

LOW PROTEIN DIET IN CHRONIC KIDNEY DISEASE PATIENTS IN SUB-SAHARAN AFRICA: AN IMPORTANT BUT DIFFICULT INTERVENTION

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ABSTRACT

Background: Chronic kidney disease (CKD) is a growing public health challenge in sub-Saharan Africa, where limited access to kidney replacement therapy necessitates effective conservative management strategies. Low-protein diets (LPDs) have been proposed to slow CKD progression and delay the need for dialysis. However, their implementation in this region is complicated by food insecurity, protein-energy malnutrition, and reliance on plant-based protein sources.

Objective: This review examines the potential benefits and challenges of LPDs, including very low-protein diets (VLPDs) and keto analogue-supplemented diets, in the management of CKD in sub-Saharan Africa.

Methods: A comprehensive analysis of available literature was conducted to evaluate the impact of dietary protein restriction on CKD progression, metabolic complications, and nutritional status. Consideration was given to the feasibility of implementing LPDs in resource-limited settings and the role of dietary counselling in improving adherence.

Findings: Evidence suggests that LPDs and VLPDs may reduce glomerular hyperfiltration, slow disease progression, and improve metabolic control in CKD patients. However, concerns about protein-energy malnutrition, particularly in sub-Saharan Africa, highlight the need for careful dietary planning and supplementation with keto analogues where necessary. The predominance of plant-based protein sources in the region may influence the efficacy of protein restriction strategies. Additionally, socioeconomic barriers and limited access to nephrology dietitians pose challenges to dietary adherence.

Conclusion: While LPDs hold promise in CKD management, their implementation in sub-Saharan Africa requires a tailored approach that balances the benefits of protein restriction with the risks of malnutrition. Future research should focus on region-specific strategies to optimise dietary interventions, improve adherence, and enhance patient outcomes. A multidisciplinary approach, incorporating nephrologists, dietitians, and public health measures, is essential to maximising the benefits of LPDs in this setting.

INTRODUCTION

Chronic kidney disease is defined by Kidney Disease Improving Global Outcomes (KDIGO) as abnormalities of the structure or function of the kidneys present for a minimum of 3 months with implications for health¹. It is associated with a range of complications leading to adverse health outcomes, which include, but are not limited to cardiovascular disease and death (all-cause)². The increasing prevalence of chronic kidney disease (CKD) in sub-Saharan Africa presents a significant public health challenge, demanding innovative approaches to management³. The management strategies in CKD are mainly focused on slowing down the progression to kidney failure, at which time, the patients are offered kidney replacement therapy². In sub-Saharan Africa, access to lifesaving modalities for kidney replacement therapy is limited due to unavailability and high cost of procedures such as haemodialysis and kidney transplant⁴. Thus, many patients are placed on conservative management initially before commencing kidney replacement therapy.

Low protein diets (LPDs) are an important conservative CKD management, aiming to slow disease progression to kidney failure and potentially delay or avoid dialysis⁵. While these diets show promise, their implementation in sub-Saharan Africa requires careful consideration of the region's unique context, particularly the prevalence of protein-energy malnutrition and the predominance of plant-based protein sources⁶⁻⁸.

This review article will examine the potential benefits and challenges of LPDs, including very low protein diets (VLPDs) and keto analogue-supplemented diets, for CKD patients in sub-Saharan Africa. The discussion will focus on the interplay between dietary protein restriction, CKD progression, and the risk of protein-energy malnutrition, taking into account the characteristics of protein sources available in the region. Additionally, the review will consider strategies to improve dietary adherence and the feasibility of implementing different LPD approaches in resource-limited settings.

METHODOLOGY

The literature for this review was identified through a comprehensive search of PubMed, Scopus, Google Scholar and Web of Science, focusing on studies published between 2000 and 2025. The search strategy incorporated keywords and Boolean operators, including “low protein diet,” “chronic kidney disease,” and “sub-Saharan Africa”, with additional terms to capture regional and clinical variations. Reference lists of relevant articles were also screened to identify additional studies.

