

Evaluating a culturally relevant, low-cost *Snakes and Ladders* game to strengthen mother-child attachment: a pre-experimental study

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Abstract

A mother's role is crucial in meeting the physical and psychological needs of her child, such as affection, love, and attention. By leveraging a culturally relevant and interactive medium, this study examined how shared play experiences foster emotional connections and strengthen family bonds. It examines the use of a low-cost, modified *Snakes and Ladders* game to improve mother-child attachment, focusing on the caregiving practices of mothers who rarely engage in beneficial play activities. A pre-experimental design with a one-group pretest-posttest design was employed,

with 160 respondents selected through stratified random sampling. The data were analyzed using a paired-sample *t*-test. The analysis revealed a significant increase in attachment ($p < 0.000$). The game encouraged structured, enjoyable interactions that promoted communication, cooperation, and emotional closeness between mothers and their children. The modified *Snakes and Ladders* game is an effective tool for enhancing mother-child attachment by fostering mutual support, understanding, and trust. However, this study is limited by its pre-experimental design, which lacks a control group, and its focus on a specific age group and cultural context. Future research could explore the impact of the game in diverse settings and with different populations to validate its broader applicability. These findings suggest the potential for culturally relevant, low-cost games to be integrated into parenting interventions to strengthen familial relationships.

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Introduction

Parent-child attachment is a critical component of healthy child development, as it influences emotional well-being, social relationships, and self-esteem. However, increasing rates of attachment disorders have raised concerns globally, with research highlighting their long-term impacts, including emotional instability, bullying behaviors, and academic challenges.¹⁻⁴ Attachment disorders in infancy can affect future abilities, including emotional expression, self-confidence, and relationships. Studies link early attachment types to traits like autonomy, self-esteem, and empathy in childhood⁵⁻⁹ and academic problems.¹⁰ Data from the United States and Indonesia indicate a rising prevalence of emotional and behavioral disorders among children, exacerbated by parenting practices that lack sufficient engagement in daily interactions.¹¹⁻¹³

It is very important for children to have a strong relationship with their parents, especially their mother, as early as possible.^{14,15} Despite the importance of early attachment, many young mothers lack the knowledge and skills to foster these bonds effectively.^{16,17} Babies with insecure attachments need support to form secure bonds, especially if the process has been delayed. The sooner activities to strengthen attachment are implemented, the better the chance of addressing previous gaps.¹⁸

Attachment, defined as the emotional bond between parent and child, is developed through stages and is most effective when it results in secure attachment. Secure attachment fosters feelings of safety and trust, while insecure attachment is linked to developmental and psychological difficulties.^{1,19} Secure attachment is the best type of attachment because children feel safe and protected even though their parents are not nearby.²⁰

A preliminary study conducted in a region of Indonesia, through surveys and direct interviews at an early childhood education institution, revealed that many mothers do not interact sufficiently with their children. This was observed through the number of children being dropped off and picked up by individuals

other than their mothers, such as fathers, grandfathers, grandmothers, and caregivers. Additionally, interviews with five mothers regarding play interactions at home and children's behavior development showed that only one mother frequently played with her child. In comparison, the other four mothers rarely did. About 4 out of 5 mothers work outside the home, and the amount of interaction with their children is limited. This makes them feel less close and less able to understand their child. The culture of raising children based on past experiences has become a habit for these mothers. In this digital era, the mothers also expressed confusion and a lack of ideas in finding a medium, other than using a mobile phone, that could be easily utilized for interacting with their children while also bringing joy to both. Given this challenge to enhance mother-child attachment effectively, interactive media serve as a valuable mediator. This media should be affordable, accessible, and enjoyable for both mother and child.²¹⁻²³

Interactive play has been recognized as an effective tool for fostering attachment, promoting communication, cooperation, and emotional closeness. Preliminary observations revealed that many mothers are disengaged during playtime, leading to emotional and social challenges for their children. This study aims to assess the impact of a low-cost, culturally relevant game, *Tangga Kasih: The Bonding Ladder* (a modified version of *Snakes and Ladders*), on improving attachment between mothers and children aged 4-6 years. By integrating structured and interactive elements into play, this research aims to address the gap in effective and accessible interventions for promoting secure attachments.

Materials and Methods

Research design

This study employed a quantitative approach, utilizing a pre-experimental research design, specifically a one-group pretest-posttest design. It aims to evaluate the effectiveness of a low-cost *Snakes and Ladders* game as an intervention tool to enhance mother-child attachment. This design was chosen due to the exploratory nature of the research, aiming to provide initial insights into the feasibility and potential impact of the intervention within a specific community context. By focusing on this preliminary stage, the study seeks to gather foundational data, identify relevant factors influencing outcomes, and assess the practicality of the approach before advancing to more rigorous experimental designs. Despite its limitations in controlling external variables, this design provides a cost-effective and flexible framework to explore innovative methods for strengthening mother-child bonds.

