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JURNAL PENDIDIKAN, SOSIAL, DAN AGAMA

The Effect of Gender and Zigzag Run Game on Children's Gross Motor Development in Kuncup Mekar Kindergarten Alahan Panjang

Resvi Livia [1], Rakimahwati [2], Yaswinda [3], Nurhafizah [4]

[1] Padang State University, Padang, Indonesia; liviaresvi1295@gmail.com
[2] Padang State University, Padang, Indonesia; rakimahwati10@yahoo.com
[3] Padang State University, Padang, Indonesia; yaswinda@fip.unp.ac.id
[4] Padang State University, Padang, Indonesia; nurhafizah@fip.unp.ac.id

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Abstract

This study aims to analyze the effect of the Zig-Zag Run game and gender on the development of children's gross motor skills at the Kuncup Mekar Alahan Panjang Kindergarten. This study uses a quantitative approach with an experimental type. The objects of the study were children aged 5-6 years at the Kuncup Mekar Kindergarten, and the study was conducted from August 2023 to April 2024. Data were collected through observation using observation sheets tested for validity and reliability. The data collection technique used a performance test involving the Zig-Zag Run Games activity. Data analysis was carried out using a t-test to compare the difference in average values between the control and experimental groups and normality and homogeneity tests. The results showed that the Zig-Zag Run game significantly increased children's gross motor skills by 0.001, and gender did not affect this development. The simultaneous test of both gave an effect of 0.949. It is proven that the Zig-Zag Run game is effective in improving children's gross motor skills and is recommended to be implemented in kindergartens.

Keywords Early Age; Gender; Gross Motor; Kindergarten; Zigzag Run Game

Corresponding Author
Resvi Livia
Padang State University, Padang, Indonesia; liviaresvi1295@gmail.com

1. INTRODUCTION

Education is essential for everyone from birth to death as it provides valuable life skills. This principle drives the government's focus on enhancing education quality at all levels, from preschool to higher education. (Pristiwanti et al., 2022) . Education obtained by a person from an early age will be a very strong foundation for taking education to the next level and become the foundation for helping the growth and development of physical, mental, emotional, and intellectual children. (Afiyah, 2020). Early childhood education is for children from birth to 6 years old and is tailored to their developmental stages. Each developmental stage requires proper stimulation for optimal growth and development. (Maghfiroh & Shofia Suryana, 2021). Good growth and development will make human children more qualified in the future. (Edwards, 2013). Additionally, early childhood education encourages children to explore their potential, develop social competence, and become active, independent learners. (Marsh et al., 2019).

Early childhood education is carried out to shape behavior, instill noble and moral values, and

develop intellectual and physical motor development in children. (Sriandila & Suryana, 2022). This means early childhood education focuses on developing six aspects of child development: moral and religious values, language, social-emotional, physical motor, cognitive, and art. (Kurniawati, 2023). One aspect that is very important to develop is the physical, fine, and gross motor of children.

Physical motor aspects of children focus on children's physical development, which includes gestures due to coordination with the nervous system, muscles, and brain. (Oktaviyati et al., 2023). Physical motor aspects need to be developed so that children can have various motor skills and complete motor skill tasks well, thus making physical development healthier. (Rakimahwati et al., 2018). A child's physical motor development is influenced by the physical activity performed. The activity gives children basic motor skills. (Jones et al., 2020). Physical activities include crawling, jumping, running, throwing, and so on (Xiaofei, 2020). If the child has more active basic motor skills, the child will have higher competence than his less skilled peers (Webster et al., 2019).

The development of good basic motor physical aspects in early childhood will affect motor skills throughout a person's age. (Newell, 2020). Physical motor development in early childhood requires appropriate stimuli, both in fine and gross motor children. (Damayanti & Nasrul, 2020). Children's fine and gross motor development will develop optimally if they get the appropriate roles from their environment (Mayar et al., 2022). Fine motor development in early childhood focuses on coordinating children's smooth muscles. One of the activities carried out on children's fine motor skills is coordinating hands and eyes to perform complex movements. (Evivani and Oktaria, 2020). Muscle strength is important in fine motor development (Sagrandma, 2023). While activities in children's gross motor development are related to children's ability to perform sports activities, this ability is related to the work of large muscles in the human body (Saripudin, 2019).

The child's gross motor skills will present the child's desire. For example, when the child sees various toys, he perceives in his brain that he wants to play with them. The perception will motivate the child to do something, which is to move to take it. As a result of the movement, the child will succeed in getting his desire, and this will affect the child's self-image or self-confidence (Ananditha, Health, and Muhammadiyah 2017). Gross motor development in children requires enormous energy to move all parts of the body, and large muscles are required for gross motor development. (Safitri & Eka Nugroho, 2017).

Gross motor development is important for early childhood, and interesting learning methods must be developed that make learners happy to do so. Gross motor development in children can be done by learning methods, such as game modification (Mashuri et al., 2022). Outdoor activities can be the best choice because they stimulate children's muscle development. (Sukamti, 1994). Gross motor development in children is very important to develop early because, with gross motor development, children will become healthier, providing them with a strong foundation to face physical challenges in the future. (Candra et al., 2023). This is why we, as kindergarten teachers, give proper attention and stimulation to gross motor development in early childhood. One way we can do this is to provide fun learning activities such as play activities.

