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Malnutrition Assessment in Chronic Kidney Failure Patients Undergoing Hemodialysis in Beni-Suef Governate

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Keywords
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Abstract

Background: Malnutrition is defined as "an imbalance among dietary demand and intake leading in accumulated deficiencies of calories, protein, or micronutrients," according to the World Health Organization (WHO). A diagnosis of chronic kidney disease (CKD) is made when the GFR is lower than sixty milliliters per 1.73 square meters. **Aim and objectives:** To assess the malnutrition in hemodialysis patients and trying to find relation between nutrition and some factors and conditions that affecting nutrition to avoid these factors to make nutrition of ESRD cases on dialysis better. **Subjects and methods:** This prospective observational research involved 200 individuals with chronic kidney failure on hemodialysis. This research was performed in nephrology unit in Beni- Suef university hospital From January 2022 for 6 months. **Results:** There was a highly negative significant association among MNA score and each of age, Dialysis Duration and Total cholesterol while there was highly negative significant correlation among MNA score and each of BMI and Hb. MNA

score was between 12–29 with a mean value of 22.43±3.644. relation between HTN and MNA score and it show no statistically significant differences. **Conclusion:** we concluded that CKD patients undergoing hemodialysis were mostly either malnourished or at risk of malnutrition. BMI, obesity, anemia, age, dialysis duration are the main factors that affecting the nutrition.

1. Introduction:

Reduced kidney function, as measured by GFR of below 60 mL/min per 173 m2, or indicators of kidney damage, or both, for at least three months, is considered CKD, regardless of the etiology [1].

According to the global concern of disease, CKD will be the 5th most leading cause of mortality by 2040 [2].

Its prevalence is one in ten adults globally and is 24.7% in hypertensive and16.6% among diabetic patients, with significant morbidity and mortality [3].

Risk factors for CKD include hypertension, diabetes mellitus (DM), cardiovascular diseases (CVDs), sex, obesity, social history, and family history of kidney disease [4].

Malnutrition is common in hemodialysis individuals who have ESRD because of uremic circumstances or poor dietary choices and is related to a higher risk of death and morbidity [5].

Assessment of malnutrition can be done by various methods. subjective global assessment (SGA) scale is recommended. It is simple, inexpensive, non-invasive, and rapid to conduct at the bedside [6].

In order to evaluate a person's nutritional status, quality of life, cognitive abilities, mobility, and subjective state of health, the European Society for Clinical Nutrition and Metabolism (ESPEN) recommends performing a mininutritional assessment (MNA) [7].

This work aimed to assess the malnutrition in hemodialysis patients and trying to find relation between nutrition and some factors and conditions that affecting nutrition to avoid these factors to make nutrition of ESRD cases on dialysis better.

2. Patients and methods:

Two hundred individuals on hemodialysis with chronic renal failure

participated in this prospective observational study. Starting in January 2022, researchers collected information from participants admitted to the nephrology unit at Beni- Suef University Hospital. The study protocol was approved by ethical committee **(Approval No: FMBSUREC/08032022/Radwan)**

Inclusion criteria: Both adult males and females have an age greater than or equal to 18 years and have been on hemodialysis for greater than or equal to 6 months.

Exclusion criteria: Patients On hemodialysis for less than 6 months, Patients who were unable to respond to the questions (mental retardation patients), Uncooperative patients and other conditions that may affect nutrition (malabsorption disorders, malignancy …etc).

Methods:

All participants were subjected to:

History taking: Personal history (age, name & sex), Present history :Onset of CKD, Duration of CKD, Signs and symptoms of CKD: (Vomiting, Nausea, Fatigue and weakness, Loss of appetite, Urinating more or less, Sleep problems, Muscle cramps, Decreased mental sharpness, Swelling of feet and ankles and Dry, itchy skin), Past history, Family history and Medication history (long- term exposure to nephrotoxic antibiotics, frequent use of NSAIDs or pain killers, chemotherapeutic use, frequent exposure to radiocontrast agents, etc.).

Examination: (General and Physical examination) and **Routine labs and radio**.

The Mini Nutritional Assessment: Every individual completed the screening portion of the Mini Nutritional Assessment (MNA- SF; short form) and the assessment portion (MNA- SF; long form). The screening phase (which is utilized as a short form for determining individuals at risk of malnutrition) involves 6 items: a food intake item, two anthropometric parameters (recent weight loss as well as BMI), and three general parameters (physical and emotional stress, mobility, in addition neuropsychological). Four items were included in each of the following phases of the assessment: anthropometric (calf as well as upper arm circumference), general (six questions on lifestyle, medication, and mobility), dietary (eight questions on number of meals, food and fluid intake, and mode of feeding), in addition subjective (personal view of health and nutritional status). Older patients' nutritional status was classified utilizing the combined

MNA scores (MNA≥ 24 for appropriate nutrition, MNA 17.5-23.5 for risk of malnutrition, and MNA <17 for protein-calorie malnutrition) [8].

