# ARE PATIENTS ON MAINTENANCE HEMODIALYSIS UNDER-WEIGHT? A COMPARATIVE ANALYSIS OF ACHIEVED BODY WEIGHT TO IDEAL BODY WEIGHT IN MAINTENANCE HEMODIALYSIS PATIENTS.

**Dr. Atiya Arif, Dr. Mohammad Ahad Qayyum**

**Bahria Town Hospital, Lahore, Pakistan**

## ABSTRACT

**Introduction:**
End stage renal disease (ESRD) patients are frequently found to be malnourished which in turn is linked to increased mortality in this population group. Additionally protein energy malnutrition is considered a negative prognostic factor in the recovery of ESRD patients from various concurrent illnesses. Various markers have been studied to evaluate the nutritional status of this population group with each one either involving a blood sample or tedious expensive monitor applications. Most notably serum albumin, serum cholesterol, C reactive protein and body composition monitor (BCM) have been studied.
Alternatively limited yet validated data exists to suggest ideal body weight as an appropriate and easy to measure marker for malnourishment in this population group. The aim of this study is to assess whether the ESRD patients on maintenance hemodialysis achieve their ideal body weight or not. Additionally, we go onto assess the prevalence of malnutrition in this population group using ideal body weight as a reference marker.
**Methods:**
We conducted a cross sectional study whereby all patients on thrice per week maintenance hemodialysis regimens at Bahria Town International Hospital Dialysis Unit had their ideal body weight calculated using standard formulae and then compared with the achieved body weight of the patient. The data analysis was done using SPSS software version 20.0.
**Results:**
A total of 60 patients (30 male and 30 female) who were on thrice/week maintenance hemodialysis at Bahria Town International Hospital Dialysis Unit were included in the study. Out of the 60 participants, 31 patients (51.7%) had an achieved dry body weight greater than ideal body weight while 21 patients (35%) had an achieved dry body weight less than ideal body weight and 8 patients (13.3%) had an achieved dry body weight equal to ideal body weight +/-2kg.
**Conclusion:**
The study shows that the majority of the ESRD patients on maintenance hemodialysis were achieving their target dry body weight in reference to ideal body weight. Further studies are needed to validate the role of ideal body weight in assessing malnutrition.

**Key Words**: *hemodialysis, malnutrition, end stage renal disease, ideal body weight.*

**CORRESPONDING AUTHOR:**

Dr. M. Ahad Qayyum
Head Department of Nephrology.
9 J Johar Town, Lahore, Pakistan
**Telephone:**+92-300-8432150
**eMail:** drahadqayyum@gmail.com

## INTRODUCTION:

End stage renal disease (ESRD) patients are known to be malnourished with the prevalence of protein energy malnutrition reaching almost 50% in the Indian dialysis population [1]. The cause of malnutrition in patients on maintenance hemodialysis remains multifactorial i.e. anorexia secondary to uremia, depression, inter-current illnesses, social factors etc. [2] It is noteworthy that protein energy malnutrition is associated with increased morbidity and mortality in this population group. Additionally various studies have demonstrated over-weight and obese dialysis patients (Body Mass Index > 27.5) to have a significantly better 12 month survival in comparison to both normal weight (BMI 20 – 27.5) as well as under-weight (BMI < 20) dialysis patients [3]. Malnutrition and unintentional weight loss contribute to progressive decline in health, reduced physical ability, cognitive functional status, increased utilization of health care services, premature institutionalization, and increased mortality.

Unsurprisingly the KDOQI guidelines advise an increased in caloric intake in maintenance dialysis patients to the amount of 35 Kcal/kg/day along-with a recommended protein intake of 1.2 gram/kg/day. [4]

Various markers exist to assess the nutritional status of the patients especially to recognize malnutrition. These markers include food intake diaries, calorie counting, body mass index, triceps skin-fold thickness, serum albumin, serum cholesterol, C reactive protein, bio-impedance etc. [5] Unfortunately measuring these markers can be tedious and may require blood sampling. Alternatively, a very basic and easily quantifiable marker can be the actual body weight of the patient. Scarce yet validated data exists to support weight based assessments of malnutrition in the dialysis population [6].

Furthermore, it would be very interesting to assess whether the dialysis patients achieve their ideal body weight in the first place. The ideal body weight is calculated from standardized formulae from the height of patient. [7]

This study was conducted to assess whether patients on thrice per week maintenance hemodialysis at our unit were meeting their ideal body weight. Using this data we will be able to discuss the nutritional status of our patients by using the ideal body weight as a reference point.

**METHODS:**

All patients undergoing maintenance hemodialysis on a thrice/week regimen at Bahria Town Hospital Dialysis Unit Lahore between the ages of 18-70 were included in the study. The study was conducted during the time period starting from 1st of December 2016 till 1st of March 2017. Informed consent was taken prior to inclusion into the study. Patients with the following states were excluded from the study:

- Age less than 18 or greater than 80
- Dialysis vintage of less than 6 months
- Active infection
- Malignancy
- Cardiac failure or clinical volume overload

The ideal body weight for each patient was calculated from the height of the patient using the standard formula.

