OBESITY MANAGEMENT VIA HERBAL APPROACH— A REVIEW

ABSTRACT

Obesity is a one of the metabolic disorders which mainly occur due to the variation in balance between energy consumption and energy usage and furthermore, thisdisease associated with various other pathological states in obese person such as problems associated with CVS, CNS, Hormonal disorder like diabetes etc.so, it has become essential to monitor the overweight in reliable manner. There are different waysof obesity management but masses are eager to those standard ways which are cost effective with minimum side effects. In present era the plant-based approachis most widelyfamous for the control of obesity as this therapy consider with lessside effects and efficient to reduce the weight of the obese people. This present review emphasised on plant-based approach to manage obesity.

INTRODUCTION

Obesity is a disorder which results due to the over deposition of fatty substances in body. When a person is overweight then this state leads to other serious health concerns like Rise in blood pressure, other CVS disorders, hormonal changes (Diabetes),difficulty in breathingand Induction various types of carcinomas. This condition has aprominent impact on person's social life, financial status and psychological aspects due to which there is agrowth of depression [1].According to WHO approx. 2.8 million people dying each year due to Obese condition. At certain times, it was concerned with high-economicnations, but now the scenario has flipped properly and in this era this disease is also prevalent in low as well as middle-economic nations.Now the obese patients are increasing world widely. There are different measures to control obesity such as change in lifestyle, exercise, conventional medicines and surgery. But the conventional therapy has many side effects, moreover, the surgical procedures also has various complications such as infection, postoperative anastomotic fistula, deep vein thrombosis, and long-term complications such as anaemia and malnutrition [2]. Due to this scenario the herbal drugs therapy showing promising effects in obese condition, moreover, with little or no side effects.

Epidemiology of obesity according to WHO:

Globally Obesity is increasing day by day and it has almost reached to triple in number since 1975. In year 2016 approximately 1.9 billion people found to be overweight. Mostly the globalmassbelongs to those countries where this condition of obesity kills people. According to a report in year 2019 more than 38 million children under age group 5 were found to be obese.

Pathogenesis of obesity:

The basic pathogenesis of this disorder deals withincrease in energy intake and decrease in energy expenditure. Moreover, low calorie utilization regulation lead to cellulardysfunction andformation of excess of adipocytes further that lead to rise inrelease of cytokine, which further causethe complicationsassociated with vascular system such rise in lipid content in blood, abnormalities in CVS and deposition of fats in arteries[3].

