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CONSUMPTION OF SOYBEAN-BASED DIET AMONG PATIENTS WITH CHRONIC KIDNEY DISEASES

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Abstract

Chronic kidney disease (CKD) is a major global public health challenge, characterised by high morbidity, mortality, and a lack of curative treatments, significantly impairing patients' quality of life. Malnutrition has been identified as a key factor influencing the clinical outcomes of CKD, prompting recommendations for high-quality plant-based proteins, such as soy products. However, adherence to this dietary advice remains low among patients. This study aimed to explore possible reasons for this poor adherence in order to inform future interventions. A cross-sectional survey using a semi-structured questionnaire was conducted among 70 CKD patients in two tertiary health institutions in Ekiti State, Nigeria. Findings revealed that 64.0% of respondents were aware of the importance of high-quality protein diets, and 61.0% recognised soy as a suitable protein source. While 61.4% could correctly identify soybeans as protein, 68.3% believed CKD patients should avoid soy products, largely due to information received from medical personnel (58.5%). Consequently, around 60.0% avoided soy in their diets. Despite this, 61.4% believed soy could slow CKD progression, yet only 14.6% were willing to replace animal protein with soy. These findings suggest a significant gap between knowledge and practice, largely influenced by misconceptions propagated by health professionals and media sources. To address this, targeted, evidence-based education for both patients and healthcare providers on the nutritional value and safety of soy products is essential to improve dietary practices and health outcomes for CKD patients.

Keywords: Plant-based protein diet, Soybean-based diet, Dietary education, Chronic kidney disease

Introduction

Chronic kidney disease (CKD) represents a growing global public health concern, severely affecting patients' quality of life and imposing substantial healthcare costs. The kidneys play a pivotal role in maintaining nutritional balance by regulating body fluids, glucose metabolism, and excreting waste products. When kidney function declines, nutrient homeostasis is disrupted, leading to numerous metabolic complications (Carrero et al., 2020). With over 850 million people affected worldwide, CKD is projected to become the fifth leading cause of life loss by 2040 (Cockwell & Fisher, 2020; Li et al., 2020). As the disease progresses, many patients eventually reach end-stage renal disease (ESRD), necessitating dialysis or transplantation. However, this outcome can be delayed through early diagnosis, timely treatment, lifestyle modifications, and, notably, nutritional interventions.

Nutrition plays a central role in managing CKD by mitigating disease progression, correcting metabolic imbalances, and enhancing clinical outcomes. Nutritional therapy, as noted by Mak et al. (2023), aims to maintain body mass, reduce comorbidities, and improve long-term health in both adults and children with CKD. Given the kidney's compromised ability to process waste, CKD patients require tailored diets that control protein intake while limiting phosphorus and potassium levels (Cupisti et al., 2020). Healthy eating is essential for people with CKD, as poor dietary practices can accelerate renal deterioration. Diet plans must therefore be carefully designed to meet nutritional needs without overburdening kidney function.

Among the dietary options, soybean-based foods have gained attention as an effective alternative to animal proteins. Soybeans offer high-quality plant protein, essential amino acids, and beneficial bioactive compounds. Their role in managing CKD and other non-communicable diseases has been increasingly recognised (Oyegbami, 2020). Studies by Fang et al. (2022) found that plant-based diets, especially those rich in soy, can improve kidney function and reduce the rate of decline in glomerular filtration. Additionally, soy protein is comparable to animal protein in nutritional value and has been associated with reduced serum creatinine and phosphorus levels in CKD patients, particularly those not yet on dialysis.

Despite these benefits, the knowledge and acceptance of soy-based diets among CKD patients, especially in Nigeria, remain limited. Traditionally, soy was believed to lack essential amino acids and was therefore considered nutritionally inadequate for kidney patients. However, contemporary research has debunked these misconceptions, confirming that soy provides complete protein and essential nutrients comparable to those found in animal products (Kaesler et al., 2021; Hughes et al., 2011). Plant-based diets, especially those incorporating soy, have demonstrated potential in reducing cardiovascular risk and supporting kidney health. Yet, this potential remains underutilised due to persistent myths, limited awareness, and insufficient dietary counselling among patients.

