

Floortime Approach to Increase Communication Skills for Children With Autism Spectrum Disorder and Intellectual Impairment

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ABSTRACT

Several studies have already proven the effectiveness of using floortime approach in increasing the reciprocal communication skills of children with autism spectrum disorder (ASD). However, there are only a few studies that have focused on this approach for children with both ASD and intellectual impairment because this intervention is considered very challenging for a child with this kind of dual diagnosis. Therefore, this study aims to explore the effectiveness of floortime approach in increasing the reciprocal communication skills of children with ASD and intellectual impairment. This study is a single-case research design with multiple baselines across settings, involving free play and semi-structured play situations. The pre- and post-test method were used to measure and monitor progress in the child's communication skills. Both the child (age 8 years, 9 months; has ASD and intellectual impairment disorder) and mother were included in this study. In total, 26 sessions were divided as follows: 3 baseline assessments, 2 psycho-educational sessions, 17 direct treatments, 3 post-test sessions, and 1 follow-up session. The effectiveness of the intervention was evaluated using the circle of communication (CoC) form and the child's Functional Emotional Assessment Scale (FEAS), with effectiveness defined as the change in trend or percentage change of CoC and FEAS data after the intervention was completed. Results for both free play and semi-structured play settings show an average increase in initiation of interaction (open CoC) by the child and in the number of interactions between the child and the mother (CoC). Our findings show that the child's communication skills were significantly improved after treatment completion.

Keywords: *DIR/floortime, autism spectrum disorder, intellectual impairment, circle of communication, communication skills.*

1. INTRODUCTION

Communication and interaction skills are considered as the two highly essential competencies to be mastered by every individual. For children, these skills support their learning process through the social environment and further help them fulfill their needs through expressive language (Gooden & Kears, 2013).

Unfortunately, communication and interaction are the skills most commonly impaired in children with autism spectrum disorder (ASD) (Greenspan & Wieder, 2006). According to the American Psychiatric Association (2013), the main feature of ASD is the significant deficit in initiating and sustaining communication

with other people. Deficits in social aspects potentially lead to problems in daily life, such as difficulty in socializing with peers or adults, fulfilling needs and desires, and issues with adaptive functioning (Greenspan & Wieder, 2006; Sears, 2010; Bal, Kim, Cheong, & Lord, 2015).

Depending on the child's place along the spectrum, ASD may be determined to be more severe with a sensory profile, cognitive issues, and varied affect. The intellectual functioning of children with ASD is on a different continuum, from above average to below average, or even intellectually disabled. Based on several studies, 30–50% of children with ASD have intellectual impairment, defined as an intelligence quotient (IQ) <70. Meanwhile, the condition of ASD accompanied by intellectual impairment can greatly affect the prognosis, which tends to be negative (Chaste & Leboyer, 2012; CDC, 2014).

Thus, there is a dire need for intervention to minimize the effects of ASD, especially when this disorder is accompanied by intellectual impairment. For children to be able to communicate and interact with others, basic skills must be acquired as follows: paying attention to the interlocutor, showing interest in communicating, and responding-initiating interaction. If these basic skills are already well developed, then children may more easily absorb information and respond properly and better maintain interaction (Greenspan & Wieder, 2006). These basic skills can be enhanced with the developmental, individual differences, relationship-based (DIR) approach, which comprises six functional–emotional developmental stages. Floortime has been defined as an intervention method founded

on DIR as its basic principle, which aims to improve children's functional–emotional well-being through their relationship with their primary caregiver (Greenspan & Wieder, 1999; Hess, 2013).

Several studies have proven the effectiveness of floortime intervention in enhancing interaction skills of children with ASD, as measured using the circle of communication (CoC) (Greenspan & Wieder, 2006; Dionne & Martini, 2011; Pajareya & Nopmaneejumrulers, 2011; Hess, 2013). In Indonesia, studies on the effectiveness of floortime among ASD children were able to evaluate participants with different characteristics (Lumbanbatu, 2015; Boediman & Mardian, 2017; Phandinata, Atmodiwirjo, & Basaria, 2017); however, few studies have been performed in children with both ASD and intellectual impairment (Hess, 2013). In this dual-diagnosis population, the implementation of floortime is considered to be challenging. According to Hess (2013), it is essential to have a comprehensive understanding of the child's specific profile and interests and to consider the child's uniqueness as the basis for designing the program. Therefore, this current study aims to evaluate the effectiveness of the floortime approach in children with ASD and intellectual impairment.

