



ANALYSIS OF NUTRITION EDUCATION NEEDS AS A BASIS FOR BOOKLET DEVELOPMENT IN CHRONIC KIDNEY DISEASE PATIENTS WITH HEMODIALYSIS: A STUDY FROM THE PATIENT'S PERSPECTIVE

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ABSTRACT

CKD patients with Hemodialysis therapy require strict and continuous nutritional management. Low knowledge and non-compliance with diet are the main problems so that nutrition education is an important intervention, but often not tailored to the individual needs of patients. This study aims to identify the nutritional education needs of hemodialysis patients from a nutritionist perspective. Cross-sectional study design, data were collected using an online questionnaire via a Google Form link distributed via WhatsApp messages (personal chat). The collected data were downloaded in Excel format and processed and analyzed using descriptive analysis. The results showed that almost all (>95%) respondents agreed that the need for nutrition education includes specific materials related to hemodialysis diets based on Minangkabau local wisdom. An individual approach according to the clinical condition and characteristics of the patient, the use of educational media in the form of printed booklets with attractive designs (balanced images, text and colors) and family involvement in diet management can increase knowledge and adherence to diet and improve the quality of life of patients. The conclusion of this study is that patients need educational media in the form of printed media (booklets) with complete material, with a combination of clear writing and images, can be taken home and is based on local wisdom which is very important to improve knowledge, dietary compliance and quality of life of hemodialysis patients.

Keywords: dietary compliance; hemodialysis; individualization; nutrition education; nutritionist

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INTRODUCTION

Chronic kidney disease is a progressive condition characterized by an irreversible decline in kidney function so that the body is unable to maintain metabolic, fluid, and electrolyte balance (Setiawati et al., 2024). The prevalence of chronic kidney disease according to data from the World Health Organization (WHO) in 2019 in the world amounted to 15% of the population and has caused 1.2 million deaths and it is estimated that the number of deaths due to chronic kidney failure will increase to 41.4% in 2040 (Deng, L. et al., 2025). The prevalence of CKD in Indonesia based on doctor's diagnosis in the population aged ≥ 15 years according to the Indonesian Health Survey (SKI) in 2023 was 0.18% (638,178 people). The prevalence of CKD in West Sumatra in 2023 was 0.23%, above the national average of 0.18%. The high number of CKD in West Sumatra requires greater attention to the management and treatment of this disease, especially for patients requiring hemodialysis therapy (SKI, 2023).

In advanced stages, CKD patients require renal replacement therapy such as hemodialysis to sustain life. However, this therapy does not cure the disease, so patients must undergo long-term management, including strict and complex dietary management (Silalahi et al., 2025). Hemodialysis patients are at high risk of malnutrition due to a combination of decreased food intake, dietary restrictions, and nutrient loss during the dialysis process (Afifah et al., 2023). According to Saleh and Jayadi (2023), protein and potassium intake are related to the nutritional status of hemodialysis patients, so dietary management is an important factor in maintaining the patient's clinical condition. Most patients do not comply with dietary recommendations, this is due to knowledge factors, limited health and nutrition literacy, which play a role in determining the quality of a patient's nutritional intake (Jalaludin et al., 2023; Marbun R et al., 2021).

Nutrition education is one of the main interventions in improving patient knowledge and adherence to diet. Various studies have shown that nutrition education can improve patient understanding of diet management and have a positive impact on therapy adherence. One important step in designing effective education is conducting a needs assessment from the patient's perspective as a basis for developing educational media that are more targeted, engaging, and easy to understand. Educational media such as booklets have proven effective in increasing patient knowledge, resulting in the majority being able to understand the principles of the hemodialysis diet after the intervention (Jalaludin et al., 2023; Marbun R et al., 2021). Based on this, this study aims to explore the nutritional education needs of hemodialysis patients from the perspective of CKD patients undergoing hemodialysis.

METHOD

This study used a quantitative design with a cross-sectional approach, which aims to identify the nutritional education needs of CKD patients with hemodialysis based on the patient's perspective. This study was conducted from April 17 to 20, 2026. The sample in this study were 42 patients undergoing hemodialysis at Dr. Achmad Mochtar Hospital, Bukittinggi. Sampling was carried out using a purposive sampling method with inclusion criteria. Data collection was carried out using an electronic questionnaire compiled in the Google form platform and combined with interview techniques. This research questionnaire has passed the instrument feasibility test (expert judgment) by three people (nutritionists/lecturers), to ensure content validity, language clarity, and item relevance to the research objectives. The questionnaire consists of components of respondent characteristics, perceptions of the educational conditions that have occurred as well as components of media needs and educational materials for CKD patients with hemodialysis. After the data was collected, the questionnaire results were downloaded in spreadsheet format (Excel) for further processing and analysis using IBM SPSS Statistics version 26. The research was based on research permit letter N 0: 892/041/RSAM-SDM/III/2026 and approved by the Health Research Ethics Committee of the Padang Ministry of Health Polytechnic, Ministry of Health of the Republic of Indonesia, No: EC-057/KEPK-PDG/IV/2026.

