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"ASSESSMENT OF KNOWLEDGE, ATTITUDE, AND PRACTICE REGARDING NUTRITIONAL CARE AND SARCOPENIA IN RENAL AND HEPATIC DISORDERS: A CROSS-SECTIONAL SURVEY"

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ABSTRACT

Background: Sarcopenia is a common yet underrecognized complication in chronic kidney disease (CKD) and chronic liver disease (CLD), contributing significantly to morbidity, reduced quality of life, and increased mortality. Nutritional therapy plays a critical role in the prevention and management of sarcopenia; however, limited awareness and inconsistent clinical practices among healthcare professionals may affect patient outcomes.

Objective: To assess the knowledge, attitudes, and practices (KAP) regarding nutritional care and sarcopenia management among healthcare professionals involved in the care of patients with renal and hepatic disorders.

Methodology: A cross-sectional survey was conducted using a structured questionnaire comprising knowledge, attitude, and practice domains related to nutritional management and sarcopenia in CKD and CLD. The questionnaire included multiple-choice and practice-based questions. Descriptive statistics including mean, median, and mode were used for analysis.

Results: A total of 18 consultants were approached, of whom 13 completed the survey (response rate: 72.2%). Participants demonstrated positive attitudes toward nutritional therapy, dietitian referral, and the importance of individualized nutritional care. Routine nutritional assessment and protein calculation practices were commonly reported. However, limited use of validated sarcopenia screening tools and variability in knowledge regarding nutritional management were observed.

Conclusion: Healthcare professionals demonstrated favorable attitudes toward nutritional care in renal and hepatic disorders; however, important gaps in sarcopenia-related knowledge and screening practices remain. Structured nutrition education and standardized clinical protocols may improve sarcopenia management and patient outcome.

Background

Sarcopenia, characterized by progressive loss of skeletal muscle mass, strength, and function, has emerged as a major clinical concern in patients with chronic renal and hepatic disorders. In both chronic kidney disease (CKD) and chronic liver disease (CLD), the presence of sarcopenia is associated with increased morbidity, poor quality of life, higher hospitalization rates, and increased mortality. The pathophysiology of sarcopenia in these conditions is multifactorial and includes chronic inflammation, metabolic derangements, hormonal imbalance, reduced dietary intake, insulin resistance, physical inactivity, and altered protein metabolism. In patients with advanced liver disease, impaired glycogen storage and hyperammonemia further contribute to accelerated muscle protein breakdown, whereas in CKD, metabolic acidosis, dialysis-related amino acid losses, and protein-energy wasting play significant roles in muscle depletion.^{1,2,3}

The prevalence of sarcopenia is particularly high among patients with cirrhosis and end-stage renal disease (ESRD). Globally, approximately 25% of individuals with CKD are affected by sarcopenia, with prevalence increasing to nearly 50% among patients with end-stage renal disease (ESRD) receiving dialysis.⁴ Similarly, sarcopenia affects an estimated 30–70% of patients with cirrhosis, depending on disease severity and diagnostic criteria used.⁵ Muscle wasting in these populations has been linked to frailty, diminished functional capacity, cardiovascular complications, poor treatment outcomes, and increased mortality.^{6,7}

Shared Pathophysiological Mechanisms in CKD and CLD

Despite differences in the primary organ involved, CKD and CLD share several key pathways that promote muscle loss:

1. **Chronic Inflammation** Elevated levels of pro-inflammatory cytokines such as TNF- α , IL-1 β , and IL-6 activate the NF- κ B signaling pathway, leading to upregulation of the muscle-specific E3 ubiquitin ligases MuRF1 and Atrogin-1. This accelerates ubiquitin–proteasome-mediated proteolysis and promotes skeletal muscle degradation.
2. **Anabolic Resistance and Hormonal Dysregulation** Both conditions are characterized by reduced levels of insulin-like growth factor-1 (IGF-1), testosterone, and growth hormone activity, resulting in impaired activation of the mTORC1 pathway and reduced muscle protein synthesis. Concurrently, elevated myostatin levels further suppress muscle growth and regeneration.
3. **Mitochondrial Dysfunction and Oxidative Stress** Uremic toxins in CKD and hyperammonemia in CLD increase reactive oxygen species (ROS) production, causing mitochondrial dysfunction and impaired ATP generation. This contributes to reduced muscle fiber contractility, impaired muscle regeneration, and satellite cell senescence.