Furthermore, to date, few studies conducted in Indonesia have implemented floortime in a structured play setting. Greenspan and Wieder (2006) claimed that the application of floortime is inseparable from free play and structured play settings because this intervention needs to be implemented in structured natural setting in order to allow children to gain relevant learning through daily activities.

Therefore, this current study uses the method of multiple baselines across the different play settings, utilizing floortime

2. METHODS

2.1. Study Design

This study is a single-case research design with multiple baselines across settings. The pre-and post-test method was used to measure the effectiveness of the intervention. The variable was measured in both free play and semi-structured play situations.

2.2. Participants

The study participants were the child (female, age 8 years and 9 months) and the child's mother (age 33 years). The child had ASD accompanied by intellectual impairment; she underwent developmental regression at the age of 2 years. At the time of the study, she had significant deficits in communicating and interacting socially in various situations. She rarely initiated and responded to interaction. She only used nonverbal language to communicate with others in order to fulfill her primary needs. Based on the results of the Vineland test and developmental checklist, her current overall development was equivalent to children younger than 2 years.

The child's mother was from a low socioeconomic background. At the time of the study, she was raising two children diagnosed with ASD and intellectual impairment and one infant with normal development. She reported often feeling overwhelmed with her role as a mother of two children with special needs, and she further noted that the situation made it difficult for her to provide optimal care and parenting to her three children.

approach in both free play and semi-structured play settings.

2.3. Measurements

This study used these standardized measurements as follows: Short Sensory Profile (SSP), Sensory Processing/Motor Planning Questionnaire (SPMPQ), and Functional Emotional Assessment Scale (FEAS). The first sensory profile was developed by Dunn (Dunn, 1999). The SPP has been defined as a tool to identify the sensory profile of children between ages 3 and 10 years old, and it was already adapted to Bahasa Indonesia by Yudhiatmoko in 2014. The SSP internal consistency was 0.875 (Cronbach's alpha), and the test-retest value was 0.97. The study by Yudhiatmoko (2014) conducted a validity test using the transcultural validity method, which showed that the SSP's applicable for use in Indonesia. The SPMPQ is a rating scale, developed by Dr. Stanley Greenspan; it was used to assess adults' sensory profile. The FEAS, also developed by Greenspan and Dr. Georgia A. DeGangi, is an instrument to evaluate and identify children and caregivers' functional-emotional developmental capacity based on six functional-emotional developmental stages (DeGangi & Greenspan, 2001).

In addition to these three standardized measurement tools, this study used a nonstandardized instrument called the *circle of communication measurement* form. This form was developed in order to evaluate the number of interactions between the child and the mother (*CoC*), particularly the number of interactions that the child initiated (*open CoC*). The reliability test was conducted using the inter-class correlation method. Based on

the CoC baseline and post-test data, the α -coefficient was determined to be in the range 0.82–0.977 ($p > 0.05$). The validity test was performed using the content validity method.

2.4. Procedure

2.4.1. Stage 1: Pre-intervention Stage

During the pre-intervention stage, the following activities were completed: conduct psychological assessment; provide information about and explanation of the floortime intervention program and provide informed consent to participate in the study; participate in the training for the administration of the FEAS and CoC; practice delivering floortime intervention through role-play activity; and conduct DIR assessment to identify the child's baseline and profile in order to develop the floortime activity and to monitor the progress of the floortime intervention.

During the baseline session, the mother and child were asked to play for 20 minutes while being observed by the researcher; during which time, the researcher obtained the data for the CoC and FEAS based on their interactions. Baseline data in the free play setting was gathered for 3 consecutive days (1 day = 1 session), and the semi-structured play baseline was collected 7 times on different days (1 day = 1 session).

2.4.2. Stage 2: Intervention Stage

As stated by Greenspan and Wieder (2006), the most appropriate application of the floortime intervention is highly adapted to the needs and characteristics of each child. Therefore, this program was adjusted to the condition of the child and mother, as has been shown at the time of the assessment and baseline evaluation.