Only peer-reviewed original research articles examining the effects of low-protein diets on CKD progression, metabolic outcomes, and patient adherence in adult populations within sub-Saharan Africa were selected. Systemic reviews and meta-analyses were considered if they included relevant primary studies. Case reports, editorials and studies that focused mainly on animal models were excluded, as well as non-English articles, unless translations were available.

Included studies were categorised based on study design, population characteristics, dietary interventions and clinical outcome. A narrative synthesis approach was used to summarise key themes.

Several limitations were considered in this review, such as:

- i. The limited availability of high- quality studies on low-protein diets in CKD patients within sub-Saharan Africa, with most studies having small sample sizes and being observational in design.
- ii. Variability in dietary assessment methods
- iii. Differences in healthcare infrastructure
- iv. Differences in cultural dietary practices

THE EFFECT OF PROTEIN DIETARY INTAKE ON PATIENT WITH CHRONIC KIDNEY DISEASE

Sources have strongly suggested a direct and linear relationship between baseline dietary protein

intake (DPI) and the rate of subsequent glomerular filtration rate (GFR) decline in CKD patients^{5,9-12}. Higher baseline DPI is associated with a faster rate of GFR decline, indicating a potentially detrimental effect on kidney function¹³. This relationship was observed across a range of DPI levels and without a discernible threshold, meaning there is not an optimal DPI level within the observed range that mitigates the risk¹³.

In a prospective observational study involving 1594 CKD patients, researchers found that for every 0.1 g/kg/day increase in baseline DPI (estimated from 24-hour urinary urea excretion), the hazard ratio for kidney failure increased by 1.05⁵. This association remained significant after adjusting for factors like age, gender, diabetes, and blood pressure. Further analysis on a subset of 920 patients with multiple GFR measurements revealed that a higher baseline DPI was linked to a steeper decline in GFR over time⁵. Specifically, each 0.1 g/kg/day higher baseline DPI correlated with a 0.064 ml/min/year faster loss of kidney function⁵. Notably, this emphasizes the absence of a threshold in the relationship between DPI and GFR decline. This implies that even moderately elevated DPI can contribute to faster kidney function deterioration.

The potential mechanisms driving this relationship include:

1. **Metabolic Burden:** Protein metabolism generates nitrogenous waste products and acids that need to be excreted by the kidneys. A high protein intake increases this metabolic burden, potentially accelerating kidney damage in individuals with already compromised kidney function⁵.
2. **Hyperfiltration:** High DPI can induce hyperfiltration, a state of increased blood flow and filtration pressure within the kidneys. While initially compensatory, chronic hyperfiltration can lead to glomerular sclerosis and progressive kidney damage¹⁴.
3. **Work Overload on Nephrons:** In CKD, the remaining functional nephrons work harder

to compensate for the lost kidney function. High DPI intensifies this workload, potentially accelerating the decline of the remaining nephrons. This effect might be more pronounced in patients with lower GFR¹⁵.

It should be noted that studies failed to definitively establish causality between DPI and GFR decline. Other unmeasured factors could be influencing the observed association^{5,9}. There is the possibility that patients with lower GFR might have already reduced their protein intake due to dietary advice or spontaneous adaptation. Despite these limitations, the findings combined with the mechanistic understanding of protein metabolism and kidney function, provide compelling evidence for a detrimental effect of high DPI on GFR decline in CKD patients⁵.

TYPES OF PROTEIN DIETS

Protein is broadly categorized into "normal," "low," and "very low" protein diets.

1. Normal Protein Diet: A normal protein diet for healthy adults is recommended at 0.8 g/kg/day. This amount meets the metabolic requirements for 97.5% of the adult population¹⁶.

For individuals with CKD at risk of progression, current guidelines recommend avoiding high protein intake exceeding 1.3 g/kg/day¹. This suggests that those with a protein intake above this threshold should reduce it to the normal range of 0.8 g/kg/day¹⁷.

