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The Effect Of Nutrition Education On Food Waste In Patients With Diabetes Mellitus

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ABSTRACT
Background: Food waste is an indicator of the success of nutrition services in hospitals. If food waste is >20% in every feeding then this shows that nutrition services in the hospital have failed. One way to reduce food waste is by providing education. And Diabetes Mellitus is the biggest contributor to food waste during hospitalization. The purpose of the study was to determine the effect of providing nutrition education on food waste in patients with diabetes mellitus at RSUD Undata, Central Sulawesi Province. Methods: The type of research used is quantitative with experimental method of pre-experiment design one group pretest-posttest. The population of this study were patients with diabetes mellitus who were hospitalized at RSUD Undata, with a sample size of 30 respondents aged 18 to 55 years. The data collection technique used the method of weighing food waste. Research Results: Of the 30 respondents, the percentage of food waste before being given nutrition education was (>20%) with each type of staple food 43%, animal side dishes 38.3%, vegetable side dishes 37.4% and vegetables 56.3%. After being given education, the percentage of food waste decreased, namely (<20%) the type of staple food 5.6%, vegetable side dishes 13.3%, animal side dishes 5% and vegetable 10.3%. Conclusion: There is an effect on the provision of nutrition education on food waste in patients with diabetes mellitus with a significance value >0.05 on the types of staple food, animal side dishes, vegetable side dishes and vegetables. While nutrition education on the rest of fruit food has no effect with a significance value >0.05.

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INTRODUCTION

Toddlers with short stature conditions that do not match their age or are called stunting is a process of stunted growth in the toddler age group. Stunting problems can occur from various factors, one of which is long-term malnutrition due to the failure to meet food consumption according to the nutritional needs of toddlers (Rahmadhita, 2020). A toddler is said to be stunted if the measurement of his length or height does not match his age (PB/U or TB/U) with a Z-Score value of <-2 SD (Regulation of the Minister of Health of the Republic of Indonesia, 2020).

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A hospital is an institution or place to obtain health services in the form of treatment and care (Agustina et al., 2022). One form of activity carried out in hospital services is nutritional services. Nutrition services are services provided to patients to achieve optimal conditions in meeting the nutritional needs of patients through food according to the disease they suffer from (Mangalik et al., 2020).

One of the indicators of the success of nutritional services in a hospital institution is food waste. If there is more than 20% of food waste in each feeding, this indicates that the nutrition service in the hospital has failed. If the food waste in patients is low or less than 20%, it can help evaluate nutrition services in a hospital (Faridi et al., 2021). If a hospital institution has more than 20% food waste, it indicates that the food supply for patients is not optimal. Therefore, food waste is a simple metric that can be used to assess the success of hospital nutrition services (Saro and Jumiati, 2023).

One of the diseases that is often encountered and is the largest contributor to food waste in hospitals is diabetes mellitus (Septidiantari et al., 2022). This is in accordance with the results of initial research related to food waste conducted on diabetes mellitus patients at the Undata Regional Hospital, Central Sulawesi Province. The initial data results obtained food waste of 21.4% during 2023.

Diabetes mellitus is the most common degenerative disease in the world. High blood sugar levels above normal limits, namely above 200 mg/dL or 126 mg/dL when fasting, are a sign of diabetes mellitus (Perkeni, 2021). Diabetes mellitus patients are usually unaware that they have this disease, so it is often called a silent killer disease because it is only discovered when the patient has experienced complications from other diseases (Utary et al., 2023). Diabetes mellitus has a damaging impact on the entire body system, from the skin to the heart and causes complications such as old wounds, hypertension, and even death (Dzaki et al., 2023).

According to data from the International Diabetes Federation (2021), the prevalence of diabetes mellitus in 2021 reached 537 million people worldwide with an age range of 20-79 years. Data on diabetes mellitus according to the 2023 Indonesian Health Survey found that 1.7% of the Indonesian population aged over 15 years had this disease (Ministry of Health, 2023). Central Sulawesi Province has data on diabetes mellitus in 2022 of 91,312 people and has increased by 19,059 people in 2023 (Central Sulawesi Provincial Health Office, 2023).

