

Management of Overweight and Obesity through specific Yogic procedures

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ABSTRACT : Obesity is the most hazardous factor found in modern sedentary society. It is the main underlying cause of life threatening diseases like Coronary Heart Disease, Diabetes Mellitus, Atherosclerosis etc. Therefore it is important to control the increasing weight. The alternative therapies like Ayurveda, Yoga are being increasingly popular due to the limitations of allopathy. In the present study, the efficacy of certain yogic procedures is studied on the basis of subjective and objective parameters of obesity. Statistically highly significant results are observed to decrease weight and Body Mass Index as well as subjective complaints of obesity by treatment through Yogic procedures.

Key words : Obesity, Yogasana, Pranayama, Kapalbhati.

INTRODUCTION

Obesity is a complex disorder of the modern world. It is emerged as the most prevalent sedentary lifestyle disorder in urban society. Excessive body weight is associated with various diseases particularly cardiovascular diseases, type 2, diabetes mellitus obstructive sleep apnea, certain types of cancer and osteoarthritis¹. It is known since ages as it is described well in Ayurveda. As quoted by Great physician Charaka

*Sama Mamsapramanastu Samasamhanano Narah |
Dridhendriyo vikaranam na balena abhibhuyate ||*²

Means persons having proportionate musculature and compactness of the body possess very strong sensory and motor organs and as such they are not overcome by the onslaught of diseases. But these features are now becoming a part of history slowly due to modernization. Obesity is being a widespread social disease. In the present era of modernization human life is being more and more sedentary. Daily stressful and competitive business, leading to improper dietary habits and unhealthy life style is causing metabolic disorders like obesity. This plays major role in cardiovascular disorders, atherosclerosis, hypertension, diabetes mellitus, pulmonary diseases, endocrine disorders, etc.

Ayurveda, the holistic science of life, rightly explains causes of excess fat deposition like :

*Avyayamat divaswapnat medyanam cha ati bhakshanat |
Medovahini dushyanti varunyashcha ati sevanat ||*³

This indicates that *avyayama* (lack of physical activity), *divaswapna* (day time sleep) *atimeda-*

bhakshana (excessive fat intake), *ati varuni sevan* (excess alcohol intake) lead to Medovaha strotasa disorders which resembles with obesity due to deranged fat and lipid metabolism. These various factors are very important in the aetiopathogenesis of obesity. '*Sthaulya*' is the other term used in Ayurveda which can easily be correlated with Obesity.

Definition of obesity :

Ayurveda defines Sthaulya as :

*Meda mansa ati vridhdhatvat chal sphik udara stanah |
Ayathopchayotsaho naro atisthola uchayate ||*⁴

Means the person whose fat and muscular tissues are excessively increased, that buttocks, abdomen, and breasts are movable and whose metabolism is impaired is called *Atisthula* (Obese). Obesity is an abnormal accumulation of body fat, usually 20% or more over an individual's ideal body weight. Obesity is associated with increased risk of illness, disability, and death⁵. It is defined as increase in weight of the body over the desirable level caused due to generalized deposition of fat⁶. Depending on the weight, obesity is classified as follow :

Mild to Moderate : 10-20% above desirable weight.

Moderate to severe : 20 - 30% above desirable weight.

Severe obesity : 30% above the desirable weight.

Causes for Obesity : These can be enlisted as improper dietary habits, eating more than requirement of body i.e. excess intake of calories leading to deposition of fat, lack of exercise, abnormalities in endocrine secretions of thyroid, pituitary etc. which regulate the metabolism of fat and lipids, and various psychological factors like stress, depression, bulimia nervosa are equally important in causing obesity. As modern medicine is

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showing its own limitations due to adverse drug effects and lacking in proper management of obesity, medical world is looking for the best alternative treatment options like Ayurveda and Yoga.

Yogic Concept of Obesity : Modern human has numerous conveniences at his disposal to give physical comfort and sensual pleasure. But ultimately instead of peace, rest and happiness he gets lots of physical, mental and emotional tension. Yoga offers men a conscious process to solve the problems of daily life and evoke the hidden potential in a systemic and scientific way.

The word 'Yoga' is derived from the root 'Yuja' which means to unite or integrate. The union of individual consciousness with the supreme consciousness is called *Yoga*. According to Bhagvad Geeta, *Yoga* is skill and efficiency in action. It also states *Yoga* as equanimity in success and failure.⁷ Patanjali defines *Yoga* as the Control of fluctuation and mind is *Yoga*⁸. It is integration and harmony among head, heart and limbs.

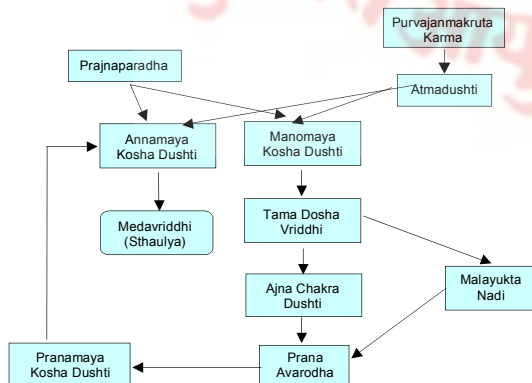
Pathogenesis of disease according to Yoga : Yoga Shastra believes in three principle causes for the occurrence of disease -

- 1) Purva Janma Vritti (deeds of previous birth),
- 2) Manasika Karma (psychological measures) and
- 3) Sharirika Karma(physical measures).

