

# Overweight and obesity education through Body Mass Index (BMI) Measurement for elementary school students in Donggala, Gorontalo

**Aisah R. Pomatahu**

Universitas Negeri Gorontalo, Faculty of Sport and Health, Department of Physical education, Health and Recreation  
Email: [aisahpomatahu@ung.ac.id](mailto:aisahpomatahu@ung.ac.id)

## Abstract

Overweight and obesity are two different things. Although both indicate an excessive accumulation of fat in the body characterized by an increase in Body Mass Index (BMI) above normal. The purpose of this program is to educate elementary school students about overweight and obesity, through BMI measurement. Carried out in elementary schools in Donggala, this program applies observational methods to measure BMI. As a result, students know and understand their BMI. Based on the measurement, the incidence of overweight and obesity was found to be 3.05% and 11.67% of 197 students participating in this program. In addition, very thin and thin nutritional status was detected.

**Keywords:** overweight, obesity, student, elementary school

## A. INTRODUCTION

Overweight and obesity are two different things. Although both indicate an excessive accumulation of fat in the body characterized by an increase in Body Mass Index (BMI) above normal. Overweight and obesity are caused by an imbalance between excess calorific consumption compared to energy requirements. (Evan et al., 2017; Krismawati et al., 2019; Loliana & Nadhiroh, 2015; Telisa et al., 2020). Obesity is defined as a pathological condition due to excessive fat accumulation in the body. (Maria et al., 2019; Paleva, 2019; Rahmawati, 2014; Susantiningasih, 2015), with an increase in body weight beyond skeletal and physical requirements.

The increase in overweight and obesity has occurred globally (Chu et al., 2018). According to WHO data in 2016, 1.9 billion (39%) of the world's population aged <18 years were obese and 650 million (13%) were overweight (OECD, 2019). The Global Nutrition Reports in 2014 also shows that Indonesia is among 17 countries that have three nutrition problems at once, namely *stunting*, *wasting*, dan *obesity* (International Food Policy Research Institute, 2014). Therefore, since 1997, WHO declared obesity a global epidemic (Haththotuwa et al., 2020).

In Gorontalo Province, (Kemenkes RI, 2013) sequentially for 2007, 2010, dan 2013, it found that the number of obese in Gorontalo increased in 2007 to above 10%, 2010 to above 30%, and in 2013 to above 40% in men and women. Riskesdas data from the 2018 Gorontalo (Kemenkes RI, 2019) showed that the incidence of obesity in children aged 5-13 years was 5.34% of the total 565 samples. Based on these

conditions, the purpose of this program is to educate elementary school students about overweight and obesity, through BMI measurement.

## B. IMPLEMENTATION AND METHOD

This observational activity was carried out in Donggala, SDN No. 35 dan SDN No.36 Hulonthalangi. Program targets are students grade 1 to grade 6. Before calculation BMI, measurements of height, and weight were taken manually by trained personnel. Data recording was done by different trainer, so that the process of measuring height and weight was not interrupted. Height was measured with Onemed 2m stature meter, weight using Serenity BR2016. Other data required in the BMI analysis were gender, age, and Z-Score guidelines for children aged 5-18 years.

**Tabel 1.** Z-Score standard deviation criteria

Index	Nutrition Status	Z-Score
Children aged 5-18 years	Very thin	< -3 SD
	Thin	-3 SD to < -2 SD
	Normal	-2 SD to 1 SD
	Over-weight	> 1 SD to 2 SD
	Obese	> 2 SD

Sumber: (Kemkes, 2020)

## C. RESULT AND DISCUSSION

### Characteristics of program targets

The characteristics of the targets of program include class and gender as physiological attributes of students. The data can be seen in Tables 2 and 3.

**Table 2:** Target distribution by class

Class	Frequency	(%)
1	27	13.70
2	30	15.23
3	36	18.27
4	30	15.23
5	27	13.71
6	47	23.86

**Tabel 3.** Gender

Gender	Frequency	(%)
Boy	94	47,72
Girl	103	52,28

Table 2 shows the total number of students present at the time of height and weight measurement, while table 3 shows the target number consisting of: 94 boys and 103 girls.

