



THE EFFECT OF MODIFIED LUNCH ANIMAL SIDE DISHES ON LEFTOVERS IN PATIENTS ON A REGULAR RICE DIET

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ABSTRACT

Food waste is an important indicator of the quality of hospital nutrition services and influences the adequacy of patient intake. Data from Dr. H. Andi Abdurrahman Noor Regional General Hospital (RSUD) in 2025 showed that animal side dishes at lunch had the highest waste, particularly omelettes and fried catfish. This study aimed to assess the effect of modified animal side dishes on animal side dish waste in hospitalized patients on a regular rice diet. The study used a quasi-experimental design with a control and intervention group. A total of 72 patients were selected purposively, consisting of 36 patients who received standard side dishes and 36 patients who received modified side dishes (fried egg balado, sweet and sour catfish, and crispy catfish). Food waste was measured using the Comstock method, while sensory assessments were obtained through a questionnaire with validity test results showed that all sensory assessment questionnaire items had a calculated r value $>$ r table (0.30), thus being declared valid. The reliability test results for the sensory assessment questionnaire showed a Cronbach's Alpha value of 0.82, indicating a reliable instrument. The statistical test used was the independent mean difference test (T-independent test). The results showed that standard side dishes had a very high percentage of food waste. After modification, the average food waste decreased significantly ($p = 0.001$). Consumption of modified side dishes increased, with the "good" category reaching 63.9% for fried egg balado, 69.44% for sweet and sour patin, and 59.4% for crispy patin. This study concluded that modifying animal side dishes effectively reduced food waste and increased patient sensory acceptance.

Keywords: food waste; hospital nutrition services; modified animal side dishes; plain rice diet; sensory acceptance

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INTRODUCTION

Nutrition services in hospitals are an integral part of health care that aims to support the patient's healing process by optimally fulfilling nutritional needs (Emiliana et al., 2021). Hospital food service includes a series of processes starting from menu planning to serving food to patients, accompanied by an evaluation of the menu provided (Ardana & Nirwana, 2024). The success of hospital food service can be assessed through food waste indicators. Food waste is the portion of food not consumed by patients and left on plates. Food waste is categorized as high if the amount exceeds 20% (Rahmadani, 2018).

Food waste is one measure of food quality. The minimum service standards for hospital nutrition services stipulate that patients consume at least 80% of the food served (Nirmalarumsari & Sumarlan, 2024). The occurrence of food waste in these patients leads to inadequate nutritional intake, which is also related to the adequacy of the patient's nutritional intake. Adequate nutritional intake for hospitalized patients is essential to help accelerate the patient's healing process, shorten the length of stay, prevent complications, reduce mortality and morbidity, which ultimately can save on medical costs (Oktaviani, 2023).

Modifying animal side dishes, both in terms of processing methods, spices, texture, and presentation variations, is one strategy that can be implemented to increase the acceptability of patient food (Wati et al., 2025). Modification efforts can be made by modifying the recipe. Recipe

modification is the effort to make limited changes to the original recipe formula to create a new dish with better nutritional value, shape, taste, texture, and aroma, according to needs (Nilamina et al., 2025).

Recipe modification involves making limited changes to the original formula to obtain a new recipe with specific nutritional content, a specific form, and the desired quality, with the aim of meeting patient needs. Research by Nilamina et al., (2025) indicates that the use of standard recipe modifications has an impact on patient acceptance. Other hospital research indicates that the average food waste is 57%, with a breakdown of each type of food including vegetables (73%), animal side dishes (61%), staple foods (54%), and plant side dishes (41%) (Lestari et al., 2023).

In the research Oktaviani, (2023) a study entitled "The Relationship Between Taste and Menu Variety and Leftovers of Soft Food in Inpatients at Teluk Kuantan Regional Hospital" found a discrepancy. Of the 26 respondents with less varied diets, 7 (26.9%) had little leftovers. This was because patients believed hospital food was beneficial for the healing process. Meanwhile, of the 49 respondents with varied diets, 20 (40.8%) had large amounts of leftovers. This was because patients became bored with the food provided due to their prolonged hospitalization. This study was supported by the chi-square statistical test, which obtained a p-value of 0.016 ($\alpha=0.05$), indicating a significant relationship between food variety and leftovers in inpatients at Teluk Kuantan Regional Hospital. The Prevalence Odds Ratio (POR) value was 3.936 (95% CI = 1.395-11.102), meaning that patients with less varied diets were 3.9 times more likely to have large amounts of leftovers than those with varied diets.

