Effectiveness of the Picture Exchange Communication System (PECS) in school aged children and adolescents with autism in Child Psychiatric Ward Maharaj Nakorn Chiang Mai Hospital

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Abstract

There is a growing number of children with autism at present. It is believed to promote developments of children but autistic children may exhibit some limitations for treatment. Language development is another difficulty for them to acquire for verbal communication with other people. The purpose of this study was conducted to study the outcome of the Picture Exchange Communication System (PECS) in school-aged children and adolescents with autism in Child Psychiatric Ward of Maharaj Nakorn Chiang Mai Hospital.

This study is a single-case research. Participants ought to diagnosed as autistic according to the Diagnostic and Statistical Manual disorders 4th-edition Text Revision (DSM-IV-TR) were six case studies at the age of 6-19 and both genders were recruited. The procedures were 1) educate the nursing staffs 2) Assigned the training sessions for 3 months 3) Followed up the training session and evaluated the progress each day for the entire 3 months.

The results revealed that after used PECS for 3 months, five case studies had been improved communication. There were no increases of speech, but improvements in language test scores Before attending the Picture Exchange Communication Program, six people of the sampling group showed the average communicative ability at 3.83. Their scores averagely rose to 6.83 after the program was provided. These results indicated the positive trend of using the PECS in school aged children and adolescences with autism. This provides an opportunity for helping autistic people without communication.

Keywords : Picture Exchange Communication System; PECS, Autism

Introduction

There is a growing number of children with autism at present. According to the Centers for Disease Control and Prevention (CDC, 2013), the ratio of children diagnosed as autistic is one per 50 persons, a higher number than that of the year 2007 with one per 86 persons. Likewise, the study to survey the Thai population with autism, learning difficulty, and short intention span conducted by Suchada Akarasirithirakul (2007) stated around 37,200 persons diagnosed as autistic or six per 1,000 persons in 2007. Meanwhile, parents made their consultations with specialists of varied centers. However, the proper treatment for children with autism is ideal to start early at the young age (Myers & Johnson, 2007). It is believed to promote

developments of children but autistic children may exhibit some limitations for treatment. In fact, different developments in children with autism are mostly caused by a level of autism despite the long duration of treatment. Children with mild autism or high functioning show higher or normal intellectual ability and better language development than the other groups. Some of them (5-10%) may exhibit the underlying ability but they may lack social skills, emotional perception, and recognition of other people's feelings or Asperger's Syndrome. On the other hand, children with moderate autism (50-75%) have slow developments in terms of language, communication, social skills, learning ability, and self-management. This group of children is found with the behavioral problems but they are still able to develop their self-management and attend the regular school system. Another group is children with severe autism showing slow development of all aspects accompanied by other impairments such as intellectual disability, aggressive behaviors, and a low level of cognitive skill. With regardless of any developments, 32 percent was reported with some degree of self-management and 46 percent with less self-management.

Autism can be observed before the age of 3 years. Initially, children with autism still have normal developments suited to their age with ability to make a sound. Some may call their parents but spoken words will fade away afterwards. In particular, the symptoms are clearly noticed when they are grown up with a lack of interpersonal reactions to others even to their parents while failing to show the relationship of parenthood and childhood. In other words, they prefer to play alone, become isolated, and show no communication. They often manage everything by themselves without a request for help or they sometimes cry loudly when failing to obtain what they desire. Similarly, some of them lead their parents by hand to the object they desire. They also ignore the parents' calls or surrounding sound as they pay most attention to some specific objects or their response is too soft. When hearing the undesirable sound, they will close their ears and make a loud noise or strange noise with no meaning. Repetitive behavior without any meaning or imagination is another sign of this impairment (Uprachong, 2011).

Behaviors reported in children with autism are abnormal or too high level of doing an activity, frequent mobility, unintentional movement either working or playing, and easy excitement. For children with a low level of activity, they will move slowly, look confused, have easy fatigue, and show no attention to the surroundings (Phetaksorn, 2542).

