

Original Research

**Play Therapy Modified Ludo Games Decreasing Hyperactivity, Impulsivity, And Inattention In Children With Attention Deficit And Hiperactivity Disorder**

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**ABSTRACT**

**Background:** Attention Deficit and Hyperactivity Disorder (ADHD) is a disorder experienced by children with characteristics including hyperactivity, impulsiveness, and inattention things that affect the occupational performance of children in their activities. Occupational therapy play a role in handling ADHD children through play therapy methods. One of the children's games that have therapeutic value is the modified ludo game. Modified ludo game can be applied to decreasing symptom ADHD.

**Methods:** Quantitative with pre-experimental research design, one group pretest-posttest with a sample size of 36 children with ADHD in RSUP Dr. Sardjito Yogyakarta. The sampling technique was purposive sampling, inclusion criteria: being able to understand simple commands, aged 3 - 6 years old, no motor impairment and able to move. Three rules modified ludo games models are provided in each session. The measuring instrument use ADHD rating scale that is valid and reliable. The data analysis method uses a paired sample t-test.

**Results:** Paired sample t-test results showed that p-value < 0.05. Play therapy modified ludo games intervention have a possitive and significant effect on hyperactivity, impulsivity, and inattention in children with ADHD ( $p = 0.001$ ).

**Conclusion:** Play therapy modified ludo games has an effect on decreasing hyperactivity, impulsivity, and inattention in children with ADHD, so it's recommended as an alternative game for occupational therapy for ADHD children.

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**INTRODUCTION**

An epidemiological study of 20 countries from the World Health Organization World Mental Health Surveys found that across high-, upper-middle-, and low or lower-middle-income countries, prevalence rates of ADHD in children and adolescents were highest in the USA (8.1%) and lowest in Iraq (0.1%), Poland (0.3%) and Romania (0.4%) (ADHD Institute, 2021).

The National Survey of Children's Health (NSCH) in the United States in 2016 explained that 6.1 million children who had been diagnosed with ADHD aged 2-17 years old, 2.4 million aged 6-11 years old, and 12-17 years old were 3.3 million (Bitta et al., 2017). In China it reached 6.26% (Lelong et al., 2021). In Indonesia it is 2.2% for the hyperactivity-impulsivity type, 5.3% for the mixed type of hyperactivity-impulsivity and inattention, and 15.3% for the inattentive type (Utami et al., 2021). People with ADHD are increasing every year, and it affects more boys (84.3%) than girls (15.7%) (ADHD Institute, 2021).

Children with ADHD can have an impact in various areas (Mirzai et al., 2020). Some parents of children with ADHD say that their children are uncontrollable in academics and achievement, have behavioral problems at home and at school, such as disturbing friends, and sometimes in public doing things out of control and experiencing social difficulties. Behavior of children with hyperactivity tends to be arbitrary so that it often causes children to have difficulty establishing interpersonal relationships with other people, whether parents, peers or the surrounding environment (Javanbakhsh & Shahidi, 2021).

Attention disorders or inattention can be seen from the failure of children to give full attention to something, it is easy to switch attention from one thing to another (Larasati et al., 2017). Children with ADD/ADHD also have difficulty concentrating if there are things going on around them, they usually need a quiet, environment to stay focused (Ashori & Bidgoli, 2018). Usually children always fail to pay attention to detail and always make mistakes because they are careless when doing school work or other activities.

Currently, several therapeutic methods are widely used in the treatment of attention deficit disorder in ADHD children, both pharmacological and non-pharmacological. Occupational therapists play a role in handling ADHD children through non-pharmacological methods in the form of therapy. One form of therapy given is play therapy or play therapy.

Play therapy has been shown to have significant results on the individual and lives of children who have been diagnosed with ADD, children who have done play therapy show that their stress levels are reduced, especially regarding anxiety, emotional stress and withdrawing self (Zakershoshtari & Bozorgi, 2016). Play therapy has a positive impact on overall behavioral disorders, internalization problems, problematic behavior, self-concept, self-efficacy, depression, anxiety and treatment of adherence.

Another study on play therapy for Attention Deficit Hyperactivity Disorder (ADHD) (Mirzai et al., 2020) revealed that the majority of the population of children suffering from ADHD were male, including the majority of people with ADHD experiencing concentration disorders in learning and other school activities. Based on the results carried out using axlin play therapy, it was revealed that ADHD children prefer to play and are quick to catch things and instructions that are obtained because in this therapy process the subject does not feel that he is being treated but feels he is playing. In this activity, playing can indeed increase the joy and connect with children's emotions. So that it can make it easier for children to focus on matters that require concentration.