In this study, Giesthafanny, (2022) the study, titled "Literature Review: Analysis of Factors Causing Food Waste in Hospital Institutions," shows that attractive food presentation plays a role in increasing patient appetite. Appealing food presentation is influenced by color variation, portion size, and consistency of texture. Appealing food presentation has been shown to reduce food waste among patients. Therefore, hospital food service providers need to pay more attention to food presentation aspects to increase patient appetite and reduce food waste.

The high amount of animal side dish waste indicates low patient acceptance, which is thought to be influenced by a lack of menu variety, repeated servings of animal side dishes within a short time, and processing methods and seasonings that do not align with patient preferences. If this condition is not addressed, it can result in inadequate patient nutritional needs, a decline in the quality of hospital nutrition services, and increased food waste. Therefore, improvements are needed through modifying animal side dishes, especially at lunchtime, as a strategy to increase patient acceptance and reduce food waste. Based on this, the aim of this study is to analyze the effect of modifying animal side dishes for lunch on the remaining animal side dishes in patients receiving a regular rice diet at Dr. H. Andi Abdurrahman Noor Regional General Hospital.

METHOD

This study was a quasi-experimental study. It compared the remaining animal side dishes and sensory assessments of groups receiving standard animal side dishes and those receiving modified animal side dishes. The study used a quasi-experimental design with two groups: a control group (standard animal side dish menu) and an intervention group (modified animal side dish menu). This design measured the effectiveness of the side dish modification on taste and appearance, including taste (aroma, seasoning, temperature, doneness) and appearance (color, texture, shape, portion size). The study was conducted at Dr. H. Andi Abdurrahman Noor Regional General Hospital in Tanah Bumbu Regency. The study period was from October to November 2025. The population in this study was an average of 267 patients per month. The sample size was obtained using the Slovin formula, with 72 inpatients receiving a regular rice diet. The sampling technique used in this study

was purposive sampling. The criteria used for the sample were willingness to participate, having received regular rice, and being able to communicate.

The modified menus included the second menu cycle, which included omelettes and fried eggs in balado sauce (package A), the fourth menu cycle, which included fried patin (fried patin with sweet and sour sauce) and fried patin (fried patin with sweet and sour sauce) (package B), and the seventh menu cycle, which included fried patin (fried patin with crispy sauce) (package C). The samples consisted of the standard and modified animal side dishes, each group receiving the standard and modified animal side dishes. The sample size was 72 participants: 36 participants received the standard menu and 36 participants received the modified menu. This study used a Food Residue Assessment Sheet (Comstock method) questionnaire. This questionnaire was used to measure patients' food waste after consumption, using a specific rating scale. The percentage of remaining animal side dishes measured was categorized as 1 (Poor), with $\geq 20\%$ remaining, and 2 (Good), with $< 20\%$ remaining.

The Sensory Assessment Questionnaire was used to assess patients' perceptions of the side dishes served, including aroma, taste/seasoning, texture, temperature, color, and appearance (adjusted to the sensory variables studied). Validity test results showed that all sensory assessment questionnaire items had a calculated r value $> r$ table (0.30), thus being declared valid. The reliability test results for the sensory assessment questionnaire showed a Cronbach's Alpha value of 0.82, indicating a reliable instrument. The statistical test used was the independent mean difference test (T-independent test). This research has passed ethical approval under No. 694/KEPK-PKB/2025, issued by the Health Research Ethics Committee (KEPK) of the Banjarmasin Ministry of Health Polytechnic on October 16, 2025

RESULT

Modifications to Animal Side Dishes

Table 1.




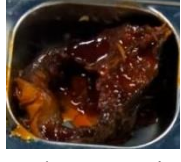


Modifications to Animal Side Dishes		
Menu	Animal Side Dishes Before Modifications	Animal Side Dishes After Modifications
Day Cycle-2	 Omelet	 Fried Eggs in Balado Sauce
Day Cycle-4	 Fried Patin	 Sweet and Sour Fried Patin
Day Cycle-7	 Fried Patin	 Crispy Patin

Table 1 shows a comparison of the recipe's form and preparation before and after modifications.