Kleshas such as *Raga, Dwesha, Abhinivesha* lead to *Chitta Vikshepas* and causes Manasika Vikaras like *Kama, Krodha, Lobha, Moha, Ahamkara*. These play integral role for Sharirika Vyadhi.

Ahara Mithya Yoga (Improper dietary habits), Jivan Charya (life style), Vegadharana(suppression of natural urges) all these lead to a series of a disease like obesity. Yoga strictly believes in process of rebirth and the Karma of Purva Janma which had not achieved their Vipaka at their time, must affect this birth in the form of disease.

Pathogenesis of Obesity in yogic view¹² :



Importance of Mitahara (Balanced Diet) :

In Yogic Classical Texts, the importance of balanced diet which is of the quantity sufficient to one's needs, is very rightly described. In Gheranda Samhita & Shiva Samhita, due importance is given to Mitahar before starting Yogic procedures.

Gheranda Samhita :

Mitahara Vinayastu Yogarambha tu Karayet !

Nana Roga Bhavanti Asya..... !!

Aadau sthanam yatha kalam Mitaharam yatha param !!

Mudga, Shalianna, Chanaka, Patol, Panasa !

Shiva Samhita :

Ateeva Bhojanam Yogi Tyajedetani Nishchitam !!

In Ayurveda also, Charaka also admits the importance of 'Mitahar' while describing the treatment of 'Shosha'⁹.

The other Yogic classical texts like Hatha Yoga Pradipika and Patanjali Yoga Sutra , in Ashtanga Yoga, Yama and Niyama are emphasized before starting Yoga.

- ♦ *Patanjali Yoga Sutra* : Yama and Niyama
- ♦ *Ten Yama* : Ahinsa Satyam Asteyam....Yamadasha !

Beneficial Yogic Procedures in Obesity :

- ♦ *Patanjala Yoga Sutra* describes :
 - Chittavritti Nirodha → Behavioral modification
 - Self control
 - Self monitoring
 - Yama - Niyama → Preventive Aspect.
 - Asana-Pranayama → Preventive Aspect & Curative aspect.
- ♦ *Gheranda Samhita* describes :
 - Shatkarma → Shodhana
 - Asana → Dridhata
 - Mudra → Sthairya
 - Pranayama → Laghava
 - Dhyana → Pratyaksha
 - Samadhi → Nirlepana

- ♦ Shatkarma are beneficial as follow :
 - Neti : *Kaphadosha Vinashyanti Divyadrishti Prajayate !*
 - Kapalabhati : *Bhavit Swachchhand Dehashcha Kaphadosham Nivarayet !!*

Hathayogapradipika :

Shatkarma : *Medah Shleshmadhikah Purve Shatkarmani Samacharet I*

Asana : *Kuryat Tad Aasanam Sthairyam Aarogyam Angalaghavam I*

Pranayama : *Nadishuddhi Chinhani : Kayasya krishata, Kanti, Analasya Pradeepanam I*

Kapalabhati : *Kapalabhati Vikhyata Kaphadosha Vishoshini I*

The above references show that Yoga is a gentle way to bring a balanced attitude to all aspects of life. Yoga helps to control oneself more effectively, whether to lose weight or to gain it. It leads life to a self disciplined, self regulatory and self conscious approach, helping the individual to control over the unnecessary patterns of improper diet and lifestyle. Various specific controlled postures called *Yogasana* may stimulate the secretions of endocrine glands to regulate the metabolic functions. So the present research was designed to study their effects scientifically in the management of obesity.

Aims and Objectives :

- 1) To study the pathogenesis of Obesity in Yogic parlance.
- 2) To evaluate efficacy of certain yogic procedures in treatment of obesity.

MATERIAL & METHODS

Patients attending OPD of Maharshi Patanjali Institute of Yoga, Naturopathy Education and Research fulfilling the following inclusion criteria were selected for study.

Inclusion criteria :

- 1) Patients having classical signs of mild to moderate obesity and willing to take treatment irrespective of sex, caste, religion.
- 2) Patients between age of 15 to 50 years.

Exclusion criteria :

- 1) Patients below age of 15 and above 50 years.
- 2) Patients having severe diseases like cardiac disorders, hypertension etc.

Criteria for assessment of results :

- 1) Gradations adopted as per the W.H.O. marking scheme especially for obesity are taken for assessment of results.
- 2) Body mass index, weight, waist to hip girth ratio are measured before and after treatment to assess the results.

Treatment plan for clinical study :

Patients were treated with yogic procedures as per specific yogic plan and trained to follow standard yogic techniques.¹⁰ Special advice regarding diet and lifestyle modification was given to patients.

