ISSN 0976 – 3333

Available Online at www.ijpba.info

International Journal of Pharmaceutical & Biological Archives 2017; 8 (1): 1-5

REVIEW ARTICLE

Recent Advance in Antiobesity Herbs

Deepak Jain[1]*, Anurekha Jain[2]

[1]*Research Scholar, Pacific Academy of Higher Education and Research University, Udaipur (Rajasthan) - 313003, India*

[2]*Dean, Jyoti Mahila Vidhyapeet University, Jaipur (Rajasthan) - 303122, India*

Received 22 Nov 2016; Revised 03 Feb 2017; Accepted 13 Feb 2017

ABSTRACT

Obesity and its associated disorders are a growing epidemic across the world. Many genetic, physiological, and behavioral factors play a role in the etiology of obesity. It is being characterized by high cholesterol, fatty acid levels, Insulin desensitization; high blood pressure; and excessive adipose mass accumulation. Currently more than 1 billion adults are overweight and at least 300 million of them are clinically obese. It is defined by body mass index and further evaluated by both percentage body tat and total body fat. Diet and exercise are known to play a valuable role in the treatment and prevention of obesity and associated disorders such as hypertension, heart disease, retinopathy, neuropathy, cancer and diabetes. Various factors modulating the development of obesity are age, sex, smoking, growth hormone level, skeletal muscle metabolism. Therefore, the purpose of this review is to examine the prevalence, etiology, consequences, and treatment of obesity.

Key words: weight loss, diet, exercise, physical activity, metabolic syndrome

INTRODUCTION

The prevalence of obesity is increasing globally, with nearly half a billion of the World's population now considered to be overweight or obese [1]. The pandemic of obesity is so great that it has even spawned a new word 'globosity'[2].Obesity can be defined as a disease in which excess body fat has accumulated such that health is adversely affected [3]. Obesity can only occur when the energy value of food eaten exceeds energy expended. This situation is known as "a positive energy balance". In this situation the excess intake of energy inevitably appears as deposits of fat.

Obesity is a worldwide communal health problem. The problem does not only affect developed countries, as there is now a significant increase in overweight and obesity throughout the developing world [4]. Obesity is a major risk factor for many chronic diseases, including diabetes mellitus, cardiovascular diseases, and cancer. Obesity was previously considered a health issue in developed countries, but is now common worldwide, particularly in urban areas.

There are many etiologic factors for this, including genetic, metabolic, behavioral and environmental variables. The rapid increase in the prevalence of overweight and obesity suggests that behavioral and environmental influences are predominant, rather than biological changes.

There are 2 parts to the obesity equation:

1. An increased intake of foods with excessive amounts of fat, salt, and sugars, but less vitamins, minerals, and other nutrients; and
2. A decrease in physical activity due to increasingly sedentary lifestyles, changing modes of transportation, irregular daily routines, and increasing urbanization.

Thus, the fundamental cause of obesity and overweight is an energy imbalance between calories consumed and those expended. The body needs a certain amount of energy, or calories, from food to sustain basic life functions. Body weight is maintained when calories eaten equals those used. When more calories are consumed than those burned, the overall energy balance is tilled toward weight gain, predisposing one towards being overweight and possibly obese [5].

***Corresponding Author:** Deepak Jain, **Email:** deep_nisha99@rediffmail.com

Due to the high morbidity and mortality, the management and treatment of obesity requires numerous resources including pharmacologic agents, balanced diets, and physical training costs.

There are 5 distinct mechanisms or strategies for weight loss:

1. Reducing food intake cither by augmenting the inhibitory effects of anorexigenic signals or factors that suppress food intake or by blocking orexigenic signals or factors that stimulate food intake.
2. Blocking nutrient absorption in the alimentary canal, in particular, fat.
3. Increasing thermogenesis by uncoupling fuel metabolism from the generation of ATP, thereby dissipating food energy as heat.
4. Modulating fat or protein metabolism or storage by regulating fat synthesis / lipolysis or adipose differentiation /apoptosis. Enhanced fat or protein turnover might reduce body weight by affecting either food intake or energy expenditure.
5. Modulating the central controller regulating body weight by –
6. Altering the internal reference value sought by the controller or
7. Modulating the primary afferent signals regarding fat stores analyzed by the controller.

This approach would have the potential advantage of forcing the endogenous controller to regulate multiple pathways of energy balance and minimize restitution.