Table 2
Frequency Distribution of Remaining Animal Side Dishes Packages A B C

Remaining Animal Side Dishes Package A	Standard Side Dishes		Modified Side Dishes	
	f	%	F	%
Good	0	0	23	63,89
Not Good	36	100	13	36,11
Remaining Animal Side Dishes Package B	f	%	f	%
Good	1	2,78	25	69,44
Not Good	35	97,22	11	30,56
Remaining Animal Side Dishes Package C	f	%	f	%
Good	1	2,8	25	59,4
Not Good	35	97,2	11	30,6

Table 3.
Frequency Distribution of Patient Assessments of the Taste of Standard and Modified Animal Side Dishes Packages A B C

Package		Rating									
		Dislike		Less Like		Like		Very Like		Total	
		f	%	f	%	f	%	f	%	f	%
Package A Taste											
Aroma	Standard	12	33,3	11	30,6	10	27,8	3	8,3	36	100
	Modified	0	0	7	19,4	24	66,7	5	13,9	36	100
Spices	Standard	16	44,4	7	19,4	8	22,2	5	13,9	36	100
	Modified	0	0	15	41,7	17	47,2	4	11,1	36	100
Temperature	Standard	15	41,7	9	25,0	5	13,9	7	19,4	36	100
	Modified	0	0	12	33,3	9	25,0	15	41,7	36	100
Cookedness	Standard	11	30,6	10	27,8	7	19,4	8	22,2	36	100
	Modified	0	0	2	5,6	8	22,2	17	47,2	36	100
Package B Taste											
Aroma	Standard	24	66,7	8	22,2	2	5,6	2	5,6	36	100
	Modified	1	2,8	20	55,6	10	27,8	5	13,9	36	100
Spices	Standard	18	50,0	9	25,0	8	22,2	1	2,8	36	100
	Modified	0	0	19	52,8	9	25,0	8	22,2	36	100
Temperature	Standard	21	58,3	7	19,4	3	8,3	5	13,9	36	100
	Modified	0	0	16	44,4	14	38,9	6	16,7	36	100
Cookedness	Standard	8	22,2	17	47,2	4	11,1	7	19,4	36	100
	Modified	2	5,6	8	22,2	24	66,7	2	5,6	36	100
Package C Taste											
Aroma	Standard	23	63,9	11	30,6	1	2,8	1	2,8	36	100
	Modified	1	2,8	20	55,6	10	27,8	5	13,9	36	100
Spices	Standard	17	47,2	13	36,1	6	16,7	0	0	36	100
	Modified	0	0	16	44,4	14	38,9	6	16,7	36	100
Temperature	Standard	23	63,9	4	11,1	4	11,1	5	13,9	36	100
	Modified	2	5,6	8	22,2	24	66,7	2	5,5	36	100
Cookedness	Standard	7	19,4	21	58,3	3	8,3	5	13,9	36	100
	Modified	1	2,8	6	16,7	26	72,2	3	8,3	36	100

Table 2 shows a comparison of the remaining animal side dishes between the standard omelette and the modified fried egg in Package A. For the standard omelette, all respondents (100%) rated it as poor. For the fried egg in Balado, the majority (25 respondents) rated it as good. For the standard fried egg, almost all respondents (97.22%) rated it as poor, with only one (2.78%) rating it as good. After the modification to sweet and sour fried patin, acceptance increased significantly. Twenty-five respondents (69.44%) rated the Sweet and Sour Fried Patin as good, significantly higher than the standard Fried Patin. The table shows a clear difference between the levels of remaining animal side dishes in Package C before and after the modification. For the standard fried patin, almost all respondents (97.2%) rated the food as poor. On the other hand, after being modified into crispy

patin, there was a significant increase in consumption, where 59.4% of respondents were in the good category.

Table 3 shows changes in patient ratings of the flavor of animal-based side dishes before and after modifications to packages A, B, and C. For seasoning before modification, the highest rating was "dislike" at 44.4%, while the lowest rating was for aroma, with only 8.3% rating "very much like." After modification, there was a significant shift in ratings, with aroma changing to "like" at 66.7%, with no respondents reporting "dislike." The table also shows changes in patient ratings of the flavor of animal-based side dishes before and after modifications to package B, covering aspects of aroma, seasoning, temperature, and doneness. For flavor before modification, the highest rating was "dislike" at 66.7%, while the lowest rating was "very much like" at 2.8%. After modification, the highest rating shifted to "like" at 66.7%, with no respondents reporting "dislike" in the temperature and seasoning categories. The table shows changes in patient assessments of the taste of animal side dishes before and after the modification of package C, which includes aspects of aroma, seasoning, temperature, and doneness. In the taste aspect before the modification, the highest was in the aroma and temperature category "dislike" at 63.9%, while the lowest category was in the seasoning category with no respondents stating "very much like." After the modification, the highest assessment shifted to "like" at 72.2% in the doneness category and the lowest category was with no respondents stating "dislike" in the seasoning category.

