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Subjective Global Assessment in Hemodialysis Patients in an Iranian Care Hospital

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Authors' contributions

This work was carried out in collaboration between all authors. Author BEK is the corresponding author. Authors BEK, AMD and MRN designed the study, collection of data performed the statistical analysis, wrote the first draft and managed the literature searches. Author BEK revised final manuscript. All authors read and approved the final manuscript.

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ABSTRACT

Background: The nutritional status of end stage renal disease (ESRD) patients is a critical index of effective health care delivery. Nutritional status can be estimated by subjective global assessment (SGA).
Aims: We assessed the nutritional status among hemodialysis patients in a governmental-owned hospital, from Northeast Iran.
Materials and Methods: Forty-eight randomly selected hemodialysis patients participated in a cross -sectional descriptive analytical study. We assessed SGA (dry weight, height, body mass index, triceps skinfold thickness, mid-arm circumference, mid-arm muscle circumference, and arm muscle area), along with several biochemical and anthropometric indices. Data were analyzed with the SPSS statistical package for Window version 11.0, Chicago, USA. A p-value of <0.05 was

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considered significant.
Results: Of the included patients, three people (6.3%) had “normal” nutritional status; twenty-four people (50%) were mildly malnourished, whereas twenty-one people (43.7%) had fallen into the “moderately” malnourished status. None of the patients had “severe” malnourishment. SGA scores had significant correlation with patients’ age (r=0.335,P=0.035), duration of dialysis (r= 0.332, P=0.031) and education level (r=-0.425 P=0.029). Patient's SGA did no differ by gender. Serum C-reactive protein and creatinine were not significantly associated with SGA score.
Conclusion: In this study, none of patients had severe malnutrition and most of patients had mild or moderate malnourished. Significant correlation were observed between SGA grades and biochemical and anthropometric variables, indicating the value of SGA to assess the nutritional status in hemodialysis patients

Keywords: Hemodialysis; malnutrition; subjective global assessment.

1. INTRODUCTION

Protein-energy wasting (PEW) in chronic kidney disease (CKD), is characterized by a decline of body mass proteins and energy stores including fat tissues, especially in those undergoing maintenance hemodialysis (MHD). This loss of muscle and adiposity mass with general cachexia [1] affects 20-60% of MHD patients and increases with duration of MHD treatment [2]. Elevation of pro-inflammatory cytokines combined with superimposed hyper catabolic states and declines in appetite, loss of nutrients during the dialysis, co-morbid disease burden diseases and hormonal abnormalities of ESRD all contribute to this frequent phenomenon [3]. PEW is decline in body protein mass and energy reserves, including muscle and fat wasting and visceral protein pool contraction [4]. The observation that malnutrition in patients receiving dialysis was associated with increased morbidity and mortality prompted many expert groups to develop nutritional scoring systems applicable for these patients [5].

It is important to note the robust association between the extent of PEM and the risk of hospitalization and death in these patients, regardless of the nutritional marker used [2]. Several methods such subjective global assessment (SGA) are used to evaluate the nutritional status of hemodialysis patients [6]. SGA is simple, quickly, valid and yet applicable and minimum cost way to assess the nutritional status of patients [7-10]. Assessing nutritional status of hemodialysis patients by SGA is recommended at least every six months. Nutritional status of these patients improves by regular evaluation and creating nutritional awareness in these patients [7]. SGA can also help to predict certain health outcomes, such as length of stay, in-hospital medical expenditures [11]. This study aims to assess the nutritional status of hemodialysis patients by SGA score as good nutritional assessment and prognostic indicator [12-15] in a government-owned hospital at Gonbad Kavoos city, Golestan Province, Iran.

2. PATIENTS AND METHODS

This cross sectional and descriptive study assessed the nutritional status of 48 hemodialysis patients by SGA and different anthropometric and laboratory measurements such as body mass index (BMI), mid-arm circumference (MAC), mid-arm muscle circumference (MAMC), triceps skin fold (TSF) and biceps skin fold (BSF), serum albumin, triglyceride, cholesterol, C-reactive protein (CRP) and lipid profile in a government-owned hospital. In this dialysis unit, access type was fistula, flow rate was 500 cc/minut and filter type was high flux. Each patient was on dialysis 3 sessions per week and Each hemodialysis session lasted 4 hours. We informed all participants for purpose of study and each patient signed a consent form. We obtained Patient´s medical history, demographic and duration of hemodialysis from the Patient´s medical record. We measured Patient´s dry weight with little clothing as possible within 10-20 minutes after dialysis session and height in the standing position using a tape measure. BMI was calculated as body weight (Kg) ratio to square of height (m^2) [7]. Patient´s post dialysis dry weight six months prior to study date was collected from the medical record. Skin fold measurements in areas of biceps (BSF) and triceps muscle (TSF) was done with special caliper to estimate the body fat. Mid-arm circumference (MAC) was obtained by measuring tape to estimate muscle mass. MAC signifies the thickness of subcutaneous fat and muscle. Mid-arm muscle circumference (MAMC), which reflects the protein store of body, was