RESULT

The study included 42 CKD patients undergoing hemodialysis at Dr. Achmad Mochtar Bukittinggi Regional Hospital. The respondent profile consisted of 57.14% men and 42.86% women, with a mean age of 53.2 years. In terms of education, the most common attainment was a junior high school degree (38.09%).

Table 1.
Frequency distribution of characteristics of respondents

Characteristics	f	%
Gender		
Man	24	57.14
Woman	18	42.86
Age (Years), Average Elementary School Education		53,185
Elementary School	9	21.42
SMP	16	38.09
SMA	14	33.3
Diploma/Sarjana	3	7.14
Lama HD		
<1 bulan	11	26.2
1-2 Bulan	14	33.3
2-4 Bulan	17	40.5

The data in table 2 shows that almost all patients (95.23%) had received nutrition education, mostly from nutritionists (76.2 %) using leaflets, but most patients (76.2%) had difficulty understanding the diet, requiring repeated education. When asked whether patients followed the recommended diet advice, almost all patients (95.23%) did not always comply with the diet. Barriers to patient compliance with the diet were that the information was too complicated (85.71%), difficulty changing eating habits (76.2%), incomplete media, and lack of information support (damaged or lost leaflets).

Table 2.
Perceptions of CKD Patients on Hemodialysis Regarding Current Nutrition Education

Nutrition Education Practice Components	f	%
History of Receiving Nutrition Education	40	95.23
Educational Resources		
Nutritionists	32	76.2
Nurse	4	9.5
Doctor	6	14.26
Media used when receiving education		
HD Diet Leaflet	32	76.2
Food Exchange Leaflet	27	64.3
Just an explanation	19	45.23
Patients have difficulty understanding nutrition education		
Yes	32	76.2
No	10	23.8
HD patients follow the dietary advice that was given during nutrition education.		
Obedient	2	4.7
Sometimes/not always	40	95.23
There was clinical improvement after education		
There is	4	9.5
There isn't any	12	28.57
Not always	23	54.76
Don't know	3	7.14
Obstacles in Implementing a Diet		
Lack of Knowledge about CKD Diet with HD	36	85.71
Difficulty changing eating habits	32	76.2
The media does not contain complete information	28	66.7
No holding media/missing media	25	59.52
Difficulty remembering dietary recommendations	21	50
Lack of family support	8	19.04
Economic Factors	4	9.52
Limited access to necessary food	2	4.76

The data in table 3 shows that almost all respondents (>97%) stated that complete material is needed in educational media for PGK with Hemodialysis, including explanations of the disease, signs and symptoms, understanding hemodialysis, nutritional needs, recommended and not recommended foods, menu examples, processing techniques and health problems that can arise due to not managing the diet. Respondents also stated that it is necessary to include elements of wisdom and examples of local menus in nutritional education media. Most respondents (78.57%) agreed that booklet media is needed which is equipped with photos of food with household sizes (URT) with a balanced design between text and images (85.71 %), medium text size (78.57%) with a number of pages of 10-20 pages (73.8%).

Table 3.

Educational Media Needs for PGK Diet with Hemodialysis from a Nutritionist's Perspective

Nutrition Education Components	f	%
Hemodialysis diet information material requirements:		
Definition and function of the kidneys	42	100
Signs and symptoms of kidney disease and hemodialysis	42	100
Nutritional problems in kidney disease patients with hemodialysis	42	100
Definition and purpose of Hemodialysis diet	42	100
Nutritional needs (Carbohydrates, protein, fat, sodium, potassium, phosphorus, fluids)	42	100
Recommended, restricted and not recommended foods	42	100
Example of a hemodialysis diet menu	42	100
Food processing and fluid management tips	42	100
Low potassium food processing techniques (e.g. soaking)	42	100
Complications due to dietary non-compliance	36	85.71
The Need for Integration of Local Wisdom		
It is important to include local food elements in the booklet.	40	95.23
Need local menu example	42	100
The visual format considered most effective		
Dominant Image	3	7.14
Infographics (Diagrams, icons, colors)	7	16.6
Balanced combination of text and images	36	85.71
Font Size for Educational Print Media		
Currently	33	78.57
Big	9	21.4
Number of Booklet Pages		
<10 pages	7	16.6
10-20 pages	31	73.8
20-30 pages	4	9.52
A household measurement conversion table (HRM) or food photo is required.		
Yes	33	78.57

