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EVALUATION OF SAFETY PROFILE AND CLINICAL OUTCOMES OF DESIDUSTAT IN CHRONIC KIDNEY DISEASE PATIENTS WITH ANEMIA: A PROSPECTIVE OBSERVATIONAL STUDY

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ABSTRACT

Background: Chronic Kidney Disease patients develop anemia in the later stages of the disease. We evaluated the efficacy of Desidustat in improving anemia in these patients ***Materials & Methods:*** *We conducted a prospective analysis of data from patients with chronic kidney disease and anemia who were referred to our department between February 2024 and August 2024, using Desidustat.* ***Results:*** *200 patients (55.23 ± 15.6 years, 58% males, 42% female) were analyzed. Common presenting symptoms were shortness of breath (63.5% n=127), edema (36.5% n=73), and headache (22.5% n=45). A total of 9(4.5%) patients had stage 3a chronic kidney disease, 21(10.5%) had stage 3b, 94(47%) had stage 4, 76(38%) had stage 5. All the patients were followed up for 4 months. We checked the mean and median difference in all the parameters (Hemoglobin, Serum Creatinine, Blood Urea Nitrogen, Serum Uric acid, Serum Iron, and Serum electrolytes). After follow-up, mean hemoglobin was improved to 11.23 ± 1.02 mg/dL, Serum Creatinine decreased to 0.95 ± 0.21mg/dL, and Blood Urea Nitrogen decreased to 15.384.71mg/dL, Serum Uric acid decreased to 5.57 ± 1.22mg/dL, and Serum Iron improved to 75.03 ± 5.54µg/dL, and all the electrolytes has shown better* *improvement. Upon follow-up, we observed that all patients experienced a positive impact from Desidustat, which improved their anemic conditions. Conclusion: The current study demonstrates that Desidustat effectively enhances anemia treatment in Chronic Kidney Disease (CKD) patients, significantly raising their hemoglobin levels.* ***Conclusion:*** *Our study demonstrates that Desidustat effectively improves anemia in patients with chronic kidney disease. Over a four-month follow-up period, Desidustat significantly increased hemoglobin levels while contributing to improvements in renal function markers, including reductions in serum creatinine, blood urea nitrogen, and serum uric acid. Additionally, serum iron levels and electrolyte balance showed positive trends. These findings suggest that Desidustat is a promising therapeutic option for managing anemia in CKD patients, potentially enhancing their overall clinical outcomes. Further research with larger sample sizes and longer follow-up periods is recommended to confirm these benefits.*

KEYWORDS: *Chronic Kidney Disease, Anemia, Desidustat, Hemoglobin.*

INTRODUCTION

Chronic kidney disease or CKD is an illness that lasts for a long time and is characterized by the kidneys being damaged an eGFR that is less than 60 mL/min/1.73 m^2 over three months or more. It gets worse gradually, and sometimes it could require a patient to be on dialysis or even get a kidney transplant. CKD not only affects the kidneys, but other body parts such as the heart, brain, bones, anemia, and blood pressure. Detection during the early stage is extremely important, and the eGFR test, helps to find out the severity of it. The development of the disease can occur for both controllable and uncontrollable factors. The treatment carries making adjustments to medications according to the eGFR results, preparing for dialysis or transplantation, and addressing reversible factors to slow the progress to the extent it can be managed. The comprehensive attitude of healthcare workers focuses on rewards that can be modified to manage the disease.

Anemia has become a common problem due to CKD and thus has resulted in poor health and increased mortality. It is when the haemoglobin levels are less than 13 g/dL in men and less than 12 g/dL in women. Initially, blood transfusion was the go-to method, but it had a lot of risks like infections and complications for kidney transplants. Anemic conditions associated with CKD are majorly due to a decrease in erythropoietin (EPO) production, a glycoprotein hormone necessary for the synthesis of red blood cells. Continued inflammation weakens the body and leads to poor iron metabolism. The HIF-PHD pathway is involved in the process of hematopoiesis is, thus, the main target for therapeutic purposes.

Desidustat (Oxemia(TM)) was a drug obtained from Zydus Cadila, a pharmaceutical company, which is an oral HIF-prolyl hydroxylase (HIF-PH) inhibitor that regulates HIF and thus stimulates EPO formation. It was given the green light in India on the 7th of March 2022 for the purpose of treating CKD or chronic kidney disease-related anemia in both patients on dialysis and patients who are not on dialysis. The minimum daily amount for dialysis patients is 100 mg, which is taken three times orally a day.

This research attempts to measure the satisfactory and useful effect of Desidustat in ill patients having anemia and CKD. In fact, the main study objective was to ensure its safety, however, the secondary endpoint was to scrutinize its efficacy in improving hemoglobin levels.

I. MATERIAL AND METHODS

This was a prospective observational study conducted for a period of 6 months with a sample size of 200 patients. The patients were enrolled in the study after signing informed consent. The data of Chronic kidney disease patients with anemia receiving Desidustat was collected from the hospital EMR.

Study Design: Prospective open-label observational study.

Study Location: This was a tertiary care teaching hospital-based study done in the Department of Nephrology, at Medicover Hospital, Madhapur, Hyderabad.

Study Duration: November 2023 to April 2024.

Sample size: 200 patients.

Sample size calculation: We opted to base our sample size determination for our study on the use of the standard sample size formula, assuming an incidence of 500 cases. The selection of the sample size was based on the following formula:$n = (Z^2 \times p \times (1 - p)) / d^2$ Here are some of the terms: **Z** represents the normal volume diffuseness of the desired confidence level to get the data (1.96 in case the data's confidence is estimated to be 95%), **p** equals the estimated proportion of the total cases, and **d** is the width of the interval. This computation procedure was able to tell us that by utilizing a measurement of 200 patients, we gathered significant, reliable data that can be efficiently processed under our study.