One of the children's games that have therapeutic value is the modified ludo game. Ludo is a racing game with 2 to 4 players. Players are asked to circle the four pieces around the board and enter the finish area (Alvi & Ahmed, 2011). While the modified

ludo game in this study is a quick ludo game with an expansion technique on the size of the ludo board, as well as pawns played by children.

Some of the benefits obtained from the ludo game are training children's patience in waiting their turn, practicing solving simple problems, and honing skills in socializing with friends (Sikhah, 2018). These benefits are in accordance with the explanation that ADHD children need alternating play activities, channeling energy, as well as activities such as developing strategies and adjusting points on the dice with the number of steps that must be taken in the game in order to reduce frustration, hyperactive and impulsive behavior and train concentration (Afifah et al., 2019 ; Lelong et al., 2021).

Therefore, the modified ludo game is expected to be an alternative choice of play for children with ADHD. Aim of study is to know the effect of modified ludo game on hyperactivity, impulsivity and inattention in children with ADHD. The novelty of this research a modification of the ludo game in the form of a quick ludo game with an expansion technique on the size of the ludo board, pawns played by children

## **MATERIALS AND METHOD**

This research is a quantitative pre-experimental study using a one-group pretest-posttest design. The population in this research was all ADHD children at RSUP Sardjito Yogyakarta. The research subjects were 36 ADHD children obtained through purposive sampling technique with inclusion criteria: being able to understand simple commands, aged 3 - 6 years old, no motor impairment and able to move.

First, the study objective was explained to the parents, then provided informed consent. Current research tool was ADHD Rating scale that is valid and reliable. ADHD Rating scale is a DSM-IV-TR referenced rating scale that screens for problems with attention or impulse control symptoms of childhood disorders.

We interviewed with parents and completed clinical interview checklist based on DSM-IV. Moreover, ADHD Rating Scale was completed by parents as pre and post test, too. Data collection is carried out by means of direct intervention and evaluation during December 2020 to August 2021.

The intervention was carried out by giving a modified ludo game with 3 main rules, namely Go Out First, Hit First and Quick Finish. This modified ludo game is done 14 times of group play therapy (2 sessions per week, each for 45-60 minutes for 8 weeks. The hyperactivity, impulsivity, and inattention problems of subject were assessed before and after the intervention using ADHD Rating Scale which consisted of 18 items (9 items measuring inattention, 9 items measuring hyperactivity-impulsivity).

Data analysis was performed in SPSS software using the Shapiro-Wilk test and Paired t-test. The results of the normality test of the data obtained are normally distributed, the statistical analysis used is the paired t-test. Ethical clearance was obtained from Health Research Ethics Committee Dr. Moewardi General Hospital number 765 / VI / HREC / 2020.

## **RESULTS**

The intervention was carried out at Sardjito Hospital Yogyakarta during December 2020-August 2021. The sample of the study was 36 children with a percentage of 61% male samples (22 children) and 39% female samples (14 children).

**Table 1.** Mean ADHD Rating Scale pretest-posttest and Hypothesis Test Result

Characteristic	ADHD Rating Scale		$\Delta$	T	Df	Sig. (2-tailed)
	Pretest	Posttest				
	Hyperactivity-Impulsivity	7.0				
Inattention	12.2	7.6	4.6			
Total	19.2	11.5	7.7			

Based on table, it can be seen that after the intervention, the characteristic of inattention decreased the average score of the ADHD Rating Scale more than the hyperactivity-impulsivity, which was 4.5, while the hyperactive-impulsive characteristic had a mean difference of 3.2. In addition, in total it is known that after the intervention there was a decrease in the ADHD Rating Scale score of 7.7. In the t-test analysis, the results of the pretest and posttest p value = 0.001 ( $p < 0.05$ ).

This shows that there is an effect of modified ludo game on hyperactivity, impulsivity, and inattention of ADHD children at Sardjito Hospital Yogyakarta.

**Table 2.** Data Normality Test Results

Characteristic	Shapiro-Wilk		
	Statistic	Df	Sig.
Pretest	.894	36	.092
Posttest	.886	36	.070

Based on table 2. it is known that the results of the normality test using the Shapiro-Wilk test obtained a value (p) in the pre-test = 0.92 > 0.05 and the value (p) in the post test = 0.070 > 0.05. The data in the study were normally distributed.

