

Original Research Article

Plate waste of inpatients with diabetes mellitus

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ABSTRACT

Background: The nutrition services of inpatient with diabetes mellitus is very important because dietary management is the key to controlling blood glucose level. Ensuring the patient to consume all the food served by the hospital or reduce the plate waste may help patients to meet their nutritional needs. This study aimed to investigate plate waste of inpatient with diabetes mellitus in hospitals and its contributing factors so the quality of food service in the hospital could be enhanced.

Methods: The sample of the study was 22 inpatient with diabetes mellitus at Al Islam Hospital in Bandung, Indonesia from November 2014 to February 2015. The patient's plate waste at breakfast, lunch and dinner for 2 days was weighed using an electronic scale. Patients were also interviewed to find out the reasons for wasting food.

Results: The overall mean of plate waste in this study was 13.26% of food served. Porridge was the type of food that had the highest mean percentage of plate waste (17.38%). Vegetables were the second-highest wasted food (17.05%). Loss of appetite, lack of knowledge, cold food temperature and large main plate portion were the reasons for food wastage.

Conclusions: The type of food that wasted the most by inpatient with diabetes mellitus was porridge and vegetables. Improving the quality of food service and delivery as well as increasing the role of health workers to educate and encourage patients to eat while under treatment in hospitals are interventions that can be done to reduce the amount of inpatient plate waste.

Keywords: Diabetes mellitus, Inpatient, Plate waste

INTRODUCTION

Patients need to fulfill nutritional intake during treatment in the hospital to help the healing process. Patients who eat less than their nutritional needs will experience a decrease in immune function. Patients will become lethargic, the healing period becomes longer, the wound becomes difficult to heal and vulnerable to infection.^{1,2} The weak patient's condition as a result of a failure in reaching their nutritional requirements in the hospital will be aggravated if the patient suffers from a disease that requires nutritional therapy such as diabetes mellitus.³ The International Diabetes Federation (IDF) in 2012 stated that more than 371 million people worldwide had diabetes mellitus and

4.8 million people died from this disease.⁴ The prevalence of diabetes mellitus in Indonesia is only 1.1% in 2007 and increased very high to 6.6% in the 2013.^{4,5}

The nutrition services of inpatient with diabetes mellitus is very important because dietary management is the key to controlling blood glucose level.⁶ People with diabetes mellitus need nutritional therapy to get better metabolic control and prevent complications.⁷ Diabetes mellitus patients are recommended to reduce energy intake, saturated fat, trans fat, cholesterol and sodium.⁸

Foodservice quality is one of the indicators of nutrition service quality in the hospital. The quality of food service

affects the amount of food consumed by patients.¹ Patients will not eat food that they dislike thus resulting in plate waste.⁹ The health department of Indonesia determined that plate waste of inpatient in the hospital should not exceed 20% than the amount of food served.¹ Several studies abroad and in Indonesia showed that the amount of plate waste in hospitals was still higher than 20%.¹⁰⁻¹² A study in British in 1995 showed that 27% of patients agreed that the lack of quality of the food served was the reason for food wastage.¹³ A study by Stephen et al in 1997 showed that 42% of elderly patients thought that the food portion was too large.¹⁴

Ensuring the patient to consume all the food served by the hospital or reduce the plate waste may help patients to meet their nutritional needs.¹ Patients who receive adequate nutrition will have a shorter length of stay in the hospital which can also reduce the cost of treatment.^{1,15,16} This study aimed to investigate plate waste of inpatient with diabetes mellitus in hospitals and its contributing factors so the quality of food service in hospitals could be enhanced.

METHODS

This study design was cross sectional with post-positivism paradigm. The sampling technique used in this study was total population sampling where the entire population who met the study criteria was included. The sample was 22 inpatients with diabetes mellitus at Al Islam Hospital in Bandung, Indonesia from November 2014 to February 2015. The average number of inpatients with diabetes mellitus who met the study criteria for three months from secondary data (September 2013 to September 2014) was 21 people. The patient's plate waste was collected for 2 days (the average patient length of stay was 3 days).

Inclusion criteria

Type 2 diabetes mellitus patients. Patients were hospitalized for at least 3 days. The age of the patient was 26-65 years. Subjects were willing to participate in the study

Exclusion criteria

Patients who could not be fed orally. Patients with complex complications. Subjects did not follow the whole research series.

Patient's plate waste was measured using food weighing method and collected for 2 days. After the patients gave consent to be the study subject, their wasted food after each meal was weighed using an electronic scale with a maximum capacity of 5000 gram. The patient's food waste at breakfast, lunch and dinner were weighed based on the type of the food, which was main plate (steam rice or porridge), vegetable side dishes (food prepared from vegetables or fruit such as tofu, tempeh, corn fritters), animal side dishes (foods processed from animals) and

vegetables. Patients were also interviewed to find out the reasons for wasting food.

The data that have been collected were analyzed descriptively by calculating the percentage of food wasted from the amount of food served. This study was approved by the Health Research Ethical Committee of Faculty of Medicine, University of Padjadjaran, Indonesia with ethical number 057/UN6.C2.1.2/KEPK/PN/2014.