Table 4.

Frequency Distribution of Patient Assessments of the Appearance of Standard and Modified Animal Side Dishes Packages A B C

Package A Appearance		Rating									
		Dislike		Less Like		Like		Very Like		Total	
		f	%	f	%	f	%	f	%	f	%
Color	Standard	21	58,3	10	27,8	4	11,1	1	2,8	36	100
	Modified	0	0	25	69,4	7	19,4	4	11,1	36	100
Textur	Standard	9	25,0	13	36,1	11	30,6	3	8,3	36	100
	Modified	0	0	15	41,7	11	30,6	10	27,8	36	100
Shape	Standard	10	27,8	20	55,6	4	11,1	2	5,6	36	100
	Modified	0	0	15	41,7	19	52,8	2	5,6	36	100
Portion Size	Standard	10	27,8	14	38,9	7	19,4	5	13,9	36	100
	Modified	3	8,3	4	11,1	27	75	2	5,6	36	100
Package B Appearance		f	%	f	%	f	%	f	%	f	%
Color	Standard	16	44,4	6	16,7	7	19,4	7	19,4	36	100
	Modified	1	2,8	6	16,7	26	72,2	3	8,3	36	100
Textur	Standard	16	44,4	9	25,0	9	25,0	2	5,6	36	100
	Modified	0	0	10	27,8	21	58,3	5	13,9	36	100
Shape	Standard	5	13,9	23	63,9	6	16,7	2	5,6	36	100
	Modified	0	0	20	55,6	13	36,1	3	8,3	36	100
Portion Size	Standard	7	19,4	20	55,6	3	8,3	6	16,7	36	100
	Modified	2	5,6	20	55,6	10	27,8	4	11,1	36	100
Package C Appearance		f	%	f	%	f	%	f	%	f	%
Color	Standard	18	50,0	7	19,4	6	16,7	5	13,9	36	100
	Modified	0	0	19	52,8	9	25,0	8	22,2	36	100
Textur	Standard	18	50,0	6	16,7	11	30,6	1	2,8	36	100
	Modified	0	0	10	27,8	21	58,3	5	13,9	36	100
Shape	Standard	5	13,9	25	69,4	6	16,7	0	0	36	100
	Modified	0	0	20	55,6	13	36,1	3	8,3	36	100
Portion Size	Standard	4	11,1	22	61,1	4	11,1	6	16,7	36	100
	Modified	2	5,6	20	55,6	10	27,8	4	11,1	36	100

Table 4 shows changes in patient ratings of the appearance of animal side dishes before and after modification, including color, texture, shape, and portion size. For appearance before modification to Package A, the highest and lowest ratings were for color, with 58.3% reporting "dislike" and 2.8% reporting "very like." After modification, the highest rating shifted to "like" for portion size, with 75% reporting "like," and the lowest rating was for color, texture, and shape, with no respondents reporting "dislike" (0%). The table also shows changes in patient ratings of appearance of animal side dishes before and after modification to Package B. For appearance before modification, the highest rating was for shape, with 63.9% reporting "dislike," and the lowest rating was for shape and texture, with 5.6%. After modification, the highest rating was for color, with 72.2% reporting "like," and the lowest rating was for texture and shape, with no respondents reporting "dislike." The table shows a clear improvement in all aspects of appearance of Package C's animal side dishes after modification to crispy catfish. In terms of appearance before modification, the highest score was "dislike" at 69.4%, while the lowest score was "very much like" with no respondents stating "very much like." After modification, the highest score was "like" at 58.3% in the texture category, and the lowest score was "dislike" with no respondents stating "dislike" in the color, texture, or shape categories.

Table 5.
Analysis of the Effect of Modified Animal Side Dishes on Remaining Animal Side Dishes in Packages A, B, C

Variable	Group	n	Mean	P Value
Remaining Side Dishes Package A	Standard (omelet)	36	2.611	0,001
	Modified (Fried Eggs in Balado Sauce)	36	1.111	
Remaining Side Dishes Package B	Standard (fried patin)	36	2.583	0,001
	Modified (patin with sweet and sour sauce)	36	1.056	
Remaining Side Dishes Package C	Standard (fried patin)	36	2.528	0,001
	Modified (crispy patin)	36	1.056	

