Jurnal Kesmas Prima Indonesia (JKPI)
Vol. 9 No. 1 January 2025 E-ISSN : 2721-110X

N-Gain To Test The Effectiveness Of Green Bean Juice And Soybean Juice To Increase Toddlers' Weight

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ABSTRACT

Statistics is one of the sciences that underlies the development of science, one of which is health science. Researchers are trying to implement green bean juice and soybean juice, the benchmark for the success of which is seen from the size of body weight before and after treatment. This study aims to measure the effectiveness of providing green bean juice and soybean juice interventions to toddlers using the N-Gain test. The method used in this study is quasi-experimental with a pretest-posttest design type. The number of samples is toddlers aged 1-2 years. Many as14respondents were divided into Group 1, green bean juice intervention, and Group 2, soy juice intervention. The data analysis technique used in this study was calculating the percentage of respondents' body weight multiplied by 100%, and then the N-Gain test was carried out. The study showed that 13 toddlers (92.8%) experienced an increase in body weight with low criteria, and as many as one toddler (7.2%) experienced an increase in body weight with moderate criteria. Green bean and soy juice with very ineffective criteria (16.4%) and less effective criteria can still increase toddlers' body weight (22.1%). The N-Gain test implemented the soy juice test more effectively than green bean juice given to toddlers to increase body weight.

Keywords: N-gain, Effectiveness, Green bean extract, Soybean extract

INTRODUCTION

Statistics is one of the sciences that underlies the development of educational and non-educational sciences. (1) Statistics works with numbers (numerics) as categorical numbers and uses a mathematical approach, which is the basis of calculations and analysis. (2) Inferential statistics is a method related to data analysis on samples, and the results are used to generalize the population. Inferential statistics is based on probability; the samples analyzed are obtained randomly. (3).

The N-Gain test is one of the inferential statistical tests that can be used to measure the effectiveness of learning or intervention on respondents. N-Gain stands for 'normalized gain' or normalized increase, creating a very useful framework in research (4). In this study, researchers

tried to implement green bean and soybean extract, whose success benchmark was seen from body weight measurements before and after treatment.

The content of green bean juice consumed becomes additional food that can meet nutritional needs to support the growth and development of toddlers. Green bean juice is a source of fat and protein that is important for the growth and nutrition of toddlers. (5) Soy milk is a soluble fraction extracted from soybeans, a beverage product that increases protein consumption. The content of nuts can help the baby's growth process. Based on research by Ulfa Dwi Yuliana and Umu Qonitun(6), soy milk can increase a baby's weight by an average of 150 grams.

This study uses the N-Gain test, which is quite popular among researchers. Various studies have also used this test, including research conducted by Abdul Wahab, Junaedi, and Muh. Azhar(1)to determine the effectiveness of learning educational statistics using the N-Gain improvement test at PGMI, research by Anggie Bagoes Kurniawan and Rusty Hidayah(7)to support the effectiveness and efficiency of acid-base learning by implementing an Android-based learning style.

Furthermore, this study measures the effectiveness of providing green bean and soy extract interventions to toddlers who are underweight. Plangkrongan Village, Poncol District, Magetan Regency, and then the N-Gain test was carried out.

METHOD

The method used in this study is quasi-experimental with a pretest-posttest design type, which can be described as follows:

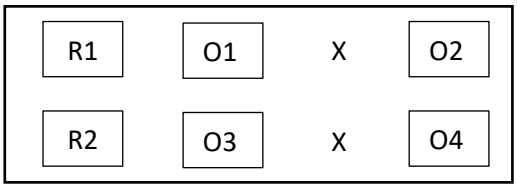

Figure 1 Experimental Design Scheme

The sampling technique in this study was purposive sampling; the number of samples was toddlers aged 1-2 years who were underweight as many as14respondents were divided into two groups, namely group 1, consisting of 7 respondents given green bean juice intervention, and group 2, composed of 7 respondents given soy juice intervention. The study was conducted for 7 days, namely August 19-25, 2024; every morning, each group of respondents was given 180 ml of green

bean juice and/or soy juice.

The data in this study are quantitative in the form of body weight before (pretest) and after (post-test) the green bean juice and soybean juice intervention. Furthermore, a difference test (T-test) was conducted to see the significance of the differences in the pretest and post-test of each group. The data analysis technique used in this study was calculating the percentage of the respondent's body weight multiplied by 100%. The N-Gain test was performed after the T-Test, and the p-value results were obtained. According to Richard Hake(8), the N-Gain formula and its criteria are as follows.

$$N - Gain = \frac{skor\ post\ test - skor\ pre\ test}{skor\ ideal - skor\ pre\ test}$$

Table 1. N-gain level criteria

Average	Criteria
g > 0.7	Tall
0.3 ≤ g ≤ 0.7	Currently
0 < g < 0.3	Low
g ≤ 0	fail

The percentage results can be converted into effectiveness criteria. According to Arikunto(9), Percentage data is categorized using the following limits.

