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# **The Influence of Baby Gymnastic and Baby Massage on Baby Motor Development Aged 3-6 Months in Posyandu Kapasa**

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## **Abstract**

This study aimed to determine the effect of baby gymnastics and baby massage on changes in motor development of infants aged 3-6 months at the Posyandu (Integrated Health Post) Kapasa Makassar. This study was a field experiment research involving treatment variables namely baby gymnastics and baby massage, while the response (dependent) variable was the development of infant motor skills. The research design was the Quasy experiment using pretest-post test of two group design. The study population were infants aged 3 - 6 months in the Posyandu Kapasa Makassar, while the samples were infants aged 3 - 6 months in the Posyandu Kapasa Makassar which numbered 20 subjects, selected with random sampling technique and then divided into 2 (two) groups, one group as the treatment consist of 10 subjects and one control group also consist of 10 subjects. This study used a Denver Development Screening Test (DDST) for evaluating motor development and measured before and after administration of intervention. The interventions performed 3 times a week for 2 months. The result showed that by giving baby gymnastics and baby massage results in increased motor skills of infants aged 3 - 6 months at the Posyandu Kapasa Makassar. It is recommended for mothers to give baby gymnastics and baby massage to their babies to improve motor development of infants aged 3-6 months.

**Keywords:** Infant gymnastics; Infant massage; Infant motor development.

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## **1. Introduction**

A person's growth includes the growth of body's physical size, and development is more directed at cell differentiation and maturation [1]. There are still many children under five who are found during growth and development experience delays that caused by a lack of fulfillment human needs of children, including the need to play. Many parents don't know about child development. This matter which is related to child growth is only known by health workers [2]. Growth and development occur synchronously in each individual and depend on the mother's stimulation actions which have a great influence on growth and development, especially on the gross motoric development of the child. Impact if less stimulation can lead to growth disorders, especially gross motor development such as when babies are between 8-12 months old, babies have not been able to sit without grip, stand with a handle, get up and stand, stand two seconds and have not been able to stand [3]. Childhood is a golden age for children. In this period, experienced extraordinary growth and development, both in terms of physical, emotional, cognitive and psychosocial. Development is all changes that occur in children, in terms of cognitive, psychosocial and motoric. The mother's stimulation action is very influential with the growth and development of children. The role of health workers is also needed to reduce the frequency of gross motor disorders in children by conducting health promotion using direct counseling to mothers who have babies. Health workers also conduct direct checks to get a real image of developmental events gross motoric behavior in children of infant age because if the child is not given stimulatory action it will affect their growth and development. One form of stimulation given to improve a baby's motor development is baby gymnastics. Baby gymnastics can also be given to babies aged 3-6 months [4]. The benefits of baby gymnastics have been studied by a number of studies, such as the Harvard Pre School Project (under the leadership of Buton I., White), University of Chicago (under the leadership of Benjamin S. Bobom), Maternal and Child Health institutions in Tsjechoslowakie (by Jaroslav Koch), and Suzy Pudden studio's in New York City. The study showed that babies who do gymnastics could speak faster, had better appetite, slept better and the process of development of their movements was faster than those who do not take exercise [5]. In addition to baby gymnastics, other form of stimulation such as baby massage also need to be given. Baby massage helps the baby's digestion, makes the baby consume breast milk better, petrify the child's physiological and emotional development. Babies who are massaged regularly are less likely to experience health problems. Regular baby massage has a positive effect on the baby's physical growth such as improvement in physical and mental growth [6]. Today's research in Australia was revealed by Lana Kristiane F. Flores proving that babies who are massaged by their parents would have a tendency to increase body weight, emotional and social relationships better [7]. However, medical science about infant massage has not been widely known by the public [8]. Based on the observations data carried out at the Posyandu Kapasa in February 2018 of 43 babies there were 20 of them aged 3-6 months. The researcher are interested in examining whether there is an effect of giving baby gymnastics and infant massage to changes in motoric development of infants aged 3 - 6 months there.

## **2. Materials and Methods**

### **2.1. Description of the Study Area**

This research was conducted at Posyandu Kapasa Makassar for two months, starting in July-August 2018 by selecting 40 babies aged 3-6 months were born by normal labor. Data is processed and analyzed based on

research objectives. The analysis results were presented using table equipped with table description.

Data Collection Instrument consist of secondary data pre test and post test, table of normal baby growth and motor growth/Denver pre test and post test, and table of motor growth test. The data obtained were analyzed using the normality test followed by the effect test. Processing and analyzing data using SPSS, then presented in tables and narratives.