2. Low Protein Diet (LPD): Generally considered to be an intake of 0.6 g/kg/day of protein. However, a slightly broader range of 0.6–0.8 g/kg/day is the most pragmatic and safest target^{1,18}.

3. Very Low Protein Diet (VLPD):

VLPDs typically involve a protein intake of 0.3–0.4 g/kg/day, often supplemented with essential amino acids and keto analogues. VLPDs are generally considered in CKD stages 4 and 5, especially for those aiming to delay dialysis initiation^{1,18}. VLPDs supplemented with

keto analogues typically require trained and compliant patients to ensure proper dietary adherence and avoid potential adverse effects¹⁹.

THE ROLE OF KETO ANALOGUES IN THE DIET OF PATIENTS WITH CKD

Keto analogues play a significant role in the dietary management of patients with chronic kidney disease (CKD), particularly those on very low protein diets (VLPDs). VLPDs, with a protein intake of 0.3-0.4g/kg/day, frequently incorporate keto analogues to mitigate the risk of malnutrition¹⁹. This is because such diets are vegetarian or vegan diets that have severe protein restriction can lead to deficiencies in essential amino acids, which are crucial for various bodily functions^{1,19}.

Keto analogues are nitrogen-free molecules that can be converted into essential amino acids through a process involving urea recycling, provided there is sufficient calorie intake¹⁹. Essentially, they act as precursors to essential amino acids, allowing the body to synthesize them without relying heavily on dietary protein¹⁹.

The supplementation of VLPDs with keto analogues aims to achieve several goals²⁰:

- i. Reduce the production of nitrogenous waste products, which burden the kidneys.
- ii. Prevent the breakdown of body protein for energy production, preserving muscle mass and overall nutritional status.
- iii. Improve metabolic control, addressing issues like metabolic acidosis and hyperphosphatemia.

VLPDs supplemented with keto analogues have been associated with slower CKD progression and delayed dialysis initiation⁹. It is suggested that keto analogue supplementation can improve blood pressure control and reduce proteinuria in CKD patients. Keto analogues may contribute to better metabolic control, reducing the need for medications like phosphate binders, bicarbonate supplements, and diuretics²⁰. Keto analogues are often prescribed in conjunction with a vegetarian diet, as this further reduces the intake of nitrogenous waste products and helps control phosphate levels²⁰.

Overall, the sources suggest that keto analogues can play a valuable role in the dietary management of CKD patients on VLPDs, helping to reduce the burden on the kidneys, prevent malnutrition, and potentially slow disease progression^{1,5,9,20}. However, careful patient selection, monitoring, and education are crucial to ensure the safe and effective use of these supplements.

LOW PROTEIN DIETS IN CHRONIC KIDNEY DISEASE

A low-protein diet for non-diabetic CKD patients is generally defined as 0.6 g/kg/day^{1,13,18}. However, some sources recommend a slightly broader range of 0.6-0.8 g/kg/day as a more practical and safer target, particularly in earlier stages of CKD^{5,10,19}.

LPDs are thought to be beneficial in patients with CKD in several ways^{5,11,13};

- i. Reduced workload on the kidneys: By lowering protein intake, the production of nitrogenous waste products, which the kidneys must filter, is reduced.
- ii. Metabolic control: LPDs can help improve metabolic issues commonly associated with CKD, such as metabolic acidosis and hyperphosphatemia.
- iii. Slowing CKD progression: There is some evidence suggesting that LPDs can potentially slow down the progression of CKD, although more research is needed.

An LPD is generally recommended for individuals in CKD stage 3a and above particularly if they have proteinuria. Studies have shown that an LPD with 0.55g/kg/day may be more beneficial than 0.8g/kg/day in CKD stage 4, as it leads to better metabolic control and reduced medication needs. In predialysis CKD stage 5 patients an LPD of lower than 0.6g/kg/day, might be considered for selected patients and this should be done under strict clinical and nutritional supervision²¹.

