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A CLINICAL STUDY ON THE HYPOLIPIDEMIC EFFECT OF KUSHTHA (SAUSSUREA LAPPA, C.B. CLARKE) CHURNA IN MEDOROGA (OBESITY)

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ABSTRACT

Background: *Medoroga* (obesity) is a metabolic condition characterized by excessive accumulation of *Meda Dhatu* (adipose tissue), leading to dyslipidemia. In *Ayurvedic* texts, it is described as a disorder involving *Kapha* and *Meda*, with *Agnimandya* (digestive dysfunction) as a key factor. *Kushtha* (*Saussurea lappa C.B. Clarke*) is included in *Lekhaneeya Mahakashaya* and is known for its *Medohara* and *Agnivardhaka* properties. **Objectives:** To evaluate the hypolipidemic and anti-obesity effect of *Kushtha* in patients of *Medoroga*. **Methods:** An open-label clinical study was conducted on 20 patients diagnosed with *Medoroga*. *Kushtha Churna* was administered for a specific duration. Pre- and post-treatment data were collected and statistically analyzed, focusing on lipid profile and anthropometric parameters such as BMI, body weight, and waist circumference. **Results:** Total cholesterol reduced by 13.23%, triglycerides by 18.33%, and LDL by 10.66%. HDL increased by 8.98%. All changes were statistically significant ($p = 0.005$). VLDL levels remained largely unchanged. Anthropometric measures showed significant improvement: BMI reduced by 4.84%, body weight by 4.62%, and waist circumference by 4.24% ($p <$

0.001). No significant changes were noted in blood pressure. **Conclusion:** *Kushtha* (*Saussurea lappa*) demonstrated significant hypolipidemic and anti-obesity activity. It can be considered a safe and effective single-drug intervention for managing *Medoroga,* showing improvement in lipid metabolism and anthropometric indices.

KEYWORDS: *Medoroga,* dyslipidemia, obesity, hypertriglyceridemia, *Kushtha,* Saussurea Lappa.

INTRODUCTION

According to *Ayurveda*, the human body is composed of *Sapta Dhatus*[1], out of the seven dhatus the *Meda Dhatu* which is the fourth *Dhatu*, plays a vital role in maintaining *Snehatwa* or lubricity.[2] Like all the *Sapta Dhatus*,this *Meda Dhatu* also exists in two forms—*Poshak* and *Poshya*.[3] The *Poshak* form is mobile in nature and circulates throughout the body along with *Rasa* and *Rakta Dhatus*, it nourishes the *Poshya Meda,* which is stationary and localized primarily in the *Medodhara Kala*—regions such as the abdomen, bones, and buttocks. *Meda* is further categorized in the *Charaka Samhita* as *Baddha Meda,* which is immobile fat accumulated in several places and linked with disorders including obesity, and *Abaddha Meda,* which is mobile and circulates with lipids like cholesterol and triglycerides.[4]

What we now call obesity was known even in ancient times. In fact, *Acharya Charaka* mentioned excessive obesity (*Ati Sthaulya*) as one of the eight undesirable body types (*Ashta Nindita Purusha*), showing just how seriously it was viewed back then.[5]

Fast forward to today, and obesity has grown into a major global health concern. The World Health Organization even calls it “globesity” to reflect how widespread the issue has become. And it’s not just about appearance; obesity increases the risk for serious health problems like high blood pressure, diabetes, heart disease, liver issues, infertility, and even some cancers. According to the World Health Organization, as of 2022, over 1 billion people globally are living with obesity. This includes approximately 890 million adults aged 18 years and older and 160 million children and adolescents aged 5–19 years. In addition, over 390 million children and adolescents aged 5–19 years were overweight in total. As of 2024, an estimated 35 million children under the age of 5 are overweight.[6] In India, the ICMR-INDIAB (2015) study reported that obesity and central obesity prevalence ranges from 11.8%–31.3% and 16.9%–36.3%, respectively.[7] Effective preventive and treatment strategies are desperately needed given the enormous load obesity causes on public health and national resources.

