

PROVIDING SNACKS TO IMPROVE DIETARY ADHERENCE, ADEQUACY OF NUTRITION INTAKE AND QUALITY OF LIFE FOR HEMODIALYSIS PATIENTS

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ABSTRACT

The number of hemodialysis patients has increased every year. In hemodialysis conditions, nutrition is an important factor that must be considered. But at that time, the energy and protein intake of hemodialysis patients was still less than the recommended one. This study aims to determine the effect of high-energy-protein snacks on increasing dietary adherence, adequacy of nutrition intake, and quality of life of hemodialysis patients. This research is a pre-experimental study with a one group pre-test and post-test design. The number of subjects in this study was 71. All research subjects were patients undergoing hemodialysis treatment at Dr. Sardjito Hospital Yogyakarta. Patients were given high energy and protein snacks twice a day for 21 days. The sample itself was selected by using the consecutive sampling method. Data analysis using McNemar test. The results showed that there was a significant increase in dietary compliance and nutrient intake during the intervention, but after the intervention was completed, decreased compliance and nutritional intake. So that there was no significant difference in dietary adherence between before and after the intervention ($p = 0.32$) and there was no significant increase in the adequacy of nutrient intake between before and after the intervention. There was a significant difference between the quality of life scores before and after the intervention ($p = 0.01$). The provision of snacks can help to increase the average intake of nutrients to meet the intake of nutrients and the quality of life of hemodialysis patients.

Keywords: *nutritional intake, hemodialysis, dietary adherence, quality of life*

ABSTRAK

Jumlah pasien hemodialisa mengalami peningkatan setiap tahunnya. Pada kondisi hemodialisis, nutrisi merupakan faktor penting yang harus diperhatikan. Namun saat itu asupan energi dan protein pasien hemodialisis masih kurang dari yang dianjurkan. Penelitian ini bertujuan untuk mengetahui pengaruh makan selingan tinggi energi-protein terhadap peningkatan kepatuhan diet, kecukupan asupan gizi, dan kualitas hidup pasien hemodialisis. Penelitian ini merupakan penelitian pra-eksperimen dengan rancangan *one group pre-test and post-test design*. Jumlah sampel dalam penelitian ini adalah 71 responden. Semua responden penelitian adalah pasien yang menjalani terapi hemodialisis di RSUP Dr. Sardjito Yogyakarta. Pasien diberikan makanan selingan tinggi energi-protein dua kali sehari selama 21 hari. Subjek penelitian

ditentukan dengan metode *Consecutive Sampling*. Analisis data menggunakan uji McNemar. Hasil penelitian menunjukkan bahwa terjadi peningkatan kepatuhan diet dan asupan gizi yang signifikan selama intervensi, namun setelah intervensi selesai dilakukan penurunan kepatuhan dan asupan gizi. Sehingga tidak ada perbedaan yang signifikan kepatuhan diet antara sebelum dan sesudah intervensi ($p = 0,32$) dan tidak ada peningkatan kecukupan asupan gizi yang signifikan antara sebelum dan sesudah intervensi. Terdapat perbedaan yang signifikan antara skor kualitas hidup sebelum dan sesudah intervensi ($p = 0,01$). Pemberian makanan selingan dapat membantu meningkatkan rata-rata asupan zat gizi untuk memenuhi asupan zat gizi dan meningkatkan kualitas hidup pasien hemodialisis.

Kata kunci: asupan gizi, hemodialisis, kepatuhan diet, kualitas hidup

INTRODUCTION

The number of kidney failure patients undergoing hemodialysis therapy in Indonesia is increasing every year. Based on the data of *Report Indonesia Registry 2017* (IRR) Report shows an increase in the number of hemodialysis patients every year. In 2015 there were 21,050 new patients and 30,554 old patients who were still actively undergoing hemodialysis. Then it increased in 2016 to 25,446 new patients and 52,835 old patients. This figure also increased again in 2017 to 30,831 new patients and 77,892 old patients. In 2017 of the number of patients who stopped undergoing hemodialysis for more than 3 months, 30% of them dropped out and the cause was unknown and the remaining 70% died.(1).

