OPEN ACCESS
Scholars International Journal of Biochemistry
Abbreviated Key Title: Sch Int J Biochem
ISSN 2616-8650 (Print) |ISSN 2617-3476 (Online)
Scholars Middle East Publishers, Dubai, United Arab Emirates
Journal homepage: https://scholarsmepub.com/sijb/

Original Research Article

Mqsga (Modified Quantitative Subjective Global Assessment) Scoring For the Assessment of Nutritional Status of Hemodialysis Patients and Its Correlation with Serum Albumin and Hs Crp (High Sensitive C-Reactive Protein)

Dr. Shubha Jayaram[1], Dr. Meghana N[2], Dr. Sahithya CS[3*], Dr. Meera S[4], Dr. Hema NG[5]

[1]Professor, Department of Biochemistry, Mysore Medical College & Research Institute, Mysore, Karnataka, India
[2]Postgraduate, Department of Pediatrics, Mysore Medical College & Research Institute, Mysore, Karnataka, India
[3]Senior Resident, Department of Neurochemistry, NIMHANS, Bangalore, India
[4]Professor & HOD, Department of Biochemistry, Mysore Medical College & Research Institute, Mysore, Karnataka, India
[5]Professor, Department of Pharmacology, Mysore Medical College & Research Institute, Mysore, Karnataka, India

DOI:10.21276/sijb.2019.2.7.2 | **Received:** 16.07.2019 | **Accepted:** 23.07.2019 | **Published:** 29.07.2019

***Corresponding author:** Dr. Sahithya C.S

Abstract

Malnutrition has been implicated as a possible indicator of development of atherosclerotic cardiovascular disease in hemodialysis patients. Recently a new quantitative scoring system, called MQSGA (Modified Quantitative Subjective Global Assessment) has been developed to assess dialysis malnutrition. Study was conducted with following objectives 1) To assess the nutritional status in hemodialysis patients by the MQSGA scoring. 2) To correlate the MQSGA score with biochemical marker of malnutrition- Albumin and inflammatory marker hs CRP (High Sensitive CRP). 50 patients in the age group of 20-70 years diagnosed as having chronic kidney disease undergoing hemodialysis were studied**.** MQSGA score was calculated using 7 features- weight change, dietary intake, GI symptoms, functional capacity, co-morbidity, subcutaneous fat and signs of muscle wasting. Serum albumin levels were estimated using end point colorimetric method and hsCRP using Immunoturbidimetric method. MQSGA scores in the present study was found to be 17.32±4.37 in males and 16.2±4.81 in females with a total 17.19±4.4. hsCRP levels was found to be significantly raised (16.59±21.4mg/L). Serum Albumin levels were low (3.27±0.67 g/dl), in both males (3.28±0.69) and females (3.22±0.153). There was a significant positive correlation between serum hsCRP levels and MQSGA scores of the subjects (p=0.0418, r=0.3156). To conclude Nutritional status of the patients undergoing dialysis is frequently ignored**.** Present study shows moderate degree of malnutrition in CKD patients. Simple methods of nutritional assessment and diet modification could have a favorable impact on the patient management.

Key words: Chronic Kidney Disease, Malnutrition, MQSGA Score.

INTRODUCTION

Chronic kidney disease (CKD), one of the leading causes of morbidity worldwide, is defined as a pathophysiologic process with multiple etiologies resulting in decrease in nephron number and function leading to end stage renal disease (ESRD) [1].

Approximately 7.85 million are suffering from chronic kidney diseases (CKD) in India [2]. Renal replacement therapies like Maintenance Hemodialysis and transplantation has increased the survival rate in patients with CKD [3]. Maintenance hemodialysis is begun in most of these patients when their GFR decreases to <15ml/min per 1.73m^2.

Malnutrition is present in a large proportion of CKD patients (10-70%) on hemodialysis and it is linked with morbidity and mortality [4]. Studies have implicated malnutrition as a possible indicator of development of atherosclerotic CVD in hemodialysis patients [5].

Persistent inflammatory response may mediate malnutrition and progressive atherosclerotic CVD by a number of pathogenic mechanisms that have not yet been clearly understood [6, 7].

Recently a new quantitative scoring system, called MQSGA scoring system has been developed to assess dialysis malnutrition [8]. But not many studies

have been done in the Indian subcontinent using the MQSGA scoring system and also there is deficient literature to show the correlation between the biochemical and inflammatory markers and the MQSGA scoring system.

Hence the present study to assess the Nutrition status of hemodialysis patients and its correlation with biochemical markers of malnutrition and inflammation.

OBJECTIVES OF THE STUDY

The study was conducted with the following objectives.

- To assess the nutritional status in hemodialysis patients by the MQSGA scoring method.
- To correlate the MQSGA score with biochemical marker of malnutrition- Albumin
- To correlate the MQSGA score with an inflammatory marker like hsCRP (High Sensitive CRP)

METHODOLOGY

It is a Cross sectional observational study, Study population consisted of CKD patients undergoing hemodialysis in, Department of nephrology K.R. Hospital belonging to Mysore medical college and research institute (MMC&RI), Mysore. Institutional ethical clearance was obtained for the study.

