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Research Article

A COMPARATIVE STUDY OF *KAPAL BHATI* AND *MEDOHARA ARKA* IN THE MANAGEMENT OF *STHAULYA* (OBESITY)

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ABSTRACT

Obesity is a blessing of the Modern age of Machines and Materialism. The impact of modern civilization has absolutely changed our life styles. Most of the peoples are forced to live a sedentary life. Obesity is a type of disease, which invites many major & minor manifestations. *Ayurveda* has described one of such disorder as *Sthaulya*. The parallel in western medicine to this order is "Obesity. It is clinically prove that both *Yoga* and *Ayurveda* are mutually supportive and offer many ways to prevent and heal various disorders as well as cleanse and rejuvenate the body. *Kapal Bhati is* reliable to control the *Sthaulya. Medohara Arka* is known to exert several beneficial physiological effects including the anti-obesitic influence.

Study Design: 90 patients, randomly divided into three groups with 30 patients in each group. In Group A, *Kapal bhati* was administered twice a day for 15 minutes in morning and evening on empty stomach for 45 days. In Group B, *Medohara arka* was administered in 30 ml dose with *Madhu anupana* twice a day for 45 days and in Group C, both *Kapal Bhati* and *Medohara arka* was administered as mentioned above.

Results & Conclusion: Marked Improvement was not observed in any of the groups. Moderate Improvement was observed in 6.66 % patients in Group A and 3.33% in Group C. Mild Improvement was observed in 80% patients in Group C and 60% patients in Group A & 53.33% in Group B. No improvement was observed as 36.66% in Group B, 33.33% in Group A and 16.66% in Group C. Thus, it can be concluded that the *Kapal Bhati* along with *Medohara Arka* is effective in the management of *Sthaulya* as it is safe, cost effective and free from any side effects.

KEYWORDS: *Kapal Bhati*, *Medohara Ark*, Obesity, *Sthaulya.*

INTRODUCTION

Obesity is one among the major diseases of modern era, increasing in prevalence. The Word Health report of W.H.O. listed Obesity under 10 top selected risks to the health. Obesity is a state of excess adipose tissue mass. Overweight refers to an excessive amount of body weight that includes muscle, bone, fat, and water[1]

Accumulation of fat over the limit led to ill/adverse effect in the body known as obesity. Body mass index (BMI) is an index of weight-for-height that is commonly used to classify overweight and obesity in adults. The World Health Organization (WHO) definition is: 1) A BMI greater than or equal to 25 is overweight and, 2) A BMI greater than or equal to 30 is obesity. BMI provides useful population-level measure of overweight and obesity as it is the same for both sexes and for all ages of adults. However, it should be considered as rough guidance because it may not correspond to the same degree of fatness in different individuals.[2, 3]

Obesity is a major health threat. Overweight and obesity are linked to more deaths worldwide than underweight. For an example, 65% of the world's population live in countries where overweight and obesity kill more people than underweight (this includes all high-income and most middle-income countries). Obesity is often associated with Dyslipidaemia which is a condition of abnormal levels of any of all lipids or lipoproteins in the blood. Obesity leads to other various complications like coronary artery disease, Diabetes Mellitus, Hypertension, Stroke, Gout, Infertility, Hypothyroidism, Psychological disorders, Gall stones and Cancer etc.[4]

The use of allopathic and pharmacological drugs has become a popular means to overcome excess weight gain [5]. While these drugs generally are effective, severe adverse toxicities may limit their overall usefulness [6, 7].

In *Ayurveda* Obesity *(Atishaulya)* is described as *medoroga*". *Atisthaulya* (obesity) is considered as one of the eight despicable conditions (*Nindniya prakruties)* according to the body constitution & obesity is one of them as described by *Acharya Charaka [8].* undesirable person and he further stated that *Sthaulya* is a *Santarpanjanya Vyadhi*[9]. With help of classical therapy and *Pathya-Apathya* concept of our *Acharyas,* we can give better results in *Sthaulya*[10] *Sthaulya* is counted as *Kapha nanatmaj vyadhi* in *Charak samhita*[11]. *Sushrut Samhita* also refers the Obesity (*Sthaulya / medoroga*) treatment in the *Sutrasthan* under the heading "*Rasanimittamev Stholyam Karshyam Cha.*[12]

It is clinically prove that both *Yoga* and *Ayurveda* are mutually supportive and offer many ways to prevent and heal various disorders as well as cleanse and

rejuvenate the body. *Yoga* have many simple, natural, effective remedies without toxic side effect and none expensive, need less care and attention and consume less time. *Kapal Bhati is* one of them. It is reliable to control the *Sthaulya. Medohara Arka* is known to exert several beneficial physiological effects including the anti-obesitic influence.

