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A REVIEW ON MULTI DIMENSIONAL ANGLE OF OBESITY AND ITS EFFECTIVE MANAGEMENT

S. K. Giri ^{1*}, Sanghamitra Patnaik ², Kavya N ³

¹Research officer, Scientist – 2 (Ayurveda), Regional Ayurveda Research Institute for Metabolic Disorders, (CCRAS), Ashoka pillar, Jayanagar, Bengaluru, Karnataka, India

²Professor and HOD, Dept of Panchakarma, Sushrutha Ayurvedic Medical College, Bengaluru, Karnataka, India

³Senior research fellow (Ayurveda), Regional Ayurveda Research Institute for Metabolic Disorders, (CCRAS), Ashoka pillar, Jayanagar, Bengaluru, Karnataka, India

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***Corresponding author**

E-mail: giridr@yahoo.co.in

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ABSTRACT

Susceptibility to sthoulya (obesity), a Medoroga (disease caused by derangement in fat metabolism) varies widely among individuals specifically in urban communities. It has deleterious effects both on body and mind. Hence, declared by W.H.O. as global epidemic giving rise to a new term 'Globesity'. Rapid increase of prevalence rate of obesity suggests all branches of physicians to understand the pathogenesis of this in the norms of basic fundamental principle of individual health sciences thoroughly and to provide successful and suitable management either by pharmacologic or non pharmacologic methods to satisfy the global demand. Entire world is expecting a fruitful control and prevention of obesity from Ayurveda which is a natural and pure health science. Keeping these facts in view, this paper is an effort to understand the nidāna (aetiology), samprāpti (pathogenesis) as well as cikitsā sūtra (treatment strategy) of Sthoulya, co-relating it with the etio-pathogenesis of obesity also presenting some successful clinical experiences for the betterment of mankind.

Keywords: Obesity, Medoroga, Sthoulya, Globesity.

INTRODUCTION

The prevalence of obesity/ Sthoulya/ Medo Roga is increasing worldwide in all age group within people of higher socio-economic status, specifically in urban communities. Maharshi Charaka opined healthy state as Proportionate musculature, compactness of the body, proper sensory & motor function. It indicates, in ancient era also, structural fitness was considered as the symbol of health. Hence obesity which is the state of excess adipose tissue mass or grossly fat & also sthoulya refers to "sthūlasya bhāva" being bulkiness i.e., abnormal increase in medo dhātu & māṃsa dhātu breaks the harmony of fitness or health.

It is a complex; multi factorial disease which invites several serious pathological complications like Hypertension, Diabetes mellitus, atherosclerosis, certain types of Cancer, hepatic steatosis, endocrine abnormalities, obstetric complications, trauma to weight bearing joints, and possibly immunologic impairment¹ as well as it hampers the cosmetic value of the victim.

Ayurveda highlights sthoulya as kapha pradhānaja (predominantly caused due to vitiated kapha doṣa), medopradoṣaja (Meda is the tissue which is predominantly affected), bahudoṣa avasthā (multifactorial condition) which can be counted as santarapaṇajanyavyādhi (Disease caused due to affected anabolism).

In ancient Indian literature, the auspicious figure of Lord Vinayaka i.e., huge abdomen and short stature, has been considered as one of the first representations of sthoulya. The later reference of sthoulya can be traced to rākṣasa (demonic characters). All the rākṣasas were known to possess a sthūla deha

(Obese body make-up), suggesting a hereditary occurrence which can be attributed as bijasvabhāva.

Obesity/sthoulya has the deleterious effect both on body and mind. Hence WHO declared it as global epidemic, giving rise a new term Globesity². United States is considered as most Obese nation followed by Mexico³ and every 3rd child is expected to be obese in next couple of years. Previously obesity was considered a lifestyle problem, but now WHO classified it as a disease due to its increasing prevalence rate. Worldwide atleast 2.8 million die each year due to overweight.

Sthoulya roga of Ayurveda comes under the heading of the medoroga which results due to the dysfunction of medo dhātvāgni (factor responsible for nourishment of medo dhātu) and is considered a metabolic disorder. Further, its description is available in aṣṭau ninditīya adhyāya (Chapter dedicated to 8 types of undesirable bodily types) of Caraka Samhita where obese are criticised by society because of inappropriate body parameters⁴.