Study participants

The sample for this research, consisting of 160 mother-child pairs (children aged 4-6 years), was selected using stratified random sampling. First, the population was divided into strata based on specific child age. 40% of the population consisted of 4-year-olds, 35% of 5-year-olds, and 25% of 6-year-olds; 64 pairs were selected from the 4-year-olds, 56 pairs from the 5-year-olds, and 40 pairs from the 6-year-olds. Random sampling was then conducted within each stratum to select the participants, ensuring that the sample accurately represented the population. The inclusion criteria for this study comprised children enrolled in kindergarten and mothers who were willing to participate as respondents. The exclusion criteria included children with mental retardation, mothers of twins, and mothers who were illiterate. The researcher submitted an ethical clearance application to the Health Research

Ethics Commission and received the ethical clearance certificate.

The decision to include children aged 4 to 6 years in this research is due to this age group signifying a pivotal phase in early childhood development, during which children start to form more intricate emotional and social bonds. This period is also known as the initiative stage, according to Erikson's theory,²⁴ where children start to develop independence, initiative, and self-confidence, which are strongly influenced by their interactions with caregivers, especially mothers. Additionally, children in this age range are still in the formative stages of attachment development, making them particularly responsive to interventions aimed at strengthening mother-child bonds. By focusing on this age group, the study targets a developmental window where attachment is crucial and can be positively influenced through interactive activities, such as the game being studied.

Variable, instrument, and data collection

The variables in this study include the characteristics of the mother, the characteristics of the child, the quality of mother-child attachment before the intervention, and the quality of mother-child attachment after the intervention.

The instrument used as an intervention in this study (Figure 1) is a modified version of the classic *Snakes and Ladders* game, referred to as "*Tangga Kasih: The Bonding Ladder*". The game board is divided into small squares, and some squares have several "ladders" or "snakes" drawn on them that connect to other squares. The researcher developed this low-cost game modification to enhance emotional attachment between mothers and their children. The modification process involves adjusting the traditional game format to suit the specific needs and characteristics of the participants. These adjustments include altering the game's structure,



Figure 1. Tangga Kasih: The Bonding Ladder.

simplifying the rules, modifying the playing tools, and adapting the game to suit the number of players and the duration of play. The key innovation lies in the inclusion of attachment-building activities within the game itself. This version consists of 8 rows and 6 columns, totaling 48 squares, each containing prompts for activities designed to foster emotional connection. These activities include following animal sounds, mimicking facial expressions, singing together, drawing, giving hugs, exchanging massages, clapping, shouting, and making movements together. By integrating such interactive and emotional activities, *Tangga Kasih: The Bonding Ladder* aims to offer an engaging and meaningful way for mothers and children to strengthen their bond, setting it apart from traditional versions of the game.

The steps for playing the modified game are as follows: mothers set aside dedicated time to play with their children, free from other activities. The game consists of one die and two pawns. The child starts at box number 1 and rolls the die, with the mother following suit. On their turn, the player rolls the die and moves their pawn according to the number rolled. If a player rolls a 6, they do not move their pawn immediately; instead, they roll the die again and move their pawn according to the new number rolled. The mother assists the child in counting the spaces on the board according to the number rolled on the die. More than one pawn may occupy the same box. The mother helps the child read the instructions on each game square and demonstrates the actions to be taken for each instruction. There are four snakes in the game; if a player lands on the tail of a snake, they must move their pawn to the head of the snake. The game also features five ladders; if a player lands on the bottom of a ladder, they move up to the top. The winner of the game is the player who reaches box 48, or the final square, first.

The instrument used to measure the quality of maternal-child bonding in this study was a questionnaire utilizing a Likert scale. Specifically, the Parent-Child Interaction Questionnaire Revision (PACHIQ_R) was employed to assess the quality of the mother-child relationship. PACHIQ is a tool designed to evaluate the interactions and relationships between parents and children, focusing on aspects such as emotional closeness, communication, support, and warmth, particularly in the context of early childhood through early adolescence.²⁵ The questionnaire consists of 25 items addressing themes such as emotional closeness, emotional responsiveness, involvement, quality time together, security and trust, support and independence, and conflict and stress management. The instrument has been tested for validity and reliability. The validity results show that the calculated R value is higher than the R table value at a significance level of 0.05. Reliability testing found a Cronbach's alpha greater than 0.7, with the instrument's Cronbach's alpha at 0.892.²⁶

