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Research Article

EFFECT OF *PARTHA VATI* IN *MEDOROGA* WITH SPECIAL REFERENCE TO DYSLIPIDEMIA AND IN ENHANCING CARDIOPROTECTIVE ACTIVITY

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ABSTRACT

Medoroga, a highly prevalent disease in the society today due to modified lifestyle, sedentary mode, of majority of people causing various systemic illnesses demanding lifelong medications due to its relapsing nature. Dyslipidemia has been strongly associated with the pathophysiology of cardiovascular diseases and is a major independent risk factor for coronary artery disease. Despite the well documented benefits of statin, people undergoing statin therapy are frequently challenged with various adverse reactions. Based on this background a better, safe and effective medication is the need of the hour. Thus, *Partha Vati*, an *Anubhuta* yoga was selected and this study was aimed to find the effect of *Partha Vati* in *Medoroga* with special reference to dyslipidemia and in enhancing cardioprotective activity. The trial was a pre and post interventional study. A total of 38 subjects were selected and all of them completed the trial. The interventional drug *Partha Vati* was given as 250mg tablet, morning and night amidst meal, for continuous 30 days. Graded criteria were assessed on 0th and 31st day. Data regarding all the variables were collected and analysed statistically. The results of the test were found to be statistically significant with a P value <0.001 except for *Athikshut* which means the intervention helped to decrease the signs and symptoms of *Medoroga.* The medicine was found to be effective and statistically significant in *Medoroga*. Hence the drug *Partha Vati* was found to be effective in *Medoroga* with special reference to dyslipidemia and in enhancing cardioprotective activity.

INTRODUCTION

In the current world, people are behind materialistic and monetary pleasures rather than following *Dinacharya*, *Ritucharya* and *Achararasayana*, which results in the impairment of physical, mental, social and spiritual wellbeing of individuals. The sedentary and modified lifestyle of majority of people in the society has resulted in the vitiation of *Agni, Dosa* and *Dhatu*. This in turn results in the formation of *Ama* and its circulation through the *Srotas* causing the people to suffer from various systemic illnesses demanding lifelong medications. *Medoroga* is one such entity which is highly prevalent in the society today.

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The reference of *Medoroga* is scattered in *Brihattrayi*. However, in *Laghutrayi* a separate chapter for *Medoroga* is mentioned. *Avyayama, divaswapna* and *Shleshmalaahara* in excess will cause impairment of *Jatharagni* as well as *Medodhatuagni,* which leads to *Ama*. This will increase the *Samamedas* by its *Madhurarasa* and *Snigdhaguna* and it causes *Srotorodha* and there by hindering the nourishment of further *Dhatu*. This will make the person *Sarvakarmasuashakta,* with *Kshudraswasa, Trushna, Moha, Swapna, Angasada, Atikshut, Atisweda, Angadaurgandhya, Alpa Pranata, Alpamaidhuna* and *Udaravrudhi.* The vitiated *Vata* will circulate in the *Koshta* and stimulate the *Agni. Agni* and *Vata* will burn out the individual like a wild fire[1]. Taking various factors in to consideration *Medoroga* may be correlated with the condition, dyslipidemia.

Dyslipidemia refers to either lipoprotein overproduction or deficiency, which is a consequence of abnormal lipoprotein metabolism. This leads to

elevated total cholesterol, low-density lipo-protein (LDL-C) cholesterol and triglyceride (TG) concentrations and a decrease in the high-density lipoprotein (HDL-C) cholesterol concentration in blood[2]. Dyslipidemia could be primary (genetic defect in the lipid metabolism that causes abnormal lipid levels) or secondary (caused due to modifiable lifestyle and environmental factors, diseases, and medications)[3]. Dyslipidemia has been strongly associated with the pathophysiology of cardiovascular diseases (CVDs) and is a major independent risk factor for coronary artery disease (CAD), further leading to the development of atherosclerosis and associated cardiovascular events[4]. CVDs have become a growing burden across the globe and are highly prevalent, especially in the developing countries that alone account for 80% of the global CVD mortality[5]. CVDs tend to occur at a younger age in Indians, out of which 10% occur in people below 40 years and more than 50% of cardiovascular deaths are in people below 70 years of age. The age-standardized estimates for disability-adjusted life-years (DALY's) lost due to CAD are three times higher in India than in the developed countries[6,7].