TABLE NO. 1: YOGIC TREATMENT PLAN :

	1 ST week	2 nd week	3 rd week
1.	Prayer	Prayer	Prayer
2.	Sukshma vyayama ♦ Joint rotation ♦ Stretching ♦ Bending	Sukshma vyayama ♦ Joint rotation ♦ Stretching ♦ Bending	Sukshma vyayama ♦ Joint rotation ♦ Stretching ♦ Bending
3.	Surya namaskara 4 rounds	Surya namaskara 10 rounds	Surya namaskara 10 rounds
4.	Shavasana	Shavasana	Shavasana
5.	Asanas	Asanas	Asanas
A	Supine Position ♦ Uttanapadasana ♦ Pavanmuktasana ♦ Setubandhasana ♦ Matsyasana	♦ Supine Position ♦ Uttanapadasana ♦ Pavanmuktasana ♦ Setubandhasana ♦ Matsyasana ♦ Viprit karni	♦ Supine Position ♦ Uttanapadasana ♦ Pavanmuktasana ♦ Sarvangasana ♦ Matsyasana with Padmasana ♦ Naukasana
B	Prone Position ♦ Bhujangasana ♦ Ardhashalbhasana	Prone Position Bhujangasana Shalbhasana Sarpasana Dhanurasana	Prone Position Tiryaka Bhujangasana Shalbhasana Sarpasana dhanurasana
C	Sitting Position ♦ Vajrasana ♦ Mandukasana ♦ Janu-shirshasana ♦ Vakrasana	Sitting Position ♦ Vajrasana ♦ Mandukasana ♦ Janu-shirshasana ♦ Vakrasana	Sitting Position ♦ Vajrasana ♦ Mandukasana ♦ Pashchimottanasana ♦ Matsyendrasana ♦ Yog mudra

Contd....

D	Standing ♦ Tadasana ♦ Katichakrasana	Standing ♦ Tadasana ♦ Trikonasana ♦ Katichakrasana	Standing ♦ Tadasana ♦ Vrikshasana ♦ Ushtrasana
6.	Pranayama ♦ Anuloma-viloma ♦ Bhastrika ♦ Shitali	Pranayama ♦ Anuloma-viloma ♦ Bhastrika ♦ Shitali	Pranayama ♦ Anuloma-viloma ♦ Bhastrika ♦ Shitali
7.	Shat-karma ♦ Kapal bhati ♦ Agnisara	Shat-karma ♦ Kapal bhati ♦ Agnisara	Shat-karma ♦ Kapal bhati ♦ Agnisara
8.	Relaxation	Relaxation	Relaxation
9.	Om chanting	Om chanting	Om chanting

Advice : The patients were advised for Prayer or meditation twice a day, to take 2-3 sips of hot water half hr or per hour to do Surya nadi chalan 3-4 times per day and Walking for 5 km in one hour. They were advised to avoid Over eating, Eating faster with out chewing food, Sweets, fried, milk and milk products, bakery products, sugar in excessive quantity, ice - cream, chocolates .etc.,to take day time sleep and retire soon after dinner. Specific dietetic plan was advised for 21 days.

Criteria for Assessment :

For assessing the changes after treatment O.P.D. patients were examined. Counseling was done for day to day diet. The suitable scoring method and objective signs were assessed on the basis of subjective as well as objective criteria.

Subjective Criteria :

Most of the signs and symptoms of obesity are subjective in nature. To give results objectively and for statistical analysis, scoring system was adopted. This score was obtained before and after the treatment through statistical analysis and percentage relief was taken to assess the efficacy of the therapy. Score was given according to the severity of the symptoms. The details of scoring adopted for the main signs and symptoms in the present study are as follows :

Scoring pattern¹² :

- Absence of symptoms - 0
- Mild degree of symptoms - 1
- Moderate degree of symptoms - 2
- Severe degree of symptoms - 3

The details of this course adopted for the main signs and symptoms in this present study are as follows:

Weakness :

- 0 - Can do moderate to hard work.
- 1 - Can do routine work without difficulty.
- 2 - Can do routine work with difficulty.
- 3 - Can do only mild work.

Dyspnoea :

- 0 - No dyspnoea even after heavy work.
- 1 - Dyspnoea after moderate work.
- 2 - Dyspnoea after little work, but relieved later and up to tolerance.
- 3 - Dyspnoea after little work but relieved later and beyond tolerance.
- 4 - Dyspnoea in resting condition.

Hypersomnia :

- 0 - Sleep up to 6 - 7 hours a day.
- 1 - Sleep up to 8 hours a day.
- 2 - Sleep up to 8 hours with uneasiness whole day.
- 3 - Sleep up to 10 hours with dizziness.
- 4 - Sleep more than 10 hours.

Hyperhydrosis (At normal temp. at normal condition):

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

Polyphagia :

- 0 - Normal diet with lunch and dinner.
- 1 - Morning breakfast with lunch and dinner.
- 2 - Morning breakfast, lunch, dinner and food at evening.
- 3 - Supplementary food with above mentioned diet.

