

**DIFFERENCE IN ACCEPTABILITY AND LEVEL OF PREFERENCE
BETWEEN MODIFIED AND STANDARD SUPPLEMENTARY
FEEDING IN UNDERNOURISHED TODDLERS AT JANTI
COMMUNITY HEALTH CENTER, MALANG**

Sugeng Iwan Setyobudi, I Nengah Tanu Komalyana, Nurulloh

Nutrition Department Malang State Health Polytechnic

ABSTRACT

Background: In East Java, the prevalence of 36% of toddlers did not finish standard supplementary feeding biscuits. Some contributed factors were disfavor of children (66.6%), forgotten to feed (3.9%), incompatible (0.5%), eaten by another family member (23.4%), and others (5.6%). This study aimed to determine the difference in acceptability and level of preference between modified and standard supplementary feeding in undernourished toddlers at Janti Community Health Center, Malang, East Java.

Subjects and Method: A quasi-experimental study with one group pretest-posttest design was conducted at Janti Community Health Center, Malang, East Java, in July 2019. A sample of 16 under-five malnourished children aged 12-59 months was selected by purposive sampling. The dependent variables were acceptability and the level of preference of under-five malnourished children. The level of preference was categorized into taste, texture, color, and aroma. The independent variables were standard (biscuit) and modified (chocolate ball and chocolate pudding) supplementary feedings. The data were collected by questionnaires. The data were analyzed by Kruskal Wallis.

Results: The highest level of acceptance was obtained in chocolate ball, followed by chocolate pudding and standard biscuit, and it was not statistically significant ($p= 0.112$). The highest preference for taste was chocolate ball, followed by standard biscuit and chocolate pudding, and it was statistically significant ($p= 0.022$). The highest preference for texture was chocolate ball, followed by chocolate pudding and standard biscuit, and it was statistically significant ($p= 0.025$). The highest preference for color was chocolate ball, followed by chocolate pudding and standard biscuit, and it was statistically significant ($p= 0.022$). The highest preference for aroma was standard biscuit, followed by chocolate pudding and chocolate ball, and it was not statistically significant ($p= 0.190$).

Conclusion: There are no significant differences in the level of acceptance between standard (biscuits) and modified (chocolate ball and pudding) supplementary feedings among undernourished toddlers. The highest preference for taste and texture is in chocolate ball feeding. The highest preference for color is in standard biscuit feeding.

Keywords: standard, modified, supplementary feeding, acceptance, preference level

Correspondence:

Sugeng Iwan S. Nutritional Study Program, School of Health and Sciences, Malang. Jl. Besar Ijen No.77C, Oro-oro Dowo, Klojen, Malang, East Java, 65119. Email: sugengiwan66@gmail.com. Mobile: +6281330200826.

BACKGROUND

According to Riskesdas (2013), in East Java, the prevalence of infant malnutrition and malnutrition was 19.1%. In the year 2018 decreased to 11.6%. Even though there was a decrease of 7.5%. This is still a task that

health workers and health offices must complete alleviating nutritional problems in Indonesia.

One of the East Java government's efforts to overcome malnutrition and malnutrition is by providing a supplementary

feeding program in biscuits for children aged 12-59 months. In East Java alone, the prevalence of children aged 6-59 months receiving supplementary feeding programs was 33.7%. The prevalence of children under five who do not consume was 36%. There are several reasons for the child not spending the supplementary feeding program, including the child does not want to (66.6%), the mother forgets to give (3.9%), side effects such as diarrhea (0.5%), eaten by other family members, most often siblings (23.4%), and others such as not liking biscuits (5.6%) (Riskesdas, 2018).

Besides, if the supplementary feeding package was not consumed immediately, it was feared that it will expire. Meanwhile, the results of the Research Report on the Evaluation of the Implementation of the Supplementary Feeding Program for Thin Toddlers and Pregnant Women with Chronic Energy Deficiency (Ministry of Health, 2017) showed that the reasons for children under five do not consume with the reasons: the child is bored (63.9%) other households (62.4%), eaten by people other than family members (15%), disliked taste and aroma (11.7%), types of supplementary feeding were less varied (10%), mother did not have time (2, 6%), and there were side effects (2,6%).