Data from NHANES (National Health and Nutrition Examination Survey) and similar western studies have highlighted the role of elevated levels of LDL-C and TG levels in the development of CAD[4,8,9]. Studies have shown that Asians have a higher prevalence of lipid abnormalities as compared to non-Asian. It has been observed that dyslipidemia in Asians, especially Indians, is atherogenic, with a higher prevalence of low HDL cholesterol and high triglycerides and a lower prevalence of high serum cholesterol, than their non-Asian counterparts[4,8,9]. A study conducted among young CAD patients in India confirmed the Asian pattern of high TG, low HDL-C and a low level of LDL-C[4,10]. The ICMR-INDIAB (Indian Council of Medical Research-India Diabetes) study, a cross-sectional survey conducted across India also confirmed a lipid abnormality pattern in the country with no rural-urban differentiation[8,11]. In 2016 the prevalence of hypercholesteremia was found to be 63.8% in northern part of Kerala. This result was similar to the studies conducted in central and southern Kerala which reported prevalence between 37% and 57% respectively[12]. The prevalence of hypercholesteremia in Kerala is more than the global average of 39% reported by the World Health Organization[13].

HMG Co A reductase inhibitors or statin is the most commonly prescribed pharmacological agent in dyslipidemia. Despite the well documented benefits of statin, the people undergoing statin therapy are frequently challenged with various adverse reactions. The serious reactions include rhabdomyolysis, hepatic dysfunction, renal dysfunction and drug dose dependent risk of diabetes mellitus[14].

For the current study *Parthavati* is selected as trial drug. It is an *Anubhuta yoga* in which *Arjuna Tvakchoorna* is triturated with estimated quantity of *Rasonadikashaya. Rasonadikashaya* mentioned in *Sahasrayoga-vataroga prakarana* is attributed with the property of "*Peetamunmaargagam vatamanulomayati kshanat"*[15]. By virtue of this *Vatanulomana* property, it is having significant effect on maintaining the normalcy of *Srotas*. *Arjuna* has *Sheetaguna, Medohara karma* and *Hrdya* property[16]. The process *Bhavana* improves the bioavailability of drugs and enhances the potency. This also helps in reducing the dosage and improving the shelf life of final product [17].

All the ingredients are proven hypolipidemic drugs. Allicin and S-allyl cysteine presented in garlic extract and diallyl disulphide present in garlic oil are the active compounds responsible for anti-atherosclerotic effect. Long term application of garlic and its preparations on experimental atherosclerosis induced by a high cholesterol diet showed 50% reduction in atheromatous lesions particularly in the aorta (Jain, 1977)[18]. Nigellone and thymoquinone present in *Karavi* possess anti-hyperlipidemic and cardioprotective activity[19]. Piperlonguminine, piperine and pipernonaline in *Pippali* exhibits appreciable anti hyperlipidaemic activity *in vivo*, which was comparable to that of commercial anti hyperlipidaemic drug simvastatin[20]. Pre-treatment of the aqueous extract of *D. gangeticum* (3ml/100gm) for thirty days showed reduced cholesterol level and free radical scavenging potential *in-vitro* against isoproterenol induced myocardial infarcted rats[21]. Subsequent work done by Sharma *et al*. also substantiated the hypolipidemic and antioxidant effect of *Arjuna*[22]. In the Langendorff's rabbit heart preparation, the aqueous extract has demonstrated to cause an increase in the coronary flow[23].

AIM

To determine the effect of *Partha Vati* in the management of *Medoroga* (dyslipidemia)and in enhancing cardioprotective activity.

OBJECTIVE

Primary Objective: To determine the effect of *Partha Vati* in reducing the signs and symptoms of *Medoroga* (dyslipidemia).

Secondary Objective: To determine the cardioprotective capacity of *Partha Vati* by assessing Atherogenic Index of Plasma.

METHODOLOGY

Hypothesis

Null hypothesis: *Partha Vati* is neither effective in reducing the signs and symptoms of *Medoroga*

(dyslipidemia) nor enhances the cardioprotective activity.