Playing in early childhood is very important because playing will provide unforgettable experiences and knowledge for children. (Alharbi & Alzahrani, 2020). Play in early childhood is very important, as well as following the principles of early childhood learning. Kylie also expressed another opinion that play is an important part of childhood because it facilitates various aspects of child development, such as physical, motor, social, and cognitive aspects. (Dankiw et al.,, 2020). Play will also provide opportunities for children to interact, increase feelings of closeness with their peers, and build positive emotions in themselves. (Duflos, Lane, and Brussoni, 2023). For the benefits of play to be obtained by children properly, teachers as facilitators must be able to provide flexible, interesting games for children and allow children to express and imagine (Watini 2020) freely.

Based on preliminary observations made by researchers from September to October 2023 in

Kuncup Mekar, Kindergarten buds found a lack of development of gross motor aspects in children.

This is evidenced by the number of children who have been unable to make coordinated and agile movements following rhythmic gymnastics in the morning before entering class. Many children have difficulty following the movements demonstrated by the teacher in the front row. It can even be seen that many children stand still, watching the movements made by the teacher. This would be more evident if there were a new gymnastics demonstration. Children find it difficult to distinguish the movements of their right hand and left hand, and some cannot even distinguish them. (Avezmurodovich, 2020). Out of 60 00 children, only 20 can precisely catch the ball with their hands. In addition, during the trial of running and directly kicking the ball in front of the child, only 15 children could kick the ball well.

The development of gross motor aspects that have not been well developed can be said to be caused by the lack of stimulation teachers provide in providing learning. Children tend to prefer learning in the classroom to learning outside the classroom. This is due to the lack of time teachers devote to outdoor activities. Children learn only using children's worksheets (LKA) that the teacher has provided. Regarding motor development, teachers dominate activities that stimulate children's fine motor development. For example, teachers only do plasticine, scissors, and writing activities, so children's gross motor aspects have not developed properly. In Kuncup Mekar Kindergarten, during morning activities, especially This is evidenced by the row of women always in front of boys. Boys always choose the back row. This shows no equality between boys and girls when doing gymnastics activities or activities for children's gross motor development.

Gross motor skills develop through the stimulation of structured and unstructured physical activities. This development is important for a child's physical health, coordination, and ability to participate in everyday activities (Akbar, 2020). The theory of gender differences in child development suggests that gender may influence preferences and participation in various physical activities. Boys and girls may show differences in gross motor skills due to biological and social factors (Lauer et al., 2019). Based on training and agility theory, zigzag running involves rapid and repeated changes in direction, which can improve gross motor skills by training large muscles, balance, and coordination (Tabacchi et al., 2019). The correlation between zigzag running game and gross motor skills can be explained by the theory that physical activities that require rapid changes in direction can improve agility and gross motor coordination. Gender may also interact with the type of physical activity preferred and gross motor skills, where boys and girls may show different levels of motor skills in zigzag running activities. This study will explore how these variables relate to each other and whether there are significant interactions that affect children's gross motor development outcomes.

This study attempts to fill the gap in the empirical literature on how zig-zag games affect the development of gross motor skills in early childhood. Empirically supported studies indicate a lack of comprehensive understanding of specific interventions, like zig-zag running, and their impact on motor skills. This research aims to provide empirical data to support the conceptual relationship between zig-zag running games and improvements in gross motor skills.

This study is important because gross motor skills are essential for early childhood development, involving large muscle coordination such as walking, running, jumping, and throwing. Good gross motor skills contribute to a child's physical health, ability to play, and participation in daily activities. Lack of gross motor skills can cause difficulties in physical activity, reduce self-confidence, and hinder a child's social and emotional development. The criteria and indicators used to measure the effectiveness of gross motor skills include balance, agility, coordination, and muscle strength abilities observed through various physical activities.

Based on the description described above, which was obtained based on direct observation by researchers, the researcher wants to innovate learning activities that can develop gross motor aspects of children aged 5-6 years by conducting research with the title " **The Effect of Gender and Zigzag Run**

Game on Children's Gross Motor Development in Kuncup Mekar Kindergarten Alahan Panjang."

2. METHODS

This research was conducted through a quantitative approach with an experimental approach. Experimental research is also research conducted to test hypotheses and create answers to research problems. The results of experimental research can be used as decision making or policy development in certain fields (Syahrizal & Jailani, 2023).

This study used a factorial experimental level 2x2 design. This design is the simplest (Rahman, 2023). In this design, the independent variable is formed into two sides: the treatment variable, by zigzag run games (A). In contrast, the dependent variable is the development of early childhood's physical, motor, and cognitive aspects, which are classified into two, namely high or low (B). Following the research design above, the constellation of research variables can be seen in the design below:

Table 1. Research Design

Method (A) **Sex (B)**	**Zigzag Run Game Activity (A1)**	**Normal Running Without Obstacles (A2)**
Boy (B_1)	A_1B_1	A_2B_1
Girl (B_2)	A_1B_2	A_2B_2

Information:

A : Method used

B : Development of developed children

A1 : Zigzag Run Games Activity Method

A2 : Regular Running Method

B1 : Male

B2 : Women

A1B1 : Zigzag run games on the gross motor development of boys.