Different trials have taken place in several hospitals, research centres, health centres to counteract obesity; however, there has been no satisfactory management protocol as there is involvement of multiple factors in obesity. Hence, there is a need for the physicians of all branches of medicine to understand the pathogenesis of obesity in the norms of their basic fundamental principles & search effective ways of management which will be beneficial for the mankind. This article is an attempt to explore the nidāna (Aetiology), samprāpti (Pathogenesis) as well as the cikitsa sūtra (Treatment principle) of sthoulya with some successful clinical experiences by correlating it with the aetio-pathogenesis of Obesity.

Understanding of Obesity in Ayurveda

Obesity is derived from the word “obesus” which means having eaten & obesity indicates grossly fat, where as “sthoulya” is “sthūlyasa bhāvaḥ” i. e., corresponding to bulkiness.

Obesity is the condition of abnormal excessive fat accumulation in adipose tissue which impaired health, abnormal growth of adipose tissue either due to enlargement of fat cell size (hypertropic) or increase in number of fat cells (hyperplastic) or combination of both leading to increase in body weight beyond the limitation of the body requirement.

Ayurveda accepts sthoulya as dūshya dominant disorder i. e., medodhātuvṛddhi in order of both qualitative and quantitative. Qualitatively, the snigdhāṁśa of fat tissue increases. The normal quantity of fat tissue in the body is said to be 2 anjali (measurement unit) of meda and 3 anjali vasā which amounts to a total of 5 anjali⁵. Quantitative increase in this also is considered under sthoulya. Total measurable quantity of body element is 56.5 anjali. So, approximate meda constitutes 11 – 12% of body composition, which is in accordance with recent modern physiology as well⁶.

Synonyms of Obesity – Over weight, Corpulence, Adiposity, Turgidity, Plumpness etc.

Synonyms of sthoulya – There are certain terms mentioned in Ayurveda which indicate over nutritional condition. Those terms can be considered synonyms of sthoulya. The terminologies are vipula, pīna, piṇva and pīrava.

Health Consequences of Obesity

Morbidity & Mortality rates are higher among obese/sthūla individuals than lean/kṛśa people. Even if the harśanītya achintā (having no stress) is the etiological factor for sthoulya, however after manifestation of sthoulya, the rate of anxiety & depression becomes higher. The premature mortality gradually increases with increasing BMI.

It is concluded by American Institute of Nutrition that the lowest mortality risk is associated with BMI between 18 to 25 kg/m². So, it proves that lean is comparatively better than obese⁷. Ayurveda also accepts that Karshya is better than Sthoulya because for both Langhana (enhances Agni & Vayu) & Bruhmana (enhances Kapha & Meda) is not suitable.

Aetiology of obesity

Obesity is known to be caused by three different kinds of factors viz. Exogenous, endogenous and miscellaneous. Diet and sedentary lifestyles are included under exogenous factors. Endocrine disorders are considered under endogenous factors. Other factors influencing body weight such as age, socio-economic causes, occupation, psychogenic factors, drugs etc constitute the miscellaneous factors.

Exogenous causes

The dietary causes can be explained under two types. It is due to increased energy intake or decreased energy expenditure or both. Increased energy intake i.e., high carbohydrate, fat & protein intake i.e. consumption of food which is madhura amla rasa pradhāna (predominantly sweet and sour in taste) and śleṣmāla (that food which increases Kapha dosha) and adhyaśana (intake of food before the earlier taken food is digested) like dietary habits.

Decreased energy expenditure includes Sedentary Life Styles like avyāyāma (lack of exercise), avyavāya (lack of sexual activity), divāsvapna (sleeping during day time) and psychological aspects such as harśanītya achintā (having no stress).

Obesity caused specifically due to disturbances in the equilibrium between energy intake & expenditure (i.e., jātarāgni vṛddhi & medodhātuvāgnimāndya) which can be controlled by co-ordinated effect of endocrine & neural signals, that can be explained as the effect of kledaka kapha, pācaka pitta, samāna vāta and vyānavāta along with medodhātuvāgni.

Alcoholism causes obesity due to disturbed liver metabolism leading to disturbances in fat metabolism. Ayurveda accepts navamadya like vāruṇi, surā, gouḍikā can cause Obesity. Charaka opines that medovahasrotas gets vitiated by atisevana of vāruṇi madya.