Focusing not only on symptoms but also on restoring the balance of body, *Ayurveda* presents a time-tested and all-encompassing method to such diseases.

For managing *Sthaulya,* the *Ayurvedic* texts advocate the use of *Lekhaniya Dravyas*—herbs that help reduce excess fat and restore metabolic balance. Among these, *Kushtha* (*Saussurea lappa*, *C.B. Clarke)* has been prominently mentioned in the *Lekhaneeya Mahakashaya* of Charaka.[8] This herb is naturally found in the higher altitudes of India, such as the Himalayas and Jammu & Kashmir, and is abundantly available in the region where this study is being conducted.[9] This geographical significance corresponds with the traditional advice that individuals should utilize medications indigenous to their locale, thereby guaranteeing both compatibility and efficacy. Moreover, in a time when the issue of drug adulteration is increasingly pressing, the accessibility of authentic *Kushtha* from Lahaul and Spiti in Himachal Pradesh facilitates the acquisition of true raw drug.[10]

MATERIALS AND METHODS

Ethics compliance

The Institutional Ethics Committee of Rajiv Gandhi Govt Post Graduate Ayurveda College and Hospital, Paprola approved the study. The study was registered with the Clinical Trial Registry of India, vide CTRI/2024/05/066641 registered on 01/05/2024.

Preparation of drug

The *Kushtha* plant was authentically procured from the Lahaul and Spiti district of Himachal Pradesh. The roots were carefully cleaned to remove any impurities and then sun-dried under hygienic conditions. After complete drying, the roots were finely powdered using a mechanical grinder. This powder was then processed using a capsule-filling machine to ensure uniform dosage. The filled capsules were packed into clean, labelled bottles for further use.

The drug was sent to DTL (drug testing laboratory) and drug testing certificate was obtained. (FIG. 1 & 2)

Selection of patients

20 patients fulfilling the diagnostic criteria were selected, after getting their written informed consent. The selected patients were subjected to take the prescribed drug.

Dose of the drug – 2 capsules (500mg each) B.D. with lukewarm water,

Empty stomach

Route of administration – Oral

Duration of trial- 8 weeks

Follow up: every 15 days till completion of trial

Criteria for selection of patients

- **Diagnostic criteria**

The diagnosis was made on the basis of:

Serum Lipid profile

S. Cholesterol > 200 mg/dL

S. Triglycerides > 150 mg/dL

LDL > 130 mg/dL

HDL < 40 mg/dL in males

< 50 mg/dL in females

VLDL > 30 mg/dL

Inclusion Criteria

- ❖ Patients who fulfilled the diagnostic criteria.
- ❖ Patients who were willing to participate in the trial.
- ❖ Patients between the age group of 18-70 years of age.

Exclusion criteria

- ❖ Patients suffering from diseases like nephrotic syndrome, hypothyroidism, jaundice, hepatitis, chronic infections and other serious diseases.
- ❖ Patients who were not willing for the clinical trial.
- ❖ Patients below 18 years and above 70 years of age.
- ❖ Pregnant ladies and lactating mothers.

Criteria for Withdrawal

- ❖ Patient himself wants to withdraw from clinical trial
- ❖ If patient does not follow up.
- ❖ Any positive findings in ECG.

Assessment Criteria

i. Patients were thoroughly assessed based on various subjective and objective parameters after every 15 days of the treatment. However, Serum Lipid Profile was the main criteria.
ii. Scoring system was adopted to assess the improvement in various subjective parameters.