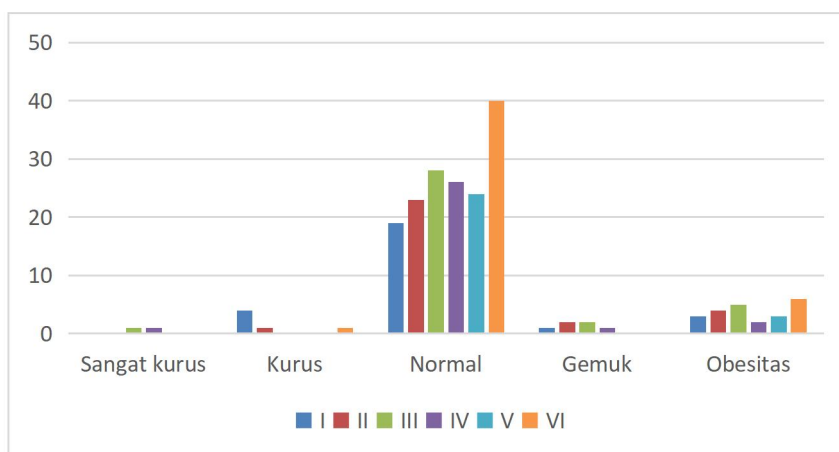
### Students' Nutrition Status in Donggala

Based on BMI calculations with Z-Score, data on the nutritional status of students in each elementary school were obtained (can be seen in Table 4).

**Table 4.** Nutritional status of children

Nutrition Status	Frequency	(%)
Very thin	2	1.01
Thin	6	3.05
Normal	160	81,22
Over weight	6	3.05
Obesity	23	11.67

The total number of students present at the time of height and weight measurement in both elementary schools was 197 children. Based on the nutritional status categories of children aged 5-18 years, the condition of students in both schools was known, namely: very thin 2, thin 6, normal 160, overweight 6, and obese 23 (Figure 1).



**Figure 1.** Students' nutrition status in Donggala

Overweight and obesity do not happen overnight. But gradually, when the factors that cause obesity become the child's habit of life. Some authors have specifically researched on these causative factors over time, such as (Arundhana et al., 2013) with the finding of sedentary behavior as a risk factor for obesity in elementary school children. Based on the place of residence, the average duration of sedentary behavior in urban areas was higher than in rural areas. (Junaidi & Noviyanda, 2016) concluded that the majority of fast food consumption by 62.5% of obese children was "frequent" compared to normal-weight children. (Pavilianingtyas, 2017) revealed the factors of frequency of fast food consumption, screen time, parental obesity, ethnic background,

and mother's education level. As well as emphasizing the factors of screen time and ethnic background need to be developed again in other studies. (Setyawan, 2018) the outcome of the study is that factors that cause the incidence of obesity, consist of: genetic factors with parents, unbalanced intake of food consumed with energy released, and lack of exercise. (Hutasoit, 2020) School-age children who have the following habits are more likely to be obese: snacking on junk food, lack of physical activity and monotonous activities such as playing with mobile phones (sedentary lifestyle), not eating breakfast, and little sleep duration.

The change from an active lifestyle to a sedentary lifestyle is a negative impact that accompanies advances in science and technology. (Hamalding et al., 2019; Kurdanti et al., 2015; Mariam & Larasati, 2016; Nurcahyo, 2011). (Arundhana et al., 2013) explaining the type of sedentary activities obese students have a higher frequency of watching tv, board, and card games, and sitting longer than non-obese students.

### **Conclusion**

The incidence of overweight and obesity among elementary school students in Donggala reached 3.05% and 11.67%, respectively. Through this education program, students are informed that the factors that cause obesity can be diverse. We refer to the results of the author's previous research, and rank the causes of obesity from high to low risk as follows: 1) physical activity patterns (lack of movement); 2) diet, ranging from not eating breakfast to snack habits and fastfood consumption; 3) little sleep duration; (4) parental knowledge (especially mothers); (5) genetic factors. In addition, students were also introduced to the recommended physical activity (WHO, 2020) for children under the age of 18, which is to do at least 60 minutes of physical activity a day. Another thing to note is the incidence of very thin and thin, which indicates that children consume fewer calories than energy.

### **Suggestion**

This service program should be conducted periodically. So that schools have a source of BMI data for students, and students can be educated about overweight and obesity. Another important finding in this program was the incidence of very thin and thin among students. Both categories are also nutritional problems that need attention (Hamzah et al., 2020). It is associated with an imbalance between the under-consumption of calories and energy needs. These findings could be useful for schools, parents, and especially for academics.

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