

## **Contribution of Physical Fitness on Academic Achievement: A Comparison Between Preschool Based and Non-Preschool Based Elementary School Pupils**

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### **Abstract**

Keywords: physical fitness, academic achievement, preschool based, non-preschool based

The purpose of this study was to determine the level of physical fitness of preschool based and non-preschool based grade-1 elementary school pupils, and the contribution of physical fitness on their academic achievement –in particular mathematics-, at both the beginning and the end of the first semester. An Ex-Post Facto method was conducted, involving 40 male and female grade-1 pupils from three elementary schools. Two instruments (TKJI/ Indonesia Physical Fitness Test and TKA/.Academic Achievement Test) were used to collect data. A questionnaire was also distributed in order to obtain important additional information from the parents' perspective. The results supported the predictions of significant differences on physical fitness levels and academic achievement between preschool based and non-preschool based in grade-1 elementary school pupils at the beginning of the first semester. Respectively, the preschool based pupils possessed better fitness levels and scored better in mathematics, the latter also found at the end of the first semester. In addition, at the end of the first semester no significant differences were found on fitness levels between the two groups.

It is concluded from this study that preschool education plays a significant role in support of attaining better academic achievements on part of the pupils. Further, increases in physical fitness levels on part of the non-preschool based pupils do not contribute to their academic achievements. Based on the results of this study, it is recommended that preschools should increase the quality of their programs/curriculum in order to establish better quality assurance of their graduates. In addition, it is highly recommended for children to have preschool education prior to entering elementary school education.

### **1. Introduction**

Children will grow and develop into maturity through education only; in other words it is only education which can determine how well a child can become a mature and responsible person (Immanuel Kant, 1940; cited in Henderson, 1947). Moreover, Rusli Lutan et al. (1997) views education as deliberate actions toward a child in order for him or her to reach maturity. More specifically, Henderson (1947) stressed the importance of education to assist young people in searching for a philosophy of life.

It is a fact that the financial cost of education increases by the year, whereas education is a primary necessity to be carried out in a person's life. The high cost of education is felt at all levels of education, including the preschool level. Due to this situation, a great deal of parents from economically lower class families are not able to afford preschool education for their children.. This unfortunate situation, however, may be regarded as an imbalance in the children s' right for obtaining proper education prior to entering elementary education. Consequently, preschool based children have more access to curriculum-based structured physical activities (physical education) compared to non-preschool based children. The latter are practicing physical activities by relying only on their initiatives and the opportunity they might have.

Most of grade-1 elementary school pupils, particularly in schools located at the suburbs and regencies, are non-preschool based pupils. An overview of elementary schools in the city, suburbs, and regencies of Bandung, each showing the percentage of preschool based and non-preschool based pupils is shown in Table 1.

Table 1

Proportion of Preschool Based and Non-Preschool Based Pupils at Elementary Schools in the City, Suburbs, and Regencies of Bandung

Area	Name of School	Percentage of Pupils	
		Preschool Based	Non-Preschool Based
	Banjarsari	100	0
	Sabang	100	0
City	Soka	95	5
	Kartika	95	5
	Taruna Bhakti	100	0
	Padasuka	70	30
Suburbs	Cikutra 1	84	16
	Cikutra 2	55	45
Border of	Cikutra 3	69	31
	Sadang Serang	71	29
Regencies	Pasirayung	68	32
	Cimenyan	5	95
Regencies	Pasirluhur	10	90
	Sukarahayu	0	100

It is widely believed that physical education contributed positively to academic achievements. Rusli Lutan (2001) clarified that physical activities are significant means to develop and enhance understanding and mastery of academic concepts. He clearly stated that movement activities experienced by the child through physical education may increase the child's learning capacity. Moreover, he pointed out that through structured movement tasks and play in physical education classes, the teacher will be able to teach and implement many academic concepts to the students, for example in regard to understanding mathematical concepts. Similarly, Renstrom & Roux (1988; cited in Santosa Giriwijoyo, 2003) put forward evidence of better academic results achieved by adolescents who actively participated in sport. Additional research data from the Center for Curriculum in 1999 shows that the highest percentage of elementary school pupils not promoted to the next level were students in Grade-1 (10.35%) compared to pupils in other grades. It further appeared that those grade-1 pupils were the unfortunate non-preschool based pupils. All of the authors' statements and research evidence point out to one conclusion in that physical education and sporting activities are most important factors in the continuous growth and development process of all children. Physical education and sport can be considered as the only significant method to foster and maintain the physical fitness level of a person. A certain significant level of physical fitness is important for a person to accomplish daily tasks and duties without fatigue. In regard to students, a good fitness level is needed to positively support their accomplishment of academic tasks and duties.

However, more research is needed to more justify the contribution of physical fitness on academic achievement, in particular comparing its contribution between preschool based and

non-preschool based elementary school pupils. Moreover, the universal issue in that physical education is still kept at a margin demands more aggressive ways to convince potential policy/decision makers at the government level, by way of producing significant research evidence in similar related areas regarding positive contributions of physical education and sport to many aspects of life.