## DISCUSSION

The results of the hypothesis indicate that there is an effect of modified ludo game on hyperactivity, impulsivity, and inattention of ADHD children. Ludo games are considered effective in reducing signs and symptoms of ADHD (Azmi et al., 2017; Sikhah, 2018). Some of the benefits obtained from the ludo game include training children's patience in waiting their turn, practicing solving simple problems, improving motor skills, honing social skills, practicing memory skills, and learning pre math.

A scheduled ludo game can increase attention and calm in ADHD children from 3 seconds to 60 seconds (Newton, 2021). Ludo games can increase neurotransmitter levels so that it will increase dopamine in the central nervous system. Dopamine can provide feelings of pleasure and joy in children, making it easier for children with ADHD to control themselves in reducing impulsivity and increasing attention (Linward, 2021).

The ludo game applied in this study is a modified ludo game in the form of a quick game or a short version of ludo with an expansion technique on the size of the ludo board and the pawns played by children. The game begins with reading the rules of the game in a sitting position. The technique used in reading the rules is oral accompanied by examples of movements and picture card media.

After understanding the rules of the game, the child is then invited to stand and place himself in the corner of the ludo board to start the game. Next, the child picks up and rolls a dice that has been modified in size. After being thrown, the child counts the

number of dots on the dice that come out. The child then walks according to the number of counts. After that, the child waits for another player's turn until it is his turn. The winner in this game is the player who can quickly reach the finish.

The game begins with reading the rules. The rules read in the modified ludo game are not leaving the game box, running around, and talking excessively. Regulations can channel children's emotions and impulses, so that they can reduce the hyperactive-impulsive characteristics of ADHD children (García-Redondo et al., 2019).

This decrease can be seen from the results of observations of each session when doing a modified ludo game. In the first week the child talks excessively and likes to run around. At the fourth week the child is no longer talking excessively but still likes to run. At the eighth week the child is no longer talking excessively and becomes calmer.

The technique used in reading the rules is orally accompanied by examples of movements and picture card media. DSM V-TR (2013) states that lack of concentration is an obstacle for children with ADHD in capturing available information. So that the use of visual media in the form of examples of movement and picture card media can increase children's concentration in capturing and understanding existing information.

In this study, information about the rules of the game. The increase in concentration can be seen from the results of observations of each session when reading the modified ludo game rules. In the first week the child understands the rules by reading accompanied by examples of movement and picture card media. In the fourth week, children understand the rules only with picture cards. By the eighth week the child has memorized the rules of the game.

When reading the rules of the game in a sitting position, the child must be quiet, calm, and pay attention to the therapist. After reading it, the child is asked whether he has understood the rules or not. The ability to understand one of these is influenced by attention (Garcia-Redondo et al., 2019; Olfers & Band, 2018). So that this activity can train attention and make a decrease in the attention characteristics of ADHD children. This decrease can be seen from the results of observations for each session when reading the modified ludo game rules.

In the first week the average attention span of children is 30 seconds. In the fourth week the average attention span of children is 1 minute. In the eighth week the average attention span of children is 2 minutes. During the intervention session there was a significant difference in terms of ability to maintain attention. This is similar to the findings of (El-Nagger et al., 2017) which states that the behavior of children when sitting and maintaining attention to tasks shows a significant difference.

After the child understands the rules of the game, the child is invited to stand and place himself at the end of the ludo board to start the game. Attention skills are needed in listening to instructions and knowing the end of the mat. Children with good attention will independently place themselves on the edge of the ludo board. Meanwhile, children with attention tend not to listen to instructions and place themselves at the end of the ludo board. Then, the child is asked to pick up and roll a dice that has been modified in size.

When the child rolls the dice, the child performs movements that involve eye-hand and bilateral coordination. Eye-hand coordination movements when throwing dice can make a decrease in the attention characteristics of ADHD children (Newton, 2021). Activities that involve hand-eye coordination can familiarize children with focusing and concentrating (Mohammadabad & Shahbazi, 2017). The decrease in inattention

characteristics can be seen from the results of observations of each session when doing a modified ludo game.

In the first week the child often looks the other way every time he hears a sound. By the fourth week the child has begun to focus but several times still looks the other way every time he hears a sound. By the eighth week the child is able to maintain focus and is not affected by sound. The use of both hands when throwing dice is one of the bilateral coordination activities that can improve motor skills.