The number of cases of diabetes mellitus recorded in Palu City was 19.82% or around 21,884 people out of 110,3711 people (Palu City Health Office, 2023). The number of diabetes mellitus patients at the Undata Regional General Hospital (RSUD) of Central Sulawesi Province in 2022 reached 424 patients and increased by 715 people in 2023. This is a challenge, especially for nutritionists in providing appropriate nutritional services for diabetes mellitus patients so that they can recover quickly and return to their activities (Kusumastuty et al., 2022).

There are two risk factors that trigger diabetes mellitus, namely modifiable and non-modifiable factors. Modifiable risk factors include counseling and education, physical activity, a balanced diet, and regular medication consumption. Non-modifiable risk factors include

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ethnicity, race, gender, family history of diabetes mellitus, low birth weight, and birth weight >4,000 grams (Perkeni, 2021).

Nutrition education is an activity to provide education to someone to help improve their knowledge about nutrition and health. After nutrition education is provided, it is hoped that individuals and families can solve their nutrition problems, such as changing their diet and overcoming their nutrition problems with healthier lifestyle habits (Yuniar et al., 2023). As part of hospital nutrition interventions, nutrition education has an important role in providing knowledge in changing patient attitudes and behavior (Kusumastuti et al., 2022).

Factors causing food waste in patients with diabetes mellitus at Undata Hospital, Central Sulawesi Province based on interview results include not knowing about the diet being followed, fear of increased blood sugar due to the diet food consumed, and patient dislike of the food served. If food waste is still high (> 20%) then it affects the length of treatment at the hospital and is one of the indicators that patients can go home if food consumption has been met. Therefore, nutritional education is crucial to increase knowledge, behavior and attitudes towards the diet food consumed, in order to reduce food waste.

Providing nutritional education has an impact on changing patient behavior to comply with their meal plans, thereby reducing food waste (Indrawati et al., 2023). Research by Momongan et al. (2021) revealed that there was a difference in dietary compliance before and after diet education with booklet media. This statement is in line with research by Handayanti et al. (2022) which revealed that providing nutritional education can increase the knowledge of eating in diabetes mellitus patients so that they finish their food and do not leave food waste. Based on the problems above, researchers are interested in investigating changes in food waste in diabetic patients before and after being given nutritional education through booklet media at the Undata Regional General Hospital, Central Sulawesi Province.

METHOD

This study uses an experimental method with the research design used is a pre-experimental one group pretest-posttest design. The following design involves one group given a pre-test (O1), then given an intervention in the form of a booklet media (X) and continued with the provision of a post-test (O2).

Based on the calculation results using the Lemeshow formula, the sample in this study was 30 people. From 30 people, the percentage of food waste before and after nutrition education will be seen. Data from the research sample includes patient identity data (name, age, gender) and patient food waste data collected using the food weighing method by taking into account staple food waste (eg vegetables and fruits, animals). In this study, data analysis will be carried out using the Wilcoxon test.

RESULTS

Respondents in this study were patients with a diagnosis of diabetes mellitus as many as 30 people. The following are the characteristics of respondents in the study which can be seen in Table 1 as follows.

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Table 1. Frequency Distribution of Research Respondent Characteristics

Characteristics	(f)	(%)
Gender		
Man	11	36.7
Woman	19	63.3
Age		
36-45 Years	8	26.7
46-55 Years	22	73.3
Work		
Civil Servants/TNI/Polri	8	26.7
Self-employed	8	26.7
Others (IRT)	14	46.6

Source: Primary Data (2024)

Based on Table 1 above, it is known that the frequency distribution of respondent characteristics based on the age of the majority of respondents with an age range of 38-47 years as many as 11 people (36.7%) and an age range of 46-55 years as many as 22 people (73.3%). Gender characteristics are obtained from the results of the frequency distribution. Most respondents are female as many as 19 people (63.3%) and male as many as 11 people (36.7%). In addition, the characteristics of the respondents' work are known to work as Housewives (IRT) as many as 14 people (46.6%), self-employed as many as 8 people (26.7%), and PNS/TNI/Polri as many as 8 people (26.7%).