Based on interviews with the preliminary study subjects, 77% of the reasons under five did not finish the supplementary feeding biscuits were boredom, 15.4% said they did not like it, and 7.6% because there were other snacks. In a day, only 23.1% of malnourished children under five were able to consume 5-6 biscuits, 38.4% were able to consume 3-4 biscuits, 23.1% were able to consume 1-2 biscuits, and 15.4% do not want to. This showed that no children under five reach the government's recommendation of 12 pieces per day.

Product development needs to serve toddlers becomes more varied and attractive.

It is hoped that it will increase the preference for toddlers and minimize the risk of saturation with previous supplementary feeding. The development of this product was by re-using standard biscuits into several more interesting and varied snack products. This study aimed to determine the difference in acceptability and level of preference between modified and standard supplementary feeding in undernourished toddlers at Janti Community Health Center, Malang, East Java.

SUBJECTS AND METHOD

1. Study Design

A quasi-experimental study with one group pretest-posttest design was conducted at Janti Community Health Center, Malang, East Java, in July 2019.

2. Population and Sample

A sample of 16 under-five malnourished children aged 12-59 months was selected by purposive sampling.

3. Study Variables

The dependent variables were acceptability and the level of preference of under-five malnourished children. The level of preference was categorized into taste, texture, color, and aroma. The independent variables were standard (biscuit) and modified (chocolate ball and chocolate pudding) supplementary feedings.

4. Operational Definitions of Variables

Modified supplementary feedings were a modification with materials government programs such as biscuits as one of the ingredients, and local materials that meet the requirements to become a supplementary feedings product that meet the rules of the energy's nutritional value density and protein approaches the standard supplementary feedings.

Standard supplementary feedings were a form of biscuits provided by the government for stunting aged 6-59 months with 90 days, every day 12 pieces with an energy of

540 kcal, 12 grams protein, and 18 grams, 84 grams carbohydrate.

Acceptability was the ability of toddlers aged 12-59 months to receive or consume modified supplementary feedings. Measured by visually estimating the amount of food eaten by looking at food scraps, the target of receiving modification is toddlers aged 12-59 months. With the Scales: 0 = not eaten; 1 = eaten a quarter of a portion; 2 = eaten half a portion; 3 eaten three-quarters of a portion; 4 = almost finished (approximately 1 table-spoon left); 5= food runs out.

The level of preference was the toddler preference for modified supplementary feedings made from biscuits in terms of taste, color, aroma, texture, and appearance. Measured by giving ratings from 1-4 for each category of taste, color, aroma, texture, and appearance with the scales 1 = very dislike, 2 = dislike, 3 = like, 4 = very like.

Energy Density Analysis was the energy content obtained from empirical calculations

of supplementary feedings constituent materials calculated based on their nutritional content with the unit for energy = Kcal, protein = gram, Fat = gram, Carbohydrate = gram.

4. Data Analysis

Univariate analysis was conducted to show sample characteristics in frequency and percentage. Bivariate analysis was carried out using Kruskal Wallis.

5. Research Ethics

This research had received ethical approval from the Ethics Commission of the Health Polytechnic of the Ministry of Health Malang with registration number: Reg.No:335/KE-PK-POLKESMA/2019 Sample

RESULTS

A. Sample Characteristics

The number of children under five who were willing to become research subjects who had less nutritional status based on weight/height in Janti Health Center, there were 16 children under five.

Table 1. Characteristics Samples (categorical data)

Variables	Categories	Frequency	Percentage
Number of the family member	<4	9	56.25
	≥4	7	43.75
Educational Level	Elementary	8	50.00
	Middle School	5	31.25
	High School	3	18.75

Table 2. Analysis of nutrition supplementary feedings per serving

Type of supplementary feedings	Energy (Kcal)	Protein (gram)	Fat (gram)	Carbohydrate (gram)
Standard Biscuits (12 pieces = 120 g)	540	12	18	84
Chocolate balls (5 pieces)	573.5	11	30	70
Chocolate pudding (7 cups = 420 g)	573.3	16.8	20.3	83.3

B. Bivariate Analysis

Table 3. The difference between standard and modified supplementary feedings on the acceptability

Variables	Mean	p
Biscuits (standard)	19.78	0.112
Chocolate Balls	29.94	
Chocolate Pudding	23.78	