Classification of Obesity:

A more common and scientifically acceptable definition given by WHO is the "Quetelet Index" which is also known as the "Body Mass Index" (BMI). This is calculated by dividing the weight of a person in kilograms by the square of the height in meters [7]. It is estimates the ideal weight of the individual based on their height and size.

Table 1: BMI and classification of Obesity (WHO 2008 Classification):

S. No	Classification	BMI (Kg/m^2)
1	Underweight	<I8.5
2	Normal Range	18.5 - 24.9
3	Overweight (Pre-obese)	25.0 - 29.5
4	Obese	>30.0
5	Class I Obesity	30.0 - 34.9
6	Class II Obesity	35.0 - 39.9
7	Class III Obesity	>40.0

Class III Obesity is further classified in to more descriptive Subgroups:

Sever obesity : BMI > 35 Kg/m^2
Morbid Obesity : BMI > 40 Kg/m^2
Super Obese : BMI > 50 Kg/m^2
Super - Super obese : BMI > 60 Kg/m^2

Different between obesity and over weight:

Obesity is present when a person's weight is at least 20% above the normal for that person's sex, age, height, and skeletal frame size [8]. The term "overweight" is used to describe individuals whose weight is 10-20% above their desirable weight [3].

Causes of **obesity**

At an individual level, a combination of excessive food energy intake and a lack of physical activity are thought to explain most cases of obesity [9]. A limited number of cases are primarily due to genetics, medical reasons, or psychiatric illness [10]. In contrast, increasing rates of obesity at a societal level are felt to be due to an easily accessible and palatable diet.

A 2006 review identified ten other possible contributors to the recent increase of obesity:

1. Insufficient sleep.
2. Endocrine disrupters (environmental pollutants that interfere with lipid metabolism).
3. Decreased variability in ambient temperature.
4. Decreased rates of smoking, because smoking suppresses appetite.
5. Increased use of medications that can cause weight gain (e.g., atypical antipsychotics).
6. Proportional increase in ethnic and age groups that tend to be heavier.
7. Pregnancy at a later age (which may cause susceptibility to obesity in children).
8. Epigenetic risk factors passed on generationally.
9. Natural selection for higher BMI and
10. Assortative mating leading to increased concentration of obesity risk factor [11].

Table 2: ANTI OBESITY DRUGS: [13- 16]

S. No	Drug	Mechanism of action	Adverse effects
1	Orlistat	Reduces fat absorption from the intestine by inhibiting pancreatic Hpase and reduces triglyceride hydrolysis. Low fat diet is generally advised.	Steatorrhoea (oily stools).
2	Sibutramine	Centrally acting sympathomimetic amine that enhances satiety by inhibiting nonselective uptake of nor adrenaline, serotonin and dopamine	Hypertension, serotonin syndrome

3	Metformin	It activates cAMP-activated protein kinase and suppresses hepatic gluconeogenesis activity.	Lactic acidosis, Gastrointestinal
4	Rimonabant	It is an approved but infrequently used drug.It is a canabinoid CB1 receptor antagonist. It selectively acts on CBI receptor in brain and peripheral organs, reduces lipogenesis in liver. They not only cause weight loss but in addition reverse metabolic effects of obesity, activity.	Severe depression and predisposes to neurodegenerative diseases E.g. Alzheimer's disease, amylotropic

MECHANISMS OF OBESITY:

The regulation of energy balance needs to be explored, including the neuro-endocrine factors that control energy intake, energy expenditure, and the differentiation of adipose tissue resulting from excess calories. The genes that are important in human obesity need to be identified. These include those that alter eating and physical activity behaviors, those that affect thermogenesis, and those associated with the co-morbidities of obesity. The roles of environmental and behavioral influences on metabolic factors important in obesity, as well as gene environment interactions, need to be studied. Predictive factors should be examined to identify who is most at risk of developing obesity, and whether there are critical periods of life when these factors are most operative. In addition, the influence of the intrauterine environment on the development of obesity needs to be investigated, particularly to determine whether early deprivation leads to a later propensity for overweight and associated co-morbidities, such as insulin resistance, or if high maternal weight gain and high birth weight are related to the risk of obesity and its co-morbidities.

An Ideal Herbal Remedy for Obesity [17]:

Herbal products for weight reduction may be effective in the management of obesity and associated disorders. Consistent and safe herbal product for weight reduction is a need of developed and developing countries. In our literature survey, herbal products showed potential effects on weight control. However, for the majority of products, more data are needed to assess the suitability as an anti obesity product.

We have attempted to provide salient futures for an ideal herbal product for the management of obesity.