Subjects & selection method: The study population was drawn from consecutive Chronic kidney disease patients who presented to Medicover Hospital with Anemia and were prescribed Desidustat and underwent Serum Creatinine, Hemoglobin, Serum Ferritin, Serum Electrolytes, Serum Uric Acid, initiation between November 2023 to April 2024. Patients were followed for 6 months. They were followed as before and after treatment with Desidustat.

Inclusion criteria

1. Patients suffering from chronic kidney disease with Anemia
2. CKD Patients with stage 3 to stage 5
3. CKD Patients with Iron deficiency
4. Anemia Hb<10gm
5. Patients Aged above 18
6. All Genders

Exclusion criteria

1. Patients with CKD stage1 and stage2
2. Pregnant and Lactating Women
3. Patients undergoing any surgery during the study period
4. Patients with erythropoietin exposure (within 1 month)
5. Patients with a history of blood transfusion

Procedure methodology

In a tertiary care hospital, a prospective observational study was carried out to assess the clinical, biochemical, and imaging outcomes of Desidustat. A total of 200 patients were included in our investigation which was conducted for 6 months after written informed consent was obtained, a well-designed questionnaire was used to collect the data of the recruited patients prospectively. The questionnaire included socio-demographic characteristics such as age, gender, nationality, height, weight, consanguineous marriage, physical activity, and lifestyle habits like smoking and alcohol. Patient data was collected with all the parameters needed

Information about the drug Desidustat was taken from the pharmacy database. Baseline characteristics of the patients were collected from the database 1 week before the first use of drugs.Height and weight were measured using a standardized method. The body mass index (BMI) was calculated as the weight in kilograms divided by height in meters squared.

All renal parameters were quantified along with the Hemoglobin, Serum Ferritin, Serum Iron and Serum Electrolytes and followed up about every month. All biochemical assays were carried out by the same team of laboratory technicians using the same method, throughout the study period.

The prescribed doses of Desidustat were 100 mg thrice a week

Statistical analysis: Data was analyzed using SPSS version 20 (SPSS Inc., Chicago, IL). Student's *t*-test was used to ascertain the significance of differences between mean values of two continuous variables and confirmed by a nonparametric Mann-Whitney test. In addition, a paired *t*-test was used to determine the difference between baseline and 2 years after regarding biochemistry parameters, and this was confirmed by the Wilcoxon test which wasa nonparametric test that compares two paired groups. Chi-square and Fisher exact tests were performed to test for differences in proportions of categorical variables between two or more groups. The level $P < 0.05$ was considered as the cutoff value or significance.

II. RESULTS

In a tertiary care hospital, a prospective observational study was carried out to assess the Safety profile and clinical outcomes of Desidustat in CKD patients with anemia. A total of 200 patients were included in our investigation.

A total of 200 subjects were included in the final analysis.

Table 1: Descriptive analysis of age in the study population (N=200).

Parameter	Mean ± SD	Median	Minimum	Maximum
Age	55.23 ± 15.6	57.00	24.00	89.00

The data in the table 1 contains the summarizing statistics of the age of the researched individuals. The average age is 55.23 which is 15.6 years of standard deviation away. This shows some inconsistency or diversity in the sample. The most frequent age in this group is 57 years, meaning that 50% of the participants have the age this or younger. The gap from the youngest to the eldest participants is 24-89 years, which embodies the age range of the participants.

Table 2: Descriptive analysis of Gender in the study population (N=200).

Gender	Frequency	Percentages
Male	116	58.00%
Female	84	42.00%

The table 2 gives the overview of the gender distribution of the subjects. The 116 (58.00%) of the observations were male, and the 84 (42.00%) of the observations were female. So, this lets us know that male participants constitutes a greater percentage of the voluntary sample. It can broadly be suggested that the demography of the sample is comprised of males and females, and this can be observed from the distribution.

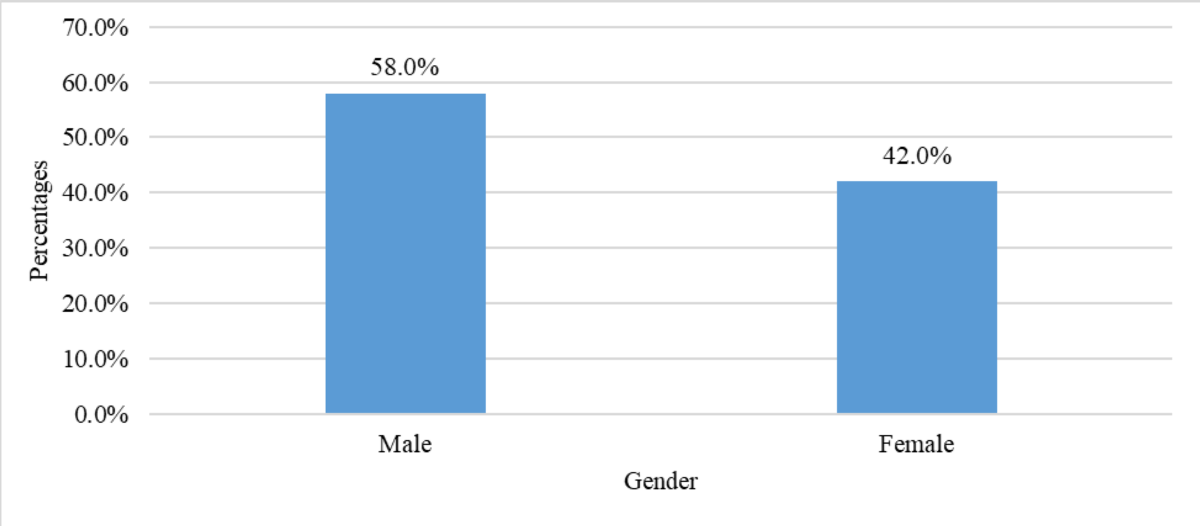

Figure 1: Bar Chart of Gender in the Study Population.

Table 3: Descriptive analysis of anthropometric parameters in the study population (N=200).