Questions about local foods frequently consumed by patients were asked using open-ended questions. Staple foods or sources of carbohydrates are rice, corn, sweet potatoes, cassava, and potatoes, processed into boiled and fried chips (chips). Protein sources frequently consumed by patients include freshwater fish, sea fish, eggs, dried fish, offal, peanuts, and tempeh, processed into curry, kalio, fried, rendang, asam padeh, peanut rempeyek, and pepes. Vegetables frequently consumed by patients include chayote, radish, and green vegetables such as cassava leaves, processed into boiled, stir-fried, or curry. Fruits frequently consumed by patients include papaya, banana, pear, apple, pineapple, and seasonal local fruits such as rambutan, mangosteen, and durian. Local cakes consumed by patients include lemang, tapai, chips (banana, sweet potato, tempeh), and peanut rempeyek.

The next open question is about the questions that respondents want to convey to nutritionists which can be summarized as follows:

1. How to consume vegetables properly?
2. How to manage fluid consumption to prevent swelling?
3. What foods can be consumed to normalize hemoglobin?
4. What fruit is allowed and what is not allowed
5. How to meet your protein needs if you don't like eating fish and chicken
6. How to meet fiber needs, because vegetables and fruit are limited
7. What foods can lower urea and creatinine?

Respondents' expectations regarding the educational media for the PGK Diet booklet with HD are summarized as follows:

1. complete, concise , easy to understand information and can be read repeatedly.
2. The use of text, images and colors is more balanced so that it is attractive and easy for the general public to understand.
3. A more detailed explanation of foods that can be consumed, especially foods that are easy to get and affordable.
4. Examples of HD diet menus that are varied according to local traditional menus, easy to find in the residential environment and have interesting processing methods so as not to cause boredom.
5. " Please expedite the booklet because it is needed"

DISCUSSION

The 42 CKD patients undergoing hemodialysis at Dr. Achmad Mochtar Hospital, Bukittinggi, comprised 57.14% men and 42.86% women, with a mean age of 53.2 years. These findings align with research by Tahir et al. (2024) at Prof. Dr. H. Aloei Saboe Hospital, Gorontalo, which indicated that hemodialysis patients generally fall within the adult to elderly age group (36–60 years) with a higher proportion of males, likely linked to risk factors such as hypertension and lifestyle. Furthermore, the majority of respondents had a relatively low level of education, predominantly junior high school (38.09%). This educational level potentially impacts their ability to comprehend health information and adhere to therapy. As shown by Komariyah et al. (2024), education is a critical determinant of compliance with fluid restrictions and disease management in CKD patients. Consequently, these characteristics highlight the need for an educational approach tailored to patients' age and literacy levels to enhance the effectiveness of nutritional interventions and the success of hemodialysis therapy.

Dr. Achmad Mochtar Hospital, Bukittinggi, is a Type A hospital owned by the West Sumatra Provincial Government and plays a strategic role as the primary referral center for hemodialysis patients in northern and central West Sumatra. This includes areas in northern West Sumatra, including Agam Regency, Tanah Datar, Payakumbuh City, Pasaman Regency, and even border areas such as Riau, North Sumatra, and Jambi. In the context of hemodialysis services, this referral role is crucial. Chronic kidney disease patients requiring hemodialysis therapy often come from primary health care facilities (community health centers) or Type C and D hospitals in these areas. Due to limited facilities and expertise in the area, patients are then referred to Dr. Achmad MochtarBukittinggi Hospital, which has hemodialysis facilities, adequate specialist and subspecialist medical personnel, and experienced nutritionists.

The results indicated that nearly all patients (95.23%) had received nutrition education, primarily from nutritionists (76.2%) via leaflets. However, 76.2% of patients reported difficulty understanding the diet, necessitating repeated educational sessions. Furthermore, nearly all respondents (95.23%) did not consistently adhere to the recommended dietary advice. This finding highlights a significant gap between the provision of educational media and its effectiveness in

improving patient comprehension. While leaflets are widely utilized due to their practicality, low cost, and ease of distribution, they may lack the depth required for complex management. A randomized controlled trial by Sajjadi et al. (2024) demonstrated that individualized and interactive education is significantly more effective in meeting the learning needs of hemodialysis patients than conventional static media. Such static tools often fail to address the complex and heterogeneous needs inherent in hemodialysis dietary management.