1. Should bring down the body weight by 10% over placebo in a well designed randomized placebo con-trolled clinical trial.
2. Should show evidence of improvement of bio markers like blood pressure, lipids and glycemia.
3. Should have known mechanism of action.
4. Should be standardized with bioactive phytochemicals which is / are responsible for anti obesity activity.
5. Should not have any kind of side effects.

RATIONALE FOR USING HEBAL PRODUCTS [17]:

1. Less demanding than accepted lifestyle changes, such as exercise and diet.
2. Easily available without a prescription.
3. Health benefits of weight loss without any side effects.
4. More easily accepted than a professional consultation with a physician or a nutritionist.
5. 100% natural origin and perception that natural means safe.

Table 3: List of herbs indicated for obesity in ayurveda:

S No	Botanical name	Sanskrit / Official name	Part(s) used
1	Acacia arabica	Babbula	Gum, bark, leaf,
2	Acacia catechu	Khadira	bark, heartwood, flower
3	Achyranthus aspera	Apamarga	Root, seed, leaf,
4	Aconitum heterophyllum	Ativisha	Root, rhizome
5	Acorus calamus	Vacha	Rhizome
6	Adathoda vasica	Vasa	Leaf, root, flower
7	Aloe vera	Kumari	Leaf, root
8	Alstonia scholaris	Saptaparna	Bark, latex, flower
9	Ananas comosus	Ananas	Fruit
10	Anthocephalus chinensis	Kadamba	Bark, leaf, fruit,
11	Azadirachta indica	Nimba	All parts
12	Berberis arhtata	Daruharidra	Root, stem, fruit
13	Betula utilis	Burja	Bark, nodes
14	Calatropis gigantea	Arka	Root, bark, flower, leaf, latex, seed
15	Calicarpa macrophylla	Priyangu	Flower, leaf
16	Capsicum annuum	Kutavira	Fruit
17	Cassia tora	Chakramardha	Seed, leaf, root
18	Cedrus deodara	Devadaru	Heartwood oil
19	Cinnamomum zeylanicum	Twak	Bark, leaf, oil
20	Cissampelos pareira	Patha	Root, stem
21	Cierodendrum phlomidis	Agnimantha	Root, bark, leaf
22	Cocus nucifera	Narikela	Fruit, flower, oil, root
23	Commiphora Mukul	Guggulu	Gum-resin
24	Coriandum sativum	Dhanyaka	Whole plant, leaf, fruit
25	Costus speciosus	Kebuka	Rhizome
26	Cuminum cyminium	Jeeraka	Seed
27	Curcuma ionga	Haridra	Rhizome
28.	Desmostachya bipinnata	Kusa	Root
29	Dolichos biflorus	Kulatta	Seed
30	Embelia ribes	Vidanga	Fruit
31	Embtica officinal is	Amalaki	Fruit
32	Euphobia nerifolia	Snuhi	Latex, stem, leaf, root
33	Ferula nortex	Hingu	Oleo-gum resin
34	Ficus Glomerata	Udumbara	Bark, fruit, latex
35	Ficus lacor	Plaksha	Bark
36	Ficus religiosa	Ashwattha	Bark, fruit, leaf

37	Ficus rwnphii	Asmanthaka	Stem, bark, latex, fruit
38	Garcinia Indica	Vrikshamla	Fruit, root, bark, oil
39	Gymnema sylvestre	Meshashringi	Leaf, root, seed
40	Holarrhena antidysentrica	Kutaja	Seed, bark
41	Innula racemosa	Pushkaramula	Root
42	Marsdenia tenacissima	Murva	Root
43	Momordica charantia	Karavellaka	Fruit, whole plant, leaf, root
44	Moringa oleifera	Sigru	Root, bark, seed
45	Ougenia dalbergioides	Tinisa	Heart wood
46	Picrorhiza kurroa	Katuka	Root
47	Piper chaba	Chavya	Root, fruit
48	Piper longum	Pippali	Fruit, root
49	Piper nigrum	Maricha	Fruit
50	Plumbago zeylanica	Chitraka	Root, bark
51	Pongamia pinnata	Karanja	Fruit, seed, oil, root
52	Plerocarpus marsupeum	Bijaka	Heart wood
53	Randia dumetorum	Madanaphala	Fruit
54	Santalum album	Candana	Heartwood
55	Saussurea lappa	Kushta	Root
56	Sphaeranthus indicus	Munditaka	Whole plant
57	Stereosprmum sauvealens	Patala	Root, bark, flower, seed, leaf
58	Symplocos racemosa	Lodhra	Bark
59	Terminalia arjuna	Arjuna	Bark, root, leaf
60	Terminalia bellerica	Bibhitaka	fruit
61	Terminalia chebula	Haritaki	fruit
62.	Terminalia tomentosa	Asana	Bark, heartwood
63	Thea sinensis	Oolong tea	Leaf
64	Tinospora cordifolia	Guduchi	Stem, root
65	Trachyspermum ammi	Yavani	Fruit
66	Truxiu iin'ohiCt'nt'J	Yavasa	Whole plant
67	Tribulus terrestris	Gokshura	Fruit, root, whole plant
68	Trigonellafoenum graceum	Methika	Seed, leaf, whole plant
69	Valerianajatamansi	Tagara	Root
70	Zingiber officinale	Shunti	Rhizome
71	Ziziphus mauritiana	Badara	Root, leaf, fruit

