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The Development of manual for speech and language treatment for parents of children with cleft palate ages 0-3 years old

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ABSTRACT

Background: Cleft palate is a congenital disability affecting the palate's structure and function, which may lead to delayed speech and language development and communication disorders. There is a shortage of speech therapists in Thailand. Therefore, developing a manual for speech and language treatment for the parents of children with a cleft palate would be an essential early intervention that parents could perform.

Objectives: This research aimed to develop a speech and language treatment manual for parents of children with cleft palate ages 0-3 years old and evaluate the manual's effectiveness, satisfaction, and feedback.

Materials and methods: This research was divided into Phase 1, which involved developing a speech and language treatment manual for parents of children with cleft palate ages 0-3 years old and assessing its validity and reliability. Phase 2 tested the manual's effectiveness by conducting a three-month of 16 participants, who were divided into two groups: A control group without the manual and an experimental group with the manual and phase 3 data analysis.

Results: The content validity of the manual and satisfaction of the questionnaires were found to have a content validity index of 0.87 and 0.92, respectively. The total language and speech development scores before and after participating between groups found a statistically significant difference. After participating, the number of the experimental group who passed the 90th percentile of language development was higher than the control group. The language between the children and parents showed that the experimental group displayed more communication skills than the control group.

Conclusion: The speech and language treatment manual for parents of children with cleft palate ages 0-3 years old could stimulate the language and speech development of the experimental group more effectively than the control group that did not receive the manual.

Introduction

Cleft lip and palate (CLP) are a congenital anomaly of the facial structure of the lips and palate caused by the failure of fetal facial development during incomplete fusion of the fetus. As a result, the upper lip and palate have separated.[1]

Children with a congenital anomaly with CLP represent a worldwide average prevalence of about one to two per 1,000 live births, while in Thailand, the prevalence is approximately 0.58-2.49 per 1,000 live births. The highest

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incidence is found in the Northeastern region of Thailand, with approximately 2.49 per 1,000 live births or around 700-800 cases per year.[2]

Although the surgical treatment could help with oral consumption and external appearance, some issues remain and impact speech mechanisms, such as respiration (some people have short breathing and/or hoarseness), phonation, articulation, and resonance.[3] In some cases, people could also experience hearing problems. Consequently, these impacts often lead to speech and language development delays, especially in children under three years old. In most cases, playing complex sounds is challenging, which results in a delay in combining sounds to form meaningful words and combining words, thus eventually leading to limitations in vocabulary development and speech use.[4,5] Moreover, receptive language and expressive language abilities could be delayed.[6,7] Furthermore, there may be a limitation in the lexical vocabulary bank, a limited ability to play consonant sounds, or a lack of diversity compared to typical children.[4] Problems with articulation disorder, resonance, mispronunciation of sounds or rhythms, and compensatory articulation disorders could also occur.[3,4] Accordingly, it could be concluded that a cleft palate would increase the risk of communication difficulties, resulting in delayed language development and speech problems if not diagnosed and treated.[8] Additionally, this could increase the risk of language and learning disabilities when the child enters school.[8] Language and speech are important tools for communication, learning, and development of various skills, as well as for everyday life. As such, communication difficulties could lead to emotional and social difficulties that could impact communication and learning in daily life, as well as other areas of development. Therefore, children with a cleft palate would need to receive language and speech therapy, as children with this condition would be more likely to have delayed language and speech development or speech impairments. Hence, early intervention would be a critical process providing the necessary counseling and therapy to the parents and children[9] to prepare them to develop their full potential during the early learning stage, which would vary according to each child and family.[10,11] The objective of language and speech therapy for children with a cleft palate with and without a cleft lip would be to stimulate sound production, increase the variety of consonant sounds, improve control of the airflow in the mouth, and expand the vocabulary bank.[12] As such, early intervention should begin before the child starts producing consonant sounds or speaking[13,14] to prevent a delay in language and speech development and reduce the severity of speech impairments.[14]