## **2.2. Population and Sample**

The research population was 43 babies who routinely came to Posyandu Kapasa. Study samples were 40 infants aged 3 - 6 months whose mothers agreed to be respondents and wanted to massage their babies. The number of subjects participated in this study was 40 babies, 20 subjects treated with gymnastic and baby massage giving for 8 weeks with 24 treatments and 20 subjects as control group without any intervention. The instrument used in data collection is DDST to measure baby's motor development of each respondent before and after treatment.

## **2.3. Inclusion Criteria**

The inclusion criteria were ages 3-6 months, babies in good health, the baby's mother agreed to be a respondent and her child wants to be massaged.

## **2.4. Exclusion Criteria**

The exclusion criteria was premature babies

## **2.5. Collecting Data and Procedure Intervention**

The researcher makes a letter of approval, and the respondent must sign the contents of the report that the respondent is willing to be a sample of this research until the end of the research. Data collection by researcher by measuring baby motor development using Denver Development Screening Test (DDST).

## **2.6. Data Analysis**

The collected data is analyzed using the analysis of the wilcoxon test that performed computerized.

## **2.7. Ethical consideration and clearance**

Ethical approval for this study was obtained from the Ethics Committee, Health Polytechnic of Ministry of Health in Makassar, Indonesia.

## **3. Results**

This research is a quasi-experimental study conducted to determine the effect of baby gymnastics and massage on changes in motoric development of infants aged 3-6 bulan at Posyandu Kapasa Makassar using subjects were

infants aged 3-6 months who meet the inclusion criteria in this study. Aged distribution of infants at Posyandu Kapasa most of them at age 4 months was 20 subjects (50,0%) while the age of both 3 months and 5 months each was 10 subjects (25,0%). Sex distribution of subjects consist of 17 subjects are male (42,5%), and 23 subjects are female.

**Table 1:** Distribution of infant motor development in the treatment and control group at the Posyandu Kapasa Makassar in July 2018

Motor development	Treatment		Control	
	f	%	f	%
Pretest				
Late	4	20,0	4	20,0
Normal	16	80,0	16	80,0
Posttest				
Late	-	-	2	10,0
Normal	13	65,0	18	90,0
Advanced	7	35,0	-	-

Table 1 shows that in the treatment group at pre test, 4 subjects (20%) had late motor development and 16 subjects (80,0%) had normal motor development and at the post test, 13 subjects (65,0%) had normal motor development and 7 subjects (35,0%) had advanced motor development. Another results showed in the control group. At the pre test, 4 subjects (20,0%) had late motor development and 16 subjects (80,0%) had normal motor development and at the post test, 2 subjects (10,0%) had late motor development and 18 subjects (90,0%) had normal motor development. The results showed that in the treatment group, mean of motor development pre test 1,80 ( $\pm 0,41$ ) and post test 2,35 ( $\pm 0,48$ ) while in the control group mean of motor development pre test 1,80 ( $\pm 0,41$ ) and post test 1,90 ( $\pm 0,30$ ). Changes in mean malues obtained showed an increase in motor development after baby had treated by gymnastics and infant massage. This results give an information that giving exercise and baby massage result in increased motor development in infants aged 3-6 months.

**Table 2:** The results of Wilcoxon test analysis both in the treatment and controlled group

Condition	N	Mean	SD	Different Mean	Ranks			p
					- Ranks	+ Ranks	Ties	
Treatment group								
Pre test	20	1,80	2,117	0,55	0	11	9	0,001
Post test	20	2,35	2,141					
Controlled group								
Pre test	20	1,80	0,4104	0,10	0	2	18	0,000
Post test	20	1,90	0,3078					

The Table 2 above showed the results of the Wilcoxon Test which consists of Ranks and Z scores. Based on

rank values, 11 subjects were positive for ranks and 9 subjects were ties, it means that 11 subjects experienced increased in motor development after being given gymnastics and infant massage. The results analysis showed mean difference value was 0.55 ( $p=0,001<0.05$ ), which statistically meant that there was a significant difference in motor development before and after baby being given treatment. This result showed that giving gymnastics and baby massage can have a significant effect on increasing motor development of infants aged 3-6 months. In the controlled group, 2 subjects were positive for ranks and 18 subjects were ties, it means that 2 subjects experienced increased in motor development. The results analysis showed mean difference value was 0.10 ( $p=0,000<0.05$ ).