CURRENT DRUG THERAPIES: SAFETY AND EFFICACY

As the goal of current drug therapies is to induce and maintain a state of negative energy and this is done until the desired weight loss is achieved. Based on the principle of energy intake and energy expenditure, above discussed negative balance is achieved. Prevention and treatment of obesity includes four important strategies which ensures weight loss.

1. **Appetite suppression** - Stimulate the release of anorexigenic signals which further blocks orexegenic signals. This mechanism acts centrally.
2. **Inhibition of nutrient digestion and absorption** - This is a peripherally acting mechanism thus do not directly alter chemistry of brain. This reduces energy intake through GIT mechanism.
3. **Stimulating fat metabolism** - This is done by decreasing triglycerides synthesis and deposition in fat stores.

REFERENCE

1. Rossner, S.: Obesity: the disease of the twenty-first century. *Int. J. Obes.,* 26: S2-S4 (2002).
2. Speakman, S.R.: Obesity. Part one-The greatest health threat facing mankind. *Biologist,* 50:11-14(2003).
3. Kopelman, P.O.: Obesity as a medical problem. *Nature,* 404: 635-643 (2000).
4. CPHA (Canadian Public Health Association): The continuing challenge of obesity. *Can, J.Public Health,* 97: 428 (2006).
5. Strategic Plan for NIH Obesity Research. U.S. Department of Health and Human Services, National Institutes of Health. NIH Publication No. 04-5493. 2004. Available at: http: //www.caringfordiabetes.com/Educational Resources/ LiteralureLibrary/NIH.cfm
6. Bray GA, Tartaglia LA. Medicinal strategies in the treatment of obesity. Nature 2000; 404:672-677.
7. Sanchez-Garcia, S., Garcia-Pena, C., Duque-Lopez, M.X., et al.: Anthropometric measures and nutritional status in a healthy elderly population. BMC. Public Health, 7: 2 (2007)
8. Robinson, C. H. (1972) Normal and therapelilic nutrition (14th ed.)New York: McMillan.
9. Lau DC, Douketis JD, Morrison KM, Hramiak IM, Sharma AM. Obesity canada clinical practice guidelines expert panel. CMAJ2007; 176:S1-S13.
10. Bleich S, Cutler D, Murray C, Adams A. Why is the developed world obese? Annu Rev Public Health 2008; 29:273-95.
11. Keith SW, Redden DT, Katzmarzyk PT. Putative contributors to the secular increase in obesity: exploring the roads less traveled. Int J Obes 2006; 30:1585-94.
12. Robert WS, Yolanda EB. Stemming the Obesity - Diabetes Epidemic: Lifestyle and Changes and Therapeutics. Nat Rev Nephrol 2008; 4:486-487.
13. Roh C.; Jung U.; Jo S.K. Screening of anti-obesity agent from herbal mixtures. Molecules 2012, 17, 3630-3638.
14. Udani JJ Cetal., Effects Of Acai (Enterpeolerccea Mart.) Berry Preparation on Metabolic Parameters in

a healthy overweight population: a Pilot Study, Nutritional Journal, 10(45), 2011.

15. Westerterp Plantenga MS, Smeets A,! Lejeune MPG. Sensory and gastrointestinal satiety effects of capsaicin on food intake. Int J Obes Relat Metab Disord 2004; 29: 682-688.
16. World Health Organization "Obesity And Overweight", March 4, 2009;URL:http://www.whoint/mediacentre/factsheets/fs311/en/index.html
17. Chandrasekaran C. V., Vijayalakshmi M. A., Prakash K., Bansal V. S., Meenakshi J., Amit A.: Herbal Approach for Obesity Management, *American Journal of Plant Sciences*, 2012, 3, 1003-1014