

FOOD WASTE AND FOOD SERVICE SATISFACTION AMONG OLDER ADULTS IN NURSING HOMES

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ABSTRACT

Food waste and food service satisfaction can be used of a good food service management. Nursing homes are an institution that also provides food service. This study aims to identify and analyze the association between food waste and food service satisfaction among older adults in the nursing home in Surabaya, Indonesia. A cross-sectional study was conducted on 63 older adults. The 3x24-hour visual Comstock method was used to identify food waste and food service satisfaction was assessed using a questionnaire adapted from the RFSQ (Resident Foodservice Satisfaction Questionnaire) and FoodEx-LTC (Food Expectations-Long-Term Care). Data were analyzed descriptively and inferentially using the Chi-square test. The association between food waste and older adults' food service satisfaction is insignificant ($p=0.115$). The majority of the older adults (71.4%) were satisfied with the food service and the average of food waste was relatively low ($\leq 20\%$). However, some menus still had $>20\%$ leftovers. It is important to investigate older adults' acceptability and preferences of each menu to minimalize food waste. Menu cycle planning needs to be evaluated periodically and well-designed to meet the nutritional needs of the residents.

Keywords: diet, food service satisfaction, food waste, nursing home, older adults

INTRODUCTION

Food service is a series of processes starting from menu planning, purchasing, preparation, processing, and distribution, to serving food till it is ready to be consumed by consumers (Andrini, 2012; Taqhi, 2014). Food service applied in nursing homes is non beneficially oriented that intended to meet the nutritional needs of the older adults in nursing home (Widyastuti et al., 2018). Therefore, the implementation of food service in nursing homes are prone to causing dissatisfaction.

Nursing homes are one of the government programs that are made to support the welfare of the homeless, poor, neglected, or living-alone older adults (BPS, 2021; Rahayu & Ma'ruf, 2018). Several previous studies have stated that older adults who live in nursing homes tend to be malnourished, have a lower BMI, and more likely to experience malnutrition than the older adults who live in the community (Saghafi-Asl & Vaghef-Mehrabany, 2017). Malnutrition is a condition that is often found in older adults (Amarya et al., 2015, 2018). Malnutrition have a higher risk of reduced

mobility, increased risk of falls and fractures, susceptibility to infectious diseases, and in the end, it can worsen the condition of malnutrition (Divert et al., 2015). Therefore, improving food service satisfaction in nursing homes are essential.

Nutritional problems in the older adults are closely related to inadequate intake of nutrients (Divert et al., 2015). Food service satisfaction and food waste are the indicators that can be used to assess food service successes as well as assess intake by assessing the estimated amount of intake (Puspa et al., 2019; Semedi et al., 2013). Adequate nutritional intake in the older adults is important due to its related to minimizing worsening of health and nutritional problems (Sofia & Gusti, 2017).

Food service satisfaction is known to be associated with improved nutritional status related to a more adequate amount of intake and minimal food waste (Semedi et al., 2013). Previous studies showed that the older adults care was institution that had the highest amount of leftover food (20.6%) after canteens, restaurants, and pre-school food service. And also, nursing home had the

highest number of leftovers per portions after restaurants and hotels, which amounted to 129 grams of leftovers per meal (Malefors et al., 2019). This shows that food waste in institutions such as nursing homes need to be considered and related to the food services provided. Therefore, this study aims to analyze the relationship between the level of satisfaction with food service and food waste for the older adults at nursing home in Surabaya.

METHODS

This observational study with a cross-sectional design was followed by the older adults living at nursing home in Surabaya. Population of older adults living at nursing home in Surabaya are 171 including independent, partial, and bed-rest older adults. The sample size obtained is 63 older adults calculated using Lemeshow formula. The sampling method was carried out using the simple random sampling method and justify based on central limit theorem. The sample inclusion criteria was the older adults at least 60 years old, had lived at nursing home in Surabaya for at least 3 months, independent older adults, able to communicate well, cooperative, and did not have memory disorders. The exclusion criteria for this study were the older adults with dementia and the older adults on bed rest.

