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Effectiveness of Physical Activity and Android-based SDIDTK Application on Motor Development of Preschool Children

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ABSTRACT

Introduction: A developmental process always accompanies a child's growth. Children whose growth is good will experience good development as well. Pre-school children begin to be taught activities related to academics, namely recognising letters and numbers, counting, memorising prayers and songs, writing and even reading. These academic abilities must be based on the readiness or maturity of the child's development of gross motor, fine motor, observation, speech and social. To make pre-school children become children who are ready at the next level of education, it is necessary to stimulate proper development by training many children to do physical activities. And to detect children's development, there needs to be an instrument that is fast, easy and precise, one of which is the SDIDTK application based on android. Research objective to determine the effectiveness of physical activity and SDIDTK application based on android on the motor development of PAUD children. **Methods**: experimental with a total sample of 50 people divided into control and treatment groups. **Results**: The group that was given physical activity treatment and SDIDTK measurement assistance based on android to parents had better motor development than the control group. **Conclusion**: physical activity is beneficial for children to improve motor development.

Keywords: *Physiotherapy, Physical Activity, Children, SDIDTK Application, Development*

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INTRODUCTION

In today's technological era, everyone uses *gadgets* in carrying out their activities, both parents and children. *Gadgets* are used as a means of supporting work, study or entertainment activities. A survey of parents in Indonesia states that 90% of children aged 4-6 years use gadgets, and 26% of children show signs of gadget addiction according to their parents. The data also states that 28% of children aged 4-6 years use smartphones or tablets for educational purposes, 22% for playing games, and 50% for education and games, with an average use per day of 62 minutes (Ardiyani et al., 2021).

The reduction in children's activities outside the home due to exposure to gadget technology has led to reduced physical activity (Nasiri et al., 2023) . Children prefer to do activities by sitting or lying down while playing mobile phones or watching television. In addition, there is no child-friendly spark or lack of children's play facilities in Malingping village, Lebak Banten, causing children to be more interested in playing at home with their gadgets. The imbalance of gadget use with physical activity in children causes problems in child development, especially children's gross motor development due to the lack of active children in moving (Weiss, 2020).

Disorders in children's motor development will hinder children's ability to carry out the learning process such as focusing on paying attention to the teacher, copying writing to the ability to memorise (Pate et al., 2019).

In addition, children's gross motor development is also influenced by family parenting, the environment, and early stimulation (David et al., 2024) . Early detection of child development will detect developmental disorders experienced by children so that appropriate stimulation can be carried out (Moghaddaszadeh & Belcastro, 2021). Early detection skills must be possessed by parents and posyandu cadres. Early detection skills are carried out using easy, effective and efficient instruments such as the android-based SDIDTK application.

Training - training to improve community knowledge and skills needs to be carried out evenly to the deepest areas. Communities need to receive training related to examining children's growth and development so that people are aware of any growth or developmental disorders in their children, so that stunting can be overcome early (Purwati et al., 2019).

The android-based SDIDTK application is here to provide convenience in the implementation of stimulation, detection and early intervention of growth and development through the palm of the hand. Armed with the internet, people can easily enter child data and then check growth and development according to the instructions on the mobile phone screen.

Stimulation, Detection, Early Intervention of Growth and Development (SDIDTK) is a series of processes that must be carried out to monitor the growth and development of children (Saurina, 2016). The targets of this programme consist of direct targets, namely children 0 - 5 years and pre-school children aged 5 - 6 years. And the indirect target is posyandu cadres.

Stimulation activities are very important to optimise the functions of organs both physical, mental, emotional and social (Khayati et al., 2023). Early detection activities to determine growth and development deviations that are not in accordance with normal conditions as early as possible and intervention activities are activities to correct, correct and overcome problems or deviations. The general objective of SDIDTK is that all toddlers aged 0 - 5 years and preschool children aged 5 - 6 years receive stimulation, detection and early intervention services for growth and development so that they grow and develop optimally according to their potential (Ariani et al., 2022).

