

RESEARCH STUDY

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The Assessment of Daily Menus in Nursing Home Residents for Improving Intake and Nutritional Status in Elderly

Penilaian Menu Harian dari Penghuni Panti Werdha dalam Rangka Memperbaiki Asupan dan Status Gizi Lansia

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ABSTRACT

Background: Malnutrition has impacted the health condition and life quality of the elderly who live in nursing homes. Unmaximized menu planning can cause this condition.

Objectives: This study aimed to analyze the nutrition content of the menu provided by the nursing home based on recommended dietary allowance (RDA) for older people and to identify the current nutrition status of the elderly

Methods: The food intakes were evaluated by observing all menus during the five days. Nutrient contents were analyzed by calculating all meal nutrition and comparing them to the recommended dietary allowance for the elderly. Body weight was measured using Bio Impedance Analysis (BIA) Tanita, and a stadiometer measured body height. Furthermore, weight and high were measured based on body mass index calculation to measure nutritional status.

Results: It was found that the mean energy content was 1242.6 ± 193.9 kcal/day, and only $69.03 \pm 10.7\%$ fulfilled the recommendation. For protein content, it only met 70.5% of the RDA. Macronutrients such as protein are only 70.5% of the recommended dietary needs for the elderly. From BMI analysis, it was found that 26.23 % of the elderly are undernutrition.

Conclusions: The nutritional content of the menus served for the elderly in nursing homes did not yet meet the daily requirement and is still below that recommended for the elderly, so the nutrient of the menus should be increased to achieve optimum nutritional status.

INTRODUCTION

The elderly is one of the periods in the human life cycle initiated by aging. Malnutrition is crucial to older adults since it correlates with many health indicators such as frailty, chronic diseases, impaired cognitive, morbidity, and all-cause mortality¹⁻³. Furthermore, it has negative consequences such as reduced quality of life, increased hospital length of stay, and health care costs⁴. The elderly mostly live with their family, the so-called community-dwelling elderly, and others live in nursing homes. The elderly living in nursing homes are at risk for undernutrition and poor nutrition. In Indonesia, as many as 58% of the elderly in nursing homes suffer from malnutrition which is strongly associated with frailty as the predictor of all-cause mortality among individuals living in nursing homes³.

Food consumption is the most essential factor associated with malnutrition, especially in older adults living in nursing homes. Food services and the government have a significant role in preventing and delaying malnutrition, which often happens in nursing home residents because all food intakes are supplied and served by the nursing home, which works under the

government's rules and budgets. Several studies have proven that food system management impacts food intake and subsequent nutritional status among older people in nursing homes^{2,4,5}. Compared to community-dwelling elderly, nursing home residents received poor diets, quantity, and quality⁶.

The lack of daily dietary intake can cause malnutrition and poor health, particularly in the elderly. The prevalence of malnutrition in the elderly is high in nursing homes. Nursing homes are expected to be able to maintain and improve the health and nutritional status of the elderly^{1,3,7}. Unmaximized menu planning can cause malnutrition due to the lack of nutrition requirement fulfillment. Factors related to this problem are gender, aging, the amount of food consumed by the elderly, the level of friendliness of care, low BMI (Body Mass Index), and the form of food served⁸. Since malnutrition impacts the health condition and quality of life of the elderly, particularly those living in nursing homes, and can be caused by unmaximized menu planning. The study aims to evaluate and analyze food intake in daily menus, compare older people's dietary allowance, and identify undernutrition among the elderly in nursing care.

METHODS

This study was an observational study with a cross-sectional design involving institutional dwelling elderly. This study was conducted in the nursing home UPTD Griya Werdha, located in Surabaya, Indonesia, from June until September 2021 after getting the license from Surabaya Social Services and Head of the Nursing Home. This study involved older people classified as independent and partially independent nursing home residents. This study involved 61 elderlies conducting an interview and physical examination using Bio Impedance Analysis (BIA) Tanita to examine their body composition. For assessing subjects' intake based on the served menus, this study observed the one menu cycle (five days) applied in UPTD Griya Werdha. Furthermore, the study also involved five food handlers to clarify the results of previous observations conducted on 5-day food menus.

Subject characteristics identified in this study were age, sex, and nutritional status. Nutritional status measurement was based on examining body composition to assess the body dimension and detailed body composition. The body mass index (BMI) was calculated based on measuring body weight and height and conducted using Bio Impedance Analysis (BIA) Tanita and classified by undernutrition (BMI <18.5 kg/m²), normal (BMI 18.5-25 kg/m²), and overweight (BMI > 25 kg/m²). Before conducting body composition measurements, this research conducted an observation of the elderly regarding the physical ability of the elderly. The elderly involved in this measurement can also stand and hold the grip of the BIA⁹.

