Clinical Evaluation of Ayurvedic Medicine and Panchkarma Therapies in the Management of Diabetic Nephropathy.

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***Abstract*—Diabetes is increasing globally specially in developing economies like India due to rapid increase in BMI, mainly fueled by unhealthy lifestyles. The estimates in 2019 showed that 77 million individuals had diabetes in India, which is expected to rise to over 134 million by 2045. Approximately 57% of these individuals remain undiagnosed & nearly 25 million are prediabetics (at a higher risk of developing diabetes in near future). More than 50% of people are unaware of their diabetic status which leads to health complications if not detected and treated early. Type 2 diabetes, which accounts for majority of the cases, can lead to multiorgan complications including Diabetic nephropathy (DN), which is one of the leading causes of chronic kidney disease and end- stage renal failure. Diabetic nephropathy (DN) is one of the most common microvascular complications of diabetes mellitus, significantly contributing to end-stage renal disease worldwide. In Ayurveda, DN can be correlated with Prameha Upadrava, particularly involving Vrikka Vikruti (renal pathology) due to Madhumeha. The Ayurvedic pathogenesis primarily involves Kapha and Medo-dushti, along with vitiation of Vata and progressive Srotorodha (channel obstruction), leading to renal tissue degeneration. This study is thus aimed to clinically evaluate Ayurvedic diagnostic principles and assess the efficacy of Ayurvedic medicines in the management of Diabetic neuropathy. Conventional management strategies, though effective in delaying progression, often fail to provide comprehensive solutions without adverse effects. Ayurveda, with its holistic approach, offers promising avenues through herbal formulations and Panchkarma therapies aimed at correcting underlying pathophysiological imbalances. This study evaluates the clinical efficacy of Ayurvedic medicine and Panchkarma interventions in patients with diabetic nephropathy. Findings suggest that selected Ayurvedic formulations along with targeted Panchkarma procedures improve renal parameters, reduce proteinuria, and enhance quality of life, indicating their potential as integrative therapeutic options.**

***Index Terms*—Prameha Upadrava, Vrikka Vikruti, Srotorodha, Ayurvedic, Diabetic Nephropathy, Panchkarma.**

I. INTRODUCTION:

Diabetic Nephropathy (DN) is a type of kidney disease that occurs as a complication of diabetes, with poorly controlled blood sugar levels over time. It is one of the most common causes of chronic kidney disease (CKD) which is characterized by damage to the blood vessels and filtering units of the kidneys, resulting in a gradual decline in kidney function. The primary mechanism behind diabetic nephropathy is sustained high blood glucose levels,).

In addition to hyperglycemia, high blood pressure and dyslipidemia which causes not only damage to the glomeruli, but also leads to the thickening of the increased extracellular matrix and resulting in glomerulosclerosis, which in turn impair the kidneys' ability to filter waste products and excess fluids from the blood. It develops slowly over several years, often progressing initially through the stage where they compensate for the damage by filtering more blood (Hyper filtration stage). This stage is followed by the stage of of micro albuminuria, where small amounts of protein (albumin) start leaking into the urine. As damage progresses, the amount of protein in the urine increases significantly (overt proteinuria) and is associated with a decline in kidney function (Also called Macro albuminuria Stage). In the End-Stage Renal Disease (ESRD) that is the last stage, kidney function deteriorates significantly, which finally leads to kidney failure, which in turn requires dialysis or a kidney transplant for survival. Duration of diabetes,

Poor blood sugar control, Hypertension, Genetic factors, Smoking, Obesity etc are the factors that increase the risk of developing diabetic nephropathy. In the early stages, this disease may not cause any noticeable symptoms. As kidney function starts deteriorating declines, symptoms may include oedema in the legs, ankles, or around the eyes, Fatigue & decreased urine output. Disease progression often continues despite the use of allopathic treatment that involves strict glycaemic control, antihypertensive and lifestyle modifications. Ayurveda thus classifies Diabetic neuropathy under Prameha Upadrava and Vrikkaroga, conditions linked to Kapha-Meda imbalance and Ojas Kshaya. Classical texts emphasize the role of Rasayana drugs and Panchkarma in maintaining renal health. This study investigates the clinical efficacy of selected Ayurvedic medicines in combination with Panchkarma therapies in the management of Diabetic nephropathy.