One of the stimulations that can help in the development of children is physical activity performed by children (Thufailah et al., 2010). According to the World Health Organization (WHO) physical activity is a body movement produced by skeletal muscles and requires a lot of energy. In addition, physical activity includes doing household chores, activities during play, and recreation (Bidzan-Bluma & Lipowska, 2018).

Physical activity is different from sports, physical activity activities that are often carried out by the community such as gardening, cleaning the house, walking, dancing, and others are included in physical activity (Bachtiar et al., 2020) . Sport or physical exercise is a physical activity that is planned, continuous and repetitive and aims to improve physical fitness (Gondhowiardjo, 2019).

Based on the 2020 physical activity guidelines from the World Health Organization (WHO) physical activity for children and adolescents aged 5-17 years is done for an average of 60 minutes a day with moderate to vigorous intensity every day, which is proven to have improved physical, mental, and cognitive health outcomes (Bull et al., 2020).

From this background, the researcher wanted to assess the effectiveness of physical activities and the android-based SDIDTK application on the motor development of PAUD children in the Lebak - Banten.

METHODS

The research design was Non Equivalent Control Group Design which placed the research subjects into two groups, namely the experimental group and the control group to analyse the effectiveness of physical activity and android-based SDIDTK application on the motor development of PAUD children in Malingping village, Lebak - Banten. This study has obtained ethical approval from the UPNVJ Research Ethics Commission with number 293/VI/2024/KEP.

In this study, the effect of treatment was calculated through the difference in gain (T2-T1) between the experimental and control groups.

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Table 1. Table of Gain Differences between Groups

Group	Pretest	Treatment	Post test
Experiment	T1	X	T2
Control	T1	-	T2

Description:
T1 = Pre-test (initial test) before treatment is given
T2 = Post-test (final test) after the treatment is given
X = Treatment of the experimental class, namely with the physical activity approach and the android-based SDIDTK application

Based on the design above, this study was conducted in two groups, namely the experimental group that was given physical activity and SDIDTK application and the control group that was not given physical activity and SDIDTK application.

The research sample was obtained by random sampling to obtain PAUD D with 25 children as the control group and PAUD H with 25 children as the treatment group. Both groups met the following criteria:

Inclusion criteria; Age 3-6 years, male or female gender. Exclusion criteria; Upper/lower extremity injuries or other movement disorders, nervous system disorders, children with mental retardation, children with visual and hearing impairments

RESULTS

From this study, information was obtained regarding the results of the research that had been carried out. Research conducted at PAUD Mathlaul Anwar Malingping with a total sample of 50 people divided into 25 people in the control group and 25 people in the treatment group obtained the following results.

Table 2. Subject Characteristics by Gender and Age

Subject Characteristics	Frequency (n)	Percentage (%)
Gender		
Male	23	46
Women	27	54
Age		
36 - 48 months	2	4
49 - 60 months	21	42
61 - 72 months	27	54

Table 2 shows that there were 54% of the sample who were female. And the sample aged 61 - 72 months or equivalent to 5-6 years old is more, namely 54%.