Alternate hypothesis: *Partha Vati* is effective in reducing the signs and symptoms of *Medoroga* (dyslipidemia) and shows improvement in cardioprotective function.

Research question

Whether the oral administration of 500mg of *Partha Vati* in equally divided doses, morning and night amidst meal (*Madhyama bhakta)* for a period of 30 days is effective in reducing the signs and symptoms of *Medoroga* (Dyslipidaemia) and also enhancing cardio protective activity in participants belonging to the age group of 18-60 years irrespective of gender attending the O.P.D. of P.N.N.M. Ayurveda Medical College & Hospital, Cheruthuruthy.

Study design

Interventional study with pre and post evaluation by graded subjective parameters and objective criteria without any control group for a period of 30 days.

Subject inclusion criteria

1. Participants belonging to 18-60 years of age irrespective of gender.
2. Participants with signs and symptoms of *Medoroga* (dyslipidaemia).
3. Willing to sign the informed consent form.
4. Participants having any or all of the lipoprotein levels with following values
   a. S.C ≥ 200mg/dL
   b. TG ≥ 150mg/dL
   c. LDL ≥ 100mg/dL
   d. VLDL ≥ 30mg/dL
   e. HDL < 40mg/dL

Subject exclusion criteria

1. Known cases of other systemic illnesses.
2. Drug induced Dyslipidaemia.
3. Atherogenic Index Plasma > 0.24
4. Systolic blood pressure > 180mmHg or Diastolic blood pressure >120mmHg
5. Pregnancy & lactation

Sample size: 38

Sampling procedure

Sex – Irrespective of gender

Number of participants planned to be enrolled - 38

Sampling procedure- Consecutive cases satisfying inclusion criteria were selected from.

O.P.D of P.N.N.M. Ayurveda Medical College & Hospital till the sample size is attained.

Table 1: Intervention Materials

S.No	Drug	Botanical Name	Family name
1	*Arjuna*	*Terminalia arjuna*	*Combretaceae*
2	*Rasona*	*Allium sativum*	*Amaryllidaceae*
3	*Karavi*	Nigella sativa	*Ranunculaceae*
4	*Krishna*	*Piper longum*	*Piperaceae*
5	*Sthira*	*Desmodiumgangeticum*	*Fabaceae*

Method of preparation: All ingredients of *Parthavati* were identified, collected, washed well, dried and crushed. Coarse powder of *Rasona, Karavi, Krishna* and *Sthira* were taken 90gm each and 1.4L water was added, boiled and reduced to 360ml. Then 240gm of *Arjunachurna* was triturated with *Kasayam* till the *Kashayam* get totally absorbed in *Arjunachurnam* and *Gutika* was prepared and packed. The medicine was prepared in the GMP certified pharmacy of Keraleeya Ayurveda Samajam, Shoranur.

Procedure

- Dosage form – *Vati*
- Dose– 250mg; morning and night amidst meal (*Madhyamabhakta)* for 30 days.
- *Anupana* – Water
- Route/mode of administration- Oral administration
- Treatment period, including the assessment day – 32 days
- Medication/treatment: Routine essential medicines were permitted. Medication for dyslipidaemia were not permitted.

Withdrawal criteria

- Unwillingness of participants to continue medication
- Adverse drug reactions

Subjective criteria[24-27]

Lack of enthusiasm (*Utsahahani*)

1. No laziness- Grade 0
2. Doing satisfactory work with late initiation- Grade 1
3. Doing unsatisfactorily and take time- Grade 2
4. Doing little work very Slowly- Grade 3
5. Does not take any initiation even after pressure- Grade 4

Dyspnoea on exertion (*Kshudraswasa)*

1. Dyspnoea after heavy work but tolerable- Grade 0
2. After moderate work but tolerable- Grade 1

3. After little work but tolerable- Grade 2
4. After little work but beyond tolerance- Grade 3
5. In resting condition also- Grade 4

Excess sweating *(Atisweda)*

1. Profuse sweating after heavy work- Grade 0
2. Profuse sweating after moderate work and movement- Grade 1
3. Profuse sweating after little work and movement- Grade 2
4. Sweating even at rest- Grade 3

Excess Sleep (*Atiswapna)*- Epworth sleepiness scale

Chance of Dozing

a. Sitting and reading
b. Watching T.V.
c. Sitting inactive in a public place
d. As a passenger in a car for an hour without break.
e. Lying down to rest in the afternoon when circumstances permit.
f. Sitting and talking to someone.
g. Sitting quietly after lunch.
h. In a car, while stopped for a few minutes in traffic.