Therefore, integrating soybean-based nutrition into CKD dietary management requires not only scientific validation but also effective patient education. Inadequate nutritional knowledge and low adherence to dietary recommendations hinder effective CKD management (Rhee et al., 2023). Understanding the composition of soy-based diets and addressing misconceptions surrounding them is crucial. Tailored nutritional education, especially from trusted healthcare

providers, could significantly improve the acceptance of soy products and support the development of effective dietary strategies for CKD patients.

Given these benefits, incorporating soybean-based diets into CKD nutritional management presents a promising dietary strategy; however, the level of awareness, acceptance, and adherence among CKD patients remains a critical area of investigation. This study aims to assess the nutritional profile of soybean-based diets and examine patients' knowledge and perception of their consumption. By providing clear evidence-based insights into the role of soybean products in CKD management, this research contributes to the growing body of empirical findings supporting plant-based dietary strategies in renal care and informs clinical practice for improved patient outcomes.

Methods

A cross-sectional survey was carried out among chronic kidney disease (CKD) patients receiving care in two tertiary health institutions in Ado Ekiti, Ekiti State, Nigeria: Ekiti State University Teaching Hospital (EKSUTH) and Afe Babalola Multi-system Hospital (ABMSH). Seventy patients in CKD stages 3 and 4, with glomerular filtration rates (GFR) ranging between 59–15 ml/min/1.73 m², were enrolled between January and March 2024. The study employed a semi-structured questionnaire adapted from Lvgui et al. (2022), similar in format to China's Amazon Mechanical Turk platform (Yin et al., 2021). The study applied the Kidney Disease: Improving Global Outcomes (KDIGO) 2012 classification system to define and categorise CKD stages, referencing GFR and albuminuria levels as outlined by Radhakrishnan and Cattran (2012). The participants included both non-dialysis and haemodialysis patients from nephrology clinics in the selected hospitals.

The questionnaire design was collaboratively developed by the researchers and nephrologists at EKSUTH, drawing upon clinical experience to tailor the items to the local patient population. Prior to full implementation, a pre-test was conducted with a small group of CKD patients to ensure the questions were culturally relevant and easy to comprehend, given the variation in educational backgrounds among the respondents. Adjustments were made based on the feedback received before final deployment. Research assistants were engaged to guide respondents through the questionnaire to ensure clarity and completeness, and each participant was allowed only one submission to maintain data integrity. The final questionnaire was divided into three major sections: socio-demographic data, patient perceptions of soy products, and knowledge assessment regarding soy consumption. Some questions, particularly those addressing information sources and dietary choices, were designed as multiple-choice to accommodate the possibility of multiple influencing factors.

Data collected from the questionnaires were coded and analysed using SPSS Statistics version 27. Descriptive statistics, including frequencies and percentages, were used to present the distribution of responses. The chi-square test was employed to determine the association between socio-demographic and perceptual variables with patients' knowledge about soy products. Questions such as how patients receive dietary information and their willingness to include soy-based meals were assessed for significant associations with demographic characteristics. A p-value of less than 0.05 was considered statistically significant throughout the analysis. The findings from this study are expected to contribute to understanding the barriers to soy product

consumption among CKD patients and to aid in developing effective nutritional interventions to improve dietary habits and health outcomes in this population.

Ethical approvals were obtained from both hospitals, and informed consent was signed by all participants after the study's purpose was clearly explained.

Results

Table 1 shows the socio-demographic profile of the 70 respondents. The mean age of participants is 51.5±14.5 years (ranging from 37 to 66 years), indicating a predominantly middle-aged population. Males constitute a majority at 63.4%, while females represent 36.6%. Educational attainment varies, with 46.3% having tertiary education, 22.0% with secondary education, and 9.8% with primary education below. Christianity is the dominant religion, accounting for 80.5% of participants, followed by Islam at 17.1%, while other religious affiliations constitute 2.4%. Income distribution shows that 65.9% earn between N100,000 and N499,999, while 31.7% earn below N100,000, and only 2.4% report earnings between N500,000 and N1 million. Occupationally, civil servants (41.4%) and farmers/traders (40.1%) form the largest groups, with retirees at 15.7% and business/artisan workers at 2.8%. Marital status analysis reveals that 78.0% are married, while 12.2% are single, and 2.4% are divorced or in other categories. Tribal representation is predominantly Yoruba (82.9%), followed by Igbo (12.2%) and Hausa (4.9%). These demographic characteristics provide a comprehensive profile of the study participants, reflecting their socio-economic diversity.