Aims and Objectives

- To assess the efficacy of *kapal bhati* in the management of *Sthaulya.*
- To assess the efficacy of *Medohara arka* in the management of *Sthaulya.*
- To compare the effect of *Kapal Bhati* and *Medohara arka* in the management of *Sthaulya.*

MATERIALS AND METHODS

Study type

Prospective, open randomized. Patients fulfilling criteria and attending OPD and IPD & Yoga Unit of Shri Dhanwantry Ayurvedic College & Dabur Dhanwantry Hospital, Chandigarh. Total 103 patients were registered for the current trial. Out of them, 10 cases dropped out from the study and study was completed in 93 cases. Further, 90 cases were selected for the present study. An informed written consent of all 103 patients was taken in language best understood by them

Inclusion Criteria

1. Patients aged between 16 to 60 years.
2. Patients having clinical signs and symptoms of *Sthaulya.*
3. Patients should not on any other medicine for *Sthaulya.*
4. Patients willing to sign the consent form.

Exclusion Criteria

1. Patients below the age of 16 years and above 60 years.
2. Patients with Hypothyroidism.
3. Patients with long term Steroid treatment.
4. Patients with severe Hypertension.
5. Patients with evidence of Renal, Hepatic and Cardiac involvement.
6. Patients with Diabetes mellitus.
7. Pregnant women

Diagnostic Criteria

1. It was mainly based on the specially prepared proforma, including all clinical signs and symptoms of the disease in which detailed history was taken and physical examination was done. Standard height–weight chart was also included (in all anthropometry). Moreover, the value of BMI, Circumferences and Skin Fold thickness were also used as diagnostic criteria.

Investigations

1. Routine haematological, urine, stool examination were done to know the present status of patients as well as to exclude other pathological conditions.
2. Relevant biochemical tests like S. Cholesterol, and S. triglyceride etc. were carried out before and after treatment.

1) Group A – *Kapal Bhati* group:

In this group *Kapal bhati* was administered twice a day, morning and evening respectively, on empty stomach.

Time period: 15 min.

Duration: 45 days

2) Group B – *Medohara arka* group:[13]

The components of *Medohara Arka* are –

1. *Gomutra Arka* 1 liter
2. *Kesar* (Crocus Sativus) 500 mg

In this group *Medohara* ark was given orally twice a day, on empty stomach.

Dose: 30 ml

Duration: 45days

Anupana: Madhoodaka

3) Group C – *Kapal Bhati* with *Medohara arka* group :

In this group, *Kapal bhati* was administered along with *Medohara arka* as mentioned above.

Duration of the trial: 45 days

Follow up: Patients will advise to visit for follow up after every fortnight for the duration of one month.

Assessment Criteria

Subjective Criteria

1. *Chala Sphika Udara Stana*

Absence of Chalatva	0
Little visible movement (in the areas) after fast movement	1
Little visible movement (in the areas) even after moderate movement	2
Movement (in the areas) after mild movement	3
Movement (in the areas) even after changing posture	4

2. *Alasya/Utsahahani*

No Alasya (doing work satisfactorily with proper vigor in time)	0
Doing work satisfactory with initiation & late in time	1
Doing work unsatisfactory with lot of mental pressure & late in time	2
Not starting any work on his own responsibility and doing little work very slowly	3
Does not take any initiation and not want to work even after pressure	4

3. *Kshudra shwasa*

Dyspnoea after heavy work (movement) but relieved soon and up to tolerance	0
Dyspnoea after moderate work but relieved later and up to tolerance	1
Dyspnoea after little work but relieved later and up to tolerance	2
Dyspnoea after little work but relieved later and beyond tolerance	3
Dyspnoea in resting condition	4

4. *Daurbalya*

Can do routine exercise	0
Can do moderate exercise without difficulty	1
Can do only mild exercise	2
Can do mild exercise with very difficulty	3
Can not do even mild exercise	4

5. *Nidradhikya*

Normal sleep 6-7 hrs. per day	0
Sleep up to 8 hours/day with anga gaurava	1
Sleep up to 8 hours/day with anga gaurava and jrimbha	2
Sleep up to 10 hours/day with tandra	3
Sleep more than 10 hours/day with tandra and klama	4