No chance	Mild chance	Moderate chance	High chance
0	1	2	3

Grade	0	1	2	3	4
Score (0-24)	0-5	6-10	11-12	13-15	16-24

Heaviness of the body (*Angagaurava*)

1. No heaviness in body- Grade 0
2. Mild heaviness but not hamper routine work- Grade 1
3. Mild heaviness hampering routine work- Grade 2
4. Moderate heaviness which hampers routine work- Grade 3
5. Severe heaviness which hampers routine work- Grade 4

Excess thirst (*Atipipasa*) - Thirst distress scale

a. My thirst bothers me a lot.
b. I am very uncomfortable when I am thirsty.
c. My mouth feels like sandpaper when I am thirsty.
d. My mouth feels dry when I am thirsty.
e. My saliva is very thick when I am thirsty.
f. When I drink less water, my thirst gets worse.
g. I am so thirsty I could drink water uncontrollably.
h. My thirst feels difficult to overcome.

Strongly disagree	Disagree	Neutral	Agree	Strongly agree
0	1	2	3	4

Grade	0	1	2	3	4
Score (0-40)	0-8	9-16	17-24	25-32	33-40

Excess Hunger (*Athikshuth*)

1. Severe hunger during meals- Grade 0
2. Severe hunger between meals- Grade 1
3. Having hunger pangs frequently between meals- Grade 2
4. Hunger pangs immediately after meals- Grade 3

Objective Criteria

1. Lipid profile
2. Atherogenic index of plasma
3. Body mass index
4. Blood pressure
5. Waist circumference

OBSERVATION

Table 2: Observation on Demographic data

Distribution	Category	Percentage (%)
Age group (in years)	20-30	10
	30-40	8
	40-50	29
	50-60	53
Gender	Male	42
	Female	58
Type of work	Sedentary	16
	Moderate	55
	Heavy	29
Stress	Present	82
	Absent	18

Nature of food	Vegetarian	3
	Mixed	97
Adhyaśanam	Present	45
	Absent	55
Viṣamāśanam	Present	68
	Absent	32
Water intake in relation to food	Just after	55
	Just before	3
	During	29
	No relation	13
Nature of stool	*Samam*	68
	Niramam	32
Bowel Movement	Regular	63
	Irregular	37
Bowel Satisfaction	Satisfied	66
	Unsatisfied	34
Bowel consistency	*Kathinam*	32
	Dravam	3
	Alpa samhatam	10
	Susamhatam	55
Sleep and dinner interval	Less than 1 hour	13
	1 hour	68
	2 hours	16
	More than 2 hours	3
Exercise	Yes	16
	No	84
Family History	Dyslipidemia	24
	Hypertension	37
	Cardiac disease	8
	Diabetes Mellitus	34
Prakruti	*Vata-pitta*	8
	Pitta – vata	8
	Vata-kapha	13
	Kapha- vata	47
	Kapha- pitta	16
	Pitta-kapha	8

Table 3: Observation on Various characteristics

Distribution	Category	Percentage (%)
BMI	Normal	34
	Over weight	58
	Obese	8
Agni	*Mandam*	60
	Viṣamam	24
	Samam	3
	Tīkṣṇam	13
Jihva	*Liptam*	71
	Nirliptam	29
Āhāraja Nidānam	*Adhyashanam*	45
	Navannam	100
	Pishtannam	100
	Mamsam	76
	Bhojanottara jalapanam	55
	Ksheera vikruthy	94
	Dadhi	38
Viharaja nidanam	*Avyayama*	84
	Divaswapnam	13
	Asana sukha	92
	Bhojanottara nidra	82
	Beejadushti	58
Rupam	*Utsahahani*	92
	Kshudraswasam	95
	Atinidra	92
	Swedadhikyam	60
	Anga gauravam	92
	Atipipasa	55
	Atikshut	18

