



Management of Children with Autism Spectrum Disorder using Picture Exchange Communication System - A Pilot Study

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Abstract

Aim: The aim of the study was to empirically assess the efficacy of Picture Exchange Communication System (PECS) in 5 children with autism spectrum disorder (ASD). This study was also intended to report parental feedback on using PECS with their children.

Method: Purposive convenient sampling was used for this quasi-experimental study. Five nonverbal children who were diagnosed with mild to moderate autism spectrum disorder with a median age of 4.1 years were selected for the study. All the five participants who exhibited limited or no functional communication skills were recruited for the study. Exclusion criteria included presence of any syndrome or any significant medical conditions such as seizures. The pre-assessment and the post assessments after 24 sessions of PECS training were done using selected communicative function domains. Post therapy parental feedback was obtained concerning five categories which are communication intent, attention, behavioural issues, vocalization and ease of communication. Also frequency of initiation as observed in home settings was obtained by interview method.

Results: Current study shows that all the children were able to use PECS spontaneously and independently without any physical prompts. Children were able to generalize PECS at home with ease and were able to initiate communication on their own using the pictures. The mothers of the children reported that they observed a drastic subsidence in children's challenging behaviours and also improvement in their attention span. The findings from our study showed that PECS training is effective in improving the socio-communication skills in children with ASD who had restricted communication. On analysing the report, mothers stated that they were able to easily incorporate PECS at home with their child as it implements the use of actual pictures for communicative exchange. As PECS training paves the way for expression of the child's needs, there was also a significant reduction in the children's behavioural problems such as tantrums and other self-injurious behaviours.

Conclusion: From this study, it can be concluded that PECS training is effective in improving various communicative temptations in socio-communication skills in children with ASD who have restricted communication. It was also noted that obtaining parental feedback periodically would help in generalization and it encourages the parents' involvement in the child's learning process.

INTRODUCTION

Autism spectrum disorder (ASD) is a neurodevelopmental disorder characterized by deficits in social communication, and the presence of restricted, repetitive behaviour.¹ Approximately 50% of children with PDD/ASD are nonverbal. Such children are unable to acquire significant verbal communication skills in spite of best efforts.² To address the communication challenges of children with ASD, speech-language pathologists have turned to augmentative and alternative communication (AAC).³

The picture exchange communication system (PECS) is an augmentative and alternative communication system in which a pictorial system is used for children with ASD,⁴ and children who displayed no functional or socially acceptable speech,⁵ it potentially provides a bridge to speech acquisition. Lori Frost and Andrew Bondy developed it in 1985.

The principle behind PECS is that exchanging a picture for a reinforcing object is similar to how communication occurs in daily conversation.⁶ PECS uses behavioural principles to teach children functional communication and pictures are used for the same. Different teaching methods, reinforcement techniques, error correction techniques, and generalisation techniques are crucial for training each skill.

According to Bondy & Frost, PECS differs from other communication systems in three key aspects: (a) There are no prerequisites needed; (b) It was established in order to address the issue of the motivation for social reinforcement; and (c) Instead of training reacting before initiating, it teaches initiating immediately.⁴

The PECS approach has been popular nationally and internationally among children with autism and is appealing for a number of reasons.^{7,8} First, the system does not necessitate the listener's knowledge of a second language, such as sign language, and a few complex motor gestures from the speaker.⁴ Second, the PECS system is portable, affordable, and appropriate for usage in a variety of contexts. Third, case studies show that the method can be learned quickly.⁶ Finally, the PECS system incorporates functional communicative responses that promote meaningful interactions between the

child and the environment.⁴

Bondy and Frost reported outcomes for 85 non communicative preschool children with ASD younger than and equal to five years of age. 41 of the 66 children who had been using PECS for more than a year were able to speak on their own, whereas the other 25 utilised a combination of pictures or symbols and words. All children learned how to communicate with pictures or symbols, albeit not all of them attained the higher PECS levels.⁴

In a study by Charlop-Christy *et al.*, three children with autism spectrum disorders were given access to PECS, and it was stated that all three of them quickly became proficient users. They displayed an increase in imitation speaking, the mean-length of utterance, and social communication skills like eye contact and shared attention.⁹