Together, these mechanisms create a persistent catabolic state that accelerates the loss of muscle mass and function in both CKD and CLD.^{8,9,10,11,12}

Despite its strong prognostic significance, sarcopenia frequently remains underdiagnosed in routine clinical practice. Nutrition therapy is considered a cornerstone in the prevention and management of sarcopenia in CKD and CLD. Current guidelines recommend individualized nutritional interventions including adequate caloric intake, optimized protein provision, resistance exercise, and regular nutritional assessment to preserve muscle mass and improve patient outcomes.^{13,14} In patients with cirrhosis, late-evening snacks, branched-chain amino acid supplementation, and management of metabolic abnormalities have demonstrated beneficial effects. Similarly, in CKD patients, appropriate protein-energy management and nutritional supplementation play a vital role in preventing protein-energy wasting and muscle loss.¹⁵ Healthcare professionals play a pivotal role in identifying nutritional risk, providing dietary counseling, and implementing evidence-based nutritional strategies in patients with renal and hepatic disorders. However, several studies suggest that nutrition-related education among physicians and healthcare professionals remains inadequate, leading to inconsistencies in nutritional assessment, sarcopenia screening, and referral practices.¹⁶ Limited awareness of validated screening tools and lack of standardized nutritional protocols may further contribute to suboptimal nutritional care. Assessment of healthcare professionals knowledge, attitudes, and practices (KAP) regarding nutritional care and sarcopenia is therefore essential to identify existing gaps and improve clinical practice.

However, data evaluating KAP related to sarcopenia and nutrition management in renal and hepatic disorders remain limited, particularly in the Indian healthcare setting. Hence, the present cross-sectional survey was conducted to assess the knowledge, attitudes, and practices regarding nutritional care and sarcopenia among healthcare professionals involved in the management of patients with chronic renal and hepatic diseases. The study aimed to identify existing knowledge gaps, current clinical practices, and potential areas requiring further education and standardization to improve patient-centered nutritional care.

Methodology

A cross-sectional, questionnaire-based survey was conducted among consultants and healthcare professionals involved in the management of patients with chronic renal and hepatic diseases. A structured questionnaire consisting of knowledge, attitude, and practice domains was developed to assess participants' understanding of sarcopenia, nutritional management strategies, confidence in nutrition counseling, and routine clinical practices related to nutritional assessment.

The survey included both multiple-choice and open-ended questions covering topics such as protein requirements, nutritional interventions, sarcopenia screening tools, dietary counseling, and referral practices. Data were collected electronically following informed consent.

Descriptive statistical analysis was performed to summarize participant responses. Quantitative variables were represented using mean, median, and mode values, while qualitative responses were analyzed descriptively to identify trends, gaps in nutritional knowledge, and barriers to effective nutrition counseling.

Results

A total of 18 consultants were approached for participation, of whom 13 completed the survey, yielding a response rate of 72.2%.

Knowledge Domain

Participants demonstrated variable knowledge regarding sarcopenia and nutritional management in CKD and CLD. Higher awareness was observed regarding protein requirements in dialysis patients, late-night snacks in cirrhosis, and dietary restrictions in hepatic encephalopathy. However, lower response rates were observed for questions related to primary nutrition management approaches and challenges associated with protein intake.