Table 1: Socio-demographic information of participants

Variables	**Grouping**	**Patients**
		N (%)
Age	Age in year	**51.5±14.5 (37 – 66) years**
Gender	Male	**44(63.4%)**
	Female	**26(36.6%)**
Education	Primary education	**7(9.8%)**
	Secondary Education	**15(22.0%)**
	Tertiary Education	**32(46.3%)**
Religion	Christianity	**56 (80.5%)**
	Islamic	**12(17.1%)**
	Others	**2(2.4%)**
Income	< ₦100,000	**22(31.7%)**
	₦ 100,000 - ₦ 499,999	**46(65.9%)**
	₦ 500,000 - ₦ 1million	**2(2.4%)**
	> ₦ 1million	**0(0.0%)**
Occupation/	Farmer & Trader	**28(40.1%)**

Professional	Civil Servant	**29(41.4%)**
	Retiree	**11(15.7%)**
	Business & Artisan	**2(2.8%)**
Marital Status	Single	**9(12.2%)**
	Married	**55(78.0%)**
	Divorced & Others	**2(2.4%)**
Tribal Status	Yoruba	**58(82.9%)**
	Igbo	**9(12.2%)**
	Hausa	**3(4.9%)**

Table 2 shows how CKD patients perceived a soybean-based diet. The results indicated a high level of awareness, with 91.4% of respondents indicating familiarity with the legume (soybean). Acceptance of soybean products varies, as 62.8% of participants express satisfaction to varying degrees, while 15.7% report dissatisfaction and 21.4% remain neutral. Regarding colour perception, 72.9% of respondents are satisfied or very satisfied, while only 8.6% express dissatisfaction. Perception of soybean smell receives a mixed response, with 60% perceiving it positively, 28.6% maintaining neutrality, and 11.4% expressing dissatisfaction. Taste tolerance is relatively high, with 60% reporting satisfaction, while 14.2% find it unpleasant, and 25.7% remain neutral. Texture acceptance follows a similar trend, as 65.7% are satisfied, 15.7% express dissatisfaction and 18.6% remain neutral. When classifying soybeans nutritionally, the majority (61.4%) correctly associate it with protein. In comparison, 12.9% classify it as fat and oil, 14.3% as vitamins and minerals, and 4.3% as carbohydrates, with 7.1% recognizing its composite nutritional profile. These findings indicate that while general knowledge and acceptance of soybeans among CKD patients are relatively high, variations in sensory perception may influence dietary adherence.

Table 2: Perception of soybean among CKD patients

Items	**Grouping**	**Frequency**	**%**
I know soybeans	No	6	**8.6%**
	Yes	64	**91.4%**
I accept soybean products.	Very Dissatisfied	7	**10.0%**
	Dissatisfied	4	**5.7%**
	Neutral	15	**21.4%**
	Satisfied	32	**45.7%**
	Very Satisfied	12	**17.1%**

I accept the colour.	Very Dissatisfied	4	**5.7%**
	Dissatisfied	2	**2.9%**
	Neutral	13	**18.6%**
	Satisfied	38	**54.3%**
	Very Satisfied	13	**18.6%**
I perceive soybeans smell.	Very Dissatisfied	3	**4.3%**
	Dissatisfied	5	**7.1%**
	Neutral	20	**28.6%**
	Satisfied	33	**47.1%**
	Very Satisfied	9	**12.9%**
I tolerate the soybeans taste	Very Dissatisfied	5	**7.1%**
	Dissatisfied	5	**7.1%**
	Neutral	18	**25.7%**
	Satisfied	32	**45.7%**
	Very Satisfied	10	**14.3%**
I feel the soybeans' texture.	Very Dissatisfied	4	**5.7%**
	Dissatisfied	7	**10.0%**
	Neutral	13	**18.6%**
	Satisfied	31	**44.3%**
	Very Satisfied	15	**21.4%**
I classify soybeans into specific classes of food.	Carbohydrates	3	**4.3%**
	Protein	43	**61.4%**
	Fat & Oil	9	**12.9%**
	Vitamins & Minerals	10	**14.3%**
	All of the above	5	**7.1%**