Ganz & Simpson trained 3 children with ASD to use PECS. The PECS system was mastered by all three kids, and they showed improvements in their average number of intelligible words per trial. All subjects started Phase I speaking only in one-word utterances or no words at all, and they all finished Phase IV uttering three to four word sequences.¹⁰

A single case study by Malhotra *et al.*, showed almost no change in the child's repetitive head and hand flapping behaviours after 32 sessions of PECS training; A considerable improvement in communication as well as an increase in the child's level of independence in self-help activities were also noted in the study. They have also stated that PECS, when implemented along with traditional behavioural techniques such as Differential Reinforcement of Alternate Behaviour (DRA), reprimand and task direction aids in effective management of behavioural problems in children with autism.¹¹

Another single case study by Usha reported that PECS could be used for teaching functional skills necessary for daily living as it increases the level of the child's functional skill. The study has shown that after 90 sessions of PECS training till phase IV, there was a distinguishable improvement in the child's communication skills in manding for food items, play materials and other daily activities which was measured using a functional communication assessment checklist.¹²

Even though PECS is extensively utilised, few studies

have specifically looked at parents' perspectives of the system. The majority of studies focused on PECS use in general. In a survey on parents' views of the PECS for children with autism spectrum disorders, Alsayedhassan *et al.* found that parents with higher levels of education were more knowledgeable about PECS and had a greater degree of integration of PECS into their daily lives than were parents with lower levels of education. However, both groups noted that PECS was simple to apply and successful in enhancing their communication skills.¹³

PECS being a low-tech AAC, is easily accessible in our Indian context compared to other high-tech devices. However, there is limited Indian literature on the effective use of PECS among non-verbal children with ASD and the parental perception on PECS. This study adds to the evidence in creating the social acceptance of such types of alternative communication methods. Parental perception of the child's behaviour throughout the course of treatment is important as it motivates them to use it in home settings. Hence the purpose of the present study was to empirically assess the efficacy of PECS on communicative functions in children with autism spectrum disorder. This study was also intended to report parental feedback on using PECS with their children.

METHOD

This study was approved by the institutional ethics committee. This is a quasi-experimental study where five nonverbal children who were diagnosed with mild to moderate autism spectrum disorder in the age group of 5 to 7 years were selected through purposive convenient sampling. All the five subjects exhibited limited or no functional communication skills and were males. Children with presence of any syndrome or any significant medical conditions such as seizures were excluded from the study. After obtaining consent, the parents of the subjects were counselled regarding this evidence-based program. The study was conducted in three phases where the first phase included pre therapy assessment, second phase included PECS training and the third phase included post therapy assessment and parental feedback was obtained as-

Phase I Pretherapy assessment was done where

a 45 minute & free play session was given to each child and their mothers. The mothers were free to choose the task to interact with their children and two co-investigators were made as observers. The communicative functions assessed were request, negotiation, commenting and expression of feelings. For the purpose of scoring, ten trials were given to understand the frequency of each of the communicative functions.

Phase II In the second phase, PECS training trials were conducted in clinical setups. A table and two seats facing each other were in the room in the clinical setup. This training involved the child and two clinicians where one was the communication partner with the child and the other was the physical prompter. Ten items were selected from the children reinforcement inventory. Laminated picture cards of the items were used and the size of the picture cards was 9 cm X 8 cm. Mothers of the children were involved in the training process to promote usage in daily life at home. Training was given for 24 sessions and each session was conducted for 45 minutes for each child individually.

Phase III Post therapy assessment was done for each child following 24 sessions of training. Similar to phase I assessment, post therapy assessment was carried out. The communicative functions assessed were request, negotiation, commenting and expression of feelings. For the purpose of scoring, ten trials were given to understand the frequency of each of the communicative functions. Post therapy parental feedback on acceptance and use of PECS was also obtained from mothers concerning five categories. The domains included in the parental feedback were communication intent, attention, behavioural issues, vocalization and ease of communication. Also frequency of initiation of picture exchange by children on a Likert scale of 0-10 was obtained from parents as observed in the home settings

RESULTS AND DISCUSSION

Out of five children, two of them achieved till phase III (picture discrimination) whereas the other three children achieved till phase II (distance and persistence) in the conventional PECS training. Descriptive analysis was carried out and the results were documented based on the following aspects

(1) Pre and post therapy assessments of the five children are reported based on four domains: Request, Negation, Comment and Express feelings. (2) Parental feedback.