Table 2. Effectiveness Criteria

Percentage (%) Mean	Criteria
0 – 20	Very less effective
21 – 40	Less effective
41 – 60	Quite effective
61 – 80	Effective
81 - 100	Very effective

RESULTS

Toddler weight measurements were taken at the beginning of the meeting (pretest) and the end

(post-test). The aspects to be known include weight gain, paired t-test application, and aspects of n-gain application. Pretest and post-test were given to determine the description of weight gain using paired t-test analysis and the effectiveness of green bean and soybean juice interventions using the N-Gain test.

Table 3. Frequency Distribution of Respondents by Gender

Gender	f	%
Man	4	28.6
Woman	10	71.4
Amount	14	100

Source: primary data, 2024

Based on Table 3, the frequency distribution of male gender is 4 respondents (28.6%), and female gender is 10 respondents (71.4%).

Table 4. Paired T Test

Intervention	Respondents	Body weight (Kg)			P-value
		Pretest	Posttest	Post-Pre	
Green Bean Juice	R1	8.6	9.0	0.4	0,000
	R2	7.2	7.8	0.6	
	R3	8.3	8.8	0.5	
	R4	9.0	9.4	0.4	
	R5	7.2	7.6	0.4	
	R6	7.9	8.1	0.2	
	R7	7.8	8.1	0.3	
Soybean Extract	R8	8.0	8.4	0.4	0.016
	R9	8.0	8.6	0.6	
	R10	9.0	9.5	0.5	
	R11	7.8	8.2	0.4	
	R12	8.0	8.5	0.5	
	R13	8.1	8.5	0.4	

	R14	9.0	9.4	0.4

Source: primary data, 2024

Based on Table 4, the results of the paired T-Test showed that the p-value of group 1 with green bean juice intervention was 0.000, while the p-value of the paired t-test results of group 2 with soybean juice intervention was 0.016.

Table 5. N-Gain Criteria Value and Intervention Effectiveness

Intervention	N-gain value	N-Gain Criterion	Percentage (%) Mean	Effectiveness Criteria
Green Bean Juice	0.19	Low	16.4	Very Less
	0.20	Low		effective
	0.21	Low		
	0.16	Low		
	0.17	Low		
	0.07	Low		
	0.15	Low		
Soybean extract	0.13	Low	22.1	Less
	0.37	Currently		Effective
	0.22	Low		
	0.22	Low		
	0.23	Low		
	0.17	Low		
	0.21	Low		

Source: primary data, 2024

Based on Table 5, 13 toddlers (92.8%) experienced an increase in body weight with low criteria, and as many as one toddler (7.2%) experienced an increase in body weight with moderate criteria. Green bean and soybean juice, with very ineffective and less effective criteria, can still increase toddlers' body weight.

DISCUSSION

The paired t-test showed that the p-value was 0.000 for the green bean juice intervention and 0.016 for the soybean juice intervention. This value is smaller than □=0.05, so H0 is rejected. This means that at a significance level of 5%, there is a difference in the pretest and post-test scores of toddler weight.

This research is supported by research conducted by Tri Astuti(5). Namely, it is known that soy milk and green bean extract increase the baby's weight because the p-value is 0.007. This is in line with the research conducted by Elika(10), namely, there is a positive effect of giving soy milk on increasing breast milk production where all responses experience an increase in breast milk production and are able to optimize breast milk production and the concentration of breast milk color in breastfeeding mothers which results in an increase in the baby's weight.

Energy requirements for basal metabolism vary with body tissue composition and are usually gender-dependent, but gender differences are negligible (relatively small) until the child is 10. Water is the most critical nutrient for the body's hydration, health, and fluid homeostasis. The estimated daily fluid requirement for toddlers based on body weight is 1.3 L/day(11). From the research, giving 180 ml of green bean and soy juice daily was considered far less than the daily fluid requirements for toddlers.

The application of the N-Gain test to test the effectiveness of increasing toddler weight is determined by the intervention of green bean juice and soy juice given to toddlers. Weight measurement was carried out on research subjects who were given a pretest before and a post-test after the intervention. Then, all pretest and post-test data were analyzed statistically to obtain the analysis requirement assumption test results, namely the normality test. After meeting the analysis requirement assumptions, the paired t-test, which was the N-Gain increase test, was continued.

This research is in line with research conducted by Abdul Wahab(1), namely, the effectiveness of learning statistics in education using the N-Gain improvement test in PGMI. The study results showed that learning statistics effectively achieved learning objectives, as evidenced by significant learning outcomes using the N-Gain test. This aligns with Mirani Oktavia's research(12)about the gain normality test for consolidation and modules with one group pre-and post-test. The results of the study concluded that the proposal for the procurement of consolidation activities and the provision of modules significantly affected the effectiveness of students' understanding of the lesson material so that it could help improve students' academic grades.

CONCLUSION

Green bean juice and soy juice can increase toddler weight. Soybean juice is more effective than green bean juice given to toddlers to increase weight. The N-Gain test is used to measure the effectiveness of an intervention. For further research, additional interventions can be added over a longer time (1 month) or with variables and tested with association analysis.

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