Before the floortime intervention actually began, the researcher provided educational activities and training for the child's caregiver (mother). This activity was carried out for 2 days at the Department of Psychology, University of Indonesia, Depok, Indonesia.

After the mother was perceived as successful in understanding the DIR and floortime material, the intervention session was started. The floortime intervention program was performed for 17 consecutive sessions (1 session = 1 day). Each session in this program was targeted to last for 80 minutes. One session is divided into four activities, with a duration of 20 minutes each. Those activities were initial discussion, free play, semi-structured play, and evaluation.

2.4.3. Stage 3: Post-intervention Stage

At this stage, the researcher conducted a post-test evaluation and a follow-up to remeasure the study variables after all intervention sessions were completed. The data obtained were expected to represent the consistency of changes in the child's communication skills after an intervention is no longer provided (Gravetter & Forzano, 2012). Post-tests were carried out thrice after the intervention was completed, and follow-up was conducted 1 month after the last post-test. At this stage, the researcher asked the mother and child to interact in free play and structured play settings for 20 minutes each without assistance.

2.5. Data Analysis

Data analysis in a single-case design research study generally uses visual analysis techniques with graphics (Gravetter & Forzano, 2012). Kazdin

(2013) has noted that one of the criteria that can show the effectiveness of an intervention is the *change in trend*, which is defined as a change (either increase or decrease) in data after an intervention has been given. The average of total CoC and FEAS scores from baseline and post-test

were then compared to determine the changes in participant behavior patterns. Results of the CoC and FEAS numbers in the follow-up session were also considered to determine the consistency of the participants' behavior changes.

3. RESULTS

As previously described, this study was conducted in a total of 26 sessions (3 baseline sessions; 2 psycho-educational and training sessions for the mother; 17 intervention sessions; 3 post-test sessions; and 1 follow-up session). The duration of the implementation in 3 sessions—the 5th, 10th, and 15th interventions—was determined to be around 40 minutes longer than the expected 80-minute sessions because the researcher had to show the video of the previous sessions to the mother in the evaluation session. In addition, changes in toy selection were made as needed to adjust to the child's interest.

(270%) in the free play setting. The average number of CoC interactions between child and mother also increased by 11 (29%). In a semi-structured play setting, the average number of open CoCs for the child was also recorded to increase by 22 initiations (275%), and the average number of CoC interactions between the child and mother increased by 21 (91.3%). The trendline on graphs 4.2 and 4.3 also showed an increase, meaning that the total amount of CoCs between child and mother and open CoCs by the child in both play settings increased. **Table 1, Figure 1, and Figure 2** provide more information about the increase in child's CoC interactions lay settings increased. Enlisted below are more information about the increase in child's CoC;

3.1. CoC Comparison in Pre- and Post-Intervention

Results showed an increase in the average number of child-initiated interactions (open CoC) by 27 initiations

Table 1. Comparison of CoC increase in the percentage in free play and semi-structured play settings

Setting: Free play						
	Open (child's initiation)		Increase in percentage	Total of mother-child CoC		Increase in percentage
	Baseline	Post-test		Baseline	Post-test	
	10	40		31	40	
	7	32		42	55	
13	42	39	53			
Average	10	37	270%	38	50	29%
Target			50%			50%
Notes			As targeted			Not as targeted
Setting: semi-structured play						
	Open (child's initiation)		Increase in percentage	Total of mother-child CoC		Increase in percentage

	initiation)		percentage	CoC		percentage
	Baseline	Post-test		Baseline	Post-test	
	8	39		20	50	
	6	30		19	48	
	6	21		29	34	
	9			21		
	7			23		
	7			30		
	11			21		
Average	8	30	275%	23	44	91.3%
Target			50%			50%
Notes			As targeted			As targeted

