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EFFECTIVENESS OF GRAVITATIONAL RESISTANCE AND DIET (GRAD) SYSTEM IN REVERSING CHRONIC KIDNEY DISEASE (CKD) - AMONG DIALYSIS PATIENTS

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Abstract

Background: The global prevalence of Chronic Kidney Disease (CKD), referred to as *mutraghat* or *mutrakshay* in Ayurveda, affects approximately 70 crore individuals, with nearly one-third of the cases reported in India and China. Currently, there are no definitive cures, and the available treatments are limited to dialysis or kidney transplants. **Objective:** This study aimed to evaluate the effectiveness of the GRAD (Gravitational Resistance and Diet) System, developed by Dr. Biswaroop Roy Chowdhury, in reversing CKD in patients dependent on dialysis. The GRAD System has been reported to aid the regeneration of nephrons, enabling patients to gradually eliminate their reliance on dialysis, medications, and other external interventions, thereby living a healthy, drug-free, and dialysis-free life. **Methods:** A prospective cohort study was conducted from August 2021 to March 2022 on 100 dialysis patients who agreed to incorporate the GRAD system into their lifestyle for an average duration of 100 days. Data was collected through interviewer-administered questionnaires, participant examinations, and review of medical records. Various clinical and economic parameters were carefully recorded. **Results:** Out of 100 dialysis patients, 28 fully adopted the GRAD system, with 21 (75%) achieving complete freedom from dialysis and supporting drugs. The remaining 25% experienced partial freedom. Among 72 patients who partially adopted the system, 11 (15%) discontinued supporting drugs entirely, while 44 reduced their dialysis frequency. All patients

reported improved quality of life, with 58% achieving a 70%-90% reduction in economic burden. No adverse effects, deaths, or negative impacts were observed, and all patients experienced significant improvements in overall health, well-being, and financial stability. **Conclusion:** The GRAD System demonstrates effectiveness in reversing CKD across mild, moderate, and severe cases. It offers a promising alternative to dialysis and kidney transplants, empowering patients to regain control of their health through a sustainable and non-invasive approach.

Keywords:
Prospective Cohort Study, Chronic Kidney Disease (CKD), *Mutraghat*, *Mutrakshay*, GRAD System, Dialysis Alternative, Nephron Regeneration, Ayurveda.

INTRODUCTION

Introduction

Chronic Kidney Disease (CKD), referred to as *mutraghat* or *mutrakshay* in Ayurveda, is a widespread condition globally where kidneys fail to function optimally.[1] CKD is often associated with aging and is exacerbated by the prolonged use of allopathic medications for hypertension, which, over time, lead to kidney damage.[2] Many individuals on these medications eventually develop CKD and progress to requiring dialysis due to the cumulative side effects of these drugs.[3]The economic burden of dialysis is substantial, impacting both patients and their families, and significantly affecting their social and financial well-being.[4] The cost of living for dialysis patients is notably higher, further adding to their challenges.[5]

Until recently, there was no scientifically proven intervention capable of reversing severe CKD or liberating patients from dependency on dialysis, transplants, and medications.[6] However, modern scientific literature highlights techniques such as Head Down Tilt (HDT) and Hot Water Immersion (HWI), which have been found to activate kidney function. These methods are reported to increase the excretion of sodium by five times, potassium by three times, and urine volume by three times, alongside reducing body weight and swelling.[7] In Ayurveda, Hot Water Immersion, referred to as *Avagaha Sweda*, has been mentioned as a rejuvenating therapy for compromised kidneys.[8]

Need for the Study

Chronic Kidney Disease (CKD) is a progressive and irreversible decline in renal function, often presenting with only metabolic anomalies in its initial stages. CKD is evaluated when the Glomerular Filtration Rate (GFR) falls below 30 ml/min. Conventional management primarily involves dialysis and kidney transplantation, both of which are financially and socially challenging for most of the Indian population. A kidney transplant in government hospitals costs approximately Rs. 2,00,000, while private facilities charge between Rs.

