Effects of Parent-Child Sandplay Therapy for preschool children with autism spectrum disorder and their mothers: A randomized controlled trial

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ABSTRACT

Purpose: To evaluate the effects of the Parent-Child Sandplay Therapy (PCST) Program on autism behaviors, social responsiveness and sleep quality among preschool children with autism spectrum disorder (ASD), and their mothers' parenting stress.

Design and methods: A prospective, randomized controlled, parallel-group trial was employed. Fifty-two child-mother dyads were randomly assigned to an intervention group ($n = 26$) or a control group ($n = 26$) from February 2017 to February 2019. The intervention group was treated with a 20-week PCST Program plus an Applied Behavior Analysis-based program (ABA-based program), whereas the control group received only the ABA-based program. Outcome measures included the Autism Behavior Checklist total scores, Social Responsiveness Scale scores, Children's Sleep Habits Questionnaire scores, and Parenting Stress Index-Short Form scores, measured at baseline, post-intervention (20 weeks after baseline) and follow-up assessments (32 weeks after baseline).

Results: Finally, 43 dyads completed the study. The linear mixed model analysis resulted in a significant group*time interaction effect of ABC score (Est = 2.027, $t = 3.277$; $p < 0.01$), SRS score (Est = 3.377, $t = 6.095$; $p < 0.01$), PSI-SF score (Est = 3.873, $t = 4.253$, $p < 0.01$), and CSHQ score (Est = 3.158, $t = 6.485$; $p < 0.05$).

Conclusion: Our findings suggested that the PCST Program could potentially improve social interaction and sleep quality of preschool children with ASD while decreasing parenting stress.

Practice implications: The PCST Program was found to be a feasible and a promising treatment for children with mild-to-moderate ASD as well as for their parents. It was a nurse-led program, which could be integrated into the usual nursing care of children with autism spectrum disorder in special education schools.

Trial registration: Chinese Clinical Trials Registry, ChiCTR2100047699.

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Introduction

Autism spectrum disorder (ASD) is a life-long neurodevelopmental disorder interfering with the individuals' ability to communicate and relate to others (Elsabbagh et al., 2012). It is characterized by repetitive behaviors, restricted interests, defects in social communication, and a range of other behavioral problems (Lord et al., 2018). In recent years, the incidence rate of ASD has been on the rise, and the mean prevalence is 10.18/10,000 in China (Wang et al., 2018). ASD may significantly limit the capacity of an individual to conduct daily activities and participate in society (Farley et al., 2009). Caring for a child with ASD often negatively impact the family due to the child's limitation in learning and self-care (Buescher et al., 2014; Zhou et al., 2018). Therefore, it is necessary to take some measures to improve developmental and behavioral indicators for children with ASD. Some psychosocial interventions may benefit children with ASD, such as sandplay therapy.

Sandplay therapy was developed as a psychotherapeutic approach by Dora M. Kalff and inspired by the analytical psychology of Carl G. Jung (Kalff, 2004). It enables nonverbal communication with images in sand trays, stories, expressions, and gestures, as well as self-expression with a medium called sand (Jang & Kim, 2012). Sandplay therapy offers participants the possibility to express their feelings and free themselves of deep-seated negative and suppressed emotions by a creative mean and facilitates the verbal expression of their personal life history within a protected setting (Jang & Kim, 2012; Kim & Kim, 2013). It also gives access to psychotherapeutic processes by a creative and playful approach that can be a pleasurable way for participants to connect with peers and engage in exploration using natural processes. In a sand tray with dry or wet sand and a variety of objects, participants could create an inner symbolic and imaginary world within the "free and protected" container. Therefore, sandplay therapy could enhance children's interpersonal interaction (Kim, 2006). Previous studies have shown that it could help elementary school students and children with posttraumatic stress disorder, attention-deficit/hyperactivity disorder, neurodevelopmental disorder, or major depression, by providing psychological relief, working out emotional problems, reducing problematic behaviors, and improving interpersonal interaction (Kim, 2006; Kronick et al., 2018; Kwak et al., 2020; Punnett & Canfield, 2020; Rousseau et al., 2009; Tornero & Capella, 2017). In recent years, sandplay has also been used in patients with physical conditions such as cancer (Lagutina et al., 2013). At present, there are some studies on play therapy applied to autistic children (Brefort et al., 2022; Corbett et al., 2016; Doernberg et al., 2021), but there are few reports on the application of sandplay therapy (Cao et al., 2013; Guo & Li, 2021; Lu et al., 2010). Studies have indicated that sandplay therapy was conducive to promote the social interaction, verbal expression, and mental health of children with ASD (Cao et al., 2013; Guo & Li, 2021; Lu et al., 2010). The results in the previous study have also shown that integrated sandplay therapy may be useful to improve the social interaction and sleep quality of preschool children with ASD and the quality of parent-child relationships (Liu et al., 2019).

