Effects of Home-Based Play Activities for Young Children with Autism Spectrum Disorder

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Abstract: Previous research has showed that implementing the home-based programs by parents would improve social communication development of children with autism spectrum disorder (ASD). However, little research was comprehensively investigated children's adaptive functioning and other developmental areas. This study aimed to examine if the home-based play activities would improve children's developmental abilities and adaptive functioning. Eight young children with ASD were recruited. All participants received a 14-week home-based program and were assessed at pre- and post-tests. The Chinese version of Psychoeducational Profile-Third edition (CPEP-3) was administered. All participants completed the 14-week home-based program, undergoing an average of 117.3 hours of intervention. Children with ASD have significantly greater improvements in the communication, motor, and adaptive behavior composite scores of the CPEP-3 after the 14-week program. The results suggested that the home-based play activities may benefit children with ASD, especially in terms of their social communication development, motor development, and adaptive functioning. This study contributed to evidence-based practice for children with ASD by demonstrating a feasible and economical program in current clinics.

Keywords: Adaptive functioning, autism spectrum disorder, home-based, play activities.

INTRODUCTION

Autism spectrum disorder (ASD) constitutes one of the major developmental disabilities. ASD is characterized by impairments in communication, reciprocal social interaction, and the presence of restricted and repetitive behaviors or interests [1]. The Centers for Disease Control and Prevention in the United States estimated that an average of 1 in 54 children has ASD in 2020 [2]. The prevalence of ASD is reportedly increasing in Western countries as well as in Taiwan [3]. This population urgently needs help solving intervention issues.

Most of children with ASD have global delays in their development, and their atypically developing trajectories include gross motor, fine motor, cognition, and language [1,4]. Hence, these developmental abilities will integrate together and influence how they perform tasks in their daily lives. Additionally, children with ASD have deficits in adaptive functioning [5-8]. Adaptive functioning is the ability about how an individual functionally integrates their general skills in his/her real situation, environment, and daily life [9]. Past research supports that adaptive functioning of individuals with ASD is poorer than individuals without ASD [5-8]. Kanne [5] indicated that individuals with ASD have severe delays in socialization and moderate delays in communication and daily living. Children with ASD are unable to maneuver their acquired skills or strengths functionally into their daily lives even if they have better cognitive and developmental levels [5-7]. More and more research suggests that intervention goals should be comprehensive to improve developmental progress related to features of ASD as well as adaptive functioning [4]. Therefore, improving developmental abilities and adaptive functioning should be regarded as important goals for early interventions.

Previous research support that families/caregivers should actively involve in interventions for children with ASD [4,10]. Therapists can educate and train parents as co-therapists who implement interventions at home [4,11,12]. Then, parents are able to capitalize daily routines to provide learning and practice opportunities for their children with high frequency and to facilitate children's generalization acquired skills to daily life [4].

Naturally, play is the most significant and primary occupation of children's daily life [13], and occupational therapists use it to improve children's participation in the daily life. Liao *et al*. [14] reported that the application of play strategies to daily activities had a promising result for improving the social communication development and adaptive functioning of children with ASD. Therefore, the aims of the study was to examine the effects of the home-based play activities on increasing developmental abilities and adaptive behaviors for children with ASD. The following

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question was addressed: whether home-based play activities have positive effects on increasing the developmental abilities and adaptive behaviors for young children with ASD.

METHOD

The study protocol has been approved by the Institutional Review Board of National Cheng Kung University Hospital (B-BR-103-065).

Participants

Eight young children with ASD were recruited from clinics and hospitals. The mean age of children was 62.8 months (age range: 60-66 months). All participants were boys. These children had been diagnosed by a mental health professional using the Diagnostic and Statistical Manual V (DSM-5) criteria [1]. A diagnosis on the autism spectrum and severity of disability were confirmed with the Standard Version of Childhood Autism Rating Scale – Second Edition [15]. Table **1** presents the demographic data for the participants.

Measurement

Chinese Version of Psychoeducational Profile-Third Edition

The Chinese Version of Psychoeducational Profile-Third Edition (CPEP-3) were used to determine changes in children's developmental abilities and adaptive behaviors in the study [16]. It comprises six subtests for developmental abilities (cognitive verbal/preverbal, expressive language, receptive language, fine motor, gross motor, and visual-motor imitation). All six subtests for developmental abilities are able to be combined and converted to age equivalents and communication and motor composite scores. In this study, the two composite scores and age equivalents for developmental abilities were used. The remaining subtests (affective expression, social reciprocity, characteristic motor behaviors, and characteristic verbal behaviors) measure adaptive

Table 1: Sample Characteristics (N = 8)

Variables	M (*SD*)	n (%)
Gender		
Male		8 (100%)
Age (months)	62.8 (2.1)	
CARS2-ST	36.1 (5.4)	
Severity of Autistic Symptomatology		
Mild to moderate		6 (75.0%)
Severe		2 (25.0%)
Having siblings		5 (62.5%)
Father's age (years)	38.0 (5.7)	
Mother's age (years)	36.5 (3.7)	
Father's Education Level		
Bachelor degree or above		7 (87.5%)
High school and below		1 (12.5%)
Mother's Education Level		
Bachelor degree or above		4 (50.0%)
High school and below		4 (50.0%)
Caregiver's Employment Status		
Yes (Full/Part-time)		5 (62.5%)
No		3 (37.5%)
Family Income		
Above average		3 (37.5%)
Below average		5 (62.5%)

Table 2: Mean (SD) Changes in Standard Scores and Age Equivalent

	Pre	Post	Statistics		
	M (*SD*)	M (*SD*)	*Z*	*p*	Effect size
Communication	22.6 (10.5)	25.4 (8.3)	-2.03	.042	0.72
Developmental Ages	27.4 (17.2)	29.8 (16.8)	-2.20	.028	0.78
Motor	21.0 (10.6)	24.9 (7.7)	-2.00	.045	0.71
Developmental Ages	24.8 (12.2)	27.6 (12.0)	-1.58	.115	0.56
Adaptive Behaviors	25.0 (13.5)	29.9 (12.5)	-2.21	.027	0.78

behaviors. The investigator implemented the performance scale with children. The score of each item was rated as 0, 1 or 2. The higher standard scores are, the better function children achieve.