6. *Swedadhikya* (at normal temperature in normal condition)

Sweating after heavy work and fast movement or in hot season	0
Profuse sweating after moderate work and movement	1
Sweating after little work and movement	2
Profuse sweating after little work and movement	3
Sweating even at rest or in cold season	4

7. *Daurgandhya*

Absence of bad smell	0
Occasional bad smell from the body which removed after bathing	1
Persistent bad smell limited to close areas difficult to suppress with deodorants	2
Persistent bad smell felt from long distance and is not suppressed by deodorant	3
Persistent bad smell felt from long distance even intolerable to the patient himself	4

8. *Ati Pipasa*

Normal thirst (1-2 liter intake of water)	0
Up to 1 liter excess intake of water	1
1 to 2 liter excess intake of water	2
2 to 3 liter excess intake of water	3
More than 3 liter excess intake of water	4

9. *Ati Kshudha*

Taking diet 2 times a day without any supplementary diet	0
Taking diet 2 times a day with any supplementary diet	1
Taking diet 3-4 times a day without any supplementary diet	2
Taking diet 3-4 times a day with any supplementary diet	3
Taking irregular or intermittent diet	4

10. *Anga gaurava* (heaviness in body)

No heaviness in body	0
Feels heaviness in body but it does not hamper routine work	1
Feels heaviness in body which hamper daily routine work	2
Feels heaviness in body which hamper movement of the body	3
Feels heaviness with flabbiness in all over body which cause distress to the person	4

11. *Alpa Vyavaya*

Unimpaired libido and sexual performance	0
Decrease in libido but can perform sexual act	1
Decrease in libido but can perform sexual act with difficulty	2
Loss of libido and cannot perform sexual act	3

12. *Gatra Sada*

No fatigue	0
Little fatigue in doing hard work	1
Moderate fatigue in doing routine work	2
Excessive fatigue in doing routine work	3
Excessive fatigue even in doing little work	4

Objective Criteria

Cardinal measures

1. Weight
2. BMI

Circumference/ Skin fold thickness measurements

For the present study the girth measurements of certain regions using measuring tape/skin fold caliper before and after the treatment will also carried out. The girth measurement of following areas where generally the adiposity is found more was taken:

1. Chest In normal expansion at the level of nipple.
2. Waist At the level of umbilicus.
3. Hip At the level of highest point of distension of buttock.
4. Skin fold thickness of Biceps at mid level.
5. Skin fold thickness of Triceps at mid level.
6. Skin fold thickness of Sub-scapular
7. Skin fold thickness of suprailiac

Biochemical investigations

S. Cholesterol, S. triglyceride, HDL and LDL

Assessment Gradation

The suitable scoring method for signs and symptoms were recorded in following patients.

Not present/Absence of symptoms	-	0
Mild	-	1
Moderate	-	2
Severe	-	3
Very severe	-	4

Criteria for the Overall Effect of Therapy

Overall the effect of therapy has been assessed as :

Reduction in body weight - 20%
Reduction in BMI ratio - 20%
Reduction in body circumference -10%
Reduction in skin fold thickness - 10%
Improvement in signs and symptoms -40%

OBSERVATIONS AND RESULTS

The maximum numbers of patients were in the age group of 18-30 yrs. i.e. 40%, Maximum patients i.e. 76.66% were female, majority of patients i.e. 70% were Graduate /Post Graduate, Maximum patients i.e. 86.66% were performing sitting type or sedentary type of work, Maximum patients 81.11% were Married and 16.66% were bachelors, Majority of the patients i.e. 53.33% had Positive Family history,

In present series, patients were observed with *Gatrasada* and *Anga gaurava* in 94.44%, *Chala Sphika Udara Stana* and *Daurbalya* in 90% *Alasya* in 84.44%, *Nidradhikya* in 82.22%, *Kshudra shwasa* in 72.22%, *Swedadhikya* in 54.44%, *Daurgandhya* in 53.33%, *Atikshudha* in 50%, *Alpa Vyavaya* in 45.55% and *Atipipasa* was found in 32.22% of the patients.