In hemodialysis conditions, nutrition is an important factor that must be considered. Lack of food intake is a problem that can harm patients(2). Lack of nutritional intake in hemodialysis patients often occurs on the day of hemodialysis. On non hemodialysis days, it is known that the patient's intake is

better than on the day when they are undergoing hemodialysis. But even so, the energy and protein intake of hemodialysis patients at that time was still less than the recommended one(3–6).

Another problem that was also found was that hemodialysis patients were less compliant with diets related to restrictions on certain nutrients such as sodium, potassium and phosphorus(7). In the elderly hemodialysis patients, it was also found that they consumed more processed foods or industrial food products, which had received a lot of high sodium additives, and especially occurred on the day the patients underwent hemodialysis(8).

In hemodialysis patients, chronic kidney disease experienced greatly affects the patient's physical and mental status(9). Their dependence on dialysis machines throughout their lives caused many changes in their lives. In addition, the length of time undergoing hemodialysis is also related to the patient's quality of life(10). The longer the patient undergoes hemodialysis does not

necessarily guarantee that the patient's quality of life is good. There are other factors that can also play a role in helping improve the patient's quality of life. As well as improving the nutrition taken to improve the nutritional status of the patient or also providing effective education during hemodialysis(11,12).

Providing of proper food or food intake in hemodialysis patients has been shown to be associated with quality of life factors for patients. This is related to reducing the risk of mortality in hemodialysis patients(13).

Oral supplementation 1-2 times per day on the day the patient is undergoing hemodialysis and at home is strongly recommended to help improve the patient's intake(14).

Through the provision of snacks or additional food, it is estimated that it can be an alternative to help meet the intake of hemodialysis patients as well as provide education related to eating patterns and choosing good foods to consume. So it is hoped that it can help improve patient's dietary compliance to improve the adequacy of nutritional intake and improve the patient's quality of life.

In this study, researchers wanted to find out whether there were differences in dietary compliance, adequacy of nutrition intake, and quality of life in hemodialysis patients after being given the intervention.

METHOD

This type of research is pre-experimental with one treatment group without a control group seen pre and post intervention. The study population was all patients undergoing hemodialysis at Dr. Sardjito Yogyakarta Hospital. The study was conducted in February-March 2020. The inclusion criteria of this research subjects were patients aged 19-65 years, had undergone hemodialysis for at least 3 months, underwent hemodialysis 2 times per week, and were willing to participate in the study. Exclusion criteria for this study were patients who did not suffer from infectious diseases and malignancies, post-hospitalization <7 days and patients who were pregnant. *Drop out* criteria were patients who underwent kidney transplantation, Inpatient, consumption of snacks during the intervention <80% and died. Based on the inclusion criteria, a sample of 75 patients was obtained.

All research subjects were given an intervention in the form of providing snacks (snacks and/or special milk for hemodialysis patients) high in energy and high in protein 2 times a day for 3 consecutive weeks. Milk and/or snacks provided contain energy and protein ranging from 400-600 kcal and 15-20 grams per day.

The dependent variables in this study were dietary compliance, adequacy of nutrition intake, and quality of life. Dietary

compliance is assessed from the adequacy of energy and protein intake which is compared with the recommended intake per day, namely energy 30-35 kcal / kg and protein 1.2 g / kg.(15).