Family sandplay therapy is a special kind of therapy that was first proposed by Carey (Carey, 1991). Parent-child sandplay therapy (PCST) is commonly used in family sandplay therapy based on the Developmental, Individual-difference, Relationship-based (DIR)/ Floortime™ model. The DIR/Floortime™ model is a comprehensive developmental biopsychosocial model that provides a developmental framework for interdisciplinary assessment and intervention for autism spectrum and related disorders (Wieder & Greenspan, 2003). Family involvement is a crucial aspect of the model. The combination of family play and sandplay therapy provides an opportunity for children with developmental disabilities to verbalize their feelings with caregivers and assists family members in communicating their intrapersonal world through symbolic methods (Carey, 1991; Green & Connolly, 2009). Previous studies have reported that children with ASD and their families may benefit from the DIR/Floortime™ approach (Abazari et al., 2017; Liao et al., 2014). To date, however, very little has been known about the use of PCST based on DIR/Floortime™ model for children with autism and their mothers. Therefore, this study aimed to evaluate the effects of a PCST program among preschool children with mild to moderate ASD and their mothers. Our hypotheses were as follows: (a) the PCST program could improve autistic children's autism behavior; (b) the PCST program could improve autistic children's social interaction; (c) the PCST program could improve autistic children's sleeping quality; and (d) the PCST program could decrease parenting stress of mothers.

Methods

Design

The study was a randomized controlled parallel-group trial and in accordance with CONSORT 2010 checklist criteria.

Participants

The PCST program was conducted in a tertiary maternal and children hospital in Fujian Province, China. The recruitment of participants and the ABA program were conducted in a special education school for children, which has 50 campuses across the country, including 20 campuses in Fujian Province. Participants were recruited from one of the campuses selected in Fuzhou City between February 2017 and February 2019. The inclusion criteria for participants were as follows: (a) a Diagnostic and Statistical Manual of Mental Disorders (5th ed.; DSM-V) clinical diagnosis of ASD (confirmed by independent testers); (b) aged 3 to 6 years; (c) with total development quotient (DQ) and language DQ ≥76 and scores of Children Autism Rating Scale ranged from 30 to 36; (d) without physical disabilities; (e) with mothers as primary caregivers. The exclusion criteria were: (a) diagnosis of Rett syndrome or childhood disintegrative disorder, (b) diagnosis of epilepsy or genetic syndromes, and/or (c) children or their mothers receiving other psychosocial treatments within six months.

Patient and public involvement statement

Patients or the public were not involved in the design, or conduct, or reporting, or dissemination plans of this trial.

Sample size calculation

The minimum sample size was calculated using the G-Power 3.1.3 (Franz Faul, Universität Kiel, Germany). When the repeated measurement multivariate analysis of variance was conducted, using the effect size of 0.54 for Autism Behavior Checklist (ABC) total score based on the preliminary test, to achieve an 80% power at the significance level of 0.05, the minimum total sample size was 37. Considering about 20% of the dropout rate and nonresponse bias rate, the calculated corrected total sample size was 44. Eventually, 52 dyads were included in this study, including 26 in the intervention group and 26 in the control group.

Randomization and allocation concealment

Participants were randomized to the intervention group or control group in a ratio of 1:1 by block random grouping method using SAS 9.3 (SAS Institute, Cary, NC, USA) software-generated random numbers. Opaque envelopes sealed with group assignments were opened by the third-party researcher who was blinded to the trial.

Intervention

The control group received a 20-hour weekly ABA program that included a 5-hour peer social interaction session per week over 20 weeks by special education teachers with uniform training. The intervention group received the ABA plus PCST program.

ABA-based program

The program was provided by the special education teachers trained in autism and specifically in the ABA approach (Handleman & Harris, 2005). ABA is a scientific approach to understanding how changes in the environment affect human behavior. It is to decompose the target task such as developing good habits into a series of smaller or relatively independent steps. It could improve the ability of self-care and social communication for children. The ABA-based program consisted of imitation, gross movement, fine movement, perception, language understanding and expression, hand-eye coordination, self-care, and social and emotional skills in the natural, specific, and social contexts.