Endogenous cause: (Endocrine aspect)

Hereditary predisposition is one of the causes for obesity i.e. bījadosajasthoulya. Defect of bījabhāga avayava which can grossly be correlated to Chromosomes and genes may lead to defective development.

Bhavamishra has mentioned that increased proportionate of meda and decreased proportionate of śukra in bīja at the time of conception predisposes towards development of Stout but weak body.

Obesity can cause due to hormonal imbalance. Hence Obesity frequently accompanies with hypothyroidism, hypogonadism, hypopituitarism & Cushing's syndrome.

Food intake is regulated by 2 centres in hypothalamus- Feeding centre and Satiety centre⁸ and also regulated by 2 hormones – Ghrelin, which stimulates feeding centre, increases appetite & increases adipose deposition by decreasing fat oxidation. The second being Leptine, which stimulates feeding centre, decrease appetite & increases energy expenditure causing reduced body fat⁹.

We can understand all the factors as the disturbances of kledaka kapha, pācaka pitta, samāna vāta and vyānavāta along with medodhātuvāgni and āma anna rasa.

Miscellaneous

Age – Obesity occurs in all age groups. In case of females, after 40 years of age, obesity sets in due to loss of oestrogen secretion associated with menopause which has a strong influence on body fat distribution and adipocyte differentiation¹⁰.

Based on Ayurveda, during period of menopause, dhātukṣaya (tissue wasting) as well as ārtava vaha sroto dushti vardhana (disturbances in hypothalamo-pituitary-ovarian axis and hormonal imbalance) may lead to abnormal vātavṛddhi which may lead to disturbances in the control of food consumption & energy expenditure by deviation of the action of endocrine & neural signal which causes Sthoulya.

Socio Economic factors like –Incidence of Higher Income Group people is more in comparison to Lower Income Group due to sampūrṇatā (satiety) and nityaharśa (stresslessness).

Occupation – Sedentary jobs provide the fuel for occurrence of obesity.

Psychogenic factors – Ayurveda accepts acintā, priyadarśana, nityaharṣa; whereas modern medicine accepts stress as the etiology which appears controversial. The contradiction in the views of the two systems might be pointing at two different types of Obesity such as avarodhajanya (Due to blocking of channels) & kṣayajanya vāta vṛddhi (Vata vitiation caused due to wasting) leading to Sthoulya. Avarodha is caused by acintana and kṣaya due to stress.

Drugs – Excessive use tricyclic antidepressants, oral contraceptive pills, corticosteroids can cause Obesity. Ayurveda accepts excess use of vṛṣya basti (Aphrodisiac enema), bṛmhaṇa basti (Enema intended to increase weight), and excess use of rasāyana (rejuvenating therapy), vājikaraṇa (Aphrodisiac therapy) can cause sthoulya

Classification of obesity

In Ayurveda, separate type is not mentioned. Only mild, moderate, severe obesity can be co-related as medovṛddhi, sthoulya, atisthoulya. The modern science classifies obesity on the basis of onset, severity, aetiological factor, fat distribution and histopathology (Flow Chart 1)

Premonitory Symptoms

Ayurvedic texts do not specifically mention any premonitory symptoms for sthoulya. However, medovahasrotoduṣṭi lakṣaṇa (Signs and symptoms of vitiated fat metabolism) such as atinidrā (Excessive sleeping), tandrā (Drowsiness), dourgandhya (body odour), aṅgagaurava (Heaviness of the body), śaithilyatā (Loosened joints) can be taken as pūrvārūpa (Premonitory symptoms) of sthoulya. In modern science, mild symptoms can be considered as premonitory symptoms.

Clinical Features

The clinical features of Stoulya as explained in Ayurveda are Ayuhrāsa (Diminution of life span), Javoparodha (lack of enthusiasm), Kṛcchravyavāya (Difficulties of sexual act), Dourbalya (Weakness), Dourgandhya (Foul Smell), Svedābādhā (Excessive sweating), Kṣudita atimātratā (Excessive hunger), Pipāsā atiyoga (Excessive Thirst), Cala sphik stana udara (Flabby Buttocks, Breast and Abdomen), Āyatopacaya (Abdominal growth of the body), Kṣudra śvāsa (Dyspnoea), Nidrādhikya (Excessive Sleep), Gadgada vāṇi (Indistinctness of speech) and Krathana (Breathlessness). The modern science consider Weight Gain, Development of skin fold around axilla, below the breast and peritoneal region, Protuberant abdomen, Dyspnoea on exertion, Menstrual disturbances and sterility as the clinical features of Obesity.

