MONITORING BABY'S MOTOR DEVELOPMENT THROUGH ANDROID-BASED BABY GYM APPLICATION

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INFO ARTIKEL	ABSTRACT
	Background: The process of neonatal growth and development requires sensory-motor stimulation which is fulfilled, one of which is the ability of the parents. In total, neonates still depend on the environment, especially the family as the first environment in their life. Touch is one of the stimulation sensations during the neonatal period that can be carried out at birth by parents or family. Baby Gym can stimulate and optimize the growth and development of babies from an early age. The neonatal period has four aspects of development, namely gross motor, fine motor, personal social, and language. Baby Gym can be done by parents or people closest to the baby, but it is better if it is done by the mother because the baby is used to the touch made by the mother. **Purpose:** This study aims to determine the motoric development of infants through the baby gym application. **Methods:** This type of research is a quasi-experimental design with a pretest and posttest with a control group design. The population taken in this study were mothers who had babies aged 3-12 months at the Community Health Center in South Tangerang City. The sample size for this study was 31 respondents in the intervention and control groups respectively, so the total sample was 62 people. The sampling technique in this study used the purposive sampling method. Data analysis used the Wilcoxon and Man-Whitney tests and multivariate analysis used multiple logistic regression multivariate. **Results:** The value of the Wilcoxon statistical test showed that there was a significant difference in the average motor development before and after being given the baby gym application intervention to mothers (p-value = 0.000). The results of the analysis using Mann Whitney found that there was a significant effect of using the baby gym application on the motor development of infants in the intervention group compared to the control group with a value of p = 0.000 (p

<0.005). **Conclusion:** there is an effect of using the baby gym on the baby's motor development. To provide recommendations for using the Baby gym application to help stimulate the development of the baby and also to establish affection between mother and baby.

Introduction

The success of a child in achieving optimal growth and development can determine the future of a nation (Tanu, 2017). The period from the time the fetus is in the womb to the age of 2 years is a very important period in growth and development or also known as the golden period. Good nutrition, optimal health status, and proper stimulation will help children to grow healthily and reach their optimal abilities (Nur Fiana, 2021). Appropriate stimulation will stimulate the brain so that the development of movement, speech, and language abilities as well as socialization and independence can take place optimally according to the child's age (Destiana et al., 2017).

African and sub-Saharan countries are countries with the largest rates of child development delays or disorders in the world where more than 60% of early childhood children are at risk of not achieving age-appropriate developmental tasks (Mulyanti et al., 2021). According to UNICEF data (2019), it shows that developmental disabilities in Indonesia are 11.7%.

In the United States, 15-18% of children have developmental or behavioral disorders (Santoso, 2019). Baby gymnastics has been researched by many research centers such as the Harvard Pre School Project (under the leadership of Dr. Benyamin S. Bloom), the Maternal and Child Health Institute in Tsjechoslowakle (by Dr. Jaroslav Koch), and Suzy Prudden Studios in New York City. This research shows that babies who do gymnastics speak faster, have a better appetite, sleep more deeply and develop their movements faster than those who do not take part in gymnastics. (Wasiatiningrum & Zuhroh, 2019).

The baby gym provides benefits for all aspects needed for the growth and development of babies, namely encouraging complex intelligence for babies, including learning to coordinate, and strengthening muscles and also joints in babies in preparation for babies to sit, stand and walk (Mahanani & Minarso, 2017). Other benefits of a baby gym are improving circulation or circulation of blood, and heart, increasing balance and alertness, and optimizing hearing, vision, and baby's growth and development (Aminati, 2013).

Baby Gym can be done by parents or people closest to the baby, but it is better if it is done by the mother because the baby is used to the touch made by the mother (Maimunah, 2015). It can also be done with the help of an experienced physiotherapist, but usually, some obstacles are often encountered. Babies are usually surprised because those who do gymnastics are strangers to babies (Aminati, 2013). When practicing baby gymnastics, parents can at the same time make observations or detect early indications of deviations in the baby's development (Wasiatiningrum & Zuhroh, 2019).

The Baby gym service Polkes application is an application developed to facilitate the implementation of Baby gym activities carried out by parents for children at home and easily accessible anywhere so that the application can assist in providing information on Baby gym in supporting children's motor development and parents can also monitor the development of the child so that they can immediately examine from the start if there is an abnormality. The purpose of this research is to find out the motoric development of babies through the baby gym application.

Research methods

This type of research is a quasi-experimental design with a pretest and posttest design with a control group (Hastjarjo, 2019). In this study two groups were used, namely, the

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intervention group was given the baby gym application while the control group was only given the baby gym guide. Furthermore, the respondents will do the baby gym according to the information they get. Before and after the intervention, measurements of the baby's motor development will be carried out in both the intervention group and the non-intervention group.