calculated by following formula: MAMC = MAC - (3.1415 × TSF) [7]. SGA score includes weight loss during the previous 6 months, symptoms of gastro intestinal tract, such as anorexia, nausea, vomiting, diarrhea, food intake, functional capacity (related to power failure), the history of dialysis, loss of subcutaneous fat in the mild arm muscle area and arm muscle area of the lateral line of the body and the muscles in the shoulder and quadriceps muscle of the thigh. Each patient would have to acquire a total score of 7 (normal nutrition) to 31 (severe malnutrition), this mining that the higher score the greater risk for malnutrition. Total score is then summed and this provides a guideline as to level of nutrition intervention required, as well as facilitating quantitative outcome data collection [7]. Each patient was allocated into four groups according to the points scored as follows: well nourished (SGA =7), mild malnourished (SGA= 8-12), moderately malnourished (SGA= 13-25), and those with SGA =26-31 was classified as severely malnourished [12]. Experienced nurse measured anthropometric indicators. Laboratory technician took fasting blood immediately after dialysis. All experiments were performed in the hospital laboratory. Creatinine was measured with JAFEE Test, CRP with Agglutination method, Blood Urea Nitrogen (BUN) levels with Manual Colorimetric Method, Cholesterol and triglycerides were determined by photometry using a diagnostic kit (all kits were tested at company construction [16]. We analyzed Data by SPSS version 11.05 for windows (SPSS Inc., Chicago, IL, USA and expressed as mean standard deviation. We tested differences among mean values with one-way analysis of variance and used Chi-square test to compare the differences in the categorical data. P values < 0.05 were considered statistically significant.

3. RESULTS

A total of 48 patients studied, 22 patients (45.8%) were males and 26 female (54.2%). Based on SGA score,3 patients (6.3%) had a good nutritional status, 24 patients (50%) had mild malnutrition and 21 (43.7%t) had moderate malnutrition. None of patients had severe malnutrition. Malnutrition rate among men and women was not statistically different.

SGA scores had significant correlation with patients´ age (r=0.335, P=0.035), dialysis duration (r= 0.332, P=0.031) and education level (r=-0.425 P=0.029). There was negative correlation but not significant between SGA score and knee high, patient´ height and BMI.

The mean of knee height (P <0.028) and height (P <0.029) in patients with good nutritional status were significantly different in comparison with malnourished patients (Table 1).

Table 1. Mean ± standard deviation of quantitative factors based on SGA in normal and malnourished patients

nutritional status	Normal nutritional staus	Malnutrition	*P*
Index quantitative factors	**Mean ± SD**	**Mean ± SD**	
Patient age (years)	47.14 ± 17.72	53.36±11.68	0.098
Knee length (cm)	41.44± 3.02	41.33 ± 0.29	0.028
Stature (cm)	147.96± 5.15	145.54 ± 0.8	0.029
BMI(Kg/m2)	27.12±6.35	30.98±2.87	0.121
During dialysis (years)	8.4 ± 4.3	9.67 ± 4.16	0.089
Education level (years)	4.29 ± 5.03	3 ± 5.20	0.101
Hemoglobin (g / dl)	11.07 ± 1.97	10.33 ± 0.65	0.215
Cholesterol (mg / dl)	149.32 ± 33.11	166.33 ± 24.54	0.234
Triglycerides (mg / dl)	149.33 ± 13.50	144.2 ± 58.74	0.341
BUN (mg / dl)	35.33 ± 10.5	53.33 ± 13.61	0.176
Albumin (g / dl)	3.92 ± 0.28	3.90± 0.3	0.079
AFA(cm)	18.63±14.4	22.88±10.31	0.108
AMA(cm)	26.82±5.65	31.63 ±0.71	0.095
MAMC(cm^2)	22.47±4.67	26.63±2.53	0.128
Bicep. Sf(cm)	6.20±5.43	5.15±1.90	0.099
Tricep(cm)	15.25±11.3	15.92±7.92	0.387

Chi-Square test revealed nearly significant positive relationship of SGA score with different amounts of BUN(x^2=9.197 P=0.01)

Table 2. Different nutrition conditions based on BUN in referred patients

Nutrition status		Normal nutrition N(%)	mild malnutrition N(%)	Pmoderate mal nutrition N(%)
BUN (mg / dl)	40<	2(33.3)	3(50)	1(16.7)
	40>	1(2.4)	21(51)	20(47.6)

Other biochemical and anthropometric factors had no significant correlation with SGA score