RESULTS

The statistical analysis for these parameters were performed using SPSS Version 22. Wilcoxon signed rank test was used for subjective criteria and objective criteria except for HDL and LDL which was assessed using paired sample t -test. The results of the test were found to be statistically significant with a P value <0.001 except for *Athikshut* which means the intervention helped to decrease the signs and symptoms of *Medoroga.*

Effect of intervention on Subjective Criteria

Utsahahani

Table 4.1: Effect of intervention on *Utsahahani*

	BT		AT		Wilcoxon Signed Rank Test				
Utsahahani	**N**	**%**	**N**	**%**	**Mean difference**	**Calculated value**	**P value**	**Standard deviation**	
Grade 0	3	8	38	100	1.842 (BT-AT)	-5.276	<0.001	**BT**	**AT**
Grade 1	8	21	0	0				0.855	0.00
Grade 2	19	50	0	0					

Grade 3	8	21	0	0					
Grade 4	0	0	0	0					
Total	38	100	38	100					

Kshudraswasam

Table 4.2: Effect of intervention on *Kshudraswasam*

	BT		AT		Wilcoxon Signed Rank Test				
Kshudraswasa	**N**	**%**	**N**	**%**	**Mean difference**	**Calculated value**	**P value**	**Standard deviation**	
Grade 0	2	5	38	100	1.684 (BT-AT)	-5.329	<0.001	**BT**	**AT**
Grade 1	14	37	0	0				0.809	0.00
Grade 2	16	42	0	0					
Grade 3	6	16	0	0					
Grade 4	0	0	0	0					
Total	38	100	38	100					

Atinidra

Table 4.3: Effect of intervention on *Atinidra*

	BT		AT		Wilcoxon Signed Rank Test				
Atinidra	**N**	**%**	**N**	**%**	**Mean difference**	**Calculated value**	**P value**	**Standard deviation**	
Grade 0	3	8	38	100	1.947 (BT-AT)	-5.224	<0.001	**BT**	**AT**
Grade 1	10	26	0	0				1.012	0.00
Grade 2	12	32	0	0					
Grade 3	12	32	0	0					
Grade 4	1	2	0	0					
Total	38	100	38	100					

Swedadhikyam

Table 4.4: Effect of intervention on *Swedadhikyam*

	BT		AT		Wilcoxon Signed Rank Test				
Swedadhikyam	**N**	**%**	**N**	**%**	**Mean difference**	**Calculated value**	**P value**	**Standard deviation**	
Grade 0	15	40	38	100	1.079 (BT-AT)	-4.264	<0.001	**BT**	**AT**
Grade 1	10	26	0	0				1.075	0.00
Grade 2	8	21	0	0					
Grade 3	5	13	0	0					
Grade 4	0	0	0	0					
Total	38	100	38	100					

Angagauravam

Table 4.5: Effect of intervention on *Angagauravam*

	BT		AT		Wilcoxon Signed Rank Test				
Anga gauravam	**N**	**%**	**N**	**%**	**Mean difference**	**Calculated value**	**P value**	**Standard deviation**	
Grade 0	3	8	38	100	2.00 (BT-AT)	-5.239	<0.001	**BT**	**AT**
Grade 1	8	21	0	0				0.959	0.00

Grade 2	13	34	0	0					
Grade 3	14	37	0	0					
Grade 4	0	0	0	0					
Total	38	100	38	100					

Atipipasa

Table 4.6: Effect of intervention on *Atipipasa*

	BT		**AT**		**Wilcoxon Signed Rank Test**				
Atipipasa	**N**	**%**	**N**	**%**	**Mean difference**	**Calculated value**	**P value**	**Standard deviation**	
Grade 0	17	44	38	100	0.947 (BT-AT)	-4.091	<0.001	**BT**	**AT**
Grade 1	9	24	0	0				1.012	0.00
Grade 2	9	24	0	0					
Grade 3	3	8	0	0					
Grade 4	0	0	0	0					
Total	38	100	38	100					