Parameter	Mean ± SD	Median
Height	163.02 ± 10.04	161.25
Weight	64.36 ± 9.83	65.00

The descriptive statistics of the table3 are found to be for the width and height of the participants. The average height is 163.02 cm, with a standard deviation of 10.04 cm, whereas median height is 161.25 cm, which implies the average height. Moreover, the mean weight is 64.36 kg with a standard deviation of 9.83 kg, and the median weight is 65.00 kg. These indications discloses the dispersion and diversity of height and weight within the sample.

Table 4: Descriptive analysis of investigation parameters in the study population (N=200).

Parameter	Mean ± SD	Median
SBP	135.29 ± 17.9	130.00
DBP	81.13 ± 8.59	80.00
Pulse	87.23 ± 6.96	86.00
RR	20.56 ± 2.01	20.00
GRBS	112.08 ± 37.02	98.00
Spo2	96.6 ± 2.32	97.00
Temp	98.02 ± 1.08	98.40

Table 4 depicts the mean, standard deviation (SD), and median for several health parameters. Such that the systolic blood pressure (SBP) has a mean value of 135.29 mmHg, the diastolic blood pressure (DBP) is 81.13 mmHg, and the pulse is 87.23 bpm. The respiratory rate (RR) is 20.56 breaths/min, whereas the random blood sugar (GRBS) is 112.08 mg/dL, the oxygen saturation (SpO2) is 96.6%, and the temperature (Temp) is 98.02°F. As observed where the median values are included, the data indicate that the central tendencies in the data are positive.

Table 5: Distribution of Mean eGFR in Enrolled Patients at the initial time and follow-up period (N=200).

Parameter	Mean ± SD	Median
GFR at the initial period	20.07 ± 10.18	16.90
GFR at follow-up period	96.99 ± 48.02	86.72

Table 5 presents the descriptive statistics for the Glomerular Filtration Rate (GFR) at two different periods. At the initial period, the mean GFR is 20.07 with a standard deviation of 10.18, and the median is 16.90. At the follow-up period, the mean GFR is 96.99 with an SD of 48.02, and the median is 86.72. These values reflect a significant improvement in kidney function over time**.**

Table 6: Distribution of Hemoglobin in Enrolled Patients (N=200).

Parameter	Mean ± SD	Median	Mean Difference	*P - value*
Hb at the initial period	9.23 ± 1.02	9.35		
Hb at follow-up period	12.53 ± 1.02	11.35	3.3	0.001

The data in table 6 displays descriptive statistics on the levels of hemoglobin (Hb) observed for two distinct periods. During the first period, the mean Hb is 9.23, with a standard deviation of 1.02, and a median of 9.35. During the follow-up period, the mean Hb goes up to

12.53 with an SD of 1.02, and 11.35 is the median. The mean difference in the Hb content between the two periods is 3.3, which is represented by the *p - value* of 0.001, therefore, there is statistically significant evidence of HA levels improving over time.

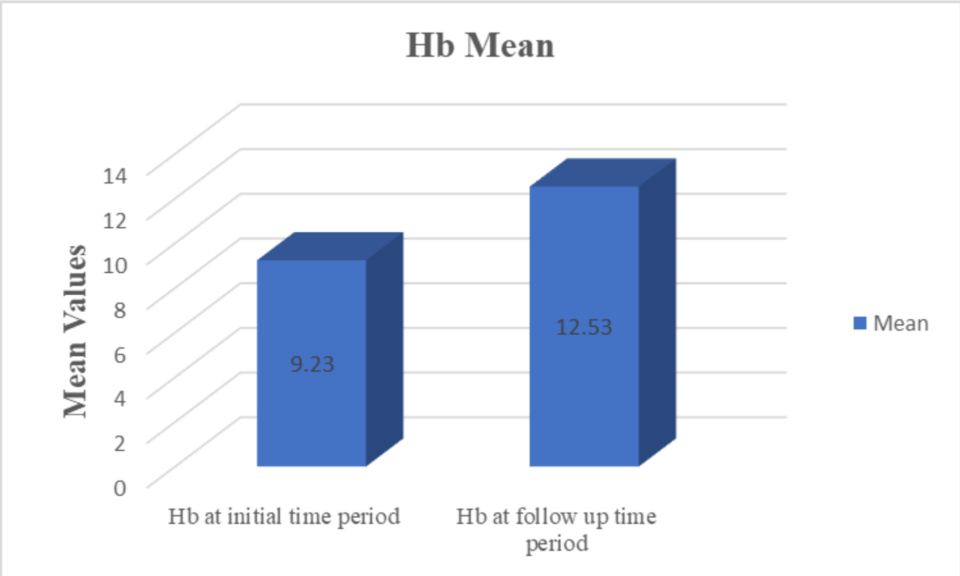

Figure 2: Bar Chart of Hemoglobin in Enrolled Patients.

Table 7: Comparison of mean Serum creatinine in Pre-operative and follow-up period (N= 200).

Parameter	**Mean ± SD**	**Mean Difference**	***P - value***
Serum Creatinine at the initial period	3.38 ± 1.02		
Serum Creatinine at follow-up period	0.95 ± 0.21	2.42	<0.001

Table 7 is an overview of blood creatinine levels and their distribution at initial and follow-up. On the other hand, at the initial period, the mean serum creatinine is 3.38 and the standard deviation is 1.02. While at the follow-up period, it has fallen to 0.95 with an SD of 0.21. The mean difference in serum creatinine between the two periods can be represented as 2.42, with a *p - value* of <0.001, which points out the necessity to undergo a lab test. In other words, the results of the study explicitly suggest that the mean difference in serum creatinine between the two periods is 2.42, that is, a *p - value* of <0.001. Consequently, it can be inferred that serum creatinine has decreased over time, meaning that the difference between the two periods is a *p - value* of <0.001.

