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Email : editorijhess@gmail.com

Education On A Balanced, Nutritious Diet And The Production Of Herbal Gummies As An Alternative To Support Immunity During Fasting

Enda Mora[1)], Ihsan Ikhtiarudin[2)], Ahridansyah[3)], Afiza Kiki Ramadhani[4)], Alicia Komala[5)], Allfina Nadia Imami[6)], Anisah Khoiriah[7)], Annisa Melani[8)], Asih Ayuni[9)], Bela Hafsah[10)*], Cut Riska Wati[11)]
[1,2,3,4,5,6,7,8,9,10,11)] Pharmacy Professional Education Program, Sekolah Tinggi Ilmu Farmasi Riau, Jalan Kamboja, Simpang Baru Village, Pekanbaru, Indonesia

*Corresponding Author
Email: hafsahbela@gmail.com

Abstract

Ramadan fasting causes changes in dietary patterns and body metabolism that may affect nutritional adequacy and adolescents' immune endurance if not balanced with proper implementation of balanced nutrition. In addition, the use of herbal plants as immune support remains suboptimal because they are generally consumed in traditional forms that are less appealing. This community service activity aimed to improve students' knowledge regarding balanced nutritional intake during fasting and to introduce the preparation of herbal gummies as an alternative functional snack to support immunity. The methods used included education through interactive lectures, discussions, visual media, product-making demonstrations, and evaluation using a quasi-experimental pre-test post-test design involving 38 students of SMAN 1 Pekanbaru. The herbal gummy product was formulated from ginger, butterfly pea flower, turmeric, lemongrass, and other supporting ingredients. The results showed an increase in participants' knowledge after the intervention. Normality testing indicated that the data were not normally distributed; therefore, the analysis was continued using the Wilcoxon Signed Rank Test. The test results showed a significance value of $p = 0.000$ ($p < 0.05$), indicating a significant difference between pre-test and post-test scores. This activity proves that balanced nutrition education and herbal gummy preparation training are effective in increasing students' knowledge and have the potential to become a practical, attractive, and beneficial herbal-based functional food innovation.

Keywords: Nutrition, Gummy, Ginger, Turmeric, Butterfly Pea.

INTRODUCTION

Fulfilling a balanced nutritional intake is one of the important factors in supporting daily activities, especially in adolescent groups such as high school students who are in the growth and development phase. Intensive academic activities and involvement in various extracurricular activities demand optimal physical condition and concentration, which is greatly influenced by the adequacy of nutrients consumed (Norhasanah & Salman, 2021). However, in practice, there are still many adolescents who have an irregular diet, low intake of essential nutrients, and tend to consume foods high in sugar, salt, and fat that are not in accordance with the principles of balanced nutrition (Adawi et al., 2017).

Ramadan fasting is a mandatory worship that has implications for changes in consumption patterns due to the shift in meal time from noon to night. These changes have the potential to affect nutrient intake, eating frequency, and body metabolic processes, including energy metabolism and hormonal regulation (Norhasanah & Salman, 2021; Adawi et al., 2017). This condition requires proper intake management so that nutritional needs are met. Therefore, the application of balanced nutrition principles is very important in maintaining nutrient balance and maintaining the body's physiological function during the fasting period (Laswanti, 2017).

This imbalance in nutritional intake can have an impact on decreased immunity, impaired learning concentration, and risk causing long-term health problems such as anemia, obesity, and metabolic disorders. In addition, the lack of knowledge and awareness about the importance of balanced nutrition is one of the main factors that affect adolescent consumption behavior. Therefore, educational efforts are needed that not only provide

theoretical understanding, but also are accompanied by simple practices that can be applied in daily life (Laswanti, 2017; Faris et al., 2012).

One of the efforts that can be made is through the use of herbal plants that contain bioactive compounds. Ginger is known to contain gingerol, shogaol, and antioxidant compounds that are anti-inflammatory and immunomodulatory (Shan & Iskandar, 2018; Sari & Hamidah, 2021). In addition, ginger has also been used in traditional medicine for a long time and is easily found in the community (Srinivasan, 2017; Indriyanti & Andrianne, 2020). Telang flowers also have the potential as a natural source of antioxidants because they contain flavonoids, anthocyanins, and phenolic compounds that play a role in warding off free radicals (Imansari et al., 2021). Other herbal plants such as turmeric and lemongrass also contain secondary metabolites that contribute to supporting the immune system (Widyanata et al., 2020).

