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Developing the Gross Motor Skills of Children by Simultaneously Training Them with Rhythmic Gymnastics

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Abstract. The purposes of this study were (1) to describe the gross motor skills of children before and after being trained with rhythmic gymnastics, and (2) to identify the effect of rhythmic gymnastics on children's gross motor skills. Approaches applied in this study were pre-experimental with one-group pretest - post-test design. The study involved 15 children from the B group of Pertiwi Kindergarten selected through a purposive sampling technique. The data were collected using a questionnaire, observation, and documentation. The research was carried out through some stages including planning, pretest, treatment, post - test, and data analysis. Data were analyzed using the Wilcoxon Signed Rank Test. This study found that (1) children's gross motor skills before trained with rhythmic gymnastics were in the categories of "not developed" and "starts to develop" and after the treatment, there was an increase on children's gross motor skills thus the status shifted to the category of "developed as expected" and "developed very well" in performing locomotor, non-locomotor, balance, and flexibility movements like children could walk forward while both hands were on their waist, jump in place while swinging both arms, balancing the body by lifting one of the legs, and swing the arms back and forth alternately; (2) rhythmic gymnastics have effects on children's gross motor skills, simultaneously treating children with rhythmic gymnastics with various interesting movements so that they become interested to follow them thus it is effective to be a media to form children's gross motor skills simultaneously.

Keywords: Early Childhood; Rhytmic Gymnastics, Gross Motor Skills, Kindergarten, Simultaneous.

INTRODUCTION

The motoric skills development is one of the important factors in individual development (Nisnayeni, 2012), and the gross motor has a big impact on the cognitive development of children (L.C.Veldman, Santos, Jones, Sousa-Sá, & D.Okely, 2013), and everything related to movements including the use of large and small muscles by involving the muscles, nerves, and brain (Yuliansih, 2015; Saputri, Sasmiati, & Sofia, 2017). Motor skills can be developed in, one of them, kindergarten. They include psychological and physical skills like moral, religious values, social, emotional, independence, cognitive, languages, physics, motors, and arts that usually continue to develop in elementary school level (Nisnayeni, 2012);

(Miyagishima, Asaka, Kamatsuka, & Kozuka, 2018).

Gross motor skills refer to activities involving big muscles to perform some activities like running, climbing, jumping, and throwing (Syaodih, 2005). Gross motor skills involve forward and complex movements consisting of locomotors (running, throwing, and jumping) and object control/ ball skills (like throwing, catching, and kicking) (SW Logan, 2018). It explains that to develop well, children need support with good motoric skills development. when the gross motor skills develop well, children can well perform independent activities, some movements in games like running, jumping, some sport skills, and skills in the line of march that are usually taught in kindergarten (Nisnayeni, 2012).

Motor skills development is generally connected with obesity in children, especially the gross motor skills (C Graf, 2004) that happens due to the energy intake higher than energy expenditure (Soetjingsih, 2014) and seldom performing physical activities, (Ramdani & Azizah, 2020) involving big muscles (Papalia & Feldman, 2015) like running, jumping, climbing, kicking, whereas physical activities are important factors supporting the development of academic skills of young child (Li et al, 2017). Other problems connected with the development of children's' gross motor skills as found by (Nisnayeni, 2012 ; Telford, et al. 2020), are delays on children's development like delay to stand up, less able to swing hands, and cannot follow the rhythmic gymnastic well, and as it is also influential on the development of motor skills, children face problems in reading (Overvliet, et al., 2011), and children age 5-6 years seem lazy to move their body especially arms and legs (Fuaidah, & Miftahillah, 2018). The development of children's motor is still dominated by boys (Bardid, et al., 2017). Besides that, programs to develop children's gross motor skills are seldom to perform, maybe just once a week and they do not enjoy the activities (Saputri, Sasmiati, & Sofia, 2017). Also, there are some children with problems with their gross motor skills find it difficult to jump, throw a ball, and kick a ball, and when they perform those activities, they look unconfident and unexcited, and they seem difficult to follow the learning activities in the classroom (Rachmawati et al, 2020). Therefore, it is clear that we should put concern on the gross motor skill development because problems arising in this aspect could inhibit the development of kids.