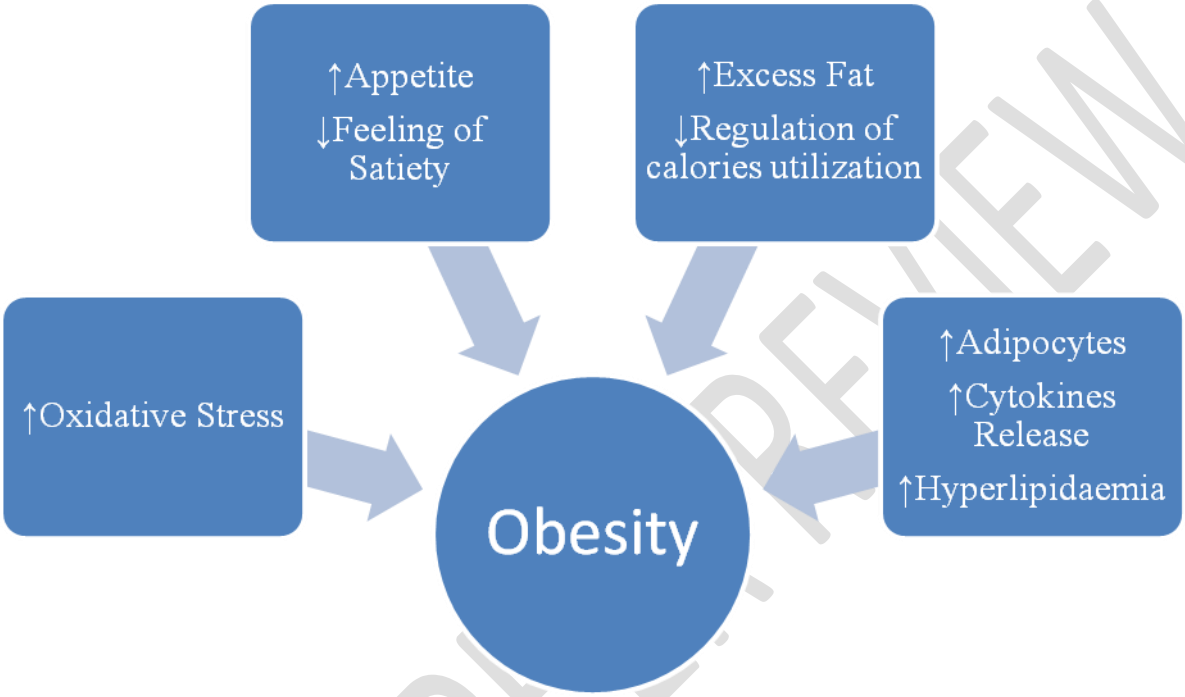


Figure 1: Representation of pathogenesis of Obesity

Body Mass Index

The one of the vital parameters of evaluation of obesity is BMI. According to guidelines released by the American Association of Clinical Endocrinologists obesity can be measured with combined effect of abnormalities related to obesity and index of body and mass. BMI is calculated by mass of body in relation to body height. So, with the help of this parameter person can be evaluated of having adequate weight/low weight/ high weight/ obese. [4,5]. The formula of calculation of this parameter is:

$$BMI = \frac{\text{weight in kilograms}}{(\text{Height in meters})^2}$$

Table 1: Classification of Weight Status by BMI

WHO CLASSIFICATION OF WEIGHT STATUS	
Weight category	**Body Mass Index (BMI), kg/m^2**
Person fall in low weight category or under weight	BMI falls below 18.5
Person fall in average weight category or normal weight	BMI is between 18.5-24.9
Person fall in highweight category or overweight	BMI falls between 25.0-29.9
Person fall in Obese Category	BMI corresponds to ≥ 30
Person fall in Obese Class I Category	BMI relates to 30.0-34.9
Person fall in Obese Class II Category	BMI is in between 35.0-39.9
Person fall in Obese Class III Category	BMI is more than or equal to 40

Management of obesity:

The major cause behind obesity is variation in balance between consumption of calories and expenditure of calories. Moreover, decrease in physical work, rise in adoption of sedentary life style, intake of high calories rich diet these are few major causes of obesity. So, regarding management of this state there is a need to control and diet as well introduction of physical activities in daily routine or few pharmacological methodologies may involve to get rid of this state of obesity such as medical natural supplements, balance diet supplements, homeopathy, surgical treatments and laser techniques etc [6].In today era as there is a wide choice of management techniques to overcome obesity with maximum effect and at low cost with less side effects. So, herbal approach is effective with promising effects along with more convenience, more cost effectiveness as well as negative side effects. Various crude drugs such as Ginger, turmeric, jalapeno, bell pepper and ginseng etc has studied and found effective in management of obesity [7,8,9]. Moreover, these plants consist of different phytoconstituents present in different parts which act by different mechanism to overcome obesity. The table below has enlisted few plants with various phytoconstituents present in them aong with mechanism of action which is responsible of effect.