Language and speech therapy is an ongoing yet long-term process requiring speech therapists' involvement. However, there is a need for more speech therapists in many areas of Thailand, which has limited access to continual therapy for children in need. Therefore, this study recognized the importance of early intervention in language and speech therapy, which would require the active participation of the parents to stimulate or train their children and reduce the risk of delayed language and speech development. Consequently, parents need to be educated about language and speech development and techniques and strategies to guide and support their children during the therapy sessions.[15]

The researchers, thus, realized the significance of developing a manual for speech and language treatment for parents of children with a cleft palate aged 0-3 years old. The manual would be provided to parents who would be the primary trainers at home so they could understand and effectively apply the training methods at home. This would allow children with a cleft palate to access appropriate language and speech stimulation and improve their language and speech development, which could reduce the severity of language and speech impairment and enhance their efficiency in communication. Thus, this research aimed to develop a manual for speech and language treatment for parents of children with a cleft palate aged 0-3 years old and to evaluate the content validity of the manual before being employed in further assessment of its effectiveness.

Material and methods

This study aimed to not only develop and test the effectiveness of a parental manual for speech and language in children with a cleft palate aged 0-3 years old but also to assess the satisfaction of the parents in using the manual and to inquire into the problems and suggestions from using the manual for further development. The Ethics Committee for Human Research, Faculty of Medicine, Chulalongkorn University, Bangkok, Thailand, approved this research project with project number COA No. 1133/2022.

Participants

This study involved 16 children with a cleft palate with or without a cleft lip. They were divided into a control group of eight participants whose parents did not receive the parental manual and an experimental group of eight participants whose parents received such a manual. All participants were aged 0-3 years.

1. The experimental group of eight participants comprised one child aged 0-12 months, five children aged 13-24 months, and two children aged 25-36 months.
2. The control group of eight participants consisted of one child aged 0-12 months, five children aged 13-24 months, and two children aged 25-36 months.

Procedures

Phase 1: *Develop a speech and language treatment manual for parents of children with cleft palate ages 0-3 years old.*

After collecting all the relevant documents about the concepts, rehabilitation theories, language, and speech development in children with a cleft palate, including researching parental involvement in language and speech development and the methods for developing the manual, the development process of this manual was as follows:

1.1 The researchers determined the size of the

book, including the cover, introduction, table of contents, objectives of the manual, instructions for using the manual, language and speech treatment for children aged 0-3 years, information about cleft lip and palate, speech and language problems in children with a cleft palate, stimulation of language and speech development, which consisted of pictures, objectives of the activities, samples of the activities descriptions, expected results, activity record forms, problems or questions that could arise, and topics to be used in the satisfaction assessment form.

1.2 The researchers drafted the manual's content by selecting only relevant information and using simple and basic vocabulary to suit the user group's role and educational level. The content was divided into sections on the methods or strategies used for stimulating language and speech development, along with incorporating illustrations and captions that were corresponsive to the objectives, plans, or strategies used during the training in a precise sequence. A record form for activities was also designed. After completing the manual, the researchers created a satisfaction assessment form by drafting the instructions and questions aligned with the manual by referring to the principles of creating an assessment form.

1.3 The accuracy of the language used in the manual and the satisfaction assessment form was tested content validity by five speech-language pathologist experts.

1.4 Finding the congruence between the manual and satisfaction assessment form was verified.

The researchers presented a training and development manual for speech and language treatment for the parents of children with a cleft palate with and without a cleft lip aged 0-3 years and an evaluation form of satisfaction with the manual. The manual was presented to five qualified experts who met the criteria of being a speech therapist with at least a Master's degree and a minimum of 10 years of experience working with children with a cleft palate with and without a cleft lip. Subsequently, the researchers analyzed the index of item objective congruence (IOC) of the manual, including the appearance and content of the introduction, table of contents, objectives, methods of use, training methods, expected results, and images. Additionally, the researchers analyzed the IOC value of the satisfaction evaluation form and gathered the experts' feedback to improve the manual's content and evaluation form. This ensured that they were aligned with the research objectives and definitions of the terminology. Once the experts reviewed and approved the manual, it was produced as the final version.