To achieve this, it is important to ensure:

1. Dietary Counselling: A significant proportion of CKD patients, including those receiving nephrology care, consume protein above recommended levels. This highlights the need for effective dietary counselling to help patients understand the impact of DPI on kidney health and adhere to recommended intake levels^{12,13,22}.

2. Individualized Approach: While a moderate reduction in DPI appears beneficial for slowing CKD progression, a very low protein diet (below 0.6 g/kg/day) might have potential risks and require careful consideration. Individualized assessment and monitoring are crucial to balance the benefits of protein restriction with the need to prevent malnutrition^{12,13,22}.

KDIGO RECOMMENDATIONS FOR DAILY PROTEIN INTAKE IN ADULTS WITH CKD

The KDIGO (Kidney Disease: Improving Global Outcomes) guidelines provide specific recommendations for daily protein intake in adults with CKD, aiming to balance the potential benefits of protein restriction with the need to prevent malnutrition.

For adults with CKD at risk of progression, regardless of GFR, KDIGO recommends avoiding a high protein intake greater than 1.3 g/kg/day¹. This suggests that individuals consuming more than this amount should reduce their protein intake to a lower level.

For adults with a GFR less than 30 ml/min per 1.73 m², KDIGO suggests lowering protein intake to 0.8 g/kg/day¹. This recommendation aims to reduce the burden on the kidneys while still providing sufficient protein for essential bodily functions.

The KDIGO guidelines did not explicitly provide detailed specific recommendations for different CKD stages beyond those mentioned above. However, it does offer insights into the rationale behind KDIGO's approach and the broader context of protein intake in CKD management.

KDIGO's approach reflects a shift towards a lower protein intake for both the general population and individuals with CKD. This shift stems from the recognition that a high protein intake may be detrimental to kidney health, particularly for those with CKD.

The recommended daily allowance (RDA) of protein for healthy adults has been revised down from 1-1.2 g/kg/day to 0.8 g/kg/day¹. This aligns with KDIGO's recommendation for adults with CKD and a GFR below 30 ml/min/1.73 m².

In determining optimal protein intake for CKD patients, an individualised approach to dietary

guidance is required. In such a guide, factors such as CKD stage, presence of diabetes, nutritional status, and personal preferences should be considered when tailoring protein intake recommendations.

Monitoring and management of nutritional status are crucial when implementing any form of protein restriction. Regular assessments of weight, serum albumin, and other relevant markers can help detect and address potential malnutrition risks.

Overall, KDIGO guidelines emphasize a balanced approach to protein intake in CKD, aiming to protect kidney function while ensuring adequate nutritional support.

Consultation with a healthcare professional, such as a nephrologist or registered dietitian, is essential for determining the most appropriate dietary plan for individuals with CKD.

HOW LOW-PROTEIN DIETS AFFECT CKD PROGRESSION?

The impact of low-protein diets (LPDs) on the progression of chronic kidney disease (CKD) in non-diabetic adults is a complex issue with a history of debate and ongoing research.

In 1994, the Modification of Diet in Kidney Disease Study was inconclusive in showing a relationship between a low protein diet and the progression of CKD²³.

A 2018 Cochrane Review concluded that very low protein diets (VLPDs), defined as 0.3 to 0.4 g/kg/day with supplements of essential amino acids and keto-analogues, probably reduce the number of participants with CKD 4 or 5 who progress to kidney failure⁹. This finding suggests that VLPDs can significantly delay the need for dialysis in patients with advanced CKD.

A meta-analysis of 16 controlled trials found that diets with restricted protein intake (less than 0.8 g/kg/day) were associated with lower rates of progression to kidney failure¹¹.

Another study found that a keto analogue- supplemented vegetarian very low-protein diet (0.3 g/kg/day vegetable protein plus keto analogues) was more effective than a conventional LPD (0.6 g/kg/day) in deferring dialysis initiation in patients with CKD stages 4 and 5²¹.