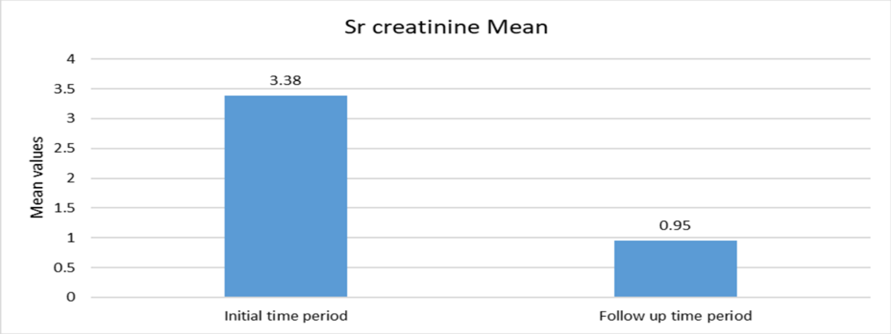

Figure 3: Bar chart of Serum Creatinine in Pre-operative and follow-up period (N= 200)

Table 8: Comparison of mean Blood Urea Nitrogen in Pre-operative and follow-up periods (N= 200).

Parameter	**Mean ± SD**	**Mean Difference**	***P - value***
Blood Urea Nitrogen at the initial period	55.79 ± 17.83		
Blood Urea Nitrogen at follow-up period	15.38 ± 4.71	40.41	<0.001

Table 8, you can see the descriptive statistics for blood urea nitrogen (BUN) levels in two different periods. At the initial period, the average BUN level is 55.79 with a standard deviation of 17.83. At the follow-up period, BUN levels drop to 15.38 with an SD of 4.71. The mean difference in BUN between the two periods is 40.41, with a *p - value* of <0.001, which means that the decrease in BUN levels over time is of high significance.

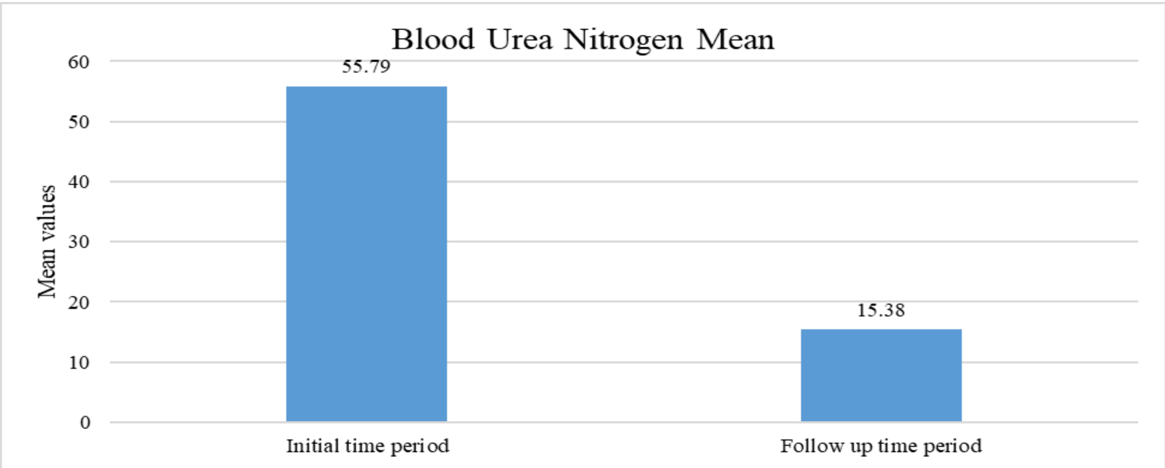

Figure 4: Mean Blood Urea Nitrogen in Pre-operative and follow-up period (N= 200).

Table 9: Comparison of mean Serum Uric Acid in Pre-operative and follow-up periods (N= 200).

Parameter	**Mean ± SD**	**Mean Difference**	***P - value***
Serum Uric acid at initial time period	7.03 ± 2.09		
Serum Uric acid at follow up time period	5.57 ± 1.22	1.45	<0.001

Table 9 gives the mean and standard deviation for serum uric acid levels at two different time periods. In the first follow-up period, the mean serum uric acid is 7.03 with a standard deviation of 2.09. However, by the time of the follow-up, the mean serum uric acid goes down to 5.57 with an SD of only 1.22. Therefore, the mean difference in serum uric acid of the two periods is 1.45, with a *p - value* of <0.001, evidence that the reduction in serum uric acid is statistically significant over time.

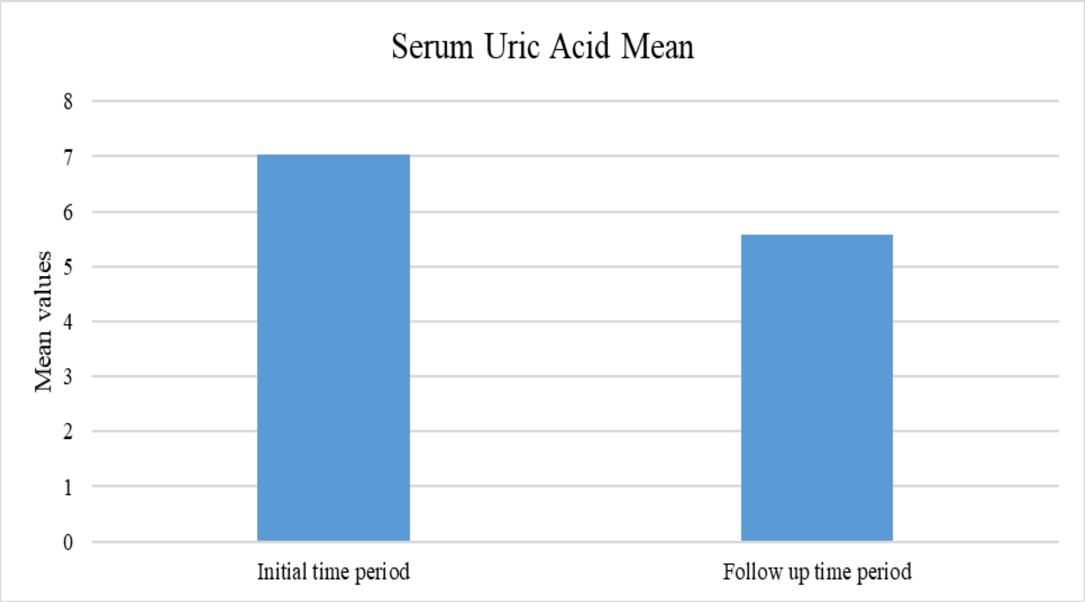

Figure 5: Bar chart of mean Serum Uric Acid in Pre-operative and follow-up periods (N= 200).