Daily food menus provided by nursing homes for one-cycle menus (5 days) were observed directly by four trained dietitians, and their nutrient content was estimated using the Nutrisurvey 2007 indo.fta database. The food intake was investigated based on a daily menu

consisting of breakfast, lunch, dinner, and snacks. The food meals were determined by observing the menu and interviewing the food handlers. The menus' macro and micronutrient content was calculated using the Nutrisurvey software (version 2007) database and compared with the Indonesian recommended dietary allowance (RDA) of those nutrients for the elderly¹⁰. Percent fulfillment recommended by the Department of Health, Republic of Indonesia is <70% categorized as severe, 70-79% as moderate, 80-89% as mild, 90-119% as normal, and >120% as categorized as above the requirements.

All statistical calculations were conducted with Statistical Package for Social Science (SPSS) version 21. Categorical variables such as age, sex, and body mass index were summarized as numbers and percentages. To calculate and estimate the mean and standard deviation (SD) of the nutrient content of the menus and further analysis of the nutritional composition, SPSS (Statistical Product and Service Solution) was applied. The ethical clearance committee approved this study on 7 July 2021 with certificate number 357/HRECC.FODM/VII/2021.

RESULTS AND DISCUSSION

The significant population in the nursing house is female, as much as 70.5% of the total population with age ranges from 71-80 years old. From the measurements conducted to measure body composition, it was found that 16% of the elderly, as much as 26.23% of the population, were classified as having low BMI (<18.5 kg/m²). On the other hand, according to the analysis, some elderlies experience overweight and obesity. As much as 23% of the total population has BMI >25 kg/m². Table 1 fully presents the subject's characteristics data and the distribution of participants in this study.

Table 1. Subject's characteristics

Variables	Category	Total N=61 (%)
Age (years)	50-60	4 (06.56)
	60-70	21 (34.43)
	70-80	24 (39.34)
	>80	12 (19.67)
Sex	Male	14 (22.95)
	Female	47 (77.05)
Body Mass Index (kg/m ²)	< 18.5 (underweight)	16 (26.23)
	18-25 (normal)	31 (50.82)
	>25 (overweight/obesity)	14 (22.95)

Table 2. Nutrient content of the analyzed menu

Nutrient	Nutrient Content Mean ± SD	% of Fulfillment mean ± SD
Energy (kcal)	1,242 ± 193.9	69.03 ± 10.7
Carbohydrate (g)	163.6 ± 50.53	59.49 ± 18.37
Fat (g)	45.6 ± 14.08	91.2 ± 28.16
Protein (g)	42 ± 5.05	65.62 ± 7.89
Fiber (g)	11.8 ± 2.59	47.2 ± 10.35
Sodium (g)	2,093 ± 265.95	177 ± 26.59
Potassium (mg)	934.8 ± 155.21	19.88 ± 3.3
Calcium (mg)	771 ± 75.43	64.25 ± 6.28



Figure 1. The elderly daily menus served by the food service at Griya Werdha Surabaya

Like other nursing homes and other institutions under government responsibility, all food intake for the elderly was supplied by the government-determined budget. This institution also engages food handles to cook and serve the food helped by nurses. Figure 1 shows an example of one daily menu served for the elderly. The menu presented in the figure was a menu for Sunday which contains three different menus consists of breakfast menu, lunch menu, and dinner menu

The nutrient content of the menu was analyzed using Nutrisurvey 2007 and compared with the recommended dietary intake guidelines provided by the Ministry of Health Republic Indonesia¹⁰. It can be seen in Table 2 that the energy content of the served food was $1,242 \pm 193.9$ kcal/day, and it only fulfills 69.03% of the recommendation. Protein only fulfills 65.62% of the recommendations. The minimum allocated budget (IDR15.000 daily) might cause low nutrient content, particularly for essential micronutrients for the elderly, in almost menus served; fiber, potassium, and calcium were lower than the recommended daily requirement. At the

same time, sodium was above the recommended daily requirement. The average recommended sodium consumption for the elderly with the age range 65-80 years old is 1,150 mg, meanwhile, the sodium fulfillment from the provided diet for the elderly contains 2,039 mg of sodium. This amount of sodium is counted for 177% of the sodium needs of the elderly.

Based on the menus evaluated, we arranged the nutrient menus adjusting daily requirements for the elderly and food budget. Table 3 demonstrated one daily menu containing 1700 kcal energy/day, protein fulfillment 96%, and fiber fulfillment 112%. This study arranged a menu that fulfilled the recommendations and adjusted to the limited cost provided by the Ministry of Social. It is challenging to set menus that fulfill both quantity and quality diet with a limited budget. Table 3 shows an example of one daily menu recommendation for the elderly in a nursing home consisting of 1700 kcal energy/day, protein fulfillment 96%, and fiber fulfillment 112%.