While the exact mechanisms by which LPDs slow CKD progression are not fully understood, the sources point to several potential pathways^{1,5,13,19}:

i. **Reduced Glomerular Hyperfiltration:** High protein intake can lead to increased intraglomerular pressure and hyperfiltration, potentially damaging the kidneys over time. LPDs, by reducing protein intake, can help lower this pressure and potentially protect kidney function.

ii. **Reduced Production of Nitrogenous**

Waste Products: Protein metabolism produces nitrogenous waste products, such as urea and ammonia, which the kidneys must filter and excrete. LPDs reduce the burden on the kidneys by lowering the production of these waste products.

iii. **Synergy with Renin-Angiotensin- Aldosterone System (RAAS) Inhibitors:** LPDs may enhance the renoprotective effects of RAAS inhibitors, commonly prescribed medications for CKD. Both LPDs and RAAS inhibitors contribute to lowering intraglomerular pressure through complementary mechanisms.

iv. **Improved Metabolic Control:** LPDs can help improve metabolic abnormalities associated with CKD, such as metabolic acidosis and hyperphosphatemia, potentially contributing to slower disease progression.

The effect of LPDs on glomerular filtration rate (GFR) remains uncertain. Some studies show no significant difference in GFR decline between LPD and normal protein diet groups²⁴, while others suggest a trend towards greater preservation of kidney function with VLPDs⁹.

While a consensus exists regarding "low" and "very low" protein intake, the precise optimal protein intake for individuals with CKD can vary depending on factors like CKD stage, nutritional status, and individual preferences¹. Personalised dietary guidance is crucial.

PROTEIN INTAKE IN LOW AND MIDDLE-INCOME COMMUNITIES IN SUB SAHARAN AFRICA

Currently, the average daily protein intake in Sub-Saharan Africa is estimated at 62 g per person per day, this represents a marginal increase from 57 g per person per day recorded in 1990-92, but below the World Health Organization (WHO) recommendation of 75 g per day for a 90 kg adult male⁶.

There is a predominance of reliance on plant-based protein as diets in Sub-Saharan Africa are heavily reliant on staple crops like maize, rice, wheat, sorghum, millets, cassava, potatoes, and sweet potatoes^{6,8}. These crops provide the majority of protein intake, but their protein quality is often limited⁸. These cereals and starchy roots are generally low in essential amino acids, particularly lysine, tryptophan, leucine, methionine, and cysteine^{6,25}. This deficiency in essential amino acids can lead to protein inadequacy, even if the total protein intake appears sufficient.

In Sub-Saharan Africa, there is limited access to animal-source protein due to economic and cultural constraints^{6,8}. Consumption of animal-source foods like meat, poultry, fish, eggs, and dairy is limited in these communities due to economic constraints, cultural practices, and religious beliefs⁸. Animal-source proteins are high-quality proteins that provide all essential amino acids in adequate amounts. Increasing the consumption of these foods could significantly improve the nutritional status of populations in Sub-Saharan Africa.

Due to this low intake of quality protein, individuals show significant stunting and wasting, which are visual manifestations of protein deficiency⁶. In South Africa, for example, 16% of children are underweight for their age, and 1 in 5 children are stunted⁶.

DIFFERENCES IN DIETARY PATTERNS: LOW- AND MIDDLE- INCOME COUNTRIES VS. DEVELOPED COUNTRIES

The substantial differences in dietary patterns between low- and middle-income countries (LMICs)

and developed countries, primarily in the quantity and quality of protein consumed.

- i. Protein Intake: People in LMICs often consume insufficient protein compared to their requirements⁶. The quality of protein from commonly consumed foods is also often limited, reducing the availability of protein for the body to use. Protein consumption in developed countries frequently exceeds recommended intakes⁷. Food availability is typically unrestricted, and diets often include a high percentage of animal-based products⁷. This high protein supply is a measure of wealth, and protein quality is less of a concern due to diverse food choices.
- ii. Protein Sources: The primary sources of protein in LMICs are cereals and starchy roots like maize, rice, wheat, cassava, potatoes, and sweet potatoes⁸. These crops form a significant portion of the diet, sometimes comprising nearly two-thirds of daily per capita caloric intake⁶. Only 3% of dietary energy comes from animal products in low-income countries, pulses, nuts, and oilseeds contribute 6% of dietary energy, while roots and tubers provide 11%⁸. In developed countries, animal products and cereals are the two most important protein sources, with a higher consumption of animal-based protein⁷. This leads to a higher intake of essential amino acids.