Data collection for this study was conducted after respondents who met the inclusion criteria were provided informed consent and completed the research questionnaire. The questionnaire included questions about the characteristics and quality of the mother-child attachment, as perceived by the mother. Upon completion of the pre-intervention questionnaire, the mother received a guide for playing the modified game, which was to be played at home with her child for 10 days over a two-week period. Each game session lasted between 30 and 45 minutes, with the game played once daily, based on the availability of the mother and child. During the data collection process, mothers were instructed to engage only in their routine activities with their children, apart from playing the game. While playing, respondents were asked to document the activity through photographs, which were then sent to the researcher. As

part of the intervention, respondents were provided with a game set, an instructional manual, and a daily activity book. Following the two-week intervention, mothers were asked to complete a posttest questionnaire regarding the quality of attachment between themselves and their child, as assessed from their perspective.

Data analysis

Data analysis was conducted using descriptive statistics to illustrate the frequency distribution of variables, along with a paired sample *t*-test to compare pretest and posttest results within the same group. The paired sample *t*-test was employed to determine whether there was a significant difference in the mean scores before and after the intervention or treatment within the same group.

Ethical clearance

The research has received ethical approval from the Health Research Ethics Commission of Universitas Muhammadiyah Purwokerto, as indicated by the ethical certificate no. KEPK/UMP/115/IV/2024. Throughout the study, the researcher adhered to ethical principles, including informed consent, respect for human rights, beneficence, and non-maleficence.

Results

The results of this research are described in the form of a univariate analysis of the characteristics of the mother and child and a bivariate analysis of differences in the quality of attachment before and after intervention.

Table 1 presents the characteristics of the mothers in the sample, comprising a total of 160 respondents. The age distribution of the mothers is mainly between 19 and 39 years (70%), while the remaining 30% are aged 40-65 years. Regarding the number of children, the majority of mothers have two children (40%), followed by those with three children (32.5%) and one child (27.5%). In terms of occupation, most mothers are employed (72.5%), while 27.5% are housewives. These characteristics reflect the diversity of the sample in terms of age, family size, and employment status.

Table 1. Mothers' characteristics based on age, number of children, and occupation.

Variable	n	%
Mother's age		
19-39 years	112	70
40-65 years	48	30
Number of children		
1	44	27.5
2	64	40.0
3	52	32.5
Mother's occupation		
Housewife	44	27.5
Employed	116	72.5
Children's age		
4 years	28	17.5
5 years	68	42.5
6 years	64	40.0
Gender		
Boy	72	45.0
Girl	88	55.0

Table 1 also presents the characteristics of the children in the sample, comprising a total of 160 respondents. The age distribution is as follows: 17.5% of children are 4 years old, 42.5% are 5 years old, and 40.0% are 6 years old. In terms of gender, 45% of the children are boys, and 55% are girls. These characteristics reflect a balanced distribution of age and gender among the children in the study.

Table 2 shows that the lowest attachment score before the intervention was 90, while the highest score was 117. After the intervention, the respondents' scores increased, with the lowest attachment score being 98 and the highest score reaching 120. Furthermore, the average attachment score before the intervention was 102.12, with a standard deviation of 5.97, which increased to 109.58, with a standard deviation of 5.18, following the intervention using the modified *Snakes and Ladders* game.

Table 3 shows the results of the paired samples *t*-test for the effect of the modified game on mother-child attachment. The mean difference between the posttest and pretest scores is 7.46, indicating a significant increase in attachment scores following the intervention. The standard deviation of the differences is 4.77, and the standard error of the mean is 0.38. The *p*-value (Sig. 2-tailed) is 0.000, which is less than 0.05. This result indicates that the difference between the pretest and posttest scores was statistically significant, suggesting that the intervention had a positive and significant effect on increasing the attachment between mothers and children. The positive mean difference (7.46) confirmed that attachment quality improved following the intervention.

Discussion

The results showed a significant increase in maternal attachment scores after using the modified game. Before the intervention, the average maternal attachment score was 120.20, while after the intervention, it increased to 130.07. This demonstrates that interaction through the right medium, even for just 30-45 minutes over 10 days, can significantly enhance the quality of attachment between mother and child. Games that encourage actions such as hugging, singing together, and imitating movements promote communication in a fun, non-coercive way. These findings align with previous research suggesting that various educational media can help improve the quality of attachment between mothers and children.²⁷⁻³⁰

The use of the *Snakes and Ladders* game, designed for children aged three years and older, provides a variety of benefits, including cognitive stimulation, emotional engagement, and learning collaboration. The game encourages direct interaction between mother and child, allowing for moments such as singing together, drawing, hugging, and other shared activities. This creates opportunities for mothers to offer support and guidance, helping their children overcome challenges, while also reinforcing collaborative efforts to reach goals.

