

# The Nutritional Status Based on Anthropometry and Interest in Learning Physical Education to the Level of Physical Fitness

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**Abstract**—The purpose of the research was to design comfortable tables and chairs for learning and gathering students in campus. The method used were anthropometry and percentiles to design tables and chairs. Statistical tests were used to process anthropometric data, including data adequacy tests, data uniformity tests, data normality test with Kolmogorov-Smirnov, Excel software for statistical test calculations, and SPSS software for Kolmogorov-Smirnov normality test simulation. The results obtained were the dimensions used by the hand range, elbow height, hand range, popliteal height, and popliteal buttocks. Adequacy tests showed that the data of all identified dimensions were sufficient; the test of uniformity of the data showed that one data for identified hand span dimensions was not uniform while data for other dimensions were uniform. Kolmogorov-Smirnov normality test for all dimensions of data was normally distributed. The conclusion is that the table was designed by using a percentile of 50% for hand span dimensions and percentile 95% for popliteal height dimensions and sitting elbow height. The chair was designed by using percentile 5% for popliteal height dimensions, percentile 50% for hand span dimensions, and percentile 95% for popliteal buttocks dimensions.

**Keywords:** *anthropometry, chair, design, percentile, table*

## I. INTRODUCTION

Physical fitness has a very important role in living everyday life, someone who has a good level of physical fitness will feel light in doing all activities without experiencing significant fatigue. It should be noted that physical fitness without being balanced with exercises and good food intake, there will be no significant influence on one's fitness condition. Therefore, it needs to be supported by exercises and foods that have good nutritional content that can make the body maintain physical fitness [1].

The child's nutrition can be seen from the nutritional status. Nutritional status of a child is closely related to food intake consumed both in quantity and quality [2]. Nutritional status can be illustrated through anthropometric calculations, this can be identified whether the child has poor nutritional status, normal nutritional status, or excess nutritional status. Can be clearly seen children with big, thin, fat, or short condition, with

the method of BMI (Body Mass Index) that is height and weight. Nutritional status can also be used as a benchmark for success in nutrition. In addition, nutritional status is a reference for assessing the health status of the balance between intake and nutritional needs of children. On the other hand, the lack of nutritional status in children caused by a lack of intake of the amount of nutritional needs can result in disruption of the growth of the child's anatomy and motor development.

Many of the research that searching the physical education and nutrition, but the authors have not found any research on nutritional status based on anthropometry and interest in learning of physical education to the level of physical fitness of the students. the other research that searching on the relationship of nutrition education with physical activity such as: Guerraa [3], Nijamkin [4], Jennifer [5], E. Pasini [6], while another study that examines motivations are: Chen [7], Prusik Katarzyna [8], all of them do not studied on motivation related to the nutritional status of students based on anthropometry tests but the relationship of motivation to physical learning activities based on BMI, It can be find out how far it contributed to students interest in learning physical fitness, from the previous those studies no one has tried to combine nutrition status based on anthropometry [9] and students interest in learning physical fitness [10].

## II. METHOD

This study uses associative quantitative methods, and correlational association techniques.

The dependent variable is Student Physical Fitness Level and the free variable is Nutritional Status Based on Anthropometry and Student Learning Interest.

In this study the sample was 35 male students of 47 students of fifth grade of Elementary School at SDN Cimahi Mandiri I, students are 10-12 years aged. 12 students are female students is not taken as sample.

Data Collection Techniques used:

- Find out the Physical Fitness of the students by Indonesian Physical Fitness Test (TKJI) [3]: sprint run

test 40 meters, pull up, sit up, vertical jump, and run a medium distance 600 meters,

- Body Mass Index (BMI) = (Weight (kg)) / (Height (m) x Height (m)) [4], and
- Questionnaires for students learning interest. In calculating the data analysis writer uses SPSS 23.0 program.

### III. RESULTS AND DISCUSSION

Data collected in this study are data on Nutritional Status test results based on anthropometry (X1), Physical Education Learning Interest (X2), and Physical Fitness Level (Y) data.