Some factors influence dietary patterns seen in LMIC compared to the developed countries^{6,8}.

- i. Economic Constraints: Financial limitations in LMICs often lead to diets that are inferior in both quantity and quality, with limited dietary diversity. Protein, being a relatively expensive component of the diet, is often the first to be restricted during financial hardship.
- ii. Cultural Practices and Beliefs: In many LMICs, particularly in Africa, livestock is seen as a sign of affluence rather than a primary food source. Cultural and religious constraints also play a role in limiting the consumption of certain animal products.
- iii. Food Availability and Accessibility: Access to supermarkets and diverse food options can be limited in LMICs, especially in rural areas. Small shops in rural areas often sell a smaller selection of foods at higher prices.

The low intake of high-quality protein in LMICs contributes to widespread health implications such as stunting and wasting, particularly among children⁶. However, in developed countries, high protein intake, particularly from red meat, has been linked to an increased risk of chronic diseases like cancer, diabetes, and cardiovascular disease in developed countries⁷.

A MULTIFACETED APPROACH TO ADDRESS THE CHALLENGE OF PROTEIN INADEQUACY IN SUB- SAHARAN AFRICA

Several strategies can be undertaken to improve protein intake in LMICs⁸:

- i. Promoting local agricultural production: Encouraging the production and consumption of locally sourced protein-rich foods like legumes and pulses.
- ii. Improving the protein quality of existing crops: Implementing techniques such as soaking, germination, fermentation, and fortification to enhance the nutritional value of staple crops.
- iii. Addressing food insecurity and poverty: Implementing socioeconomic interventions to improve food access and affordability.
- iv. Increasing Livestock Production: Promoting indigenous livestock production could enhance economic status, improve access to high-quality protein, and contribute to environmental sustainability.
- v. Improving Protein Quality of Plant- Based Foods: Utilising techniques like soaking, germination, fermentation, and fortification can enhance the protein quality of staple crops, making them more nutritious.
- vi. Dietary Diversification: Encouraging dietary diversity that includes a wider range of protein sources, both plant- based and animal-based, is crucial for ensuring adequate intake of essential amino acids.
- vii. Addressing Socioeconomic Factors: Recognising and addressing socioeconomic factors that limit access to nutritious foods, such as poverty and food insecurity, are essential for making a sustainable impact on protein intake.

ADDRESSING CKD IN SUB-SAHARAN AFRICA WITH PROTEIN- RESTRICTED DIETS

The increasing prevalence of chronic kidney disease (CKD) in sub-Saharan Africa presents a significant public health challenge, demanding innovative approaches to management^{4,26}. Low protein diets (LPDs) are a cornerstone of conservative CKD management, aiming to slow disease progression and potentially delay or avoid dialysis¹¹. While these diets show promise, their implementation in sub-Saharan Africa requires careful consideration of the region's unique context, particularly the prevalence of protein-energy malnutrition and the predominance of plant-based protein sources.

When examining the usefulness of low protein, very low protein, and keto-analogue dietary regimes for CKD patients in Sub-Saharan Africa, it is crucial to consider the region's specific context, particularly regarding protein sources and the prevalence of protein-energy malnutrition.

Very low protein diets (VLPDs), defined as 0.3-0.4g/kg/day with supplements of essential amino acids and keto-analogues, probably reduce the number of patients with CKD 4 who progress to kidney failure⁹. However, there is limited data on adverse effects like weight differences and protein-energy malnutrition, as well as the impact on the quality of life due to adherence challenges.