A1B2 : Zigzag run games on the gross motor development of girls.

A2B1 : Regular running sports activities Against boys' gross motor skills

A2B2 : Ordinary running sports activities Against girls' gross motor skills

The population is the entirety of the subject and object to be studied (Roflin, 2021). In this study, the number of samples taken from the population by researchers is based on the number researchers who can reach (Swarjana, 2022). In this study, the population and sample selection was done carefully to ensure the representativeness and security of the data. The population selected was children aged 5-6 years at the Kuncup Mekar Alahan Panjang Kindergarten, consisting of 60 children. The population in this study is early childhood in Kuncup Mekar Kindergarten under the leadership of Mrs. Rusfita Lioza, S.Pd. Five teachers take care of AUD. Kuncup Mekar Kindergarten has 60 students in groups of B1, 20 children, B2 15 children, B3 15 children, and B4 15 children. This can be seen in the table as follows:

Table 2. Number of Children in Kuncup Mekar Kindergarten Alahan Panjang

No	Group	Number
1	Group B1	20 Children
2	Group B2	20 Children
3	Group B3	20 Children
	Amount	60 Children

(Source: Kuncup Mekar Kindergarten)

The sample is part of the population; the Sample can also be referred to as a small part of the population members taken according to certain procedures that can be representative of the population. (Hindun Umiyati, 2021). Samples in a study intended to generalize from the results of their research in the sense of imposing conclusions on broader objects, symptoms, or events (Amin, Garancang, and Abunawas, 2023). Sample in quantitative research is an issue that can determine the validity of data found from the research results (Martono 2014). Therefore, the sampling technique used in this study was a random sample. By using this sample, researchers will try to minimize errors by using the right procedures and appropriate techniques to provide opportunities for all members of the population to be selected as research samples.

Based on the explanation above, the group that will be used as a target or sample in this study is group B1 in TK Kuncup Mekar Alahan Panjang and used as an experimental group, then samples of groups B 3 and B4 in TK Kuncup Mekar as a control class. However, children were not included in the study.

The sample would still get the same activities in the experimental or control groups. Thus, the number of samples in each group used as material for analysis in this study can be seen in the following table:

Table 3. Number of samples in Kuncup Mekar Kindergarten

No	School Name	Group	Number
1	TK Kuncup Mekar	Group B1	20 children
		Group B 2	20 children
	Amount		Zigzag Run Game (A1) Activities

Table 4. Research Instruments

No	Assessment Aspects	Criterion			
		Very Good Development	Developing as Expected	Start Growing	Undeveloped
		4	3	2	1
1	Children are able to demonstrate balanced movements	Children are able to demonstrate balanced movements independently and can help their friends	Children are able to demonstrate balanced movements without the help of a teacher	Children who are able to demonstrate balanced movements still need to be helped by teachers	Children who are able to demonstrate balanced movements must be guided and exemplified by the teacher

2	Children are able to demonstrate agile movements.	Children are able to demonstrate agile movements independently and can help their friends.	Children are able to demonstrate agile movements without the help of a teacher.	Children who are able to demonstrate agile movements still need to be assisted by teachers	Children who are able to demonstrate agile movements must be guided and exemplified by the teacher.
3	Children are able to demonstrate coordinated movements	Children are able to demonstrate coordinated movements independently and can help their friends	Children are able to demonstrate coordinated movements without the help of a teacher	Children who are able to demonstrate coordinated movements still need to be assisted by teachers	Children who are able to demonstrate coordinated movements must be guided and exemplified by the teacher
4	The child is able to demonstrate coordinated movements of all limbs	The child is able to demonstrate coordinated movements of all limbs independently and can help his friends	Children are able to demonstrate coordinated movements of all limbs without the help of a teacher	Children who are able to demonstrate coordinated movements of all limbs still need to be assisted by a teacher	Children who are able to demonstrate coordinated movements of all limbs must be guided and exemplified by the teacher
5	Children are able to practice movements in a coordinated manner	Children are able to practice movements in a coordinated manner independently and can help their friends	Children are able to practice movements in a coordinated manner without the help of a teacher	Children who are able to practice movements in a coordinated manner still need to be assisted by teachers	Children who are able to practice movements in a coordinated manner must be guided and exemplified by the teacher
6	The child is able to repeat coordinated movements	The child is able to repeat coordinated movements independently and can help his friend	The child is able to repeat coordinated movements without the help of the teacher	Children who are able to repeat coordinated movements still need to be assisted by teachers	Children who are able to repeat coordinated movements must be guided and exemplified by the teacher
7	Children are able to follow movements according to the song and the rhythm of the music	Children are able to follow movements according to the song and rhythm of music independently and can help their friends	Children are able to follow movements according to the song and rhythm of the music without the help of the teacher	Children who are able to follow movements according to the song and rhythm of the music still have to be helped by the teacher	Children are able to follow movements according to the song and the rhythm of the music must be guided and exemplified by the teacher
8	The child is able to comply with physical play with the rules	The child is able to comply with physical games with rules	Children are able to comply with physical games with rules	Children are able to comply with physical games with rules that	Children are able to comply with physical games with rules that