The ineffectiveness of leaflets reported by respondents—including being easily lost, overlooked, or perceived as unattractive and incomplete—is corroborated by research indicating that printed educational materials with poor visual appeal often result in low readability and poor information retention. Furthermore, the use of non-interactive media that is not tailored to specific patient needs can diminish the overall effectiveness of health education. Conversely, all respondents (100%) in this study identified a need for booklets as an alternative medium, which they perceived as more effective due to their capacity to provide comprehensive information on the complexities of the CKD diet. This is further supported by the findings of Ezdha et al. (2023), who demonstrated that health education using the Hemodialysis Diet Booklet (BookET Lisa) significantly increased patient knowledge. Their intervention resulted in 90% of participants achieving a proper understanding of the diet following education at Dr. RM. Pratomy Regional General Hospital.

The majority (76.2%) of respondents experienced difficulty comprehending the education provided, indicating that the primary challenge in hemodialysis patient management lies not only in the availability of education but also in the effectiveness of its delivery and the patient's health literacy. A study by Marbun (2021) highlighted that patient compliance is a critical indicator of successful hemodialysis therapy, defined as behavior that aligns with healthcare provider recommendations regarding diet, fluid restriction, and medication. However, in practice, dietary adherence remains a significant challenge due to the complexity of the lifelong regimen that patients must maintain.

Barriers to dietary adherence identified in this study include a lack of knowledge regarding the hemodialysis diet (85.71%), difficulty in modifying long-term eating habits (76.2%), and inadequate informational support due to incomplete or damaged media (e.g., lost leaflets). Patient knowledge remains a pivotal factor influencing adherence, as corroborated by Simbolon (2019), who found a significant correlation between knowledge and dietary compliance ($p=0.027$). This suggests that a robust understanding fosters greater patient awareness of the diet's role in disease management. Furthermore, these findings highlight limited health literacy as a significant barrier, hindering patients' ability to comprehend and implement complex nutritional restrictions, particularly concerning fluid, sodium, potassium, and phosphorus intake.

The high proportion of patients struggling to modify their eating habits (76.2%) suggests that dietary adherence is influenced not only by cognitive factors but also by behavioral and psychosocial dimensions, including long-term dietary patterns, food preferences, and social environments. A study by Widyanti (2023) demonstrated that hemodialysis patients often face challenges in sustaining behavioral changes due to insufficient motivation, inadequate family support, and a lack of adaptive coping strategies. Consequently, even after receiving education, dietary implementation often remains suboptimal. Furthermore, the psychological burden of long-term therapy—including stress, anxiety, and burnout—can significantly diminish a patient's motivation to adhere to dietary restrictions. Therefore, an integrated educational approach that addresses not only cognitive understanding but also psychological and social aspects is essential for improving dietary compliance among hemodialysis patients.

The types of local food frequently consumed by CKD patients on hemodialysis in West Sumatra are strongly influenced by local dietary culture, which is dominated by staple foods such as rice, animal-based side dishes (fish, eggs, chicken, offal, dried fish), and strongly spiced dishes such as rendang, gulai, and asam padeh (a type of sour and spicy dish). Furthermore, the consumption of plant-based foods such as tempeh, sweet potatoes, green vegetables, and traditional foods such as dadih, leman, and tapai is also quite common. These findings illustrate that the dietary patterns of hemodialysis patients are inseparable from local wisdom and cultural habits that have been formed over generations. In the context of clinical nutrition, this presents both a challenge and an opportunity for dietary intervention, as drastic dietary changes are often difficult for patients to implement. Some foods such as rendang, gulai, and coconut-based dishes tend to be high in fat and sodium, potentially worsening the patient's condition if consumed excessively. Meanwhile, foods such as fish, tempeh, and eggs are good sources of protein, but still need to be adjusted to the protein needs of hemodialysis patients.

The variety of foods consumed by patients in this study demonstrates significant potential for developing nutrition education based on local wisdom. Research indicates that dietary adherence among hemodialysis patients is heavily influenced by behavioral factors, established eating habits, and the alignment of the prescribed diet with local culture. Furthermore, providing comprehensive education tailored to individual patient needs can enhance dietary compliance and effectively prevent further complications.

