Annexure -VIII

UNIVERSITY GRANTS COMMISSION

BAHADUR SHAH ZAFAR MARG

NEW DELHI 0 110 002.

PROFORMA FOR SUBMISSION OF INFORMATION AT THE TIME OF SENDING THE FINAL REPORT OF THE WORK DONE ON THE PROJECT

1. **NAME AND ADDRESS OF THE PRINCIPAL INVESTIGATOR**
   Dr. Ragini Kamlesh Chahande
   Office: S.K. Porwal College of Arts and Science and Commerce Kamptee.-441001,Dist- Nagpur
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2. **NAME AND ADDRESS OF THE INSTITUTION**
   Department of biochemistry
   Seth Kesarimal Porwal College of Arts and Science and Commerce , Gautam nagar Kamptee- 441001, Dist. Nagpur

3. **UGC APPROVAL NO. AND DATE: F 47-2200/11(WRO) Dated 7/4/2012**

4. **DATE OF IMPLEMENTATION** : April 2012

5. **TENURE OF THE PROJECT**
   TWO YEARS (07-04-2012 TO 07/04-2014)

6. **TOTAL GRANT ALLOCATED**
   Rs. 1,25,000/- (Rupees One Lakh Twenty Five Thousand)

7. **TOTAL GRANT RECEIVED**
   RS. 97,500/- (Rupees Ninety Seven Thousand Five HUNDRED)

8. **FINAL EXPENDITURE**
   RS. 94, 257/- (RUPEES NINETY FOUR THOUSAND TWO HUNDRED AND FIFTY SEVEN)

9. TITLE OF THE PROJECT

BIOCHEMICAL SPECTRUM OF KIDNEY FUNCTIONS IN THE SICKLE CELL ANEMIA AND SICKLE CELL TRAIT PATIENTS

10. OBJECTIVES OF THE PROJECT

In the rural areas around Kamptee, people have poor socio-economic background. They are not aware of the disease penetrated roots deep inside the society. It has been found that people in these areas are the victim of sickle cell anemia. The disease is also prevalent in rural areas of kamptee amongst the people below poverty line. In the previous minor Research project, carried out by Dept. of Biochemistry on "status of anemia in adjoining areas of Kamptee" result obtained were showing low Hb status which is one of the causes of SCD. By keeping in mind these observations, intended to extend our work of anemia to sickle cell anemia. Present studies particularly emphasized on the biochemical changes occurring in the kidneys of sickle cell anemia patients. Kidney dysfunctions are common complication of sickle cell anemia and its variant. And not much is known about the biochemical consequences of this disease. Thus accurate spectrum of Kidney regarding to changes occur in it is necessary to chalk out the farther health and nutritional counseling program which would be helpful in reducing the crises of disease.

11. WHETHER OBJECTIVES WERE ACHIEVED : YES, All the objectives were achieved.

12. ACHIEVEMENTS FROM THE PROJECT: We have received exact spectrum of renal parameters in sickle cell anemia patients.

13. SUMMERY OF THE FINDINGS : See summary report attached as Annexure A

14. CONTRIBUTION TO THE SOCIETY :

1. The results obtained from the project is useful for counselling of students and parents.

2. We have conducted surveys in Kamptee region to spread social awareness about Sickle Cell Anemia

3. Good care of patients and healthy diet including renal function test were suggested.

15. WHETHRE ANY PH.D ENROLLED/PRODUCED OUT OF THE PROJECT: No student was enrolled for Ph. D under this project

16. NO. OF PUBLICATIONS OUT OF THE PROJECT:

"Biochemical Anomaly of Renal Parameters in Sickle Cell Anemia Patients" Ragini Chahande*[1] and Shalini J. Chahande[2] IJCRT Volume 11, Issue 2, 558-563, Februar, 2023

17. ORAL PRESENTATION: 5th International conference on science and Technology for Society -ICSTS GOA, 19TH and 20th June, 2022 "Biochemical Anomaly of Renal Parameters in Sickle Cell Anemia Patients" Ragini Chahande*[1] and Shalini J. Chahande[2]

11/07/23

Signature of Principal Investigator **Principal**

MINOR RESEARCH PROJECT
SUMMARY REPORT

Sickle cell disease is a chronic disease characterized by progressive multiorgan failure, particularly involving the liver and kidney. Chronic renal disease occurs in 25% of older adults and results in 50% of their deaths. Patients with sickle cell disease have increased mortality rates from renal failure compared with non sickle cell patients. Sickle cell disease (SCD) produces many structural and functional abnormalities in the kidney, including glomerular abnormalities.. Reduction of renal concentration capacity, urinary acidification, impaired potassium metabolism often observed in these patients. Glomerular filtration rate exceed the normal value in children and adults. Proteinuria is prevalent in 25% cases, microalbuminuria was seen among the Hb SS patients than in Hb AS which is important marker of glomerular injury with Hb SS patients which is associated with reduce creatinine clearance. In the present study we have examined prevalence of renal dysfunction in the individuals with Hb SS and Hb AS. In addition we have tried to establish the correlation between kidney dysfunction and duration of disease.

