

Evaluation of Nutritional Status and Quality of Life in Hemodialysis Patients: Traditional Review

Hemodiyaliz Hastalarında Beslenme Durumu ve Yaşam Kalitesinin Değerlendirilmesi: Geleneksel Derleme

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ÖZET

Kronik Böbrek Yetmezliği (KBY) hastalarının beslenme durumunun değerlendirilmesi özellikle hemodiyaliz (HD) sürecinin beraberinde getirdiği diyet ve sıvı kısıtlamaları nedeniyle sıklıkla karşılaşılan malnütrisyonun erken teşhisi ve tedavisinde önemlidir. Malnütrisyonun değerlendirilmesinde klinik kullanımı olan birçok ölçüm aracı geliştirilmiştir. Bu beslenme durumu değerlendirme araçları hitap ettiği kitle ve kullanım alanlarına göre farklılık göstermektedir. Geniş kapsamları, uygulanmasında özel bir ekipmana gereksinim duyulmaması ve kısa sürede gerçekleştirilebilmesi nedeniyle beslenme durumunun etkili bir şekilde değerlendirilmesine ve malnütrisyonun tespit edilmesine olanak sağlayan Subjektif Global Değerlendirme – 7P (SGD-7P) ve Malnütrisyon İnflamasyon Skoru (MIS), HD hastalarında en sık kullanılan öznel değerlendirme araçlarıdır. Ayrıca HD bireylerin fiziksel, psikolojik ve sosyoekonomik durumlarını etkileyerek yaşam kalitelerini değiştirebilmektedir ve bu değişim çoğunlukla negatif yönde bir eğilim göstermektedir. Bu popülasyondaki hastaların yaş ortalamasının yüksek olması günlük yaşam aktivitelerinin ve kendi başına iş yapabilme kapasitesinin de etkilenmesine sebep olmaktadır. HD hastalarının daha kötü yaşam kalitesine sahip olması komplikasyon risklerini ve mortaliteye yatkınlığı da beraberinde getirmektedir. Bireylerin yaşam kalitesinin değerlendirilmesinde Böbrek Hastalığı Yaşam Kalitesi Ölçeği-36 (KDQOL-36) ölçüm aracı etkili bir yöntem olarak karşımıza çıkarken bu ölçüm araçlarının kombine bir şekilde kullanılması hastaların genel durumunun gözlenmesi ve takibinde daha güçlü sonuçlar vermektedir. Malnütrisyonun erken teşhisi için beslenme durumunun düzenli aralıklarla değerlendirilmesi ve yaşam kalitesinin belirli aralıklarla değerlendirilerek hastalara gerekli desteklerin sağlanması hastaların klinik seyrinin iyileşmesi ve mortalite riskinin azaltılmasında önem arz etmektedir. Bu derleme, HD hastalarında beslenme durumu ve yaşam kalitesi ilişkisinin literatürdeki yerinin değerlendirilmesi ve bu durumun bireylerin tedavi sürecindeki önemini ortaya koymak amacıyla hazırlanmıştır.

Anahtar Kelimeler: beslenme durumu, diyaliz, malnütrisyon, yaşam kalitesi

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ABSTRACT

The assessment of nutritional status in patients with Chronic Renal Failure (CRF) is crucial for the early diagnosis and management of malnutrition, a common complication arising from the dietary and fluid restrictions imposed by the hemodialysis (HD) process. Various measurement tools have been developed for clinical use to evaluate malnutrition, each differing in their target populations and applications. Among these, the Subjective Global Assessment–7P (SGA-7P) and the Malnutrition Inflammation Score (MIS) are widely utilized in HD patients due to their comprehensive scope, ease of application without specialized equipment, and short administration time. These tools effectively assess nutritional status and detect malnutrition, making them essential components of patient evaluation.