Table 3. The example of menu recommendation for the elderly in a nursing home

List of Menu Recommendations
Breakfast: Rice 150 g, noodles with pakcoy 80 g, chicken breast 60 g, and a cup of tea
Lunch: Rice 150 g, fish 80 g, chili sauce 10 g, yam leaves vegetable 80 g and banana 80 g
Dinner: Rice 150 g, spinach vegetable 80 g, catfish 80 g, and boiled banana 80 g

From the assessment of nutritional status, this study showed almost fifty percent of subjects got malnutrition, which aligns with prior studies. A study conducted in Makassar, Indonesia, involving 38 elderly living in Nursing House Tresna Werdha Gau Mabaji demonstrated that 50% elderly experienced being underweight¹¹. Furthermore, the study explained that being underweight which usually occurs in the elderly, is caused by the reduced amount of food consumed and infections that often occur in the elderly, along with the development of diseases related to immune function disorders¹¹. Another study conducted in New Zealand showed that 47% of the elderly living in nursing homes were more susceptible to malnutrition⁸. A recent study by Rizka *et al.* (2021) in six nursing homes in Indonesia showed a malnutrition prevalence rate of 58%³. In Lebanon and Poland, 48.7% and 61% of the elderly in nursing homes are at risk of malnutrition^{1,6}. It can be concluded that nutrition-related problems, particularly

malnutrition, are still a common and significant problem among nursing home residents in many countries.

Some older people live in a social nursing center, such as a nursing home, and have received treatment, but malnutrition is still high. This phenomenon can be caused by the lack of protein and energy intake, which is mainly found in nursing homes and is related to the unmaximized menu planning in the nursing home. This study showed that the energy and protein content of the served food was only 64.6%, and 70.5% fulfilled the recommendation. Fiber, potassium, and calcium fulfillment are also far below the recommendation. This study is similar to the previous study in long-term care homes in Spain, where none of the menus complied with the recommendation for fiber, potassium, magnesium, and other nutrients. A specific study in Belgian showed that meals served in nursing homes are not entirely consumed by their residents. As expected, the energy consumed is lower in subjects considered malnourished or at risk of malnutrition⁵.

Studies about meals served in Danish nursing homes and analysis of the energy and macronutrient content demonstrated that the nursing home menus seldom or never fulfilled the recommendation⁴. Another study in New Zealand showed that 70% of 90% nutrient content was planned in the menu, which succeeded in being served but not consumed by the elderly⁸.

There is still a phenomenon of multiple undernutrition, lack of optimal energy, and other nutrients that significantly impact overall health. Some variables causing this phenomenon are related to gender, aging, amount of food consumed by the related elderly, level of hospitality treatment, low BMI, and form of served food⁸. The previous study conducted in 2013, referred to Calories Restricted Society, the calorie consumption of less than 45% of daily intake a day can cause a reduction of metabolic profile and organ function¹². The study conducted in mice also showed that the consumption of food which low in calories over a long period will cause the reduction of fat mass, decreased blood pressure, decreased cholesterol plasma, decreased sensitivity of the insulin, increased inflammation marker cells, and reduced circulating growth factor¹².

Food services and the government have a significant role in preventing and delaying malnutrition in nursing home residents. This condition is due to the residents' food intake being fully fulfilled by the food provided and served by the nursing home. The nutritional contributions made in elderly food services are qualitatively and quantitatively significant. It should fulfill dietary recommendations to achieve optimal health. The menus listed should offer a large variety of items and a proper amount of serving. It is not just eating habits, but for physical and mental health, the content of nutrients is compliance with the physiological requirement^{13,14}. One of the biggest challenges in preparing nutritious food menus for nursing home residents is the limited cost provided by the social organization since nutrient quality in the diet is usually associated with food cost¹⁵. For continuous monitoring, daily consumption maintenance, and food quality process assurance by the food handlers, it should be necessary to employ a dietitian in food system management, particularly in nursing homes, to get a better health and nutrition status for the elderly¹⁶. However, this study has some limitations in that it might not be able to explain the association between food intake and nutritional status since it did not directly measure the actual food intake of each elderly. This study only assessed nutrient content from daily menus served by the nursing home and evaluated menus generally for healthy elderly. This study did not calculate nutrient requirements for elderly with specific health conditions who might need different recommendations and nutrient intake set points.

CONCLUSIONS

The nutritional content of the menus served for the elderly in nursing homes did not yet meet the daily requirement and is still below that recommended for the elderly, so the nutritional content of the menus should be increased to achieve optimum nutritional status. Furthermore, it is necessary to evaluate food service continuously and similarly involves observing nutritional

content and the acceptance, satisfaction, and food waste to get proper intake among the elderly in a nursing home. Furthermore, the food budget should be adjusted to get a quality diet.

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Conflict of Interest and Funding Disclosure

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