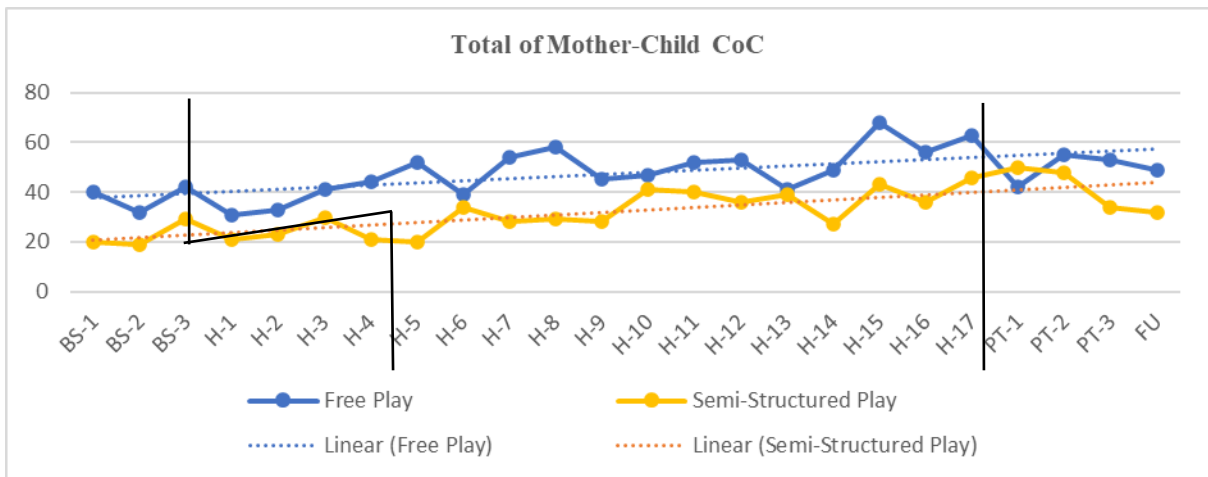


Figure 1. Total number of child–mother CoCs in free play and semi-structured play settings. CoC, circle of communication.

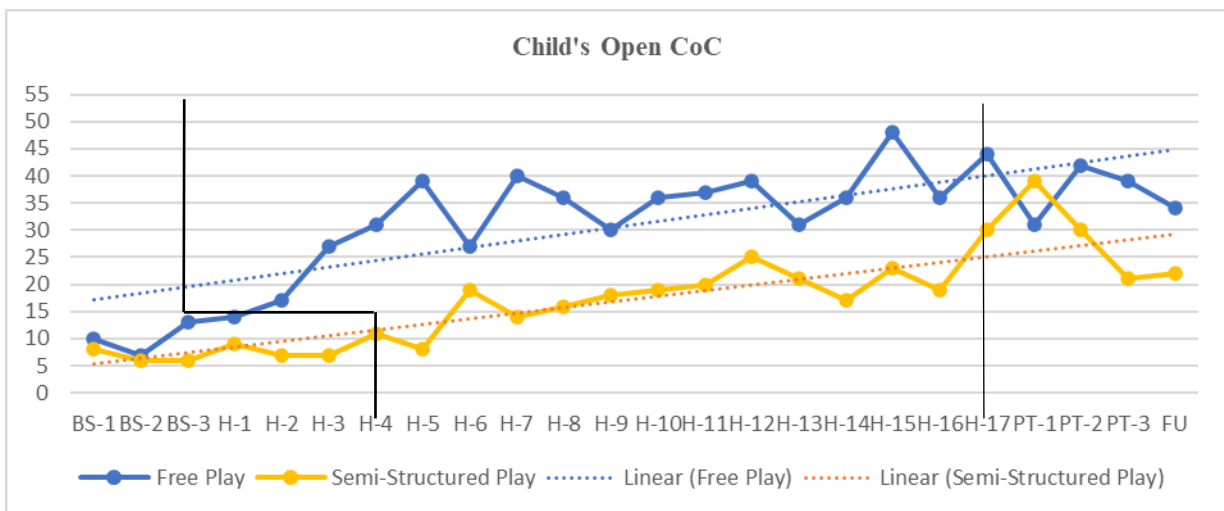


Figure 2. Total number of child-initiated interactions in free play and semi-structured play settings. CoC, circle of communication

3.2. FEAS (Child Scale) Comparison in Pre- and Post-Intervention

In general, an increase was recorded in the total FEAS score of the child in both play settings. The average of the FEAS total score in the free play setting increased by 57.9% and 52.8% for the

symbolic play activities and the sensory play activities, respectively. The average of child’s FEAS total score in the semi-structured play setting also increased by 150%. Increased score was observed at levels 1 to 3 (**Figure 3**).