Atikshuth

Table 4.7: Effect of intervention on *Atikshuth*

	BT		**AT**		**Wilcoxon Signed Rank Test**				
Atikshudha	**N**	**%**	**N**	**%**	**Mean difference**	**Calculated value**	**P value**	**Standard deviation**	
Grade 0	31	82	38	100	0.237 (BT-AT)	-2.460	0.014	**BT**	**AT**
Grade 1	5	13	0	0				0.542	0.00
Grade 2	2	5	0	0					
Grade 3	0	0	0	0					
Total	38	100	38	100					

Agni

Table 4.8: Effect of intervention on *Agni*

	BT		**AT**		**Wilcoxon Signed Rank Test**	
Agni	**N**	**%**	**N**	**%**	**Calculated value**	**P value**
Manda agni	23	60	0	0	-4.914	<0.001
Vishma agni	9	24	0	0		
Theekshna agni	5	13	0	0		
Sama agni	1	3	38	100		
Total	38	100	38	100		

Effect of intervention on Objective Criteria

Waist circumference

Table 4.9: Effect of intervention on waist circumference

Wilcoxon Signed Rank Test						
Mean		**Mean difference**	**Calculated value**	**P value**	**Standard deviation**	
BT	**AT**	0.61 (BT-AT)	-4.796	<0.001	**BT**	**AT**
35.79	35.18				4.40	4.24

Body Mass Index (BMI)

Table 4.10: Effect of intervention on BMI

BMI	BT		AT	
	N	%	N	%
Normal	13	34	20	40
Over weight	22	58	15	52
Obese	3	8	3	8
Total	38	100	38	100

Table 4.11: Effect of intervention on BMI

Wilcoxon Signed Rank Test						
Mean		Mean difference	Calculated value	P value	Standard deviation	
BT	AT	0.54 (BT-AT)	-4.206	<0.001	BT	AT
26.42	25.88				4.34	4.03

Systolic BP

Table 4.12: Effect of intervention on systolic BP

Wilcoxon Signed Rank Test						
Mean		Mean difference	Calculated value	P value	Standard deviation	
BT	AT	9.26 (BT-AT)	-4.898	<0.001	BT	AT
123.47	114.21				9.13	6.42

Diastolic BP

Table 4.13: Effect of intervention on diastolic BP

Wilcoxon Signed Rank Test						
Mean		Mean difference	Calculated value	P value	Standard deviation	
BT	AT	8.68 (BT-AT)	-4.538	<0.001	BT	AT
79.21	70.53				9.12	3.24

Total Cholesterol (TC)

Table 4.14: Effect of intervention on Total Cholesterol (TC)

Total cholesterol	BT		AT	
	N	%	N	%
Desirable	9	24	15	40
Low risk	23	60	21	55
High risk	6	16	2	5
Total	38	100	38	100

Table 4.15: Effect of intervention on Total Cholesterol (TC)

Wilcoxon Signed Rank Test						
Mean		Mean difference	Calculated value	P value	Standard deviation	
BT	AT	21.33 (BT-AT)	-4.029	<0.001	BT	AT
213.95	192.62				48.25	44.60

High Density Lipoprotein (HDL)

Table 4.16: Effect of intervention on High Density Lipoprotein

HDL	BT		AT	
	N	%	N	%
Low	7	18	1	3
Normal	30	79	36	94
High	1	3	1	3
Total	38	100	38	100

Table 4.17: Effect of intervention on High Density Lipoprotein

Paired sample t-test						
Mean		Mean difference	Calculated value	P value	Standard deviation	
BT	AT	-2.79 (BT-AT)	-4.612	<0.001	BT	AT
43.45	46.24				5.09	4.50

DISCUSSION

The association between dietary patterns and cardiometabolic risk are well established from studies conducted in Western countries. In general, a "healthy" dietary pattern that is rich in vegetables and fruits is inversely associated with cardiometabolic risk, whereas a "unhealthy" dietary pattern that is rich in foods such as red meat, processed food, and fried food is positively associated with cardiometabolic risk. However, Indian dietary patterns are more complex than a simplified "healthy" or "unhealthy" dietary pattern seen in Western countries. Diets with high-carbohydrate (refined), high-fat and high-salt (fried carbohydrate, pulses as snacks), together with some fruits, are commonly consumed in India, and this doesn't seem to be easily detected as "unhealthy" as in the Western diet.