Polydypsia :

- 0 - Upto 1 lit of water intake a day.
- 1 - Upto 1 - 2 lit. of water intake a day.
- 2 - Upto 2 - 3 lit. of water intake a day.
- 3 - Upto 3 - 4 lit. of water intake a day.
- 4 - More than 4 lit. of water intake a day.

Oily luster of skin :

- 0 - Normal skin luster
- 1 - Mild diffuse shining skin luster.
- 2 - Moderate moisty shining skin luster.
- 3 - Oily skin luster.

The assessment was done before starting the treatment and after 21 days of treatment i.e. at the completion of the treatment and improvement was assessed on the basis of percentage relief.

Objective Criteria :

Effects were assessed objectively on body weight, B.M.I., before starting the treatment and after completion through percentage relief and statistical analysis.

B.M.I./Quetdet's Index¹³:

The B.M.I. is the actual body weight divided by the height, squared in meter (kg/m^2). This index is more closely correspondent to measurements of body fat and better differentiates "Over Weight" due to an increase in muscle mass from true Obesity.

The international classification of B.M.I. has been widely accepted based on the following range of B.M.I. values.

B.M.I. (kg/m^2)	Terminology
<20	Under weight
20 - 25	Normal
25 - 30	Overweight
30 - 40	Obese
40	Very obese

RESULTS**TABLE NO. 3 : EFFECT ON SYMPTOMS :**

Symptoms	n	Mean score		%	S.D.	S.E.	t	p
		B.T.	A.T.					
Weakness	5	1.40	1.00	28.58	0.55	0.24	1.63	<0.1
Dyspnoea	5	1.00	1.00	00.00	0.00	0.00	—	—
Polyphagia	6	1.33	0.16	87.50	0.40	0.16	7.00	<0.001
Polydypsia	4	1.25	0.75	40.00	0.57	0.28	1.73	<0.1
Hypersomnia	3	1.00	0.33	66.66	0.57	0.33	2.00	<0.1
Hyperhydrosis	3	1.33	1.33	00.00	0.00	0.0	—	—
Oily lusture	3	1.33	0.33	75.00	0.00	0.00	—	—

Presentation of Data : The data collected and compiled from the clinical work was sorted out and processed further by subjective to statistical methods.

OBSERVATIONS

Total six patients were registered for the present study and all completed the treatment. All the patients were female and between the age of 20-40 years & Hindu by religion. Among all, maximum 66.66% patients were educated up to graduate level. Maximum 50% patients were housewives. The 66.66% patients were married and 83.33% patients were from middle socio-economic class. In maximum of 50% patients, the status of Agni was Vishama. All the patients (100%) were habituated with improper diet styles like Samashana, Vishamashana and Viruddhashana. Observed for sedentary life style, 83.33% patients were not doing any physical exercise. The 66.66% patients were having Kapha-Vataja Sharira Prakriti and 83.33% were having Tamas dominant Manasa Prakriti. In the present study all (100.00%) patients were habituated to daytime sleep. The 50% patients were having Body Mass Index in the range of 25 to 30 and same number of patients were found with B.M.I. between 30 to 35.

TABLE NO. 2 : SYMPTOM WISE DISTRIBUTION :

Symptom	No. of patients	%
Weakness	05	83.33
Dyspnoea	05	83.33
Polyphagia	06	100.00
Polydypsia	04	66.66
Hypersomnia	03	50.00
Hyperhydrosis	03	50.00
Oily lusture	03	50.00

TABLE NO. 4 : EFFECT ON WEIGHT :

No.	Mean score		Mean diff.	%	X	S.D.	S.E.	t	p
	B.T.	A.T.							
1	64	61	3	4.68					
2	66	64	2	3.03					
3	65	63	2	3.07					
4	65	63	2	3.07	2.5	0.83	0.34	7.31	<0.001
5	66	62	4	6.06					
6	70	68	2	2.85					

TABLE NO. 5 : EFFECT ON B.M.I. :

No.	Mean score		Mean diff.	%	X	S.D.	S.E.	t	p
	B.T.	A.T.							
1	26.29	25.06	1.23	4.67					
2	30.13	29.21	0.29	3.05					
3	30.91	29.96	0.95	3.07					
4	26.03	25.23	0.80	3.07	1.10	0.42	0.17	6.39	<0.001
5	31.39	29.48	1.91	6.08					
6	28.76	27.94	0.82	2.85					

TABLE NO. 6 : OVERALL EFFECT OF THERAPY :

Improvement	Yoga Therapy No. of Patients	%
Unchanged	00	00.00
Mild	01	16.66
Moderate	04	66.66
Marked	01	16.66
Complete	00	00.00

Polyphagia was observed in all (100%) patients, followed by Weakness & Dyspnoea in 83.33% patients each. (Table no. 2). Remarkable (87.5%) and highly significant (<0.001) improvement was observed in Polyphagia by Yoga therapy. It relieved Polydipsia by 40% and weakness by 28.58%. Also, it resulted in 66.66% and 75% decrease in Hypersomnia and oily luster respectively. These results were insignificant statistically (Table no. 3).