PCST program

The PCST program consisted of 20 training sessions (each duration of 45–60 min). Children or their mothers receiving at least 16 (>80%) sessions were included in this study. The PCST intervention was carried out after the third session of peer social interaction every week. Every session with one-on-one and face-to-face intervention per week was

conducted with each mother-child pair by the therapist in a quiet and private treatment room. The therapist was a registered nurse with more than five years of work experience with professional training in sandplay therapy. The treatment room was approximately 10 square meters with a 72 cm × 57 cm × 7 cm (length × width × height) sandbox and two 160 cm × 80 cm × 30 cm (length × width × height) shelves accommodated with 3000 sand sets. The PCST program involved the initial stage, creating works, sharing with works, archiving photos, dismantling works, and the closing stage. The implementation of the entire program was supervised by an experienced senior clinical psychologist. Before each session, the therapist communicated with the child-mother dyad by phone and made an appointment in advance. If the child was unable to complete the session, an appointment could be made for another time of the week.

(a) Initial stage. The initial stage was a 10-min opening introductory meeting. Each participant made a self-introduction, shook hands, and communicated with each other. Next, the therapist introduced the rules of the game and made some simple demonstrations to enhance understanding of the game. (b) Creating works. The child-mother dyads created their terrains and selected their favorite toys in turn and then put them into sandboxes to build a sand world. The therapist took the attitude of a silent witness to accompany the participants to create the work. (c) Sharing with works. The therapist guided the participants to explore the themes and main storyline of the sandbox work. The child-mother dyads shared the story and process experience of the work mutually based on the voluntary principle. The initial sharing started with the mother and then with the child after the first five times. They were encouraged to describe whether they were in the work, where they were (i.e., looking for a self-portrait), and the most interesting sand set in the sandbox. (d) Photo archiving and dismantling works. After obtaining the consent from the participants, the therapist took photos of the sand tray and archived them. The participants were encouraged to dismantle and return the sand sets to the original places. If the child did not agree, they could skip this step. (e) The closing stage. The therapist briefly summarized and emphasized the requirement of the homework, including the child sharing the sandplay experience with family members in the form of words or drawings based on photos.

Outcomes and measurements

Primary outcomes

Autism behavior. Children's autism behavior was measured by the Autism Behavior Checklist (ABC), a parent-reported instrument, consists of 57 items with each item measured by a 2-point Likert scale (Krug et al., 1978; Yang et al., 1993). The ABC addresses typical behaviors related to five areas: sensory, relating, body and object use, language, and social self-help. The total scores range from 0 to 158. The original version of ABC has an interrater reliability of 0.94, test-retest reliability of 0.95, a sensitivity ranged from 0.38 to 0.58, and a specificity ranged from 0.76 to 0.97 as well as the Chinese version has good sensitivity and specificity (Krug et al., 1978; Yang, 2016). In the current study, the total Cronbach's alpha values was 0.894 and the test-retest reliability was 0.802.

Child's social responsiveness. Children's social responsiveness was measured by the Social Responsiveness Scale (SRS), which is a quantitative assessment tool for ASD screening of 4–18-year-old children (Constantino & Gruber, 2005). It was parent-reported instrument, which consists of 65 items measured on a 4-point Likert scale. The SRS is divided into 5 subscales: social awareness, social cognition, social communication, social motivation and autistic mannerisms. The higher scores suggest more severe social deficits and autistic behaviors (Cen et al., 2017). The Chinese version of SRS has good reliability and validity (Cen et al., 2017; Zhou et al., 2017). In the current study, the total Cronbach's alpha values was 0.882 and the test-retest reliability was 0.837.

Parenting stress. Parenting stress refers to the pressure that parents feel when raising their children. It encompasses the specific stressors of parenting a child (Rutherford & Mayes, 2019). The mothers' parenting stress was assessed using Parenting Stress Index-Short Form (PSI-SF), a 36-item, 5-point Likert self-report questionnaire developed by Abidin (Abidin, 1995). The PSI-SF comprises of three subscales (parental distress, parent-child dysfunctional interaction, and difficult child). The total scores ranged from 36 to 180, with higher scores indicating higher parenting stress. The PSI-SF was translated into Chinese and had been validated in Chinese population with high reliability and validity (Yeh et al., 2001). In the current study, the total Cronbach's alpha values was 0.897 and the test-retest reliability was 0.893.