Objective assessment criteria

1. Body Mass Index
2. Serum Lipid profile
3. Waist circumference (WC)
4. Weight

Subjective assessment criteria

1. *Kshudra Shwasa* (Shortness of breath,
2. *Sandhi Shool* (Pain in joints)
3. *Pipasa atiyoga* (Excessive Thirst),
4. *Kshudha -adhikaya* (Excessive Hunger),
5. *Javoparodha* (Lassitude),
6. *Chala Sphik Udara Stanam* (Movement of body parts)
7. *Swedabadha* (Excessive sweating),
8. *Daurgandhya* (Bad odour),
9. *Daurbalayam*(Debility),
10. *Nidradhikya* (Excessive sleep)

Statistical analysis

The information gathered based on observation made about various parameters were subjected to statistical analysis in terms of mean score B.T. (Before Treatment), mean score A.T. (After treatment), Standard Deviation (S.D.), Standard Error (SE). All were calculated and presented in tabular form. 'Students paired t-test' was carried out for comparison on various objective parameters within the group. The results were categorized as highly significant, significant, and insignificant depending upon the value of p.

- Highly Significant (H.S) p value <0.001
- Significant (S.S) p value <0.05
- Insignificantp (I.S) p value >0.05

OBSERVATIONS

Table No. 1: Effect on Lipid Profile (Which Was The Main Criteria).

Sr. No.	Symptoms	Mean		% relief		S.D.+	S.E.+	't'	'p'	
		BT	AT	Diff.	%age change					Sig
1.	Total Cholesterol	247.45	214.7	32.75	13.23	42.21	7.13	4.5	<0.001	HS
2.	Triglycerides	231.85	189.35	42.5	18.33	87.50	12.4	3.4	<0.005	SS
3.	HDL	43.7	48.7	5.03	8.98	5.75	1.29	4.32	<0.001	HS
4.	LDL	137.35	122.7	14.64	10.66	22.07	5.37	2.69	<0.005	SS
5.	VLDL	47.95	43.45	3.50	4.45	10.75	2.40	1.45	>0.05	IS

Table No. 2: Effect on other Objective Criteria.

Sr. No.	Symptoms	Mean		% relief		S.D.+	S.E.+	't'	'p'	
		BT	AT	Diff.	%age change					Sig
1.	BMI	28.07	26.71	1.36	4.84	1.36	7.13	4.5	<0.001	HS
2.	Weight	71.52	67.90	3.62	4.62	3.64	12.4	3.4	<0.005	SS
3.	Waist Circumference	37.07	35.5	2.45	4.24	4.63	1.29	4.32	<0.001	HS
4.	Blood Pressure (Systolic)	125.4	123.5	0.90	0.77	22.07	5.37	2.69	>0.05	IS
5.	Blood Pressure (Diastolic)	88.9	87.6	1.3	1.46	10.75	2.40	1.45	>0.05	IS

Table No. 3: Effect of Therapy on Subjective Criteria.

0	Symptoms	Mean		% relief		S.D.+	S.E.+	't'	'p'	
		BT	AT	Diff	%age change					Sig
1.	*Kshudra Shwasa* (Shortness of breath)	0.95	0.45	0.50	52.63%	0.61	0.14	3.68	<0.001	HS
2.	*Sandhi Shool* (Pain in joints)	1.0	0.53	0.47	47.37%	0.51	0.12	4.02	<0.001	HS
3.	*Kshudha -adhikaya* (Excessive Hunger)	1.0	0.8	0.2	20%	0.69	0.21	0.68	>0.05	IS
4.	*Pipasaatiyoga* (Excessive Thirst)	1.0	0.8	0.2	20%	0.88	0.21	0.71	>0.05	IS
5.	*Javoparodha*(Lassitude)	0.7	0.5	0.2	28.5%	0.65	0.20	0.96	>0.05	IS
6.	*Swedabadha* (Excessive sweating)	0.8	0.7	0.1	12.5%	0.75	0.23	0.41	>0.05	IS
7.	*Daurgandhya* (Bad odour)	0.6	0.4	0.2	33.3%	0.41	0.06	2.92	<0.05	S
8.	*Chala Sphik Udara Stanam* (Movement of body parts)	0.95	0.55	0.4	42.11%	0.50	0.11	3.56	<0.01	HS
9.	*Daurbalayam* (Debility)	1.0	0.55	0.45	45%	0.4	0.11	4.09	<0.01	HS
10.	*Nidradhikya* (Excessive sleep)	0.6	0.5	0.1	16%	0.5	0.11	0.66	>0.05	IS

Table no. 4: Effect of Therapy on Hb, TLC FBS and ESR.