The daily activity records from respondents indicated a positive reciprocal interaction between mothers and children during the modified *Snakes and Ladders* game.³¹ Given the sample's high

number of working mothers who engaged in limited playtime with their children, the game provided a unique opportunity to promote interaction. However, it is important to recognize the significance of both parents' involvement in raising children.³²⁻³⁴

It was found that the majority of mothers were employed outside the home, working six to eight hours a day. This work schedule reduces the amount of direct interaction between mothers and their children within a day. Consequently, this reduction in time encourages mothers to become more creative and adopt alternative, more effective strategies for fostering a secure attachment with their children. A study highlights that a mother's employment does not necessarily improve or deteriorate her attachment to her children. Instead, the key factor in fostering a strong and secure bond lies in achieving a balanced integration of professional and maternal roles.³⁵ Further, based on the respondent characteristics, it was evident that most of the mothers had more than one child. Previous studies suggest that a woman's parenting experience influences her ability to care for subsequent children.^{36,37} Additionally, the quality of parenting can be shaped by prior experiences of parental bonding.³⁸⁻⁴⁰ It has also been noted that the quality of attachment bonding with children can positively contribute to the parents' psychological well-being.⁴¹⁻⁴³

The use of the PACHIQ instrument in this research proves highly effective. Designed for easy use by the general public, it allows mothers to complete the assessment without needing special training or a background in psychology. With simple language and intuitive instructions, the instrument enables accurate responses from parents. Its broad scope, covering aspects such as emotional closeness, communication, support, and quality time, provides a comprehensive view of parent-child interactions. Particularly suitable for evaluating relationships in young children (ages 4-6), PACHIQ offers both a reflective tool for parents and a means of early detection for further evaluation.⁴⁴

In terms of the intervention, the *Tangga Kasih: The Bonding Ladder* game presents several advantages over traditional activities designed to enhance attachment between mothers and their children. This modification retains the playful nature of the classic game while incorporating elements that promote emotional connection and communication. The game's flexibility enables mothers to tailor their involvement to their children's needs, thereby increasing both the quality and frequency of shared moments. As mothers and children engage in the modified game, the emotional closeness between them is heightened through fun, interactive, and meaningful experiences. This approach lies in its dual focus: not only does the game serve as a tool for play, but it also acts as a medium for building trust, security, and a sense of attachment. By

Table 2. Distribution of average quality of attachment between mother and child before and after *Tangga Kasih: The Bonding Ladder* intervention.

	n	Mean	SD	Min	Max
Pretest	160	102.1	5.97	90	117
Posttest	160	109.5	5.18	98	120

SD, standard deviation.

Table 3. Results of the differential test on the effect of *Tangga Kasih: The Bonding Ladder* on increasing mother-child attachment.

	Mean	SD	Paired samples t-test		<i>t</i> -test	df	Sig. (2-tailed)
			Lower	Upper			
Pretest-posttest	7.46250	4.77136	6.717	8.207	19.783	159	0.000*

SD, standard deviation; df, degrees of freedom; **p*<0.05.

utilizing a low-cost and easily accessible game format, this modified version can be implemented in diverse settings, making it an inclusive and sustainable method to enhance maternal-child attachment. The novelty lies in the intentional integration of attachment-building activities within a familiar and enjoyable format, which differentiates it from conventional, non-interactive games that may not prioritize emotional engagement. Through this structured interaction, the modified *Snakes and Ladders* game provides a unique and effective means of strengthening the emotional bond between mother and child. In this game, mothers have the opportunity to provide support and guidance as children learn to overcome challenges and failures, encouraging mothers and children to collaborate and work together to reach their highest potential. Furthermore, mothers have the opportunity to appreciate their children's achievements.⁴⁵⁻⁴⁷

Therefore, it can be concluded that parental interaction and involvement in children's play, facilitated by an effective game mediator, can significantly improve attachment. This enhancement in attachment reflects an improvement in the quality of the relationship, encompassing factors such as trust, communication, and emotional closeness.

Conclusions

The use of a low-cost interactive game like *Snakes and Ladders* fosters meaningful mother-child engagement by promoting shared experiences, communication, and emotional connection through its structured yet playful nature. This creative, participatory approach not only strengthens familial bonds but also supports children's social and emotional development. The findings highlight the value of accessible tools in enhancing attachment, suggesting parents integrate simple games into daily routines. Future research should examine long-term effects, while educators and policymakers are encouraged to adopt similar strategies in early childhood programs to promote healthier developmental outcomes and stronger family connections.

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