Table 5, the analysis results show a significant effect of modifying animal side dishes on the remaining animal side dishes in all menu packages studied, namely Package A, Package B, and Package C. In Package A, the average remaining animal side dish in the standard group with an omelet was 2.611 grams, while in the modified group with fried eggs in balado, the average remaining decreased to 1.111 grams. The statistical test results showed a p-value of 0.001, indicating a significant difference between the standard and modified groups. In Package B, the average remaining animal side dish in the standard group with fried catfish was 2.583 grams, while in the modified group with sweet and sour fried catfish, the average remaining animal side dish decreased to 1.056 grams. The p-value of 0.001 indicates that modifying animal side dishes significantly reduced the remaining animal side dish. Furthermore, in Package C, the standard group with fried patin had an average of 2.528 servings of animal side dishes, while the modified group with crispy patin showed a lower average of 1.056 servings. The statistical test results, with a p-value of 0.001, confirmed a significant difference between the two groups. Overall, the results of this study indicate that modifying animal side dishes at lunch significantly reduced animal side dish leftovers in patients receiving a regular rice diet.

Table 6, the analysis results show that modifications to the flavor and appearance of the animal side dishes in Package A varied significantly on patient acceptance. Regarding taste, the aroma component showed a significant difference between the standard and modified groups. The average aroma rating in the standard group was 2.111, while in the modified group it increased to 2.944, with a p-value of 0.001. This indicates that modifying the animal side dishes significantly improved the aroma of the food. The seasoning component also showed a significant difference, with the standard group having an average rating of 2.056, while the modified group had an average rating of 2.694, with a p-value of 0.004. Conversely, there were no significant differences in temperature and doneness between the standard and modified groups, with p-values of 0.208 and 0.212, respectively.

Table 6.
Analysis of the Effect of Modified Animal Side Dishes on the Taste and Appearance of Animal Side Dishes (Balado Eggs) Package A

Taste	Group	n	Mean	P Value
Aroma	Standard	36	2.111	0,001
	Modified	36	2.944	
Spices	Standard	36	2.056	0,004
	Modified	36	2.694	
Temperature	Standard	36	2.111	0,208
	Modified	36	2.389	
Cookedness	Standard	36	2.333	0,212
	Modified	36	2.639	
Appearance	Group	n	Mean	P Value
Color	Standard	36	1.583	0,001
	Modified	36	2.417	
Textur	Standard	36	2.222	0,003
	Modified	36	2.861	
Shape	Standard	36	1.944	0,001
	Modified	36	2.639	
Portion Size	Standard	36	2.194	0,005
	Modified	36	2,778	

Regarding appearance, all components assessed showed significant differences between the standard and modified groups. The color component had an average rating of 1.583 in the standard group and increased to 2.417 in the modified group, with a p-value of 0.001. The texture component also showed a significant increase, from an average of 2.222 in the standard group to 2.861 in the modified group, with a p-value of 0.003. Furthermore, the shape component showed an average rating of 1.944 in the standard group and 2.639 in the modified group, with a p-value of 0.001. The portion component also experienced a significant increase, from an average of 2.194 in the standard group to 2.778 in the modified group, with a p-value of 0.005. Overall, these results indicate that modifying the animal side dishes in Package A significantly improved the aroma and seasoning aspects of the flavor, as well as all aspects of the food's appearance, but did not significantly affect the temperature and doneness.

Table 7.
Analysis of the Effect of Flavor Modifications on Animal Side Dishes (Sweet and Sour Fried Catfish) Package B

Taste	Group	n	Mean	P Value
Aroma	Standard	36	1.500	0,001
	Modified	36	2.528	
Spices	Standard	36	1.778	0,004
	Modified	36	2.694	
Temperature	Standard	36	1.778	0,208
	Modified	36	2.722	
Cookedness	Standard	36	2.278	0,212
	Modified	36	2.722	
Appearance	Group	n	Mean	P Value
Color	Standard	36	2.139	0,001
	Modified	36	2.861	
Textur	Standard	36	1.917	0,003
	Modified	36	2.861	
Shape	Standard	36	2.139	0,001
	Modified	36	2.528	
Portion Size	Standard	36	2.222	0,005
	Modified	36	2,444	