Statistically highly significant results were observed in weight reduction by Yoga therapy, but the changes were not considerable in terms of percentage improvement (Table no. 4). Yoga therapy didn't reduce the BMI considerably in terms of percentage but the results were statistically highly significant (Table no. 5). On analysis of overall effect, it was revealed that Yoga therapy produced mild improvement in 16.66% patients, moderate in 66.66% and marked in 16.66% patients (Table no. 6).

DISCUSSION

The world is looking towards drugless therapies like Yoga and Naturopathy. Both are rapidly growing as the best alternative treatments. Sushruta has also mentioned the drugless therapy and quotes that the diseases may be cured by following proper diet and lifestyle without any medicine. But in the absence of proper diet and lifestyle, even after giving hundreds of medicines, the disease can't be cured.

*Vianapi Bhesajaih Vyadhi Pathyaat Eva Nivartate..
Na tu Pathya Vihinasya Bhesajaih Shataih Api...II*

An attempt to evaluate utility of Yoga in the management of overweight and obesity has been made through this study.

Age-Socio-economic status : All these factors are important in determining the life style, dietary habits and behavior as well as health consciousness of the patients.

Agni and Faulty dietary habits : All the patients were found habituated with improper dietary habits like Samashana, Viruddhashana and Vishamashana. Agni plays the most important role in digestion and metabolism of all types of food products. The dietary styles and quality of diet are also vital factors in maintenance of proper functioning of digestive system. Any wrong habit can lead to disturbances in these mechanisms. Improper digestion leads to accumulation of toxins in the body, ultimately resulting in to obesity.

Exercise and Day time sleep : Maximum patients (66.66%) were not doing any physical exercise, while remaining started it after realizing the problem of overweight. All the patients were habituated to sleep in the daytime. Sedentary life style is the main cause of excess deposition of fats in the body. Increased calorie intake and decreased work out create the imbalance in homeostasis resulting into ample physical and psychological disorders. Exercise is the only non-invasive way to burn excess calories. To resist and reduce further accumulation of toxins in the body, Day time sleep should be avoided.

Sharira Prakriti and Manas Prakriti : Maximum patients were of Kapha Vataja Sharira prakriti (66.66%) and Rajasika Manas prakriti (58.33%). Prakriti is the basic constitution of a person on which overall composition of the body as well as behavior, lifestyle and diet pattern depends. So it is highly recommended to select diet and life style according to the prakriti as the first preventive measure. Rajas is related with Affection and Tamas with Greed, both play dominant role at psychological plane in obesity, so as the Sharira dosha like Kapha and Vata.

Body Mass Index (B.M.I.) : The 50% patients were having Body Mass Index in the range of 25 to 30 and same number of patients were found with B.M.I. between 30 to 35 i.e. they were overweight and pre-obese. It was noteworthy that if treatment is advised in early stage, the prognosis is better in obese patients, so it is important to create awareness among overweight patients to seek early treatment and prevent further complications.

Symptoms of Obesity : All these can be considered as the subjective complaints of obesity. These are the manifestations of underlying faulty digestion and metabolism as well as pathogenic state, which if neglected may result into dreadful complications.

Effect of Yoga Therapy : Remarkable (87.5%) and highly significant (<0.001) improvement was observed in Polyphagia by Yoga therapy. It relieved Polydipsia by 40% and weakness by 28.58%. Statistically highly significant results were observed in weight and BMI reduction, but the changes were not considerable in terms of percentage improvement.

The results observed in Polyphagia and changes in weight and BMI are attributed to the correction of Agni by Whole Yoga Treatment Plan. Yogasana like Bhujangasana and Sarpasana are typically aimed to improve Agni¹⁴. Pranayama like Anuloma Viloma, Bhramari and Bhastrika play supportive role on correction of metabolism through regulation of the Vata dosha. Asanas like Sarvangasana, Matsyasana, Viparitarani are

effective in regulation and proper functioning of endocrine glands like Thyroid and Pituitary, which regulate all the metabolic processes¹⁵. Other Asanas like Pavanmuktasana, Uttanapadasana, Shalabhasana, Mandukasana, Janushirshasana, Paschimottanasana, Dhanurasana, Matsyendrasana and Yogamudra are effective in reducing the deposition of fat (abdominal in particular) through the stretch receptor stimulation¹⁶. These also improve muscle tone and muscle power to strengthen the musculoskeletal system¹⁷. Other balancing postures like Tadasana, Vrikshasana provide the mind-body balance to increase self-consciousness, self-awareness and self-realization¹⁸. These along with OM chanting and prayer are very important to a sense of Psycho-physical well being¹⁹.

Overall effect : Yoga therapy produced mild improvement in 16.66% patients, moderate in 66.66% and marked in 16.66% patients. However intensive study with large sample size is required to draw a concrete conclusion about the comparison of effects.

Mode of Action of Yogic Procedures :

Yoga Therapy and its mode of action :

Prayer : Every day before starting Yoga techniques, the following prayer was chanted.