More importantly, there has been a "nutrition transition" in India in the past decades that has resulted in changes in diet (e.g., reduced intake of coarse cereals, fruits, and vegetables, and increased intake of unhealthy fats, salt, and animal foods). This has been observed in parallel to the rapid development of economy and the epidemic of cardiometabolic diseases. Even within India, dietary patterns differ between Northern and Southern regions, where Northern patterns are generally characterized by animal products, fried snacks, and sweets, whereas Southern patterns compose of increased consumption of fruits, vegetables, pulses, and rice. In Kerala we can see two major dietary patterns. The "snack-fruit" pattern characterized by food groups of fats, snacks, and fruits and the "rice-meat-refined wheat" pattern characterized by food groups of meat, rice and refined wheat. The "snack-fruit" pattern was significantly associated with increased triglycerides, whereas the "rice-meat-refined wheat pattern" was significantly associated with central obesity. There is no clear line between "healthy" and "unhealthy" diets of these two dietary patterns, as each of them probably contribute to cardiometabolic risks in different ways[28]. In this study also all the participants had followed this type of dietary patterns which played a significant role in developing dyslipidaemia.

Sedentary lifestyle and lack of regular exercises are the other etiological factors observed. The primary one is certainly the metabolic effect of exercise, as the increased energy metabolism of active people increases both the metabolism due to more muscular activity and, in the long term, the resting metabolism. Moderate endurance exercise in particular uses intramuscular triglycerides as a primary source of energy, depending on the duration. In addition to enzyme systems of the musculature, other processes of lipid metabolism are also promoted by physical activity[29]. A sedentary lifestyle causes important alterations in metabolism, such as: reduced glucose tolerance, insulin resistance, reduced lipid clearance, visceral lipid deposition, reduced circulating levels of HDL and systemic inflammation. In particular, fat accumulation in liver likely stimulates de novo lipogenesis and an increased synthesis of atherogenic lipid particles[30]. Habit of sleep before the dinner get digested and habit of day sleep are also the factors contributed to *Kaphavridhi*.

Probable Mode of Action of Drug

In *Medoroga*, due to etiological factors *Kaphadosha* become aggravated along with impaired *Agni*. There the food remains uncooked and turns more sweeter, this *Ahararasa* circulating throughout the body produces excess *Samamedas* because of its unctuousness. The channels become obstructed by the increased *Medas*, and further *dhatu* are not nourished.

So, correcting the obstructed *Srotas* by removing the excessively accumulated *Medas* after *Amapachana* and regaining the normal *Jatharagni* and *Medodhatwagni* is the target in *Medorogachikitsa*. So, the drug used for *Chikitsa* is expected to have such qualities in order to achieve this objective.

For understanding the probable mode of action of a compound, detailed analysis of its ingredient is beneficial[31]. *Parthavati* is a tablet prepared by triturating *Arjunachurna* in *Rasonadi kashaya*[32]. *Arjuna* is having *Kashayarasa*, *Laghu– Ruksha guna, Shita veerya, Katu vipaka* and *Karma* like *Kapha pittahara, hrdya* and *Medohara*. All these qualities are beneficial in *Medoroga*. *Rasona* is having *Amlavarjitha pancharasa, Snigdha-thikshna guna, Ushnaveerya, Katu vipaka* and having *Deepana-pachana-medohara-mootrala-anulomana-yakruthuttejaka karma. Karavi is* having *Katu-thiktarasa, Ruksha-laghuguna, Ushna-veerya, Katuvipaka* and *Deepana- Pachana-Vatakapha-hara karma. Pippali* is having *Katurasa, Tikshna-laghu-snigdhaguna, Madhura vipaka, Anushna virya and Kaphavatasamana-deepana-recaka-swasaharakarma. Sthira* is having *Madhura-tiktarasa, Guru-snigdha guna, Madhura vipaka shita virya* and *Vatapittasamana-karma.* The *Katu-tiktha rasa, Ushna veerya, Katu vipaka, Laghu-ruksha-tikshna guna* and *Deepana-pachana-rechaka karma* of *Parthavati* do *Pachana* of *Saamamedas* and bring about *Srotoshodhana*. It will regain *Vatanulomata* and normalcy of *Agni*. This prevents further formation of *ama*. All the ingredients are having *Medoharakarma*. Thus, *Parthavati* can address *Medoroga* and associated symptoms.