		independently and can help his friends	without the help of a teacher	must still be assisted by teachers	must be guided and exemplified by teachers
9	Children are able to practice physical movements according to the rules	Children are able to practice physical movements according to the rules independently and can help their friends	Children are able to practice physical movements according to the rules without the help of a teacher	Children who are able to practice physical movements according to the rules still need to be helped by teachers	Children are able to practice physical movements according to the rules must be guided and exemplified by the teacher
10	Children are able to adjust the movements of the child's hand and left hand	Children are able to adjust the movements of the child's hand and left hand independently and can help their friends	Children are able to adjust the movements of their hands and left hands without the help of a teacher	Children are able to adjust the movements of their hands and left hand must still be helped by teachers	Children are able to adjust the movements of the child's hand and left hand must be guided and exemplified by the teacher
11	The child is able to show the movements of the child's hand and left hand	Children are able to show the child's hand movements and left hand independently and can help their friends	Children are able to show the movements of the child's hand and left hand without the help of the teacher	Children are able to show the movements of the child's hand and the left hand must still be assisted by the teacher	Children are able to show the movements of the child's hand and the left hand must be guided and exemplified by the teacher
12	Children are able to equate the movements of the child's hand and left hand	Children are able to equate the movements of the child's hand and left hand independently and can help their friends	The child is able to equalize the movements of the child's hand and left hand without the help of the teacher	Children who are able to equalize the movements of their hands and left hands still need to be helped by teachers	Children are able to equate the movements of the child's hand and the left hand must be guided and exemplified by the teacher

Source: Goodway (2021)

Data analysis is a crucial process in research conducted after all necessary data has been collected. The data is classified and grouped, identifying similarities and differences. The analysis technique used is the t-test to compare the mean values between two groups. Before conducting hypothesis testing, a normality test using the Liliefors technique is performed to ensure the data is normally distributed, and a homogeneity test using Bartlett's test is conducted to ensure the variance of the sample data is homogeneous. This process helps in testing the validity of the hypotheses proposed in the research.

Hypotheses

First Hypothesis

H0 : Gender does not have an effect on the development of children's gross motor skills.

H1 : Gender does have an effect on the development of children's gross motor skills.

Second Hypothesis

H0 : The Zig-Zag Run Games do not have an effect on the development of children's gross motor skills.

H1 : The Zig-Zag Run Games do have an effect on the development of children's gross motor skills.

Third Hypothesis

H0 : There is no significant interaction between the Zig-Zag Run Games and gender on the development of children's gross motor skills.

H1 : There is a siglnificant interaction between the Zig-Zag Run Games and gender on the development of children's gross motor skills.

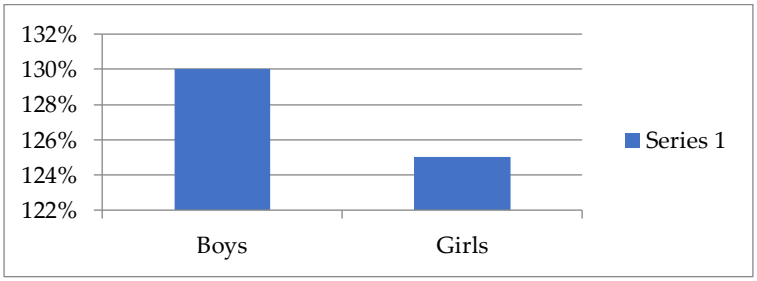
3. FINDINGS AND DISCUSSIONS

Data collection in this study was carried out in Kuncup Mekar Alahan Panjang Kindergarten. The B1 group, consisting of 10 female and 10 male students, was used as an experimental class, while B2, consisting of 10 male students and 10 female students, was used as a control class. The research data was based on the pretest, treatment, and posttest, using research instruments to develop the gross motor skills of year-old children in kindergarten.

Data Description

This study conducted as many as eight meetings, divided into two control class meetings guided by the teacher and two experimental class meetings guided by researchers. Meeting 1 was conducted pretest in the experimental class, and meeting 2 was conducted pretest for the control class to see the extent of the child's gross motor development. Furthermore, in the experimental class, *treatment was* given four times with the theme of playing and working together. The treatment given in class B1 was a ZigZag Run Game activity, then continued by doing posttests for both classes.

Gross motor development of boys increased by 95%, and girls increased by 95%, as can be seen in the fourth treatment result graph, namely:



Graph 1. Fourth Treatment Chart

Description of Posttest Results of Gross Motor Development of Boys and Girls Experimental Class and Control Class

Posttest data on gross motor development of early childhood as a whole were obtained from a sample (respondents) of 40 children, which were divided into two classes of 20 in B1, with 10 boys and 10 girls each, and class B2, with 20 children consisting of 10 boys and ten girls.

a. Posttest Gross Motor Development Data for Boys and Girls Chest Experimental Class

After obtaining the results of the posttest of children's motor development in the experimental class, it was seen that the highest score achieved by boys wa, the lowest was 39, and the highest score achieved by girls was there. More details about the range of interval scores of experimental class value data in gross motor development can be seen in tables 5 below:

Table 5. Posttest Frequency Distribution of Gross Motor Development 100%

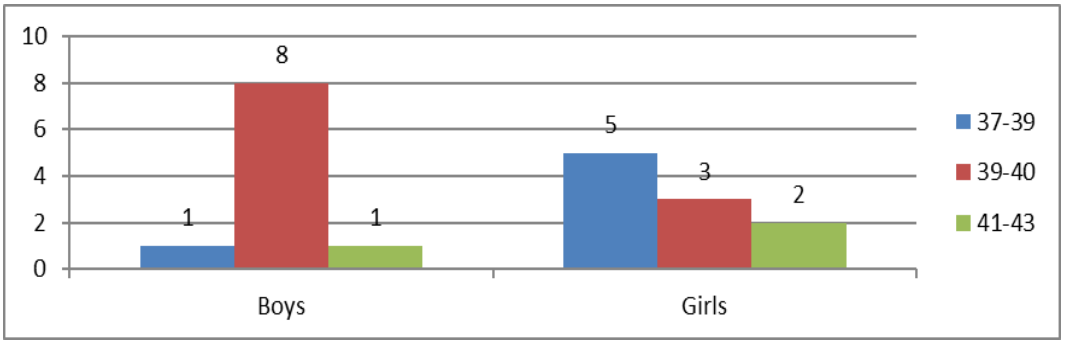
Regular Running Without Obstacles (A2)	**Male (B1)**	**A1B1**	**A2B1**
Female (B2)	A1B2	A2B2	10%
40-42	41	8	80%
43-45	42	1	40%
		10	100%

Elaboration of data on the interval range of gross motor development of children Experimental class boys was given the treatment of playing Zigzag Run Games, which a group of value set ranges 37-39 with a midpoint of 38 as many as one child, a range of values 40-42 with a midpoint of 41 as many as eight children, a range of values 43-45 with a midpoint of 42 as many as one children. So, it was concluded that the interval with a relatively high frequency in the posttest stage of gross motor development of experimental class children is located in the range of values 37-39 with a midpoint of 38 because it has more children compared to other values ranges of 8 children. After obtaining the posttest results of the child's gross motor development, in the control class, it was seen that the highest score achieved by the child was 43 and the lowest was 39.

Table 6. Posttest Frequency Distribution of Gross Motor Development

Interval	**Mean**	**Frequency**	**Percentage %**
37-39	38	5	50%
40-42	41	3	30%
43-45	44	2	20%
		10	100%

Elaboration of data on the interval range of gross motor development of children Experimental class girls were given the treatment of playing Zigzag Run Games, which was set by a group of value ranges of 38-40 with a midpoint of 39 as many as five children, a range of values 40-42 with a midpoint of 41 as many as three children, a range of values 40-42 with a midpoint of 41 as many as two children. so it was concluded that the interval that has a relatively high frequency in the posttest stage of gross motor development of experimental class children is located in the range of values 37-39 with a midpoint of 38 because it has more children than the range of other values, which is as many as five children. After obtaining the posttest results of the child's gross motor development in the control class it was seen that the highest score achieved by the child was 43 and the lowest was 38. The condition of differences in gross motor development results from experimental classes of boys and girls can be explained in Graph 2:



Graph 2. Gross Motor Development Chart of Boys and Women's Experimental Class

Based on graph 2. above, it can be seen that there was a difference in the increase in gross motor development of boys and girls after being given the recognition of zigzag run games activities from 20 children consisting of 10 boys and girls each.

b. Posttest Results Data of Gross Motor Development of Boys and Girls Control Class

After obtaining the posttest results of gross motor development in the control class, it was seen that the highest score achieved by boys was 29, and the lowest score was 27. The highest score achieved by girls is 29, and the lowest score is 26. For more details, the range of score intervals and data on the scores of control class boys and girls can be seen in Table 7 and Table 8

Table 7. Frequency Distribution of Posttest Scores for Gross Motor

Development Control Class Boys

Interval	Mean	Frequency	Percentage %
25-27	26	3	30%
28-30	29	7	70%
		10	100%

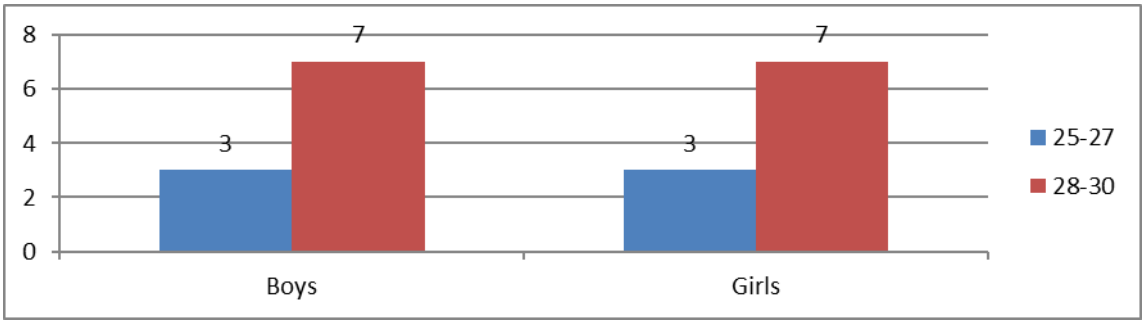
The description of the data on the interval of gross motor development of control class boys in the range of values 25-27 with a midpoint of 26 as many as three children, a range of values 28-30 with a midpoint of 29 as many as seven children. So, it was concluded that the interval that had a relatively high frequency in the posttest stage of gross motor development of control class children was located in the range of values 28-30 with a midpoint of 29 because it had more children than the range of other values, namely as many as seven children.