Beyond nutritional concerns, HD significantly impacts the physical, psychological, and socioeconomic well-being of individuals, often leading to a decline in overall quality of life. The advanced age of many HD patients further affects their ability to perform daily activities and maintain independence, contributing to poorer health outcomes and increased susceptibility to complications and mortality. In this context, the Kidney Disease Quality of Life Scale-36 (KDQOL-36) serves as a valuable tool for evaluating quality of life, providing critical insights into patients' well-being.

The combined use of SGA-7P, MIS, and KDQOL-36 enhances the accuracy of patient assessments, enabling a more comprehensive evaluation of both nutritional status and quality of life. Regular monitoring of these parameters facilitates the early detection of malnutrition and allows for timely interventions, ultimately reducing the risk of mortality and improving clinical patient outcomes. This review aims to evaluate the relationship between nutritional status and quality of life in HD patients as presented in the literature, and to highlight the significance of this relationship in the treatment process.

Keywords: nutritional status, dialysis, malnutrition, quality of life

INTRODUCTION

Chronic renal failure (CRF) represents a significant global health challenge, with an increasing incidence and a substantial contribution to premature mortality worldwide¹. International guidelines, such as the Clinical Practice Guidelines for Chronic Kidney Disease, recommend the use of both objective and subjective methods to assess the nutritional status of CRF patients and to implement appropriate nutritional interventions².

Inflammation, which is prevalent in CRF, contributes to protein and muscle loss through the release of cytokines. Furthermore, nutrient losses via dialysate during hemodialysis (HD), fluctuations in body weight and hydration status, and decreased serum albumin levels resulting from chronic inflammation underscore the importance of continuous nutritional monitoring and early intervention^{1,3}. These factors accelerate anorexic and catabolic processes, trigger malnutrition, and significantly diminish patients' quality of life by increasing the risk of premature mortality¹.

The methods employed to assess malnutrition, with prevalence rates reported to vary between 23% and 76% depending on the population studied¹ and the assessment techniques used, generally include evaluations based on medical history and physical examinations⁴. Assessing nutritional status and quality of life in HD patients serves as an important predictive tool for the early estimation of mortality risk. This review aims to evaluate the relationship between nutritional status and quality of life in HD patients as presented in the literature, and to highlight the significance of this relationship in the treatment process.

Evaluation of Nutritional Status in Hemodialysis Patients

Malnutrition is a prevalent complication among patients undergoing hemodialysis (HD), with reported prevalence rates ranging from 18% to 75%^{5,6}. Consequently, a comprehensive assessment of nutritional status is essential for individuals at risk. Failure to accurately evaluate nutritional status can delay personalized nutritional interventions and, when combined with other complications, markedly increase the risk of mortality^{1,7}. Accordingly, the European Best Practice Guidelines for the monitoring of malnutrition advocate for the close monitoring of nutritional status alongside HD treatment⁸.

Nutritional assessment serves as a crucial prognostic tool in HD patients, facilitating early interventions that can enhance quality of life^{6,9}. However, despite its importance, the routine assessment of nutritional status in HD patients remains challenging. Although a multifaceted evaluation—incorporating nutritional history, body composition, physical examination, and laboratory parameters—can provide a comprehensive interpretation, it is often impractical and time-consuming in routine clinical practice³.

Numerous measurement tools have been developed for the clinical assessment of malnutrition; each tailored to specific populations and settings. The European Society for Clinical Nutrition and Metabolism (ESPEN) recommends several such tools, including the Malnutrition Universal Screening Tool (MUST) for general clinical use, the Nutritional Risk Screening Test-2002 (NRS-2002) for inpatients, the Global Leadership Initiative on Nutrition (GLIM) which utilizes a two-step approach, and the Mini Nutritional Assessment-Short

Form (MNA-SF) designed for individuals over the age of 65¹⁰. Additionally, other instruments are frequently employed in various settings: the Short Nutritional Assessment Questionnaire (SNAQ) is used in nursing homes and hospitals, the Malnutrition Screening Tool (MST) can be self-administered by patients, and the Nutriscore Test (NUTRISCORE), developed alongside the MST, is also commonly utilized¹¹.