Om Sahanavavatu Sahnau Bhunaktu Sahaveeryam Karavavahai I

Tejaswinavadheetamastu Ma Vidvishavahai I

Om Shanti Shanti Shantihi I

May he (lord) protect us both (Guru and Shishya) together; may he nourish us both (by bestowing the results of knowledge; may we attain vigour together ; what we study be energetic. May not we despise each other.

Prayer plays an important role for the relaxation of mind. Its anxiolytic and stress modifying effect is already searched out. Alpha rhythm becomes prominent during prayer and its general causative effect is observed on all over the body. Thus prayer is useful regarding physical, mental, intellectual and spiritual aspect.

Sukshma Vyayama : Before starting practice of Asana, Sukshma Vyayama was performed regularly. Sukshma Vyayama includes joint rotation of the body, stretching of major muscle groups and bending of different body part. Sukshma Vyayama is very necessary before practicing Asana. It reduces joint stiffness release muscle tension. It increases blood circulation, it activates mind and body in general aspect and general warming up effect is achieved so its prerequisite to Asanas.

Surya Namaskara :

The term Surya Namaskara means sun salutation as sun is a powerful symbol of spiritual consciousness. In Yogic term, practice of Surya Namaskara awakens the solar aspects of man's nature and releases this vital energy for the development of higher awareness. Surya Namaskara includes 12 physical postures as follows :

Postures	Related Chakras	Related Mantras
1. Pranamasana	Anahat Chakra	Om Mitray Nama
2. Hasta Uttanasana	Vishuddhi Chakra	Om Ravaye Nama
3. Pada Hastasana	Swadhisthana Chakra	Om Suryay Nama
4. Ashwa Sanchalanasana	Agna Chakra	Om Bhanave Nama
5. Parvatasana	Vishuddhi Chakra	Om Khagay Nama
6. Ashtanga Namashkara	Manipura Chakra	Om Pushnai Nama
7. Bhujangasana	Swadhisthana Chakra	Om Hiranya garbhay Nama
8. Parvatasana	Vishuddhi Chakra	Om Marichyay Nama
9. Ashwasan-chalanasana	Agna Chakra	Om Aadityay Nama
10. Pada Hastasana	Swadhisthana Chakra	Om Savitre Nama
11. Hast Uttanasana	Vishuddhi Chakra	Om Arkay Nama
12. Pranamasana	Anaha Chakra	Om Bhaskaray Nama

Surya Namaskara being an active and dynamic series exerts its major influence on Pingala Nadi and all the Chakras mentioned above. It generates heat effect rather thermal axis of the body deviates towards heat. So its physiological function is seen as increases B.M.R. Moreover, all the major groups of muscles get exercised by the twelve posture of Surya Namaskara.

Asana : Asanas are specific postures indicated for various psycho-physical benefits.

Uttanapadasana : This is a traditional posture, which can be viewed as first stage of Viparita Karani, Sarvangasana or Halasana. This Asana creates pressure on the lower abdomen and stretches abdominal muscles. So that it regulates bowel habit, improve digestion and also be helpful to decrease the amount of fat from greater omentum. It strengthens the muscles of thigh and pelvic brim and increases muscle tone. It strengthens the ractus abdominus muscle of abdomen and gives proper shape to the abdomen.

Pavanamuktasana : The word 'Pavan' means wind and the word 'Mukta' means to release or to make

free. Its so called because its very useful in removing wind or flatulence from the intestine and stomach. This Asana gives an excellent massage to the abdomen. In this pose the abdominal muscles are tensed and simultaneously internal organs are compressed by the folded legs. This position increases the circulation of the blood and hence helps to relieve various types of abdominal ailments associated with malfunctioning of either organs. This is useful Asana for removing constipation and flatulence specially. This Asana also tones up back muscles and spinal nerves.

Matsyasana : In this asana posture the shape of the body appears similar to fish in the water. Such a statement is bold as the fact is we don't recognize the posture as fish but one can float on the water without any movement in this asana. This stretches the Thyroid and Pitutary glands. It improves the circulation in these glands assuring healthy functioning. Also the thigh & abdomen muscles are stretched systematically.

Bhujangasana : This Asana is described in Gheranda Samhita. In Sanskrit, Bhujanga means Kobra. The final position of this Asana resembles the hooded snakes hence it is called Bhujangasana. It produces extension of spinal cord, it expands chest and strengthens chest muscles. The vital capacity of lung is increased by the practice of this Asana regularly. It improves digestion and respiration, it reduce size of protruding belly and shape up the abdomen. According to Yoga, it affects mainly on Manipura Chakra and Anahat Chakra.

Ardhashalabhasana : This is the modified simple form of Shalabhasana. This Asana is for beginners and those who are unable to perform Shalabhasana. This strengthens the extension group of muscles of thigh and also tones up the muscles of the lower abdomen. Its main effect is observed on gluteal region and lower abdomen. So it might be helpful to shape up this body parts which are most probably disfigured in obese person. It possess mainly on Muladhara and Manipur Chakra.