Inclusion criteria: All patients in the age group of 20-70 years diagnosed as having CKD and undergoing hemodialysis. Informed consent was obtained from all the subjects.

Exclusion criteria: a) Patients who have required hospitalization in the month prior to the study. b) Patients suffering from any acute infections at the time of collection of sample. Sample size was calculated for 95% confidence interval with allowable error of 20%. 50 patients in the age group of 20-70 years diagnosed as having chronic kidney disease undergoing hemodialysis were studied.

MQSGA involves seven components which were used to assess MQSGA score. It includes weight change, dietary intake, gastrointestinal symptoms, functional capacity, comorbidity, signs of subcutaneous fat and muscle wasting. Each component was given a score from 1 (normal) to 5 (very severe). The MQSGA score, sum of all components, ranged from 7 (normal) to 35 (severely malnourished). Patients were categorized into three groups: normal nutrition (score of 7–10), mild-to-moderate malnutrition (score of 11–20), and severe malnutrition (score of 21–35) [9]. Serum albumin level was estimated using end point colorimetric method and hsCRP was estimated using Immunoturbidimetric method.

Statistical Analysis

Data entry was done in MS Excel 2010 Data analysis was done using Instat statistical software. Descriptive statistics in terms of percentage, mean and standard deviation were calculated and Pearson's correlation test was applied for correlating MQSGA with Age, hsCRP levels, Albumin, duration of dialysis, urea and creatinine levels. The differences were interpreted at 5% levels of significance.

RESULTS

Table-1: Mean values of the parameters of the study population

Parameter	Men (mean±SD)	Women (mean±SD)	Total (mean±SD)
Age	44.48±13.24	32.4±13.84	43±14.005
Number of months of dialysis	24.27±17.8	15.8±15.53	23.26±17.16
MQSGA score	17.32±4.37	16.2±4.81	17.19±4.4
S. hsCRP	17.29±8.09	12±10.86	16.59±21.4
S. Albumin	3.28+0.69	3.22±0.153	3.27±0.67
S. Creatinine	8.66±3.1	8.34±2.76	8.8±3.0
S. Urea	108.6±28.63	137.8±33.68	108.19±38.06

Table-2: Degree of malnutrition seen in study population

MQSGA scoring	Normal (7-10)	Mild to moderate malnutrition (11-20)	Severe malnutrition (21-35)
	2	**36**	**12**
	4%	**72%**	**24%**

Table-3: Correlation of MQSGA scores with hsCRP

R value	95% confidence interval	r^2 value	p value	significant (yes/no)	If significant (+ve/-ve)
0.3156	**0.01278- 0.5653**	**0.09957**	**0.0418**	**yes**	**Positive**

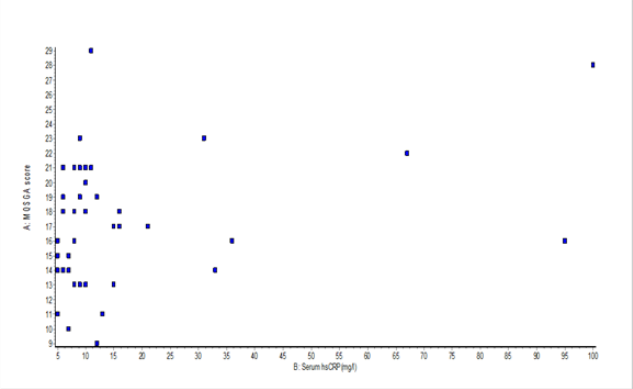


Table -4: Correlation of MQSGA scores with S. Albumin

R value	**95% confidence interval**	**r^2 value**	**p value**	**significant (yes/no)**	**If significant (+ve/-ve)**
-0.1591	**-0.4417 to -0.1523**	**0.02530**	**0.3143**	**No**	**Negative**

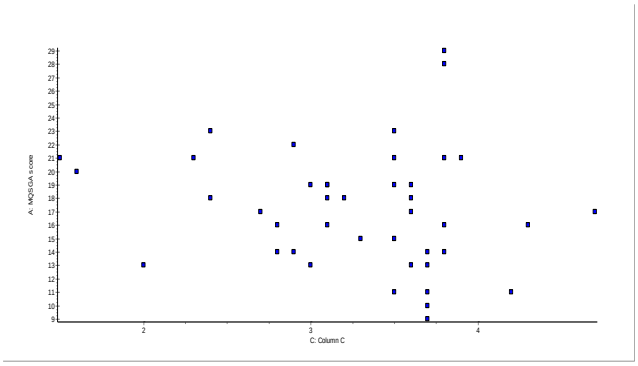


Table-5; Correlation of MQSGA scores with number of months of dialysis

R value	**95% confidence interval**	**r^2 value**	**p value**	**significant (yes/no)**	**If significant (+ve/-ve)**
0.3962	**0.1049 to 0.6250**	**0.1570**	**0.0094**	**Very significant**	**Positive**