Table 3 indicates knowledge of soybeans among CKD patients. A majority (90.0%) of respondents are pre-dialysis patients and 62.9% are aware of their recent blood creatinine values, indicating a moderate level of health monitoring. However, only 30.0% acknowledge being informed about the necessity of high-quality protein intake for CKD management, suggesting gaps in dietary education. While 60.0% recognize soybean-based diets as a source of high-

quality protein, 67.1% report being advised against consuming soy products, highlighting conflicting nutritional guidance. Health professionals serve as the primary source of information for 62.9% of respondents regarding dietary restrictions. Despite these insights, 75.7% have avoided soybean-based diets since their CKD diagnosis, although 55.7% consumed them before diagnosis. Furthermore, 65.7% report consuming less soybean-based food post-diagnosis. A significant proportion of patients (75.7%) had diabetes mellitus before CKD onset, while 55.7% had hypertension, emphasizing common comorbidities. Engagement in extracurricular activities is high (85.7%), suggesting an active lifestyle among most patients. Lastly, while 61.4% believe soybean consumption can slow CKD progression, 38.6% remain skeptical. These findings underscore the need for clearer, evidence-based dietary education for CKD patients to optimize their nutritional management.

Table 3: Knowledge of Soybeans among CKD patients

Items	**Responses**	**N (%)**
During the treatment of CKD, patients are often informed that they should have high-quality protein diets.	No	26(37.0%)
	Yes	44(64.0%)
Soybean products are good sources of high-quality proteins.	No Idea	14(19.5%)
	No	14(19.5%)
	Yes	42(61.0%)
CKD patients are often informed that they should avoid soybean products like soybeans, tofu, tempeh, edamame, and unsweetened soy milk.	Yes	48(68.3%)
	No	21(29.3%)
	I don't know	1(2.4%)
Your knowledge concerning the effect of soybean products on CKD was obtained from various sources like.	Medical workers	41(58.5%)
	Internet	9(12.2%)
	TV	3(4.9%)
	other CKD patients	9(12.2%)
	Family members	7(9.8%)
	others	1(2.4%)
Your feelings about soybean products may vary depending on personal preferences and dietary considerations.	Do not dare to eat	1(2.4%)
	Do not like to eat	17(24.4%)
	No preference	21(29.3%)

	Enjoy eating	31(43.9%)
If soy foods are not part of your dietary choices, the reason(s) could include	Proteinuria	3(4.3%)
	Haematuria	5(7.1%)
	High blood uric acid	5(7.1%)
	High blood creatinine	15(21.4%)
	Medical personnel suggestion	42(60.0%)
Your frequency of consuming soybean products varies as:	never	22(31.7%)
	Once in a while	33(46.3%)
	three times a week	5(7.3%)
	Daily	10(14.6%)
Your frequency of consumption of soybean foods may have changed since being diagnosed with CKD depending on dietary recommendations.	never	26(36.6%)
	Occasionally	12(17.1%)
	Less than before the diagnosis	22(31.7%)
	Eat more soy foods to replace all or part of animal protein	10(14.6%)
You may have diabetes mellitus.	No	44(63.4%)
	Yes	25(36.6%)
	I don't know	1(2.4%)
You may have Hypertension.	No	17(22.0%)
	Yes	53(75.6%)
It is believed that consuming soybean products may help slow the progression of CKD.	I don't know	39(56.1%)
	No	5(7.3%)
	Yes	26(36.6%)

Table 4 focuses on the association between the socio-demographic characteristics and the perception of soybeans among CKD patients. Regarding age, senior participants (55–85 years)

exhibited the highest positive perception (80.5%), whereas younger individuals (18–34.9 years) had the lowest (60.0%), though the association was not statistically significant (p = .352). Gender differences were minimal, with females (80.8%) showing higher acceptance than males (70.5%), also not statistically significant (p = .340). However, education level had a significant impact (p = .010), with postgraduate respondents displaying the highest acceptance (100%), followed by tertiary-educated individuals (82.4%), while those with only secondary education or below had the lowest (55.6%). Religious affiliation, income, and occupation showed no statistically significant associations with perception (p > .05), though Christians (71.9%) and those earning between $100,000–499,999 (72.9%) had higher acceptance rates. Among occupational groups, civil servants (81.0%) had the highest acceptance, while artisans and others had the lowest (60.0%). Marital status and tribal affiliation did not significantly influence perception, though Yoruba respondents (76.3%) had a higher acceptance rate than Igbo participants (57.1%). Based on the analysis, education emerged as the key determinant of soybean perception among CKD patients, underscoring the importance of nutritional education in influencing dietary choices