Therapy Attitude Inventory (TAI)

The TAI is a 10-item with 5-likert scale (from 1 dissatisfaction to 5 maximum satisfaction) for assessing parents' satisfaction for parent training [17]. The item ratings yield a total score between 10 and 50. The higher total scores indicate the higher parents' satisfaction. The investigator translated the TAI to Chinese version and parents completed it at posttest.

Play Activities

Parents conducted a 14-week program at home. The first week, the investigator introduced general developmental stages of cognition, fine motor, gross motor, and language to parents. The manual books that consisted of play activities were provided to parents. The investigator discussed with parents and helped them apply play activities to daily activities. During the second to the fourteenth weeks, parents implemented play activities at home and recorded the intensity every day. The investigator checked how they implemented these activities. Importantly, parents were encouraged to do activities with their children for at least 1 hour per day.

Data Analysis

SPSS 22.0 for Windows was used to analyze the data. Descriptive statistics were used to examine the demographic data, independent variables, and outcome measures for study variables. Wilcoxon signed rank tests were done to examine. A *p*-level of 0.05 was accepted as significant. An effect size index r was reported (low effect size: 0.1 [r < 0.3, medium effect size: 0.3 [r < 0.5, large effect size: r ≥ 0.5) [18].

RESULTS

The average hours of intensity for the home program was 117.3 hours (SD = 38.7). Eight parents completed the TAI, with a mean score of 39.8 (SD = 4.4). Table **2** presents changes in composite scores and two age equivalents of the CPEP-3. Children with ASD showed significant differences in the communication, motor, and adaptive behaviors composite scores of the CPEP-3 with large effects between pretest and posttest. The communication, motor, and adaptive behaviors of children with ASD improved after the 14-week period. Before applying play activities, the scores represented an age equivalent of 27.4 months in communication domain and 24.8 months in motor domain. After the 14-week play activities, children with ASD made significant gains in the communication age equivalent. However, there was no statistically difference in motor age equivalent.

DISCUSSION

The present study contributes to our knowledge about the effects of home-based play activities on increasing social communication development and adaptive behaviors for children with ASD. There were two main findings. First, a significant progress was observed in children's communication and motor development after utilization of home-based play activities. Second, children had a significant improvement in their adaptive behaviors. The utilization of 14-week home-based play activities showed positive effects on increasing social communication development and adaptive behaviors for children with ASD.

Our findings correspond to the findings of Liao *et al*. [14], who reported that the children with ASD demonstrated positive changes in their social communication development following the intervention. Lord and McGee [19] suggested that structured and

strategic approaches have positive effects on improving language, social, and behavioral deficits of children with ASD. Implementing home-based programs by parents may have significant effects on the social communication development of children with ASD [20,21]. Previous research has paid less attention on motor development for children with ASD. Notably, in our study, children with ASD presented a significant improvement in the motor composite scores. One possible reason might be that the program designed in this study consisted of structured play activities, which focused on children's age-appropriate skills. Aldred *et al*. [22] and Drew *et al*. [23] suggest that parent training programs educate and train parents in adapted strategies tailored to their child's individual competencies and specific behavioral problems. Adopting structured play activities might also have beneficial effects on the specific developmental abilities.

The adaptive behaviors composite scores of the CPEP-3 had significantly improvement after the 14-week period. Consistent with a previous study [14], implementing the home-based play program could improve the adaptive functioning. As poor socialization is characterized as a main deficit of children with ASD, previous related studies have mainly focused on the socialization and communication outcomes [24,25]. However, many children with ASD have difficulties in adaptive functioning no matter what cognitive ability levels they have. Both children with and without intellectual disabilities present difficulties in adaptive functioning [5-7]. In this study, the results provided evidence in effects on adaptive functioning for the home-based play activities.

In past research, only few research to investigate parents' satisfaction with simple satisfaction survey and showed most parents were satisfied with the parent-training program [26,27]. This study firstly used a standardized measurement (TAI) to evaluate parents' attitude toward the program and showed high satisfaction in this program.

The major limitations of this study were the small sample size and the lack of a comparison group. The small sample size may have biased the results. Future research using larger samples with a comparison group is needed. Furthermore, the effects of normal development on each child' progress could not be eliminated, and some confounding factors in some contexts were ignored. It is necessary to treat autism holistically rather than piecemeal. Despite these limitations, the findings of this study provide considerable valuable information about the positive effects of home-based play activities and offer suggestions for future research.

CONCLUSION

Young child with ASD may benefit from the home-based play activities, especially for children's social communication development, motor development, and adaptive functioning. Moreover, parents were satisfied with this program and subjectively considered that it was effective for improving children's skills and behaviors.

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