Menu Patterns, Food Acceptability, and Lunch Preferences among Female Students

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Abstract: *This study aims to examine the menu patterns, food acceptability, and lunch preferences among female students of ICBS Wustha Al Muflihun, Malang. A descriptive qualitative research design with a cross-sectional approach was employed. Data collection used modified observation and interview methods. A total of 34 students were selected from 52 using purposive sampling. The study found that the lunch menu patterns were generally unbalanced, consisting only of staple food, plant-based side dishes, and vegetables. Food acceptability was categorized as good, with an average leftover percentage of 6.53%. Regarding preference, 67% of students liked the taste, 56% liked the color and aroma, and 64% liked the texture. It is suggested that school lunch providers consider a more balanced menu and improve variation to increase acceptance and nutritional adequacy.*

Keywords: *menu pattern, food acceptability, lunch preference, adolescent nutrition, school meals*

INTRODUCTION

Adolescence is a critical period characterized by rapid growth and development, which significantly increases the body's nutritional needs. During this stage, adolescents require a balanced intake of energy and nutrients to support both physical growth and cognitive function (Sinai et al, 2021). However, this age group is also highly susceptible to nutritional issues such as undernutrition and anemia, often due to poor eating habits, including irregular meal patterns and low dietary diversity (Kupka et al., 2020).

School-based meal programs play a vital role in addressing adolescent nutrition by providing meals that can contribute significantly to daily nutrient requirements. Lunch, in particular, is essential as it supplies approximately one-third of the total daily energy needs (Rohayati, 2014). A well-organized lunch program should offer a nutritionally balanced and appealing menu to ensure adequate intake and prevent food waste (FAO, 2023).

ICBS Wustha Al Muflihun in Malang is one such institution that provides lunch through an internal food service system. Preliminary observations indicated concerns regarding the adequacy of menu planning and student satisfaction with the meals served. Given the influence of food sensory qualities—such as taste, color, texture, and aroma—on meal acceptance and intake, it becomes crucial to assess not only the nutritional adequacy but also the sensory appeal of school meals.

This study aims to examine the lunch menu patterns, food acceptability, and student preferences at ICBS Wustha Al Muflihun. The research seeks to understand how menu composition and sensory factors influence food consumption behavior among female students. The findings are expected to provide insights for improving school meal services to better meet the nutritional needs and preferences of adolescents.

METHODS

This research employed a descriptive qualitative design using a cross-sectional approach to assess menu patterns, food acceptability, and lunch preferences among students. The study was conducted on January 2024, at ICBS Wustha Al Muflihun, Malang.

The target population consisted of all female students aged 12–16 years enrolled in grades 7 to 9. Using purposive sampling, 34 students were selected from a total population of 52, based on criteria including regular participation in the school lunch program and willingness to complete all components of the research.

Data were collected through structured observation and interviews, using modified instruments. Menu patterns were evaluated by observing the daily lunch components served over a 7-day cycle and classified based on the category of a balanced menu (4 components: staple food, side dish, vegetable, fruit) or unbalanced (<4 components). Food acceptability was categorized based on the percentage of food waste (≤20% = good) (Kemenkes, 2014). The level of preference refers to the method used by Dewi (2022) which is categorized as good (≥80%), moderate (60–79%), avd low (<60%). Lunch preference data were gathered using a 3-point hedonic scale (1 = dislike, 2 = neutral, 3 = like) to evaluate taste, color, texture, and aroma of the meal.

Descriptive analysis was conducted to determine the frequency and percentage distribution of responses in each category. Findings were interpreted in relation to existing literature and institutional food service standards. Data analysis using the Spearman correlation test, with a significant value of ρ-value < 0.05.

RESULTS AND DISCUSSION
Menu Patterns and Food Waste:

The lunch menu observed over seven days at ICBS Wustha Al Muflihun showed an unbalanced pattern. All meals consisted of only three components: staple food (rice), plant-based side dishes (tempeh or tofu), and vegetables (such as *sayur asem*, *sayur sop*, or *sayur lodeh*). No animal-based side dishes or fruits were included throughout the cycle, indicating that students' nutritional needs were not fully met in terms of both variety and nutrient adequacy. One contributing factor was a limited food budget, which constrained the variety of food ingredients.

The results of the study are in line with the research of Pujiastuti and Murti (2022) on the pattern of breakfast and lunch menus for seven days at the Kanjeng Sunan Kalijogo Islamic Boarding School. The results show that the menu served does not meet the balanced category. Breakfast consists of rice, tempeh, and crackers, while lunch consists of rice, tofu and tempeh, and vegetables. There are no animal and fruit side dishes on the menu. This condition is caused by limited costs that affect the variety and portion of food.