The population taken in this study were mothers who had babies aged 3-12 months at the South Tangerang City Health Center

The sample size for this study was 31 respondents in the intervention and control groups respectively, so the total sample was 62 people. The sampling technique in this study used the Purposive Sampling method where to obtain data the researchers met research subjects, namely mothers who had babies aged 3-12 months.

The instrument used in this study was a questionnaire that assessed mothers' knowledge about baby gyms and infant motor development and also a questionnaire to assess infant motoric development. The analysis in this study used univariate analysis, the data were presented in the form of frequency and proportion on categorical variables and in the form of the mean (mean), standard deviation (SD), and 95% CI value on numerical variables. Bivariate analysis was used to see the significance and magnitude of the relationship that occurs between the dependent variable and the independent variables and other variables using the Wilcoxon and Mann-Whitney tests. Multivariate analysis was carried out to determine the quantitative relationship between the independent variables and the dependent variable after controlling other variables using Multivariate Multiple Regression. logistics.

Results and Discussion

The results of this study are presented in the following table:

Table 1.
Distribution of Respondent Characteristics at Regional Health Centers
South Tangerang City in 2022

Variable	Intervention		Control		Total	
	n	%	n	%	n	%
Mother's age						
<20 dan >35 Year	15	45.5	2	6.1	17	25.8
20-35 Year	18	54.5	31	93.9	49	74.2
Paritas						
Primipara	10	30.3	16	48.5	26	39.4
Multipara	23	69.7	17	51.5	40	60.6
Ethnic group						
Sunda	9	27.4	5	15.2	14	21.2
Jawa	8	24.2	17	51.5	25	37.9
Betawi	8	24.2	5	15.2	13	19.7
Lainnya	8	24.2	6	18.1	14	21.2
Education						
Low	6	18.2	17	51.5	23	34.8
Tall	27	81,8	16	48.5	43	65.2
Work						
PNS/BUMN/POLRI	3	9.1	4	12.1	7	10.6
Employee	6	18.2	6	18.2	12	18.2
ART	22	66.6	19	57.6	41	62.1
Other	2	6.1	4	12.1	6	9.1
Gender of Baby						
Man	16	48.5	17	51.5	33	50.0
Woman	17	51.5	16	48.5	33	50.0
Baby Age						
3-6 Month	6	18.2	25	75.8	31	47.0
>6 Bulan-9 Month	8	24.2	7	21.2	15	22.7
>9 Bulan-12 Month	19	57.6	1	3.0	20	30.3

Based on Table 1 shows that in the intervention group most of the mothers were in the age range of 20-35 years (54.5%), and most of the mothers had given birth more than once (multipara) as much as 60.7%. Almost all mothers have tertiary education (81.8%) with the majority of mothers working as housewives (66.6%). Based on the characteristics of the baby, the proportion of male and female gender was not much different, namely 48.5% and 51.5% respectively.

In the control group, almost all mothers in the control group were aged 20-35 years

(93.9%), and the proportion of parity of mothers was almost the same between primiparas and multiparas with a percentage of 48.5% and 51.5% respectively. Most of the mothers are Javanese (51.5%) with almost the same proportion of education between lower education (51.5%) and higher education (48.5%).

Most of the mothers have a job as IRT (57.6%). Based on the characteristics of the baby, there are more boys (51.5%) than girls (48.5%).

Table 2.
Description of Respondent Characteristics in Regional Health Centers
South Tangerang City in 2022

Variable	Intervention Group				Control Group			
	Mean	Min	Maks	SD	Mean	Min	Maks	SD
Mother's Age	31.4	17	42	7.4	28.0	22	36	3.7
Baby Age	9.4	4.0	12.0	2.6	5.3	3	12	2.5
Baby's Weight	10.7	6.0	15.0	2.8	6.8	4	12	1.6
Baby Body Length	66.8	54	77.0	5.0	65.3	55	90	7.3

Based on table 5.2 shows that the mean age of the mother in the intervention group was 31.4 years and 28 years in the control group. The mean age of infants in the intervention group was 9.4 months and in the control group 6.8 months. Based on the characteristics of the baby's body length, the mean body length of the

babies in the intervention group and the control group was almost the same, namely 66.8 cm and 65.3 cm. Meanwhile, based on the body weight in the intervention group, was slightly heavier, namely 10.7 kg compared to the control group, 6.8 kg.

Table 3
Overview of Infant Motor Development Before and After Intervention in the Intervention and Control Groups at the South Tangerang City Health Center in 2022

Motor Development	Intervention Group				Control Group			
	Mean	Min	Maks	SD	Mean	Min	Maks	SD
Before	10.4	9.0	12.0	0.8	8.8	7	11	1.4
After	11.3	10.0	12.0	0.7	9.0	8	11	1.2

Table 3 shows that the average motor development of infants in the intervention

group before being given the baby gym application to mothers was 10.4 and after being

given the baby gym application it was 11.3. These results indicate an increase in motor development in the intervention group before and after being given the baby gym application to mothers. The results also show that the value of variation before being given training is 0.8 and after being given training is 0.7. The results of the study also showed a slight increase in the non-intervention group which was only given baby gym guidelines. The average motor development before the study was 8.8 and increased to 9.00 after being given the baby gym guidelines. The value of variation before being given guidelines was 1.4 and became 1.2 after being given guidelines.

