

## ANTHROPOMETRIC ASSESSMENT OF PATIENTS ON MAINTENANCE HEMODIALYSIS AT A TERTIARY CARE HOSPITAL IN NEPAL

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### ABSTRACT

### INTRODUCTION

Protein energy wasting is common in hemodialysis patients and is linked to increased morbidity and mortality. Anthropometric measurements such as skin fold thickness, mid arm circumference and mid arm muscle circumference are widely used to assess nutritional status in patients on maintenance hemodialysis. Subjective global assessment dialysis malnutrition score is used to classify patients' nutritional status. The aim of this study was to assess the nutritional status using anthropometry.

### MATERIAL AND METHODS

This descriptive cross-sectional study was carried out from 1<sup>st</sup> October 2021 till 30<sup>th</sup> September 2022 under Nephrology unit, Department of Internal Medicine at Universal college of Medical Sciences, Bhairahawa, Nepal. Ethical clearance was taken. Subjective Global Assessment Dialysis Malnutrition score was calculated. Triceps skin fold thickness, Mid arm circumference and Mid arm muscle circumference was measured. Convenience sampling was used. The data were analyzed using the Statistical Package for the Social Science version 17.

### RESULTS

In this study of 50 patients undergoing MHD for at least 3 months, the Mean age of population was  $42.00 \pm 15.26$  years. Nearly half of the study population 21 (42%) was having mild to moderate malnutrition using subjective global assessment dialysis malnutrition score and none had severe malnutrition.

### CONCLUSION

There is mild to moderate malnutrition in patients on maintenance hemodialysis at our center based on anthropometric measurement including subjective global assessment dialysis malnutrition score tool.

### KEYWORDS

Anthropometric assessment, Hemodialysis, Malnutrition

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## INTRODUCTION

Protein energy wasting (PEW) is common in hemodialysis patients and is linked to increased morbidity and mortality. There are several causes of PEW in patients with advanced chronic kidney disease (CKD). The dialysis procedure itself may promote wasting by removing nutrients<sup>1</sup> and may promote protein catabolism due to bio incompatibility.<sup>2</sup>

Patients on maintenance hemodialysis (MHD) require adequate nutrition in order to prevent PEW. Failure to diagnose malnutrition leads to neglect of nutritional support during illness. Active nutritional support has been shown to improve outcomes and reduce cost of treatment in severely malnourished patients.<sup>3</sup> Nutritional status is frequently ignored in many dialysis centers while simple methods of nutritional assessment have a favorable impact on patient management.<sup>4,5</sup> Anthropometric measurements such as skin fold thickness, mid arm circumference (MAC) and mid arm muscle circumference (MAMC) are widely used to assess PEW in MHD patients.<sup>4</sup>

There is a paucity of data on the assessment of nutritional status in Nepalese patients on MHD. Subjective global assessment-Dialysis Malnutrition Score (SGA-DMS) is a simple and dynamic tool to assess malnutrition in MHD patients. Thus, this study aimed to do anthropometric examination of the patients which is a simple, rapid and cost-effective method to assess the overall status of patients on MHD.

## MATERIAL AND METHODS

This descriptive cross-sectional study was carried out from 1st October 2021 till 30th September 2022 under Nephrology unit, Department of Internal Medicine at Universal college of Medical Sciences, Bhairahawa, Nepal. Ethical clearance was taken from Institutional Review committee (IRC letter reference no. UCMS/IRC/128/21). Patients on maintenance hemodialysis for at least 3 months and giving informed and written consent were enrolled in the study. Patients having active infection, presented with Acute Kidney Injury (AKI) on CKD and requiring emergency hemodialysis were excluded from study. Convenience sampling was done and the final sample size calculated was 50. Malnutrition score (MS) forms were filled up and Triceps skin fold thickness (TSF) with calipers, Mid arm circumference (MAC) with tape on the non-access arm was measured. Mid arm muscle circumference (MAMC) was calculated as  $MAMC = MAC - (3.1415 \times TSF)$ . Clinical, demographic and laboratory data were collected. The data were analyzed using the Statistical Package for the Social Science version 17. Point estimate at 95% Confidence Interval was calculated along with frequency and percentages for binary data and mean with standard deviation for continuous data.

## RESULTS

In this series of 50 patients undergoing MHD for at least 3 months, the mean age of population was  $42.00 \pm 15.26$  years with male-female ratio of 1:1.08. The demographic data of study population is given in table 1.