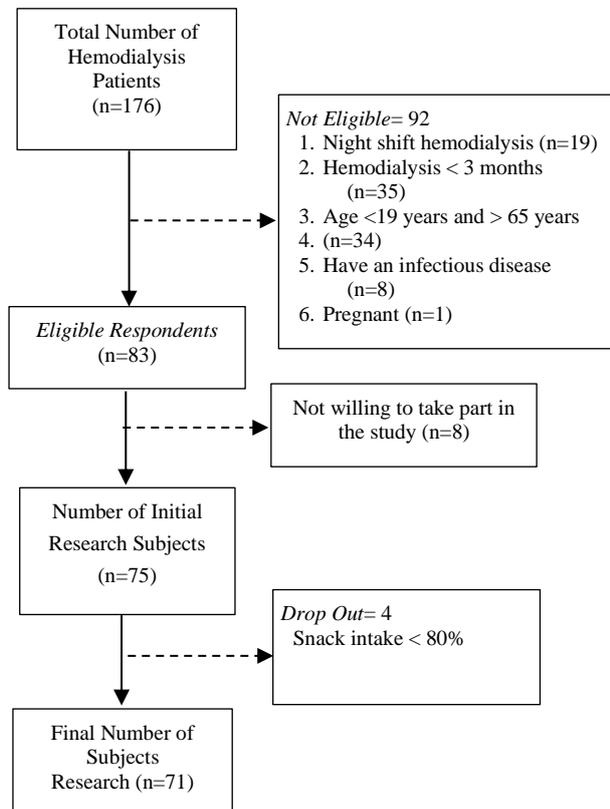


Figure 1. Subject Determination Flow

Adequacy of nutrient intake was assessed from the adequacy of macronutrient intake (energy, protein, fat, and carbohydrates) and micronutrients (sodium, potassium, phosphorus, magnesium, and calcium) of the subjects compared with the recommended daily intake of carbohydrates 50-60%, sodium 750-2000 mg, potassium 2000-3000 mg, phosphorus 800-1000 mg, magnesium 200-300 mg, calcium 800 -1500 mg(15–20).The external variables of this study were gender, age, education, employment status, income,

duration of hemodialysis, and comorbidities.

The instruments used in this study were the sociodemographic questionnaire, the food record form and the SF-36 quality of life questionnaire. Each patient was collected data before the intervention in the form of measurements of height and weight, sociodemographic information, recording of meals for 3 days before the intervention, as well as an assessment of quality of life. At the time of the intervention, data collection was also carried out for recording meals for 3 days. Then at the end of the intervention, data was collected after the intervention, namely weight measurement, recording of meals 3 days after the intervention ended and an assessment of quality of life.

Data analysis carried out with univariate and bivariate analysis. Univariate analysis to determine the distribution of the characteristics of the research sample dan bivariate analysis was carried out to determine the effect of providing snacks intervention on the dependent variable. The statistical test used was the McNemar test which was considered significant if $p < 0.05$ with a 95% confidence level.

RESULTS

Primary data in this study were obtained through interviews and filling out questionnaires by research subjects. The results showed that the subjects in this study were dominated by male patients, aged 46-

65 years, had low education, were still actively working and had a high income or more than the Regional Minimum Wage (RMW). Most of the respondents in this study had undergone hemodialysis therapy for more than 12 months and most of them also had co-morbidities other than the current kidney disease. A complete description of the distribution of respondents' characteristics can be seen in the table. 1.

Table 1. Distribution of Research Subject Characteristics

Variable	Total (n)	Percentage (%)
Gender		
Man	40	56.34
Woman	31	43.66
Age		
19 – 45 years old	27	38.03
46 – 65 years old	55	61.97
Education		
Low	46	64.79
Tall	25	35.21
Job status		
Doesn't work	28	39.44
Working	43	60.56
Income		
Low	31	43.66
Tall	40	56.34
Hemodialysis duration		
< 12 months	7	9.86
12 months	64	90.14
Co-morbidities		
There is	68	95.77
There isn't any	3	4.23

Table 2 shows that there was no significant improvement in the subject's

dietary compliance after the intervention p -value = 0.32. However, practically it showed an increase in the number of subjects who adhered to the diet from 12 to 16 subjects after intervention. Meanwhile, when viewed from dietary compliance between before and during the intervention, there was a significant change in the subject's dietary compliance when given the intervention compared to before the intervention (p -value = 0.00). This shows that there is an improvement in the subject's dietary compliance when given a snack, but the dietary compliance decreases again after the intervention ends.

The average intake of energy nutrients, protein, fat, carbohydrates, sodium, potassium, phosphorus, magnesium, and calcium increased after the intervention. Despite an increase in the nutrients sodium, potassium and phosphorus, the increase in these nutrients is still within the range of dietary recommendations. Based on the increase in the average intake of these nutrients, there was an increase in the number of subjects who had adequate intake of nutrients, namely the adequacy of nutrient intake of energy, protein, fat, carbohydrates, sodium, potassium, phosphorus, magnesium and calcium. In practice, there has been an increase in the number of subjects whose nutritional intake is adequate, and there is a significant increase in the adequacy of

several nutrients including energy, protein, fat, sodium and phosphorus intake

statistically did not show a significant increase ($p>0,05$).