Subjective Global Assessment (SGA) and the Malnutrition Inflammation Score (MIS) have emerged as the most used subjective assessment tools in this patient population². Their widespread adoption is attributable to their broad applicability, the minimal requirement for specialized equipment, and their efficiency in detecting malnutrition, which supports their routine use in clinical settings⁴. These methods are also endorsed by the 2020 National Kidney Foundation/Kidney Disease Outcomes Quality Initiative Nutrition Guidelines for regular nutritional assessment in HD patients^{3,8}.

Subjective Global Assessment-7P (SGA-7P)

Patients undergoing HD frequently encounter both acute and chronic complications, with nutritional issues being among the most critical factors influencing quality of life¹². The utilization of the Subjective Global Assessment (SGA) scale for the evaluation and early detection of malnutrition offers a comprehensive approach. The SGA requires clinical expertise for accurate application and provides essential data for decision-making, particularly when integrated with other methods during long-term follow-up⁸, its widespread use began with the CANUSA study, during which the tool was adapted into a 7-point scale specifically designed to assess the nutritional status of HD patients⁴.

The SGA-7P typically evaluates recent changes in body weight, dietary history, and physical examination findings, and is recognized as a valid instrument for cross-sectional assessment of malnutrition risk on a global scale⁸. Studies indicate that the SGA, recommended for biannual administration in HD patients, effectively detects long-term changes in nutritional status; its diagnostic accuracy is further enhanced when combined with biochemical and anthropometric assessments^{13,14}.

Developed in 1984 by Detsky et al.¹⁵ and validated in Turkish in 2019¹⁶ for evaluating the nutritional status of surgical patients, the SGA-7P integrates both subjective and objective components of a patient's physical and clinical history. Based on the total score, nutritional status is classified as well-nourished (6–7 points), mildly to moderately malnourished (3–5 points), or severely malnourished (1–2 points)^{1,2,17,18}.

The tool comprises five criteria derived from the patient's medical history and three from the physical examination. Specifically, the SGA-7P assessment includes evaluation of body weight change over the preceding six months, dietary intake, gastrointestinal symptoms, the presence of comorbidities, the ability to perform daily activities, and physical examination parameters that assess fat storage, muscle mass loss, and edema^{1,17,18}.

Malnutrition Inflammation Score (MIS)

Comorbidities are significant predictors of malnutrition in HD patients¹⁹. The Malnutrition Inflammation Score (MIS) is an assessment tool that integrates laboratory findings—including Body Mass Index (BMI), serum albumin levels, and total iron binding capacity—with the fundamental parameters of the SGA tool^{4,8}.

It has been reported that the median survival period of patients with CKD is less than five years, a statistic largely attributed to cardiovascular complications that necessitate HD treatment. However, high mortality in this patient population is not solely due to cardiovascular issues. Protein–energy malnutrition, resulting from inadequate nutrition during the HD process, and the malnutrition–inflammation complex associated with increased oxidative stress are major factors that further exacerbate this condition²⁰.

Given that the malnutrition–inflammation complex syndrome is frequently observed in HD patients, MIS is regarded as one of the gold standard criteria for nutritional evaluation. Comprising 10 key criteria, MIS, like SGA-7P, necessitates subjective evaluation and clinical expertise for its proper application²¹.

Developed in 1999 by Kalantar-Zadeh et al.²² as a modification of the SGA form, MIS is organized into four main sections: the patient's medical history, physical examination, BMI, and laboratory findings. The scoring system ranges from 0 to 30, with higher scores indicating a worsening nutritional status. Evidence from evaluations utilizing both SGA-7P and MIS in HD patients suggests that individuals diagnosed with malnutrition face a higher risk of morbidity and mortality, underscoring the utility of these tools in predicting patient outcomes and guiding future management^{2,4,6}. A comparison of the Subjective Global Assessment-7P (SGA-7P) and Malnutrition Inflammation Score (MIS) methods used in the assessment of nutritional status is presented in Table 1.