Table 2. Research Analysis Results

Variables	Average Percentage of Food Waste		P Value
	Before Nutrition Education	After Nutrition Education	
Staple Food Remainder	43%	5.6%	0.001
Leftover Animal Food	38.3%	5%	0.001
Leftover Vegetable Side Dishes	37.4%	13.3%	0.005
Vegetable Leftovers	56.3%	10.3%	0.001
Leftover Fruit Food	2.1%	2.7%	1,000

Source: Primary Data (2024)

Based on Table 2 above, it is known that the percentage of food waste before being given nutritional education to patients with diabetes mellitus is still high in the types of staple foods, animal side dishes, vegetable side dishes, and vegetables where the number of food waste is ≥ 20% while in the type of fruit <20%. After being given nutritional education, the percentage of food waste shows a value of <20% in all variables of staple foods, animal side dishes, vegetable side dishes, vegetables and fruit. The results of data analysis show that there is a real effect of providing nutritional education on food waste in patients with diabetes mellitus on staple food waste, animal side dishes, vegetable side dishes, and vegetables with a significance value of <0.05. In addition, the provision of nutritional

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education does not have a real effect on fruit food waste with a significance value of >0.05. This is due to the level of knowledge and attitude of patients in consuming fruit when sick to speed up the healing process.

Discussion

The percentage of food waste in diabetes mellitus patients given nutritional education is ≥20% with the highest food waste in the vegetable menu, staple foods, animal side dishes, and vegetable side dishes, while the fruit menu is at a percentage of <20%. This is because diabetes mellitus patients do not know about the diet they are on, are afraid of an increase in blood sugar due to the diet food they consume, and the patient's dislike of the food served. This statement is in accordance with previous research by Putricia et al. (2023) which states that the high food waste factor in diabetes mellitus patients is the lack of knowledge about the diet given and the food served does not suit the patient's taste.

After being given nutritional education, the percentage of food waste on the staple food menu, animal side dishes, vegetable side dishes, vegetables and fruits showed a significant decrease with a value of <20%. The media used in this study was a booklet which is a media that displays interesting pictures so that it can make someone interested in reading the material given. The booklet made in this study contains material on the definition of diabetes mellitus, causative factors and classification and interventions for handling diabetes mellitus.

Providing this booklet media for nutritional education for diabetes mellitus patients can provide in-depth understanding, especially regarding the 3J principle (Type, Schedule, and Amount) for nutritional intervention for diabetes mellitus patients. In line with the research of Momongan et al. (2021) stated that providing diet education with booklet media has a real influence on changes in dietary compliance attitudes and blood sugar levels of diabetes mellitus patients. This is because when patients comply with their diet, it makes patients finish their food so that they meet their nutritional needs and can reduce food waste.

The results of statistical tests showed that there was a real effect of nutritional education on changes in food waste in the types of staple foods, animal side dishes, vegetable side dishes, and vegetables of diabetes mellitus patients at the Undata Regional Hospital, Central Sulawesi Province with a significance value of <0.05. This is in line with the research of Zulferi and Suryani (2022) that there was a real difference in nutritional counseling on changes in soft food waste in diabetes mellitus patients at the Raden Mattaher Hospital, Jambi. The research of Setianingsih and Kusumawati (2023) obtained the results of the effect of nutritional counseling on changes in knowledge and food waste in hypertension patients at the dr. Darsono Regional Hospital, Pacitan Regency.

However, there was no real effect of nutritional education on fruit food waste with a percentage of more than 0.05. This is influenced by two main factors, namely the level of knowledge and attitudes of the research respondents. The results of observations and interviews conducted, found that patients had a good understanding that fruit consumption can help in the healing process. Respondents get this knowledge from various mass media both online and offline. This good level of understanding proves that respondents'

knowledge has increased and changed respondents' attitudes towards their eating patterns. This statement is in line with the research of Indrawati et al. (2023) regarding the relationship between the level of knowledge and motivation towards food waste in hypertensive patients.

CONCLUSION

The conclusion of this study is that the percentage of food waste before being given nutritional education in patients with diabetes mellitus is still high in the types of staple foods, animal side dishes, vegetable side dishes, and vegetables where the number of food waste is ≥ 20% while in the type of fruit <20%. The percentage of food waste after being given nutritional education shows a value of <20% in all variables of types of staple foods, animal side dishes, vegetable side dishes, vegetables and fruits. There is a real effect of nutritional education on patient food waste in the types of staple foods, animal side dishes, vegetable side dishes, and vegetables with a significance value of <0.05. There is no real effect of nutritional education on food waste in patients with diabetes mellitus in the type of fruit with a significance value of >0.05. It is hoped that this study can be continued with a focus on the level of knowledge and attitudes so as to strengthen the data of this study. In addition, other methods are needed in developing educational patterns that can help patients to be able to consume their diet.

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