

Estimation Of The Fat Mass Percentage From Anthropometric Measures In Relation To Body Mass Index In Patients On Hemodialysis

Mercedes Albaladejo Pérez, Marisol Ros, Susana Roca, Maria Rosa Gea, Laura Bucalo, Diana Manzano, Manuel Molina.

HGU Santa Lucía. FMC Services, Nephrology, Cartagena, SPAIN.

Introduction

In clinical practice, poor nutritional assessment based on simple and traditionally known criteria as weight or body mass index (BMI) is usually performed. The analysis of body composition by anthropometric measures allows a more complex assessment of the patient since it indirectly estimates the fat mass and fat free mass in the patients.

Objectives

The purpose of this study is to correlate the information provided by both methods, applied to the same group of patients on hemodialysis in order to evaluate the possible advantages that the anthropometry method (1) might have over traditional BMI by providing more complex information.

Methods

Observational study. 54 randomly chosen stable patients. Nutritional assessment was done by:

1- **BMI = Weight (Kg) / Size (m²)**. In accordance with the consensus of the SENPE (Spanish Society of Nutrition), it is considered malnutrition when BMI <18.5; insufficient weight or risk of malnutrition if BMI=18.5-21.9; normal if BMI=22-26.9; overweight if BMI=27-29.9, and obese if BMI>30.

2- **Study of body composition by antropometric measures (the arm and calf perimeters and the four folds: bicipital, tricipital, subscapular, and iliocrestal)**. This was made according to the Durnin and Womersley formulas (2) and the equation of Siri et al.(3) to predict the fat mass percentage from the estimated BD. Finally, the sample was divided into different nutritional states according to the body fat percentage, using as reference the normal fat percentages accepted by SEEDO as well as those published by Bray G. et al. and Gallagher et al (4).

Results

Regarding the BMI in the sample, 1 malnourished patient (1.9%), 17 patients in normal weight (31.5%), 21 overweight patients (38.9%) and 15 obese patients were found (27.8%). When calculating the fat mass percentage (fat in kg in relation to body weight (%)) according to the anthropometric method, in our sample composed of 54 patients 33 of them presented optimal fat levels (61.1%); 13 patients showed average fat levels (24.1%); 6 patients got high fat levels corresponding to overweight (11.1%), and 2 patients revealed very high fat levels indicative of obesity (3.7%). In general, absolute values showed an underestimation in the detection of obesity and adiposity levels when the predictive model based on anthropometry was used versus the traditional BMI (only 11.1% overweight and 3.7% obese versus overweight 37% and obesity 27.8%). In the statistical analysis, significant differences were found in the assessment (p = 0.05).

Conclusion

The anthropometric method seems to underestimate the fat content when it is used on the population of patients on hemodialysis

References

- 1- Estándares Internacionales para la valoración antropométrica. Sociedad internacional para el avance de la kinantropometría. Marfell-Jones. 2001
- 2- Durnin, JGVA and Womersley. Body fat assessed for total body density and its estimation from skinfold thickness: measurements on 481 men and women aged from 16-72 years. *British Journal of Nutrition* 1974;32: 77-97.
- 3- Siri WE. Body composition from fluid spaces and density: analysis of methods. Brozec J, Henschel A, eds. *Techniques for measuring body composition*. Washington DC: National Academy of Sciences, Natural Resources Council; 1961. p. 223-4.
- 4- Manual de instrucción Medidor de Grasa Corporal. Gallagher et al. *American Journal of clinical nutrición* vol 72 set 2000