7,00,000 and Rs. 10,00,000. Post-transplant, annual maintenance medicines cost Rs. 2,00,000, or Rs. 20,000 per month. These economic and logistical hurdles necessitate alternative therapies that are both safe and accessible.

To address these issues, Dr. Biswaroop Roy Chowdhury developed the GRAD System, combining HDT, HWI, and the DIP Diet, with the objective of reversing kidney failure, especially in dialysis-dependent patients. This protocol aims to reduce reliance on dialysis, delay or avoid kidney transplantation, and provide a sustainable solution for CKD patients.

Objectives and Goals of the Study

- To demonstrate the effectiveness of combining modern techniques and Ayurvedic remedies in treating CKD.
- To provide a future therapeutic option for the vast population suffering from CKD, minimizing the need for dialysis and avoiding or delaying kidney transplantation.

Methods and Techniques

The GRAD System integrates **2 hours of HDT**, **2 hours of HWI**, and adherence to the **DIP Diet**. Dialysis patients are instructed to perform these activities daily, along with maintaining a *Patients Reporting to Activate Nephrons (PRAN)* sheet through the GRAD app. The PRAN sheet is used to monitor specific parameters, as shown in Table 1, to track patient progress and response to the protocol.

Table:1 Weekly P R A N Sheet (For Kidney / Liver Patients) Arrow represents the expected outcome of the patients

Date	B.P.	Pulse ↔	↓Weight	↓Swelling (yes/no)	↑Urine Output (If<400ML)	↓Symptoms
1	HDT	HDT	HWI	HDT		
1. 2.	1. 2.	1. 2.	1. 2.			
HWI	HWI	HWI	HWI			
3. 4.	3. 4.	3. 4.	3. 4.			

Based on the improvement on the above parameters, the patients who participated in the study were required to taper down or phase out the drugs and various other medications which they were taking and to reduce the frequency of dialysis. Patients were advised to gradually increase the duration of HDT / HWI as the body adapted to the therapies and started showing positive improvement. Many patients could adhere to the GRAD system partially because of poor family support, lack of discipline because of discouragement from their dialysis centers, or other reasons.

What is Head Down Tilt (HDT)[9]

When a patient is made to lie down at 10 degrees angle of the head, it leads to a decrease in the Plasma Aldosterone and Renin hormones in the body. This results in a decrease in Plasma volume and subsequently, an increase sodium excretion from the body.

Scheme: 1

HDT 10[0]

HDT > 5°

↓

Decrease in Plasma Aldosterone

+

Plasma Renin

↓

Decrease in plasma volume

+

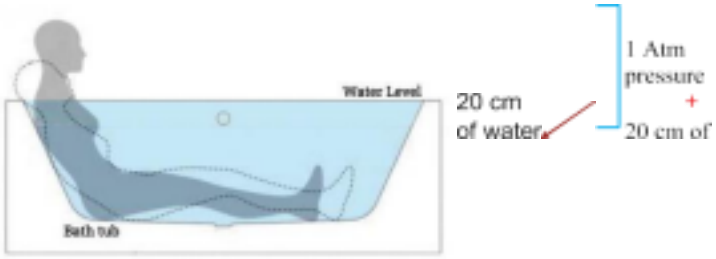
Increase in sodium excretion

What is Hot Water Immersion HWI (Avagaha Swed) 8

Scheme: 2

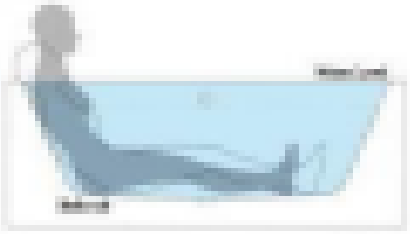
Physics of HWI

Negative Pressure Breathing



The physics of HWI (Lungs)[10]

When the patient sits in the bath tub, he experiences two different pressures, one being the atmospheric pressure on the body above neck (which is not immersed in water) and second being additional water pressure on the body below neck (which is immersed in water). This pressure difference causes the negative pressure breathing.



Physics of HWI (Heart)

Increase in stroke volume by 15 to 20%

Blood from lower limb gets redistributed to intra

thoracic area.