**Table 3:** The results of u mann whitney test

Group	N	Mean	Different Mean	Ranks			p
				- Ranks	+ Ranks	Ties	
Treatment	20	0,55	0,50	0	13	17	0,000
Controlled	20	0,10		0	2	18	

Table 3 showed analysis results of t independent test the differences between treatment and controlled group  $p=0,000<0,05$  stated that there was an influence of giving gymnastic and baby massage on motoric development changed on baby aged 3-6 months. Subjects in the treatment group showed increase higher (mean=0,55) than in the controlled group (mean=0,10).

#### 4. Discussion

In general, baby motor development needs special attention. This needs should be met thus children can develop well as expected. There are many factors considered because it affects the mastery of motor skills in children. In addition to the maturity factors of the body, things that are not less important are the exercise and experience factors. In this study showed that giving 6 times gymnastics was more effective in gross motor development of infants aged 3-6 months compared to 3 times gymnastics. Theoretically, this is caused by the provision of gymnastics that will continuously provide an adaptation effect on the innervation system. Where there is an increase in the number of dendritic branches and an increase in greater complexity in the V neuron layer compared to giving 3 times the gymnastics and through gradual and continuous movements will stimulate the cerebral homunculus, which is the part of the brain that acts as the center of movement of the muscles and body balance can optimize a baby's gross motor development. According to Adriana (2011) that babies who take baby gymnastics generally have more optimal motor development than babies who have never beed performed baby gymnastics [9]. This is in accordance with Irawati's (2006) study that babies aged 4 months and above were given a gymnastic program had faster motor development without medical indications [5]. Babies become more confident, more active, better socialization than children of their age. Infants aged 4-12 months who do gymnastics, will be able to stimulate the pituitary gland to increase the release of somatotropin hormone (Growth Hormone), causing bone growth to become faster, therefore gross motor development is in accordance with age. Baby gymnastics also helps improve blood circulation, causing oxygen forces throughout the body

become regular, stimulating muscle development and cell growth, cause gross motor development is in accordance with baby age. According to Notoatmojo (2010) an increase in one's knowledge can be derived from information gained of people who are considered important [10]. Level of one's knowledge consists of knowing, understanding, application, analyzing, synthesizing and evaluating. The results of this study are in line with Saleh's research which concluded that health education with a modeling approach was effective in increasing knowledge, practical ability, mother's confidence in breastfeeding and stimulating babies [11]. Premkumar explained that there was a relationship between stimulation such as baby gymnastics in stimulating the growth and development of babies according to age. Stimulation given to babies is used to introduce a new information in the form of movements or various positions, then stimulate the sensory of joints in the body which means that the message has been received and perceived by the brain. Repeated stimulation is a learning process to produce a skills, habits and gross motor maturity needed to stand up, walk and hence ready for the next phase [12]. Stimulation of baby gymnastics and baby massage can help babies practice gross motor movements according to their age. Babies are given stimulation with gymnastics in which there are repetitive movements, so the neural network in the brain becomes aroused, organized and continues to grow. Movements in gymnastics help simultaneously coordinate the use of both eyes, both ears, both hands and both legs. Baby gymnastics and baby massage should make mothers and children happy to do it. For children, the body itself is a natural playground tool. The child first observes and plays with his hand, then with his legs and then put everything into the mouth, the goal is that the child is able to reach his body better and thus the child learns to understand the situation [13].

## **5. Limitation of The Study**

The factors that influence baby motor development in this study are only baby gymnastics and infant massage, while there are many other factors that affect baby motor development such as nutrition, and stimulation provided by parents.

## **6. Conclusions**

The researcher concluded that there was an effect of giving gymnastics and baby massage in increasing motor development of baby aged 3-6 months. This can be seen in the data obtained from the beginning before and after the baby massage and baby gymnastics is carried out. The treatment group experienced an increase in infant motor skills more than the control group. This research is expected to be a reference for health workers in promoting and providing health services by performing baby gymnastics and baby massage at the posyandu thus children's growth becomes more optimal and the parents understand the importance of baby massage for children's motor development.

## **7. Abbreviations**

DDST: Denver Development Screening Test.

## **8. Competing interest**

The authors declare that they have no competing interest.

## **9. Recommendation**

Based on the results of this study, it is recommended to add baby gymnastic and baby massage in increasing motor development of baby aged 3-6 months.

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