The study results revealed that more than 95% of respondents identified a need for comprehensive information within educational media for CKD patients undergoing hemodialysis. This finding aligns with research by Silalahi et al., which suggests that the educational requirements for these patients should not be fragmented. Instead, they must encompass disease pathophysiology, therapeutic processes, and practical dietary management. This is essential because patient knowledge regarding dietary management plays a crucial role in the overall success of hemodialysis therapy (Silalahi et al., 2025). Respondents' expressed needs for foundational materials—such as disease explanations, signs and symptoms, and the core concepts of hemodialysis—indicate a significant gap in basic knowledge among patients. This is supported by research from Simbolon (2019), which suggests that CKD patients often lack a clear understanding of their condition because symptoms typically manifest only at advanced stages. Consequently, providing basic education is vital for increasing patient awareness and enhancing adherence to long-term therapy (Simbolon et al., 2019). Furthermore, a lack of understanding regarding the disease and its therapy is associated with low adherence to dietary and fluid management among hemodialysis patients (Prakoso et al., 2024).

The demand for educational materials concerning specific nutrients, recommended versus restricted foods, and sample meal plans indicates that patients require highly applicable and contextual guidance. These findings are consistent with research by Ezdha et al. (2023), which found that most hemodialysis patients struggle to manage their nutritional intake due to a lack of practical dietary understanding (Ezdha et al., 2023). Respondents' requirements for information on food processing techniques and the consequences of dietary non-adherence highlight the importance of a behavior-based educational approach. Research on dietary interventions indicates that providing integrated education—including practical skills and family involvement—can significantly enhance the clinical outcomes and quality of life for hemodialysis patients (Özkan, İ. & Taylan, S., 2022). Respondents emphasized the integration of local wisdom and regional menus as vital components in the development of educational media. A culture-based approach has been shown to increase the acceptance and relevance of nutritional interventions, as they align more closely with patients' daily eating habits. This principle is further supported by Annisha and Husna (2024), whose study on modern nutrition education emphasizes the importance of personalizing and contextualizing materials to enhance engagement and foster long-term behavioral change (Annisha, D. & Husna, N.,

2024). By incorporating local menus, patients can more easily implement the diet because they do not have to drastically change their eating patterns.

According to the results of this study, the media needed is media designed to convey information, is attractive, easy to read, understand, and implemented by CKD patients on hemodialysis. The media meets the principles of readability and legibility, which are greatly influenced by letter size, font type, and text layout. Research shows that larger font sizes consistently improve reading speed, comfort, and reader comprehension, especially in groups with visual limitations or varying literacy levels (Pan J et al., 2021). The use of medium font sizes for the content and larger font sizes for titles has been shown to increase appeal and help readers identify important points in educational materials. In the context of hemodialysis patients, most of whom are adults to the elderly with complications of visual impairment, the use of larger font sizes is very relevant to increase the effectiveness of information delivery.

To accommodate patients' health literacy levels, educational media should utilize simple language, concise sentences, and a systematic information structure. From a visual design perspective, an ideal booklet must achieve a balance between text and imagery. The inclusion of contextual illustrations or photographs—such as images of local foods or household measurement portions—can significantly enhance patients' practical comprehension of the material. This is corroborated by a study in visual communication by Buljat et al. (2024), which demonstrated that visual elements such as color, contrast, and layout are critical factors influencing both readability and information retention.²² A layout that is not too dense, the use of sufficient white space, and grouping information in subheadings will help readers gradually understand the contents of the booklet.

The development of effective educational media should be guided by a patient-centered approach, taking into account target characteristics such as age, educational background, cultural context, and clinical conditions. For instance, when designing booklets for patients with chronic conditions, such as Chronic Kidney Disease (CKD) undergoing hemodialysis, the materials should be concise, focused on essential information, and equipped with practical examples that are easily implementable in daily life. Recent research emphasizes that educational materials designed based on user needs with high readability levels are more effective in enhancing patient comprehension and engagement in self-management.

CONCLUSION

Educational needs for CKD patients on hemodialysis include providing basic information, comprehensive, applicable, and contextual materials, and printed media based on patient-centered principles, which are crucial for improving knowledge, dietary compliance, and quality of life for hemodialysis patients. Patients require a clear understanding of the disease concept, hemodialysis therapy, and HD diet management, including nutritional needs, food type regulation, intake restrictions, and sample daily menus. Furthermore, education should emphasize practical aspects such as food preparation methods and the clinical impact of diet non-compliance. The study also demonstrated the importance of integrating Minangkabau local wisdom into educational materials, particularly regarding food choices and daily consumption patterns, to make them more easily accepted and implemented by patients. Thus, the identified educational needs are comprehensive, not only increasing knowledge but also supporting behavioral change through approaches tailored to the patient's habits, culture, and actual conditions.

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