Scheme: 3

As a result of above the heart pumps an increased volume of blood causing redistribution of blood to upper body

Chemistry of HWI [11]

The above physiological change often leads to increase in the level of IL-6, Ilira, 1Hsp72 and NO and simultaneous decrease in the level of Norepinephrine, Vasopressin and Renin.

Scheme: 4

IL-6, Ilira	Norepinephrine
Hsp72 , iHsp72	Vasopressin
NO	Renin

HWI Causes Dialysis [12]

Scheme: 5

HWI Causes Dialysis

What is D.I.P. Diet

The D.I.P. (Disciplined and Intelligent diet) is being developed by Dr. Biswaroop Roy Chowdhury and through clinical trials-**1** and various case studies[13], it has been proven to be effective in reversing lifestyle diseases.

Steps to Design Your Personalized D.I.P. Diet:

Step-I

Till 12:00 noon, eat only fruits of three to four types including mango,banana, grapes, etc.

Minimum amount to be consumed = Your body weight in kg × 10 =gm

For example, a 70 kg person should consume at least 700 gm of 4types of fruits before 12 noon.

Step-II

Always eat your lunch/dinner in two plates. Plate 1 and Plate 2.

Scheme: 6

Table no. 2 Meal Plan for Lunch/Dinner

Plate	Contents	Quantity Calculation	Example (70 kg person)
Plate-1	Four types of raw vegetables (e.g., carrot, tomato, radish, cucumber).	Body weight (kg) × 5 (grams).	70 kg × 5 = **350 gm** of raw vegetables.
Plate-2	Home-cooked vegetarian food with negligible salt and oil.	Replace wheat and rice with millets. Take as much as desired.	E.g., cooked vegetables, lentils, or millet-based preparations.

Rules for Lunch and Dinner

1. **Begin with Plate-1:** Consume the calculated quantity of raw vegetables before moving to Plate-2.
2. **Complete Dinner by 7:00 P.M:** Ensure you finish your meal early to optimize digestion and metabolic benefits.
3. **Avoid Excess Salt and Oil:** Use minimal seasoning to enhance the health benefits of your meals.

Table 3: Guidelines to Avoid Snacking/Binge Eating

To Avoid	Recommended Alternatives
1. Packed food	1. Soaked nuts: Your weight (kg) = __ gm (e.g., 70 kg person can consume 70 gm of nuts in a day).
2. Refined food	2. Fruits: Consume plenty.
3. Dairy food/Animal foods	3. Coconut water: As you like.
4. Nutritional supplements	4. Sprouts: Your weight (kg) = __ gm.
5. Avoid drinking tea/coffee, especially before lunch	5. Coconut: As you like.
6. Never eat after 8:00 P.M.	6. Sunshine: At least 45 minutes daily.
7. NSAIDs	

Ayurvedic Perspective of CKD and Hot Water Immersion (HWI)

The human body and its nutritional element, which is food, are both derived from a combination of 5 elements (*Panchmahabhutas*). The various permutations and combinations of these five foundational elements of food and the body can be modified, adapted, incorporated, or eliminated to cause remedy or prevent certain conditions from arising in the body. This can then be transformed as *sajitha* or tissue in which specific substances or *Duttwahrasa* (specific nutrients) can be incorporated for boosting *sharirdhaatus*.

Vrukk or Kidney is made up of *rakta* and *meda* and is the end part of *Ahaarpaak*. The anatomical *Vrukk* is an organ and can be used to refer to the renals, suprarenals, ureters, and bladder in different contexts. *Vrukk* is the supplementary organ of *koshtha* and is located in the *koshtha*.

Vrukk (Kidneys) and *Mutravaha Strotas* (Urinary Tract) or nephrons are microchannels for the production and storage of urine.

Pathogenesis (*Samprapti*) of CKD / *Mutraghat* in Ayurveda

According to Ayurveda, chronic kidney disease resembles *Mutraghat* or *Aama* in *Mutravaha Strotas*. *Aama* in *Mutravaha Strotas* hampers the function of the kidney. The *Doshas* involved are primarily *Vata* and *Kapha*.