ANTROPOMETRIC MEASURES

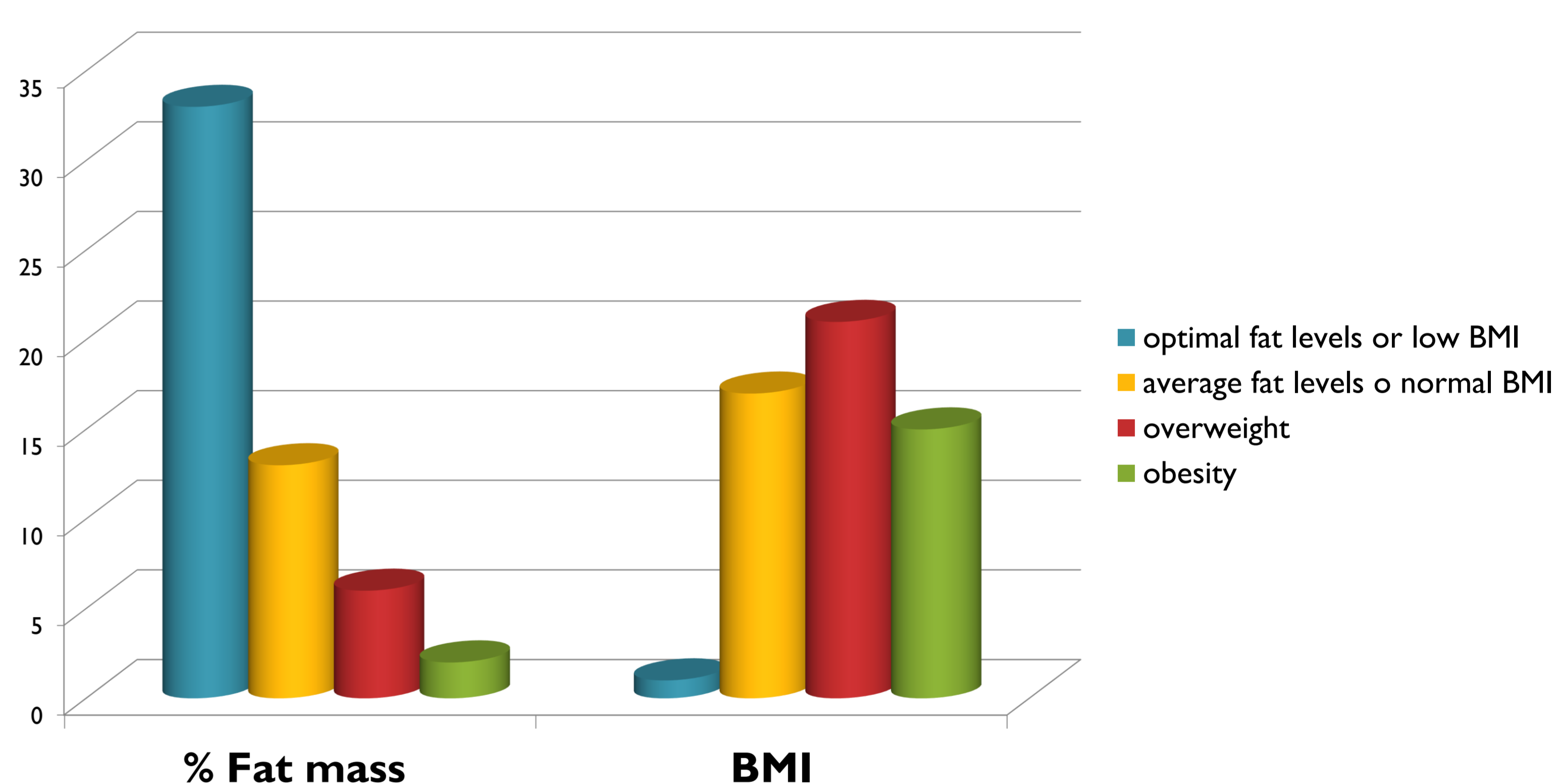
FAT MASS PERCENTAJE

BODY COMPOSITION

EDAD MUJERES	OPTIMO (1)	PROMEDIO (2)	SOBREPESO (3)	OBESO (4)
20-39	16-23	21-28	26-33	>34
40-59	22-29	25-34	30-38	>39
>=60	28-30	31-35	36-39	>40

EDAD HOMBRES	OPTIMO (1)	PROMEDIO (2)	SOBREPESO (3)	OBESO (4)
20-39	10-18	15-22	20-26	>27
40-59	14-24	20-28	24-30	>31
>=60	21-25	26-29	30-31	>32

Fat mass porcentaje. Reference levels SEEDO (4).



Prevalence of obesity in the sample according to both assessment methods.