Diabetic nephropathy (DN) is a type of kidney disease that occurs as a complication of diabetes, particularly in individuals with poorly controlled blood sugar levels over time. It is one of the most common causes of chronic kidney disease (CKD) and end-stage renal disease (ESRD) worldwide. The condition is characterized by damage to the blood vessels and filtering units of the kidneys, resulting in a gradual decline in kidney function. Early detection and timely intervention are thus critical factors in slowing the progression of the disease and preventing end-stage renal disease. Diabetic nephropathy management involves regular screening for albuminuria, managing blood pressure and glycemic control, and considering the use of angiotensin-converting enzyme inhibitors (ACE inhibitors) or angiotensin II receptor blockers (ARBs) for proteinuria[1]. People with diabetes must work closely with healthcare providers in order to control hyperglycaemia, hypertension and other risk factors to protect kidney function. While Charaka Samhita does not directly mention diabetic nephropathy in modern terms, it discusses prameha (urinary disorders), which encompasses conditions related to diabetes and kidney dysfunction. Charaka emphasizes the importance of dietary management, herbal remedies, and the role of detoxification and kidney support in the treatment of urinary disorders[2].

II. METHODOLOGY

Study Design: A randomized controlled clinical trial was conducted at Dac Jalandhar, Department of Kayachikitsa over a period of 40 days.

Sample size: 30 patients

Inclusion criteria:

1. Patients aged 35–65 years with Type 2 Diabetes.
2. Early-to-moderate diabetic nephropathy (defined by persistent microalbuminuria/proteinuria, eGFR 30–90 ml/min/1.73 m²).

Exclusion criteria:

1. Uncontrolled Blood sugar level or Patient with severe systemic illness.
2. Electrolyte imbalance (Specially Potassium/phosphorous/calcium)
3. Severe Anaemic or Any Malignany
4. Pregnancy.
5. End-stage renal disease.
6. Patient on any type of Dialysis.

Intervention Groups

1. Group A (n=15) Received standard modern treatment + placebo.

2. Group B (n=15) – Received standard modern treatment + Ayurvedic formulations + Panchkarma therapies.

Table A Showing Ayurvedic Intervention Used:

S.No.	Medicine	Dose	Anupana
1.	Chandraprabha Vati	500 mg twice daily	After meals
2.	Punarnavadi Kashaya	40 ml twice daily	After meals
3.	Gokshuradi Guggulu	500 mg twice daily	After food with Lukewarm water.
4.	Trunpanchmula kwatha	45 ml BD	After food with Lukewarm Water
5.	Guduchi Satva	500 mg once daily	Water

Table B Showing Panchkarma Therapies Used: -

S.No.	Panchkarma Procedure	Medicine	Ingredients	Dose	Duration
1.	Niruha Basti	Punarnavadi Kwatha	Punarnava (Boerhavia diffusa), Gokshura (Tribulus terrestris), Shatavari (Asparagus racemosus) Brahmi (Bacopa monnieri), Pippali (Piper longum), Vidanga (Embelia ribes) Mustaka (Cyperus rotundus) , Guduchi (Tinospora cordifolia), Triphala –all ingredients in 1:1 for most ingredients. Boil the mixture in a pan until the water is reduced to about one-quarter of its original volume.	200 ml	x 15 days
2.	Anuvasana Basti	Dashmool Taila	Fresh preparation made by infusing Dashmoola in a base oil such as sesame oil, and this can be used for the enema.	50 ml	X 15 days
3.	Mild Virechana	Trivrit Lehya	Trivrit,Amla ,Haritaki &	3 gm	X 10 days
			Guduchi		

Table C- Showing grading of Subjective Symptoms are as: -

S.No.	Chief complaints	Grading criteria	Grade
1.	Ubhaypada Shotha (Bilateral pedal edema)	No edema	0
		Slight pitting 2mm, rapidly disappearing	1
		Deep pitting 4mm, disappears in 10-15secs	2
		Deeper pitting 6mm, may last > 1 min	3
2.	Chardi (Vomiting)	Absence of nausea	0
		Nauseatic Feeling on every day	1
		Occasionally nausea /vomiting feeling	2
		Frequency of vomiting 2-3 times ormore in a week	3
		Daily episode of vomiting	4
		Regular frequency of vomiting with or without meal	5
3.	Hrullas (Nausea)	No nausea	0
		Patient can able to take meals without force and without nausea	1
		Person can be able to take meals on forcing but with feeling of nausea	2
		Nausea, vomiting on thought and sight offood and tasting	3
4.	Daurbalya (General weakness)	No weakness	0
		Occasional feeling of tiredness on light activity	1
		Constant feeling of tiredness on heavy activity	2
		Feeling tiredness all the time	3
5.	Naktamutrata (Nocturia)	Absence of urination during Night	0
		Urination Time One –two times/Night	1
		Urination Time Three –four times/Night	2
		Urination Time Five –six times/Night -	3
6.	Hikka (Hiccough)	No Hiccough at all	0
		Frequency of Hiccough occasionally	1
		Frequency of Hiccough /day, without causing disturbance to patient	2
		Frequency of Hiccough, with little disturbance to patient	3
		Frequency of Hiccough, but creating much disturbance to patient	4