Mutraghata:

- **Mutra-Kshaya:** Dehydrated and fatigued state.
- **Pathogenesis:** Even though a *Ruksha* person has no *Pitta*-aggravating factors, *Pitta* along with *Vata* leads to the drying up of the urine (*Mutrashoshana*).

Clinical Features of *Mutrashoshana*:

- Burning micturition.
- Painful micturition.
- Troublesome small quantity of urine.

Treatment of *Vrukk Dosha* Mentioned in Charaka and Sushruta Samhita

Avagaha Sweda:[13]

Avagaha Sweda is the process of submerging the patient's body into medicated liquid or decoction up to the neck. Ayurvedic therapy or its incorporation or combination with other kinds of therapies is primarily aimed at maintaining homeostasis in the system by eliminating excess or undesirable elements and aiding in the absorption of essential elements by the body.

In a tub with medicated *Dravadravya*, the patient is seated comfortably such that their body's lower part is submerged above the umbilicus level. By submerging the body up to the neck, *Sarvanga Avagaha Sweda* must be done. Some amount of the liquid should be replaced by warm *Dravadravya* when the temperature of the medicated *Dravadravya* cools down, keeping the temperature uniform.

The patient's body should be wiped with tissue paper or a towel after the prescribed time. By employing a dry towel, *talam* should be wiped off, and prescribed *choornas* like *Rasnadi*

Choorna or *Kacchooradi Choorna* should be applied. Finally, the patient rests for half to one hour and then bathes with lukewarm water.

Charaka Samhita on *Avagaha Sweda*[14]

Charaka Samhita mentions the inclusion of *Avagaha Sweda* as an effective treatment. Fomentation by immersion in a tub filled with *Vata*-alleviating decoctions, milk, oil, ghee, meat juices, or hot water is termed as *Avagaha*.

Indications of Swedana[15]

Swedana is beneficial for a wide range of conditions, including:

- Rhinitis, cough, hiccups, breathing difficulties, heaviness of the body, earache, headache, cervical pain, hoarseness of voice, and choking sensation in the throat.
- Facial palsy, monoplegia, quadriplegia, hemiplegia, prostrated postures, abdominal flatulence, constipation, urinary retention, excessive yawning, stiffness of flanks, dorsum, lumbar region, and abdomen.
- Sciatica, dysuria, scrotal enlargement, body ache, pain and stiffness in the dorsum of the foot, knee, thigh, and calf.
- Edema, severely painful radiculopathy, indigestion, chills, shivering, subluxation of the ankle, contractures, convulsions, colicky pains, stiffness, heaviness, numbness, and similar disorders throughout the body.

Varieties of Swedana

There are thirteen varieties of fomentation (*Swedana*):

1. Sankara
2. Prastara
3. Nadi
4. Parisheka
5. Avagaha
6. Jentaka
7. Ashmaghna
8. Karshu
9. Kuti

10. Bhu
11. Kumbhika
12. Kupa
13. Holaka

Among these, the 13 varieties of *Saagni Sweda* include *Avagaha*.

Avagaha Swedana

Avagaha Swedana is classified as *Saagni Sweda* because it uses heated fluids prepared with medicines after contact with heat or fire (by heating or boiling).

Materials for Avagaha Sweda (Tub Fomentation):

- Decoctions (*Kwatha*) prepared with herbs possessing *Vatahara* (Vata-alleviating) properties.
- *Siddha Ksheera*: Milk medicated with *Vatahara* decoctions.
- *Taila*: Herbal oil for specific ailments.
- *Ghrita*: Medicated ghee.
- *Mamsarasa*: Meat soup.
- *Ushnodaka*: Warm water.

In this study, warm water was used for *HWI (Hot Water Immersion)*.