Table 4. The difference between standard and modified supplementary feedings on the level of taste preference

Variables	Mean	p
Biscuits (standard)	20.88	0.022
Chocolate Balls	32.28	
Chocolate Pudding	20.34	

Table 5. The difference between standard and modified supplementary feedings on the level of color preference

Variables	Mean	p
Biscuits (standard)	17.88	0.022
Chocolate Balls	31.34	
Chocolate Pudding	24.28	

Table 6. The difference between standard and modified supplementary feedings on the level of preference for the display

Variables	Mean	p
Biscuits (standard)	18.41	0.025
Chocolate Balls	31.56	
Chocolate Pudding	23.53	

Table 7. The difference between standard and modified supplementary feedings on the level of texture preference

Variables	Mean	p
Biscuits (standard)	19.34	0.009
Chocolate Balls	33.03	
Chocolate Pudding	21.13	

Table 3 showed no significant difference in accessibility between supplementary feedings with biscuits (standard), chocolate balls, and chocolate pudding ($p= 0.112$).

Table 4 showed no significant difference in accessibility between supplementary feedings with biscuits (standard), chocolate balls, and chocolate pudding on the level of taste preference ($p= 0.022$).

Table 5 showed no significant difference in accessibility between supplementary feedings with biscuits (standard), chocolate

balls, and chocolate pudding on the level of color preference ($p= 0.022$).

Table 6 showed no significant difference in accessibility between supplementary feedings with biscuits (standard), chocolate balls, and chocolate pudding on the level of color preference ($p= 0.025$).

Table 7 showed no significant difference in accessibility between supplementary feedings with biscuits (standard), chocolate balls, and chocolate pudding on the level of color preference ($p= 0.009$).

DISCUSSION

Acceptability

Chocolate is a versatile food that is added to produce a different taste and texture sensation. The organoleptic characteristics of chocolate are very good at covering up unpleasant tastes and giving them a soft and texture creamy (Lang, 2007). Apart from chocolate, butter also gives chocolate balls a fragrant aroma. Sweetened condensed milk adds a sweet taste to the chocolate balls to mask dark chocolate's slight bitterness. The nuts provide the balls with an attractive appearance as they serve as a topping.

Some ingredients are added in the chocolate pudding modification, including flavored chocolate pudding, sugar, eggs, and biscuits. Pudding is made from instant pudding flour, consisting of dry ingredients such as milk powder, cocoa powder, and thickening (gel-forming) mixed homogeneously. The ingredients influence the color, texture, taste, appearance and aroma of the pudding in the pudding. In this chocolate pudding modification, the researchers added biscuits (standard), eggs, and sugar. This study's chocolate pudding was soft texture, attractive brown color with white fibers from the egg, not too sweet taste, and fragrant aroma from the chocolate pudding.

In chocolate balls, subjects like all the characteristics, including taste, color, aroma, appearance, and texture. This was evidenced by the statistical test results between standard biscuits (standard) and chocolate balls significant for all of these characteristics. This was inversely proportional to the yield between biscuits (standard) and chocolate pudding. This was consistent with the statement, "acceptability of food is influenced by the level of preference."

a. Taste

The taste produced by the chocolate balls was not too sweet, causing the child not to be full

and energized sooner, with a little savoury than butter. The addition of dark chocolate and butter was what increases the taste preference for chocolate balls. Butter is considered the best fat among others because of its convincing taste and sharp aroma because butterfat comes from animal milk fat. The chocolate's organoleptic characteristics cover up the unpleasant taste and give it a soft and texture creamy.

The sweet chocolate pudding taste comes from sugar, with a little savory flavor from the eggs and biscuits. Based on this, it was recommended to use pudding as an alternative modification to replace it with fruit flavors so that children avoid feeling bored. The level of liking for taste continues to increase, or there is no decrease, which will impact increased acceptance.

Pudding was administered in the last week of the study after giving chocolate balls in the previous week. The repetition of the chocolate taste caused boredom and resulted in a decrease in the level of preference.

b. Color

In the modification of chocolate balls, the anthocyanins contained chocolate function as natural coloring agents. Besides, in the modification of chocolate balls, the biscuit balls are coated with dark chocolate previously melted so that the color of the biscuits was coated with chocolate.