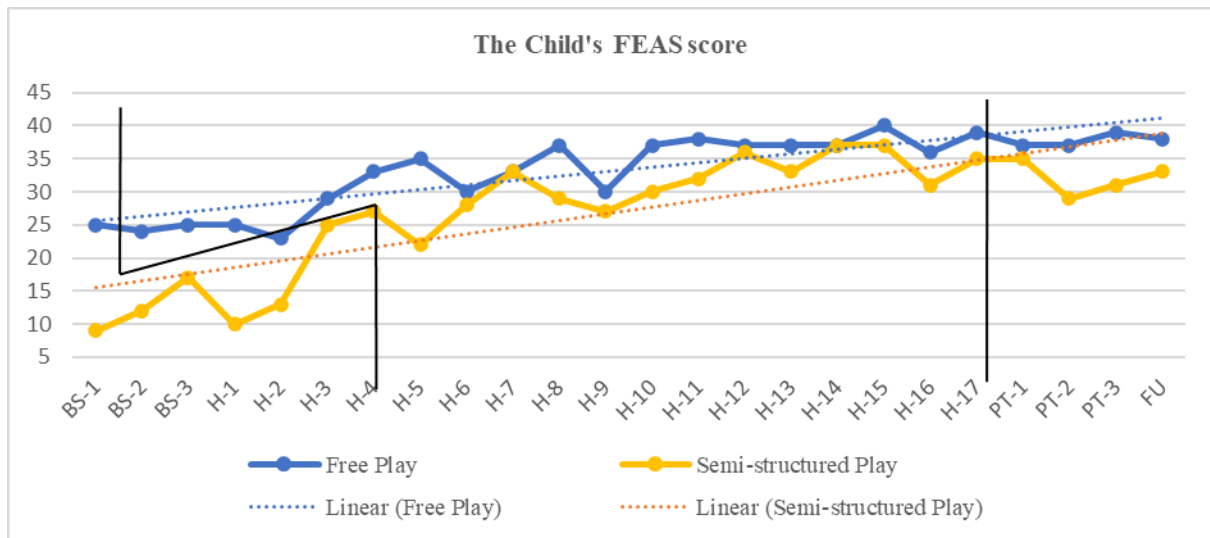


Figure 3. Comparison of the FEAS child scale score in the baseline, intervention, and post-intervention periods. FEAS = Functional Emotional Assessment Scale

3.3. FEAS (Caregiver Scale) Comparison in Pre- and Post-Intervention

The total of FEAS caregiver scale score in the free play and semi-structured play settings was also observed to have increased. The increase in the average

FEAS caregiver score in the free play setting was 19.7% for symbolic play activities and 11.4% for sensory play activities. The increase in the average FEAS caregiver score in the semi-structured play setting was 20.3% (**Figure 4**).