This research was conducted from 2021 to 2022. The data collected consist of the characteristics of the older adults, food waste, and food service satisfaction. Characteristics data were obtained from older adults and nursing home's database including sex, age, length of stay, education level, medical history, and nutritional status based on BMI. Education level was classified as very low (did not go to school), low (primary or junior high school), moderate (senior high school), and high (college). While BMI was classified refers to Indonesian Ministry of Health classification which are underweight ($<18.5 \text{ kg/m}^2$), normal ($18.5\text{-}25.0 \text{ kg/m}^2$), and overweight/obese ($>25.0 \text{ kg/m}^2$) (Kemenkes RI, 2014).

Food waste assessment was carried out with the visual comstock method through observations made by nutritionists and food service satisfaction was carried out using interviews based on questionnaires. Food waste observations were

carried out for three days including breakfast, lunch, afternoon snack, dinner, and evening snack using a 0-5 scale (from 0% to 100% food waste) (BPPSDMK, 2018). Refers to Decree of Ministry of Health number 129/Menkes/SK/II/2008, food waste $\leq 20\%$ can be used as success food services indicator (Dewi, 2015).

The food service satisfaction questionnaire was designed by the references of the RFSQ (Resident Foodservice Satisfaction Questionnaire) by Wright et al. (Wright et al., 2008) and FoodEx-LTC (Food Expectations-Long-Term Care) by Crogan et al. (Crogan et al., 2004). The RFSQ and Food-Ex questionnaires were chosen because they were designed to assess food service satisfaction in nursing home settings. In addition, that questionnaires has been tested in several previous studies.

The data obtained were then analyzed descriptively and inferential analysis using the chi square test. This research has been approved by the Ethics Committee of the Faculty of Public Health, Airlangga University with the number 78/EA/KEPK/2022.

RESULTS AND DISCUSSIONS

A total of 63 older adults people participated in this study. Respondents were dominated by women (69.8%) with an age range of 60-74 years (61.9%). The length of stay of the older adults at nursing home in Surabaya is mostly 12-36 months. The nutritional status of the older adults based on Body Mass Index (BMI) showed that 15.9% were classified as underweight, although the normal nutritional status was recorded at around 50.8%. The characteristics of the older adults can be found in more detail at table 1.

In a food service system, leftovers can be used to assess the estimated amount of food intake. Food waste is influenced by several factors, including external and internal factors. External factors include taste, food quality, limited menu choices, inappropriate portion size and meal times, dining environment, economic, educational, and socio-cultural factors. While the internal factors that influence include appetite, eating habits, age, gender, and illness (Puspa et al., 2019; Simzari et al., 2017).

Table 1. Participant's Characteristics

Variable	n (%)
Sex	
Male	19 (30.2)
Female	44 (69.8)
Age (year)	
60-74	39 (61.9)
74-90	24 (38.1)
>90	0 (0.0)
Length of stay (month)	
<12	19 (30.2)
12-36	28 (44.4)
≥36-60	15 (23.8)
≥60	1 (1.6)
Education level	
Very low	17 (27.0)
Low	38 (60.3)
Moderate	6 (9.5)
High	2 (3.2)
Medical history	
Hypertension	46 (73.0)
Gout/arthritis	17 (27.0)
Diabetes mellitus	12 (19.0)
Stroke	4 (6.3)
Heart disease	1 (1.6)
Other	15 (23.8)
Nutritional status	
Underweight	10 (15.9)
Normal	32 (50.8)
Overweight/obese	21 (33.3)

In this study, the leftovers for three days are relatively small, but in certain menus, the leftovers are still quite high. A lot of leftover food can indicate that less food is consumed. Some respondents said the reason for leaving food was because the menu did not match their eating preferences and the processing method was less favorable. Also, some of them was having their eating preference based on their awareness of medical problem. Sometimes, older adults with underweight status was more likely to ask an additional portion, while overweight/obese older adults had their leftover food. Dietary patterns across generations have been shown to differ in previous studies (Sari et al., 2022). Puspa et al., (2019) states that the quantity of leftovers is much influenced by taste, appetite and the way of presentation (tidiness and cleanliness of cutlery).