**Table 1. Socio-Demographic data of study population (n=50)**

Characteristics	Categories	Number	Percentage
Age groups (in year)	18-39	24	48.0
	40-59	18	36.0
	≥ 60	8	16.0
Sex	Male	24	48.0
	Female	26	52.0
Educational status	Illiterate	18	36.0
	Literate without formal education	14	28.0
	Formal education	8	16.0
	High School (SLC)	7	14.0
Religion	Intermediate (+2)	3	6.0
	Hindu	40	79.0
	Muslim	6	11.0
	Buddhist	3	8.0
	Christian	1	2.0

The mean body mass index (Table 2) of study was  $21.16 \pm 2.94$  kg/m<sup>2</sup>. Malnutrition score is given in Table 3. Patients anthropometric measurement is given in Table 4.

**Table 2. Body mass index of study population (n=50)**

Characteristics	Categories	Number	Percentage
Body Mass Index (BMI) in kg/m <sup>2</sup>	<18.5	14	28.0
	18.5-23	24	48.0
	>23	12	24.0

**Table 3. Subjective global assessment malnutrition score of study population (n=50)**

Characteristics	Categories	Number	Percentage
SGA MS	7-10 (Normal nutrition)	29	58
	11-22 (Mild to Moderate Malnutrition)	21	42
	23-35 (Severe Malnutrition)	0	0

**Table 4. Anthropometric measurement of study population (n=50)**

Characteristics	Minimum	Maximum	Mean ± SD
Age in years	16	83	42.00 ± 15.26
Triceps Skin Fold Thickness (TSF) in mm	6.00	16.60	12.25 ± 1.64
Mid arm circumference (MAC) in cm	16.00	35.00	22.15 ± 3.13
Mid arm muscle circumference (MAMC) in cm	12.86	30.70	18.30 ± 2.78
Subjective Global Assessment Malnutrition Score (SGA MS)	7.00	16.00	10.28 ± 2.49

More than half of the patients were having normal nutrition as per the subjective global assessment dialysis malnutrition score. The mean hemoglobin level and mean serum albumin level of the study population was  $8.60 \pm 1.07$  gm/dl and  $3.64 \pm 0.55$  gm/dl.

## DISCUSSION

The study looked into anthropometric measurements of patients on MHD. The prevalence of protein-energy wasting in dialysis patients ranges from 10% to 70%, depending on the choice of nutritional marker and the population studied.<sup>6</sup> Nearly half (42%) of study population was having mild to moderate malnutrition and none had severe malnutrition which is similar to the study done in Bir Hospital by Sedhain et al<sup>7</sup> and MCOMS, Pokhara by Maskey et al.<sup>8</sup> Mean serum albumin level recommended by International Society of Renal nutrition and metabolism as a marker of protein energy wasting was 3.64 gm/dl which is mild level of malnutrition as compared with the normal value of 3.8 gm/dl.<sup>9,10</sup> The mean anthropometric measurement values for 50th percentile of the normal population for MAC and MAMC was recorded in the study population which was 22.15 ± 3.13 cms and 18.30 ± 2.78 cms respectively. This is similar to the study done by Manandhar et al, where it was 20.63 ± 2.47 cms and 17.23 ± 2.26 cms respectively. In our study we had more patients having normal anthropometric measurements than when SGA DMS was considered. It is based on the average measurements of MAC >22.3 cms and MAMC of >12.5cms as normal. This may be because clinical dry weight and biochemical impedance analysis (BIA) derived dry weight differ in many situations. Clinical estimation of weight may be higher than BIA derived one so this may lead to false interpretation of nutritional status. The findings with TSF showed mean of 12.25 ± 1.64 mm which is below the recommended average of >15.3 mm and is similar to the study done at Nepal Medical college where it was 10.85 ± 4.33 mm.<sup>11</sup> Thus, further large-scale studies are required to validate and generalize our findings.

The main limitation of the present study was unavailability of bioimpedance spectrometry at our centre which could have provided an objective parameter for the assessment of fluid status of the patients.

## CONCLUSION

The study found that there was mild to moderate malnutrition in patients on maintenance hemodialysis at UCMS-TH based on anthropometric measurement including subjective global assessment dialysis malnutrition score tool.

## CONFLICT OF INTERESTS

None

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