

# Interleukin 6 strongly correlates with malnutrition inflammation score and it is strong predictor for mortality in hemodialysis patients

## Abstract

**Background:** Among chronic kidney dialysis patients the morbidity and mortality rate is high, with recent evidence suggested that this may be linked to inflammation. The activity of IL-6 plays a pivotal role in inflammation, being the most powerful inducer of the acute-phase response, and markedly up-regulated in end stage renal diseases (ESRD) patients and serum IL-6 levels predict outcome of hemodialysis (HD) patients. Studies are performed to investigate the relationship between serum IL-6 and the nutritional status among chronic hemodialysis patients.

**Methodology:** The study was conducted at Sri Ramachandra University Hospital, descriptive cross-sectional design with fifty three patients were recruited using convenient sampling technique which is of non-probability type and Pre dialysis blood samples were taken for IL 6. The Malnutrition Inflammation Score (MIS) has 10 components, which is a likert scale ranging from normal to severe. Statistical Analysis was done using SPSS 16.0.

**Results:** The IL-6 mean score was 16.2 with the SD of 3.4, where as for MIS the mean was 19.77 with SD of 4.49. The Pearson's correlation coefficient values  $r^2=0.305$  which is statically significant at  $p<0.05$  Level. Patients with high score of MIS demonstrated severe degree of malnutrition and inflammation. This reveals that increase in MIS leads to elevation of IL-6, which indicates that the patients are gradually developing inflammation when unidentified can even cause mortality.

**Conclusion:** Study finding suggests that patients must be monitored for MIS score periodically rather than testing IL-6 levels, which can be and a cost effective methods for the patients.

**Keywords:** inflammation, malnutrition, hemodialysis, interleukin 6

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**Abbreviations:** ESRD, end stage renal diseases; HD, hemo dialysis; MIS, malnutrition inflammation score

## Introduction

The annual morbidity and mortality rate in dialysis patients remains high despite the marked improvement in dialysis technology and patient care. Many hemodialysis (HD) patients<sup>1-4</sup> show increase in IL 6, which is indicated by increased circulating levels of non-specific markers of inflammation. IL-6 plays an important role in inflammation, being the most potent inducer of the acute-phase response.<sup>5</sup> Nutritional status is important to analysis the CKD patients for morbidity and mortality<sup>6,7</sup> as well as in their quality of life and ultimate rehabilitative potential.

## Aim of the study

To analysis the relationship between interleukin 6 and malnutrition inflammation score among hemodialysis patients.

## Methodology

### Research design

The research design chosen for this study was descriptive cross-sectional design. The researcher collected and documented the data

to understand the demographic and biochemical variables of patient undergoing hemodialysis. The investigator also gathered the data to identify the malnutrition by using malnutrition questionnaire.

### Sample

Patients who fulfilled the inclusion criteria.

### Sample size

A total of fifty three (53) patients who underwent hemodialysis.

### Data collection

Data were collected by structured questionnaire. The questionnaire included information on sociodemographic factors, and malnutrition inflammation score (MIS).

### Laboratory evaluation

Serum albumin and IL 6 venous blood was collected before dialysis.

### Statistical analysis

Statistical Analysis Data were analyzed with descriptive and inferential statistics using SPSS 16.0 statistical package.

## Result

The IL 6 mean score 16.12 with the SD of 34.10, whereas for serum albumin, the mean was 3.41 with SD of 0.44. The Pearson's correlation co-efficient value  $r=-0.429$ , which statistically evidenced highly negative correlation at  $p<0.01$  level. This shows that if IL 6 increases, then the serum albumin decreases (Table 1) (Table 2). The IL 6 mean score 16.12 with the SD of 34.10, whereas for MIS, the mean was 19.77 with SD of 4.49. The Pearson's correlation co-efficient value  $r=0.304$ , which statistically evidenced positive correlation at  $p<0.05$  level. This shows that if IL 6 increases, then the MIS increases (Table 3).

**Table 1** Mean and Standard Deviation of Study Variables among Hemodialysis Patients

Sl. No.	Variables	Mean±SD
1	Age (in years)	50.04±15.26
2	Duration of illness (months)	52.58±66.28
3	Duration of diabetes(months)	36±84
4	Duration of hypertension(months)	86.28±85.921
5	Interleukin 6 (pg/ml)	16±34
6	Serum Albumin(gm/dL)	3.4±0.4

**Table 2** Relationship between Interleukin 6 and Albumin among hemodialysis patients (Correlation co-efficient value)

Scales	Statistical values		
	Mean	SD	r- value
Interleukin 6	16.12	34.1	$r=0.429$ $p<0.01$ (Highly Significant)
Serum Albumin	3.41	0.44	

**Table 3** Relationship between IL 6 and Malnutrition Inflammation Score (MIS) among hemodialysis patients. (Correlation co-efficient value)

Scales	Statistical values		
	Mean	SD	r- value
Interleukin 6	16.12	34.1	$r=0.429$ $p<0.01$ (Highly Significant)
Serum Albumin	3.41	0.44	

## Discussion

In this study, that the response of the fifty three maintenance hemodialysis patients to a simple question about malnutrition inflammation score (MIS) of the hemodialysis patients was significantly associated with several measures of inflammatory and nutritional status. During the Study the objective data of IL 6 was measured pre dialysis. In our study, IL 6 was well correlated with biochemical variables and MIS. In our study serum albumin has been shown to be a strong predictor of morbidity and mortality, and other numerous studies have focused on the determinants of level of serum albumin in patients treated with HD. In our study malnutrition and increased inflammation have been the most important factors associated with this biochemical markers.<sup>5,8-11</sup>

In the present study also able to show a relationship of negative correlation between lower serum albumin and the pro-inflammatory

cytokines of IL 6.<sup>5,12,13</sup> In the present study reveals that IL-6 levels independently predict survival for the elevated levels of circulating pro-inflammatory cytokines. The MIS correlating significantly with prospective hospitalizations of MHD patients and was found to be a predictor of mortality in MHD patients. Absolutely, improved correlations between the MIS and morbidity, MIS and mortality occur at least partly because of inclusion criteria of such known markers of outcome as serum albumin level and BMI, which is the reason included in the MIS. This study demonstrate that correlation between the MIS and serum IL 6 level was comparatively positive relationship, perhaps because of serum albumin level, a component of the MIS, is known to negatively correlating with serum IL 6 level.

## Conclusion

The MIS performs to be a convenient, short-term tool to risk-stratify MHD patients, which may circumvent the need for measuring inflammatory markers like IL-6. Study finding suggests that patients must be monitored for MIS score periodically rather than testing IL-6 levels, which can be a cost effective methods for the patients.

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## Conflict of interest

The author declares no conflict of interest.

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