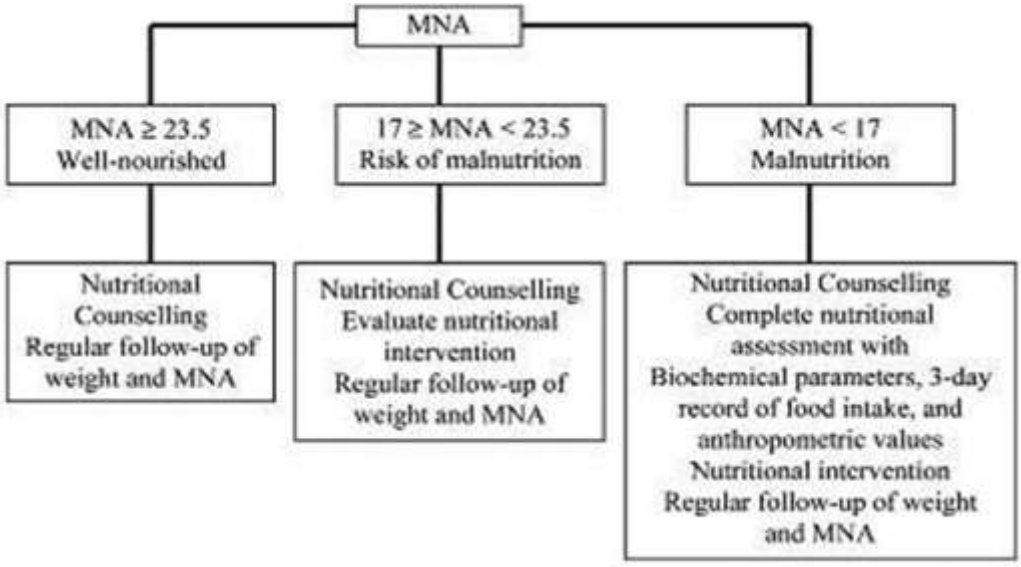

Figure (1): As a diagnostic instrument for malnutrition and a manual for nutritional intervention, MNA [9].

Ethical considerations:

The protocol had been submitted to the Research Ethics Committee for review and approval. Prior to participation in the study, patients gave their informed consent. No information had been leaked. Furthermore, all participants had the option to withdraw from the research without impacting their management.

Statistical analysis of the data [10].

Data were fed to the computer and analyzed via IBM SPSS software package version 20.0**. (**Armonk, NY: IBM Corp) [11], Numbers and percentages were used to describe the qualitative data. The Kolmogorov-Smirnov test was applied to examine the data for signs of non-normality. Quantitative information was characterized by its minimum and maximum values, as well as its mean and standard deviation. It was determined that the results were statistically significant at the 5% level. The tests that were used were the Chi-square, the Student t, and the Mann Whitney.

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3. Results

Table (1): Distribution of examined sample based on demographics.

	Number	Percent
Age (years)		
Range	21–86	
Mean±S.D.	53.41±13.180	
Gender		
Male	124	62.0
Female	76	38.0
BMI		
Range	14.0–31.6	
Mean±S.D.	22.03±3.228	
Dialysis Duration		
Range	7 months – 15 years	
Mean±S.D.	3.83±3.463	

Table (1) showed demographic data of the examined group. Age was among 21–86 years with mean value 53.41±13.180 years. Male individuals 124(62.0%) while females were 76(38.0%). BMI was between 14.0–31.6 kg/m^2 with mean value 22.03±3.228 kg/m^2. Dialysis Duration was between 7 months – 15 years with mean value 3.83±3.463.

Table (2): Distribution of examined sample consistent with chronic conditions.

Chronic Conditions	Number	Percent
No	15	7.5
HTN	179	89.5
DM	57	28.5
Cardiac	78	39.0
HCV	3	1.5
Hypothyroidism	1	0.5

Table (2) showed chronic conditions of the studied group show that 15(7.5%) had no chronic conditions, 179(89.5%) had Hypertension, 57(28.5%) had DM, 78(39.0%) had cardiac, 3(1.5%) had HCV and 1(0.5%) had Hypothyroidism

Table (3): Distribution of examined sample as regard laboratory investigation data.