Table 7, the analysis results show that modifying the flavor of the animal side dish (sweet and sour fried catfish) in Package B significantly impacted several aspects of the food's taste and appearance. In terms of taste, the aroma component showed a significant difference between the standard and

modified groups. The average aroma rating in the standard group was 1.500, while in the modified group it increased to 2.528, with a p-value of 0.001. The seasoning component also showed a significant increase, from an average of 1.778 in the standard group to 2.694 in the modified group, with a p-value of 0.004. Conversely, no significant differences were found in the temperature and doneness components between the standard and modified groups. The average temperature rating increased from 1.778 to 2.722, with a p-value of 0.208, while the doneness rating increased from 2.278 to 2.722, with a p-value of 0.212. In terms of appearance, all assessed components showed significant differences between the standard and modified groups. The color component increased on average from 2.139 in the standard group to 2.861 in the modified group, with a p-value of 0.001. The texture component also showed a significant increase, from an average of 1.917 to 2.861, with a p-value of 0.003. Furthermore, the shape component increased from 2.139 to 2.528, with a p-value of 0.001, and the portion component increased from 2.222 in the standard group to 2.444 in the modified group, with a p-value of 0.005. Overall, the results of this study indicate that the modification of the sweet and sour fried catfish side dish in Package B significantly improved the aroma and seasoning, as well as all aspects of the food's appearance, but did not significantly affect the temperature and doneness.

Table 8.
Analysis of the Effect of Flavor Modification of the Animal Side Dish
(Crispy Catfish) in Package C

Taste	Group	n	Mean	P Value
Aroma	Standard	36	1.444	0,001
	Modified	36	2.528	
Spices	Standard	36	1.694	0,001
	Modified	36	2.722	
Temperature	Standard	36	1.720	0,001
	Modified	36	2.722	
Cookedness	Standard	36	2.167	0,001
	Modified	36	2.861	
Appearance	Group	n	Mean	P Value
Color	Standard	36	1.944	0,002
	Modified	36	2.694	
Textur	Standard	36	1.861	0,001
	Modified	36	2.861	
Shape	Standard	36	2.028	0,001
	Modified	36	2.528	
Portion Size	Standard	36	2.333	0,575
	Modified	36	2,444	

Table 8, the analysis results show that the modification of the flavor of the animal side dish (crispy catfish) in Package C significantly affected most aspects of the food's taste and appearance. In terms of taste, all components assessed showed significant differences between the standard and modified groups. The aroma component increased on average from 1.444 in the standard group to 2.528 in the modified group, with a p-value of 0.001. The seasoning component also increased significantly from 1.694 to 2.722, with a p-value of 0.001. Furthermore, the temperature component showed a significant increase from an average of 1.720 in the standard group to 2.722 in the modified group, with a p-value of 0.001. The degree of doneness component also increased significantly from 2.167 to 2.861, with a p-value of 0.001.

In terms of appearance, most components showed significant differences. The color component increased from an average of 1.944 in the standard group to 2.694 in the modified group, with a p value of 0.002. The texture component also showed a significant increase from 1.861 to 2.861, with a p value of 0.001. The shape component increased from an average of 2.028 in the standard group to 2.528 in the modified group, with a p value of 0.001. However, in the portion component, no significant difference was found between the standard and modified groups, with a p value of 0.575.

Overall, the results of this study indicate that the modification of crispy catfish side dishes in Package C significantly improved all aspects of taste and most aspects of food appearance, except for the portion aspect which did not show a significant difference.

DISCUSSION

Analysis of the Effect of Modifying Animal Side Dishes in Package A (Balado Fried Eggs)

Modifying the animal side dish in Package A from omelet to balado fried egg significantly reduced food waste, with the mean remaining portion decreasing from 2.611 to 1.111 ($p = 0.001$). This finding indicates an increase in side dish consumption by patients and aligns with various studies that suggest menu modification is effective in reducing food waste in hospitals by increasing food acceptability. Regarding flavor, there was a significant increase in aroma (2.111 to 2.944; $p = 0.001$) and seasoning (2.056 to 2.694; $p = 0.004$), indicating that the use of balado seasoning better aligns with patient preferences and increases appetite. Conversely, temperature and doneness did not show significant differences, although there was an increase in the mean. This indicates that these aspects are more influenced by the hospital's food processing standards and distribution system than menu variety.

In terms of appearance, modifications to animal side dishes significantly impacted color, texture, shape, and portion size. Color increased from 1.583 to 2.417 ($p = 0.001$), texture from 2.222 to 2.861 ($p = 0.003$), shape showed a significant difference ($p = 0.001$), and portion size increased from 2.194 to 2.778 ($p = 0.005$). These improvements indicate that a more appealing visual appearance and portion size contribute to increased patient acceptance of animal side dishes. Overall, modifications to the fried egg balado side dish were shown to improve the sensory quality and appearance of the food, resulting in a reduction in leftover animal side dishes, thus supporting the effectiveness of menu modification as a strategy to improve the quality of hospital nutrition services.