Table 4.
Differences in Infant Motor Development Before and After Intervention in the Intervention and Control Groups at the South Tangerang City Health Center in 2022

Variable	Group	Mean	SD	Min-Maks	Mean Rank	P value*
Motor Development	Group Intervention					
	Before	10.42	0.83	9-12	12.50	0.000
	After	11.30	0.72	10-12		
	Beda Mean	**0.88**				
	Group Kontrol					
	Before	8.79	1.43	7-11	4.50	0.005
	After	9.03	1.21	8-11		
	Beda Mean	**0.24**				

Based on table 4, it is known that there was a significant increase in the average motor development in the intervention group, before and after being given the baby gym application to mothers with a mean difference of 0.88. The value of the Wilcoxon statistical test showed that there was a significant difference in the average motor development before and after being given the baby gym application intervention to mothers (p-value = 0.000).

Table 4 also shows that in the control group there was an increase before and after being given the baby gym guide with a mean difference of 0.24. This value also indicates that there is an increase in the average motor development before and after the study. However, the increase in motor skills was higher in the intervention group which was given the baby gym application to mothers compared to the control group which was given baby gym guidelines.

Table 5.
The Effect of Using the Baby Gym Application on Infant Motoric Development in the Intervention and Control Groups at Regional Health Centers South Tangerang City in 2022

Variable	Group	Mean	SD	Mean Rank	P value*
Motor Development	Intervention	11.30	0.72	47.45	0.000
	Control	9.03	1.21	19.55	

Based on table 5, shows that the average motor ability of infants in the intervention group after being given the baby gym application to mothers was greater, namely 11.30 with a variation value of 0.72 than the average motor ability in the control group after being given baby gym guidelines, namely 9.03 with a variation of 1.21.

The results of the analysis using Mann Whitney found that there was a significant effect of using the baby gym application on the motor development of infants in the intervention group compared to the control group with a value of p = 0.000 (p <0.005).

Table 5.6
Final Model Effect of Using the Baby Gym Application on Infant Motoric Development in the

Intervention and Control Groups at the Health Center
South Tangerang City Region in 2022

Variable	B	SE	Wald	p-value*	Exp (B)	95%CI
Aplikasi Baby Gym	2.704	0.623	18.815	**0.000**	14.933	4.402-50.664
Konstanta	0.981	0.391	6.297`	0.012	0.375	

Based on the final multivariate model, there is no effect of the characteristics of the mother and baby on the baby's motor development. It can be concluded that there is an increase in infant motor development purely due to the influence of the Android-based baby gym application intervention.

The results of this study explain that there is an effect of using the baby gym application on the baby's motor development. These results are by research conducted (İnal & Yıldız, 2012) that healthy babies born at term who received baby gymnastic actions had more significant mental motor development compared to those who were not given action.

Research conducted (Mildiana & Eka, 2019) with the result that there is an effect of baby exercise on increasing developmental delays for babies aged 3-6 months, there is a significant difference in the increase in babies who do exercise than those who do not.

The results of research on the effect of baby gyms on the development of infants aged 6 months, especially gross motor skills, are almost the same as research conducted by (Jing et al., 2007) which states that giving massage and movement exercises can improve the physical development and intelligence of babies starting from infancy. birth to a 6-month-old baby with p=0.010 for body weight index. Development is an increase in skill ability in the structure and function of the body in patterns as a result of the maturation process (Siti Aulia, 2018).

This study is by (Febriyanti et al., 2020) which states that there are differences in the values of fine motor and gross motor development after being trained in gymnastics in different groups with gross motor skills

having a p-value of 0.000, while fine motor skills having a p-value of 0.000.

Baby gym is a form of stimulation/stimulation that aims to optimize children's motoric growth and development (Purwanti, 2016) Baby gym is a physical exercise that has special characteristics and rules, namely movements are always made to achieve certain goals, and the movements are always structured and systematic. Gymnastics also helps improve blood circulation which causes the supply of oxygen throughout the body to be regular and has an impact on muscle development, increased cell growth, more optimal coordination, and balance and alertness, so that gross motor development is more optimal or appropriate.

Conclusion

The conclusion of this study found an increase in the average motor development before and after the intervention. the increase in motor skills was higher in the intervention group which was given the baby gym application to mothers compared to the control group which was given baby gym guidelines. So that there is an effect of using the baby gym application on the baby's motor development.

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