	Range	Mean±S.D.
Total cholesterol	110–268	166.09±24.360
Hb	7.0–12.4	9.79±0.943
LDL	36–121	67.49±13.300

Table (3) showed laboratory investigation data of the group. Total cholesterol was among 110–268 with mean value 166.09±24.360. Hb was between 7.0–12.4 with mean value 9.79±0.943. LDL was between 36–121 with mean value 67.49±13.300.

Table (4): Distribution of studied sample according to MNA score.

MNA Score	Number	Percent
Well Nourished	91	45.5
Risk of Malnutrition	89	44.5
Malnourished	20	10.0
Range	12–29	
Mean±S.D.	22.43±3.644	

Table (4) showed MNA score of the studied group and it show thatMNA score was between 12–29 with a mean value of 22.43±3.644.

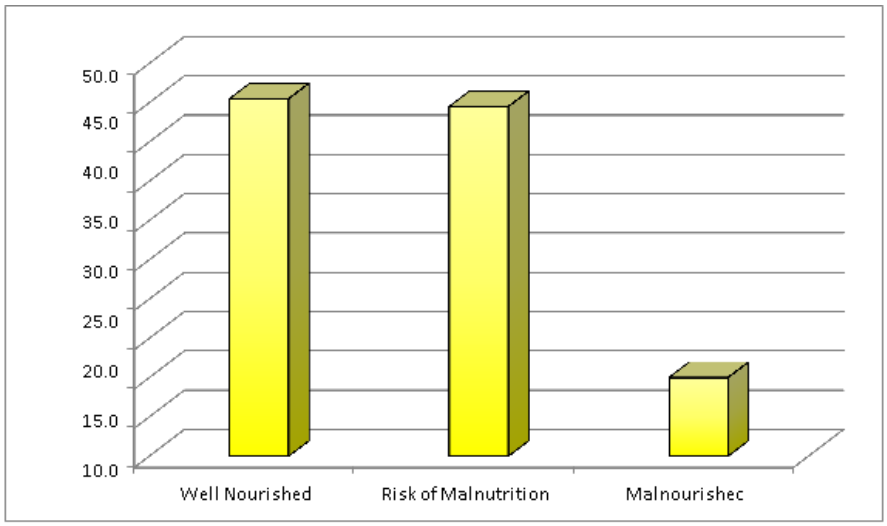

Figure (2): Distribution of studied sample depending on MNA score.

Table (5): Relation between HTN & MNA score.

	HTN		U	P Value
	No	Yes		
Range	14–29	12–29	1708.50	0.451
Mean±S.D.	22.71±4.496	22.39±3.545		

Table (5) show relation between HTN and MNA score and it showno statistically significant differences.

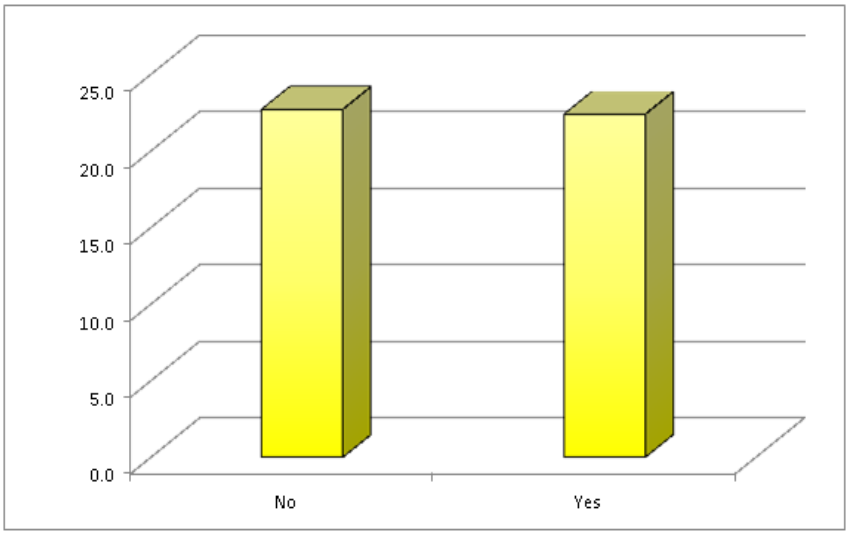

Figure (3): Relation between HTN & MNA score

Table (6): Correlation between MNA score and other parameters.

	MNA Score	
	r	**P**
Age	-0.487	<0.001*
BMI	0.219	0.002*
Dialysis Duration	-0.202	0.004*
Total cholesterol	-0.162	0.022*
Hb	0.480	<0.001*
LDL	-0.045	0.530

Table (6) showed correlation between MNA score and other parameters and it show highly negative significant correlation among MNA score and each of age (r=-0.487; P<0.001), Dialysis Duration (r=-0.202; P=0.004) and Total cholesterol (r=-0.162; P=0.022) while there was highly negative significant correlation among MNA score and each of BMI (r=0.219; P=0.002) and Hb (r=0.480; P<0.001).