Diagnosis

The methods described in ayurvedic text are mostly subjective. Suśruta mentions Sthoulya, Karṣya can be diagnosed by inspection. Ākrutiparīkṣa (Examination of Body make-up- BMI etc.), Pramāṇa (parameters like Height Weight etc) and Samhananaparīkṣa (tightness of tissues) can be correlated with objective criteria for diagnosis like measurement of height, weight, abdominal girth, skin fold thickness etc. Proper measurement of different Aṅgapratyaṅga are also mentioned in Caraka & Suśruta which can fulfil the objective criteria of obesity like BMI, Waist Circumference, Waist Hip Ratio, Relative Weight i.e. Actual weight / Desired weight and ponderal index i.e. Height in cm / weight in Kg.

Samshodhana in clinical practice VAMANA (Induced monitored Emesis)

- Vāsantika Vamana – in the month of Caitra of Vasanta ṛtu i.e. March act as preventive measure
- Sadhyovamana (Vamana done as an emergency treatment) – It is practices in 2 ways
1st way is Sadhyasnehana in 1 day, Kapha utkleśaka āhara 2nd day and 3rd day vamana
2nd Way – Sadhyovamana in one day with Dīpana Pachana
This only shows some improvement in subjective parameters
- Kramataḥ vamana (Planned Vamana as per protocol) – In classical methods, pācana (digestive), snehana (Oleation), svedana (Sudation), kaphotkleśaka āhara (Intake of food which increase Kapha doṣa) and vamana are to be followed in order.

In practice as well as recent research, Vamana was found to have profound influence on weight reduction, decrease of BMI, reduction of triglyceride, Total Cholesterol, Total Triglyceride, LDL, VLDL, as well as increase HDL

VIRECANA (Induced monitored Purgation)

- śarādīya virecana– In the month of Margashira i. e. November and December as preventive aspect
- kramātmaka virecana–pācana, snehana, virecana - snehapāna (Intake of formulations of Oil/Ghee) is the first step in virecana wherein, increasing quantities of selected sneha are given to the person. The medicated sneha facilitates the desired action against the disease entity. For instance, snehapāna with dhanvantaram taila is said to reduce triglycerides, indukānta ghrta, saharādī taila, mahākalyāṇaka ghrta which is widely practiced are known to increase HDL. Research shows presence of Stercobilinogen in the excretory material of virecana¹¹, which is considered an index for excretion of vikṛta pitta. Hence, the ati agni avasthā, and in turn atikṣudha and atitṛṣṇa are reduced, thus preventing medasañcaya.
- nityavirecana – Virecana given on a regular basis to the patient as palliative treatment brings about koṣṭa śodhana (purification of the GI system).

Basthi (Trans rectal administration of medicaments)

Lekhana basti (Basti using drugs with Scarifying action) has been the choice of therapy in Obesity in common practice. Medicinal formulation prepared with triphala kvātha, Honey, Cow's urine, yavakṣāra, shilājatu, hiṅgu, kāsīsa, tuttha, saindhava is used for lekhana basti which has shown significant result in reduction of weight, BMI, Waist circumference. The drugs used in lekhana basti possesses opposite quality of Meda and Kapha, which cause lekhana of Medha and also basti controls the vāyu and causes koṣṭasuddhi which starts proper metabolism by removing Vāyu āvaraṇa and provide nourishment to the later Dhātu.

Bahya Shodhana

Ruksha Udwarthana (Rubbing of dry medicated powders with friction)

The procedure of rubbing dry medicated powders over the body with friction in a direction opposite to the hair growth is termed as Udvartana. It is commonly practiced with kolakulatthādi chūrṇa (Ayurvedic compound formulation). However, other dry powders can also be made use of. An approximate of 3-4kg body weight reduction has been observed as a result of this procedure.

In Udvartana, due to increased friction to all parts of the body, the increased meda is depleted and increased heat generated during Udvartana helps in digesting the āma thus correcting the digestive metabolism in Obese people.