RESULTS

The characteristics of the inpatients with diabetes mellitus in this study can be seen in Table 1. Most of the patients were female (81.82 percent). Most patients were in the 56-65 years age group (59.09 percent). The nutritional status of the patients were underweight (9.09 percent), normal (27.27 percent), overweight (36.36 percent) and obese (27.27 percent). Patients have various complications including hypertension, stroke, kidney disease, hypoglycemia, congestive heart failure and hypertriglyceridemia. Most patients (72.73 percent) had a short length of stay (≤ 7 days).

Table 1: Characteristics of study subjects (n=22).

Characteristics	N=22	Percentage (%)
Sex		
Male	4	18,18
Female	18	81,82
Age (in years)		
26-35	0	0
36-45	5	22,73
46-55	4	18,18
56-65	13	59,09
Nutritional status		
Underweight	2	9,09
Normal	6	27,27
Overweight	8	36,36
Obese	6	27,27
Complications		
Stroke	4	22,73
Kidney disease	3	13,64
Hypoglycemia	3	13,64
Length of stay		
Short (≤ 7 days)	16	72,73
Long (> 7 days)	6	27,27

Table 2 shows the mean amount and percentage of plate waste based on the type of food served the hospital. The overall mean percentage of plate waste in this study was 13.26%. Porridge was the type of food that had the highest mean percentage of plate waste (17.38%). Vegetables were the second-highest wasted food (17.05%). Vegetable side dishes had the lowest amount of wasted food (4.11%).

Table 2: Mean of plate waste per day based on the type of food served in the hospital.

Type of food	Mean of food waste (gr)	Mean of food served (gr)	Percentage (%)
Main plate (steam rice)	65,18	796,8	8,18
Porridge	297,86	1714,29	17,38
Animal side dishes	11,91	189,61	6,28
Vegetable side dishes	10,14	246,6	4,11
Vegetables	25,57	149,95	17,05
Total	410,65	3097,25	13,26

The reasons for wasting food were obtained by interviewing the study subject. Loss of appetite, lack of knowledge about the needs and intake of nutrients, cold food temperature and main plate portion that did not fit the patient's nutrition requirements were the cause of food wastage.

DISCUSSION

The overall mean percentage of plate waste in this study did not exceed the standards set by the Health Department of Indonesia (20%) but eating all of the food served may help inpatients to meet their nutritional requirements thus accelerating the healing process.¹ Inpatients with diabetes also at risk of hypoglycemia if they had poor oral intake.¹⁷

In this study, the type of food that wasted the most by inpatient with diabetes was porridge and vegetables. Several studies also found that the food wasted the most by patients was vegetables and main plate, likely because the patient did not like that type of food or its presentation.^{10,18} People with diabetes are recommended to have a higher fiber intake that could be provided by vegetables. A meta-analysis by Wang et al in 2016 found that people who had higher intake of vegetables especially green leafy vegetables, yellow vegetables, cruciferous vegetables was at lower risk of type 2 diabetes.¹⁹ The risk of hyperglycemia in diabetic patients can also be reduced by eating vegetables before carbohydrates because fiber contained in vegetables is slowing carbohydrate digestion thus decreasing insulin requirement.²⁰

People with diabetes will usually have an increase in appetite, but the subjects in this study stated that they experienced the loss of appetite. This probably happened because the subjects were patients who had complications that might cause nausea, anorexia, or gastrointestinal symptoms which lower their appetite. The food served by the hospital was also low in salt, this can decrease the sensory appeal of the food. Improving the presentation and quality of the food served can help to minimize this matter.²¹

The food distribution system in hospitals also plays a major role in food quality. Several studies have shown that a decentralized food distribution system was better than a centralized system. Food could be reheated in the pantry and the portions would be monitored if the hospital adopted the decentralized food distribution system.^{10,13} The hospital where this study was conducted already using a decentralized food distribution system, but the trolley used to deliver the patient's food did not have a heater and not all food was reheated in the pantry.

The attitude of the health workers and the hospital environment could also affect the amount of food wasted by inpatients. Health workers who educate and encourage patients to eat all of their food have been proven to increase the amount of food consumed by patients.^{10,13} Patients with diabetes are at higher nutritional risk so it's best to provide feeding assistance at mealtimes.¹³

This study had some limitations. The number of participants was quite small despite using the total population sampling technique because the hospital policy for not allowing the VIP inpatients to be the study subjects. Therefore the plate waste of patients with higher economic status could not be described in this study. Further studies with larger and more varied sample, and longer time are recommended.

CONCLUSION

The type of food that wasted the most by inpatient with diabetes mellitus was porridge and vegetables. Improving the quality of food service and delivery as well as increasing the role of health workers to educate and encourage patients to eat are interventions that can be done to reduce the amount of inpatient plate waste.

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Conflict of interest: None declared

Ethical approval: The study was approved by the Health Research Ethical Committee of Faculty of Medicine, University of Padjadjaran, Indonesia (057/UN6.C2.1.2/KEPK/PN/2014)

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