However, the use of herbal plants in their traditional form still faces limitations, especially in terms of public acceptance influenced by taste. Therefore, innovation is needed in the processing of herbal ingredients into products that are more practical and have good acceptance. One alternative that can be developed is herbal gummy products, which are expected to be able to maintain the content of bioactive compounds while increasing public consumption interest.

Based on this description, this study aims to analyze the role of balanced nutrition in maintaining health and immunity during Ramadan fasting, examine the potential of herbal plants as a source of bioactive compounds, and develop herbal gummy product innovations as an alternative to consumption that is more practical and acceptable to the public.

RESEARCH METHODS

This study uses an experimental Quasy design with a one group pre-test post-test design approach. This design was chosen to see the extent to which balanced nutrition education and herbal gummy making training can improve participants' knowledge before and after the intervention is given.

Research Subject and Location

The research activity was carried out at SMAN 1 Pekanbaru on March 11, 2026. The subjects in this study were all students who participated in community service activities, namely 38 people. The sampling technique was carried out in total sampling, so that all participants were used as respondents.

Tools

The tools used are simple equipment that is easy to find, including pots, food grade plastic basins, stainless steel knives, silicone spatulas, measuring cups, scales, strainers, and silicone molds. In addition, educational media in the form of leaflets, PowerPoint slides, and video tutorials are also used to support the delivery of material.

Ingredients

The ingredients used in this activity are natural herbal ingredients, namely ginger (Zingiber officinale), telang flower (Clitoria ternatea), turmeric (Curcuma longa), and lemongrass (Cymbopogon citratus), as well as additional ingredients such as brown sugar, gelatin, and lime used in making herbal gummy**.**

Procedure

The implementation of the activity is carried out through several stages:

At the preparation stage, coordination was carried out with the school and the timing of the implementation of the activity. In addition, the team also prepared educational materials related to balanced nutrition during fasting, as well as preparing tools and materials that will be used in the training.

The implementation stage began with the provision of a pre-test to find out the initial level of knowledge of the participants. Furthermore, the material was delivered through interactive lectures accompanied by discussions and questions and answers. After that, participants were given a demonstration as well as direct practice of making herbal gummy made from ginger and telang flowers.

In the final stage, an evaluation is carried out by giving a post-test using the same questionnaire as before. This aims to see changes or improvements in knowledge after the activity is carried out.

Research Instruments

The instrument used was in the form of a questionnaire consisting of 10 questions related to balanced nutrition and the use of herbal ingredients. The questionnaire was arranged in a choice of correct and incorrect answers, making it easier to assess the level of knowledge of the participants.

Data Analysis

The data obtained was then analyzed using the IBM SPSS Statistics program. The normality test was first carried out using the Shapiro-Wilk test. Because the results showed that the data was not normally distributed ($p < 0.05$), the analysis was continued with a non-parametric test, namely the Wilcoxon Signed Rank Test, to see the difference between the pre-test and post-test scores. The significance level used was 95% ($\alpha = 0.05$).

RESULTS AND DISCUSSION

This study uses a quasi-experimental design with a pre-test and post-test approach. Data was collected through a checklist sheet derived from a questionnaire containing 10 questions, then analyzed using the Guttman scale. This design aims to assess the changes that occur after the intervention by comparing the results before and after treatment (Widyanata et al., 2020). The number of respondents in this study was 38 people who filled out the pree-test and post test questionnaires. The results obtained are as follows:

Table 1. Table of Pre-test and Post Test Scores of Respondents

Yes	Initials	Pree-test	Post- Test
1	KGG	35	100
2	COUNTRY	40	100
3	AHA	45	100
4	COUNTRY	35	100
5	TRS	35	100
6	AC	45	100
7	TH	55	100
8	FAP	75	100
9	EACH	70	100
10	ACB	25	100
11	KIH	50	100
12	C	50	100
13	DMI	85	100
14	QAA	55	100
15	NAW	55	100
16	JKH	35	100
17	ZNT	45	100
18	HJ	30	100
19	FA	50	100
20	RAL	35	100

21	C	35	100
22	MHA	40	100
23	YS	50	100
24	SF	50	100
25	AJ	95	100
26	RAR	30	30
27	BAA	50	100
28	NM	40	100
29	VWG	40	100
30	BY	50	100
31	QD	40	100
32	KPA	50	100
33	S	25	100
34	AYS	30	100
35	CW	60	100
36	RMR	40	100
37	ZRW	30	100
38	GH	30	100

Table 2. Normality Test Results

Tests of Normality						
	Kolmogorov-Smirnova			Shapiro-Wilk		
	Statistic	Df	Say.	Statistic	df	Say.
Pre Test	.180	38	.003	.882	38	.001
Post Test	.538	38	.000	.152	38	.000
a. Lilliefors Significance Correction						

The data is abnormal, then data transformation is carried out.