The Child Psychiatric Ward of Maharaj Nakorn Chiang Mai Hospital has provided the services to nearly 90% of children with autism classified in different groups as earlier mentioned. Children with mild autism are able to study in class with other normal classmates or live in the society, subject to be discharged from the hospital. On the contrary, children with moderate to severe autism may require the long and persistent duration of treatment for years whereas 50% of them receive the treatment at old age. As a result, language development is another difficulty for them to acquire for verbal communication with other people. Provided that children are aged 6 years or over with an intellectual ability below 50, the disease prediction is not fairly good (Tidmarch & Volkmar, 2003). If they receive the treatment before the age of 6 years with an intellectual level above 50, the disease prediction and language development will be better (Pickett, Pullara, O'Grady & Gordon, 2009). Therefore, during the transition of childhood to adolescence, these children may turn to be adults with autism. Overall, autistic people refer to people diagnosed as autistic in any range of ages with difficulties in verbal communication or failure to obtain the practices. Communication inability is an obvious result. To

obtain the object they need, they will lead the others by hand or cry loudly, which may cause social, emotional, and behavioral problems (Winner & Grooke, 2011).

Picture Communication System (PECS) following the concept of Frost & Bondy (2002) widely serves as the way to assist autistic people for communication with other people. PECS is an augmentative alternative communication (AAC). The literature review on the study conducted by Preston & Carter (2009) showed that PECS should be applied to children or adults with autism and children with problems of speech. The result of this system is satisfactory when autistic children show improvements of language while reducing the behavioral problems.

Most studies were done on autistic children in elementary school with better perception and learning than other ranges of age in compliance with the guidelines for autistic child care of Singapore Ministry of Health (2010). Several studies mentioned that children with autism in elementary levels should be trained with PECS because it helped improve speaking and writing skills, gestures, and verbal communication. However, studies on PECS for autistic children beyond the elementary school age, in compliance with the research on development of practice for communication in children with autism through applications of PECS and regular practices for one time per day, 20-30 times in total, or 15-20 minutes in a month, showed that children were able to pass PECS Level 1 (6 out of 7) (Khuansuwan, 2555). Therefore, the researcher aimed to study the outcome of PECS application in people with autism.

Objective

It was conducted to study the outcome of the Picture Exchange Communication System (PECS) in school-aged children and adolescents with autism in Child Psychiatric Ward of Maharaj Nakorn Chiang Mai Hospital.

Methods

This study is the single-case research to evaluate the feasibility of implementing the Picture Exchange Communication System (PECS) in school-aged and adolescents with autism obtaining the services at Child Psychiatric Ward, Maharaj Nakorn Chiang Mai Hospital during July 2012-June 2013. The samples used in this study were based on the purposive selection which included six people with autism aged between 6-12 years (school age) and those aged between 15-19 years (adolescent) both male and female.

Procedures

The procedures were described below.

1. Invited two specialists experienced in implementing the Picture Exchange Communication System in autistic people from Child Psychiatric Ward, Maharaj Nakorn Chiang Mai Hospital to educate the nursing staffs about this system for people with autism throughout the three-day training program, starting from Phase 1 to Phase 3. The training was provided in accordance with the progress of people with autism using PECS through the lecture and visual aids.

2. Selected the samples based on the requirements for the treatment. The samples ought to diagnosed as autistic according to the Diagnostic and Statistical Manual disorders 4th-edition Text Revision (DSM-IV-TR) by American Psychiatric Association and receive the daycare service at Child Psychiatric Ward, Maharaj Nakorn Chiang Mai Hospital. Their ages were ranged between 6-9 years with permission granted by parents to allow them to participate in this research. The procedures began with self-introduction, notification of the purposes, explanations on the procedures of implementing the Picture Exchange Communication System in people with autism to parents or people in charge of taking care of autistic people. A letter for the research participation was also signed.

3. Assigned the training sessions to the

nursing staffs who had an experience in taking care of the autistic people not less than 3 months and passed the proficiency assessment for training people with autism by implementing the Picture Exchange Communication System (1 trainer per 1 autistic person).