Procedure:

1. Administer *Abhyanga* (herbal oil massage) using Vata-alleviating oils.
2. Seat the patient in a tub filled with warm *Vatahara Dravadravya* up to the level of the umbilicus or neck.
3. Replace a portion of the liquid with warm *Dravadravya* to maintain a uniform temperature.
4. After the session, dry the patient using a towel and apply powders like *Rasnadi Choorna* or *Kacchooradi Choorna*.
5. Allow the patient to rest for 30 minutes to 1 hour, followed by a lukewarm water bath.

Duration:

Avagaha Sweda is administered for 1 to 4 *Muhurtas* (48 to 192 minutes) or until signs of proper *Swedana* (sweating) are observed.

Historical Significance of Hot Water Immersion (HWI) or Avagaha Sweda

Hot water immersion has been a significant part of human rituals and practices across civilizations, serving sanitary, hygienic, therapeutic, and spiritual purposes.

- **Indus Valley Civilization:** Communal baths like the Great Bath at Mohenjo-Daro.
- **Sumerian, Egyptian, Greek, and Roman Civilizations:** Emphasized hot and cold water baths.
- **European Traditions:** Weekly hot tub rituals for health and hygiene before Sunday church.

In Ayurveda, this practice evolved into *Avagaha Sweda*, emphasizing its therapeutic benefits for various health conditions.

Study Site and Participants

The GRAD study on dialysis patients was a prospective cohort study conducted from August 2021 to March 2022.

- **Participants:** 100 dialysis patients from 22 states in India, primarily from Delhi, Punjab, Haryana, and Rajasthan.
- **Training Locations:**
    - **24%:** Visited the Hospital and Institute of Integrated Medical Sciences (HIIMS) at Dera Bassi, Punjab, Jaipur, and Jodhpur, Rajasthan for in-person training with their families.
    - **76%:** Received online training via video tutorials to implement the GRAD system at home.
- Patients followed the GRAD system (either fully or partially) for an average of 100 days.

Evaluation of Study Participants

Trained research assistants obtained informed consent prior to participant enrollment. Data collection included:

- **Demographics:**
    - Age, gender, education, employment status.
    - Lifestyle behaviors (alcohol use, cigarette smoking, physical activity levels).
    - Dietary habits, including frequency and quantity of daily fruit and vegetable consumption, and table salt intake.
- **Medical History:**
    - Duration of CKD diagnosis.
    - Doses and types of medications taken at the beginning of the study.

Responses were gathered through interviews and assessed using a structured questionnaire to represent the demographic profile of the patient group under study.

Table:4 Female or Male

Age	Gender		Total
	Female	Male	
15-20	2	2	4
20-25	1	3	4
25-30	3	1	4
30-35	2	3	5
35-40	4	9	13
40-45	5	14	19
45-50	7	7	14
50-55	3	6	9
55-60	3	5	8
60-65	1	2	3
65-70	1	9	10
70-75	2	0	2
75	1	4	5

Table 5: Anthropometric Evaluations

Parameter	Details
Weight	Recorded for all participants.
Height	Recorded in meters for all participants.
Body Mass Index (BMI)	Derived by dividing the weight (kg) by the height squared (m^2).

Ethics Statement

- Participants provided written informed consent to participate and adopt the GRAD system.
- For minors (n=4), consent was signed by guardians or caretakers.
- Participants were free to withdraw from the study at any time without any impact on their health care.

Data Analysis

Study Groups:

Data from 100 eligible patients was divided into two groups based on adherence to the GRAD system over an average of 100 monitoring days:

Table no. 6 Criteria

Group	Criteria	Number of Participants
Group 1	Full adherence to GRAD system:	**28**
	- **HDT + HWI:** 4 hours for more than 80% of monitoring days.	
	- **DIP Diet:** 100% adherence for more than 90% of monitoring days.	
Group 2	Partial adherence to GRAD system:	**72**
	- **HDT + HWI:** 4 hours for less than 80% but more than 50% of monitoring days.	
	- **DIP Diet:** 100% adherence for less than 90% but more than 50% of monitoring days.	

Exclusion Criteria:

- Participants adhering to the GRAD system less than 50% of the time for **HDT + HWI** or **DIP Diet** were excluded from the study.