Table 1. Comparison of subjective global assessment-7P (SGA-7P) and malnutrition inflammation score (MIS) methods used in the assessment of nutritional status (malnutrition inflammation score (MIS))

Measurement Criteria	Subjective Global Assessment-7P (SGA-7P)	Malnutrition Inflammation Score (MIS)
Weight Loss	✓	✓
Adequate Dietary Intake	✓	✓
Gastrointestinal Symptoms	✓	✓
Functional Capacity	✓	✓
Comorbidity	✓	✓
Fat Storage and Muscle Loss	✓	✓
Presence of Edema	✓	×
Anthropometric Assessment (BMI)	×	✓
Biochemical Assessment	×	✓

Assessment of Quality of Life in Hemodialysis Patients

The World Health Organization (WHO) defines quality of life as a multidimensional construct encompassing an individual's perception of physical health, emotional well-being, and social relationships, while health-related quality of life refers to changes in these dimensions resulting from disease, treatments, lesions, and disabilities²³.

HD often negatively impacts quality of life by impairing physical, psychological, and socioeconomic conditions²⁴. In particular, the inability of HD patients to meet their energy and protein requirements can lead to a deterioration in nutritional status and significant muscle loss. This, in turn, exacerbates malnutrition and sarcopenia, further compromising both physical and mental health⁶. Additionally, the advanced average age of HD patients may limit their daily activities and reduce self-sufficiency, thereby increasing the risk of depression and other psychological disorders. The resulting decline in physical and mental health often reduces work capacity and imposes economic burdens, which collectively diminish overall quality of life^{6,17}.

Moreover, the poorer quality of life in HD patients is associated with a heightened risk of complications and mortality¹⁹. Thus, ensuring the social and economic security of these individuals, regularly monitoring their nutritional status, and enhancing supportive measures—including psychological care—are essential for improving their well-being and facilitating societal integration¹⁷.

The Health-Related Quality of Life (HRQOL) Scale is a critical tool for evaluating quality of life in HD patients. Among the various instruments available, the Kidney Disease Quality of Life Scale-36 (KDQOL-36) is the most used criterion, with regular assessments being mandated in some centers worldwide²⁵.

Kidney Disease Quality of Life Scale-36 (KDQOL-36)

Quality of life measures, which reflect a patient's subjective well-being, are critical clinical indicators of treatment effectiveness in HD patients. KDQOL-36 is one of the most frequently used instruments in this population, as it encompasses a broad range of parameters that may influence quality of life^{26,27}. The KDQOL-36 is a 36-item, 4-week retrospective questionnaire adapted from the original 134-item KDQOL and the 76-item KDQOL-Short Form (KDQOL-SF). It integrates the Short Form-12 (SF-12) instrument with disease-specific components to assess HRQOL in HD patients^{6,8,28}.

Published in 2000 based on a longer instrument initially developed in 1994, the KDQOL-36 comprises five subscales. The first two subscales derive from the SF-12 and include the Physical Component Summary (PCS) and the Mental Component Summary (MCS). The remaining three subscales are specific to kidney disease and assess the Burden of Kidney Disease (BKD), Symptoms and Problems of Kidney Disease (SPKD), and Effects of Kidney Disease (EKD)^{17,25,28}. Each subscale is scored from 0 to 100, with higher scores indicating a better quality of life^{17,26,27}.

In HD patients, reductions in physical capacity—often due to malnutrition and sarcopenia—diminished social interactions, and compromised psychological well-being are the areas most adversely affecting quality of life.

Studies have shown that these negative outcomes are associated with lower serum albumin levels, unfavorable anthropometric parameters, sleep disturbances, cognitive dysfunction, and various physical and psychological issues, such as depression. Collectively, these factors contribute to a poorer quality of life and an increased risk of mortality compared to healthy individuals^{7,29}.