Secondary outcome

Sleep quality. The Children's Sleep Habits Questionnaire (CSHQ) is a 33-item parent-reported instrument in examining sleep patterns and problems of children (Owens et al., 2000). Respondents are required to point out the occurrence frequency of sleep behaviors over a "typical" recent week by a 3-point Likert scale. Sleep problems are grouped into eight subscales conceptually: bedtime resistance, sleep onset delay, sleep duration, sleep anxiety, night wakings, parasomnias, sleep-disordered breathing, and daytime sleepiness. The higher total and subscale scores are indicative of more severe sleep problems. The Chinese version of CSHQ has good reliability and validity (Li et al., 2007; Liu et al., 2014). In the current study, the total Cronbach's alpha coefficient was 0.739, and the test-retest reliability was 0.831 for CSHQ.

Data collection procedure. Data were collected by a research assistant at baseline (T0: baseline), post-intervention (T1: week 20), and 32-week follow-up (T2: week 32). The research assistant, a registered psychotherapist who was blinded to the allocation, has received training in parent and child psychological assessment. The research assistant instructed the mothers on how to complete the questionnaires, and provided the assessment forms to them in the waiting room of the hospital. For those mothers who were illiterate and unable to fill out the questionnaire, the research assistant read the items, and then filled out the questionnaire based on the mothers' answers.

Data analysis. Data were analyzed using R software for windows (version 4.0.2, R Core Team, 2020) (R Core Team, 2022), and figures were drafted by GraphPad Prism 8.0.2 (GraphPad Software, Inc., La Jolla, USA). An intention-to-treat analysis (ITT) was conducted. The chi-square (χ^2) test, Fisher's exact test, independent 2-sample t-test, and Mann-Whitney U test was performed to compare the differences between the two groups in the baseline. The linear mixed model analysis could process the missing data and was used to examine the effects of the intervention. A random intercept fixed slope model was employed since the intercept is different between individuals, but the slope is same. $P < 0.05$ was considered statistically significant.

Ethics approval. This study was approved by the research ethics committees of Fujian Maternity and Child Health Hospital (2017–105). Children assented, and mothers provided written informed consent to participate.

Results

Participant enrollment

A total of 123 child-mother dyads completed the eligibility form. Of these, 53.7% ($n = 66$) were ineligible, and 4.1% ($n = 5$) did not sign the informed consent. Subsequently, 52 dyads were initially enrolled in the study and randomized into two groups. Three dyads refused to continue participating or intervention, 4 dyads did not complete the pre- or post-

assessment, 1 dyad moved to another city, 1 dyad was not contactable, resulting in a total of 43 dyads to complete follow-up assessments, 22 and 21 dyads in the intervention group and control group, respectively (see Fig. 1). Finally, 46 dyads conducted the posttest 1 and 43 conducted the posttest 2. While 43 dyads completed 80% of the sessions, and 32 dyads completed all the sessions.

Participant characteristics

The characteristics of participants for both groups are reported in Table 1. In each group, over 55% of the children were boys. Most mothers were married (96.2%), lived in the urban area (86.5%), with a monthly household income of >2000 RMB (92.3%), and living with an immediate family (67.4%). There were no significant differences in children and the mothers' characteristics between the two groups at baseline (all $p > 0.05$).

Primary outcomes

Autism behavior. Results of linear mixed model analysis indicated that the group*time interaction effect of ABC score was significant (Est = $2.027, t = 3.277; p < 0.01$). Further pairwise comparison results showed that the ABC score of the intervention group had a better downward

trend than the control group at T1 and T2 (all $p < 0.05$), as shown in Table 2, Table 3 and Fig. 2A.

Child's social responsiveness. The linear mixed model analysis resulted in a significant group*time interaction effect of SRS score (Est = $3.377, t = 6.095; p < 0.01$). Further pairwise comparison results showed that the SRS score of the intervention group had a better downward trend than the control group at T1 and T2 ($p < 0.01$), as shown in Table 2, Table 3, and Fig. 2B.