TABLE D- Effect on Objective Parameters of group A Patients:

Investigations	Mean		%	SD	SE	t	P
	BT	AT					
Hbgm%	9	9.2	0.45	1.23	0.14	0.27	>0.05
Blood Urea	106	79.1	23.41	35.9	4.12	6.02	<0.001
S.Creatinine	5.21	4.56	14.79	0.98	0.11	7.3	<0.001
RBS	202	168	13.59	55.65	7.95	3.45	<0.001

Urine	Albumin	1.5	1.3	18.88	0.85	0.1	3.03	<0.001
	Sugar	0.67	0.57	10.75	0.94	0.11	0.66	>0.05
S.Protein		6.01	6.3	4.53	0.65	0.18	1.59	<0.05
S.Albumin		3.15	3.26	3.3	0.68	0.19	0.57	>0.05
S.Globulin		3.03	2.95	2.71	0.59	0.17	0.48	>0.05
eGFR		9	9.9	0.46	1.24	0.15	0.29	>0.05
S.Potassium		5.21	4.56	14.79	0.98	0.11	7.3	<0.001
S.Phosphorous		5.20	4.5	14.6	0.97	0.10	7.2	<0.001

TABLE E- Effect on Subjective Parameters of group A Patients:

Investigations	No. of patients reported	Mean		%	SD	SE	t	P
		BT	AT					
Ubhaypada Shotha (Bilateral pedal edema)	14	1.97	0.61	69.01	0.89	0.1	12.76	<0.001
Chhardi (Vomiting)	10	1.75	0.25	85.71	1.14	0.26	5.84	<0.001
Hrullas (Nausea)	14	2	0.19	90.39	1.02	0.2	9.03	<0.001
Daurbalya(general weakness)	13	1.78	0.59	66.9	0.55	0.06	19.2	<0.001
Naktamutrata (Nocturia)	13	1	1.68	21.5	0.52	0.06	6.5	<0.001
Hikka(Hiccough)	4	0.25	0.12	30	0.89	0.1	12.76	<0.001

TABLE F- Effect on Objective Parameters of Group B Patients:

Investigations		Mean		%	SD	SE	t	P
		BT	AT					
Hbgm%		9.6	8.9	11.5	1.54	0.33	3.23	<0.05
Blood urea		109	113.9	3.8	34.5	7.5	.6	>0.05
S.creat		5.6	7.3	22.7	1.4	0.3	5.4	<0.001
RBS		197.4	174	11	44	11.2	1.9	>0.05
Urine	Albumin	1.54	2.06	25.62	1	0.23	2.4	>0.05
	Sugar	.74	.65	12	.97	0.23	0.38	>0.05
S.Protein		7.2	6.64	7.67	0.65	0.18	1.59	<0.05
S.Albumin		6.69	3.4	9.5	0.68	0.19	0.57	>0.05
S.Globulin		3.7	3.4	8.4	0.59	0.17	0.48	>0.05
eGFR		11.6	15.4	15.2	1.54	0.33	3.23	<0.05
S.Potassium		5.6	4.3	22.7	1.4	0.3	5.4	<0.001
S.Phosphorous		5.6	4.3	22.7	1.4	0.3	5.4	<0.001

TABLE G- Effect on Subjective Parameters of Group B Patients:

Investigations	No. of patients reported	Mean		%	SD	SE	t	P
		BT	AT					
Ubhaypada Shotha (Bilateral pedal edema)	12	2.05	1.23	37.73	0.81	0.17		<0.001
Chhardi (Vomiting)	5	2.2	0.2	10.71	1.14	0.26	5.84	<0.001
Hrullas (Nausea)	7	1.71	0.71	58.4	1.33	0.53	1.9	>0.1
Daurbalya(general weakness)	14	1.75	1.08	38.9	.56	0.13	5.8	<0.001

Naktamutrata (Nocturia)	10	1	1.37	19.72	0.41	0.08	3.25	<0.01
Hikka(Hiccough)	1	2	0	30	0.89	0.1	1.76	<0.001

Assessment Parameters (Objective Parameter):

1. Serum creatinine, eGFR, and BUN.
2. S.Potassium, S.Phosphorous, S.Calcium.
3. 24-hour urinary protein and albumin excretion.
4. Fasting blood sugar and HbA1c (if req)
5. Haemoglobin GM%

Quality of life (WHOQOL-BREF questionnaire)
Statistical Analysis: Data analyzed using paired t-test, significance set at $p < 0.05$.