Vajrasana : This can be considered as a meditative posture, so one should close his eyes at the final stage. This is the only Asana which can be practiced soon after having meal. Because of its positive effect of digestion. It reduces blood circulation in the leg and increase in abdominal region. So all the digestive organs get affected passively. This Asana strengthens the thigh muscles and also the calf muscles.

Vakrasana : This Asana is a simple form of Ardha Matsyendrasana. This Asana twists the spinal column and associated ligaments, muscles, thus makes the spine flexible and reduces its rigidity. This Asana is

also useful in kidney disorders, because it directly affects the kidney. This Asana removes constipation, flatulence, liver weakness and nervous weakness.

Tadasana : This is a traditional posture. The final position of Asana resembles the palm tree. Palm tree is usually erect and straight. Therefore one should stand straight and erect in this Asana. Spine becomes flexible by performing this Asana regularly. Visceroptosis and pain in the backbone is removed by this Asana, which is a common complication of obese person. During this Asana main pressure is felt on the calcaneal region and tarsal joints of the foot which becomes strong by this Asana.

Kati Chakrasana : This Asana has come through tradition. Chakra means wheel. In this Asana, the whole body is given the shape of half a wheel. Hence it is called Chakrasana. It minimizes the stiffness of spine and connected nerves become strong. It strengthens lateral spinal ligaments. It creates pressure passively in the kidney region. Hence, kidneys are get massaged and its improved functions are achieved.

Viparita Karani : Viparita Karani is described in Gheranda Samhita. This is the further stage of Uttanapadasana. It seems that this Asana maintains the health of thyroid gland and normalizes its functions, as hypothyroidism is one of the causative factors to produce obesity it can be relieved by this Asana. This is advantageous in problems related to genital organs. This is also useful in dyspepsia, hernia and visceroptosis. It helps for the effective blood circulation in the head which is the place of all the sense organs and brain.

Sarvangasana : Sarvangasana means the Asana which influences the whole body. Its reference is not found by its name, but it is counted under the name Viparita Karani. It is a further improvement of Uttanapadasana and Viparita Karani. It increases blood supply in the head. So hypothalamus as well as pineal and pituitary glands can function more effectively. Disease like dyspepsia, constipation, hernia and visceroptosis can be treated by this Asana. All the sense organs get proper nourishment by this Asana.

Sarpasana : The pose of the body is like a snake, hence it is called Sarpasana. This Asana helps to strengthen the spinal muscles and gives a good massage to the abdomen and pelvic organs. Other benefits in this respect are similar to Bhujangasana.

Dhanurasana : Assuming the shape of a bow at the final position is called Dhanurasana. It is described in Hatha Pradipika and also in Gheranda Samhita. It makes spine and back muscles flexible and checks

nervous weakness. It helps in removing constipation and Pitta disorders. It prevents lumbar spondylosis. The muscles of arms and legs become strong by regular practice of this Asana. This Asana also reduces extra fat from the abdomen.

Trikonasana : This Asana has also come through tradition. It has been described widely in modern Yoga texts. We assume a triangular form through this practice hence it is called Trikonasana. Its practice makes the spine flexible hence is useful in back pain. It reduces stiffness of hip joint and makes it flexible. It strengthens the muscles of arms and improves strength and tolerance.

Naukasana : Naukasana is a traditional posture. Its reference is not found in old Yoga texts. The body resembles the form of a boat, hence, is named Naukasana. Mainly pressure is felt in the middle abdomen during practice of this Asana. So it is more useful in diabetes and dyspepsia. It is also a balancing pose, so general functioning of the cerebellar region is also fortified by regular practice of the Asana.

Pashchimottasana : This Asana is found in Hatha Pradipika. The meaning of 'Pashchima' is back and that of 'Tana' is stretch. This Asana strengthens the abdominal muscles and shapes the abdomen. It removes the possibility of sciatica. It reduces the tension of thigh and calf muscles and makes it flexible. It reduces the stiffness of the hip joints.

Yoga Mudra : This Yoga Mudrasana has come through tradition. Its reference is not found in old Yoga texts. The internal organs of the abdomen work efficiently as a result of regular practice of this Asana. It is beneficial in constipation and removes seminal weakness. It strengthens the pelvic floor muscles. Gradual increase in blood circulation in the head takes place during this Asana.

Vrikshasana : A tree is always in a standing position, remains stable and grows upward. The similar process is involved in this asana and hence it is called Vrikshasana. In this asana all the muscles are stretched in one direction at one time and then relaxed. This process helps to remove all the strains. The muscles get rest and relaxation and even the earlier strains caused by other asanas get removed.

Pranayama :

Anuloma Viloma : This Pranayama is also known as Nadi Shodhana Pranayama. The main characteristic feature of this Pranayama is alternate breathing through the left and right nostrils with or

without Kumbhaka. Yoga believes that left nostril breathing has a cooling effect on the body which is known as 'Ida Nadi' or 'Chandra Nadi'. It represents constructive anabolic or energy conserving aspect of the Pranic functions. The right nostril is known as 'Pingala Nadi' or 'Surya Nadi'. It is having catabolic heating and destructive effect on the body. The main purpose of Anulomaviloma Pranayama is to purify the principle channels of energy (Nadi) it is believed that due to our improper life style and other disrupting forces the Nadis are filled with morbid substances and are blocked. So the flow of Prana gets obstructed. By this Pranayama this obstruction can be removed and morbid material can be eliminated from the body. Moreover it can elevate Kapha Dosha too. In this respect, this procedure is beneficial as a remedy of obesity.