Parenting stress. The linear mixed model analysis showed group*time interaction effect of PSI-SF score (Est = $3.873, t = 4.253, p < 0.01$). Further pairwise comparison results showed that the PSI-SF score of the intervention group had a better downward trend than the control group at T1 and T2 ($p < 0.01$), as shown in Table 2, Table 3, and Fig. 2C.

Secondary outcome

Sleep quality. The group*time interaction effect of CSHQ score was statistically significant (Est = $3.158, t = 6.485; p < 0.05$). Further pairwise comparison results showed that the CSHQ score of the intervention group had a better downward trend than the control group at T1 and T2 ($p < 0.01$), as shown in Table 2, Table 3, and Fig. 2D.
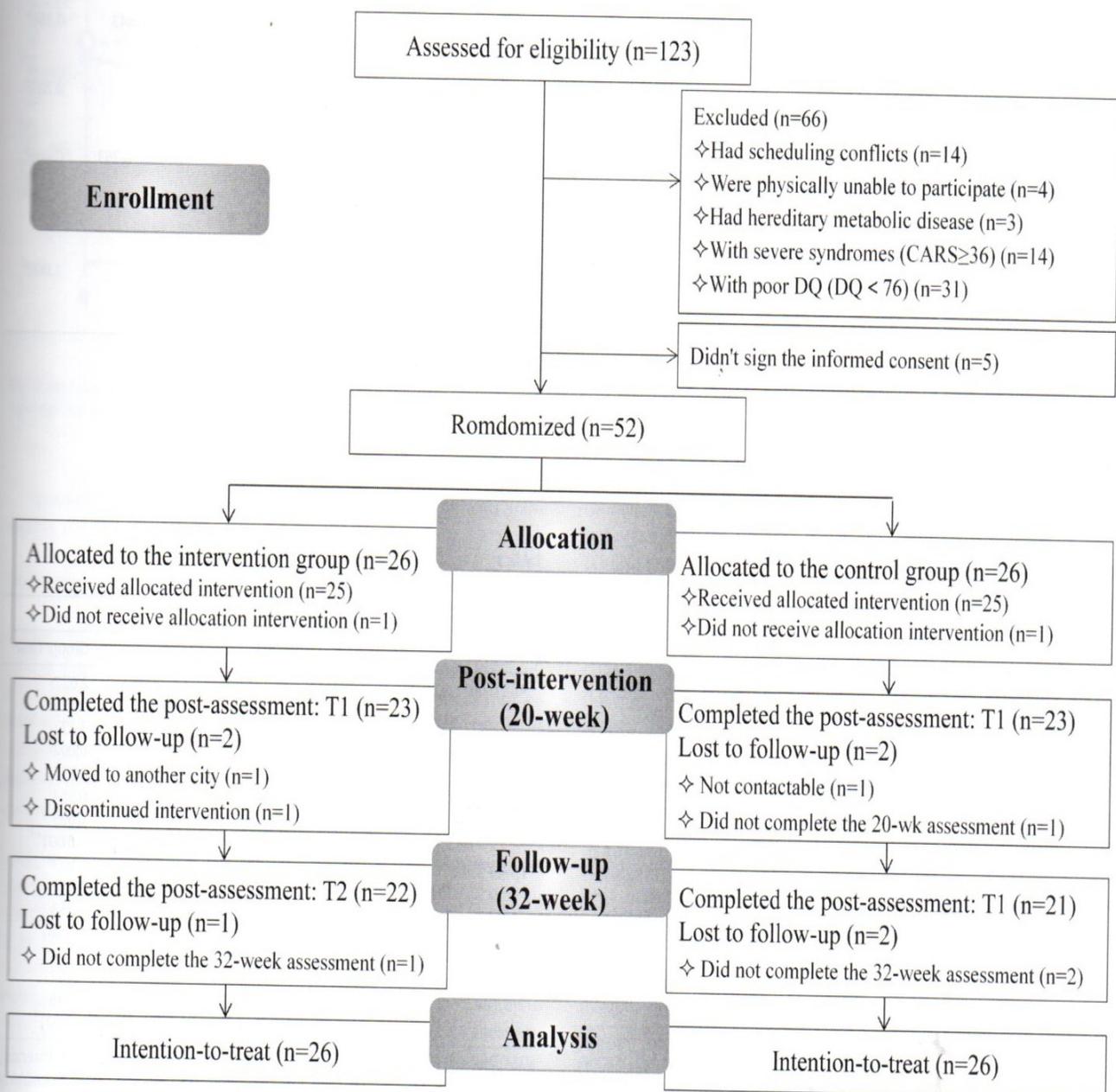

Fig. 1. CONSORT Flowchart of the study.