Phase 2: *Trial of the manual*

The researchers evaluated language and speech development using the Thai Speech and Language Test (TSLT)[17] assessment tool for children aged 0-4 years. They recorded a 30-minute video of the parents and children playing together freely. After recording, the research participants, including the parents, received training and guidance on language stimulation techniques. This was the first time the experimental group had received the manual and guidance, while the control group did not receive any. The data were collected over three months. The researchers scheduled the participants to attend sessions for data collection once a month as follows: Session 2 in week 4, Session 3 in week 8, and Session 4 in week 12. For the participants to receive initial language and speech therapy by the speech therapist, during Session 4, the researchers assessed the language and speech development using the same evaluation form.[17] A 30-minute video was recorded while the participants played freely with their parents. The parents from the experimental group assessed their satisfaction and provided suggestions for improving or developing the manual, which the control group received at the end of the study. The researchers provided the pre and post-participated evaluation results video recordings by TSLT and language use between children and parents while playing independently for 30 minutes to another speech-language pathologist to score and transcribe to assess the participants' language and speech development to compare language and speech development progress, including differences in language use before and after each person participating in the research and between the control group and the experimental group after participating in this project.

Phase 3: *Data analysis*

1.1 Analysis of the data on the content validity was determined by considering the opinions of the five experts and calculating the value of the IOC, which had to be at least 0.5, according to the experts' assessment. It was found that the manual and satisfaction assessment forms have the content validity index for the entire set at 0.87 and 0.92, respectively.

1.2 Analysis of language comprehension and expression development were assessed before and after participating in this project using the Mann-Whitney U test and comparing it with the percentile rank[17] between the control and experimental groups to measure the effectiveness of the manual.

1.3 Analysis and comparison of the pre and post-language development were conducted using video and audio recordings of each participant, which were recorded before and after participating in the research project. For other another speech-language pathologist to evaluate and transcribe audio. This is to prevent bias and help to see differences in language use between parents and children.

Results

The study aimed to develop a speech and language

treatment manual for parents of children with cleft palate ages 0-3 years old. The results of this study were as follows:

1. The level of consistency between the objectives and the format and content (IOC value) of the manual was appropriate. The appearance of the manual's components, such as font and image size, was clear and suitable for usage. The instructions on using the manual were understandable and appropriate for the objectives of each age group. The methods and strategies were correct and consistent with the relevant purposes. This manual was also easy to understand, appropriate, and straightforward. From a total of 66 content items, five experts expressed their opinions within the range of 0.6-1, and the overall consistency value from evaluating the effectiveness (IOC value) was 0.87.
2. The level of consistency between the objectives and the format and content (IOC value) of the evaluation form for satisfaction after using the manual in terms of its appearance, accessibility, instructions, font size, and use of the questions or content was correct, appropriate, complete, and clear. Five experts evaluated all 16 items; their comments were between 0.6-1. The consistency score from the IOC assessment was 0.92.
3. The results from assessing the development in receptive and expression of language between the control and the experimental groups are shown in Table 1.

Table 1 Comparative speech and language assessment analysis between the experimental and control groups.

Participants		n	Mean	SD	Median (Lo; up)	Mean Difference	Sum Rank	Mann-Whitney U Value	P Value	95 % CI	
										Low	Upper
Pre	Control Group	8	9.00	5.65	6.50 (4;15)	0.25	64.50	28.50	0.71	- 5.00	4.00
	Experimental group	8	9.00	4.37	7.50 (5; 18)		71.50				
Post	Control group	8	20.87	5.69	20.50 (15; 29)	8	48.00	12.00	0.03	3.50	16.00
	Experimental group	8	29.75	7.38	30.00 (19; 39)		88.00				

From Table 1**,** The results of the language development and speech assessment between the control and experimental groups that were done before participating in the research showed that the average scores of both groups were nine points. When comparing the total scores of the speech and language development between both groups before participating in this study using the Mann-Whitney U Test, it was found that there was no statistically significant difference (p<0.05).