	MEAN BT	MEAN AT	SD.+	SE.+	t	P	Sig
Hb	11.2	12.09	0.39	0.10	2.90	<0.01	S
TLC	7200	7100	500	118.20	0.89	>0.05	IS
ESR	25.05	23.02	8,05	1.79	1.12	>0.05	IS
FBS	120	100	15	3.35	8.95	<0.01	S

Table No. 5: Overall effect of therapy in 20 patients.

Total effect	No. of pts.	%age
Markedly Improved • Subjective Symptoms: >60% reduction • Body Weight: >4 kg reduction • BMI: Reduction of >2 grades • S. Cholesterol, Triglycerides, LDL, VLDL: >30% reduction in two or more factors • HDL: >30% elevation	**8**	**40%**
Moderately Improved • Subjective Symptoms: 30-60% reduction • Body Weight: 2-4 kg reduction • BMI: Reduction of 1 grade • S. Cholesterol, Triglycerides, LDL, VLDL: 15-30% reduction in two or more factors • HDL: 15-30% elevation	**10**	**50%**
Mildly Improved • Subjective Symptoms: <30% reduction • Body Weight: 1-2 kg reduction • BMI: Reduction of 1 grade • S. Cholesterol, Triglycerides, LDL, VLDL: Up to 15% reduction in one factor • HDL: Up to 15% elevation	**2**	**10%**

RESULT

The therapy showed a statistically significant impact on the lipid profile, which was the main assessment criterion. Total cholesterol levels reduced from a mean of 247.45 mg/dL to 214.7 mg/dL, marking a 13.23% decrease ($p < 0.001$). Triglycerides decreased by 18.33%, from 231.85 mg/dL to 189.35 mg/dL ($p < 0.005$). LDL (low-density lipoprotein) dropped by 10.66% ($p < 0.005$), while HDL (high-density lipoprotein) showed an 8.98% increase ($p < 0.001$). VLDL (very-low-density lipoprotein) levels, however, showed no significant change ($p > 0.05$).

In terms of anthropometric parameters, there was a significant reduction in BMI, body weight, and waist circumference. BMI decreased by 4.84% (from 28.07 to 26.71, $p < 0.001$), weight by 4.62% ($p < 0.005$), and waist circumference by 4.24% ($p < 0.001$). No statistically significant changes were observed in systolic and diastolic blood pressure levels.

Regarding subjective symptoms, notable improvements were seen in *Kshudra Shwasa* (52.63%), *Sandhi Shoola* (47.37%), *Daurbalya* (45%), *Chala Sphik-Udara-Stana* (42.11%), and *Daurgandhya* (33.3%) with high statistical significance. Symptoms like *Kshudha-*

adhikya, *Pipasaatiyoga*, *Swedabadha*, *Javoparodha*, and *Nidradhikya* showed numerical improvements, but the changes were statistically insignificant.

Blood investigations revealed a significant increase in hemoglobin levels from 11.2 g/dL to 12.09 g/dL ($p < 0.01$) and a notable reduction in fasting blood sugar from 120 mg/dL to 100 mg/dL ($p < 0.01$). No significant changes were observed in total leukocyte count (TLC) and erythrocyte sedimentation rate (ESR).

Overall assessment of therapeutic efficacy showed that out of 20 patients, 8 (40%) were markedly improved, 10 (50%) were moderately improved, and 2 (10%) were mildly improved, based on combined evaluation of subjective symptoms, anthropometric data, and lipid profile changes.