The chocolate pudding color was brown with white fibers from the egg with a layer of biscuits underneath. There was a difference between the unmodified and modified biscuits at the level of preference for the pudding color. Color tends to be monotonous brown color. It was recommended that the pudding be given a fruity flavor so that the colors were more attractive to children, such as pink and green.

c. Aroma

In the modification of chocolate balls, the dominant aroma was chocolate and butter. The aroma of the standard biscuit supplementary feeding was almost gone as it was covered in the chocolate and buttery aroma (stronger aroma than biscuits).

In the modification of chocolate pudding, the aroma was the dominant chocolate aroma from the pudding alone. The aroma from the biscuits was no longer smelled. From the two modifications, it can be seen that the level of preference for the aroma of chocolate balls and pudding had decreased from before the modification. In both modifications, the vanilla aroma from the standard biscuits was almost no longer smelled. Besides the interviews with mothers of toddlers, only modifications were needed that included taste, appearance, and texture.

d. Appearance

For the appearance of chocolate balls, they were considered attractive because of their cute round shape with a sprinkling of nuts on them with the appropriate portion, including 5 chocolate balls packed using clear mica to be transparent and can be seen in shape.

For the appearance of a brown pudding with a layer of biscuits underneath, eggs give an attractive appearance to the pudding, which is the fine fibers of white color. The packaging used is a 100 mL clear cup so that the color and fibers in the pudding can look attractive and clear from the outside.

e. Texture

The texture produced by the brown balls tends to be solid, soft and not hard. PMT biscuits, which are usually hard-textured, are crushed beforehand until they are smooth so that the child does not find the hard texture of the modified chocolate balls anymore.

The texture produced by chocolate pudding tends to be chewy, soft, and not hard. Standard biscuits are usually hard-textured are crushed before and until they

are smooth so that the child does not find the hard texture of the chocolate pudding modification anymore.

There was a significant difference between the three treatments, including the provision of standard biscuits, chocolate balls, and chocolate pudding on the level of preference for taste, color, appearance, and texture. And there was no significant difference between the three treatments, including the provision of standard biscuits, chocolate balls, and chocolate pudding to the received and the preference level of aroma.

REFERENCES

- Ahmad (2017). Chocolate Ingredients. Retrieved from [https://www.scribd.com/document/354230161 / Kandungan-Coklat](https://www.scribd.com/document/354230161/Kandungan-Coklat).
- MOH (2018). *Riskesdas 2018*. Jakarta: RI Ministry of Health.
- Hermina M (2017). Research Report on the Evaluation of the Implementation of the Supplementary Food Program (PMT) for Thin Toddlers and Pregnant Women with Chronic Energy Deficiency. Ministry of Health.
- Junita DE (2018). Factors Related to Acceptability of Supplementary Food to School Children Receiving Supplementary Food for Elementary School Children in Solok City in 2018. FKM: Andalas University, Padang
- Lang LY (2007). Treatability of Palm Oil Mill Effluent (POME) Using Black Liquor in an Anaerobic Treatment Process. Thesis for The Degree of Master of Science. University Sains Malaysia. Malaysia
- Marotz LR, Cross MZ, Rush JM (2005). *Health, Safety, and Nutrition for Young Child 6th Edition*. USA: The Thompson Corporation.
- Notoatmodjo S (2010). *Health Research Methodology*. Jakarta: Rineka Cipta.

Rijadi CB (2012). The Relationship between Taste of Food, Appearance of Food, and Other Factors to Acceptability of Soft Jakarta in 2012. Thesis, University of Indonesia, Depok.

Sugiyono (2010). Statistics for Research. Bandung: Alfabeta

Yuwanida BK (2017). Development of cooking recipes (vegetable and vegetable side dishes) for the regular food menu at the Islamic Hospital of Unisma

Food in Adult Patients at the General Care Building of RSAP Gatot Soebroto

Malang. Skrispi, Nutrition, Poltekkes Malang, Malang

Zanalia HI (2018). Acceptance and Fulfillment of Energy and Nutritional Adequacy of Elementary School Children in Food Management Systems at SD Plus Qurrota A'yun Malang. KTI, Poltekkes, Malang.