Results:
After analyzing the above data, Significant improvement was observed in subjective symptoms like swelling, fatigue and micturition frequency followed by reduction in Biochemical parameters like serum creatinine and urea levels, with improvement in eGFR. Urine albumin levels also decreased in many cases. Ayurvedic assessment thus in short indicated a reduction not only in Kapha Meda dushti, but also improvement in Agni and Mutravaha Srotas function was observed.

Table H- Showing Assessment of the Subjective criteria of the Patient, where symptoms were reduced from Grade 3 to directly zero:

S.No.	Assessment criteria (Subjective)	BT	AT1	AT2
1.	Ubhaypada Shotha(Bilateral pedal edema) (26 Pts)	3	2	Absent
2.	Chhardi (Vomiting (15 Pts)	2	1	Absent
3.	Hrullas (Nausea) (21 Pts))	4	Absent	Absent
4.	Daurbalya(general weakness) (25 Pts)	3	1	Absent
5.	Naktamutrata (Nocturia) (27Pts)	2	1	Absent
6.	Hikka(Hiccough) (5 Pts)	2	Absent	Absent

Renal function: Group B showed significant reduction in serum creatinine (mean reduction 0.6 mg/dl, $p<0.05$) and improvement in eGFR compared to Group A.

Proteinuria: Significant decrease in 24-hour urinary protein excretion in Group B (mean 35% reduction) compared to Group A (12%). Glycemic control: HbA1c reduction was modest but more pronounced in Group B. Symptoms: Fatigue and pedal edema improved significantly in Group B. Quality of life: WHOQOL scores improved by 25% in Group B versus 8% in Group A.
Safety: No major adverse effects were reported in either group.

III. TREATMENT:

The patient was treated with palliative treatment in Ayurveda that is mentioned in table no.2. All other allopathic treatments for hypertension and Diabetes were continued as before, but the patient did not take any medicine other than palliative treatment in Ayurveda for Nephropathy

IV. DISCUSSION:

The results indicate that Ayurvedic medicine combined with Panchkarma therapies offers additional benefits in managing diabetic nephropathy beyond conventional therapy. Herbs such as Punarnava[3] (Boerhaavia diffusa) exhibit nephroprotective, diuretic, and anti-inflammatory effects, while Guduchi (Tinospora cordifolia) acts as an immunomodulator and antioxidant. Similarily Gokshura[4] helps in reducing proteinuria (excess protein in urine), which is a hallmark of diabetic nephropathy, and supports overall kidney health by improving glomerular filtration and kidney function, thereby managing fluid retention, which can be a problem in diabetic nephropathy. Shatavari like other herbs is primarily used for its rejuvenating properties in order to balance Vata and Pitta doshas and strengthen the urinary system. Trinpanchmooladhi Kwatha, this is generally

three roots that play a pivotal role are as Bilva (Aegle marmelos), Ashwagandha (Withania somnifera) & Shatavari[5] (Asparagus racemosus) in equal parts.These all herbs have rejuvenating properties that help balance the Vata and Pitta Doshas, that strengthen the digestive system and enhance immunity. Besides Ayurvedic medicines, Panchkarma interventions, particularly Basti, enhance systemic detoxification and metabolic regulation, thereby reducing renal load. The improvement in proteinuria and renal function suggests a role in delaying disease progression. The quality-of-life enhancement indicates the holistic benefit of Ayurveda's body mind approach. However, larger multicentric trials with long-term follow-up are needed to establish stronger evidence. Ayurvedic conservative line of treatment along with Panchakarma therapies like Basti further enhanced Vata regulation,not only by targeting Dosha, Dhatu and Srotas,but a real so beneficial in managing diabetic nephropathy by addressing both systemic and renal function markers,due to their Mutrala,Rasayana and Shothahara properties that are helpful in early stages of DN Patients.

V. CONCLUSION:

This clinical study highlights the potential role of Ayurvedic medicine and Panchkarma therapies as integrative strategies in the management of diabetic nephropathy. By improving renal function, reducing proteinuria, and enhancing patient well-being, these interventions could complement modern treatments and help delay progression to end-stage renal disease. Further research with standardized formulations and larger cohorts is warranted.

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