Table 1
Baseline characteristics of the children ($n = 52$) and their Mothers ($n = 52$).

Variable	Total (n = 52) n(%)	Control group (n = 26) n(%)	Intervention group (n = 26) n(%)	χ^2/Z/t	p value
Children					
Gender				0.315	0.575[a]
Boys	30(57.7)	16(61.5)	14(53.8)		
Girls	22(42.3)	10(38.5)	12(46.2)		
Age(years), median (IQRs)	4.65 (4.20,5.80)	4.90 (4.28,5.80)	4.50 (4.00,5.83)	−0.623	0.533[b]
Disease course (years), Mean (SD)	2.97 ± 0.61	2.92 ± 0.59	3.01 ± 0.64	0.540	0.592[c]
CARS score, median (IQRs)	33.00 (31.00,34.00)	32.00 (30.75,34.00)	33.00 (31.00,34.00)	−0.951	0.342[b]
Mothers and family					
Mothers' age (years), Mean (SD)	33.23 ± 4.02	33.19 ± 4.05	33.27 ± 4.07	0.068	0.946[c]
Mothers' education				−0.253	0.800[b]
Junior middle school or below	5(9.6)	3(11.5)	2(7.7)		
High school / Technical secondary school	9(17.3)	3(11.5)	6(23.1)		
College	24(46.2)	13(50.1)	11(42.3)		
University degree	12(23.1)	6(23.1)	6(23.1)		
Graduate degree or above	2(3.8)	1(3.8)	1(3.8)		
Number of children				0.080	0.777[a]
One	31(59.6)	15(57.7)	16(61.5)		
Two	21(40.4)	11(42.3)	10(38.5)		
Residence					1.000[d]
Urban	45(86.5)	23(88.5)	22(84.6)		
Rural	7(13.5)	3(11.5)	4(15.4)		
Marital status					1.000[d]
Married	50(96.2)	25(96.2)	25(96.2)		
Divorced/Separated	2(3.8)	1(3.8)	1(3.8)		
Occupation				0.843	0.358[a]
Employed	37(71.2)	20(76.9)	17(65.4)		
Unemployed	15(28.8)	6(23.1)	9(34.6)		
Religious belief					0.703[d]
Yes	8(15.4)	5(19.2)	3(11.5)		
No	44(84.6)	21(80.8)	23(88.5)		
Average monthly household income (RMB/USD)				−0.763	0.446[b]
≤2000 (<287) (Low-income)	4(7.7)	2(7.7)	2(7.7)		
2001–5000 (287–717) (Lower-middle income)	20(38.5)	11(42.3)	9(34.6)		
5001–8000 (718–1148) (Upper-middle income)	17(32.7)	9(34.6)	8(30.8)		
>8000 (>1148) (High-income)	11(21.1)	4(15.4)	7(26.9)		
Family structure					1.000[d]
Nuclear family (Parents and minor children live together)	15(28.8)	8(30.8)	7(27.0)		
Immediate family (Grandparents + Nuclear)	35(67.4)	17(65.4)	18(69.2)		
Single-parent family	2(3.8)	1(3.8)	1(3.8)		

Note. IQRs, interquartile ranges; SD, standard deviation.
[a] chi-squared test.
[b] Mann-Whitney *U* test.
[c] *t* test.
[d] Fisher's exact test.

Table 2
Pairwise comparison on outcome variables at all time points (n = 52).

Variable	Groups	T0 Mean (SD)	T1 Mean (SD)	T2 Mean (SD)
ABC score	Control(n = 26)	75.46(5.11)	71.13(4.50)	69.98(4.42)
	Intervention(n = 26)	75.44(7.65)	68.65(6.26)	66.00(6.23)
	F	0.000	6.817	5.585
	p	0.982	0.011*	0.021*
SRS score	Control(n = 26)	97.04(5.78)	93.74(6.19)	93.59(6.89)
	Intervention(n = 26)	97.42(5.39)	88.87(7.13)	87.14(6.88)
	F	0.0531	3.433	11.555
	p	0.818	0.001**	0.001**
PSI-SF score	Control(n = 26)	104.27(6.19)	102.74(6.83)	101.61(6.89)
	Intervention(n = 26)	102.27(8.31)	93.87(7.76)	92.32(9.71)
	F	0.750	22.600	17.320
	p	0.389	0.000**	0.000**
CSHQ score	Control(n = 26)	57.12(6.72)	57.50(6.22)	56.52(5.94)
	Intervention(n = 26)	57.58(6.24)	50.77(6.14)	50.96(5.17)
	F	0.076	15.430	11.177
	p	0.784	0.000**	0.001**

