both at word and sentence levels that might be the result of moderate hypernasality. It was an important factor for speech improvement; 3) these data were part of the main project, of which outcomes were in normal distribution. Mean difference was suitable for detecting different effects⁽³⁵⁾. Even though, data in pre and post outcomes had high correlation (86.76 for word level and 85.8 for sentence level), the number of samples to determine the effect of difference might not be enough power for detection (power of test was 34.9 for word level and 42.5 for sentence level). Thus, paired t-test analysis did not show significant statistical difference.

Regarding each child's pre- and post- number of articulation errors, particularly children No. 1, 2, 6 (Table 2) and mean difference (Table 3) both in word and sentence levels, results revealed a significant reduction in the number of post-articulation errors after implementation of Khon Kaen University Community-Based Speech Therapy Model. Cooperation of SC by SA under SLP's supervision at local hospitals, near

Table 3. Comparison between the number of pre- and post- articulation errors

Number of children	Level	Pre-test	Post-test	Mean difference (95% CI)	p-value
5	Word	8.20 (6.83)	3.80 (3.77)	4.40, 95% (-0.84, 9.64)	0.080
	Sentence	8.00 (4.85)	4.60 (3.65)	3.40, 95% (-0.18, 6.98)	0.058

their home and encouragement from caregivers to do the home program was a model, with the co-operative commitment from the community, e.g. local hospitals, and tertiary or institutional health care units for solving problems given the limitation of speech services in Thailand. This result agreed with previous studies^(13,21,28,36-38). Improvement of articulation skills in this study showed similar outcomes with previous reports about providing speech therapy with other methods^(12,13,37,39-41). Networking of Community-Based Speech Model could be also adapted to interdisciplinary or multidisciplinary approaches⁽⁴²⁾.

Conclusion

Networking of Community-Based Speech Therapy Model for SC in Non Thong Tambon Health Promotion Hospital, Borabue was an effective method for the improvement of articulation disorders in children with CLP.

What is already known on this topic ?

Speech abnormalities are common problems in clefts. Children with clefts should be provided with early speech therapy as soon as possible for the prevention of a long lasting compensatory articulation habit needing longer duration for treatment. Most children with clefts in developing countries cannot reach speech therapy because of lack of speech services. Many speech therapy models were established for providing speech therapy in these countries.

What this study adds ?

Networking of Khon Kaen University Community-Based Speech Therapy Model, Non Thong Tambon Health Promotion Hospital, Borabue District, Maha Sarakham Province, reduced the number of articulation errors for children with clefts.

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Potential conflicts of interest

None.

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เครือข่ายของการฝึกพูดในชุมชน: อำเภอบริบูรณ์ จังหวัดมหาสารคาม

ทวิตรี ภูมิหน้า, แววดา คำอูด, เบญจมาศ พระธานี

ภูมิหลัง: เด็กปากแหว่งเพดานโหว่ส่วนใหญ่มีปัญหาการพูดไม่ชัดแบบชัดเจนเนื่องจากความบกพร่องของเพดานอ่อนและผนังคอหอย ซึ่งโดยหลักการเด็กควรได้รับการฝึกพูดจากนักแก้ไขการพูด 1-2 ครั้ง/สัปดาห์ แต่เด็กปากแหว่งเพดานโหว่ส่วนใหญ่ในประเทศที่กำลังพัฒนาโดยเฉพาะประเทศไทยไม่สามารถเข้าถึงบริการด้านการฝึกพูดอย่างมาตรฐานได้ เนื่องจากมีความจำกัดของการบริการด้านการแก้ไขการพูดและการขาดแคลนนักแก้ไขการพูด เครือข่ายการฝึกพูดในชุมชนอาจเป็นวิธีที่เหมาะสมในการแก้ปัญหาดังกล่าว

วัตถุประสงค์: เพื่อศึกษาประสิทธิภาพของเครือข่ายของรูปแบบการฝึกพูดในชุมชนของมหาวิทยาลัยขอนแก่น ในพื้นที่ของโรงพยาบาลส่งเสริมสุขภาพประจำตำบลโนนทอง อำเภอบริบูรณ์ จังหวัดมหาสารคาม ในการลดจำนวนเสียงที่พูดไม่ชัดของเด็กปากแหว่งเพดานโหว่

วัสดุและวิธีการ: เด็กปากแหว่งเพดานโหว่ 6 คนที่มีภูมิลำเนาอยู่ในอำเภอบริบูรณ์หรือพื้นที่ใกล้เคียงกับ อำเภอบริบูรณ์ จังหวัดมหาสารคาม และมีประวัติการรักษาที่โรงพยาบาลศรีนครินทร์ โดยเด็กได้รับการประเมินภาษาและการพูดจากนักแก้ไขการพูดทั้งก่อนและหลังเข้าร่วมโครงการเวลา 1 ปี และได้รับการฝึกพูดโดยนักแก้ไขการพูดด้วยวิธีการสอนแสดงสำหรับผู้ช่วยฝึกพูดที่เป็นพยาบาล 1 คน หลังจากนั้นเด็กได้รับการฝึกพูดจากผู้ช่วยฝึกพูดตามโปรแกรมที่ได้รับจากนักแก้ไขการพูดและผู้ปกครองช่วยฝึกที่บ้าน

ผลการศึกษา: เครือข่ายของโรงพยาบาลส่งเสริมสุขภาพประจำตำบลโนนทอง อำเภอบริบูรณ์ จังหวัดมหาสารคาม สามารถลดจำนวนเสียงพูดไม่ชัดได้อย่างชัดเจนในเด็กปากแหว่งเพดานโหว่ 3 คน มีปัจจัยที่เกี่ยวข้องกับผลการฝึกพูดในเด็กคนอื่น ๆ ได้แก่ การพัฒนาภาษาและการพูดล่าช้า การมีเสียงขึ้นจมูกมากเกินไปและความสม่ำเสมอของการฝึกพูดที่บ้านและที่โรงพยาบาลเครือข่าย

สรุป: เครือข่ายของรูปแบบการฝึกพูดในชุมชนของมหาวิทยาลัยขอนแก่นในพื้นที่ของโรงพยาบาลส่งเสริมสุขภาพประจำตำบลโนนทอง อำเภอบริบูรณ์ จังหวัดมหาสารคาม เป็นวิธีหนึ่งที่ดีในจัดบริการด้านการแก้ไขฝึกพูดในประเทศไทย หรือประเทศที่กำลังพัฒนาที่มีความจำกัดด้านการบริการด้านการแก้ไขการพูดหรือขาดแคลนนักแก้ไขการพูดได้