Based on the observations, the most food leftovers were found on the third day. Although the average leftover food on the third day was just a few ($\leq 20\%$), it still needs to be noticed that almost half (42.9%) of the respondents have a lot of leftovers. Based on the type of food provided, the largest leftover food was at lunch with a menu of fried catfish and tamarind vegetable soup. Meanwhile, on other days, the most leftovers were found on the first day menu, namely fish sardines (pindang sarden) with 26.0% leftovers. The distribution of leftover food for 3 days menu can be seen at table 2 and table 3.

Beside food waste, consumer satisfaction with food service can also be an indicator of the success of a food service. The quality of food service can be assessed based on several indicators such as food quality (taste and appearance), punctuality, staff service, cleanliness of cutlery, menu variations, and the atmosphere of the dining environment (Nurqisthy et al., 2016; Puspa et al., 2019; Velawati et al., 2021). A better level of satisfaction is associated with a smaller decrease of nutritional status due to higher intake and less food waste (Semedi et al., 2013).

Food service satisfaction of the older adults at nursing home in Surabaya which is shown at table 4, most of the older adults are satisfied with the overall food service provided by nursing home in Surabaya (71.4%). At each indicator, food quality is the indicator that has the most dissatisfaction value (44.4%) compared to other indicators such as punctuality, staff service, cleanliness of cutlery, and the atmosphere of the dining environment.

Food quality, including the taste and appearance of food, contributes to increasing the attractiveness and appetite of consumers. Punctuality of food serving is related to the accuracy of the condition of hunger and satiety that affects one's appetite. Cleanliness of cutlery in fact can also affect someone's appetite. Dirty cutlery can make consumers feel disgusted and have no appetite. In addition, the dining environment and the staff service can affect the mood or psychology of consumers (Nawai et al., 2021; Semedi et al., 2013).

Residents' food satisfaction in this study shows a positive perspective. Most of older adults are satisfied and the most positive indicator is

Table 2. Food Waste on Each Type of Food at Griya Werdha Surabaya

Menu Cycle	Food Waste Mean (%)			Total
	Breakfast	Lunch	Dinner	
Day 1				
Staple food				
Rice	6.4	4.2	4.6	
Noodle soup	-	-	1.0	
Plant-based protein				
Tofu sardines	1.7	-	-	
Fried tofu	-	0.6	-	
Tofu (<i>perkedel</i>)	-	-	2.9	
Animal protein				
Fish sardines	26.0	-	-	
Vegetable				
Mix vegetables (<i>lodeh</i>)	-	11.4	-	
Snack/Fruit				
Banana/melon	-	2.0	-	
Steamed sweet potato	-	-	7.1	
Total				8.4±7.3
Day 2				
Staple food				
Rice	8,1	8,4	6,5	
Plant-based protein				
Tofu	9,3	-	-	
Tofu (<i>opor</i>)	-	-	7,5	
Animal protein				
Meatball	7,1	-	-	
Red soup sausage and chicken	-	18,9	-	
Shred chicken (<i>opor</i>)	-	-	7,1	
Vegetable				
Red soup	-	7,5	-	
Snack/Fruit				
Banana/orange	-	5,6	-	
Pudding	-	-	14,7	
Total				10,4±9,8
Day 3				
Staple food				
Rice	9,6	22,4	7,7	
Plant-based protein				
Fried tempeh	2,0	-	-	
Stew tofu	-	-	5,6	
Animal protein				
Fried catfish	-	45,8	-	
Stew meat	-	-	9,6	
Vegetable				
Stir carrot cauliflower	16,5	-	-	
Tamarind vegetable soup	-	32,0	-	
Snack/Fruit				
Banana/papaya	-	13,9	-	
Steamed sweet potato	-	-	17,9	
Total				17,4±15,9

Note: the use of '-' means it was not on the menu at that meal time.