Note. ABC, Autism Behavior Checklist; SRS, Social Responsiveness Scale; PSI-SF, Parenting Stress Index-Short Form; CSHQ: Children's Sleep Habits Questionnaire; T0, Baseline; T1, week 20; T2, week 32.
* $p < 0.05$.
** $p < 0.01$.

Table 3
Parameter estimates of the linear mixed models (n = 52).

Variable		Fixed effects Intercept	Group	Time	Group*Time
ABC score	Est	81.355	−1.375	−7.518	2.027
	SE	3.090	1.958	0.969	0.619
	t	26.328	−0.702	−7.757	3.277
	p	<0.001**	0.484	<0.001**	0.002**
SRS score	Est	104.500	−2.958	−8.719	3.377
	SE	3.080	1.949	0.872	0.554
	t	33.930	−1.517	−10.003	6.095
	p	<0.001**	0.133	<0.001**	<0.001**
PSI-SF score	Est	106.559	−0.643	−8.955	3.873
	SE	4.061	2.571	1.433	0.911
	t	26.238	−0.250	−6.251	4.253
	p	<0.001**	0.803	<0.001**	<0.001**
CSHQ score	Est	62.220	−2.488	−6.231	3.158
	SE	2.966	1.877	0.766	0.487
	t	20.978	−1.325	−8.135	6.485
	p	<0.001**	0.189	<0.001**	<0.001**

Note. ABC, Autism Behavior Checklist; SRS, Social Responsiveness Scale; PSI-SF, Parenting Stress Index-Short Form; CSHQ: Children's Sleep Habits Questionnaire; Est, estimate of regression coefficients; SE, standard error; T0, Baseline; T1, week 20; T2, week 32.
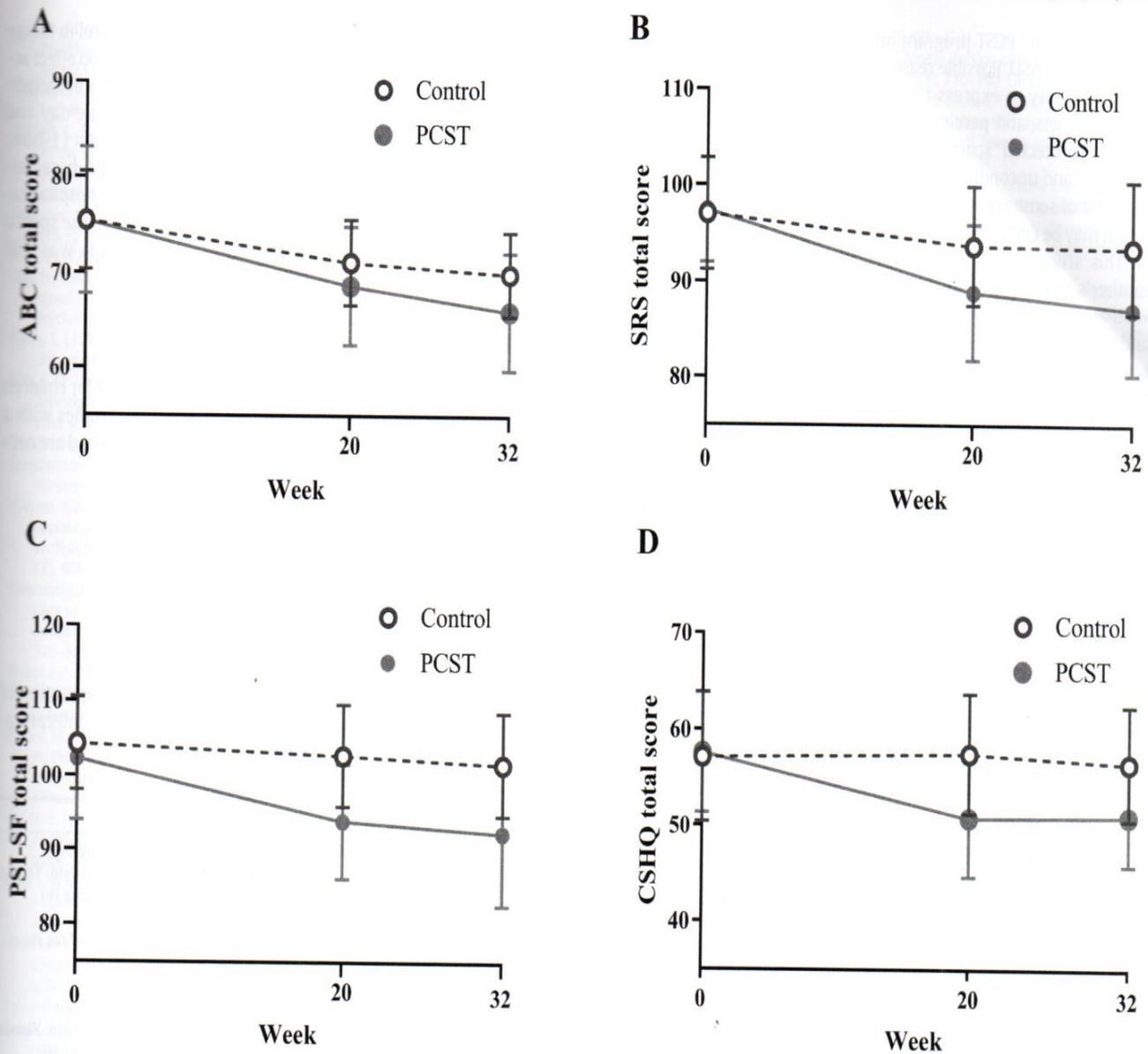** $p < 0.01$.