Nutritional Status Based on Anthropometry result by using IMT (Table 1) is:

TABLE I. STATISTICS OF NUTRITIONAL STATUS BASED ON ANTHROPOMETRY

N	Valid	35
	Missing	0
Mean		17.3557
Std. Error of Mean		.59716
Median		16.5000
Mode		14.60 <sup>a</sup>
Std. Deviation		3.53285
Variance		12.481
Range		16.00
Minimum		12.50
Maximum		28.50
Sum		607.45

Table 1 can be described Nutritional Status based on Anthropometry of fifth grade students at SD Cimahi Mandiri I, with a mean of 17.35, a median value of 16.5, a fashion value of 14.6 and a standard deviation of 3, 5 While the highest score is 28.5 and the lowest score is 12.5. From the test results it can be categorized the Body Mass Index of fifth grade students at SD Cimahi Mandiri I.

Furthermore, anthropometric test data using IMT formulas arranged in frequency distribution classified as Sturges formula, here is the Sturges formula:  $K = 1 + 3.3 \log N$ , range = maximum value - minimum value, and class length with formula = range / many classes. The calculation is presented in the table 2:

TABLE II. NUTRITIONAL STATUS BASED ON ANTHROPOMETRIC

No	Interval	Freq.	(%)	Category
1.	< 17	19	54%	Weight loss
2.	17.0 – 18.4	7	20%	deficiency is mild
3.	18.5 – 25.0	7	20%	Normal
4.	25.1 – 27.0	1	3%	Over Weight (light)
5.	> 27.0	1	3%	Over Weight (light)
	Sum	35	100%	

The category of Heavy Body Boundary Weakness is 19 students or 54%, Body Weight Loss of 7 students or 20%, Normal as many as 7 students or 20%, Overweight

Lightweight by 1 student or 3%, and weight gain is 1 student or 3% of the total sample, which is 35 students or 100%

The highest frequency in the Medium category of 16 students or 45%. Questionnaire of interest in learning are: Very High category as many as 3 students or 9%, High as many as 6 students or 17%, Low as many as 8 students or 23%, and Very Low as much as 2 students or 6% of the total sample is 35 students or 100%. Frequency of Interest in Learning shows on table 3:

TABLE III. FREQUENCY OF INTEREST IN LEARNING

No	Interval	Freq.	(%)	Category
1.	101,1 < X	3	9%	Very High
2.	94,8 - 101	6	17%	High
3.	88,5 - 94,7	16	45%	Medium
4.	82,2 - 88,4	8	23%	Low
5.	X ≤ 82,1	2	6%	Very Low
	Sum	35	100%	

Based on the physical fitness level data collected by researchers through TKJI or written evidence which is then included in several categories, it is known that the data taken from the 35 students has (Table 4):

TABLE IV. STATISTICS OF PHYSICAL FITNESS LEVEL

N	Valid	35
	Missing	0
Mean		14.8571
Std. Error of Mean		.52683
Median		14.0000
Mode		14.00
Std. Deviation		3.11677
Variance		9.714
Range		13.00
Minimum		9.00
Maximum		22.00
Sum		520.00

The medium category of 16 students or 46%, Good category Once as many as 1 student or 3%, Good as many as 6 students or 17%, While as many as 16 students or 46%, Less as many as 11 students or 31 %, and less as much as 1 student or 3% of the total sample, namely 35 students or 100%. For Physical Fitness Level has calculated on table 5:

### IV. DISCUSSION

In accordance with the purpose of the study, which is to design tables and chairs that are comfortable for learning and gathering students on campus, the percentile design must be determined first. Percentile is used to adjust the design dimensions with student dimensions. The percentile for each dimension is determined by the needs of students as users. Percentile of each dimension is seen in the recapitulation found in Table 5.

**TABLE V. PHYSICAL FITNESS LEVEL**

No	Interval	Freq.	(%)	Category
1.	22 – 25	1	3%	Very Good
2.	18 – 21	6	17%	Good
3.	14 – 17	16	46%	Medium
4.	10 – 13	11	31%	Low
5.	5 – 9	1	3%	Very Low
	Total	35	100%	

The last is students learning interest on physical education in on the table 6:

**TABLE VI. STUDENTS LEARNING INTEREST**

Model Summary				
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.360 <sup>a</sup>	.130	.104	2.95095
<sup>a</sup> . Predictors: (Constant), student interest on physical education				

In the calculation above shows the contribution of each predictor namely Nutritional Status Based on Anthropometry 20.7% and 36% Learning Outcomes Interest in Physical Fitness Level.