Bhastrika : The term is derived from the bellows used by blacksmith. The air is drawn in and emptied out rather quickly. After sitting in the usual meditative pose, 3 to 4 inhalation and exhalation are performed then sonorous inhalation is practiced and is quickly followed by force sound producing exhalation. This quick noisy process looks like the working of the blacksmith bellows. The 10 to 12 such respiratory rhythms are followed by one or two deep breathing. After completion of this Pranayama, Shavasana has been advocated. Bhastrika is supposed to be good for all type of disorders regarding, sluggishness of the body or depletion of Prana. Bhastrika also normalizes vitiated Kapha hence useful in obesity. This exercise is supposed to be very good for disease associated with digestive troubles.

Surya Bhedana Pranayama : The word 'Surya' means sun and root word 'Bheda' means to pierce or pass through. The breath is inspired through the right nostril which is supposed to be passed through Pingala Nadi or Surya Nadi. The expiration is run through the left nostrils rather than Ida Nadi. The Kumbhaka lasts for long as possible using chin locked posture called Mulabandha. The inspiration is always through right nostril and inspiration through left nostril. The mind remains attentive to the flow of air and the frictional sound. This Pranayama generates heat inside the body. Cleanse up Prana channel, increases digestive power. Regular practice of this Pranayama increases energy expenditure in this way it's a good measure for obesity.

Pranavochara : Aum is a one word Mantra (Beeja Mantra) and yet very powerful Mantra of all. It is the essence of all Mantras. In recent years due to scientific research, its universal and secular nature as well as the therapeutic significance is revealed.

Aum consist three words -

A : It is connected to Muladhara and Swadhisthana Chakra.

U : It is connected to Manipura Chakra.

M : It is connected to Anahat Vishuddhi and Ajna Chakra.

Aum recited ten times the internal attention is produced. Alpha rhythm becomes prominent and synchronized blood pressure and heart rate slows down which might be high in obese. It produces parasympathetic predominance and brings about calmness and peace. Anxiety and hypertension has been seen reduced and sleep pattern is improved by this Aum recitation regularly. These conditions are often seen as complication of obese. So it is very useful spiritual technique for obese person.

Shat Karma (Shodhana) :

Kapalabhati : The word Kapala means forehead or frontal part of the brain. Bhati means bellows. Kapalabhati therefore be translated as frontal brain bellows. During Kapalabhati the respiration obviously become shallow in nature. The tidal volume decreases and breathing rate is increased. Oxygen consumption is increased due to increased breathing work. Consequently CO₂ is eliminated in large quantity from the blood. O₂ consumption increases by 10 - 14% which improves total health. Vigorous contraction and relaxation of abdominal muscles will be helpful to reduce fat of abdominal area. Specially the adipose tissue of abdomen and of greater omentum. Gheranda Samhita says that Kapalabhati is useful in eliminating excessive Kapha from the body, which is also supported by Hathapradipika. In general pathogenesis of obesity Kapha is a predominant Dosha. So normalization of Kapha can be achieved by this divine procedure.

Although the sample size is small, the present study directs towards the effective treatment of obesity and controlling its complications through executing Yoga procedures in the routine stressful lifestyle. It also proves the efficacy of Yoga in controlling mind and its harmful tendencies towards improper subjects. Thus Yoga can be advised as the beneficial therapy in improving the quality of life, promoting health and preventing ailments.

CONCLUSION

Faulty dietary habits and sedentary life style are the main etiological factors in pathogenesis of obesity. Yoga therapy shows moderate improvement in the subjective symptoms of obesity and significant results in weight and BMI reduction.

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हिन्दी सारांश

यौगिक चिकित्सा पद्धति द्वारा भारवृद्धि एवं स्थौल्य की चिकित्सा

सुप्रिया जोशी (देवले), योगेश देवले, गौरवी व्यास, एवं एस. सी. दास

स्थौल्य आज के आरामप्रधान युग में महत्वपूर्ण व्याधि है। शारीरिक भार का अधिक होना हृदयरोग और मधुमेह जैसी हानिकारक व्याधियों का कारण है। इस व्याधि की चिकित्सा में आयुर्वेद तथा योग पद्धतियाँ लोकप्रिय होती जा रही हैं। प्रस्तुत अध्ययन में भारनियंत्रण तथा स्थौल्य की चिकित्सा में यौगिक पद्धतियों का अध्ययन किया गया है। इस चिकित्सा से रूग्णों में लाक्षणिक लाभ तथा अन्य मापदंडों पर सांख्यिकीय परीक्षण में अच्छा सुधार पाया गया है।

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गुजरात आयुर्वेद युनिवर्सिटी