Table 10: Comparison of mean Creatinine Clearance in Pre-operative and follow-up periods (N= 200).

Parameter	Mean ± SD	Mean Difference	*P - value*
CRCL at the initial period	21.11 ± 9.24		
CRCL at follow-up period	72.37 ± 32.19	51.26	<0.001

Table 10 contains the descriptive statistics for the serum uric acid levels in two different periods. In the initial period, the mean serum uric acid is 7.03 with a standard deviation of 2.09. On the other hand, at the follow-up period, the mean serum uric acid increases to 5.57 with an SD of 1.22. The mean difference in serum uric acid between the two periods is 1.45, with a *p - value* of ≪0.001, which means that there is a statistically significant reduction in serum uric acid over time.

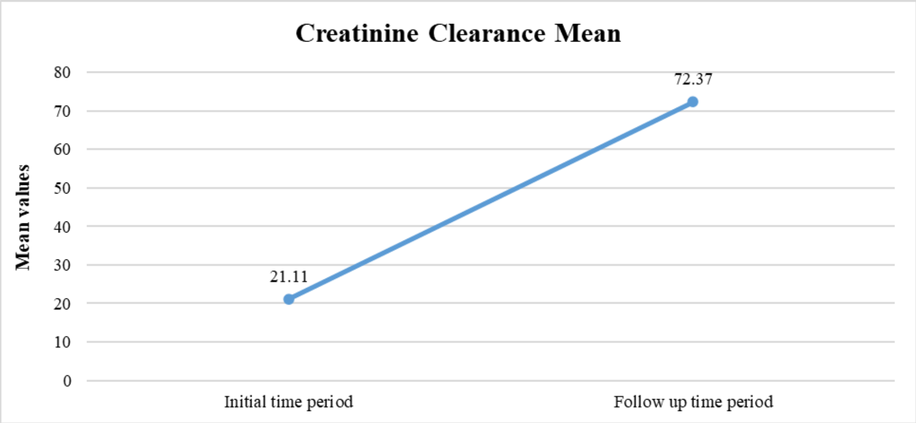

Figure 6: Line chart of mean Creatinine Clearance in Pre-operative and follow-up period (N= 200).

Table 11: Comparison of mean Serum Iron in Pre-operative and follow-up periods (N= 200).

Parameter	**Mean ± SD**	**Mean Difference**	***P - value***
Serum Iron at the initial period	50.03 ± 4.5		
Serum Iron at follow-up period	80.03 ± 4.5	30	0.001

Table 11 shows Two different time periods are compared to descriptive statistics for serum uric acid levels in this table. In the initial time period, the mean serum uric acid is 7.03 with the standard deviation of 2.09. During the follow-up period, the mean serum uric acid decreases to 5.57 with a standard deviation of 1.22. The mean difference in serum uric acid between the two periods is 1.45. Low *p - value* of <0.001 indicates the statistically significant decrease in serum uric acid over time.

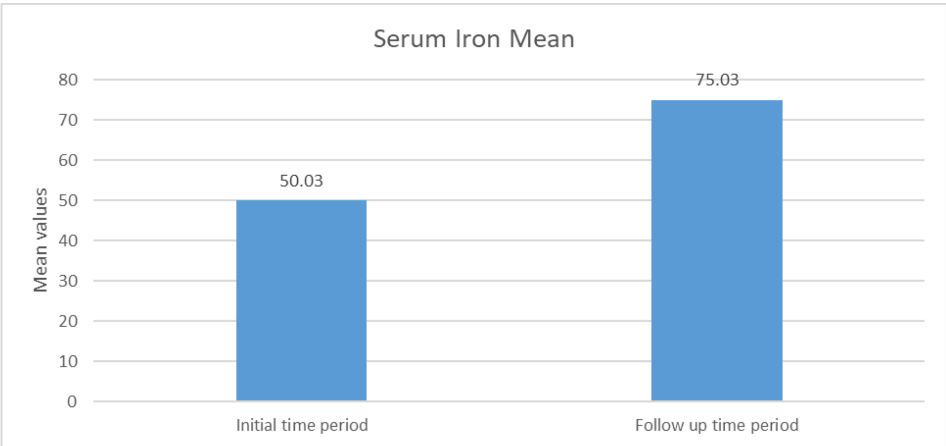

Figure 7: Bar chart of the mean of Serum Iron in the Pre-operative and follow-up period (N= 200)

Table 12: Comparison of Mean Serum Sodium in Pre-operative and follow-up periods (N= 200).

Parameter	Mean ± SD	Mean Difference	*P - value*
Sodium at the initial period	131.44 ± 10.26		
Sodium at follow-up period	138.72 ± 2.59	7.28	<0.001

Table 12 enunciates the descriptive statistics for sodium levels at two different periods. In the first period, the typical level of sodium is 131.44 with a standard deviation of 10.26. However, at the beginning of the follow-up time, the mean sodium level increased, reaching 138.72 with a standard deviation of 2.59. The mean of the changes in the sodium levels is 7.28, with a *p - value* of <0.001, which shows a statistically significant increase in the sodium level over time.