Table 1. Knowledge-related responses

Questions	Number of Responses	Mean	Median	Mode
Definition of Sarcopenia	12	1.5	1	1.0
Knowledge about role of protein	13	1.62	2	2.0
Primary approach to nutrition management	4	2.75	1.5	1.0
Patients frequently advised	10	4.1	5	5.0
Challenges ensuring protein intake	6	4.17	4.5	4.0, 5.0
Most important protein source	9	2.78	3	3.0
Nutrient restriction in advanced CKD	9	2.67	3	3.0
NOT restricted in hepatic encephalopathy	12	3.17	3.5	4.0
Preferred protein in cirrhosis with encephalopathy	11	2.36	2	2.0
Phosphorus control in renal nutrition	10	2.3	2	2.0
Vitamin deficient in chronic liver disease	10	2.5	2.5	2.0, 3.0
Nutrient limited in ascites	13	2.92	3	3.0
Protein requirement in dialysis	12	2.42	2	2.0
BCAA enriched formulas benefits	10	2.7	3	3.0
Energy intake for stable cirrhosis	13	2.62	2	2.0
NOT goal of renal nutrition therapy	13	2.69	3	2.0
Late-night snack purpose in CLD	13	2.08	2	2.0
Indicator of protein-energy wasting in CKD	13	2.38	2	2.0, 3.0

Attitude Domain

Overall, participants demonstrated a positive attitude toward nutritional care in renal and hepatic disorders. Most respondents agreed that nutritional therapy is a critical component of CKD and CLD management and recognized the importance of individualized nutritional interventions and dietitian referrals.

Table 2. Attitude-related responses

Questions	Number of Responses	Mean	Median	Mode
Nutritional therapy critical in CKD/CLD	13	2	2	1.0
Dietitian referral necessary	12	1.42	1	1.0
Needs vary by disease stage	13	1.31	1	1.0
Stay updated with guidelines	13	1.62	1	1.0
Nutritional assessment integral	13	1.77	2	1.0
Confident counseling patients	13	1.69	1	1.0

Practice Domain

Most respondents reported performing routine nutritional assessments and calculating protein requirements based on body weight. However, comparatively fewer participants reported routinely using validated sarcopenia screening tools such as SARC-F or muscle strength assessments in clinical practice.

Table 3. Practice-related responses

Questions	Number of Responses	Mean	Median	Mode
Routine nutritional assessment	13	1.08	1	1.0
Calculate protein based on weight	13	1	1	1.0
Use BMI/Albumin/SGA	13	1	1	1.0
Refer to dietitian frequency	13	1.85	1	1.0
Use SARC-F/strength tests	13	1.85	1	1.0
If yes specify tool	12	1.25	1	1.0
Provide personalized diet plans	7	1	1	1.0
Supplement commonly recommended	11	1.18	1	1.0
Biomarkers for sarcopenia	11	1.18	1	1.0
Body composition tools to diagnose sarcopenia	9	1.22	1	1.0

Discussion

The present study highlights the growing awareness among healthcare professionals regarding the importance of nutritional care and sarcopenia management in chronic renal and hepatic diseases. Participants generally demonstrated favorable attitudes toward nutrition counseling and recognized the importance of individualized nutritional interventions and multidisciplinary collaboration.

Despite positive attitudes, important gaps were identified in knowledge and clinical practice. Limited familiarity with structured sarcopenia assessment tools and inconsistent use of validated screening methods indicate the need for targeted educational initiatives and practical training programs. Similar findings have been reported in previous studies evaluating nutritional knowledge among physicians and healthcare professionals, where inadequate formal nutrition education and lack of confidence in counseling were common barriers.

The findings also underscore the need for standardized clinical protocols for nutritional screening and sarcopenia assessment in patients with CKD and CLD. Incorporating routine nutritional assessments, body composition analysis, and functional screening tools into clinical practice may facilitate early detection and timely intervention.

Conclusion

Healthcare professionals involved in the management of chronic renal and hepatic disorders demonstrated positive attitudes toward nutritional care and acknowledged the importance of sarcopenia management. However, gaps in knowledge and routine clinical practice related to sarcopenia screening and nutritional interventions were identified.

The study emphasizes the need for structured nutrition education, interdisciplinary collaboration, and implementation of standardized nutritional assessment protocols to improve sarcopenia management and patient outcomes in renal and hepatic disorders.

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