(1) Pre and post therapy assessments

Subject A

In the pre-therapy assessment, the frequency of request and comment was observed to be lower when compared with post assessment. However the frequency of negation was observed to be higher in pre-therapy assessment due to continuous protests to carry out tasks. In the pre-therapy assessment, as the child exhibited temper tantrums, expression of feelings was also observed to be higher. During post assessment, the frequency of requesting food/drink, requesting help, and greeting spontaneously was found to be increased. The child was observed to smile often while frequency of expression of anger was reduced (Figure 1).

Subject B

Similar to Subject A, the frequency of negation was observed to be higher in pre- therapy assessment due to continuous protests to carry out the tasks. Also, the child exhibited temper tantrums, and hence, the frequency of expression of feelings was observed to be higher the frequency of request and comment (such as greetings and labeling) was observed to be significantly higher during post-therapy assessment. The child was observed to smile often while frequency of expression of anger was reduced (Figure 2).

Subject C

The frequency of negation and expression of feelings were observed to be higher in pre- therapy assessment for Subject C. However, frequency of requesting help and comment (such as greetings and labelling) was observed to be significantly higher during post- therapy assessment. There was a reduction in the frequency of anger expression by the child along with an increase in social smile (Figure 3).

Subject D

Frequency of negation was observed to be comparatively higher in pre-therapy assessment due

to continuous protests to carry out tasks, also, as the child exhibited temper tantrums, expression of feelings was observed to be slightly higher. During post- assessment the frequency of requesting help and comment (such as greetings and labelling) was observed to be significantly higher. Also, the frequency of seeking attention was observed to be slightly higher contributing to better results under

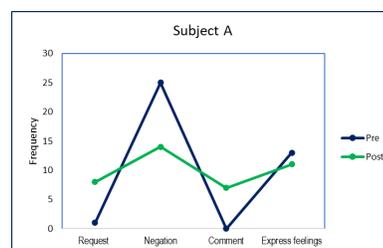


Figure 1: The frequency of the behaviours of communicative functions observed during pre and post assessment of subject A

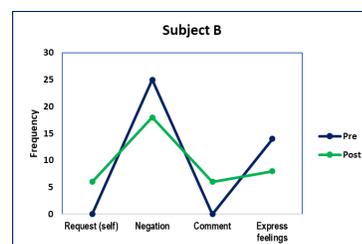


Figure 2: The frequency of the behaviors of communicative functions observed during pre and post assessment of subject B.

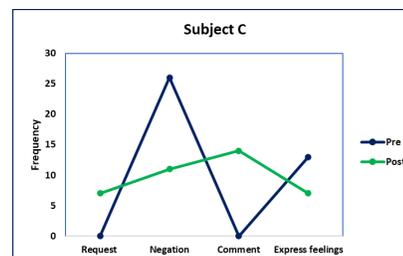


Figure 3: The frequency of the behaviours of communicative functions observed during pre and post assessment of subject C.

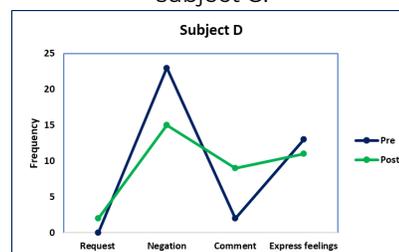


Figure 4: The frequency of the behaviours of communicative functions observed during pre and post assessment of subject D.

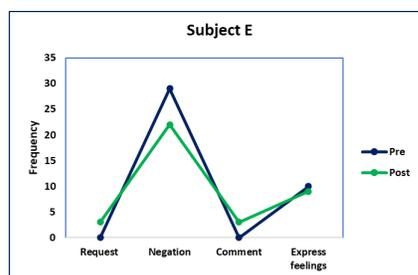


Figure 5: The frequency of the behaviours of communicative functions observed during pre and post assessment of subject E.

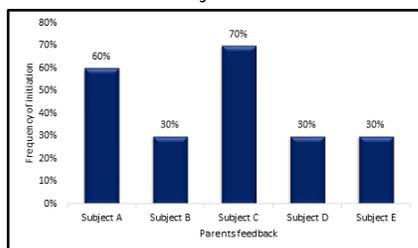


Figure 6: Parental feedback on frequency of initiation of communication

request domain. There was a decrease in the frequency of expression of anger, and the child was observed to exhibit social smile often (Figure 4).