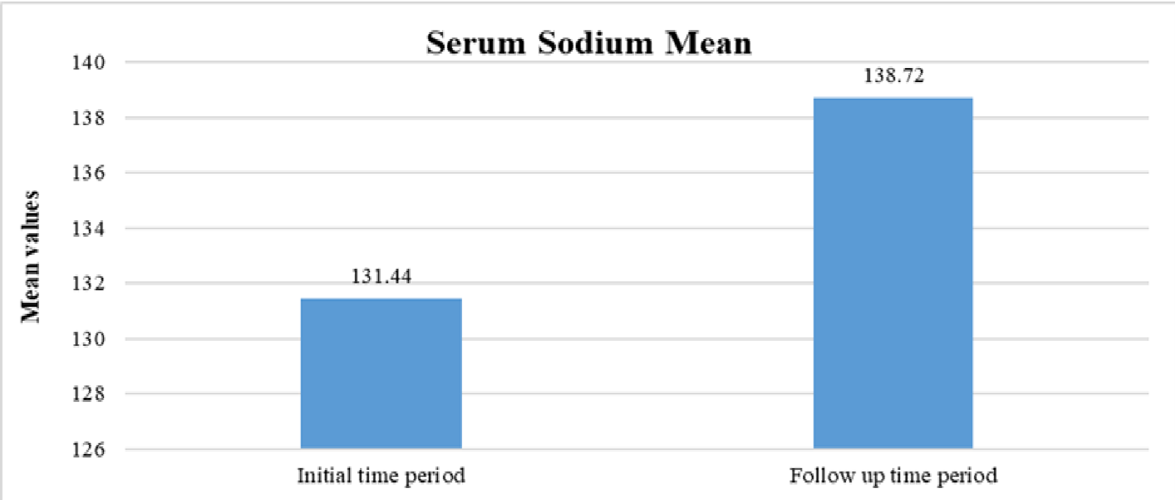

Figure 8: Bar chart of mean Serum Sodium in Pre-operative and follow-up period (N= 200).

Table 13: Comparison of mean Serum Potassium in Pre-operative and follow-up periods (N= 200).

Parameter	Mean ± SD	Mean Difference	*P - value*
Potassium at the initial period	4.89 ± 1.39		
Potassium at follow-up period	4.16 ± 0.48	0.73	<0.001

Table 13 depicts the descriptive statistics linked to potassium levels over two-time points. In the initial period, the mean potassium level is 4.89, with a deviation of the standard of 1.39. In the follow-up period, the mean potassium level drops to 4.16 with a deviation of 0.48. The mean difference in potassium levels found at both moments is 0.73; <0.001 indicates a statistically significant decrease in potassium levels over time.

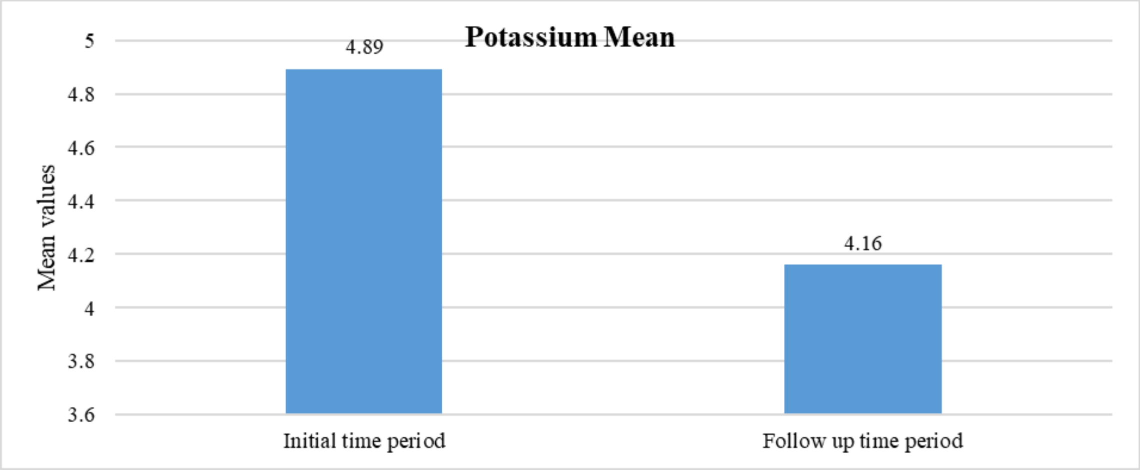

Figure 9: Bar chart of mean Serum Potassium in Pre-operative and follow-up periods (N= 200).

Table 14: Comparison of mean Chlorine in Pre-operative and follow-up periods (N= 200).

Parameter	**Mean ± SD**	**Mean Difference**	***P - value***
Chlorine at the initial period	97.61 ± 10.13		
Chlorine at follow-up period	101.66 ± 2.81	4.05	<0.001

Table 14 demonstrates the descriptive statistics for the two different periods of time for chlorine levels. In the beginning, the mean chlorine level is 97.61, while, at the same time, the standard deviation is 10.13. In a subsequent check, the mean chlorine level swells to 101.66 and takes on a standard deviation of 2.81. The average change in chlorine levels between the periods is 4.05, with a *p - value* of < 0.001, which is significant at the 5% level, and there were significant increases in chlorine levels over time.