As per modern understanding, it could be assumed that due to increased friction to all parts of the body, the beta-3 receptor present in the adipose tissue of subcutaneous fat are stimulated, so the triglyceride present in the subcutaneous tissue will break down into fatty acids. These fatty acids are carried to liver due to the effect of centripetal massage, which increases the circulation to the internal organ for the conversion of fatty acid into bile. When this therapy is added upon with low carbohydrate diet and exercise, fats are utilized for the purpose of energy production. The bile that is formed in liver, is being expelled out through faeces. Hence the reabsorption of the bile will be decreased, in turn utilizing the lipid, which is circulated through the blood. Promotion of excretion of bile in the faeces is used as one of the treatment principle to treat hyperlipidemia¹².

A few treatment modalities commonly followed for symptomatic relief

- In case of girdle type or fatty apron type of obesity which involves hip, buttock and abdomen, paste of Eranda (*Ricinus communis*) root mixed with honey is kept overnight and its juice is consumed in the morning to reduce abdominal fat. (Vangasena)
- Atimukta (*Dalbergia oojensis* Roxb.) beejachoorana with honey or chitrakamula (Root of *Plumbago zeylanica* L.) powder with honey alleviates Abdominal Fat with excessive perspiration (Vangasena)
- In Swedadourgandhya (body odour), intake of haritaki (*Terminalia chebula* Retz.) choorna with honey in morning is advisable.

- External application of haritaki (*Terminalia chebula* Retz.) paste before bath alleviates foul odour of body.
- Haridra (*Curcuma longa* L.) with milk used for wash alleviates foul smell of the body.
- Bilwa (*Aegle marmelos* (L.) Correa) leaves with haritaki (*Terminalia chebula* Retz.) paste application alleviates foul smell of arm pit.
- Incase of excessive sweating in palm and feet, Pañca tiktaka guggulu (Ayurvedic classical compound formulation) or Ghṛta can be used.

Thus Sthoulya Cikitsā involves Patient counselling, Behavioural Modification, Dietary Management, Exercise and Pharma Therapy. Patient Counselling includes lifestyle i. e. Dinacharya (Daily regimen), Rutucharya (Seasonal regimen), Sadvritta (Proper code and conduct), etc; Dietary control; mental inclination towards losing weight.

Some common Ayurvedic formulations helpful in alleviating obesity

Vati (Tablet) and Guggulu formulations such as navaka guggulu, amṛtādi guggulu, daśāṅga guggulu, vyoṣādi guggulu; Āśava ariṣṭa (formulations with contain self generated alcohol due to fermentation) like Lauhāriṣṭa, Takrāriṣṭa. Chakradatta mentions about madhūdaka (Honey with water), or uṣṇa anna maṇḍa taken in the morning reduces body bulk.

Mudga (*Vigna radiata* (L.) R.Wilczek.) is considered to be a food item which when incorporated in diet can alleviate Obesity and Dyslipidaemia¹³.

Physical activity may help to reduce body fat & prevent the decrease in muscle mass, Decrease in serum triglyceride and increase in HDL Cholesterol, Improve physical work capacity¹⁴.

Table 1: Samprapti Ghatakas of Sthoulya

Doṣa	Kaphapradhāna tridoṣa, samāna & vyānavāyu, pācaka pitta, kledaka kapha
Dūṣya	Rasa, Meda
Agni	Medadhātuvāgni māndya, jātharāgnivṛddhi
Āma	Medodhātugata
Srotas	Annavaha, Rasavaha, Māṃsavaha, Medovaha
Srotoduṣṭi	Sañga, Vimārgagamana, Atipravṛtti
Udbhavasthāna	Āmāśaya
Sañcāraṣṭhāna	Rasāyanī
Adhiṣṭhāna	Sarvaśarīra specifically Udara, Sphik, Stana
Vyaktasthāna	Whole Body
Svabhāva	Cirakālīka
Sadhyāsadhya	Krucchrasādhya