Table 4: Results of Chi-Square Test for the Association between Socio-demographic Characteristics and the knowledge of Soybeans-based diet

Variables	Yes	No	X^2	P
Gender n, (%)				
Male	20(45.5)	24(54.5)	1	**.226**
Female	18(69.2)	8(30.8)		
Age n, (%)				
Young Age (18-34.9)	2 (40.0)	3 (60.0)	1.314	**.518**
Middle Age (35-54.9)	16 (66.7)	8 (33.3)		
Senior Age (55-85)	24 (58.5)	17 (41.5)		
Education n, (%)				
Secondary School and below	17(63.0)	10(37.0)	.506	**.777**
Tertiary Education	19(55.9)	15(44.1)		
Postgraduate	6(66.7)	3(33.3)		

Variables	Grouping			□² (p-value)
		No	Yes	
Age	Young Age (18 - 34.9)	2 (40.0)	3 (60.0)	**.352**
	Middle Age (35 - 54.9)	8(33.3)	16(6.7)	
	Senior Age (55-85)	8(19.5)	33(80.5)	
Gender	Male	13(29.5)	31(70.5)	**.340**
	Female	5(19.2)	21(80.8)	
Education Status	Secondary School Below	12(44.4)	15(55.6)	**9.232(.010)**
	Tertiary Education	6(17.6)	28(82.4)	
	Postgraduate	0(0.0)	9(100.0)	

Religion	Christianity	16(28.1)	41(71.9)	**1.026(.599)**
	Islamic	2(16.7)	10(83.3)	
	Traditional	0(0.0)	1(100.0)	
Income	< $100,000	5(23.8)	16(76.2)	**.433(.805)**
	$100,000 - 499,999	13(27.1)	35(72.9)	
	$500,000 - $1million	0(0.0)	1(100)	
Occupation	Trader & Famers	12(27.3)	32(72.7)	**1.079(.583)**
	Civil Servants	4(19.0)	17(81.0)	
	Artisans & others	2(40.0)	3(60.0)	
	Single	2(25.0)	6(75.0)	**.199(.905)**
	Married	14(25.0)	42(75.0)	
	Others	2(33.3)	4(66.7)	
Tribe	Yoruba	14(23.7)	45(76.3)	**1.200(.549**
	Igbo	3(42.9)	4(57.1)	
	Others	1(25.0)	3(75.0)	

The socio-demographic variation in the knowledge of soybeans among CKD patients as shown in Table 5 shows that knowledge varied significantly by age group (p = .027), with senior participants (55–85 years) having the highest satisfaction (61.0% satisfied, 12.2% very satisfied), while younger participants (18–34.9 years) had the lowest satisfaction (60.0% neutral). Based on gender, male participants had a significantly higher proportion of satisfied respondents (61.4%) compared to females (42.3%), but females had a higher proportion of very satisfied responses (23.1%) (p = .007). Although not statistically significant (p = .056), those with tertiary education reported higher satisfaction (67.6%), whereas those with secondary education and below had lower satisfaction levels (37.0%). Based on religious affinity, Christians had the highest proportion of satisfied respondents (61.4%), while Islamic respondents had the highest proportion of neutral responses (58.3%). A significant association was found between income level and knowledge (p = .048). Those earning between ₦100,000 – ₦499,999 had the highest satisfaction (60.4%), while lower-income respondents (<₦100,000) had a higher proportion of dissatisfaction (19.0%). There was a significant association between occupation and knowledge (p = 0.028), though civil servants showed the highest satisfaction (66.7%), while traders and farmers had the lowest (47.7%). Similarly, based on marital status, no significant association was found (p = .199), though married individuals had the highest satisfaction (58.9%). In terms of tribal or cultural affinity, there exists a strong significant association (p = .000), with Yoruba respondents showing the highest satisfaction (57.6%), while Hausa respondents had the highest dissatisfaction (50.0%). These findings indicate that age, gender, income, occupation, and tribal affiliation significantly influence knowledge of soybeans among CKD patients, highlighting the need for targeted awareness programs.