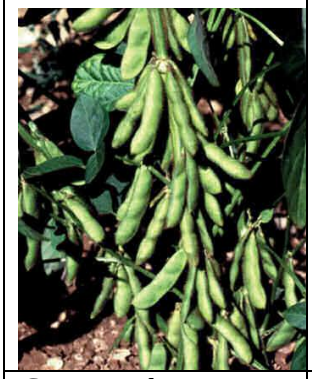
Table 2: Table Consists of Biological Source, Common Name, Plant part used, phytoconstituents and mechanism of action involved:

Botanical name Family	Common name	Plant Partused	Mechanism of Action Involved	Phytoconstituents	Ref
Aesculus turbinata Sapindaceae 	Japanese horse-chestnut	Seeds	Pancreatic lipase Inhibition; inhibition of absorption of fat and oxidation of fat	Saponons – escins, desacetyle scins.	[10]

Salacia reticulata Celatraceae 	Kothalahi mbutu	Roots and stems	Regulation of the HFD induced body weight by controlling WAT	Epicatechin, epigallocatechin	[11]
Actinidia arguta Actinidiaceae 	Hardy kiwi, kiwi berry	Roots	pancreatic lipaseInhibition, enhancement in lipolysis process	Ursolic acid	[12]
camellia sinensis Theaceae 	Tea plant Tea shrub Tea tree	Leaves and leaf buds	Inhibition of catechol O-methyl-transferase (COMT), Stimulation of thermogenesis and fat oxidation	Polyphenols	[13]
Capsicum spp Solanaceae 	Bell peppers	Fruits	Responsible for increase protein metabolism ultimately there is increase in lipid metabolism	Capsaicin	[14]

Panax quinquefolium Araliaceae 	American ginseng	Plant leaves as well as stem part	Responsible for decrease in triglyceride levels in blood plasma and rise in faecal matter due to the inhibition of pancreatic lipase enzyme	Saponins	[15]
Phaseolus vulgaris Fabaceae 	Kidney bean	Beans	Causes inhibition of enzyme alpha amylase, reduction in appetite by modulation of cholecystokinin and glucagon peptides	Phytohem agglutinin	[16]
Eisenia bicyclis Lessoniaceae 	Arame	Brown algae	Responsible for lowering the lipid levels by reducing total cholesterol, low density lipoproteins and triglycerides content	tannins, flavonoids and phenols mainly present	[17]
Rosmarinus officinalis Lamiaceae 	Rosemary	Leaves	Inhibits adipocytes differentiation	Carnosic acid	[18]

Eclipta alba Asteraceae 	False daisy	All plantparts	Responsible for Lipolytic activity	Flavonoids, tannins, sterols	[19]
Malus hupehensis Rosaceae 	Crab apple	Fruit	Lowers the serum lipid levels	Hyperoside, myricetin, kaemferol, ursolic acid	[20]
Zingiber officinale Zimgiberacea 	Ginger	Rhizomes	Enhance lipid profile	Gingerol Paradol Rutin, anthocyanins	[21]
Capsicum annum Solanaceae 	Jalapeno	Fruits	Regulates the expression of PPARα, PPARγ, UCP2 and adiponectins in body	Capsaicin	[22]
Agave angustifolia Asparagaceae	Caribbean agave	Leaves	Responsible to lowers triglyceride level and increase	Agavins	[23]

			the serum GLP-1 levels, increase ghrelin		
Glycine max L. Leguminoseae 	Black soybean	Seeds	Shows Lipolytic activity	Polyphenolic pigments	[24]
Curcuma longa Zingiberaceae 	Turmeric	Rhizomes	It shows rise in lipolysis and beta-oxidation, moreover, decrease white adipose tissue weight,serum triglyceride concentration and cholesterollevel	Curcumin	[25]

Paraguariensis Magnoliaceae 	Yerba mate	Stem bark	Responsible for rise in ghrelin levels, reduction in blood cholesterol and low-density lipoprotein levels	Polyphenolic components, flavonoids, alkaloidal constituents	[26]

Targets of the herbal plants or medicines (Mechanism of action) [27]

- By balancing the energy intake and expenditure.
- Regulates the plasma lipid content.
- Inhibition of Pancreatic lipase enzyme
- By Induction of anorexia.
- By regulation in gene expression by reducing white adipocytes (fat cells) accumulation.
- Inhibition of enzyme α-amylase.
- Increase in the fatty acids oxidation by increasing the activity of hepatic Co-A oxidase.
- By increasing the metabolism of lipid.
- Increaselevels of ghrelin.
- Various agents are word by suppressing the appetite or by inducing feeling of fullness (satiety).
- Regulation of mRNA mediated lipid metabolism.