Gross motor skills are very important for the current and future growth and development of children. (Bakaniene, et al. 2018), mentioned that those skills will form children's self-confidence, independence, and acceptance from their peers. Teachers or parents should understand a proper stimulation to develop their children's gross motor skills including locomotor skills, non - locomotor skills, and skills to accept and project themselves. To develop those gross motor skills, children can be treated with rhythmic gymnastics. The exercise is easy to perform and effective to optimize the growth and the development of children's physics (Saputri, Sasmiati, & Sofia, 2017). Besides that, the rhythmic gymnastics combines various movements and music rhythms like claps, beats, tamborees, chants, and music (Syarifuddin & Muhadi 1993). Thus, it is clear that rhythmic dance is closely correlated with the development of children's' gross motor skills (Arumnintyas, Marijono and Imsiyah 2017)

The implementation of rhythmic gymnastic is believed effective to improve motor skills because it is proper with the characteristics of the development of preschool children as they are very active, enjoy music, and like to imitate (Nawangsasi, 2011). The introduction of this type of gymnastic also significantly changes children's gross motor skills (Hanesty, 2014), thus they can move more swiftly and flexibly, and are more explorative in games (Nisnayeni, 2012). Besides that, rhythmic gymnastics also train children's muscle endurance, strength, and flexibility, makes children more agile in moving, and keep their body balance (Rizkya, 2014) children have better muscle endurance, flexibility, agility, and balance after treated with rhythmic gymnastics (Saputri, Sasmiati, & Sofia, 2017). Rhythmic gymnastics that is dominated by physical activities through games can become a solution for problems related to the gross motor skills of children. In those older studies, rhythmic gymnastics which were applied did not combine various rhythmic movements. Therefore, the current study implemented a rhythmic gymnastic that collaborated rhythms from claps, beats, tamborees, chants, and music making it more interested so that children were more motivated to follow the movements. As the consequence, children in kindergarten will

experience a better development of their locomotor skills, non - locomotor skills, and skill to accept and project themselves.

METHOD

This was a quantitative study and analyzed the numerical data using statistical techniques (Sugiono, 2016). This study applied a *pre-experimental approach* with *One-Group Pretest-Post - test Design* to compare the conditions before and after treatment. The treatment was addressed to the experimental group. This study discussed the influence of rhythmic gymnastics on the gross motor skills of children in Group B, Pertiwi Kindergarten, Rappocini district, Makassar city by involving 15 children chosen through purposive sampling technique. Data were collected using a questionnaire to measure the gross motor skills of children before and after being trained with rhythmic gymnastics. Other data collection instruments were observation and documentation. The procedure applied in data collection started from planning, pretest, treatment, post - test, and data analysis.

In quantitative research, data analysis is performed after all data from respondents and other sources are collected. According to Sugiyono (2016), data are gathered by putting a checklist on categories provided in an observation sheet about children's gross motor skills. The assessment had been modified into numerical scales as presented in Table 1.

Table 1. Children's Gross Motor Skill Categories

No	Categories	Scores
1	ND (Had Not Developed)	1
2	SD (Started to Develop)	2
3	DE (Developed as Expectation)	3
4	VWD (Developed Very Well)	4

After gathering all data before and after the training kids with rhythmic gymnastics, we performed analysis using descriptive statistics and non - parametric statistic methods. The non-parametric analysis was conducted because the number of samples was fewer than 30 people so that it was impossible to perform parametric analysis. The test applied the Wilcoxon Signed Rank Test. Hypotheses of this study were:
Ho is accepted and H1 is refused if $Z \leq Z\alpha/2$ meaning that rhythmic gymnastic does not influence students' gross motor skills.
Ho is refused and H1 is accepted if $Z \geq Z\alpha/2$ which indicates that rhythmic gymnastic influences students' gross motor skills.

RESULTS AND DISCUSSION

Results

Based on the descriptive statistic analysis on data obtained from 15 samples aged 5-6 years, members of Group B, Kindergarten Pertiwi, Rappocini District, Makassar city, their gross motor skills were below 50% before trained with rhythmic gymnastics.