The condition of the child's nutrition can be seen from the nutritional status. Nutritional status of a child is closely related to food intake consumed both in quantity and quality [11]. Nutritional status can be illustrated through anthropometric calculations, this can be identified whether the child has poor nutritional status, normal nutritional status, or excess nutritional status. Can be clearly seen children with big, thin, fat, or short condition, with the method of BMI (Body Mass Index) that is height and weight. Nutritional status can also be used as a benchmark for success in fulfilling nutrition. Nutritional status is also a reference for assessing the health status of the balance between intake and nutritional needs of children. On the other hand, the lack of nutritional status in children caused by a lack of intake of the amount of nutritional needs can result in disruption of the growth of the child's anatomy and motor development. With a good nutritional status will be directly proportional to the level of one's physical fitness to be good which will indirectly increase productivity and quality of daily life [12]. In addition to good nutritional status, the learning environment one of which is the interest in teaching and learning can also support someone to improve their physical fitness [13], because the interest in increasing fitness levels will appear on their own.

From the results of the research, it turns out that nutritional status based on anthropometry and interest in learning to provide health education provide an effective contribution to the level of physical fitness of fifth grade students at SDN Cimahi Mandiri I. In this study the nutritional status based on anthropometry and the interest in learning of health education contributed 44.4% to the level of physical fitness of students.

The other uncontrolled factors in this study include physical activity and learning motivation:

1) *Food intake*: A person's intake of food will be meaningful to increase nutritional status. Nutritional status is a reference for assessing the health status of the balance between intake and nutritional needs of children [14]. On the other hand, the lack of nutritional status in children caused by a lack of intake of the amount of nutritional needs can result in disruption of the growth of the child's anatomy and motor development.

2) *Physical activity*: A person's physical activity will be meaningful if the quality and quantity are carried out regularly, measured and programmed. Only 2 hours of study time per week will certainly be lacking to improve students' physical fitness. Resting in bed for 3 weeks will reduce a person's physical fitness level automatically [15].

3) *Teaching learning motivation*: Every student has different characteristics. To be healthy which is characterized by a good level of fitness must be passed by having motivation in the individual, which means having perseverance to refrain from satisfaction and control impulses, and have a feeling of positive motivation [16], namely enthusiasm, passion, optimism and self-confidence so Physical education learning motivation in students greatly affects their physical fitness.

## V. CONCLUSIONS

Based on the results of the research from the data analysis and discussion that has been stated above, it can conclude can that there is no significant relationship between nutritional status based on anthropometry and physical fitness level of fifth grade students of SDN Cimahi Mandiri I. It was concluded based on the calculation of the correlation with the product moment which shows the correlation coefficient of 0.232 which when compared with the significance of 5% is as follows  $0.232 > 0.05$  so that  $H_01$  is accepted and  $H_{a1}$  is rejected. There is a significant relationship between interests in learning with physical fitness level of fifth grade students of SDN Cimahi Mandiri I. It was concluded based on the calculation of the correlation with the product moment which shows a correlation coefficient of 0.033 which when compared with the 5% significance is as follows  $0.033 < 0.05$  so that  $H_02$  is rejected and  $H_{a2}$  is accepted. There is a relationship between nutritional status based on anthropometry and interest in learning with a level of physical fitness of the fifth grade students of SDN Cimahi Mandiri I. This is known based on multiple regression calculations which show that the number R 0.444 or 44.4% indicates that the level of physical fitness can be explained by the variables of nutritional status based on anthropometry and interest in learning to be educated, while the remaining  $100\% - 44.4\% = 55.6\%$  explained by the variables not included in this study with a probability of error  $0.030 < 0.05$  or  $F_{count} 3.933 > F_{table} 3.30$ . The results of the study prove that Nutritional Status Based on Anthropometry and Learning Outcomes Interest is significantly related to Physical Fitness Level. This implies that the high interest in learning education will improve students' physical fitness. In addition, it is also important for children to have good nutritional status that can be realized through the intake of nutritious food and good quality so that the calculation through anthropometry (BMI) is of good status. The existence of

nutritional status based on anthropometry and the interest in learning that students have can support students to improve their physical fitness.

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