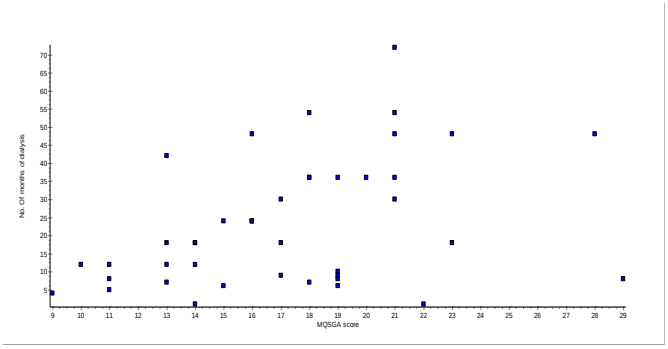
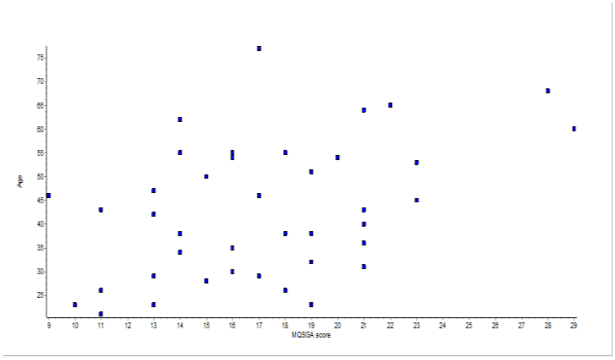


Table -6 Correlation of MQSGA scores with age of the subject

R value	**95% confidence interval**	**r^2 value**	**p value**	**significant (yes/no)**	**If significant (+ve/-ve)**
0.4173	**0.1297 to 0.6401**	**0.1741**	**0.0060**	**Very significant**	**Positive**



DISCUSSION

Degree of malnutrition

Parameters	Our study	Arun Sedhain *et al*, [10]	Shruthi Tapiawala *et al*,[11]	Jahromi *et al*,[12]
MQSGA scores	17.19+4.37	12.17 ± 3.21	SGA	16.6 ± 5.19
Mild to moderate malnutrition	72%	90%	53%	50%

Factors contributing to malnutrition in CKD patients undergoing hemodialysis [12]

Decreased dietary intake, Inflammation, Metabolic acidosis, Endocrine disorders, Co-morbidity, dialysis related and Psychosocial factors.

Inflammation and Malnutrition

In patients with CKD the most important factor associated with malnutrition is "inflammation". Many cytokines including interleukin (IL)- 1, IL- 6, tumor necrosis factor (TNF)- α are involved in the inflammatory process in CKD patients undergoing hemodialysis. The pro-inflammatory cytokines are associated with the development of anorexia and suppression of nutrient intake. Cytokines appear to exert direct action on the satiety centre.

Dialysis related problems

During a standard hemodialysis (HD) treatment using a high -flux dialysers, approximately 8g of free amino acids are removed [13].The HD membrane can activate the compliment system and contribute to the inflammatory process in HD patients which contributes to the poor nutritional status of these patients[14].Several indices of malnutrition are available ranging from the simple and well known anthropometric measurements to the complex bioelectrical impedance analysis (BIA), dual energy X-ray absorptiometry (DEXA), etc. But these methods have poor sensitivity and low practicability and applicability & they are expensive and time consuming [6].

Correlation between MQSGA and hS –CRP

Parameters	Our study	Soodeh Razeghi Jahromi *et al*,	Kalantar –Zadeh *et al*,
MQSGA and hS CRP	Positive correlation (statistically significant)	Similar	Similar

Our study is the first in India, to have assessed MQSGA score. None of the studies have correlated MQSGA with hS-CRP. Previous studies have shown hsCRP levels to be not only marker of inflammation but also powerful proatherogenic factor. Hs CRP contributes to the underlying endothelial dysfunction by directly up-regulating endothelial adhesion molecules(ICAM-1, VCAM-1 and E-selectin) and facilitating the leucocyte endothelial interaction, which is an early step in atherogenesis.

Correlation between MQSGA and Albumin

Parameters	Our study	Arun Sedhain et al,	Shruthi Tapiawala et al,	Jones et al,
MQSGA and Albumin	Negative correlation(Not statistically significant)	Similar	Similar	significant

Albumin cannot be considered as nutritional marker during inflammation. But however, there are many factors which can influence the synthesis, distribution, degradation of albumin in the body. Even though albumin is well known biomarker for assessment of malnutrition because of longer half life it cannot be a sensitive indicator for nutritional therapy.

Implications of the study

The nutritional status of the patients undergoing dialysis is too frequently ignored in many dialysis centers. Simple methods of nutritional assessment and diet modification could have a favorable impact on the patient management. Hence this study will sheen the light upon the importance of assessing mal- nutrition in patients undergoing dialysis and its role in retarding the development of atherosclerotic cardiovascular complications in them.

Limitations of the study

Less sample size

Further scope of the study

Correlation of MQSGA score with Anthropometric measurements, Other Biochemical markers like Prealbumin ,transthyretin ,transferrin

Acknowledgements:

We acknowledge MAA Association - Mysore Medical College, Mysore, for funding student grants to conduct this study.

We thank all the patients who gave consent to be the part of our study.

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