



Green Bean Juice as Supplementary Food to Increase the Weight of Underweight Toddlers

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Abstract

BACKGROUND: Toddlers with low body weight must receive treatment so as not to cause adverse health effects in the future.

AIM: This study aims to analyze the effect of additional food as green bean juice on changes in the bodyweight of underweight toddlers.

METHODS: This type of research was an experimental study involving one treatment group. The treatment was the provision of green bean juice. The subjects of this study were 15 people, who were selected by purposive sampling technique. Anthropometric examinations were carried out, namely, weight and height before and after treatment. The next stage is to test the difference in BMI between before and after being given additional food with green bean juice, using a paired sample t-test.

RESULTS: The results show that after being given the intervention as additional food with green bean juice to underweight toddlers, there has been an increase in BMI. However, the increase was tiny, which was confirmed by the results of statistical analysis that the increase was not significant.

CONCLUSION: It can be concluded that the addition of green bean juice can increase the BMI of underweight toddlers, but the increase is not significant. Furthermore, it is recommended to conduct further research by increasing the treatment dose.

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Introduction

Malnutrition is still a major public health problem in developing countries, including Indonesia. According to the World Health Organization (WHO), in 2014, the proportion of children under five having malnutrition was 15%. In 2013, 17% (98 million children under five) in developing countries had malnutrition. Meanwhile, a similar prevalence in Southeast Asia is 16%. The WHO determines the prevalence in the high category is 20.0% to 29.0% and the very high category if it is greater than 30% [1].

Developing countries such as most of Asia, Africa, Central America, and South America have the problem of malnutrition. In contrast, developed countries, such as Western Europe and the United States, experience excess nutrition [2].

Based on the 2010 Basic Health Research data, in Indonesia, there has been a decrease in the prevalence of malnutrition (weight for age) in children under five from 18.4% in 2007 to 17.9% in 2010. The decline occurred in the prevalence of malnutrition, from 5.4% in 2007 to 4.9% in 2010. However, there is no decrease in the prevalence of undernutrition, which is still 13.0% [3].

The 2013 Basic Health Research explained that if the prevalence of malnutrition and undernutrition in Indonesia was 19.6%, then this prevalence was close to the high category [4]. In the book on the management of children with malnutrition published by the Directorate General of Nutrition, Ministry of Health of the Republic of Indonesia, it is stated that 54% of infant and under-five deaths are caused by malnutrition.

Meanwhile, the results of preliminary research in the working area of a public health center in Malang City, East Java, Indonesia; cases of undernourished children under five were still found in 2016.

Based on age, the highest prevalence of malnutrition was in the 48-59 month age group (16.7%), and the lowest was in the 0-5 month age group (7.2%) [4]. Mahgoup (2006) reports that in slum areas in Africa, underweight and stunting are significantly more common in boys than girls [5]. Based on the results of the 2013 Basic Health Research, it is known that the prevalence of under-fives experiencing malnutrition is higher for boys, namely 14.0%, while for girls, it is 13.8% [4].

In 1999, WHO defined severe malnutrition in children aged 6 to 24 months using a z-score indicator of weight/height less than -3 SD from the reference population, or the presence of bilateral pitting edema,

upper arm circumference less than 115 mm in children. toddlers 6 to 24 months can be used as an independent malnutrition criterion. The increase in upper arm circumference during the rehabilitation program was lower in shorter, younger, and female children under five [6].

Measurement of nutritional status in children based on the size of the upper arm circumference is used to quickly assess nutritional status in emergency conditions, such as in the case of hunger. However, the upper arm circumference is only appropriate for toddlers aged 1 to 5 years [7]. Upper arm circumference can also be used when weight/height parameters cannot be used, such as in conditions of edema (not in the arm) and organomegaly. The collection of nutritional status data was carried out using the anthropometric method using the bodyweight index according to age; which is then compared with the Child Growth Standards from WHO.

Underweight in children under five is defined as a child's lack of weight for age based on WHO references. The term underweight includes both poor nutrition and undernutrition. In the short term, underweight is at risk for increased mortality and morbidity rates in under-five children, increasing the risk of infectious diseases due to decreased immunity and increasing the risk of death compared to normal-weight infants. In the future, continuing underweight without proper treatment will cause growth and development disorders and underweight conditions into adulthood [1].