Table 2: Complications of Obesity

System	Modern Medicine	Ayurveda
GIT	Abdominal Hernia, Gall Stone, Pancreatitis, Haemorrhoids	Āmaroga, Atikṣudhā, Atisāra, Ajīrṇa, Arśa, Bhagandhara, Kāmala
Respiratory System	Breathlessness, Abnormal Pulmonary Functions, Hypoventilation Syndrome	Kāsa, Śvāsa
Cardiovascular System	HTN, CVD, Ischemic Stroke, Varicose Veins	Kāsa, Śvāsa, Sanyāsa, Prāṇa & Ojoduṣṭi
Metabolic System	Insulin resistance, Impaired Glucose tolerance, Type 2 DM, PCOS, Menstrual Irregularities	Prameha, Pramehapiḍaka
Neurological	Idiopathic intracranial hypertension	Vātavikāra, Urustambha
Urinary System	Stress, Incontinence, Prostate Cancer	Mūtrakṛcchra, Prameha
Skin	Sweat rashes, Fungal Infection, Cellulitis, Acanthosis nigricans	Visarpa, jantuvaha, Dourgandhya
Endocrine System	Reduced Growth Hormone, reduced Prolactin response, Altered Sex Hormone	Madhumeha
Musculo Skeletal	Osteoarthritis, Gout	Vāta roga

Table 3: Fundamental Principles of Treatment in Modern Medicine and Ayurveda

Ayurveda	Modern Medicine
Medonāśaka (Guggulu)	Inhibit Fat Absorption (Orlistal)
Vātanulomaka & Srotośodhaka	Cause mobilisation of Fat mass (OB Leptine)
Apatarpana	Activation of OB receptors in Brain decreases food intake (OB Leptine)
Vātakaphanāśaka	Inhibition of Serotonin & norepinephrine re uptake – Fenfluramin & fentermin

Table 4: Effect of Vamana karma and its specific action on various factors related to Obesity

Specificity of Obesity	samprāpti vighāṭana of vamana karma
kaphapradhāna, medapradośaja vyādhi	Vamana is considered the best treatment for Kaphaja and medaja disorders as it removes vikṛta kapha and sāmasnigdha āma rasa. This can be understood by the presence of muco polysaccharide ¹⁵ in Vomitus
vāta, agni vṛddhi, sroto avarodha	Increase in D-Xylose excretion rate after Vamana Karma which indicates improved gastro intestinal absorption rate determined srotoshodhana effect which brings Vata& Agni into normal state ¹⁶ .
atikṣudha, atitrṣṇa	Induce yathā kāla kṣudha, trṣṇa
āmāśaya samudbhava vyādhi	Best clincher of āmāśaya
Samtarpana janya vyādhi	Best apatarpana cikitsā

Table 5: Food articles and Life style regimens which are to be practiced and avoided by the patients of Obesity

Types	Pathya (Do's)	Apathya(Don't's)
Cereals, Grain	PuranaShali Rice, Yava, Laja	Godhuma, New Shali
Pulses	Mudga, Masoor Dal, Kulatha Dal	Masha, Tila
Vegetables	Patola, Shigru, Ginger, Radish	MadhuraRasatmaka whole root vegetables like sweet potatoes, Potatoes etc
Fruits	Jambu, Amalaki, Bilwa, Triphala	All sweet fruits
Liquids	Honey, Takra, Hot water, Mustard Oil, Asava, Arista	Milk Preparation, Ikshu Rasa, Cold water
Physical	Physical Activity	Laziness
	Awakening	Day Sleeping
	Travelling	Lack of exercise
	Brisk Walk	Lack of movement
	Sexual Act	Absence of sexual Act

Figure 1: Classification of Obesity

Figure 2: Pathogenesis of Sthoulya

Figure 3: Aetiopathogenesis of Obesity

Figure 4: Treatment protocol based on Clinical Experience

Figure 5: Probable Mode of Action of Udvartana

CONCLUSION

Obesity is a result of over intake of Madhura, Snigdha dravya and Adhyaśana along with Avyāyāma which explains high energy intake and low energy expenditure. Hypothalamic dysfunction controlling satiety, hunger and energy expenditure can cause varying degree of obesity. Śodhana (Purificatory) and śamana (palliative) therapy modalities can be employed to treat Obesity. Educating the patient regarding life style (Dinacharya, RutuCharya), diet habits, conscious tracking of do's and don'ts are highlighted as both preventive and curative aspects of Obesity treatment. Further exploration of other treatment modalities and their validation through research is necessary.

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