Bilateral coordination is one of the perceptual motor activities that can improve motor skills in ADHD children (Javanbakhsh & Shahidi, 2021). The activity of children throwing dice can also be used to reduce the hyperactive characteristics of ADHD children (Mohammadabad & Shahbazi (2017). When throwing the dice, hyperactive children tend to throw with all their might which will make the dice roll erratically. So getting children used not to roll the dice too hard, can train children to reduce their hyperactivity.

After the dice are thrown, the child counts the number of dots on the dice that come out. Children need concentration when counting the number of points on the dice so as not to be mistaken. So that this activity can train children with ADHD to improve their concentration. Then, the child walks according to the number of counts. This activity can train attention and make a decrease in the attention characteristics of ADHD children.

Activities such as matching sequences can familiarize children with focusing and concentrating (Olfers & Band, 2018). The decrease in inattention characteristics can be seen from the results of observations of each session when doing a modified ludo game. In the first week the child does not want to play and follows instructions. In the fourth week the child begins to want to play and follow instructions. By the eighth week, children are happy to play and follow instructions.

In addition to a decrease in the inattention characteristics of ADHD children, when a child walks on a ludo board, it can also improve children's motor skills and numeracy skills. The increase in motor skills occurs because in the modified ludo game there is sensory input. Optimal motor ability is driven by efficient and accurate sensory intake and optimal processing of sensory input (Larasati et al., 2017). Sensory input obtained in the form of proprioceptive and vestibular input. Proprioceptive input occurs when the child moves his or her joint muscles to walk.

While the vestibular input is there when the child maintains balance. The child's numeracy ability is stimulated through the introduction of number symbols and number concepts, followed by mentioning the sequence of numbers when the child walks according to the point on the dice that comes out. During the intervention session there was an increase in children's numeracy skills. This is the same as (Farzadfard et al., 2015) finding which states that the ludo game can improve numeracy skills for ADHD children as a mathematics learning aid.

When the child waits for another player's turn until it is his turn, the child must be patient and not allowed to leave the game box. This activity can make a decrease in the impulsive characteristics of ADHD children. This decrease can be seen from the results of observations of each session when doing a modified ludo game. In the first week the child cries because he does not want to take turns playing. In the fourth week the children are no longer crying and are starting to take turns playing.

At the eighth week, children are happy to play and are willing to wait their turn. During the intervention session the child experienced an increase in the ability to

control his impulsivity. This is similar to the findings of (Heath et al., 2022) which states that taking turns can facilitate the development of frontal lobe inhibitory skills which can gradually control children's impulsivity. In addition to a decrease in impulsive characteristics, waiting for their turn can also practice social skills. Social skills that are trained in the ludo game include the willingness to follow and obey the rules of the game, taking turns playing (Ulhusna et al., 2020).

In addition to the above aspects, the decrease in hyperactivity, impulsivity and inattention in ADHD children is also supported by reinforcement in the form of smiles and praise when they can understand the rules or complete the modified ludo game. When given reinforcement, the child feels his self-esteem increases, is happy, and the child understands the desired behavior. This activity will be repeated by children because it gives a pleasant result, so that it can channel the encouragement of hyperactivity and impulsivity behavior and increase children's concentration (Javanbakhsh & Shahidi, 2021).

The movements in the ludo game can also improve children's motor skills. This is in accordance with research conducted by (Jihan et al., 2019) which revealed that active coordination of limbs while playing can improve motor skills.

## **CONCLUSION**

The results showed that there was an effect of giving modified ludo game on hyperactivity, impulsivity, and inattention in ADHD children. The ludo game applied in this study is a modified ludo game in the form of a quick game or a short version of ludo with an expansion technique on the size of the ludo board and the pawns played by children. The sample in this study amounted to 34 with an age range of 3-6 years. The sex of the sample is dominated by men.

The effect of this modified ludo game can be caused by several activities and components contained in the modified ludo game, namely the existence of rules, the technique of reading the rules in a sitting position accompanied by visualization, throwing the dice, counting the number of points that come out on the dice, walking to adjust the count, waiting turn, and reinforcement that can affect the success of reducing hyperactivity, impulsivity, and inattention in ADHD children.

It is recommended for parents or family, caregiver, teacher, therapist who work with children with ADHD to play modified ludo game, this will help to decrease hyperactivity, impulsivity, and inattention in ADHD children.

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