Table 8. Frequency Distribution of Posttest Scores for Gross Motor

Development Control Class Girls100%

Interval	Mean	Frequency	Percentage %
25-27	38	3	30%
28-30	41	7	70%
		10	100%

The description of the data on the interval of gross motor development of children Control class girls with a value range of 25-27 with a midpoint of 26 as many as three children, a range of values 28-30 with a midpoint of 29 as many as seven children. So it was concluded that the interval that had a relatively high frequency in the posttest stage of gross motor development of control class children was located in the range of values 28-30 with a midpoint of 29 because it had more children than the range of other values, namely as many as seven children. To see the difference in pretest scores for boys and girls, see below:



Graph 3. Posttest Results of Gross Motor Development of Boys and Women's Control Class

Based on chart 3. It can be seen that the gross motor development scores of boys and girls in the control class did not receive treatment.

c. Recapitulation of Posttest Data Results of Gross Motor Development of Boys and Girls in Experimental Class and Control Class

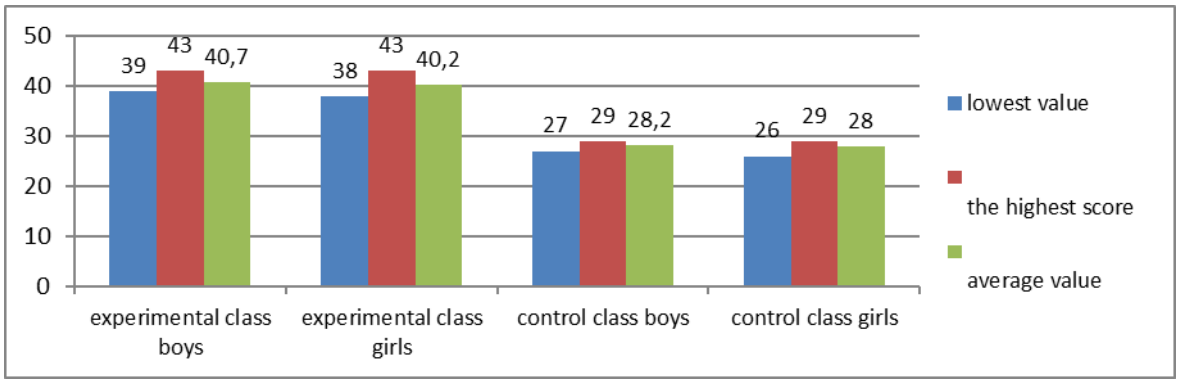
A recap of posttest data on the gross motor development of boys and girls in experimental and control classes with a total of 10 children each can be seen in the following Table 9:

Table 9. Recapitulation of Posttest Data on Gross Motor

Development Boys and Girls

Class	Activity	Aspect	N	Total	Mean	Sd	Max	Min
Experiment	Zigzag Run Game	Boys Gross Motor	10	241	24.10	1.663	26	21
		Girls Gross Motor	10	240	24.00	1.633	26	21
Control	Normal Running	Boys Gross Motor	10	243	24.30	1.494	26	21
		Girls Gross Motor	10	240	24.00	1.764	26	21

Based on the description of the table above, it can be seen that the gross motor development of children in the experimental class is higher than that of the control class. More details can be seen in the following graph 4:



Graph 4. Comparative Data of PretestaAnd Posttest Gross Motor Development Boys And Girls in The Control Class and Experimental Class

Based on the graph above, it can be described that the boys' gross motor development experimental class has the highest score of 43, the lowest score of 39, and the average score of 40.7. In contrast, the girls' experimental class had the highest score of 43, the lowest score of 38, and the average score of 40.2. The boys' gross motor development control class obtained the highest score of 29, the lowest score of 27, and the average score of 28.2. In comparison, the girls' control class obtained the highest score of 29, the lowest score of 28, and the average score of 26.

Data analysis and discussion

Testing analysis requirements are intended to test the initial assumptions used as a basis for using variance analysis techniques. For this reason, three testing methods are used: normality tests, homogeneity tests, and hypothesis tests.

Normality Test

The normality test was carried out on the values of the results of pretest and posttest observations throughout the data for the experimental and control classes. The normality test is carried out using SPSS 26.0 Software. The normality test results are seen in the Appendix). From the results of the normality, it can be seen that the Sig value > 0.05 (the real level that has been set) for all tests m, eat the

data is normally distributed. Description of the results of the pretest and posttest normality test for the entire experimental and control classes can be seen in Table 10 below:

Table 10. Pretest and Posttest Normality Test for All Experimental and Control Classes

No	Data Group	Analysis Unit	Shaphir Wilk			Information
			Stat	Df	Interval	
Frequency	Percentage %	25-27	26	3	30%	28-30
		70%	0.871	10	10	100%
		Pretest Control	0.891	Interval	Midpoint	Frequency
		38	3	30%	28-30	41
7	70%	Pretest experiment	0.935	10	100%	Normal
		Pos-test experiment	0.909	10	0.276	Normal
		Pretest Control	0.889	10	0.167	Class
		N	Total	Mean	Sd	Max

From the results of the normality test, it can be seen that the sig value > 0.05 (the real level that has been set) for all tests means that the data is normally distributed.