4. Discussion:

We observed that the age of the people in our study's sample varied from 21 to 86 years old, with a mean age of 53.4±113.180 years old. There were 124 male cases (62.0%), in contrast to 76 female cases (38.0%). BMI was ranged between 14.0–31.6 kg/m2 with mean value 22.03±3.228 kg/m2. Dialysis Duration was ranged between 7 months – 15 years with mean value 3.83±3.463.

our study was consistent with Ghorbani et al. [12] who aimed to determine how often malnutrition is among people on hemodialysis. The average age of the

study's 239 hemodialysis patients was reported to be 57.05±15.58 (ranging from 18 to 90 years old). Kt/V was 1.25±0.46, and the average BMI was 25.19±5.55 kg/m2 (14–53). Males were Male 162 (67.8%).

As regard to Distribution of studied sample according to comorbidities we found that 15(7.5%) had no chronic conditions, 179(89.5%) had HTN, 57(28.5%) had DM, 78(39.0%) had cardiac, 3(1.5%) had HCV and 1(0.5%) had Hypothyroidism.

Our study was consistent with Al Saran et al. [13] who aimed to study Nutritional Assessment of Patients on Hemodialysis in a Large Dialysis Center. The study reported that 162 (81%) of CKD patients had hypertension, 88 (44%) had DM and 54 (27%) had Ischemic heart disease.

Our results showed that Total cholesterol ranged from 110–268 with mean value 166.09±24.360. Hb was ranged between 7.0–12.4 with mean value 9.79±0.943. LDL ranged from 36–121 with mean value 67.49±13.300.

Consistent with our findings, Sabatino et al. [14] set out to investigate whether or not hemodialysis patients with end-stage renal disease could benefit from noninvasive measurement of muscle mass utilizing ultrasound of the quadriceps femoris muscle. The study reported that the studied patients had cholesterol of 155 (41) (mg/dL).

In disagreement with our study Jagadeswaran et al. [15] who aimed to examine the relationship among inflammation & nutritional status among individuals with chronic renal disease who were not yet on dialysis. The study reported that Total cholesterol (mg/dL) in the studied patients was 207 + 57 and LDL cholesterol (mg/dL) was 111+ 21.

As for Distribution of studied sample according to MNA score we found that MNA score was varied from 12–29 with a mean value of 22.43±3.644.

Our study can be supported by Heybeli et al. [16] who aimed to determine whether or not there is a correlation between EDS & nutritional status as well as serum nutrient levels in people who are older and have CKD. According to the findings of the research, the mean MNA score for the entire cohort was 20.8 ±5.1, the prevalence of malnutrition was 22% (80), and the proportion of individuals who were at risk for developing malnutrition was 44% (160).

Our study was in disagreement with Chen et al. [17] who aimed to Investigate Gustatory Function and the Uremic Toxin, Phosphate, Are Modulators of the Risk of Vascular

Calcification in Individuals with CKD: A Pilot Study. The study reported that MNA-SF scores were 12.9±1.6 in total patients, 12.7±1.8 in AAC patients and 13.1±1.3 in CKD patients without AAC.

In our study regarding Relation between gender and MNA score we found no statistically significant differences. As regard to Relation between HTN and MNA score we found no statistically significant differences.

It has been observed that male patients with CKD experience greater protein depletion and muscle mass loss, although the underlying cause remains unknown.38 Individuals with hypertensive nephropathy had the highest incidence of malnutrition compared to those with other causes, despite the fact that diabetes mellitus is an established risk factor for malnutrition in CKD [18].

Our findings also demonstrated a highly negative statistically significant correlation among MNA score as well as each of age, dialysis duration , and total cholesterol , as well as BMI and hemoglobin.

Our study was consistent with Guligowska et al. [19] who aimed to investigate the relationship among renal function, diet, and body composition in the elderly. According to the findings, an age- and sex-adjusted model revealed a progressive connection among CKD stage and malnutrition, defined as MNA < 24 or hypoalbuminemia. Statistical significance among MNA <24 and hypoalbuminemia remained only for eGFR 30, after further adjustment for comorbidities and country.

5. Conclusion:

We concluded that CKD patients undergoing hemodialysis were mostly either malnourished or at risk of malnutrition. MNA score correlated with age, BMI, dialysis duration, total cholesterol and hemoglobin. There was no relation between other comorbidities and MNA score.

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