Table 2. Results of Statistical Analysis of Dietary Adherence and Adequacy of Nutrient Intake Before and After the Intervention

	Before Intervention n(%)	When Intervention n(%)	* <i>p</i> - value	Before Intervention n(%)	After Intervention n(%)	** <i>p</i> - value	Average±SD		
							Before Intervention	When Intervention	After Intervention
Diet Compliance	12 (16.90)	28 (39.44)	0.00	12 (16.90)	16 (22.54)	0.32			
Adequacy of Nutritional Supplement									
Energy	15 (21.13)	32 (45.07)	0.00	15 (21.13)	19 (26.76)	0.37	1544.67±395.89	1974.93±769.73	1648.68±442.39
Protein	16 (22.54)	42 (59.15)	0.00	16 (22.54)	23 (32.39)	0.11	54.45±15.89	74.25±22.57	58.64±16.42
Fat	37 (52.11)	63 (88.73)	0.00	37 (52.11)	38 (53.52)	0.84	54.05±16.86	71.99±16.42	57.94±20.41
Carbohydrate	14 (19.72)	20 (28.17)	0.11	14 (19.72)	16 (22.54)	0.53	217.05±64.76	248.07±63.00	224.66±65.99
Sodium	32 (45.00)	42 (59.15)	0.04	32 (45.00)	39 (54.93)	0.13	698.21±316.87	1112.36±1050.39	788.54±337.59
Potassium	5 (7.04)	9 (12.68)	0.16	5 (7.04)	7 (9.86)	0.41	1272.15±477.27	1467.52±562.71	1336.17±452.33
Phosphor	5 (7.04)	21 (29.58)	0.00	5 (7.04)	7 (9.86)	0.48	630.69±152.89	768.07±96.14	666.81±169.29
Magnesium	21 (29.58)	29 (40.85)	0.10	21 (29.58)	26 (36.62)	0.35	188.49±69.28	198.33±56.23	191.49±61.35
Calcium	0 (0.00)	3 (4.23)	0.08	0 (0.00)	1 (1.4)	0.32	230.67±136.38	280.31±153.59	231.87±120.95

McNemar test; p-value: meaningful/significant ($\alpha<0.05$)

*:*p*-value before and during intervention; **:*p*-value before and after intervention

The quality of life variable in Table 3 shows that there are significant differences in the quality of life of respondents before and after the provision of snacks. This shows that there is a significant difference in the total score of the SF-36 assessment before and after the intervention is given and the respondent's quality of life is included in the good quality of life category. In the two assessment components, namely the categories of Physical Health and Mental Health, it can be seen that all sections show a difference in the average score before and after the intervention was given.

All assessment components have an average score of > 50 in each assessment component except in the Physical Health category where there is one assessment that shows a score of <50, means in the physical role section.

Table 3. SF-36 Scores of Research Subjects Before and After the Intervention

SF -36	Mean ± SD . Score		p-value
	Before	After	
Total SF-36	59.05±17.22	62.33±15.81	0.01a
PCS	56.50±19.86	60.74±18.94	0.00
Physical Function	64.79±24.24	64.79±24.24	-
Physical Role	30.99±38.84	44.72±36.57	0.00
Pain	77.22±26.58	79.37±25.32	0.05
General Health	53.03±12.99	54.08±12.85	0.02
MCS	64.48±19.07	67.79±17.21	0.00
Emotional	64.45±15.96	64.50±15.93	0.32
Emotional Roles	64.33±42.64	75.59±35.17	0.00
Social Function	75.88±21.16	76.94±20.88	0.03
Energy/Fatigue	52.24±19.46	54.15±19.86	0.01

^aMcNemar Test; Wilcoxon Signed Rank Test; Confidence Interval 95%; meaningful/significant ($\alpha<0.05$); PCS: Physical Component

Summary/MCS; Mental Component Summary

DISCUSSION

The provision of high energy and protein snacks twice per day which was carried out every day for 21 days to hemodialysis patients was statistically not significant to improve patient's dietary compliance. However, practically there is an

improvement in the average intake of each nutrient which is getting better according to the recommendations. Providing snacks to hemodialysis patients for 6 weeks while patients are undergoing hemodialysis (intradialytic) along with routine counseling every hemodialysis is indeed able to increase energy and protein intake according to needs.(21). In addition, it is also effective for increasing the interaction between the patient and the dietitian which makes the patient's adherence to the diet for hemodialysis increase(22). The focus of the intervention given should also be not only during hemodialysis (intradialytic) but also in the interdialytic interval period, especially day 3 because non-compliance with diet does not only occur during intradialytic but also in the *interdialytic* period.(23).