Analysis of the Effect of Modifying Package B Animal Side Dishes (Sweet and Sour Fried Catfish)

Modifying Package B animal side dishes, including sweet and sour fried catfish, significantly reduced patient food waste. The average food waste decreased from the standard side dish to the modified side dish. This decrease indicates that the flavor modification and the addition of sweet and sour sauce made the side dish more popular and consumed by patients. The results of this study are consistent with the findings of Putri and Lestari (2021), who stated that menu modifications can increase acceptability and reduce food waste in hospitalized patients. Manimaran et al. (2023) also confirmed that changing processing techniques and enhancing flavor are effective strategies for reducing food waste in hospitals.

In terms of aroma, there was a very significant improvement, with an average increase. The stronger and more appealing sweet and sour aroma has been shown to enhance patient sensory preferences. This increased aroma acceptance aligns with the results of research by Yuliani and Sari (2021), who found that enhancing food aroma directly impacts patient food consumption. Afrinis and Verawati (2023) also stated that aroma is the strongest sensory indicator in determining the acceptability of animal side dishes in hospitals. The seasoning variable showed a significant improvement, indicating that the sweet and sour seasoning formulation provided a taste experience more in line with patient preferences. These results align with research by Dewi and Pramesti (2022), which demonstrated that seasoning modification significantly increased food preference scores among inpatients. This finding was further supported by Putringtyas et al. (2020), who stated that the use of more varied and complex seasonings can improve the acceptability of side dishes in food service institutions.

Regarding the temperature variable, it was shown that the processing and serving of modified side dishes maintained food temperatures at more optimal levels. Research by Annisa and Hidayat (2023) demonstrated that improved food temperatures correlated with increased patient satisfaction. Maharani (2022) also found that food served at optimal temperatures was preferred and consumed more frequently, making these findings relevant to the improved scores for the sweet and sour fried patin modification. The improvement in doneness indicates that recooking with sweet and sour sauce resulted in a softer, more palatable fish texture for patients. These results align with the findings of Sukmawati and Aryani (2021), who confirmed that processing techniques that improve texture and doneness can improve palatability in hospitalized patients. Therefore, the modification of side dishes in this study was shown to provide better sensory results in terms of doneness.

Color and texture variables also showed improvements. The brighter color of the sweet and sour sauce and the softer texture of the fish were shown to improve aesthetic value and patient eating comfort. These findings are consistent with Santoso and Rahmadani (2020), who stated that visual appearance and texture are important determinants of food acceptance. Furthermore, Detopoulou et al. (2022) confirmed that improving dish presentation can increase energy intake in hospital patients. Both shape and portion sizes improved, although portion sizes did not show statistical significance. The insignificance of the portion size variable may be due to the standardization of food portions in hospitals. In hospital food service delivery, the portion sizes of animal-based side dishes are determined based on standard nutritional requirements and patient diets, ensuring that both standard and modified menus are served in the same quantity and weight. Modifications made in this study only included changes in shape, seasoning, and preparation techniques, without changing the portion sizes.

Furthermore, respondents' perceptions of portion sizes tended to be relatively stable, as portion sizes are more influenced by the patient's physiological needs and clinical condition than by menu variations. This resulted in the difference in mean values before and after modifications not being large enough to produce statistical significance. These results are relevant to research by Ronitawati et al. (2022), which stated that portion size perceptions often remain unchanged despite improvements in the sensory quality of food. The improvement in shape suggests that patients perceive sweet and sour fried catfish as more appealing overall. However, the insignificant portion size indicates that portion changes are not the primary factor in increasing consumption of this side dish. Overall, the modification of sweet and sour fried catfish was shown to have a positive and significant impact on nearly all sensory and consumption variables for patients.

Analysis of the Effect of Modifying Package C Animal Side Dishes (Crispy Catfish)

Modifying Package C animal side dishes showed a significant impact on reducing patient food waste. The average food waste for the standard side dish, from 2,528 pieces, decreased to 1,056 pieces after being modified to crispy catfish, with a p-value of 0.001. This decrease indicates that the crispy processing technique increases patient acceptance of fish side dishes. This finding aligns with research by Putri and Lestari (2021), which reported that modifying the texture and flavor of animal side dishes can increase food consumption by up to 40%. Furthermore, Manimaran et al. (2023) also showed that crispy textured foods tend to be preferred by patients because they provide a more pleasant eating sensation.