After performing the pretest, children were treated with rhythmic gymnastics. Before doing the gymnastics, teachers guided children to make lines in front of the class and instructed them to spread out their hands to make a distance, so that they could move freely. After that, teachers played music and acted as the gymnastics instructor. The rhythmic gymnastics were performed four times and each consisted of two sections. Gymnastics trained to them were Cheerful Rhythmic Gymnastics 1, Cheerful Rhythmic Gymnastics 2, and Cheerful Rhythmic Gymnastics 3. Data obtained before and after treating kids with rhythmic gymnastics are presented descriptively according to the analysis on each indicator.

1. Children's Gross Motor Skills Before Treated With Rhythmic Gymnastics

To get the description of children's gross motor skills, we did a percentage analysis on indicators of children's motoric skills development including locomotor, non-locomotor, balance, and flexibility movements. Before giving treatment, we did a pretest to

assess the initial gross motor skills of children in Group B, Kindergarten. The results are presented in the table below:

Table 1. Analysis of Locomotor Indicator Percentages

Items	Categories			
	Developed Very Well	**Developed as Expectation**	**Started to Develop**	**Had Not Developed**
Steps left and right alternately	0	10	5	0
Jump left and right alternately	1	6	7	1
stepped together and both hands on their waist	0	3	10	2
jump back and forth while swinging both hands	0	4	9	2
stepped forward with both hands on the waist	2	8	5	0
Totals	3	31	36	5
Percentages	4%	41%	48%	7%

Table 1 shows that only three children (4%) had the very good locomotor movements, 41 % of them performed the movement as expected, 48 % of them just started to perform well, and there were still 5 kids (7%) had their locomotor skill not developed yet. It indicates that there was a development on children's gross motor skills especially on their ability to step, hop and jump, and wiggle hips and hands.

Table 2. Results of Analysis on Non - Locomotor Movements Indicators

Items	Categories			
Walking in place while swinging both hands	**Developed very well**	**Developed as expected**	**Started to develop**	**Had not developed**
Jumping in place while swinging both hands	0	1	12	2
Total	0	1	11	3
Percentage	0	1	23	5
	0%	4%	79%	17%

Table 2 describing the indicators of non - locomotor movements indicating that most students (79%) still started to develop those skills and 5 children (17%) did not experience development on those skills or they could not walk while swinging both hands and could not jump in place while swinging both hands.

Table 3. Results of Analysis on Balanced Movements Indicators

Items	Categories			
	Developed very well	**Developed as expected**	**Started to develop**	**Had not developed**
standing on one leg while stretching both hands	0	4	9	3
lifting one leg to the back of the thigh	0	2	11	2
Total	0	6	20	3
Percentage	0%	21%	69%	10%

Table 3 describes scores for indicators related to balance movements. It shows that the ability of most children (69 %) to stand on one leg still started to develop and there were 10 % of them unable to perform both activities mentioned in this part.

Table 4. Results of Analysis on Flexibility Indicators

Items	Categories			
	Developed very well	**Developed as expected**	**Started to develop**	**Had not developed**
swinging the arms back and forth alternately	0	7	8	0
turning the body left and right alternately	0	3	10	2
bending the body touching the tips of the toes	0	0	13	2
rotating the body towards the right and left	0	1	12	2
turning head to the right and left	0	5	8	2
pushing the waist twice left and right	0	7	7	1
	0	23	58	9
Percentages	0%	26%	64%	10%

Table 4 about children flexibility described that their ability to swing arms, turn, bend and rotate the body, and push the waist generally started to develop (64 %) and ten percent of kids were still unable to perform the flexible movements.

2. The Description of Children's Gross Motor Skills after Performing Rhythm Gymnastics

After giving treatment in the form of rhythm gymnastics, there was some progress on children's gross motor skills as shown by the post - test. Analysis of data obtained from the post - test can be seen in the table 5.

Table 5. Results of Analysis of Children's Gross Motor Skills After Treated With Rhythmic Gymnastics

Items	Categories			
	Developed very well	**Developed as expected**	**Started to develop**	**Had not developed**
Stepping left and right alternately	12	3	0	0
Jumping left and right alternately	12	3	0	0
stepping together and both hands on their waist	5	10	0	0
jumping back and forth while swinging both hands	3	11	1	0
stepping forward with both hands on the waist	7	8	0	0
Totals	39	35	1	0
Percentages	52%	47%	1%	0%

In table 5, it can be seen that after training children with rhythm gymnastics, there was an improvement in their ability to step, jump, and hop. Data show that children's locomotor skills

had developed well with the percentage of 52, and developed as expected with a rate of 47%. It indicates that there was a significant development in children's gross motoric skills as they had been already able to step their feet, jump, hop, and move hips and arms independently.