Table 7: Improvement in Urine Output by Adherence to GRAD System

Adherence Level	Number of Patients	Improvement in Urine Output (% of patients)
Full Adherence	28	[Data specific to improvement in urine output]
Partial Adherence	72	[Data specific to improvement in urine output]

Table:8 - Effect on Urine

Effect on Urine	Frequency	Percent	Cum.
More	43	43.00	43.00
Same	39	39.00	82.00
Reduced	18	18.00	100.0
Total	**100**	**100.0**	

In table 4 denotes, to test if those who followed GRAD fully exhibited greaterimprovement than among those who followed it partially.

Table:9 - Urine

Urine		
GRAD	**Increased**	**Total**
Fully	13 (46%)	28
Partially	30 (42%)	72
Total	43 (43%)	100

In table 5 denotes, the group following GRAD fully have shown higher improvement in urination. In table 6 represents, Representation of the Patients who witnessed improvement in incidence of swelling because of adherence to the GRAD system

Representation of the Patients who witnessed improvement incidence of swelling as a result of adherence to the GRAD system

Table:10 - Effect on Swelling

Effect on Swelling	Frequency	Percent	Cum
Never existed	36	36.00	36.00
Swelling eliminated	23	23.00	59.00
Improved	18	18.00	77.00
Same	13	13.00	90.00
Deteriorated	10	10.00	100.00

Table:11 - Swelling

Swelling		
GRAD	**Reduced/eliminated**	**Tot**
Fully	16 (57%)	28
Partially	24 (33%)	72
Total	**40 (40%)**	**100**

In table11 denotes, it can be clearly seen that the subjects who followed GRAD fully exhibited higher improvement in swelling (in terms of both reduction and elimination of swelling).

Subjects fully following the GRAD system showed higher improvement in terms of reduction or elimination of swelling.

Table 12: Effect on Weakness

Effect on Weakness	Frequency	Percent	Cumulative Percent
Reduced	47	47.00	47.00
Increased	24	24.00	71.00
No weakness ever reported	16	16.00	87.00
Same	13	13.00	100.00
Total	100	100.00	100.00

Table 13: Correlation Between Weakness and GRAD Adherence

GRAD Adherence	Reduced Weakness	Total
Fully	15 (54%)	28
Partially	32 (44%)	72
Total	47 (47%)	100

Fully following the GRAD system resulted in a higher reduction of weakness compared to partial adherence.

Table 14: Effect on Breathlessness

Effect on Breathlessness	Frequency	Percent	Cumulative Percent
No breathlessness	47	47.00	47.00
Reduced	33	33.00	80.00
Increased	16	16.00	96.00
Same	4	4.00	100.00
Total	100	100.00	100.00

Table 15: Correlation Between Breathlessness and GRAD Adherence

GRAD Adherence	Reduced Breathlessness	Total
Fully	9 (32%)	28
Partially	24 (33%)	72
Total	33 (33%)	100

The partially following group showed slightly better improvement in breathlessness, though the difference is statistically insignificant.

Table 16: Effect on Dialysis

Effect on Dialysis	Frequency	Percent	Cumulative Percent
Reduced	49	49.00	49.00
Same	28	28.00	77.00
Stopped	21	21.00	98.00
Ambiguous	2	2.00	100.00
Total	100	100.00	100.00

Table 17: Correlation between Dialysis and GRAD Adherence

GRAD Adherence	Improvement	Total
Fully	21 (75%)	28
Partially	49 (49%)	72
Total	70 (70%)	100

Fully following the GRAD system showed significantly higher improvement in reducing dialysis dependence.

Table 18: Effect on Vomiting

Effect on Vomiting	Frequency	Percent	Cumulative Percent
No vomiting	56	56.00	56.00
No longer experienced	21	21.00	77.00
Reduced	12	12.00	89.00
Increased	7	7.00	96.00
Same	4	4.00	100.00
Total	100	100.00	100.00

Table 19: Correlation between Vomiting and GRAD Adherence

GRAD Adherence	Reduced Vomiting	Total
Fully	11 (39%)	28
Partially	21 (29%)	72
Total	32 (32%)	100

The fully following group showed higher improvement in vomiting, but the difference is statistically insignificant.