AIMS AND OBJECTIVES:

To study the prevalence of sickle cell Anemia in Kamptee

2. Investigation of important parameters headed under renal function by performing hematological and urine analysis.

3. To generate awareness among the people through camps surveys and counselling to live healthy life

METHODOLOGY

This study comprises of 25 SCD patients and 25 healthy of age in between 15 - 50 yrs. age and sex matched controls. All the patients included were in the steady state of the disease. Some sickle cell blood samples were procured from Government medical College Nagpur and Indira Gandhi Medical College, Nagpur. The ethical guideline was followed during the sample collection in Kamptee region. Fasting intravenous blood samples were obtained for hematological test, creatinine, sodium, potassium, phosphate, uric acid, total protein and albumin and centrifuged at 3000 rpm for separation of serum to perform biochemical parameters. Blood samples was collected in sampling bottles and stored in ice box for protection from heat and light. Biochemical investigations and kidney function test were carried out in Biochemistry

laboratory and pathology laboratory attached to the microbiology department of S. K. Porwal College Kamptee. Patients were free of pain crises during the study. HbSS diagnosis was based on family history. Total protein in urine was determined by biuret method, level of serum creatinine was determined by Jaffe's reaction . Creatinine clearance determination was based on collection of 24 hrs. urine and calculated as follows(urine creatinine 24 hrs urine volume)/ plasma creatinine. Instructions were given to patients for careful collection of urine at home. Microalbuminuria was determined by using commercially available kit. [5-12]

OUTCOME OF STUDIES

The laboratory data of the patients with sickle cell anemia is summarized in Table 1. None of the patients had a history of drug or alcohol abuse. The mean (± SD) value of hematocrit has shown in kidney dysfunction in sickle cell anemia patients are frequent.

Creatinine is formed from creatine and creatine phosphate in muscles and is excreted into the plasma at constant rate related to muscle mass. Plasma creatinine is inversely related to glomerular filtration rate (GFR) and it is commonly used to assess renal filtration function.

The mean concentration of serum creatinine mg/dl was found to be (0.544±0.2451) in sickle cell anemia patients. Increase in serum creatinine is seen in any renal impairment when its clearance is significantly reduced. Serum potassium and uric acid were significantly higher in patients than controls ($P<0.0001$). Sickle cell anaemia patients developed profound hyperuricemia and hyperuricosuria(Fig. 2 and Fig. 3) The main factors which influences serum urate concentration are metabolic production of urate and excreted by kidneys.

The destruction of RBCs lead to increased nucleic acid degradation which lead to the formation of uric acid content in the cell. The mean concentration of serum uric acid was found to be (**9.44±1.75**) in SCA. Patients showing mild proteinuria(24 hrs urine protein >200) with a range between 65 to 382 mg (Fig. 4). They also had microalbuminuria with a range 21 to 45 µg/min(Fig 1). There were no significant difference in serum level of sodium . Haemoglobin level of sickle cell anaemia patients were normally between 6.0 to 8.0 gm% Intermittently there can be a severe drop in haemoglobin .

Table 1 : -Renal parameters in normal healthy control and SS patients sample			
Analytes	**Patients (n=25)**	**Control (n=25)**	**P value**
Creatinine (mg/dl)	**0.544±0.2451 ^{c}**	**0.72±0.0872**	**NS**
Creatinine clearance(ml/min1.73m^2)	**114.8±18.0785 ^{c}**	**120.08±7.6480**	**NS**
Microalbuminuria(µg/min)	**36±5.4467 ^{ccc}**	**12.132±1.3011**	**(P<0.0001)**
Sodium (mmol/L)	**140.584±2.211**	**139.012±2.804**	**NS**
Potassium (mmol/L)	**5.892±0.9213**	**3.704±0.528**	**(P< 0.0001)**
Phosphate (mg/dl)	**4.0125±0.5649 ^{c}**	**3.552±0.3015**	**NS**
Uric acid(mg/dl)	**9.44±1.75^{ccc}**	**5.632±2.038**	**(P< 0.0001)**
Urine protein(mg/24hrs)	**200.33±105.408^{ccc}**	**38.088±12.27**	**(P< 0.0001)**
Hemoglobin (gm/dl)	**7.508±1.1975^{ccc}**	**11.872±0.7785**	**(P<0.0001)**

Note: significant value ^{c} P<0.05, Highly significant value ^{cc} P<0.001,
Extremely significant value ^{ccc} P<0.00

CONCLUSION:

In our study we found moderate effect on renal function in SCD patients. Microalbuminuria, hyperkalemia and proteinuria are the common features of renal impairment in sickle cell anemia patients.. Renal function tests are not altered significantly, but this will help to understand future clinical manifestation of patients. The finding of our study suggests that the biochemical profile can play an important role in assessing the sickle cell patient's physiopathology and can be used for effective management of the disease.