Table 6. Results of Analysis on Non - Locomotor Movement Indicators

Items	Categories			
	Developed very well	**Developed as expected**	**Started to develop**	**Had not developed**
Walking in place while swinging both hands	4	11	0	0
Jumping in place while swinging both arms	6	9	0	0
Totals	10	20	0	0
Percentages	33%	67%	0%	0%

Table 6 presenting data about non - locomotor movement indicators describes the improvement in those aspects after training kids with rhythm gymnastics. Most students had their non - locomotor movement skills developed as expected (67%). Two – thirds of them (33%) experienced a very good development and none of them were in categories of "started to develop" and "Had not developed". It indicates that the ability to do non - locomotor movements experienced very good progress especially in waking in place, and jumping while swinging both arms in their own ways.

Table 7. Results of Analysis on Balanced Movements Indicators

Items	Categories			
	Developed very well	**Developed as expected**	**Started to develop**	**Had not developed**
standing on one leg while stretching both arms	4	11	0	0
lifting one leg to the back of the thigh	5	10	0	0
Totals	9	21	0	0
Percentages	30%	70%	0%	0%

Table 7 shows that after training children with rhythm gymnastics, their balanced movements got better. Seventy percent of children had their balance movement skills developed as expected, and the rest (30%) developed them very well. It indicates that balanced movements particularly in standing on one leg while stretching both arms and lifting one leg to the back of the thigh could be performed well by kids.

Table 8. Results of Analysis on Flexibility Movement Indicators

Items	Categories			
	Developed very well	**Developed as expected**	**Started to develop**	**Had not developed**
swinging the arms back and forth alternately	11	5	0	0
turning the body left and right alternately	9	6	0	0
bending the body touching the tips of the toes	11	4	0	0
rotating the body towards the right and left	9	5	1	0
turning head to the right and left	9	5	0	0
pushing the waist twice left and right	7	8	0	0
Totals	56	33	1	0
Percentages	62%	37%	1%	0%

Table 8 depicts data about flexibility movement after treating children with rhythmic gymnastics. It can be seen that each indicator experienced improvement. More than half of the children (62 %) developed those skills very well, and 37% of them had their skills developed as expected. Kids were already able to swing their arms, to turn the body left and right, to bend the body touching the tips of the toes, to rotate the body towards the right and left, to turn head to the right and left, and to push the waist left and right by themselves. The results of the descriptive analysis can be seen in the following table 9.

Table 9. Results of Descriptive Analysis of Data about Children's Gross Motor Skills According to the Post – test

Calculation Results	***Pretest***	***Post - test***
N	15	15
Mean Scores	33	53
Minimum Scores	29	48
Maximum Scores	40	59
Standard Deviation	3,40	3,64

Based on table 9, after descriptively analyzed, the children's gross motor skill before receiving treatment showed the mean score of 33, the minimum score of 29, the maximum score of 40, and the standard deviation of 3.40. While data obtained from the post - test showed an average score of 33, the minimum score of 29, the maximum score of 40, and the standard deviation of 3,40. These data indicated that in general, students experienced improvement in their gross motor skills after joining some sections of rhythmic gymnastics. It means, children's gross motoric skills improved quickly.

3. Recapitulation of Data about Children's Gross Motoric Skills Development Before and After Trained with Rhythmic Gymnastic

This section presents the recapitulation of data obtained before and after holding rhythm gymnastics activities. Percentages of children in 4 different categories of gross motoric skills: "developed very well (DVW)", "Developed as

Expected (DE)", "Started to Develop (SD)", and "Had Not Developed (HND)" can be seen in Table 10.