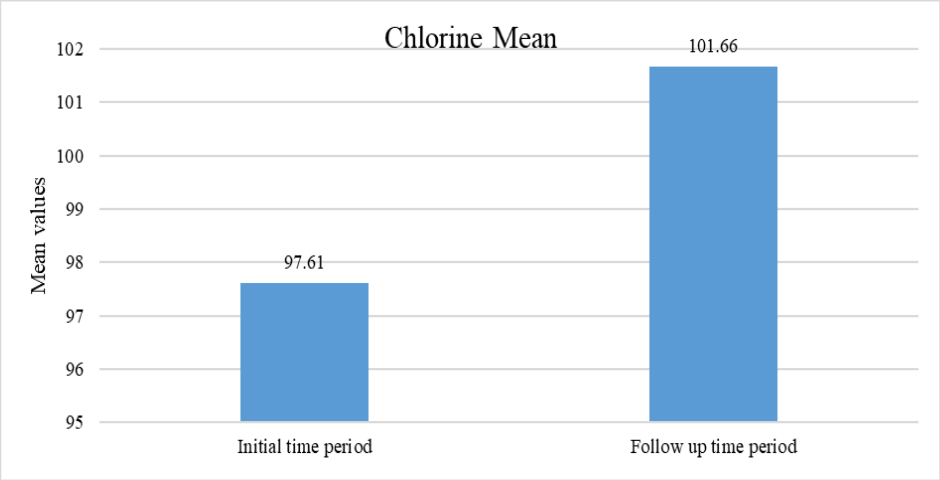

Figure 10: Bar chart of mean Chlorine in Pre-operative and follow-up periods (N= 200).

Table 15: Comparison of mean Calcium in Pre-operative and follow-up period (N= 200).

Parameter	Mean ± SD	Mean Difference	*P - value*
Calcium at the initial period	10.55 ± 3.03		
Calcium at follow-upperiod	9.38 ± 0.65	1.17	<0.001

Table 15 shows the statistics for calcium levels at two distinct times are shown in the table. The calcium level at the beginning of the period is 10.55 on average, with a standard deviation of 3.03. The mean calcium level drops to 9.38 with an SD of 0.65 over the follow-up period. With a *p - value* of <0.001 and a mean difference in calcium levels between the two periods of 1.17, there has been a statistically significant decline in calcium levels over time.

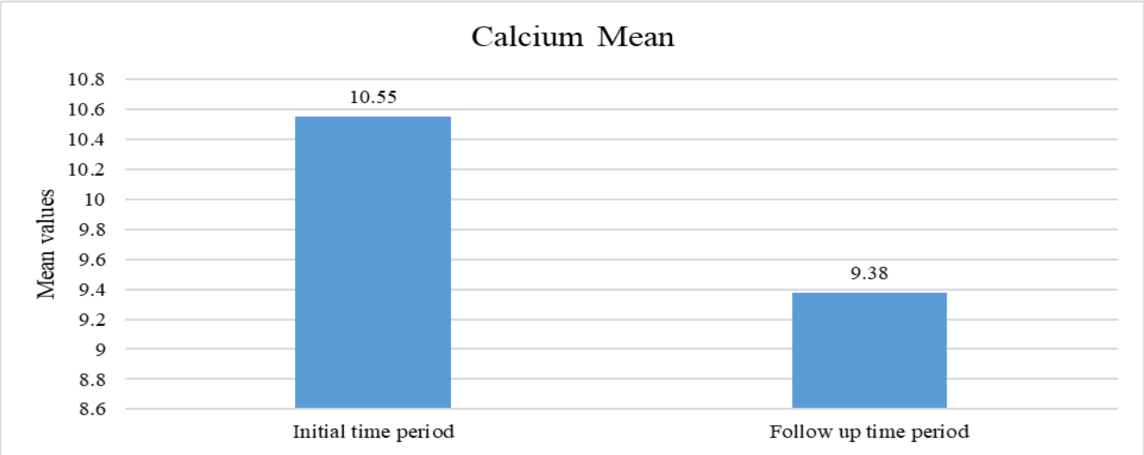

Figure 11: Bar chart of mean Calciumin Pre-operative and follow-up period (N= 200).

Table 16: Comparison of mean Magnesium in Pre-operative and follow-up periods (N= 200).

Parameter	Mean ± SD	Mean Difference	*P - value*
Magnesium at theinitial period	2.83 ± 1.28		
Magnesium at follow-up period	1.93 ± 0.16	0.90	<0.001

Table 16 shows statistics for magnesium levels at two distinct times are shown in the table. The mean magnesium level at the start of the period is 2.83, with a standard deviation of 1.28. The mean magnesium level drops to 1.93 with an SD of 0.16 over the follow-up period. With a *p - value* of <0.001 and a mean difference in magnesium levels between the two periods of 0.90, there has been a statistically significant decline in magnesium levels over time.

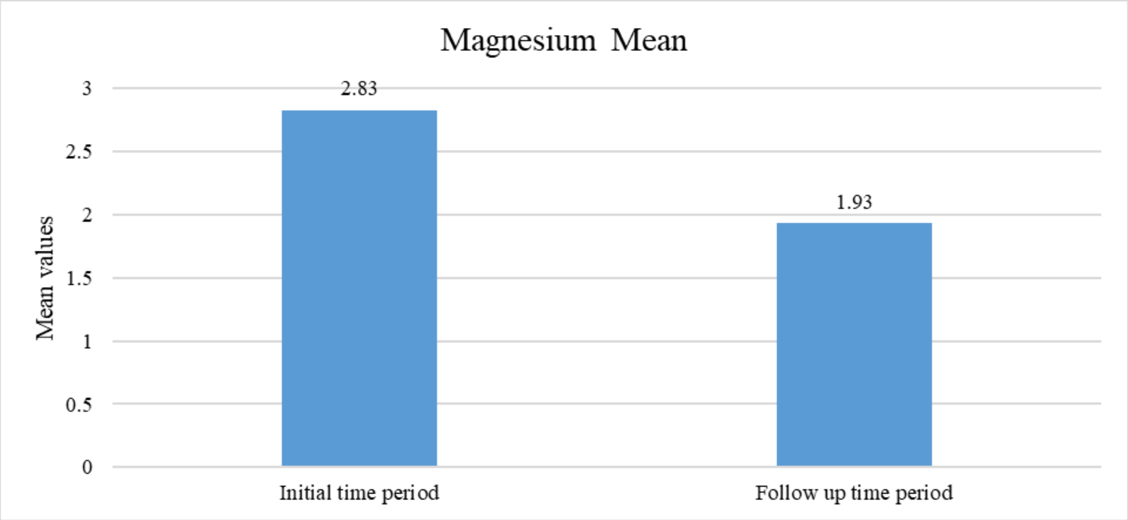

Figure 12: Bar chart of mean Magnesium in Pre-operative and follow-up periods (N=200).