Thus, the primary purposes of this study were to determine physical fitness levels of preschool based and non-preschool based grade-1 elementary school pupils at both the beginning and the end of the first semester, and to determine its contribution on the pupils' academic - particularly their mathematics subject- achievements.

## 2. Method

An Ex Post-Facto method (Sudjana & Ibrahim, 2001) was conducted for this study. The implementation of physical education, both at preschool and during the first semester of grade-1 elementary school were considered the independent variables. The dependent variables were the physical fitness level and the level of academic achievement (mathematics) at the beginning and at the end of the first semester in grade-1.

Participants who took part in this study consisted of a total of 40 male and female grade-1, first semester elementary school pupils. A detailed description of the population and sample size is listed in Table 2.

Table 2

Description of the Population and Study Participants

Name of School	Population			Participants					
	Total of Pupils	Preschool	Non-Preschool	Preschool			Non-Preschool		
				M	F	Tot.	M	F	Tot.
Cikutra 1	38	32	6	5	3	8	-	3	3
Cikutra 2	40	22	18	3	2	5	4	6	10
Cikutra 3	39	27	12	5	2	7	3	4	7
<b>Total</b>	<b>117</b>	<b>81</b>	<b>36</b>	<b>13</b>	<b>7</b>	<b>20</b>	<b>7</b>	<b>13</b>	<b>20</b>

Two categories of instruments were used to collect data. The primary instrument is called Indonesia Physical Fitness Test, a validated revised edition of the *Tes Kesegaran Jasmani Indonesia* – TKJI (Center of Physical Fitness and Recreation, the Department of National Education, 1999), particularly suited for 6 to 9 years old elementary school children. This test consists of five test items: 30 meters sprint, bend-elbow hang, 30 seconds sit-ups, vertical jump, and 600 meters run. The academic achievement test (in mathematics) used for this study was conducted only at the end of the semester.

## 3. Results and Discussion

Results of the t-test on the level of physical fitness and academic achievement at the beginning of the first semester is shown in Table 3.

Table 3

t-Test Results on the Level of Physical Fitness and Academic Achievement of the Preschool Based and Non-Preschool Based Groups

Component	Group	t	t-table	Significancy
Physical Fitness	a. Preschool Based	1.77	1.68	Significant
	b. Non-Preschool Based			
Academic Achievement	a. Preschool Based	2.27	1.68	Significant
	b. Non-Preschool Based			

Results of the correlation test at the beginning of the first semester is shown in Table 4.

Table 4

Correlations Between the Level of Physical Fitness and Academic Achievement of the Preschool Based and Non-Preschool Based Groups

Component	Group	r	r <sup>2</sup>	Significancy
Physical Fitness Academic Achievement	Preschool	0.24	0.06	6% Contribution
Physical Fitness Academic Achievement	Non-Preschool	-0.18	-0.36	No Contribution

Results of the t-test on the level of physical fitness and academic achievement (mathematics) at the end of the first semester is shown in Table 5.

Table 5

t-Test Results on the Level of Physical Fitness and Academic Achievement (Mathematics) of the Preschool Based and Non-Preschool Based Groups

Component	Group	t	t-table	Significancy
Physical Fitness	a. Preschool Based	0.15	1.68	Not Significant
	b. Non-Preschool Based			
Mathematics	a. Preschool Based	1.97	1.68	Significant
	b. Non-Preschool Based			

Results of the correlation test at the end of the first semester is shown in Table 6.

Table 6

Correlations Between the Level of Physical Fitness and Academic Achievement  
(Mathematics) of the Preschool Based and Non-Preschool Based Groups

Components	Group	r	r <sup>2</sup>	Significancy
Physical Fitness & Mathematics	a. Preschool Based	0.31	0.10	10%
	b. Non-Preschool Based	-0.20	-	-

Additional information regarding the parents' perspective which was obtained from the questionnaire is shown in Table 7. Information concerns the parents' perspective on motor habits/ behavior of their children in daily life.

Table 7

Percentage of Motor Habits/ Behaviors of Preschool Based  
and Non-Preschool Based Children

Daily Life Activities	Preschool Based	Non-Preschool Based
	%	%
a. Walking to school	80	55
b. Helping parents	28	6
c. Bicycling prior to school	6	15
d. Bicycling after school	28	30
e. Playing soccer after school	6	20
Total	148	126
Average	29.6	25.2

In general, increases in physical fitness and academic ability levels of the two groups (preschool based and non-preschool based) were indicated at the end of the first semester. Moreover, there was a 6% contribution of physical fitness on academic achievement at the beginning of the first semester and increased to 10% at the end of the semester, particularly in mathematics.

Results also showed significant differences in physical fitness levels between the preschool based and non-preschool based groups at the beginning of the first semester; whereas at the end of the semester, no significant differences in fitness levels were detected between the two groups.

Regarding academic achievement levels, results further showed significant differences between the two groups at the beginning of the first semester. Particularly, children in the preschool based group showed better improvements in their academic abilities compared to the non-preschool based group. Similarly, significantly better academic improvements of the preschool based children were also detected at the end of the first semester.

#### 4. Conclusion

It can be concluded from the results of this study in that preschool education is very important for children before entering elementary education. By so doing, a child becomes physically, mentally, and socially prepared to continue further in higher levels of education.

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