Table 20: Effect on Itching

Effect on Itching	Frequency	Percent	Cumulative Percent
No itching	48	48.00	48.00
No longer experienced	22	22.00	70.00
Reduced	12	12.00	82.00
Same	11	11.00	93.00
Increased	7	7.00	100.00
Total	100	100.00	100.00

Table 21: Correlation Between Itching and GRAD Adherence

GRAD Adherence	Improvement in Itching	Total
Fully	10 (36%)	28
Partially	14 (19%)	72
Total	34 (34%)	100

Fully following the GRAD system showed significantly higher improvement in reducing itching.

Table 22: Effect on Delirium

Effect on Delirium	Frequency	Percent	Cumulative Percent
No problem	76	76.00	76.00
Increased	7	7.00	83.00
Same	7	7.00	90.00
No longer experienced	6	6.00	96.00
Reduced	4	4.00	100.00
Total	100	100.00	100.00

Table 23: Correlation between Delirium and GRAD Adherence

GRAD Adherence	Reduced Delirium	Total
Fully	1 (4%)	28
Partially	9 (1%)	72
Total	10 (10%)	100

Fully following the GRAD system showed higher improvement in delirium.

Table 24: Effect on Seizures

Effect on Seizures	Frequency	Percent	Cumulative Percent
No seizures	92	92.00	92.00
No longer experiencing	5	5.00	97.00
Still continuing	2	2.00	99.00
Deteriorated	1	1.00	100.00
Total	100	100.00	100.00

Table 25: Correlation between Seizures and GRAD Adherence

GRAD Adherence	Reduced Seizures	Total
Fully	2 (7%)	28
Partially	3 (4%)	72
Total	5 (5%)	100

Fully following the GRAD system showed higher improvement in seizures.

Table 26: Financial Impact

Change in Expenditure	Frequency	Percent
Reduced	65	65.00
Constant Expenditure	27	27.00
Paid by Govt./Insurance	8	8.00
Total	100	100.00

Subjects experienced a marked decrease in expenditure on treatments, dialysis, medications, and hospital visits.

Table 27: Recommendation for GRAD System

Will They Recommend?	Frequency	Percent	Cumulative Percent
Yes	100	100.00	100.00
No	0	0.00	100.00
Total	100	100.00	100.00

All participants recommended the GRAD system.

Results

A total of 100 dialysis patients were successfully followed between August 2021 and March 2022. The patients were grouped as follows:

- **Group I**: Fully followed the GRAD System (28 patients, 28%).

- **Group II**: Partially followed the GRAD System (72 patients, 72%).

Additionally, 53 patients were disqualified as they either failed to provide regular data or did not qualify for either group.

Group I: Total Patients = 28

Table 28: Dialysis Status

Dialysis	**Frequency**
Dialysis Free	2
Partially Dialysis Free	7

Table 29: Dependence on Drugs

Dependence on Drugs	**Frequency**
Totally Drugs Free	1
Partially Drugs Free	1
No Change in Drugs	3

Table 30: Symptomatic Relief (Vomiting, Breathlessness, Itching, Weakness)

Symptomatic Relief	**Frequency**
More than 90% Relief	17
50% to 89% Relief	8
Relief Less than 50%	3
No Relief	0

Table 31: Recommending GRAD System

Recommendation	**Frequency**
I will recommend to others	2
I will not recommend to others	0

Table 32: Reduction in Financial Burden

Reduction in Financial Burden	Frequency
Financial Burden Reduced to 70%	2
Financial Burden Reduced below	7
No Reduction in Financial Burden	0

Group II: Total Patients = 72

Table 33: Dialysis Status

Dialysis Status	Frequency
Reduced Dialysis Frequency	42
No Change in Dialysis	28
Ambiguous	2

Table 34: Dependence on Drugs

Dependence on Drugs	Frequency
Totally Drugs Free	11
Partially Drugs Free	27
No Change in Drugs	34