The evaluation of food waste revealed that the average leftover rate over seven days was 6.53%, with the following breakdown: rice (4.83%), plant-based side dishes (5.86%), and vegetables (8.91%). Although these values fall below the 20% threshold typically used to indicate good food acceptability (Kemenkes, 2008), the highest waste occurred in the vegetable component. This suggests a degree of boredom or lower preference for vegetables, particularly because some vegetable dishes (such as *sayur sop*) were served repeatedly—appearing three times within a week.

Several factors that influence food waste consist of internal factors, namely food quality such as appetite, eating habits, taste, aroma, texture of food and boredom such as the menu served is not varied and there is repetition of the menu (Rudolf, 2014).

The highest food waste was recorded on the first day (10.54%), possibly due to undercooked rice, which negatively affected consumption. This highlights that, in addition to menu variety, technical aspects of food preparation also influence students' food intake. Izzah (2023) explained, limited menu variation can lead to food boredom and a decrease in appetite, ultimately increasing plate waste.

Based on these findings, food service providers should not only focus on nutritional adequacy but also consider sensory appeal and menu variation as strategies to reduce food waste.

Providing more balanced and creative menus could help enhance consumption and minimize food leftovers

Lunch Preferences

The lunch preference of students at ICBS Wustha Al Muflihun was assessed using a 3-point hedonic scale, covering four key sensory aspects: taste, color, texture**,** and aroma**.** The results showed that most students responded positively to the food consumed during the one-week menu cycle. A total of 67% of students reported liking the taste of the meals served. This indicates that, despite the limited menu variety—mainly consisting of rice, tofu/tempeh, and vegetables—the flavor of the meals was still generally well received. This could be attributed to the use of familiar seasonings suited to local taste preferences, especially in dishes like *semur* (sweet soy stew) or *sayur lodeh* (coconut milk vegetable stew), which are typically savory and slightly sweet or spicy, flavors commonly favored by adolescents.

For the color and aroma aspects, each received "like" responses from 56% of students. These are moderate scores, suggesting that while there was no strong rejection, the visual and olfactory appeal of the food was not optimal. The lack of variety in components—mainly plant-based items like fried tofu/tempeh and boiled vegetables—likely resulted in visually monotonous dishes. Moreover, the absence of fruit or animal-based side dishes, which usually add color and aroma, may have reduced the meals' sensory appeal. Repetitive vegetable dishes also contributed to a sense of olfactory boredom.

Meanwhile, 64% of students liked the texture of the food. This shows that, overall, the food was processed with an acceptable level of quality. For instance, tofu and tempeh were fried to a crispy texture, and vegetables were cooked to an appropriate doneness—neither too soft nor too hard. However, on the first day, undercooked rice was reported, which may have affected the texture scores for that day.

The analysis of the lunch menu pattern at ICBS Wustha Al Muflihun revealed a lack of balance and variation. Throughout the seven-day observation period, all lunches consisted of only three basic components: staple foods (rice), plant-based side dishes (such as tofu or tempeh), and vegetables. There was no inclusion of animal-based protein or fruit, both of which are essential components in a balanced diet and also contribute significantly to the sensory appeal of meals.

Despite this limitation, the preference test results showed that a majority of students still rated the meals positively, particularly in terms of taste (67%) and texture (64%)**.** However, color (56%) and aroma (56%) received lower preference ratings, which may reflect the lack of variety and sensory appeal caused by the repetitive use of similar ingredients and cooking methods. For example, vegetable dishes such as *sayur sop* were served multiple times during the week, potentially contributing to sensory fatigue and lower acceptance.

Furthermore, a Spearman correlation analysis confirmed a significant positive relationship between the number of menu components and students' average food preferences ($\rho = 0.784$, $p = 0.037$). This statistically significant result supports the interpretation that a more diverse and nutritionally complete menu could lead to increased satisfaction and greater enjoyment among students. The Spearman.s analysis corelatin results can be seen in table 1

Taken together, these findings highlight that menu diversity is a key factor influencing food preference. The inclusion of more varied components, such as animal-based proteins and fruits, could improve the visual, aromatic, and flavor characteristics of meals, leading to better acceptance and reduced food waste. Therefore, revising the current menu planning approach to incorporate greater variation is strongly recommended.

CONCLUSIONS

The findings of this study indicate that the lunch menu provided at ICBS Wustha Al Muflihun lacks variety and balance, consisting mainly of staple foods, plant-based side dishes, and vegetables. Despite this, students generally reported moderate levels of preference, especially for taste and texture. However, limited variation appeared to negatively affect preferences for color and aroma.

A significant positive correlation between the number of menu components and overall food

preference further supports the importance of menu diversity. Enhancing the variety of meal components—particularly by adding animal-based proteins and fruits—is essential to improving students' meal satisfaction and reducing food waste.

CONFLICT OF INTEREST STATEMENT

The author declares no conflict of interest related to the design, implementation, or reporting of this study.

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