A significant increase was also found in aroma, which increased from 1,444 pieces to 2,528 pieces (p-value = 0.001). The aroma changes resulting from the crispy frying process provide a stronger sensory appeal for patients. Research by Yuliani and Sari (2021) supports these findings, stating that aroma is the most important sensory factor determining whether patients are willing to consume hospital food. Furthermore, Afrinis and Verawati (2023) also reported that the aroma of crispy food conveys a perception of freshness and significantly increases appetite, especially in hospitalized patients with decreased appetite.

Regarding seasoning, the mean score increased from 1,694 to 2,722 ($p = 0.001$), indicating that the seasoning used in the crispy catfish side dish better suited patient preferences. The more even distribution of seasoning due to the flour coating process also enhanced the flavor. These results align with research by Dewi and Pramesti (2022), which confirmed that the use of spice-based seasonings and crispy processing techniques improved the palatability of animal dishes. Putriningtyas et al. (2020) also reported that more complex seasoning formulations proved effective in improving the acceptability of hospital food.

Food temperature showed a significant increase from 1,750 to 2,722 ($p = 0.001$). Crispy patin dishes maintained their optimal temperature better when served, thanks to their flour-coated structure, which retains heat longer than conventionally fried patin. This finding is supported by research by Annisa and Hidayat (2023), which showed that flour-coated foods tend to maintain a more stable temperature. Maharani (2022) also reported that satisfaction with food temperature was positively correlated with increased patient food consumption. The doneness level also increased significantly from 2.167 to 2.861 ($p = 0.001$). Crispy patin dishes produced a softer, cooked texture on the inside while remaining crispy on the outside, enhancing eating comfort. These results are consistent with the findings of Sukmawati and Aryani (2021), who stated that deep-frying provides a more consistent level of doneness in fish than conventional frying. This study explains that doneness level is an important indicator in the sensory evaluation of hospital animal side dishes.

The color and texture aspects showed significant increases, respectively, from 1,944 to 2,694 ($p = 0.002$) and from 1,861 to 2,861 ($p = 0.001$). The golden color of crispy catfish was considered more visually appealing, while the crunchy texture was the factor most influencing patient acceptance. Santoso and Rahmadani (2020) stated that brighter food colors significantly increase appetite. Detopoulou et al. (2022) added that the crunchy texture provides a multisensory stimulus that results in a more positive eating experience for hospital patients. Regarding shape and portion, the mean shape increased from 2,028 to 2,528 ($p = 0.001$), while the portion size increased from 2,333 to 2,444 ($p = 0.575$), although the increase in portion size was not significant between before and after modification. These results align with research by Hartono and Adriani (2017) and Dewi et al. (2019) stated that hospital menu modifications do not always affect patient portion perceptions, as food portions are generally set based on dietary standards and patient nutritional needs. Improved presentation showed that the cut and presentation of crispy catfish were more appealing than standard fried catfish. This is relevant to research by Ronitawati et al. (2022), which stated that food presentation influences aesthetic perception and appetite, although portion size is not always the dominant factor in increasing consumption. Overall, the modification of crispy catfish was shown to have a positive impact on almost all sensory aspects and patient food consumption.

CONCLUSION

The majority of leftovers of standard animal side dishes were found in the omelet and fried catfish menus. Most of these leftovers were in the “poor” category, with a percentage of 97.22% in the omelet and 100% in the fried catfish. This finding indicates a low level of consumption of standard animal side dishes in both types of menus. The remaining animal side dishes in the modified side dishes (fried egg balado, sweet and sour catfish, crispy catfish) were in the “good” category, reaching 63.89% (fried egg balado), 69.44% (sweet and sour catfish), and 59.4% (crispy catfish). Modified animal side dishes were proven to provide consistent improvements in all sensory aspects of food compared to standard side dishes, as shown by the average increase in all assessment variables. The results showed that the modification of animal side dishes overall had an effect compared to standard animal side dishes. However, in Package A, the temperature and doneness variables did not show statistically significant differences, while in Package B and Package C, the portion variable also did not show significant differences. However, the mean values for these variables increased after the modification, although this increase was not statistically significant. This finding indicates that the effectiveness of animal side dish modification varies across menu

packages and across assessment variables. The differences in taste and appearance between standard and modified animal side dishes affected the remaining animal side dishes, where the sensory enhancement of the modified animal side dishes increased patient acceptance and reduced the remaining animal side dishes at lunch to approach hospital nutrition service standards ($\leq 20\%$).

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