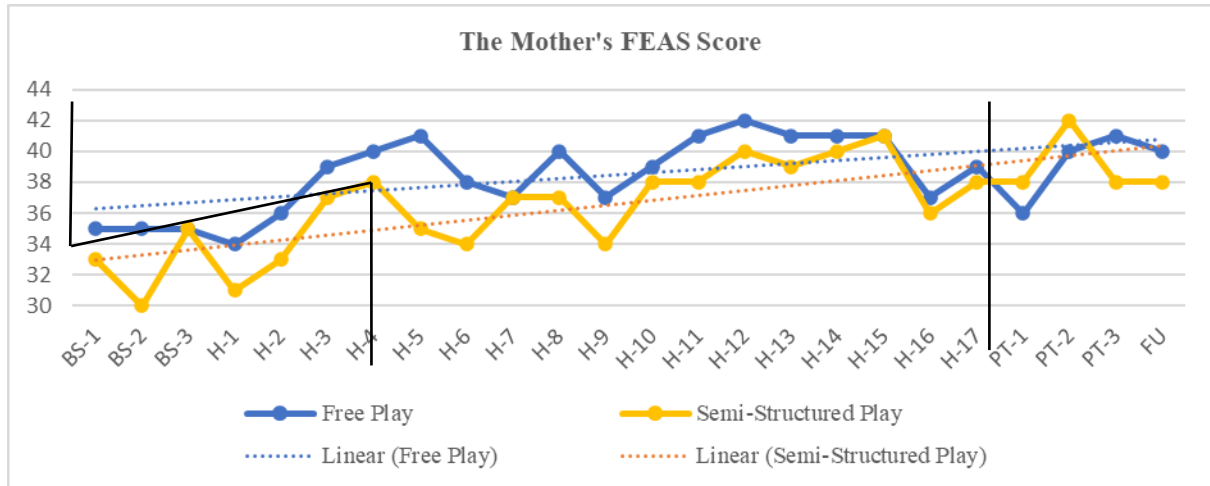


Figure 4. Comparison of FEAS caregiver scale score in the baseline, intervention, and post-intervention periods. FEAS = Functional Emotional Assessment Scale

4. DISCUSSION

The study results showed an increase in the targeted ability after the floortime intervention was delivered in 17 consecutive sessions. A marked increase was observed in the percentage of the total child–mother CoC and the child-initiated interactions. Improvements were observed in both the free play and semi-structured play settings. In addition, the functional–emotional developmental capacities of the child and the mother as measured by the FEAS score have also increased.

The total child–mother CoCs in the semi-structured play setting exceeded the expected target, which was up to 91.3%. Based on observations in the baseline period, the child tends to avoid her mother, who excessively pushed the child to carry out activities that were previously planned. After the intervention was given, the mother has gotten better in adjusting the way in which she interacted according to the child’s specific interests. This approach made the child open up to become involved in activities that have been planned. In line with the findings of this study, Greenspan and Wieder (2006)

stated that parents who are able to adjust their behavior to the child’s specific interests can help their children to develop their ability to initiate and respond to a specific stimulus aimed at them.

In contrast, enhancement in the total number of child–mother CoCs in free play situations was not increased as targeted, reaching only 29%. Based on these observations, the child often showed a closed CoC in response to the mother’s actions during the baseline sessions, including through her rejecting behavior or expressions of anger (e.g., pushing the mother’s body, making an “Hhh” sound, or hitting the chin). This type of interaction caused the amount of CoC to increase as the mother gave too much stimulus to the child in an attempt to initiate interaction. Unlike the interactions during the intervention and post-test sessions, the child became much more active to initiate the interactions. In other words, the child was the one who controlled the interaction, while the mother was expected to respond to the child’s actions.

The high increase of CoCs can be explained through the concept of “sensory–affect–motor connection.” Every individual has an affective aspect in receiving sensory stimulus. The accuracy between stimulus-giving and the children’s characteristics makes them feel comfortable in receiving sensory stimulus from the caregiver. Children develop positive feelings toward caregivers, which often leads to the emergence of a child’s response through an action. Once this pattern persists, positive feelings will continue to develop until the children are encouraged to maintain interactions with caregivers. This dynamic has become one of the main factors supporting the success of floortime interventions (Greenspan & Wieder, 2006).

After an analysis of FEAS data during the intervention, the child’s ability to perform meaningful communication emerged after she mastered the levels of previous functional–emotional development. That finding aligns with the explanation by Greenspan (2007) that children’s skills in conducting two-way communication are supported by the mastery of their abilities in the previous stage of functional–emotional development. Therefore, it is important to optimize children’s abilities in the initial stages before targeting their two-way communication skills.

Based on the findings in this study, a strong relationship is evident between the quality of functional–emotional development of the child and mother and the total CoC score. If the score of one of the variables increases, then the score of the other two variables also increases, and vice versa. This relationship happens because this intervention process involves

two-way communication and interaction, in which the behavior of one party will influence the behavior of another party as interlocutor (Penrod, 2011).

Several factors support the success of this program. The first supporting factor is delivering intensive and consecutive interventions. Hess (2013) claimed that this approach is needed to maintain the progress of development and to prevent a decrease in the ability while the intervention is ongoing.