Table 5: Results of Chi-Square Test for the Association between socio-demographic Characteristics and the perception of Soybeans among the CKD Patients.

		Perception					χ^2 (p-value)
		VD	D	N	S	VS	
Age	Young Age (18 - 34.9)	0(0.0)	2(40.)	3(60.0)	0(0.0)	0(0.0)	**17.270(.027)**
	Middle Age (35 - 54.9)	2(8.3)	1(4.2)	7(29.2)	13(54.2)	1(4.2)	

	Senior Age (55-85)	1(2.4)	2(4.9)	8(19.5)	25(61.0)	5(12.2)	
Gender	Male	3(6.8)	2(4.5)	12(27.3)	27(61.4)	0(0.0)	**14.251(.007)**
	Female	0(0.0)	3(11.5)	6(23.1)	11(42.3)	6(23.1)	
Education	Secondary School Below	3(11.1)	3(11.1)	10(37.0)	10(37.0)	1(3.7)	**15.175(.056)**
	Tertiary Education	0(0.0)	1(2.9)	5(14.7)	23(67.6)	5(14.7)	
	Postgraduate	0(0.0)	1(11.1)	3(33.3)	5(55.6)	0(0.0)	
Religion	Christianity	3(5.3)	3(5.3)	10(17.5)	35(61.4)	6(10.5)	**15.492(.050)**
	Islamic	0(0.0)	2(16.7)	7(58.3)	3(25.0)	0(0.0)	
	Traditional	0(0.0)	0(0.0)	1(100.0)	0(0.0)	0(0.0)	
Income	< ₦ 100,000	3(14.3)	4(19.0)	5(23.8)	8 (38.1)	1(4.8)	**15.643(.048)**
	₦100,000 - 499,999	0(0.0)	1(2.1)	13(27.1)	29 (60.4)	5(10.4)	
	₦ 500,000 - ₦1million	0(0.0)	0(0.0)	0(0.0)	1(100.0)	0(0.0)	
Occupation	Trader & Famers	3(6.8)	4(9.1)	15(34.1)	21(47.7)	1(2.3)	**17.194(.028)**
	Civil Servants	0(0.0)	0(0.0)	2(9.5)	14(66.7)	5(23.8)	
	Artisans & others	0(0.0)	1(20.0)	1(20.0)	3(60.0)	0(0.0)	
Marital Status	Single	1(12.5)	2(25.0)	2(25.0)	3(37.5)	0(0.0)	**11.053(.199)**
	Married	2(3.6)	2(3.6)	13(23.2)	33(58.9)	6(10.7)	
	Others	0(0.0)	1(16.7)	3(50.0)	2(33.3)	0(0.0)	
Tribe	Yoruba	0(0.0)	4(6.8)	15(25.4)	34(57.6)	6(10.2)	**29.160(.000)**
	Igbo	1(14.3)	1(14.3)	1(14.3)	4(57.1)	0(0.0)	
	Hausa	2(50.0)	0(0.0)	2(50.0)	0(0.0)	0(0.0)	

Key: VD – very Dissatisfied; D – Dissatisfied; N- Neutral; S - Satisfied; VS – Very Satisfied.

Discussion

Chronic kidney disease (CKD) remains one of the foremost global health challenges, contributing to over one million deaths annually (Bikbov et al., 2020; Kafeshani, 2017). Historically, dietary recommendations for CKD patients discouraged high protein intake due to the risk of glomerular hyperfiltration and subsequent renal deterioration (Kasbekar, 2021). However, modern guidelines, such as those by KDIGO (2021), now promote plant-based protein consumption particularly soy protein as a safer alternative for preserving kidney function. This dietary shift is also supported by evidence that plant proteins, especially soy, positively influence gut microbiota and reduce the generation of uremic toxins (Kalantar-Zadeh, 2020). Soy products, known for their high-quality plant protein content, have been recognised for their benefits in managing lipid profiles and reducing urinary albumin, serum creatinine, and serum phosphorus levels in both CKD patients and experimental models (Zhang et al., 2014; D'Amico et al., 1992). Despite these proven advantages, adherence to such dietary guidelines remains poor among CKD patients, with studies indicating that up to 70% of patients struggle to follow dietary advice (Beto et al., 2016). Against this background, a study was conducted using semi-structured questionnaires among 70 CKD patients in two tertiary institutions in Ado Ekiti, Nigeria, to assess their knowledge and perceptions of soy products.