Low protein diets (LPDs) of 0.5-0.6g/kg/day may not significantly affect the progression to kidney failure compared to normal protein diets in individuals with CKD 3²³. Similar to VLPDs, data on adverse effects and impact on quality of life is limited.

It is important to note that while protein restriction might slow CKD progression, it does not directly improve kidney function. The benefits likely stem from maintaining nutrition and health, specifically correcting metabolic acidosis and mitigating adverse effects related to phosphate and sodium retention.

A significant concern in Sub-Saharan Africa is the high prevalence of protein-energy malnutrition⁶. Dietary protein restriction could exacerbate this problem, particularly if not carefully managed. This highlights the need for meticulous monitoring of nutritional status and potentially the use of keto analogue supplements to ensure adequate amino acid intake.

The sources of protein in Sub-Saharan Africa are predominantly plant-based, often with lower biological value compared to animal proteins⁸. This means that a higher quantity of plant protein is needed to meet the body's essential amino acid requirements. However, plant-based protein may be beneficial for kidney health compared to animal-based protein²⁷. And, there is evidence that plant predominant plant protein diet (>50% plant-based source of protein) low protein diet (PLADO) is promising and consistent with precision nutrition²⁷. PLADO is a diet which has a DPI of 0.6-0.8g/kg/day with at least 50% of plant-based sources (which are usually whole, unrefined and unprocessed) to meet the targeted dietary protein²⁷. A PLADO diet will also ensure a lower sodium intake (<4g/day) and increased fibre intake of (>25g/day)²⁷. The major drawback of a PLADO diet is the risk of protein-energy malnutrition, risk of hyperkalaemia and inadequate essential proteins²⁷. But, it should be noted that the high fibre content of the PLADO diet reduces the chances of hyperkalaemia and no studies have demonstrated protein energy wasting of PLADO^{11,23,28}.

A multiple-choice approach to LPDs, tailored to individual patient preferences, could be beneficial to improve adherence. This could involve offering options like traditional mixed protein diets, vegan diets, or the addition of essential amino acid and keto acid supplements²².

VLPDs typically require trained and compliant patients, while moderately restricted LPDs can be adapted to various cuisines. Providing a broader range of dietary options could encourage the wider adoption of LPDs without creating competition between different approaches. It should also be noted that VLPD should be supplemented with keto-analogues to provide the essential amino acids, and these analogues are expensive and may be out of reach for many individuals with CKD in Sub-Saharan Africa.

Studies evaluating the long-term effects of protein restriction on CKD patients in Sub-Saharan Africa are needed. These studies should assess the impact on both clinical outcomes and nutritional status, considering the specific dietary patterns and challenges in the region. This information will help guide the development of culturally appropriate and effective dietary interventions for CKD patients in Sub-Saharan Africa.

CONCLUSION

Low-protein diets (LPDs) represent a crucial component of conservative management for chronic kidney disease (CKD), particularly in sub-Saharan Africa, where access to kidney replacement therapy is limited. While evidence suggests that dietary protein restriction may slow CKD progression and delay dialysis initiation, its implementation in this region presents significant challenges. The high prevalence of protein-energy malnutrition, reliance on plant-based protein sources, and socioeconomic constraints necessitate a nuanced and culturally sensitive approach to dietary management. Very low-protein diets (VLPDs) supplemented with keto analogues may offer additional benefits but require careful patient selection, nutritional support, and adherence strategies. The lack of long-term studies in sub-Saharan Africa underscores the need for region-specific research to evaluate the feasibility, safety, and outcomes of LPDs in local populations. A multidisciplinary approach, integrating nephrologists, dietitians, and public health interventions, is essential to optimise nutritional strategies while preventing malnutrition. Future efforts should focus on improving dietary counselling, increasing access to high-quality protein sources, and addressing socioeconomic barriers to ensure the safe and effective implementation of LPDs. Ultimately, tailored, evidence-based dietary interventions have the potential to improve CKD outcomes and enhance the quality of life for patients in sub-Saharan Africa.

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