The KDQOL-36 is appreciated for its ease of application by clinical experts, and its regular use has been shown to effectively predict hospitalization trends and estimate mortality risk in HD patients³⁰. Consequently, it is widely recommended as a standard tool for advanced and routine quality of life assessment in the comprehensive care of HD patients³¹. Schematic representation of the evaluation sections and related questions in the Kidney Disease Quality of Life - 36 (KDQOL-36) Questionnaire presented in Figure 1.

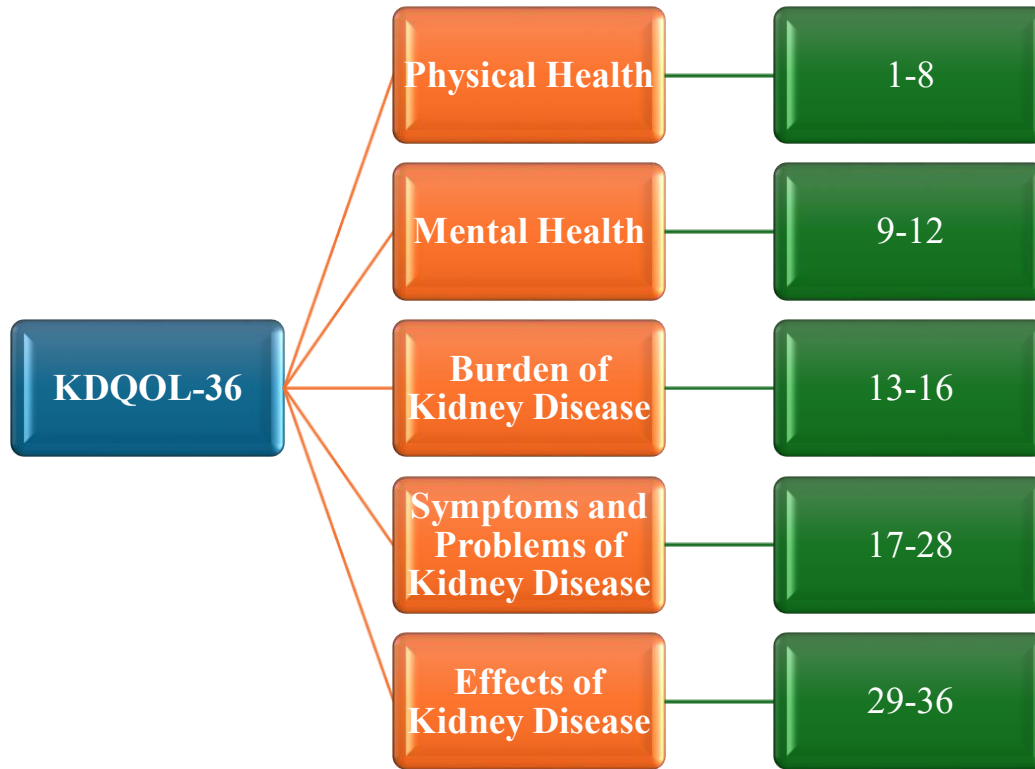


Figure 1. Schematic representation of the evaluation sections and related questions in the kidney disease quality of life - 36 (KDQOL-36) questionnaire (kidney disease quality of life scale-36 (KDQOL-36))

Combined Assessment of Nutritional Status and Quality of Life in Hemodialysis Patients

Given that malnutrition resulting from deteriorating nutritional status in HD patients is closely linked to decreased quality of life, a comprehensive evaluation of risk factors is critical for early diagnosis and intervention¹⁹.

Research has shown that nutritional status assessed by the SGA-7P and MIS, is associated with a two-fold increase in hospitalization rates and a three-fold increase in the length of hospital stay compared to well-nourished individuals⁴. However, the combined use of SGA-7P and MIS, which facilitates both objective and subjective assessment, has proven effective in identifying populations at risk for malnutrition in HD patients^{3,6}. Additionally, regular long-term evaluations are effective in tracking changes in nutritional status⁴.