Findings from the study revealed that 64.0% of participants were aware that high-quality protein diets are necessary for managing CKD, and 61.4% could correctly identify soybeans as a source of protein. Nonetheless, a contrasting 68.3% believed that soy products should be avoided by CKD patients, with 58.5% attributing this belief to information received from medical personnel. Approximately 60% of patients excluded soy from their diets based on such medical advice, even though 61.4% agreed that soybean-based diets could slow CKD progression. Strikingly, only 14.6% of the respondents reported any willingness to substitute all or part of their animal

protein intake with soy-based alternatives. These findings indicate a significant gap between patient knowledge and actual dietary practices. Many patients still view soy products with caution, largely due to misconceptions and outdated medical advice. This highlights the critical need for updated, evidence-based nutritional counselling tailored to the CKD population, including addressing persistent myths and improving healthcare providers' awareness of recent dietary guidelines.

The study further underscores that patient hesitancy regarding soy consumption is especially prevalent among pre-dialysis patients, with 62.9% reporting reluctance to consume soy despite acknowledging its nutritional value. This ambivalence may stem from a longstanding perception among both patients and healthcare professionals that soy lacks essential amino acids needed by CKD patients. Earlier beliefs suggested that soy, rich in non-essential amino acids, could lead to metabolic disturbances and nitrogen retention in renal patients (Young & Pellett, 1994; Josh et al., 2019). However, recent studies now affirm that soy contains all essential amino acids and is classifiable as a high-quality protein source suitable for CKD patients (McGraw et al., 2016). Meta-analyses and experimental trials have demonstrated soy's ability to reduce serum creatinine and phosphorus levels, as well as its cardiovascular benefits due to bioactive polyphenols (Zhang et al., 2014; Marx et al., 2017). In vivo experiments also show that soy-derived polyphenols contribute to blood pressure regulation through vasodilation mechanisms (Diebolt et al., 2001). Despite this progress in research, outdated beliefs still shape clinical practice and patient behaviour.

Moreover, the role of healthcare professionals in shaping patient dietary behaviour is evident in the study's findings. About 62.9% of the patients reported receiving information on soy product consumption from medical workers, and a significant proportion of those avoiding soy cited medical advice as the reason. This trend implies that early medical guidance possibly provided during earlier stages of disease progression may linger in patients' beliefs, even when newer evidence suggests otherwise. Given the trust patients place in their healthcare providers, especially physicians, dietitians, and nurses, the dissemination of current dietary guidelines through these professionals is vital. As CKD is a chronic condition often requiring long-term dietary interventions, continuous professional education and updated clinical practices are necessary to bridge the knowledge gap between outdated and modern dietary approaches. A healthcare workforce equipped with current nutritional knowledge will be pivotal in encouraging patients to adopt healthier, evidence-based dietary behaviours, including increased consumption of high-quality plant proteins like soy.

In conclusion, although awareness of soy as a high-quality protein exists among many CKD patients, deep-seated misconceptions and outdated clinical advice significantly hinder its integration into their diets. The reluctance of patients to consume soy products despite recognising their benefits underscores the critical need for improved nutritional education among both patients and medical professionals. Current scientific evidence supports the inclusion of soy in CKD diets due to its protective effects on renal function and cardiovascular health. However, to translate these findings into real-world dietary behaviours, healthcare systems must invest in consistent training for clinicians and the development of patient-friendly educational materials. Bridging this knowledge-practice gap holds the potential not only to improve dietary adherence but also to enhance the overall quality of life and prognosis for individuals living with CKD

Conclusion

This survey study provides some insightful information for controlling the progress of CKD from the point of view of diets or non-pharmacological methods. The results from this self-administered questionnaire study recommend that significant numbers of CKD patients, especially those over 60, are not being directed by the current understanding of high-quality protein diets, which could be vital for the maintenance of kidney functions. The findings indicate that age, gender, income, occupation, and tribal affiliation significantly influence knowledge of soybeans among CKD patients, highlighting the need for targeted awareness programs. Also, education emerged as the key determinant of soybean perception among CKD patients, underscoring the importance of nutritional education in influencing dietary choices. To improve this situation, updated training or education in medical staff in allied fields on soy products could be crucial.

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