On the other hand, the post-participating speech and language development assessment results between the control and experimental groups showed that the control group had an average score of 20.87 points. In contrast, the experimental group had an average score of 29.75 points. When comparing the total scores of speeches and language development between the control and experimental groups after participating in the research project using the Mann-Whitney U Test, it was found that there was a statistically significant difference between the two groups (p<0.05).

The difference in the total scores between the pre- and post-speech and language development among the two groups revealed that the control group had a mean score difference of 11.87 points, and the experimental group had a mean score difference of 20.75 points. Moreover, after comparing the scores between the two groups using the Mann-Whitney U Test, it was found that there was a statistically significant difference (p<0.05).

Table 2 depicts the total speech and language performance of the control group after participating in this study; only two participants passed the 90% percentile benchmark. Simultaneously, five participants from the experimental group passed the 90% percentile criteria.

From Table 3, The language use data of the research participants were evaluated through a 30-minute video recording of free play between the children and their parents. Comparing the pre- and post-participation, it was found that the speech and language development of the participants in both the control and experimental groups improved. The area that showed the greatest improvement was their ability to express themselves in language, as seen in the age range of 0-12 months, where there was no sound or communication through speech before joining this study. However, after the post-participation, they were able to communicate with meaningful words. In the age range of 25-36 months, the experimental group developed from one to two-word utterances to communicate in complete sentences. The clear difference between the two groups was the diversity and number of vocabulary used, thus noting that the experimental group appeared to have a more extensive and diverse vocabulary.

Table 2 Total speech and language score comprehension of the control and the experimental groups. Pre and Post-participation in the study compared to the percentile.[17]

Age (Months)	Participants	Receptive Language				Expressive Language				Total Speech and Language Score			
		Result		Percentile		Result		Percentile		Result		Percentile	
		Pre	Post	75	90	Pre	Post	75	90	Pre	Post	75	90
12	Control group	41.66	141.66	91.67	100.00	41.66	100.00	112.50	116.67	50.00	120.83	100.00	104.17
	Experimental group	58.33	141.66			41.66	150.00			50.00	145.58		
15	Control group	0.00	80.00	80.00	80.00	33.33	80.00	43.34	60.00	16.67	80.00	53.33	65.67
		0.00	40.00			26.66	60.00			13.33	50.00		
	Experimental group	80.00	140.00			40.00	120.00			60.0	130.00		
		26.66	86.66			13.33	86.66			20.00	86.66		
18	Control group	72.22	94.44	77.78	77.78	33.33	50.00	75.00	88.89	52.76	72.22	75.00	81.95
		50.00	83.33			33.33	55.55			41.67	69.44		
	Experimental group	44.44	83.33			22.22	122.22			16.67	102.78		
		33.33	88.88			22.22	38.88			27.78	63.89		
24	Control group	12.50	33.33	70.83	75.00	4.16	37.50	56.25	60.42	8.33	35.42	61.46	64.58
	Experimental group	4.16	33.33			33.33	108.33			18.75	70.58		
30	Control group	6.66	20.00	73.33	73.33	13.33	30.00	10.00	13.33	10.00	25.00	83.33	86.67
	Experimental group	16.66	56.66			0.00	26.66			8.33	41.67		
36	Control group	8.33	22.22	25.00	27.78	11. 11	22.22	22.22	25.00	9.72	22.22	44.44	50.00
	Experimental group	8.33	25.00			8.33	27.77			8.33	26.39		

Table 3 Comparison of the language used between the control and experimental groups for pre and post-participation.