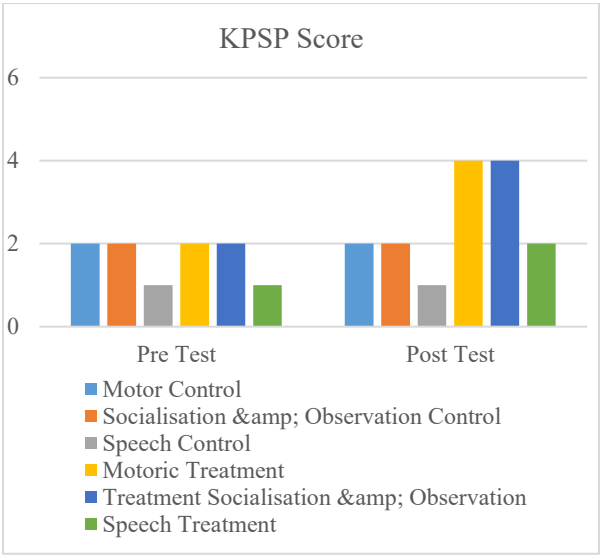

Figure 1. KPSP score

Figure 1 provides information on KPSP scores for all developments (motor, speech and social & observation) in both research groups, namely the control group and the treatment group. In the pre-treatment measurement, the KPSP score data for the control group was the same as the treatment group. After three months of routine physical activity for 60 minutes every day, the treatment group had more KPSP scores than the control group.

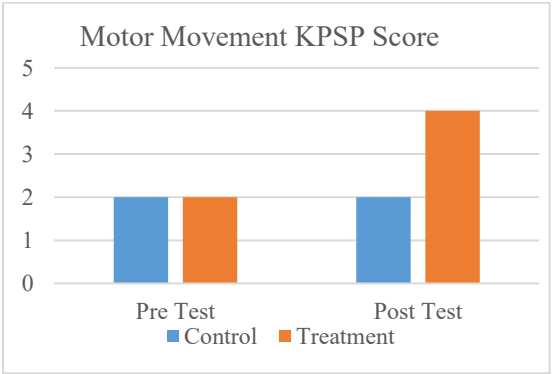

Figure 2. Motor Development

Figure 2 shows the KPSP score for motor movements in both control and treatment groups.

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In the pre-treatment measurement, the KPSP score for the control group was the same as the treatment group, namely 2. After three months of routine physical activity for 60 minutes every day, the treatment group had a higher KPSP score of 4 than the control group, which still received a score of 2.

DISCUSSION

The provision of physical activities and assistance in measuring child development using the android-based SDIDTK application proved effective in improving motor development in PAUD children in Lebak Banten.

In the research data before treatment, the KPSP score for the control group was the same as the treatment group. After three months of routine physical activity for 60 minutes every day, the treatment group had more KPSP scores than the control group. This is in line with previous research entitled "The effect of physical activity on motor skills and physical fitness of students" by Yoga Durista et al. which explains that there is a positive relationship between physical activity and students' motor skills (Yoga et al., 2023).

In addition, the treatment in the form of physical activity every day for 60 minutes given to the treatment group proved effective. This is in line with a study entitled "Physical activity and health in children under 6 years of age" by Pate Russel et al. which states that the more complex a given stimulus will increase neural activity thereby improving the quality of children's health including children's motor development (Pate et al., 2019).

The physical activity treatment given in this study was a motor game such as running, jumping, balance training and coordination training. From this study, it was found that the motor skills of children in the treatment group were higher than the control group, this is in line with research which reveals that physical activities carried out with mild intensity on a regular basis will increase synaptogenesis and angiogenesis so that it will improve the development of children's cognition including motor development (Kolehmainen et al., 2023).

In addition, previous research also explains that physical activity helps the delivery of oxygen and nutrients into the brain so that it will help the maturation of brain nerve cells that are useful for the process of child development (Petersen et al., 2020).Previous research also suggests that 60 minutes of physical activity per week for 6 weeks in children improves motor development (Mcdonough et al., 2020).

In addition, motor skills were also greater in the treatment group that was given android-based SDIDTK assistance to parents than the control group. This is in line with research which explains that skills education for parents can improve children's quality of life (Lobelo et al., 2020). Parents can be more aware of their children's developmental conditions so that parents can stimulate their children towards normal development (Setiawan et al., 2020).

Previous research also explains that SDIDTK assistance provided to parents and teachers increases parents' and teachers' awareness of child development outcomes so that they look for ways to stimulate their children to achieve age-appropriate development (Windiyani et al., 2023).

CONCLUSION

The group that was treated with physical activity and given the SDIDTK approach to parents had improved motor development than the control group.

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