4. CONCLUSIONS

Aim of study was nutritional assessing based on SGA as valid score in hemeodialysis Patients. SGA is an easy-to-use nutrition assessment tool that allows quick identification of malnutrition in hemodialysis patients [17]. in this study, while only 6.3% of patients had good nutritional status, 93.7% of patients had mild or moderate malnutrition, but none of Patients had severe malnutrition. This is nearly similar to findings of Fatemeh Espahbodi that showed 96.19% of hemodialysis patients had various degrees of malnutrition [9]. Indian study using modified SGA, showed malnutrition rate is 91% among patients undergoing hemodialysis [18]. Tehran city study, detected malnutrition in 40.7% of 54 Patients undergoing hemodialysis [19]. Qureshi and colleagues in Scotland showed that 36, 51 and 13% of hemodialysis patients are normal nutritional status, moderate and severe malnutrition respectively [20]. In Turkey study, 60% of Patients were malnourished [3]. Singapore study showed that 52% of hospitalized patients requiring hemodialysis are malnourished [21]. In Desbrow research, according to SGA, 80% of patients were well nourished and 20% of patients were malnourished [17]. Prevalence of severe malnutrition has been reported in such patients [22]. MahmoodReza Nakhai et al. showed that 8.4% of hemodialysis patients had adequate nutritional status, 47.4% had mild malnutrition and 44.2% had moderate malnutrition [23]. These differences in prevalence in difference studies may be because of environmental diversity and different diet regiments in various regions [8]. However, Gurreebun F and collegeus in UK showed that measurement of SGA doesn't diagnose malnutrition and therefore doesn't increase the sensitivity of nutritional screening [24].

In our study, prevalence of malnutrition was no significant difference between men and women. However, in other Iranian study, malnutrition was significantly more frequent in women [8]. in Turkish study, malnutrition was higher in female patients [3]. Other studies demonstrated that there was no difference between female and male patients in terms of SGA [9,25].

In this study, SGA score had direct correlation with age, means that malnutrition increased with increasing age. Other studies, had similar [26] and inconsistent result [27,28,29]. Comparing our results with these studies, seems that malnutrition is encountered more frequently in geriatric hemodialysis patients compared to younger adults [3]. High prevalence of malnutrition in older age groups can be due to underlying diseases, including infections and psychological disorders or physical disability and economic depression in preparation and consumption of food [29].

In our study, correlation between dialysis duration and SGA index score was statistically significant, that was consistent with some studies [23,26,27]. This indicates a gradual decline in physical condition hemodialysis patients, with ongoing dialysis. but Fatemeh Espahbodi et al. study [9] indicated no significant association between duration of hemodialysis and SGA score. It may be attributed to the greater mortality rate in patients with longer duration of hemodialysis, which reduced their proportion in her study population, or the fact that longer duration of hemodialysis improves the patients' knowledge of their nutritional needs.

In present study,patient´s educationlevel showed a negative correlation with malnutrition. high level of education, Improves nutritional knowledge, family income and increases the purchasing power of food and nutritional status, reduces misunderstandings about the disease, increases confidence in the health situation and the acceptance of new ideas, creates more confidence to deal with medical centers and the greater responsibility [7].

Our findings indicated significant association between malnutrition and BUN that was consistent with findings of a Turkish study by Afsar et al. [30] and was inconsistent with results of Fatemeh Espahbodi et al. study [9]. This may be because the urea modeling depends on many assumptions, such as constant protein intake [31].

We found no significant correlation of SGA score with serum cholesterol and triglyceride level. It is probably due to this matter that cholesterol and triglyceride level as indicators of energy-protein status is insensitive, unspecific, and is affected by other factors such as inflammation [30]. Other studies had similar result [9]. Therefore, no significant association between biochemical parameters (such as albumin, hemoglobin, cholesterol, BUN, and creatinine) and malnutrition revealed that these parameters can't provide accurate information about nutritional status of these patients, as Fatemeh Espahbodi stated [8]. Moreover, SGA as semiquantitative scale can still be the best tool to assess the nutritional status in patients with ESRD undergoing hemodialysis, because it can recognize various degrees of malnutrition that may remain undetected by a single laboratory assessment [9]. One of limitation was qualitive measurement of CRP. Because of cost, CRP was reported + or – (pulse OR negative). Other limitation could be that the study did not assess Prealbumin and Kt/V.

CONSENT

As per international standard or university standard, patient's written consent has been collected and preserved by the authors.

ETHICAL APPROVAL

All authors hereby declare that all experiments have been examined and approved by the ethic committee of Golestan university of medical (Ethicalapprovalcode: 2238881371) and have therefore been performed in accordance with the ethical standards laid down in the 1964 Declaration of Helsinki This study is not against the public interest

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COMPETING INTERESTS

Authors have declared that no competing interests exist.

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