4. Followed up the training session and evaluated the progress based on the criteria of the Picture Exchange Communication System each day for the entire 3 months. The evaluation criteria for each step were described as follow. In step 1, when a participant saw the desired object, he was able to put the picture on the trainer's hand (10 out of 10 times) based on five reinforcements with five trainers and five situations. In step 2, when noticing the desired object, he was able to grasp the picture distant from his body and give it to the trainer in a far distant (9 out of 10 times) based on five reinforcements with five trainers and five situations. In step 3, upon seeing an object he desired, he was able to select the picture that matched such an object and gave it to the trainer (9 out of 10 times) based on five reinforcements with five trainers and five situations. In step 4, when noticing an object he desired, he was able to select the picture "I want..." and the reinforcement picture that matched such an object to be arranged on the sentence structure board before giving it to the trainer (9 out of 10 times) based on five reinforcements with five trainers and five situations. In step 5, when the trainer asked him "What do you want?", he was able to grasp the picture "I want..." and the reinforcement picture that matched an object he desired and arranged it on the sentence structure board before giving it to the trainer (9 out of 10 times) based on five reinforcements with five trainers and five situations. In step 6, when he was asked "What do you want?" "What do you see?" or "What do you hear?", he was able to grasp the picture "I want..." "I see..." or "I hear..." to be correctly arranged on the sentence structure board along with the picture depicting his communication before giving it to the trainer (9 out of 10 times) by using five pictures with five trainers and five situations. If the participant was not able to pass in each step, relevant causes must be identified, for example, an assessment on the body structure of children which made them incapable of grasping the picture, unsuitable size of the picture, or children's potential before the solutions were given.

5. Exchanged knowledge and experience in implementing the Picture Exchange Communication System including problems, hindrances, and techniques of each trainer in each day of training.

Results

Information of autistic children

1. Personal information and symptoms of each autistic child

Six samples were five males and one female with the level of autism ranging from severe to medium levels. They all passed the PECS level 1 based on the Autism Treatment Evaluation Checklist (ATEC) of Rimland and Edelson (2000), translated to Thai language by Wanaluk Muangmaneerat and Pattraphorn Thungpankam (2003). Evaluations were made in four areas; 1) speech/language/ communication, 2) sociability, 3) sensory/cognitive awareness, and 4) health/ physical body/ behavior. Results shown by a single participant were demonstrated in Table 1 below.

Table 1: Personal information and symptoms of each child with autism

Number	Age (Years)	Speech/ language/ communication	Sociability	Sensory/ cognitive awareness	Health/physical body/ behavior
1	15	show no response to name, turn around when being called, respond to the words e.g. “No” or “Stop”, act following the simple orders, unable to utter the meaningful words, use strange incommunicable speech, reach the objects by himself if he can, sometimes catch the things from other people	turn around sometimes when being called, make a short eye contact, prefer to play alone, lie down on the floor, prefer to be isolated, pay no attention to the surrounding people, do a Wai (Thai-style greeting posture) when encouraged	show a response when being called sometimes, unable to play properly, tap or flick or throw away the object, unable to recognize the incurring danger, dislike moving	show difficulty sleeping, scream, hit the ears or head when being moody, eat a lot of food, unable to stop eating by himself, make sounds all the time, lick or flap hands repeatedly
2	20	make a good eye contact, lead the staff by hand for help, show little communication, shout continuously and aimlessly	not approach other children first, become isolated	knock an object by using elbows or knees when in frustration, become obsessed with sex, show improper sexual behaviors, run out of the designated route when doing an activity, keep playing with saliva	throw away an object despite stimulus or no stimulus e.g. adults turn to take care of other children or talk to other people, keep smiling while showing such actions, knock the floor by using his hand and heel, hit other people e.g. biting, mopping the floor or wall with saliva
3	15	utter fewer meaningful words but unclear or non-understandable, pronounce the vowel “Au” e.g. Oh-EE-Oh (Oreo), A (Lay), show some responses to the order, especially to a baby sister, lead the adult’s hand to the desired object, utter loudly when in a room	show little eye contact, be absent-minded, be likely to approach other people by hugging both children and adults	pinch hands, hit the head of other children, stretch and flick fingers, flap hands repeatedly, pick a tree leaf, exhibit a good learning ability, able to give answer by using the pictures	show hyperactivity, jump up-down quickly and repeatedly, eat some types of food, prefer to eat fried eggs or fried food and the same snacks, have fixed routines with no change, focus on placing an object to the same position, show frustration if there is any change