The second supporting factor determined is the mother’s awareness to make changes and to show a cooperative attitude. The mother showed daily commitment attending all sessions until the end of intervention program; she was active in the discussions; and she was receptive to suggestions. Lesmana (2011) stated that cooperative attitude in the intervention process depends on participant’s awareness about behavior that needs to be changed from the previous situation. The positive view and expectations of the mother toward the child also contributed to the success of the program. In the first three sessions, the mother did not want her child to play like a baby, which made it difficult for both parties to establish harmonious two-way communication. However, the mother’s behavior began to change after she was given education about matching her expectations with the developmental stages of her child. With this new behavior, the mother became more able to interact and provide challenges in accordance with the level of development of her child.

In contrast, other factors have negatively affected the data fluctuations.

First, the condition of the mother's affect has greatly influenced how the mother and child interact. When the mother shows a bad affect condition, the child tends to do her own activities, so the amount of CoC almost always decreased from the previous session. Greenspan (2007) and Hess (2013) stated that parents who have not been regulated, attuned to, and focused on play activities tend to be insensitive to children's behavior and needs. In fact, parental sensitivity is a strong foundation to make children feel comfortable.

The second negative factor was the support and knowledge of family members about floortime. Liao, Hwang, Chen, and Lee (2014) suggested that floortime does not only rely on one caregiver, but other family members need to be involved in the intervention as well so that children are provided with consistent stimulation. However, in this case, the participants' family did not provide support when the child displayed more active behavior. The mother reported that her family members often protested her way of interacting and that they have branded the child's behavior as dangerous. The mother's response toward the child's behavior was judged wrongly by the family because they perceived that she was not being strict enough. Consequently, the mother often forbade some behaviors by the child during intervention, so the communication was easily interrupted.

Furthermore, the results of CoC and FEAS in post-intervention were slightly lower compared with the results of the intervention. Observations showed that the mother still needed assistance in applying the floortime principles. Research by Pajareya and Nopmaneejumrules (2011) found that parents in Thailand also had

difficulty in changing their behavior, which typically is to dominate and give orders to children. This phenomenon is in line with the statement by Hess (2013) that floortime does not only provide training for mothers, but also tries to change the way that children are taken care of and stimulated. Therefore, it takes quite a long time to change a behavior that has been formed early in the child's and parent's lives.

This study has several strengths. Referring to the basic research principle, the measurement process used in this study—multiple baselines—can ensure that the data obtained are stable and indeed represent the participant's behavior before and after the intervention is given (Gravetter & Forzano, 2012). Another advantage is that researcher conducted inter-rater reliability on CoC and FEAS measurements, a technique that aimed to avoid researcher bias (Hallgren, 2012).

In contrast, this study has several limitations. Results of studies using single-case research design often have a low level of generalizability. In addition, the behavioral targets and design of the floortime program are highly adjustable to the characteristics of the participants. An intervention module aimed at one child may not be applicable to other children, although the characteristics of the disorder are similar. For these reasons, although this study can be used as a reference, the results cannot be generalized to a broader population (Greenspan & Wieder, 2006; Gravetter & Forzano, 2012).

In addition, data for the CoC baseline and FEAS semi-structured play setting showed an effect for the floortime approach. As Gravetter and Forzano

(2012) stated, one of the weaknesses of the multiple baseline design is the possibility that a behavior will become generalized and changed following the behavior in other situations for which an intervention was given. In this case, providing education for the mother appeared to be a factor that provided a change in the semi-structured play baseline data.

Another limitation of this study is that the use of CoC measuring devices that have not been standardized and tested. In this study, a special CoC form was created by the research team. In addition, the FEAS measurement tool only underwent the process of content validity testing with expert judgment techniques. When referring to the research principle, the testing technique carried out by the research team is the validity test, which had the weakest results (Anastasi & Urbina, 1997).

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Despite all of these limitations, because not many studies evaluate the effectiveness of the floortime approach on a child with a dual diagnosis, this study provides support for implementing the floortime approach to improve communication skills for a child with ASD with intellectual impairment. The researchers hope that this study can be a reference in making a floortime program for children who have similar characteristics to this study participant.

5. CONCLUSIONS

For a child with both ASD and intellectual impairment, the DIR-floortime approach implementation significantly increased the number of CoC for the mother and child; the number of initiation interactions (open CoC) of the child; and the functional-emotional developmental capacities in the child.

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