Participants		Pre	Post
0-12 months	Control group	1. No consonants and vocal play. 2. Not saying meaningful words. 3. Crying was the main form of communication.	1. Spoke in one-syllable words for repetition. 2. Mainly used gestures to communicate. 3. The types of words were nouns and verbs.
	Experimental group	1. No consonants and vocal play. 2. Not saying meaningful words. 3. Crying was the main form of communication.	1. Spoke in one-syllable words meaning to request, answer, or respond to parental communication. 2. Used common gestures to communicate. 3. The types of words were nouns and verbs.
13-24 months	Control group	1. Spoke in one syllable, meaning to request, refuse, and repeat the last syllable. 2. The types of words were nouns and verbs.	1. Spoke in one syllable, meaning to request, refuse, and answer with common gestures to communicate. 2. The types of words were nouns, verbs, and adverbs.
	Experimental group	1. Spoke in one syllable, meaning to express a wish. 2. Rarely followed or communicated during playtime with the parents. 3. The types of words were nouns and verbs.	1. Spoke one to two syllables to indicate a rejection, answer, request, persuade, and/or respond more quickly to parental communication. 2. There were more varieties of words. 3. The types of words were nouns, verbs, adverbs, and prepositions.
25-36 months	Control group	1. Spoke two syllables, short phrases, and sentences to request, give information, or perform actions while playing pretend. 2. The types of words were nouns, verbs, and adverbs.	1. Spoke two syllables at the level of a phrase or sentence (subject + action + object). 2. Rearranged words in sentences 3. There was a limited vocabulary in communicating using words instead. 4. The types of words were nouns, verbs, and adverbs.
	Experimental group	1. Used own language and gestures. 2. Spoke one-two syllables to indicate, request, answer, question, and refuse.	1. Spoke two to three syllables at the level of a phrase or sentence (Subject + verb + object) 2. The types of words were nouns, verbs, adverbs, prepositions, and conjunctions.

Discussion

Regarding developing a parental manual for speech and language in children with a cleft palate aged 0-3 years, the experts provided feedback on the manual's appearance, content, and practicality and that it was found to be usable and in line with the acceptable standards. After receiving the manual, both the control and experimental groups showed an improvement in language development and speaking abilities, especially the experimental group, which made significant progress in language development and speaking skills comparable to those of older children (Tables 1 and 2).

In addition, the results from transcribing the video and audio recordings revealed that the experimental group increased their vocabulary bank, could use a broader range of words, and had longer utterances. Consequently, the manual effectively stimulated language development and improved language expression, especially in approaching age-appropriate language development and speaking skills. As demonstrated in Table 3, the experimental group showed more significant progress in language expression than the control group. This suggested that the ability to produce consonant sounds was found to lead to vocabulary development. Therefore, stimulating pronunciation and vocabulary development in young children with a cleft palate could be achieved through daily interactions with the parents via activities that would foster continuous communication, which would require involvement from the parents in developing language and speaking abilities.[5,14]

Therefore, early intervention with parental involvement in speech and language development would be considered a primary rehabilitation approach. The goals would be to use daily activities to promote language learning for everyday usage, enhance pronunciation, increase speech length, develop vocabulary, improve the ability to use specific words, and make it easier for parents to model speech.[14,18-21]

Limitations

This study was limited by the small sample size, which could have led to statistical inaccuracies. Additionally, due to the time constraints in the data collection, this research lacked adequate measures to reduce the severity of speech problems, such as compensatory articulation or nasal resonance.

Conclusion

The parental manual for speech and language development in children with a cleft palate aged 0-3 years could improve the language and speech development of children in the experimental group better than the control group, whose parents did not receive the manual. Furthermore, the experimental group showed trends toward age-appropriate development. Linguistically, it was revealed that this manual could increase vocabulary and communication in daily life and could be used as a guide for speech and language treatment at home based on the advice of speech therapists. The manual could also be used for early language and speech intervention in children who were at risk or tended to delay language and speech development, apart from the group of children with a cleft palate.

Conflict of interest

The authors have declared that no competing interests existed at the time of publication. The authors have declared that no competing interests existed at the time of publication.

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