Homogeneity Test

The homogeneity test aims to determine whether both groups of sample data taken are from populations and have the same variance. Homogeneity testing with one-way ANOVA method using SPSS software. The homogeneity test results using SPSS show that the Sig value > 0.05 means homogeneous variance data. The results of data homogeneity testing can be seen in Table 4.15 below:

Table 11. Results of Homogeneity Testing for All Experimental and Control Classes

Group	Sig	Information
Gross motor development of experimental class and control class boys	0,296	Homogeneous
Gross motor development of experimental class and control class girls	0,103	Homogeneous

2-Way Annava Hypothesis Test

Based on the analysis's prerequisites, normally distributed data with homogeneous variance are obtained to meet the requirements to continue the hypothesis test. Testing aims to see the treatment given to the research sample. Hypotheses 1,2,3 and 4 use the two-way Anava test as follows:

Table 12. Two-Way Annva Hypothesis Test Results

Tests of Between-Subjects Effects					
Dependent Variable: motoric kasar					
Source	**Type III Sum of Squares**	**df**	**Mean Square**	**F**	**Sig.**
Corrected Model	1271.800[a]	7	181.686	64.631	<,001
Intercept	70329.800	1	70329.800	25018.506	<,001
Zig zag run games	1269.000	3	423.000	150.474	<,001

Tests of Between-Subjects Effects					
Dependent Variable: motoric kasar					
Source	**Type III Sum of Squares**	**df**	**Mean Square**	**F**	**Sig.**
Jenis kelamin	1.800	1	1.800	.640	.426
Zig zag run games * jenis kelamin	1.000	3	.333	.119	.949
Error	202.400	72	2.811		
Total	71804.000	80			
Corrected Total	1474.200	79			

R Squared = .863 (Adjusted R Squared = .849)

Based on the results of the table calculation above can be described:

First hypothesis

The research results in the experimental class in Group B1 of the experimental class obtained the results of a hypothesis test on the gross motor development of children with a significance of 0.001 < 0.05, so there was a significant influence of Zigzag Run Games activities on early childhood gross motor development. Based on the pretest mean value of 24.10%, it increased to 40.70% against a difference of 16.06% higher after the Zigzag Run Games activity.

Second hypothesis

The research results in the experimental class in Group B1 of the experimental class obtained the results of a hypothesis test on the gross motor development of children with a significance of 0.426 > 0.05, so there was no significant influence on early childhood gross motor development based on sex. Based on the mean pretest score, boys with 24.10% increased to 40.70% against a difference of 16.06%, and girls with a mean value of 24.00% increased to 40.20%.

Third hypothesis

The study results were obtained with the 2-Way ANAVA Test on children's gross motor development with a significance of 0.949 > 0.05, so there was a significant interaction effect betweenZigzag-run games activities and sex on children's gross motor development. The average score of Zigzag run games in boys was 29.8% and girls 27.45%

Based on research conducted by researchers on Zig-zag-run games activities on children's gross motor development. After conducting a pretest and posttest in experimental and control classes, it was proven that Zig-gamesrungame affect children's emotional development. Children very like this Zigzag run game activity. It looks like they are enthusiastic. This activity is one way to develop children's gross motor skills by moving actively and vigorously. The child plays with his surroundings and performs actions based on the rules in acting out the game. With the achievement of this goal, Zigzag runs games and and activi that promoto promote children's gross motor development. In this section, we will explain the discussion based on hypothesis 1, hypothesis 2, hypothesis, and hypothesis 3.

The Effect of Zigzag Run Game Activities on Children's Gross Motor Development

The research findings demonstrated significant improvement in gross motor development among children who participated in the Zigzag run game activities. Through a structured experimental design, both pretest and posttest assessments measured changes in motor skills. The experimental class engaged in four sessions of Zigzag run activities, designed to stimulate and develop gross motor skills such as balance and coordination. The pretest established baseline abilities, and the posttest showed

marked improvements in complex motor tasks like running, jumping, and balancing. Compared to the control group, the experimental class exhibited significant gains in gross motor skills, effectively enhanced by the Zigzag run activities (Yoshimi et al., 2021).

This improvement in motor skills was not just observed but was statistically significant, supporting the research hypothesis that Zigzag run game activities positively influence gross motor development in young children. The children's ability to navigate the zigzag course with increased agility and precision demonstrated the effectiveness of the intervention. The success of the Zigzag run game activities in enhancing gross motor development highlights the importance of incorporating dynamic and interactive physical activities in early childhood education. These activities not only promote physical health and development but also contribute to the overall cognitive and social growth of the children. By providing an engaging and enjoyable way for children to develop essential motor skills, the Zigzag run game activities proved to be a valuable tool in early childhood education settings.(Malone & Lepper, 2021)

The research underscores the significant impact of structured physical activities on the development of gross motor skills in young children. The Zigzag run games provided a fun, challenging, and effective means of fostering motor development, setting a strong foundation for the children's future physical and academic success. The findings advocate for the inclusion of such innovative and interactive activities in kindergarten curricula to promote holistic development in children.