1. *Chala Sphika Udara Stana*

Table 1: Showing pattern of clinical improvement in *Chala Sphika Udara Stana* in patient of all the three groups

Group	n	Mean			Relief %	S.D. (±)	S.E. (±)	t	p	Results
		BT	AT	X						
A	27	2.92	1.62	1.33	45.56	.907	.174	7.634	0.001	H.S
B	26	2.6	1.57	1.11	41.42	.802	.157	7.088	0.001	H.S
C	28	3	1.53	1.46	48.80	.978	.184	7.918	0.001	H.S

2. *Alasya/Utsahahani*

Table 2: Showing pattern of clinical improvement in *Alasya/Utsahahani* in patient of all the three groups

Group	n	Mean			Relief %	S.D. (±)	S.E. (±)	t	p	Results
		BT	AT	X						
A	29	2.89	2.03	0.89	30.95	0707	.131	6.82	0.001	H.S
B	23	2.86	1.95	0.91	31.81	.676	.141	6.473	0.001	H.S
C	24	3.125	1.875	1.25	40	.970	.198	6.312	0.001	H.S

3. *Kshudra shwasa*

Table 3: Showing pattern of clinical improvement in *Kshudra shwasa* in patient of all the three groups

Group	n	Mean			Relief %	S.D. (±)	S.E. (±)	t	p	Results
		BT	AT	X						
A	22	2.95	2.04	0.95	32.30	.639	.136	7.005	0.001	H.S
B	23	2.86	1.95	0.91	31.81	.676	.141	6.473	0.001	H.S
C	20	3.1	1.9	1.2	38.70	.930	.208	5.764	0.001	H.S

4. *Daurbalya*

Table 4: Showing pattern of clinical improvement in *Daurbalya* in patient of all the three groups

Group	N	Mean			Relief %	S.D. (±)	S.E. (±)	t	p	Results
		BT	AT	X						
A	26	2.92	1.96	1	34.21	.639	.125	7.977	0.001	H.S
B	26	2.88	1.88	1	34.66	.685	.134	7.433	0.001	H.S
C	29	3.1	1.9	1.2	38.70	.930	.208	5.764	0.001	H.S

5. *Nidradhikya*

Table 5: Showing pattern of clinical improvement in *Nidradhikya* in patient of all the three groups

Group	n	Mean			Relief %	S.D. (±)	S.E. (±)	t	p	Results
		BT	AT	X						
A	22	2.50	0.33	2.17	86.80	0.407	0.167	12.99	0.001	H.S

B	25	2.12	0.75	1.37	64.62	0.521	0.185	7.405	0.001	H.S
C	27	2.42	0.85	1.57	64.87	0.533	0.202	7.772	0.001	H.S

6. *Swedadhikya* (at normal temperature in normal condition)

Table 6: Showing pattern of clinical improvement in *Swedadhikya* in patient of all the three groups

Group	n	Mean			Relief %	S.D. (±)	S.E. (±)	t	p	Results
		BT	AT	X						
A	16	3	2	1.06	35.41	.852	.213	4.983	0.001	H.S
B	15	2.73	1.66	1.06	39.02	.831	.214	4.970	0.001	H.S
C	18	3.11	1.83	1.27	41.07	1.081	.254	5.011	0.001	H.S

7. *Daurgandhya*

Table 7: Showing pattern of clinical improvement in *Daurgandhya* in hands and feet in patient of all the three groups

Group	n	Mean			Relief %	S.D. (±)	S.E. (±)	t	p	Results
		BT	AT	X						
A	15	2.93	1.93	1.06	36.66	.894	.230	4.618	0.001	H.S
B	16	2.81	1.68	1.12	40	.834	.208	5.390	0.001	H.S
C	17	2.94	1.76	1.23	42	.926	.224	5.495	0.001	H.S

8. *Ati Pipasa*

Table 8: Showing pattern of clinical improvement in *Ati Pipasa* in patient of all the three groups

Group	N	Mean			Relief %	S.D. (±)	S.E. (±)	t	p	Results
		BT	AT	X						
A	10	1.80	1.00	0.80	44.44	0.578	0.183	4.371	0.01	S
B	9	1.88	1.00	0.88	46.80	0.600	0.200	4.400	0.01	S
C	10	1.70	0.70	1.00	58.82	0.816	0.258	3.875	0.01	S

9. *Ati Kshudha*

Table 9: Showing pattern of clinical improvement in *Ati Kshudha* in patient of all the three groups