A

B

C

D

Fig. 2. Means and 95% CI for ABC, SRS, PSI-SF, and CSHQ score from the baseline to follow-ups. PCST, Parent-child Sandplay Therapy; ABC, Autism Behavior Checklist; SRS, Social Responsiveness Scale; PSI-SF, Parenting Stress Index-Short Form; CSHQ: Children's Sleep Habits Questionnaire.

In addition, no adverse effect related to the PCST program was found during the T1 and T2 follow-up period.

Discussion

This study focuses on evaluating the effects of PCST on children with ASD and their mothers. Our results demonstrated that the PCST program has the potential to improve the autism behavior, social interaction and sleep quality for the children with ASD, and decrease the parenting stress of their mothers. These findings were somewhat similar with the findings reported in other studies (Cao et al., 2013; Liu et al., 2019; Lu et al., 2010).

The effectiveness of the PCST on the ABC score and SRS total score is consistent with a study concentrated on a creative intervention using sandplay and interactive symbolic games in a school setting (Lu et al., 2010). A meta-analysis conducted by Liu et al. (2020) also showed that the sandpaly therapy could improve the psychological status, speech socialization and sensory cognition of children with ASD. A likely explanation is that the sandplay therapy provides a space for children to vent their emotions (Shen & Xie, 2022). Children vent their excess energy and negative emotions in sandpaly therapy, which helps to improve their behavior problems. Moreover, the PCST program used symbolic intentions to foster self-healing of the children and their

mothers (Tan et al., 2021). Previous research has manifested that symbolic games were closely related to children's language acquisition (Quinn et al., 2018). After the child was integrated into the sand tray world, the therapist further stimulated the emergence of active language via sharing the stories, and promoted the communication between the child and the mother. Additionally, the PCST is a kind of family therapy, in which mothers and their children can freely exert their imagination and creativity in a completely relaxed environment, with a higher degree of cooperation. In our program, children with ASD were placed in the same sand tray with their mothers. They abided by the same rules, established life scenarios, tried to solve the problems together in the scenarios, and shared the sand tray experience in the symbolic games. It may help the children with ASD feel more positive about the care and support from their family, and find an outlet to vent emotions (Tan et al., 2021). Consequently, the autism behavior and social interaction among the children with ASD were improved.

In the meta-analysis by Lai et al. (2019), an overall pooled prevalence of 13% was estimated for sleep-wake disorders in the autism population. Parent-implemented behavioral interventions have been considered as treatment options for children with ASD and co-occurring sleep disturbances (Sanberg et al., 2018). However, there are limited studies that have examined the effect of using sandplay therapy on autistic children's sleep management (Liu et al., 2019). Our study

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