The influence of gender on the gross motor development of the child

The research findings revealed that gender does not play a significant role in the gross motor development of young children. This conclusion was drawn from a comprehensive analysis of pretest and posttest results, which measured the gross motor skills of both boys and girls participating in the study. During the experimental phase, both boys and girls were subjected to the same Zigzag run game activities, designed to enhance their gross motor skills through coordinated physical exercises. These activities required the children to navigate a course with agility, balance, and speed, engaging multiple muscle groups and promoting overall motor coordination (Popović et al., 2020).

The pretest assessments established a baseline for each child's motor skills, enabling a comparative analysis after the Zigzag run game activities. Posttest evaluations showed similar improvements in gross motor skills for both boys and girls, with no significant differences between genders. This suggests that Zigzag run games are equally effective for all children, regardless of gender. The findings challenge stereotypes about gender differences in physical abilities during early childhood, emphasizing that both boys and girls can achieve similar levels of gross motor development when given the same opportunities. This highlights the need for inclusive and equitable educational interventions. Educators and caregivers can use these results to design effective physical activity programs that cater to all children, promoting equal opportunities for physical development (Van Engelen et al., 2021).

The research demonstrates that gender does not affect the gross motor development of young children. Both boys and girls benefited equally from the Zigzag run game activities, showing similar improvements in their motor skills. These findings support the idea that with the right interventions, all children can develop essential motor skills regardless of gender, promoting a more inclusive and equitable approach to early childhood education.

Interaction of Zigzag run game activities and gender on children's gross motor development.

The research findings provide a fascinating insight into the dynamic interplay between Zigzag-run game activities and gender in influencing children's gross motor development. The study revealed that there are interactive effects between the type of activity and the child's gender, each influencing the other in the context of enhancing gross motor skills. During the experimental phase, children participated in Zigzag-run game activities designed to improve their balance, coordination, and overall

motor skills. These activities involved running through a zigzag course, which required quick directional changes, agility, and the use of large muscle groups. Both boys and girls were included in the study, and their performances were evaluated through pretest and posttest assessments.

The results showed a significant improvement in gross motor skills for all children, indicating the effectiveness of Zigzag-run games. However, the analysis also uncovered interesting interactions between the activity and gender. While both boys and girls benefited from the Zigzag-run games, the manner in which they engaged with the activities and the extent of their improvements varied slightly, suggesting a nuanced interaction between gender and activity type. Boys generally displayed a higher initial enthusiasm for the physically demanding aspects of the game, such as speed and agility, which translated into rapid improvements in these areas. Girls, on the other hand, showed significant gains in balance and coordination, possibly due to a more focused approach to mastering the movement patterns required by the Zigzag-run course. This indicates that while the overall benefits of the Zigzag-run games were consistent across genders, the specific areas of improvement and engagement strategies differed (Liu et al., 2021).

These findings highlight the importance of recognizing individual differences and the role of gender in physical development. The interaction effect suggests that both boys and girls can achieve substantial gains in gross motor skills through Zigzag-run games, but their paths to these improvements might differ. Educators and caregivers can leverage these insights to tailor activities that cater to the strengths and preferences of each child, ensuring a more personalized and effective approach to physical education. Furthermore, the study underscores the value of incorporating diverse and dynamic physical activities in early childhood education. By using games like the Zigzag-run, which challenge different aspects of motor skills, children can develop a comprehensive range of physical abilities (Kebede et al., 2023). The interactive effect between gender and activity type suggests that such activities can be universally beneficial, promoting inclusivity and equal opportunities for all children to enhance their motor skills. The research demonstrates that Zigzag-run game activities are highly effective in promoting gross motor development in early childhood, with notable interactions between the activity and gender. Both boys and girls showed significant improvements, albeit in slightly different areas, reflecting the importance of considering individual and gender-based differences in physical education. These findings advocate for the inclusion of varied and engaging physical activities in early childhood programs to support holistic motor development for all children (Melby et al., 2021).

The findings of this study have clearly answered the research objectives, which were to explore the influence of Zigzag-run games and gender on the gross motor development of young children. The results indicate that Zigzag-run games significantly enhance gross motor skills in children, regardless of their gender. Although there were variations in how boys and girls responded to the activities, both groups showed substantial improvements in their gross motor abilities. Thus, this study demonstrates that Zigzag-run games are an effective tool for promoting gross motor development in early childhood, and gender does not limit their effectiveness.

4. CONCLUSION

Based on the research and data processing results, it can be concluded that Zigzag Run Games activities significantly influence early childhood gross motor development. It can be seen through the annava test with results of 0.001< 0.05. There was no significant effect of sex on early childhood gross motor development. This can be seen in the annava test, which had results of 0.426> 0.05. There is a significant interaction between Zigzag run games and sex activities on children's gross motor development, which can be seen through annava tests with results of 0.949 > 0.05. With the significant influence of Zigzag run games and gender activities on children's gross motor development, it will be a reference for teachers in compiling and packaging learning to improve children's gross motor development to the maximum. The study was limited to the effect of zigzag run games and sex on

children's gross motor development, with instruments not yet fully covering all aspects of gross motor development and not considering other factors influencing them.

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