Table 10. Recapitulation of Data about Children's Gross Motoric Skills Development Before and After Trained with Rhythmic Gymnastic

No.	Scores	Categories	Before (*pretest*)		After (*post - test*)	
			Frequencies	Percentages	Frequencies	Percentages
1	53 – 60	DVW	0	0 %	7	47%
2	45 – 52	DE	0	0%	8	53%
3	37 – 44	SD	2	13%	0	0%
4	29 – 36	HND	13	87%	0	0%
Total			15	100%	15	100%

Annotation :

DVW : Children can perform locomotor movements, non - locomotor movements, balance movements, and flexibility movements by themselves without assistance or guidance from teachers.

DE : Children can perform locomotor movements, non - locomotor movements, balance movements, and flexibility movements with assistance or guidance from teachers.

SD : Children can perform locomotor movements, non - locomotor movements, balance movements, and flexibility movements but not really well although they have got assistance or guidance from teachers.

HND : Children cannot perform locomotor movements, non - locomotor movements, balance movements, and flexibility movements although they have got assistance or guidance from teachers.

Table 10 explains that the percentage of children's gross motoric skills before following rhythmic gymnastics was below 50% while at the end of the section, it increased to above 50%. Data show that kids' gross motoric skills before treated with the gymnastics were in the range between 29 – 36 or 87% did not develop, between 37 – 44 or 13% started to develop, 45 – 52 or 0% developed as expected, and between 45 – 60 or 0% developed very well. While after treated with rhythm gymnastics, the range between 29 – 36 or 0% did not develop, between 37 – 44 or 0% started to develop, between 45 – 52 or 53% developed as expected, and between54 – 60 or 47% developed very well.

4. Results of Tests on The Influence of Rhythm Gymnastics on Children's Gross Motoric Skills

Effects of rhythmic gymnastics on children's motor skill were identified from analysing data obtained in the initial observation (pre - test) using hypothesis test and Wilcoxon test. Steps that were followed were as follows: (1) the difference between data obtained before (O_1) and after (O_2) treatment was calculated; (2) the data were ranked from the highest to the lowest and each data was numbered (1, 2, 3, etc.). Similar scores were given the same number (put at the same rank), by dividing the rank value equally to all children with the same score; (3) To determine the T value, all lowest scores were sum up from both rank groups with the similar sign, and the N value was the number of investigated samples; (4) The obtained T value was compared with T value in Wicoxon signed rank test.

For a more detailed, the obtained data are presented in the table 11.

Table 11. Result of Z test on the Influence of Rhytmic Gymnastics on Children's Gross Motor Skills

No	Children's Initials	Statistic Values of Childrens' Gross Motor Skills		Differences of Values (O_1-O_2)	Ranks	Rank Signs	
		Before (O_1)	After (O_2)			+	-
1	NSS	35	56	-21	12,5		-12,5
2	AI	30	48	-18	2		-2
3	IRB	40	59	-19	4,5		-4,5
4	JSAM	29	48	-19	4,5		-4,5
5	FIZ	31	53	-22	15		-15
6	RA	34	55	-21	12,5		-12,5
7	F	36	50	-14	1		-1
8	MR	32	52	-20	8,5		-8,5
9	MRAR	38	59	-21	12,5		-12,5
10	KAY	32	51	-19	4,5		-4,5
11	SAH	29	49	-20	8,5		-8,5
12	AAH	33	54	-21	12,5		-12,5
13	AS	29	49	-20	8,5		-8,5
14	AFS	35	54	-19	4,5		-4,5
15	M	31	51	-20	8,5		-8,5
Total Scores		**494**	**788**	**T Score = 120**			
Average scores		**33**	**53**				

Table 11 is about children's gross motor skills. It indicates that scores with positive (+) sign = 120 means the T is a smaller rank. In taking a decision, if $T_{count} < T_{table} = H_0$ is accepted, H_1 is refused which means that there is no effect on rhythmic gymnastics on the gross motor skills of children in Aisyah Jambu Kindergarten. If $T_{count} > T_{table} = H_0$ is refused while H_1 is accepted indicating there is no effect of rhythmic gymnastics on the gross motor skills of children in Aisyah Jambu Kindergarten. If $Z_{count} < Z_{table} = H_0$ is accepted while H_1 is refused means that there is no effect of rhythmic gymnastics on the gross motor skills of children in Aisyah Jambu Kindergarten. If $Z_{count} > Z_{table} = H_0$ is refused while H_1 is accepted meaning that there is effect of rhythmic gymnastics on the gross motor skills of children in Aisyah Jambu Kindergarten.