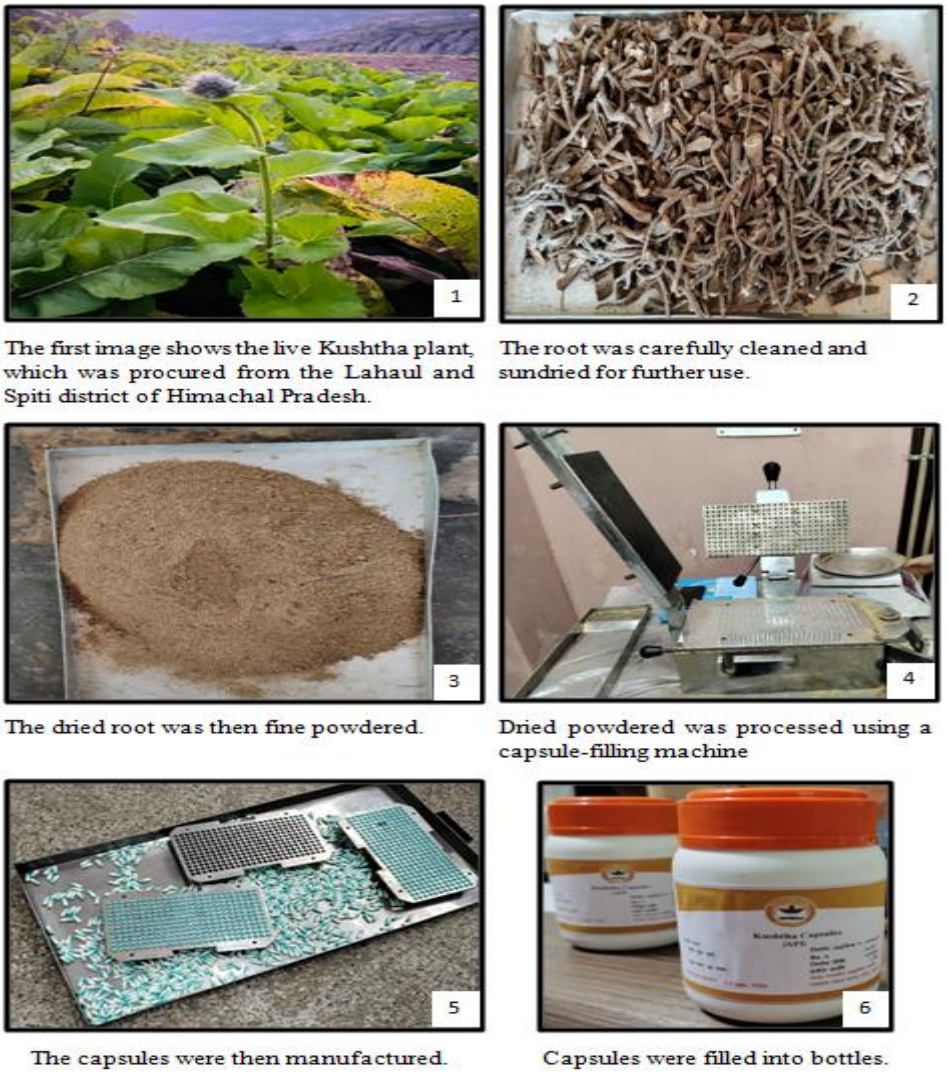

Fig. 1.

The drug was sent to DTL, Joginder nagar and drug testing certificate was obtained.

DRUG TESTING LABORATORY RIISM, JOGINDERNAGAR
(DEPARTMENT OF AYUSH HIMACHAL PRDEASH)
Telephone No: 01908-222092

No. DTL/PP/15/22- 858 Dated 21/07/2023

Report of Tests or Analysis

1.	Name of the Manufacturer	**Govt. Ayurvedic Pharmacy Paprola Distt. Kangra H.P.**
2.	Manufacturer License No.	HP-87-Ay
3.	Reference No. & Date of receipt letter :	17/06/2023
4.	Date of receipt of sample:	17/06/2023
	Detail of Drug / Raw Material	**KUSHTA CAPSULE**
5.	Detail of raw material /final product as obtained from the manufacturer	Ayurvedic Medicine
a)	Original Manufacturer's name in case of raw material & drugs repacked	
b)	Batch No	**R-1/23**
	Total quantity represented by the sample	50 gm
c)	Date of Manufacture if any	12/055/2023
d)	Date of expiry if any	Three years from the date of manufacturing