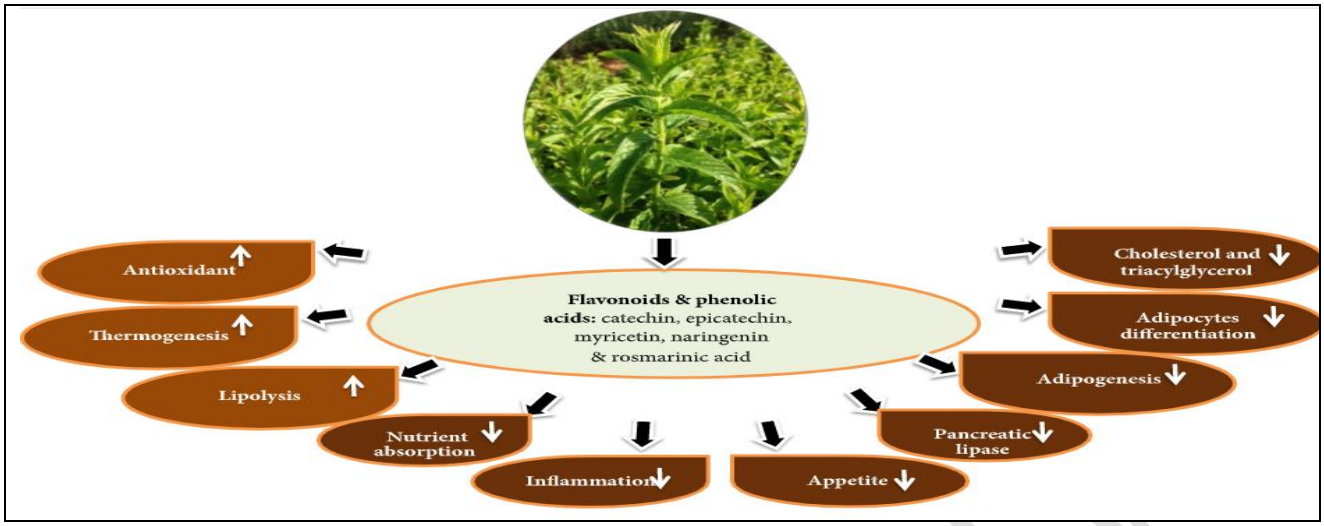


Figure 2: Mechanism of Action of herbal to manage obesity

CONCLUSION

Obesity is a metabolic disease which occur due to the ineffective balance between body's energy requirement and utilization and it leads various pathological condition in obese person like cardiovascular diseases, psychiatric disorder, type 2 diabetes therefore it became essential to control the overweight in effective manner there are various methods for the management of obesity but due to the multiple therapies for the management of obesity; Masses are more influenced towards thosemethodologies which are cheaperandnegative side effects. Nowadays,plant based drugs are commonlyadopted for the management of obesity as their lesser side effects approach and more efficiency to reduce the weight of the obese person by regulating the plasma lipid profile, inhibition of lipase, amylase, increase level of ghrelin, suppress appetite.

COMPETING INTERESTS DISCLAIMER:

Authors have declared that no competing interests exist. The products used for this research are commonly and predominantly use products in our area of research and country. There is absolutely no conflict of interest between the authors and producers of the products because we do not intend to use these products as an avenue for any litigation but for the advancement of knowledge. Also, the research was not funded by the producing company rather it was funded by personal efforts of the authors.

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