Table 3. Normality Test Results

Tests of Normality						
	Kolmogorov-Smirnova			Shapiro-Wilk		
	Statistic	Df	Say.	Statistic	df	Say.
Log	.116	38	.200*	.961	38	.207
log1	.538	38	.000	.152	38	.000
*. This is a lower bound of the true significance.						
a. Lilliefors Significance Correction						

The results of the normality test after the data transformation were carried out remained abnormal, so that what should have been done in pairs could not be done and continued with an alternative test, namely the Wilcoxon test.

Ranks

		N	Mean Rank	Sum of Ranks
Post Test - Pre Test	Negative Ranks	0[a]	.00	.00
	Positive Ranks	37[b]	19.00	703.00
	Ties	1[c]		
	Total	38		

a. Post Test < Pre Test
b. Post Test > Pre Test
c. Post Test = Pre Test

Figure 1. Wilcoxon Test

It was found that the post-test value was greater than the pre-test value which indicates that the education provided related to balanced nutrition and the manufacture of herbal gummy to increase immunity was successful and proven to increase his knowledge.

Table 4. Wilcoxon Test

Test Statistics[a]	
	Post Test - Pre Test
Z	-5.316b
Asymp. Sig. (2-tailed)	.000
a. Wilcoxon Signed Ranks Test	
b. Based on negative ranks.	

Because the sig value is <0.05, there is a significant difference between pre-test and post-test.

Discussion

Community service activities with the theme of balanced nutrition education and the use of herbal plants in the form of herbal gummy showed positive results in increasing participants' knowledge and skills. This program was carried out with an educational and applicative approach through interactive lectures, discussions, and direct demonstrations of the manufacture of herbal functional food products.

During the month of Ramadan, dietary changes have the potential to cause an imbalance in nutrient intake which has an impact on reducing immunity if not balanced with the application of balanced nutrition principles. Therefore, education about the proper composition of food during suhoor and iftar is an important aspect in maintaining health, especially in adolescents.

In addition to nutritional aspects, the use of herbal plants such as ginger (Zingiber officinale), turmeric (Curcuma longa), lemongrass (Cymbopogon citratus), and telang flower (Clitoria ternatea) has also been introduced as a natural alternative in increasing the body's immunity. The content of bioactive compounds such as gingerol, shogaol, curcumin, flavonoids, and anthocyanins is known to have antioxidant and anti-inflammatory activities that play a role in modulating the immune system.

However, the low public interest in the consumption of herbs in traditional forms is an obstacle in their use. Therefore, processing innovations in the form of herbal gummy are an effective solution because they are more practical, attractive, and have a taste that can be accepted by various groups, especially teenagers. This innovation also provides added value economically and increases entrepreneurial opportunities based on natural health products.

The results of the evaluation showed a significant increase in participants' knowledge after being given educational interventions. Based on the statistical test of the Wilcoxon Signed Rank Test, a significance value of $p< 0.05$ was obtained which showed a significant difference between pre-test and post-test scores. This confirms that the educational method combined with direct practice is effective in improving health literacy as a promotive and preventive strategy in improving public health standards, especially in adolescent groups.

This confirms that educational methods combined with direct practice are effective in improving health literacy.

CONCLUSION

Community service activities in the form of balanced nutrition education and the manufacture of herbal gummy as an alternative to support immunity during fasting at SMAN 1 Pekanbaru went well and were attended by 38 participants. Lecture methods, interactive discussions, the use of educational media, and demonstrations of product making were proven to be able to increase participants' understanding and involvement in the learning process. The results of the analysis using the Wilcoxon test showed a significance value of 0.000 ($p < 0.05$), which means that there was a significant difference between the pretest and posttest values. The higher post-test score showed that the education provided was effective in increasing participants' knowledge about balanced nutrition during fasting and the use of herbal ingredients into herbal gummy products.

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