RESULTS OF Tests/Analysis WITH PROTOCOLS OF TEST APPLIED
As per ASU Pharmacopoeia /other specific Standards

Sr. No	*Test*	**Lab. Standards**	*DTL Result*	*Remarks*
	MACROSCOPIC & PHYSICOCHEMICAL DESCRIPTION			
1.	Appearance	--------	Capsule (White+ Sky blue)	--------
2.	Powder Color	--------	Creamish	--------
3.	Odor	--------	Characteristics, Aromatic	--------
4.	Taste	--------	Bitter	--------
5.	pH(1.0% Aq. Soln.)	--------	6.36	--------
6.	Average fill weight	--------	431 mg	--------
7.	Moisture content	--------	12.46 %	--------
8.	Total Solid	--------	87.54 %	--------
9.	Total Ash	--------	05.76 %	--------
10.	Acid insoluble ash	--------	01.34 %	--------
11.	Water soluble Extractive	--------	39.76 %	--------
12.	Alcohol soluble Extractive	--------	30.81%	--------
	Identification Tests :			
13.	**Qualitative Test**		+ve test for Alk	
14.	**Thin Layer Chromatography**	**Solvent System** Tol:EA:FA 10 % H_2SO_4 Spray	**Rf. Values** 0.27,0.41,0.62,0.76,0.80,0.95	Shows the presence of Kushta

The above mentioned tests are conducted as desired by the PG Scholar.

(Signature of the person In charge of Testing)

Fig 2.

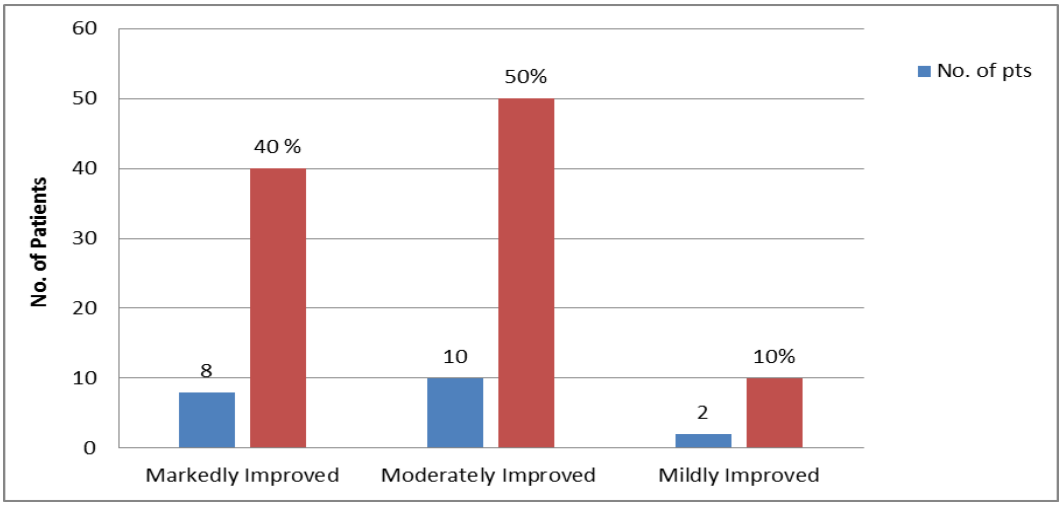

FIG 3.

DISCUSSION

According to *Charaka Samhita* (Cha. Su. 26/71), "रसादीनां तु यः कश्चित् प्रधानः स तु ईषत्." The effects of any drug are primarily determined by the preponderance of one or more of *Rasa*, *Guna*, *Virya*, *Vipaka*, and *Prabhava*. Improper diet, sedentary lifestyle, and psychological or genetic factors aggravate *Kapha Dosha* and impair *Jatharagni* (digestive fire) in *Medoroga* (obesity). This causes *Ama* to form and *Meda Dhatvagni* to weaken, which in turn causes *Meda Dhatu* to accumulate excessively and *Sthaulya* to progress.