IV. DISCUSSION

This prospective obsevational study was conducted on evaluation of clinical, biochemical, imaging outcomes ofDesidustat.It was single single-centered study conducted in a tertiary care hospital for 6 months where 200 individualswere enrolled. Desidustat commonly used in treatment of Chronic kidney disease with anemia.

1. Improved Kidney Function

Glomerular Filtration Rate (GFR) showed a significant increase from 20.07 at the beginning to 96.99 at follow-up (mean difference: 51.26, $p < 0.001$). This drastic improvement suggests that the intervention has had a profound positive effect on renal function. The rise in GFR means that the filtration ability of the kidneys has been enhanced, perhaps because the cause of the underlying condition has been well controlled or hydration status improved.

2. Declining Kidney Injury Biomarkers

By the important parameter of serum creatinine, its mean had plummeted to an extent to 3.38 on admittance but a mean level dropped to only 0.95 that demonstrates a huge amount of fall (2.42, p value <0.001). Which also showed some decline related GFR enhancement - indicating decrease damage or kidney problems. Thus in case of diminishing creatinine reflects the positive and improved aspects by enhancing clearance via renal efficiency.

3. In Haemoglobin: The levels improved significantly from a mean of 9.23 to one of 12.53, mean difference, 3.3, $p = 0.001$. It denotes an appropriate and effective response as the levels that are suggestive of anemia in the baseline improvement significantly to that of the follow-up and improve erythropoiesis-often depressed secondary to chronic diseases like chronic kidney disease.

4. Improvement of Other Biochemical Markers

BUN levels significantly decreased from 55.79 to 15.38 (mean difference: 40.41, $p < 0.001$), which is an important indicator of renal function. This reduction indicates enhanced renal clearance and less accumulation of nitrogenous waste products, thus supporting the positive renal outcomes.

Serum Uric Acid also decreased significantly from 7.03 to 5.57 (mean difference: 1.45, $p < 0.001$). Elevated uric acid is often associated with kidney dysfunction and metabolic disturbances; thus, its reduction may signify improved renal handling of waste products and a decrease in systemic inflammation.

5. Electrolyte Balance Improvement

Sodium and Chloride levels significantly increased from 131.44 to 138.72 (mean difference: 7.28, $p < 0.001$) and from 97.61 to 101.66 (mean difference: 4.05, $p < 0.001$), respectively. Such increases might represent improved function of the renal tubules, better fluid balance, and greater regulation of overall electrolytes. It may suggest an improvement in perfusion to the kidneys, thereby enabling these organs to maintain sodium and chloride in a more favorable state post-treatment.

6. Changes in Calcium and Magnesium Concentrations

The mean Calcium concentration was reduced from 10.55 to 9.38 (difference: 1.17, $p < 0.001$), which might suggest a disturbed calcium homeostasis as a result of alterations in renal function. This decrease could be associated with impaired mobilization or reabsorption of calcium, possibly occurring in the setting of kidney disease or due to interventions affecting mineral balance.

Similarly, Magnesium levels decreased from 2.83 to 1.93 (mean difference: 0.90, $p < 0.001$), suggesting potential disturbances in magnesium homeostasis. Magnesium levels are influenced by kidney function, and these findings might point to altered renal handling of magnesium, which warrants further investigation to ensure proper supplementation or management of mineral imbalances.

Interpretation of Findings

Overall, the intervention clearly improved renal function markers: GFR and serum creatinine and waste products BUN and uric acid, which points toward the effectiveness of the intervention to improve renal function and prevent damage to the kidney. Results were statistically significant at $p < 0.001$ and clinically, as these reflect a real-life benefit in participants' recovery in terms of the function of their kidneys.

The rise in Hb is another positive effect, which might imply that the intervention was effective also in controlling anemia, a common complication of patients with renal dysfunction.

The changes in electrolytes such as sodium and chloride are consistent with the improvements in renal function, as the kidneys play a key role in maintaining electrolyte balance. This improvement is promising, as it points to better fluid and electrolyte regulation, a crucial aspect of kidney health.

However, the decreases in calcium and magnesium indicate that there may have been disruptions in mineral metabolism, which could be related to changes in renal function or the treatment protocol. These changes should be monitored closely, as imbalances in calcium and magnesium can lead to further complications.

Study Limitations and Future Directions

While the results are promising, further studies with larger sample sizes and longer follow-up periods are needed to validate the findings and assess the long-term effects of the intervention. Additionally, the specific mechanisms behind the decrease in calcium and magnesium should be explored further to optimize treatment and prevent potential complications.

The sample in this study was not diverse in terms of underlying conditions and comorbidities, and future studies could consider a more heterogeneous sample to understand how different conditions might affect the outcomes.

In conclusion, there is evidence for improvement in the majority of these key health markers, especially with regard to the function of the kidneys, in the postintervention period. The results further indicate that this treatment protocol improves renal function as well as biochemical parameters, while caution should be exercised with observed decreases in levels of calcium and magnesium.

V. CONCLUSION

Our study demonstrates that Desidustat effectively improves anemia in patients with chronic kidney disease. Over a four-month follow-up period, Desidustat significantly increased hemoglobin levels while contributing to improvements in renal function markers, including reductions in serum creatinine, blood urea nitrogen, and serum uric acid. Additionally, serum iron levels and electrolyte balance showed positive trends. These findings suggest that Desidustat is a promising therapeutic option for managing anemia in CKD patients, potentially enhancing their overall clinical outcomes. Further research with larger sample sizes and longer follow-up periods is recommended to confirm these benefits.

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