Table 3. Food Waste at Griya Werdha Surabaya

Day	Mean±SD (%)		Mean±SD (%)
	Few (≤20%)	Lots (>20%)	
1	56 (88.9)	7 (11,1)	8,4±7,3
2	54 (85.7)	9 (14.3)	10,4±9,8
3	36 (57.1)	27 (42.9)	17,4±15,9
Total			12.0±9.0

Table 4. Food Service Satisfaction by the Older Adults

Variable	Satisfied n (%)	Not satisfied n (%)
Food Service Satisfaction Indicators		
Food quality	35 (55.6)	28 (44.4)
Punctuality	55 (87.3)	8 (12.7)
Staff service	54 (85.7)	9 (14.3)
Cutlery cleanliness	49 (77.8)	14 (22.2)
Dining environment	51 (81)	12 (19)
Overall food service satisfaction	45 (71.4)	18 (26.8)

Table 5. Relationship between Food Waste and Food Service Satisfaction

Food Waste	Food Service Satisfaction		p value
	Not Satisfied n (%)	Satisfied n (%)	
Few	12 (19.0)	38 (60.3)	0.115
Lots	6 (9.5)	7 (11.1)	

food quality. This is in line with previous study that indicated indicators of food quality are the most influential aspects of patient satisfaction in general, while the indicator that is considered the most positive is the service of the staff (Messina et al., 2013). This is different from this study which shows that the indicator with the most positive value is the punctuality indicator.

The high satisfaction rating of the older adults at nursing home in Surabaya can be attributed to the different backgrounds of the older adults. Based on the results of interviews, most of the older adults are neglected or living-alone so that can affect the older adults by being more accepting of the situation and grateful for having a better life than outside the nursing home. In addition, most of the older adults have lived in the nursing home for 1-3 years so that they have more or less adapted well to the conditions in the nursing home.

Based on table 5, this study shows that there is no relationship between food waste and food service satisfaction ($p=0.115$). Basically, satisfaction can be presented in food waste (Simzari et al., 2017). Previous studies have stated that food service satisfaction is related to the level of consumer consumption (Divert et al., 2015; Heidi et al., 2017; Navarro et al., 2016). The higher the level of satisfaction, the less nutrients are lost, which means there is less leftover food. This study is not in line with the results found by Ronitawati et al. (Ronitawati et al., 2021) which shows that there was a relationship between the level of satisfaction with the value of missing nutrients ($p=0.0001$, $r=-0.34$).

The absence of this relationship might be caused by the good results of the older adults' food satisfaction that mostly positive. Length of stay was one of the institutional service satisfaction predictors. Residents with a longer length of stay had better life adjustments (Sun et al., 2020). Whilst for the food waste, in this study was more influenced by the residents' food preference and mostly high only in some specific menus.

Food service in nursing home is one factor that can affect the nutritional status of the older adults related to capability to provide nutritional needs of the older adults every day. Dissatisfaction with food service can increase the risk of malnutrition up to 20 times. The more satisfied the older adults with food service are, the better the nutritional status (Saghafi-Asl & Vaghef-Mehrabany, 2017). Nursing home in Surabaya allows the older adults to receive food from outside nursing home but they do not allow the older adults to buy food from outside. Frequency of relatives or family's visit can be considered quite rare, so most of the nutritional needs is provided by the nursing home. Therefore, the nursing homes must provide a proper menu that can fulfill the older adults' requirement.

The limitations of this study was the assessment of food service satisfaction is very subjective and influenced by the level of adaptation of the older adults to life in nursing home even though it has been carried out by direct interviews without the presence of the nursing home's staff. High food waste in this study tends to be more directed to the taste, preferences, and mood of the older adults. Besides that, short sample size in this

study was due to the inclusion criteria that only enroll independent' older adults which were only around 100 and must be excluded again with the other criteria. Further studies need to be done with a bigger scope area, not only in one nursing home, to avoid a biased result.

CONCLUSION

Food service satisfaction and food waste are important things to consider in the food service management system, especially for the older adults. There is no relationship between leftover food and food service satisfaction for the older adults at nursing home in Surabaya, this possibly due to the subjective answer of the older adults satisfaction in terms of their gratitude of being care in nursing home rather than living alone. Although the satisfaction score is good, there is a high amount of leftovers food on some of the menus served, so it is necessary to explore the acceptability of each menu served and older adults' preferences to minimize the amount of food waste. In addition, the menu cycle planning needs to be evaluated periodically and arrange by adjusting to the nutritional needs of the older adults.

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