Kushtha (*Saussurea lappa* C.B. Clarke) possesses *Tikta* and *Katu Rasa*, *Laghu*, *Ruksha*, and *Tikshna Guna*, *Ushna Virya*, and *Katu Vipaka*, which collectively act to pacify vitiated *Kapha* and stimulate digestion. The *Katu Rasa* contributes to *Rukshata* (dryness) and *Tikshnata* (sharpness), aiding *Ama Pachana* and reducing *Kleda*. *Tikshna Guna* enables deeper tissue penetration and breakdown of *Meda Dhatu*, while *Laghu Guna* counters the heaviness of *Kapha*. *Ushna Virya* rekindles the impaired *Jatharagni* and supports proper *Rasa-Meda Dhatu* conversion. *Katu Vipaka* enhances post-digestive metabolism, promoting *Srotoshodhana* (channel clearance) and restoring metabolic balance.

Current scientific research supports these *Ayurvedic* qualities. *Saussurea lappa's* hypolipidemic activity was highlighted by Anbu et al., who showed that in hyperlipidemic rats, its ethanolic extract dramatically reduced serum triglycerides and raised HDL.[11] In a similar vein, Marei et al. found that giving *Saussurea lappa* to hypercholesterolemic rats significantly decreased their serum cholesterol and oxidative stress markers.[12] Thara and Zuhra's more comprehensive phytochemical review verified that *Kushtha* contains bioactive sesquiterpene lactones, costunolide and dehydrocostus lactone, which have been shown to have anti-inflammatory, hypolipidemic, and hypoglycemic properties.[13]

Kushtha's function in *Medoroga* management is therefore supported by both contemporary experimental evidence and traditional *Ayurvedic* knowledge. Its potential as a safe and efficient treatment for dyslipidemia and obesity is further supported by its capacity to increase *Agni*, metabolize *Meda Dhatu*, clear blocked *Srotas*, and rectify *Dosha* imbalances.

CONCLUSION

According to this research, *Kushtha Churna* acted on *Meda Dhatwagnimandya*. Its capacity to boost metabolism and digestion most certainly aided the body to break down extra fat. Also, the drop in waist size indicates that *Kushtha* may help lower harmful fat around the

organs, which is connected to health problems like insulin resistance and heart disease. This action on *Meda Dhatu* could explain the positive effects on weight reduction and the general metabolic improvement in the patients. Along with helping with weight loss, *Kushtha* improves general metabolic health—a condition sometimes weakened in obese people.

While raising HDL levels, the administration of *Kushtha Churna* demonstrated a great ability to lower fat levels in the blood, thereby greatly reducing cholesterol, triglycerides, and LDL levels. This implies that *Kushtha Churna* has an unanticipated favorable effect on raising hemoglobin (Hb) levels in patients and is therefore a strong agent in controlling lipid profiles that might be efficiently included into treatment procedures for managing obesity. Its effect on *Rakta Dhatwagnimandya* may help to explain this result. *Kushtha's* qualities of *Katu rasa*, *Ushna*, and *Teekshna guna* probably boosted *Dhatwagni's* performance, thereby increasing the creation of *Rakta Dhatu* and, hence, the hemoglobin levels.

Although fasting blood sugar (FBS) was not the main focus of this research, the benefits found during the trial imply that the medication may be improving insulin sensitivity or lowering insulin resistance, which are main contributing factors in metabolic syndromes including obesity. This result creates the path for more investigation on its effectiveness in controlling blood sugar levels. Finally, *Kushtha's Tikta* and *Katu Rasa*, together with its *Katu Vipaka* and *Ushna Virya*, help to explain why it is so effective in managing obesity. These qualities help to lower *Kapha Dosha*, which is usually raised in those with obesity, so causing *Meda* (fat tissue) to build up.

This clinical trial was conducted on 20 patients, and while the results are promising, they are preliminary. To establish more definitive conclusions and assess long-term efficacy and safety, studies with larger sample sizes and extended follow-up periods are essential. Further research may also explore *Kushtha's* role in combination therapies and its application in other metabolic disorders, thereby broadening its therapeutic relevance.

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