Number	Age (Years)	Speech/ language/ communication	Sociability	Sensory/ cognitive awareness	Health/physical body/ behavior
4	10	utter meaningless words, establish some communication e.g. going home and travelling, unable to initiate to express his need or request, lead a staff by hand for a help	make a good eye contact, do a Wai for greeting, become isolated, push smaller children, hit other people when being moody, lie down unusually when being irritable	show hyperactivity, walk back and forth, shrug his taking shoulder, mouth-watering, flick fingers on the wall or pictures in hand	become irritable with no cause, especially when taking part in group for praying or doing meditation, pick the buttock and smell it or grab the sexual organ, feel asleep at daytime, have difficulty sleeping at night time, severely hit other people or the floor
5	15	show less communication, utter loudly e.g. “Who is this?”, lead a staff by hand for help, follow some orders	make little eye contact, stare unintentionally, pay no attention while doing an activity, approach to a stranger especially a male, make unusual laugh, show non-stop laughing, become resistant to activities, show no attention	show a limited ability of learning, become easily distracted, have short attention span, show less adoption of an activity	have problems with excretory system and constipation, eat a lot of food, become sensitive to sounds, become easily distracted, never cry, sit at the same place, insert the nose with his finger
6	10	utter continuously and aimlessly with no meanings, show a low level of communication for need, utter with a rhythm e.g.	make a good eye contact, show some resistance to activities, approach an adult to embrace and kiss on his cheek, give more cooperation in doing	close his ears, use the little finger to stab the lateral, prefer to watch pictures on television or computer, enjoy twisting the drinking straw	become moody, cry or shout loudly, bite or scratch other people when being frustrated or hearing a loud noise, become very sensitive to the noise, walk back and forth, sit around the corner, like to eat spicy foods,

2. Comparative information of pre and post communication scores of the Picture Exchange Communication System

Before attending the Picture Exchange Communication Program, six people of the sampling group showed the average communicative ability at 3.83. Their scores averagely rose to 6.83 after the program was provided. The third and sixth participants showed with the highest scores of communication at 10 but the fifth participant showed no score increases as stated in Table 2.

Table 2 : Comparative scores regarding communicative ability both before and after attending the PECS program (n=6) (out of 28 scores)

Number	Communication Ability Scores		
	Before	After	SD
1	5	8	2.12
2	3	6	2.12
3	3	10	4.95
4	5	6	0.72
5	1	1	0
6	6	10	2.83
Average	**3.83**	**6.83**	

Discussion

Communicative ability of both school-aged children and adolescents with autism before and after attending the PECS program was found averagely higher. The third and sixth autistic children showed the highest scores but their age was quite different (10 years and 15 years). The fourth autistic person showed a low score. It therefore revealed that communicative ability did not involve with the age but sociability. In other words, the third and sixth had better social interaction, positively leading to several improvements. The study on both school-aged children and adolescent with autism by Sigman & McGovern (2005) discovered that the language ability of children would predict positive trends when they were involved with other people and had social reactions.

The success of this study rested on several factors both one-by-one training whereas each autistic person was different. Thus, single practice was a requirement (Ganz, et al., 2012). Since most children preferred snacks, giving a snack during the training along with a positive reinforcement was used in this research in accordance with the research done by Hart and Branda (2010).

Regarding the training limitations for people with autism through the Picture Exchange Communication System, the training program was provided only at the Psychiatric Ward but not all circumstances which also affected the progress of this research. The study conducted by Dunn and Wolfberg (2008) stated that participation of all involved parties would possibly increase the chance of success as the autistic people exhibited greater interpersonal differences such as ability to use fine motors in grasping an object, learning ability, cognitive skill, ability to distinguish the pictures or ability in the classroom. All of these put an effect on the application of PECS as stated in the research conducted by Gordon et al. (2011).

Even though the research pointed out that children showed their development at Level 3, they were still not able to communicate verbally based on the study of Flippin, Reszka & Watson (2010), stating that children capable of developing the verbal communication must acquire Level 4. Indeed, this level served as the most influential factor apart from levels of symptoms of each autistic person. People with autism recruited in this research were rather older to learn to speak. Likewise, the research conducted by Pickett, Pullara, O'Grady & Gordon (2009) stated that autistic children capable of verbal communication resulted from encouragement for language

development when they were younger than 5 years. Only a small number with moderate and severe levels was reported with language development at old age since it was rather difficult for speech development. It is therefore to support people with autism to implement the Picture Exchange Communication System.

Suggestion for further study

1. Expand the outcome of PECS in school-aged children or adolescents with more time duration for data collection e.g. 1-year observation for development of implementing PECS

2. Expand the outcome of PECS in school-aged children or adolescents with low level of symptoms but they are unable to speak

3. Conduct a study in children with other communicative disabilities

4. Conduct a study on PECS in school-aged children or adolescents by adding more sampling groups and more statistical analyses

5. Study the outcome of PECS for communication in school-aged children or adolescents with the pre and post trials for better comparison

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