For instance, in the study by Marte et al., which evaluated nutritional status using SGA and quality of life using the KDQOL scale, 48% of HD patients were found to be moderately malnourished and to have a low quality of life¹⁷. In another study that simultaneously assessed nutritional status and quality of life with MIS and KDQOL tools, nutritional status was significantly correlated with quality of life³²; patients at risk of malnutrition experienced a decline in quality of life, a finding that may be partially attributable to dietary restrictions. The study also emphasized that early dietary interventions could enhance quality of life⁶. Similarly, a study using MIS and KDQOL tools reported that malnutrition adversely affected the disease prognosis in 52% of patients, decreasing quality of life and increasing mortality risk, thereby highlighting the importance of early intervention through appropriate measurement tools¹⁹.

Given that HD is largely an irreversible treatment process, it is imperative to evaluate quality of life alongside related factors such as malnutrition. Such a comprehensive approach may enhance patient satisfaction, improve overall well-being, and facilitate better long-term outcomes¹⁷. Evaluation of studies using SGA, MIS and KDQOL scales in HD patients presented in Table 2.

Table 2. Evaluation of studies using subjective global assessment (SGA), malnutrition inflammation score (MIS) and kidney disease quality of life (KDQOL) scales in hemodialysis (HD) patient (combined assessment of nutritional status and quality of life in hemodialysis patients)

Research	Research Type	Patients	SGA	MIS	KDQOL	Conclusions
Santin et al., 2018 ⁴	Observational, Longitudinal, Prospective	104	✓	✓	×	Compared to the control group, patients undergoing HD) exhibit a twofold increase in hospitalization rates and a threefold increase in the length of hospital stay.
Nagy et al., 2021 ³³	Cross-sectional Observational	84	✓	✓	✓	SGA and MIS are effective tools for the early detection of malnutrition and mortality risk, both of which show a negative correlation with quality of life.
Hafi et al., 2021 ¹⁹	Cross-sectional	118	×	✓	✓	A higher MIS score is associated with an increased risk of mortality and lower quality of life.
Hi-Ming et al., 2022 ³²	Cross-sectional	379	×	✓	✓	A MIS score ≥ 5 being linked to diminished quality of life components.
Avesani et al., 2022 ³	Cohort	121	✓	✓	×	Among various nutritional assessment tools, SGA and MIS have demonstrated superior efficacy in identifying malnutrition and predicting mortality risk.
Visiedo et al., 2022 ⁶	Descriptive	120	✓	✓	✓	The use of MIS enables the early diagnosis of malnutrition and supports nutritional interventions that can enhance quality of life.
Rifai et al., 2022 ³⁴	Cross-sectional	96	✓	×	✓	SGA is recognized as a significant indicator of quality of life.
Collein et al., 2023 ³⁵	Cross-sectional	108	✓	✓	✓	SGA and MIS are closely linked to physical health, a key sub parameter of quality of life.

CONCLUSION

Malnutrition and reduced functional capacity resulting from inadequate nutrition in HD patients are associated with longer and more frequent hospitalizations, adversely impacting their physical, mental, and social health, and consequently lowering their quality of life. Therefore, regular assessments of nutritional status for the early detection and treatment of malnutrition, combined with periodic evaluations of quality of life, constitute effective and practical measures for reducing mortality risk. Moreover, large-scale studies providing supporting evidence in this field represent a critical area for future research.

Conflict of Interest and Financial Support Statement

The authors have declared no conflict of interest and no financial support.

Authors' Contribution Statement

Özlem PÖLENT: Idea, design, data collection and processing, analysis and interpretation, article writing.

A. Gülçin SAĞDIÇOĞLU CELEP: Idea, design, analysis and comment, critical review

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