Group	n	Mean			Relief %	S.D. (±)	S.E. (±)	t	p	Results
		BT	AT	X						
A	16	3	1.81	1.25	41.66	.965	.241	5.179	0.001	H.S
B	13	2.76	1.76	1	36.11	.866	.240	4.163	0.01	S
C	16	3.12	1.75	1.37	44	.904	.226	6.080	0.001	H.S

10. *Anga gaurava*

Table 10: Showing pattern of clinical improvement in *Anga gaurava* in patient of all the three groups

Group	n	Mean			Relief %	S.D. (±)	S.E. (±)	t	p	Results
		BT	AT	X						
A	28	2.8928	1.5714	1.3571	46.91	.904	.171	7.913	0.001	H.S
B	29	2.7586	1.6551	1.1034	40	.802	.148	7.405	0.001	H.S
C	28	3	1.5	1.5	50	.916	.173	8.660	0.001	H.S

11. *Alpa Vyavaya*

Table 11: Showing pattern of clinical improvement in *Alpa Vyavaya in* patient of all the three groups

Group	n	Mean			Relief %	S.D. (±)	S.E. (±)	t	p	Results
		BT	AT	X						
A	12	3	1.75	1.33	44.44	1.060	.306	4.354	0.01	S
B	13	2.76	1.61	1.15	41.66	.833	.231	4.992	0.001	H.S
C	16	3.12	1.62	1.5	48	.984	.246	6.093	0.01	S

12. *Gatra Sada*

Table 12: Showing pattern of clinical improvement in *Gatra Sada* in patient of all the three groups

Group	n	Mean			Relief %	S.D. (±)	S.E. (±)	t	p	Results
		BT	AT	X						
A	27	2.92	1.70	1.25	43.03	.826	.159	7.917	0.001	H.S
B	19	2.84	1.68	1.15	40.74	.941	.215	5.362	0.001	H.S
C	29	2.96	1.62	1.34	45.34	.923	.171	7.841	0.001	H.S

B: Anthropometric Profile

1. Body Weight

Table 13: Showing pattern of clinical improvement in Weight in patient of all the three groups

Group	n	Mean			Relief %	S.D. (±)	S.E. (±)	t	p	Results
		BT	AT	X						
A	30	82.73	79.43	3.3	3.988	1.215	.221	14.871	0.001	H.S
B	30	77.36	74.6	2.766	3.576	1.363	.248	11.112	0.001	H.S
C	30	80.26	76.23	4.033	5.024	1.490	.272	14.819	0.001	H.S

2. Body Mass Index (B.M.I)

Table 14: Showing pattern of clinical improvement in Body Mass Index (B.M.I) in patient of all the three groups

Group	n	Mean			Relief %	S.D. (±)	S.E. (±)	t	p	Results
		BT	AT	X						
A	30	34.93	33.3	1.633	4.675	.785	.143	11.38	0.001	H.S
B	30	34.9	33.46	1.4333	4.106	.704	.128	11.139	0.001	H.S
C	30	34.9	33.1	1.8	5.157	.618	.112	15.944	0.001	H.S

3. Chest Circumference

Table 15: Showing pattern of clinical improvement in Chest Circumference in patient of all the three groups

Group	n	Mean			Relief %	S.D. (±)	S.E. (±)	t	p	Results
		BT	AT	X						
A	30	100.56	98.966	1.6	1.590	1.428	.260	6.133	0.001	H.S
B	30	100.2	99	1.2	1.197	1.030	.188	6.377	0.001	H.S
C	30	100.7	98.766	1.93	1.919	.944	.172	11.212	0.001	H.S

4. Waist Circumference

Table 16: Showing pattern of clinical improvement in Waist Circumference in patient of all the three groups

Group	n	Mean			Relief %	S.D. (±)	S.E. (±)	t	p	Results
		BT	AT	X						
A	30	107.8	103.33	4.466	4.413	1.306	.238	18.73	0.001	H.S
B	30	107.53	103.73	3.8	3.533	1.423	.259	14.61	0.001	H.S
C	30	107.8	102.86	4.933	4.576	.907	.165	29.785	0.001	H.S

5. Hip Circumference

Table 17: Showing pattern of clinical improvement in Hip Circumference in patient of all the three groups

Group	n	Mean			Relief %	S.D. (±)	S.E. (±)	t	p	Results
		BT	AT	X						
A	30	109.93	106.03	3.9	3.547	1.398	.255	15.27	0.001	H.S
B	30	107.53	103.73	3.8	3.533	1.423	.259	14.61	0.001	H.S
C	30	107.8	102.86	4.93	4.576	.907	.165	29.785	0.001	H.S