Table 35: Symptomatic Relief (Vomiting, Breathlessness, Itching, Weakness, Swelling)

Symptomatic Relief	Frequency
More than 90% Relief	33
50% to 89% Relief	12
Relief Less than 50%	11
No Relief	2
Worse	14

Table 36: Recommend GRAD System to Others

Recommendation	Frequency
I will recommend to others	72
I will not recommend to others	0

Table 37: Reduction in Financial Burden

Reduction in Financial Burden	Frequency
Financial Burden Reduced to 70%	2
Financial Burden Reduced below	1
No Reduction in Financial Burden	2
Paid by Govt. / Insurance	8

Discussion

This is a pioneering study aimed at assessing the benefits of the GRAD System in reversing CKD among dialysis patients. The GRAD System is an unusual amalgamation of the knowledge of human physical engineering, specifically the application of gravitational force and hydrostatic pressure on the human body, with modern medical science principles aimed at finding a cure for CKD patients. Additionally, there is an Ayurvedic angle to the system, derived from thousands of years of Ayurvedic studies and deep knowledge recorded in ancient Indian treatises. This has been verified and found accurate and reliable after employing modern verification methods.[16]

Dr. Biswaroop Roy Chowdhury, the developer of the GRAD System, has an impressive, wide-ranging, and comprehensive academic background. This has enabled him to draw upon various disciplines, sciences, and subjects to offer a potent combination of therapies and treatments for CKD reversal, among other breakthroughs in medical practice and theory.[17]

In addition to being an engineering graduate and postgraduate specializing in Diabetes, Dr. Chowdhury has successfully acquired a PhD in Diabetes care. The rich diversity and innate depth of his education have helped him combine the physics of the surroundings with the

chemistry of the human body and the biology of the innate bodily ecosystem. This combination has demonstrated the ability to reactivate, energize, and resuscitate even a failing kidney. As evident from the data, CKD patients could successfully lower the disease burden partially or fully. The GRAD System has immense potential to revolutionize the treatment of lifestyle-related illnesses.[18]

The GRAD System can be safely followed with minimal resources in the privacy, security, and convenience of a patient's home, even in rural areas, without requiring elaborate equipment or expensive medications.

However, only 28% of the patients could fully adhere to the GRAD System, highlighting the need to create a GRAD System-friendly environment, reliable medical ecosystems, and viable infrastructure. This would make following the HWI, HDT, and D.I.P. Diet more convenient and enjoyable. The innovative efforts of patients, such as creating home-based GRAD Dialysis tubs, underscore their strong belief in the GRAD System. These innovations are encouraging for the widespread dissemination and increased application of the GRAD System globally.[19]

Challenges Encountered: 90% of the patients reported resistance and non-cooperation from their dialysis centers when they began reducing dialysis frequency in response to symptom improvements. This resistance, likely due to financial motives, led to discontinuation of the GRAD System by over one-third of participants. To address this, training, awareness, and orientation programs for medical staff, caretakers, patients, and technicians are essential to ensure the proper application and understanding of the GRAD System across the country.

Conclusion

The GRAD System can be recommended as an effective method for reversing CKD among mild, moderate, and severe cases. It is also an effective alternative to dialysis and kidney transplantation. Notably, no side effects or adverse events were reported during the entire study.

Scope for Further Research

1. **Impact of Hot Tub Usage on CKD Prevalence:** Investigate the prevalence of kidney disease in Western nations where hot tubs are a part of daily rituals, comparing it with countries like India, where bath tubs are not commonly used.

2. **Incorporating Ayurvedic Substances in HWI:** Explore the effects of adding oils, *vata*, *pitta*, and *ghrita* substances, as recommended in the Avagaha Sweda process, on the success of the GRAD System.
3. **Modern Spa Integration:** Introduce Avagaha Sweda into modern spa culture to enhance spa treatments' efficacy and therapeutic value.
4. **Reversal of Comorbid Conditions:** Conduct further studies on the GRAD System's impact on reversing diabetes, cardiovascular diseases, and other comorbidities.

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