In this study, the length of the intervention period was short, namely 3 weeks. So the change is only seen practically as seen from the change in the average increase in food intake. The provision of providing snacks which is intended as an educational medium to change patient habits in order to improve dietary compliance does require a long time, which is more than 3 to 12 months and is coupled with further monitoring.(24.25). Changes in dietary habits in a person takes at least 1 to 6 months to be able to evaluate or see changes in behavior after being given an intervention. If you want long-lasting

behavioral changes, then at least intervention and evaluation monitoring can be seen after 12 months(26–28). In addition, most of the respondents in the study were male and still actively working. These factors may also influence the assessment of dietary compliance. Dietary non-compliance usually occurs in male patients. Especially for patients who are still working, and have recently undergone hemodialysis(29–31).

The provision of snacks to hemodialysis patients can help to control sodium, potassium, phosphorus and fluid intake. By providing snacks when the patient is undergoing hemodialysis by a dietitian, it can help to form interactions between the dietitian and the patient in addition to providing standard counseling that is routinely received by the patient.(22). In addition, the provision of high-protein snacks also has an influence on the intake of other nutrients, especially potassium and phosphorus(32). Foods high in protein tend to be high in phosphorus and potassium which should be limited in hemodialysis patients. However, to control potassium and phosphorus intake, it is recommended not to reduce protein intake because the risk of death from protein deficiency is greater than hyperphosphatemia.(33). The more recommended way is through limiting the consumption of additional foods and foods high in phosphorus and potassium and

through processing foodstuffs by soaking and boiling.(34.35).

In the quality of life variable, significant changes occurred in the assessment related to physical and mental, especially on the physical role and emotional role of the respondents. Emotional conditions such as stress levels in hemodialysis patients affect the length of healing and affect the patient's quality of life(36.37). Physical and emotional conditions in hemodialysis patients can indirectly be influenced by the adequacy of nutrient intake. In this study, it was found that the percentage of patients whose nutritional intake was in accordance with the recommendation was more likely to have a good quality of life compared to respondents whose nutritional intake was not as recommended. Lack of food intake is one of the factors that will affect albumin levels in the body. Albumin levels can affect the level of depression and fatigue in hemodialysis patients through changes that occur in the levels of Interleukin-6 (IL-6)(38). Decreased levels of albumin and hemoglobin can trigger a decrease in the quality of life of hemodialysis patients(39.40).

The provision of oral food or nutrition that is given together with counseling related to nutrition and diet compliance, physical activity and about patient compliance with hemodialysis therapy can indeed help prevent a lack of protein energy intake and

help in increasing biochemical indicators such as albumin and hemoglobin levels which will help in improving health, physically and mentally on a better quality of life assessment(8,41,42).

Several things related to the limitations in this study were the absence of a control group to compare with the intervention group. So it cannot be ascertained whether the changes or differences that occur are really caused by the intervention given. In addition, the length of the intervention period or the short duration of the intervention caused the effect of the intervention given that changes in the subject's behavior could not be observed for further monitoring. Then changes through biochemical indicators to ensure changes that occur in the dependent variable in this study have also not been observed.

CONCLUSION

The provision of snacks to hemodialysis patients in this study showed a significant increase in dietary compliance and adequate intake of energy, protein, fat, sodium, and phosphorus nutrients between before the intervention and when the intervention was given. However, there was a decrease again after the intervention was completed as indicated by no significant increase in dietary compliance and adequacy of nutritional intake between before the intervention and after the intervention.

Changing the patient's habits in complying with dietary recommendations takes a long time with various other influencing factors. Meanwhile, the patient's quality of life assessment score showed a significant improvement from before the intervention compared to after the intervention.

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