Malnutrition in toddlers can be influenced by many factors that occur from pregnancy to the period of growth outside the womb. Toddlers with low body weight must receive appropriate treatment so as not to cause adverse health effects in the future. Examination of health status in under-fives with low body weight can be done through anthropometric examinations, hemoglobin levels, and the expression of blood chemistry which represents the immune status [8].

Based on the above background, it is necessary to deal with underweight toddlers through the intake of foods with good nutritional content, such as green beans. Therefore, it is considered important to research the effectiveness of green bean juice to improve the nutritional status of underweight children under five.

This study aims to analyze the effect of additional food in the form of green bean juice on changes in the bodyweight of underweight toddlers.

Methods

This type of research was an experimental study involving one treatment group. The treatment given was the provision of additional food in the form of green bean juice. This study examines the effectiveness of green bean juice on changes in the anthropometric

status of children under five with malnutrition in the working area of the Malang City Health Office, East Java, Indonesia; for a minimum of 60 days and a maximum of 90 research days.

The population in this study were toddlers (12–59 months) who were registered as active posyandu participants. The sample size in this study was 15 people, who were selected by the purposive sampling technique. Furthermore, anthropometric examinations were carried out, namely, weight and height before treatment and at least 60 days after being given additional food ingredients with green bean juice. The inclusion criteria in this study were: (1) toddlers aged 12–59 months; (2) have a Health Card (KMS); (3) do not have co-morbidities that are asked by the medical officer; (4) included in the category of malnutrition (z score is in the range $\pm <3$). Exclusion criteria were: (1) children under five who live outside the Greater Malang area; (2) research subjects who withdrew before 60 days of supplementary feeding.

Anthropometric measurements were carried out including weight measurement using a digital scale and height measurement using a microtome; then the body mass index (BMI) was calculated. The next stage is to test the difference in BMI between before and after being given additional food with green bean juice, using paired sample t-test [9], [10].

Results and Discussion

Table 1 shows the BMI of children under five before and after the nutrition intervention. The results of the data normality test showed that before and after the addition of green bean juice, the BMI of children under five was normally distributed, with $p = 0.926$ and 0.950 , respectively.

Table 1: Body mass index of toddlers before and after being given additional food with green bean juice

No	BMI before giving green bean juice	BMI after giving green bean juice
1	14.07	13.80
2	14.15	14.45
3	15.06	15.60
4	15.22	15.31
5	13.60	14.00
6	15.70	14.77
7	15.52	15.46
8	14.96	15.45
9	15.59	15.90
10	16.83	17.19
11	14.00	14.11
12	14.73	14.66
13	14.05	13.75
14	14.80	15.51
15	14.93	13.93
Mean	14.88	14.93

Table 1 and Figure 1 show that there has been an increase in the BMI of children under five after the addition of green bean juice, although the increase was small. The results of the paired sample t-test showed a

$p = 0.732$, so it was concluded that the increase in BMI was not significant.

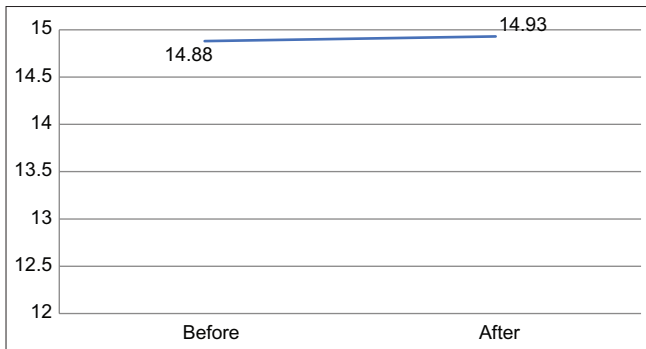


Figure 1: Increased BMI after giving green bean juice

The results of the analysis above show that after being given the intervention as additional food with green bean juice to underweight toddlers for at least 60 days, there has been an increase in BMI. However, the increase was tiny, which was confirmed by the results of statistical analysis that the increase was not significant. This requires further study of various aspects. Many factors may influence the small increase in BMI under five, for example, the lack of treatment dose. The treatment dose can be increased by increasing the duration of administration, for example, from 60 days to 120 days. The portion of green bean juice for each intake can also be increased. In addition, the frequency of giving green bean juice per day can also be increased.

Conclusion

Based on the results of the study, it can be concluded that the addition of green bean juice

can increase the BMI of underweight toddlers, but the increase is not significant. It is recommended to conduct further research by increasing the treatment dose.

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