Subject E

Frequency of negation was observed to be higher in pre assessment due to continuous protests to carry out tasks, and also, as the child exhibited temper tantrums, expression of feelings was observed to be higher. The frequency of requesting help and comment (such as labelling) was observed to be significantly higher during post assessment. Also, the frequency of seeking attention was observed to be slightly higher. Social smile was often observed in the child and as well as fewer expressions of anger (Figure 5).

(2) Parental Feedback

Post therapy parental feedback was obtained concerning five categories - Communication intent, Attention, behavioural issues, Vocalization and Ease of communication (Figure 6). Four of the mothers reported good improvement in Communication intent, attention and ease of communication; three of them reported surpassed vocalizations and all the parents stated significant improvement in reduction of behavioural issues.

Mothers were asked to rate their experience of generalisation in home settings and frequency with

which they initiated their need. Figure 6 shows mothers' rating on a Likert scale of 0–10 the frequency with which they observed initiation in home settings after training.

In the current study, five children were trained to use PECS for their functional communication. The results of the study also shows that all the five children showed distinctive data patterns between pre and post PECS training. The current findings are consistent with several studies in the past which showed improvement in the functional communication after the usage of the PECS system^{10,14-17}. As the communication exchange using PECS is similar to that which happens during verbal communication, this AAC system was readily accepted by the parents of non verbal children with ASD, without any reluctance. The first objective of our research was to empirically evaluate the efficacy of PECS on communicative functions in children with ASD. In this study, the subjects have shown improvement in post assessment under each domain. As PECS training for the children was initiated using the items from their reinforcement inventory for 24 structured sessions along with home training, all the children were able to use PECS spontaneously and independently without any physical prompts. This is consistent with the research of Bondy and Frost who reported that PECS was devised to address the inadequate motivation for social reinforcement and it imparts communicative initiative immediately.⁴ All the five children in this study had severe language deficits and none of them were chosen or evicted based on their pre linguistic skills and thus there is a least possibility that the skill acquisition was owing to the selection process.

Happe & Frith stated that picture cards are used in PECS to communicate visually and include visual discriminations in the communication process, which may speed up child's learning.¹⁸ This is demonstrated in this study by the children's ability to learn the usage of PECS within a short period of time and also exhibited ease of communication.

According to Charlop-Christy *et al.*, all of the children made collateral gains in social communicative behaviour, such as shared attention and eye contact, and quickly mastered the usage of PECS.⁹ Lerna *et al.*, reported that the frequency of joint attention, communication intent and non verbal

requests has significantly improved in children who had undergone training in PECS¹⁹ and this was found to be perceptible in our study. Along with the effectiveness of PECS in children with autism, the study also annexed the parental perception, as it brings out a collaborative approach while working with children. This was supported by the study by Alsayedhassan *et al.*, in which they have suggested that the mothers find PECS to be effective in improving the communication skills of non verbal children with ASD.¹³ On analyzing the parental feedback, it was clear that the children were able to generalize PECS at home with ease and were able to initiate communication on their own using the pictures. The parents reported that they observed a drastic subsidence in children's challenging behaviours. They also reported improvement in their attention span. In the current study, the parents reported reduced behavioral issues, which is consistent with the study reported by Heneker and Page.²⁰ They also reported that the main function of communication which was observed was requesting and thus this study adds exploratory data supporting the already widespread use of PECS.

CONCLUSION

The findings from our study showed that PECS training is effective in improving various communicative temptations of the socio-communication skills in children with ASD who had restricted communication. In the parental report, mothers stated that they were able to easily incorporate PECS at home with their child as it implements the use of actual pictures for communicative exchange. The PECS training paves the way for expression of the child's needs. Additionally, behavioural issues, like temper tantrums and other self-injurious behaviours, significantly decreased. Larger sample sizes should be used in future study and the effect of a longer intervention period should be investigated. Upcoming studies need to focus on the importance of parental guidance for implementing PECS at home settings. Parental feedback should be obtained periodically as it helps us by providing clear perception about the child and encourages their involvement in the child's learning and progress.

Prompt follow-ups need to be maintained in order to evaluate the child's consistent, spontaneous and independent usage of PECS.

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