The *Aushadha sevanakala* is *Madhyamabhakta* which is mentioned for *Samanavata* there by correcting *Jatharagni*. The medicine should be taken after completing half portion of food, then the other half portion of food should be taken.

All the ingredients are proven for their hypolipidemic activity which is helpful in this condition. The hypolipidemic action of arjuna is thought to be mediated through increased hepatic clearance of cholesterol, down-regulation of lipogenic enzymes, and inhibition of HMG-CoA reductase[33-35]. Garlic act on lipid metabolism by inhibition of HMG-CoA reductase and the hydrogen sulphide release from garlic also promote oxidation of fatty acids, inhibit adipogenesis and regulate lipoproteins[36]. Black cumin maintains lipid metabolism by AMPK activation, inhibition of HMG-CoA reductase, Cholesterol absorption inhibition, HDL modulation[37]. *Pippali* regulates hepatic lipid metabolism by inhibition of HMG-CoA reductase, AMPK activation, HDL modulation, anti-oxidant and anti-inflammatory effect and reduce fat absorption by bile acid binding activity on intestine[38]. *Sthira* by its hepatoprotective activity, HMG-CoA reductase inhibition and LDL receptors expression modification regulates lipid metabolism[39]

The combination of Terminalia arjuna, Nigella sativa, Allium sativum, Desmodium gangeticum, and Piper longum in *Parthavati* suggests a comprehensive approach to address dyslipidaemia by inhibiting HMG-CoA reductase, AMPK activation, Cholesterol absorption inhibition, HDL modulation, anti-oxidant and anti-inflammatory effect. Thus, each ingredient contributes unique properties that could collectively target different aspects of dyslipidaemia.

The hypolipidemic action of all the ingredients of *Parthavati* reduced the TG and improved HDL in the blood and thus reduced the AIP value. This shows the cardioprotective action of *Partha Vati*.

As per Ayurveda, *Chikitsa* comprises of *Aushadha seva* along with regulating *Amnnapana* and *Vihara*. *Pathya* is also a part of *Chikitsa*. Since *Kaphavardhaka ahara vihara* are said to be *Nidana* for *Medoroga*, patients were advised to avoid or reduce the exposure to such factors. Being a lifestyle disorder, diet, exercise, sleep and mental status modifications are also important in the management of dyslipidemia. In order to achieve and maintain ideal body weight, high calorie food including soft drinks, candy, food high in saturated and trans fats such as red meat, whole milk products and deep-fried items were advised to avoid. Variety of fruits, vegetables, whole grain and low-fat dairy products in diet was encouraged. Participants were instructed to do moderate exercises for a minimum period of 20min per day. Yoga and meditation were advised for stress management.

CONCLUSION

Partha Vati produced complete subjective symptom relief in all study participants and demonstrated statistically significant efficacy in *Medoroga*. Treatment with *Partha Vati* led to significant reductions in clinical signs and symptoms of *Medoroga*, serum lipid concentrations, and the atherogenic index of plasma, while improving cardioprotective parameters. These findings indicate that *Partha Vati* is an effective therapeutic option for *Medoroga*, particularly for managing dyslipidemia and enhancing cardiovascular protection.

Recommendations for further research

- As significant result is seen in atherogenic index of plasma, effect of *Partha Vati* can be explored in other metabolic disorders.
- Studies in participants with higher cardiovascular risk based on atherogenic index of plasma values.
- Further studies to asses effect of *Partha Vati* in cardiac functions can be done by including various cardiac biomarkers can be done.

- Amongst female participants, dyslipidaemia was observed more in menopausal women and hence its efficacy in this group can be explored.
- Case control studies in highly elevated triglycerides in men can be explored since during observation majority of men in the population had very high triglycerides level.
- Comparative study with conventional medicine may be explored.

Limitations

- It is a single group study.
- The chances for confounding variables were there as the study was not a controlled one.
- Objective parameters like echocardiography, TMT etc., were not included for assessing cardioprotective activity.

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