C: Biochemical Profile

1. Serum Cholesterol

Table 18: Showing pattern of clinical improvement in Serum Cholesterol in patient of all the three groups

Group	n	Mean			Relief %	S.D. (±)	S.E. (±)	t	p	Results
		BT	AT	X						
A	30	220.3	211.5	8.8	3.994	7.658	1.403	6.271	0.001	H.S
B	30	220.8	211.63	9.2	4.166	7.888	1.440	6.387	0.001	H.S
C	30	220.4	205.63	14.76	6.699	11.503	2.100	7.031	0.001	H.S

2. Serum triglycerides

Table 19: Showing pattern of clinical improvement in Serum Triglycerides in patient of all the three groups

Group	n	Mean			Relief %	S.D. (±)	S.E. (±)	t	p	Results
		BT	AT	X						
A	30	180.33	168.43	11.9	6.598	8.957	1.635	7.276	0.001	H.S
B	30	181.3	168.8	12.5	6.894	8.463	1.545	8.089	0.001	H.S
C	30	182.96	167.1	15.86	8.671	8.365	1.527	10.388	0.001	H.S

In the *Kapal Bhati group*, the results were highly significant and reduction in weight and B.M.I. ratio was 3.98% and 4.6% respectively. Considering the effect of *Kapal Bhati* on body circumference, it provided highly significant relief with reduction of 4.41% in hip, 3.54% in waist, 1.59 % in chest circumference, whereas reduction in skin-fold thickness was obtained with statistically highly significant relief of 4.17% in biceps, 5.80% in triceps, 5.2% in sub-scapular and 6.22% in Suprailiac skin fold thickness. The effect of *Kapal Bhati* on biochemical parameters provided significant reduction with relief of

3.99 % in S. cholesterol, 6.59 % in S. triglyceride, and 16.49% in serum LDL and 6.92% increase in serum HDL.

In the *Medohara arka group*, the results were highly significant and reduction was observed with 3.57% in weight and 4.1% in B.M.I. ratio. Considering the effect of *Medohara arka* on body circumference, it provided highly significant relief with 3.53% in hip, 4.57% in waist, 1.19 % in chest circumference, whereas reduction in skin-fold thickness were obtained with statistically highly significant relief of 3.47% in biceps, 4.25% in triceps, 4.5% in sub-scapular and 7.36% in Suprailiac skin fold thickness. The effect of *Medohara arka* on biochemical parameters provided significant reduction with relief of 4.16 % in S. cholesterol, 6.89 % in S. triglyceride, 16.74% decrease in serum LDL and 6.58% increase in serum HDL.

In *kapal Bhati with Medohara arka group***,** the results were highly significant and reduction was observed with 5.02% relief in weight and 5.15% relief in B.M.I. ratio. Considering the effect of *Kapal Bhati* with *Medohara arka* group on body circumference, it provided highly significant relief with 4.57% in hip, 4.57% in waist, 1.91 % in chest circumference, whereas reduction in skin-fold thickness were obtained with statistically highly significant relief of 5.28% in biceps, 6.5% in triceps, 6.9% in sub-scapular and 8.47% in Suprailiac skin fold thickness. The effect of *kapal Bhati* with *Medohara arka* on biochemical parameters provided significant reduction with relief of 6.69% in S. cholesterol, 8.67% in S. triglyceride, 19.40% decrease in serum LDL and 7.49% increase in serum HDL.

DISCUSSION

Obesity is considered to be a disorder of energy balance, occurring when energy expenditure is no longer in equilibrium with daily energy intake, so as to ensure body weight homeostasis. Although the etiology of obesity is complex, dietary factors, particularly the consumption of an atherogenic diet, is considered a risk factor for its development.[14]It is well known that obesity is associated with increased adipose tissues accumulation in the body. In *Ayurveda* the role of *Agni* (digestive fire) is quite relevant to life and responsible factor for maintenance of health, digestion and metabolism from gross to subtle level. Diminished function of *Agni is* responsible for formation of *Ama,* i.e. an unwanted metabolic waste product at respective level*. Ama* has tendency to block the micro-channels (*Srotorodha*), i.e. *Medovaha srotasa*, and increases *Ama Meda* resulting to obesity.[15]

Effect of *Medohara arka* on *Sthaulya* may be as follows:

Dosha: *Kapha dosha* takes place in the pathogenesis of *Sthaulya*. *Medohara* ark is having *Kaphahara* action by virtue of its *Ushna virya,* thus it encounters *Kapha dosha. Kaphahara* action is also achieved by its dominance of *Katu rasa and laghu-ruksha guna.*

Dushya: *Meda* is the chief culprits in *Sthaulya. Medoahara arka* performs *Medo-shoshana* action due to *Katu rasa* and dominance of *Ruksha guna. Ushna virya* also helps in *Meda vilayana* action.