*Estimated ideal body weight in (kg) =*

*Males: IBW = 50 kg + 2.3 kg for each inch over 5 feet.*

*Females: IBW = 45.5 kg + 2.3 kg for each inch over 5 feet.*

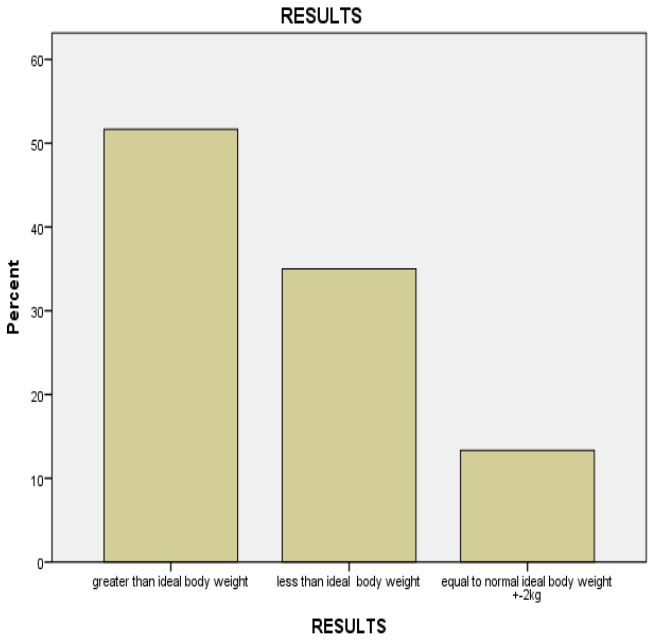
The dry weight of each patient was determined clinically by the Head of the Dialysis Unit and Consultant Nephrologist 2 weeks prior to initiation of the study. After 2 weeks of setting the dry weight for each participant, the achieved dry weight for each participant was noted on a standardized weighing scale. This weight was then compared with the ideal body weight and further analysis was done.

Statistical package for Social Sciences 20.0 version was used to analyze the data.

**RESULTS**

A total of 60 patients meeting the criteria mentioned above were included in the study. 32 of the 60 participants were male while 28 were female. The mean age of the participants was 40 +/- 5 years. Our study reports that 51.7% (31 participants) had an achieved dry body weight greater than their ideal dry body weight (+2kg range) while 13.3% (8 participants) had an achieved dry body weight equal to their ideal dry body weight {within +/- 2 kg range). Finally 35% of the participants (21) had an achieved dry body weight less than their ideal dry body weight (-2kg range). Figure number 1 illustrates the above mentioned findings graphically.

**Figure 1 :** Breakdown of participants in terms of achieving their ideal dry body weight (within +/- 2 kg range.




**DISCUSSION:**

This study reports that the majority of the patients on maintenance hemodialysis have a dry body weight which is greater than their ideal body weight (not including patients with volume overload). This finding is contrary to the common belief/finding that patients on maintenance dialysis are malnourished and hence should be underweight [8]. It is equally important to highlight that patients on dialysis are considered to have a propensity towards malnutrition secondary to multiple factors which include anorexia, uremia & under-dialysis, depression, co-morbidities like diabetes & autonomic gastro-paresis, pro-inflammatory state, loss of protein during dialysis and social factors [9,10]. At this point, it is easily recognizable that malnutrition in the dialysis population is due to innumerable causes and considering our results more detailed research is required to clarify matters further.

The majority of the studies reporting a high prevalence of malnutrition in the dialysis population are in the elderly age group [11]. It is essential to realize that the mean age of the participants in our study was 40 hence entailing a younger population. Therefore one should be careful in interpreting the above laid down data.

Weight as a general measure of malnourishment can be a sensible measure of malnourishment and remains very popular in clinical practice. At the same time the inability to standardize weight measurements in comparison to other markers like serum albumin whereby a cutoff value can be selected identifies a weakness with simple weight measurements as a marker of malnourishment [12]. This is not possible with a simple body weight measurement as it varies with physical parameters like height etc. Body mass index (BMI) has theoretically taken this aspect into account by including height in its calculation. Various studies have validated its use as a marker of malnutrition [13] but its clinical use remains unclear. Interestingly in some settings it has been shown that a simple unintentional weight loss during the previous 3–6 months period is a more accurate marker for protein–energy malnutrition than BMI [14].

**Conclusion:**

It is vital to emphasize that scarce data is available that validates weight as an ideal marker of malnourishment. Hence one needs to exercise care when using it in this aspect especially in view of our findings. More studies are needed to validate the use of body weight as a marker of nutritional status in dialysis population.

**Declaration:**
No financial conflict was declared

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