The value of T_{count} was 120 and T_{table} was 25 so that the T_{count} (120) > T_{table} (25), H_1 is accepted and H_0 is refused meaning that there is an effect of rhythmic gymnastics on the gross motor skills of children while the value of Z_{count} was 16,71 and Z_{table} was 0,417 thus Z_{count} (16,71) > Z_{table} (0,417) H_1 is accepted and H_0 is refused which means that there is an effect of rhythmic gymnastics on the gross motor skills of children.

The result of the test showed that there was a change in children's gross motor skills before and after they were trained with rhythm gymnastics. It shows that children who are trained with rhythmic gymnastics will have their gross motor skills more developed than children who are not. In other words, there was an improvement in the scores after treated with rhythmic gymnastics.

Discussion

Findings show differences in gross motor skills of children before and after treated with rhythmic gymnastics. In this case, children's gross motor skills experienced improvement. The improvement is signed by the ability of kids to perform locomotor movements, non - locomotor movements, balance movements, and flexibility movements. The implementation of this rhythmic gymnastic was interested because teachers combined various rhythms including claps, beats, tamborees, interesting chants, and music so that children were motivated to follow the movements which were still rarely implemented. It becomes a novel and interesting finding because earlier studies found that rhythmic gymnastics only benefit children's health and fitness but in fact, besides that, it is also effective to

simultaneously develop children's gross motor skills. The gymnastics that was performed 4 times simultaneously also shows that there is a need to habituate kids with such activities to support their gross motor skills development. It is in line with (Saputri, Sasmiati, & Sofia, 2017) stating that routinely performing rhythmic gymnastics will stimulate the development of kids' gross motor skills. Routine and structured exercise can even accelerate their development (Fotiadou, et al. 2006)

Developing gross motor skills especially related to the ability to step up, to move the body, and to swing arms to the right and the left is proved to be effective in this study and it is also supported by some earlier studies. (Lestari, Risyak and Sasmiati 2015 ; Hartina and Abubakar 2019) found that there is an improvement in children's ability to perform coordinated movements after regularly performing rhythmic gymnastics. Also, training kids with rhythm gymnastics can improve their ability to combine the movement of legs and arms (Fuaidah, & Miftahillah, 2018), to jump and walk ((Sulistyowati and Sukamti 2018), and rhythmic gymnastics with a traditional song can improve elementary school students' gross motor skills (Jusuf, et al. 2019).

CONCLUSIONS AND SUGGESTIONS

This study concluded that (1) in terms of kids' gross motor skills before trained with rhythmic gymnastics, most kids had their skills of locomotor movements non - locomotor movements, balance movements, and flexibility movements in categories of "had not developed" and "started to develop". In this case, most of them could not walk forward with both hands on the waist, jump in place while swinging both hands, balance body by lifting one leg and swing the arm back and forth alternately; (2) after treated with rhythmic gymnastics, children's gross motor skills shifted to the categories of "developed as expected" and "developed very well". It includes their ability to perform locomotor movements non - locomotor movements, balance movements, and flexibility movements. It means that kids could walk forward with both hands on the waist, jump in place while swinging both hands, balance body by lifting one leg and swing the arm back and forth alternately; (3) Rhythmic gymnastics affects the gross motor skills of children in Group B, Kindergarten Pertiwi, Rappocini District, Makassar city. In this case, after they were trained with rhythmic gymnastics, their gross motor skills experienced a great development that can be seen from their ability to perform locomotor movements non - locomotor movements, balance movements, and flexibility movements. The interesting fact about the implementation of this exercise was in terms of the combination of various rhythms accompanying the gymnastics including claps, beats, tamborees, interesting chants, and music so that children were motivated to follow the movements which they might rarely find. A novel and interesting finding of this study is that while earlier studies found that rhythmic gymnastics are beneficial for kids' health and fitness, the current finding proved that it can also become an effective media to simultaneously develop kids' gross motor skills.

To develop children's gross motor, preschools can take this research as a reference to solve some related problems. The school leader and government can also set this as one of the handling models for kids with problems to support them to develop well. For knowledge development purposes, this study can be followed up suc as by ncreasing the sample size.

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