Agni and Ama Dosha: *Medohara arka* have *Deepana, Pachana* and *Lekhana* properties by virtue of *Katu rasa* and *Ushna virya.* Thus, it increases *Agni* and helps in *Amapachana* thereby, alleviates *Aparipakwa* and *Ama dhatu. Katu rasa* and *Ushna virya* also encounters *Dhatwagnimandya* and potentiates the weakened *Dhatwagni.*

Srotas: Due to *Katu rasa, Medohara arka* dilated all the involved channels i.e.*"Srotansi vivrunoti* action". *Katu rasa* and *Ushna virya* checks over *Medovaha* and *Mamsavaha srotodushti.*

Effect of *Kapal Bhati* on Sthaulya may be as follows

Kapha and *Meda* are chief culprits in *Sthaulya*. *Kapalbhati* eliminates vitiated *Kapha Dosha* and reduces *Meda. Mandagni, Ama-dosha* and *Medodhatwagni-mandya* plays an important role in pathogenesis of *Sthaulya. Kapalbhati* corrects the *Agni,* which pacifies *Ama Dosha* and encounters *Dhatwagni-mandya* & potentiates the weakened *Dhatwagni* including *Medodhatwagni.*

Alpa Vyavaya and *Ati Pipasa* in *Kapal Bhati* Group, *Ati Pipasa* and *Ati Kshudha* in *Medohara Arka* Group, *Alpa Vyavaya* in *Kapal bhati* and *Medohara arka* Group showed statistically significant ($p < 0.01$) with mild relief and rest all symptoms showed highly significant result in all groups.

Whereas it was observed that in *Kapal Bhati* and *Medohara arka* group, percentage relief in all signs and symptoms was more achieved compared to *Kapal bhati* group and *Medohara arka* group.

- *Kapal Bhati* with *Medohara arka* Group showed maximum percentage relief in all subjective as well as objective parameters except in *nidradhikya*. This is the only symptom in which *Kapal Bhati* showed maximum percentage relief.
- *Medohara arka* group showed higher percentage relief as compare to *Kapal Bhati* Group in Suprailiac skin fold thickness, S. cholesterol, S. triglyceride and serum LDL.
- *Kapal Bhati* Group showed higher percentage relief as compare to *Medohara arka* group in all Anthropometric profile except in Suprailiac skin fold thickness and serum HDL.

CONCLUSION

- *Sthaulya* is a predominant metabolic disorder, which is described by *Charaka* in *Ashtaunindita Purusha*. Sedentary life, lack of exercise, faulty food habits, and urbanization precipitate the disease. Genetic predisposition, *Kapha* predominant *Prakriti* increases the prevalence of *Sthaulya.*
- In *Kapal Bhati* and *Medohara arka* group, percentage relief in all signs and symptoms was more achieved compared to K*apal Bhati* group and *Medohara arka* group.
- *Kapal Bhati* with *Medohara arka* Group showed maximum percentage relief in all subjective as well as objective parameters except in *nidradhikya*. This is the only symptom in which *Kapal Bhati* showed maximum percentage relief.
- *Medohara arka* group showed higher percentage relief as compare to *Kapal Bhati* Group in Suprailiac skin fold thickness, S. cholesterol, S. triglyceride and serum LDL.
- *Kapal Bhati* Group showed higer percentage relief as compare to *Medohara arka* group in all

Anthropometric profile except in Suprailiac skin fold thickness and serum HDL.

- It can be said that *Medohara arka* is more effective to control S. triglyceride, S. cholesterol and L.D.L due to its *Karshana, Lekhana* etc. properties.
- Overall comparison of all the parameter showed that effect of *Kapal Bhati with Medohara arka* group was better on reduction of Weight, B.M.I., Skin fold thickness, Body circumference, lipids and Signs and Symptoms.
- On the completion of follow up study, it was found that weight was not regained in 14 patients out of 65. Maximum recurrence was noted in *Medohara* group.

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