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YOGA CHIKITSA : APPLICATION OF YOGA AS THERAPY

JV'n Dr. Uttam Nikita

JAYOTI VIDYAPEETH WOMEN'S UNIVERSITY, JAIPUR
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Yoga & Obesity

Science and technology has revolutionized the life style of man. Improved standard of living has brought a great comfort to mankind. Along with these developments, the modern man has become submerged by a world full of contradictions with large number of problems and recurrent crises. There are people who have all material comforts and modern amenities at their command but even then, they are worried about health. Thus we find everyone is sick having mental as well as physical problems. Today the world is looking for solution to solve the menacing problems of unhappiness, restlessness, emotional imbalance, hyper activity, tension, stress, BP, problems, tension, stress, etc. Obesity & over weight is one of them. Obesity and its related problems are the most common disorders of today in medical practice and among the most frustrating and difficult to manage.

Overweight is generally defined as having more body fat than is optimally healthy. Being overweight is a common condition, especially where food supplies are plentiful and lifestyles are sedentary. Excess weight has reached epidemic proportions globally, with more than 1 billion adults being either overweight or obese. Increases have been observed across all age groups. A healthy body requires a minimum amount of fat for the proper functioning of the hormonal, reproductive, and immune systems, as thermal insulation, as shock absorption for sensitive areas, and as energy for future use. But the accumulation of too much storage fat can impair movement and flexibility, and can alter the appearance of the body.

Obesity

Energy Input versus Energy Output. When greater quantities of energy (in the form of food) enter the body than are expended, the body then are expended, the body weight increases. Therefore, obesity is obviously caused by excess energy input over 2 energy output. For each 9.3 Calories of excess energy entering the body, 1 gram of fat is stored. Excess energy input occurs only during the developing phase of obesity and once a person has become obese, all that is required to remain obese is that the

energy input equals the energy output. For the person to reduce in weight, the input must be less than the output. Indeed, studies of obese persons have shown that the intake of food of most of them in the static stage of obesity (after the obesity has already been attained) is approximately the same as that for normal persons. Effect of Muscular Activity on Energy Output. About one third of the energy used each day by the normal person goes into muscular activity, and in the laborer as much as two thirds or occasionally three fourths is used in this way. Since muscular activity is by far the most important means by which energy is expended in the body, it is frequently said that obesity results from too high a ratio of food intake to daily exercise. **(Guyton 1986)**

The National institutes of Health considers obesity a "Killer disease," and for good reason. A person who is obese defined as 20% above "ideal" weight based on population statistics considering age, and build is at higher risk for diabetes, digestive disorders, heart disease, kidney failure, hypertension, stroke, and cancers of the female reproductive organs and the female reproductive organs and the gallbladder. The body is enormously strained to support the extra weigh miles of blood vessels are needed to nourish the additional pounds.

Obesity refers specifically to extra pounds of fat. The proportion of fat in a human body ranges from 5% to more than 50%, with "normal" for males falling between 12% and 23% and for females between 16% and 28%. An elite athlete may have a body fat level as low as 4%. Fat distribution also affects health. Excess poundage above the waist is linked to increased risk of heart disease, diabetes, hypertension, and lipid disorders. **(Shier et al 2006)**

Theories of Obesity

(1) Some believe that overeating behaviors develop early in life (the "clean your plate" syndrome) and set the stage for adult obesity by increasing the number of fat cell formed during childhood. During early adulthood and thereafter, increases in adipose tissue mass occur by depositing more fat in the existing cell. Thus, the more cells there are, the more fat can be stored. Signals delivered by blood borne nutrients or so-called satiety chemicals (hormones and others) should prevent massive fat deposit, but it appears that

systems controlling hunger and satiety respond more quickly to carobs and protein than to fat-too slowly to stop a high-fat intake before the body has had too much. Researchers have found hints that the fat cells themselves may stimulate overeating. Supporting this idea is the observation that when yo-yo dieters lose weight, their metabolic rate falls sharply. But when they subsequently gain weight, their metabolic rate increases like a furnace being stoked. Each successive weight loss occurs more slowly, but regaining lost weight occurs three times as fast. Thus, it appears that people, like laboratory animals subjected to alternating "feasts and fasts" become increasingly food efficient, and their metabolic rates adjust to counteract any deviation from their weight "settling point" suggests that environmental factors can determine when and where weight gain ceases according to one's usual diet.

(2) Obese people are more fuel efficient and more effective "fat storers." Although it is often assumed that obese people, this is not necessarily true many actually eat less than people of normal weight.

Fat, the nutrient, is the obese person's worst enemy. Fats pack more wallop per caloric (are more fattening) than proteins or carbohydrates because of the way they are processed in the body. For example, when someone ingests 100 excess carbohydrates calories the body uses 23 of them in metabolic processing and stores 77. However, if the 100 excess calories come from fat, only 3 calories are "burned"and the rest (97) are stored. Furthermore, since carbohydrates are the preferred energy fuel for most body cells, fat stores aren't tapped until carbohydrate reserves are nearly depleted. These facts apply to everyone, but when you are obese the picture is even bleaker. For example, fat cells of overweight people "sprout" more alpha receptors (the kind that favors fat accumulation). Furthermore, the enzyme lipoprotein lipase, which un-loads fat from the blood (usually to fat cells), is exceptionally efficient and more of it formed in the obese. In fact, obesity research done at Harvard Medical School found no correlation between caloric intake and body weight, but did find

that those whose diets were highest in fat (especially saturated fats) were most over-weight regardless of the number of calories consumed.

(3) Morbid obesity is the destiny of those inheriting two obesity genes. However, a true genetic predisposition for "fatness"—distributed "with-out compassion or fairness" by recently discovered recessive obesity genes—appears to account for only about 5% of the U.S. obese. These people, given excess calories, will always deposit them as fat, as opposed to those who lay down more muscle with some of the excess calories.

Etiologic factors in obesity

Genetic factors

A number of genetic forms of obesity are well known in animals. Perhaps the beststudied of these is the obese mouse, which appears to have a constitutional defect in thermogenesis. When these mice are exposed to cold, they do not increase their heat production as do normal mice. The defect in thermogenesis appears to involve reduced levels of sodium/potassium ATPase in muscle and liver. The resulting decreased energy expenditure apparently leads to accumulation of energy stores in adipose tissue in the form of triglycerides. 5 A similar defect involving both a decrease in the number of ouabain-binding sodium/potassium ATPase sites and the activity of this enzyme has been described in the erythrocytes of some obese humans. The observation that these abnormalities did not change after weight loss suggests that it may be a constitutional defect associated with obesity. Because other investigators have failed to confirm this finding, such a conclusion must await further understanding of the technical aspects of measurement of ATPase activity. Recent investigations suggest that cholecystokinin octapeptide (CCK8) inhibits appetite in mammals when infused into the cerebral ventricles. This polypeptide, which corresponds to the 8 C terminal amino acids of intestinal cholecystokinin (CCK33), is found in higher concentrations in the central nervous system than in plasma. Deficiencies in levels of CCK8 and of its central nervous system

receptors have been postulated to exist in genetic animal models of obesity. Obesity in humans is frequently familial, but separation of genetic from environmental effect is difficult. Much of the observed familial aggregation of obesity may be related to family eating patterns, especially as they effect nutrition in infancy and early childhood. Nevertheless, studies of identical twins reared apart provide convincing evidence for substantial genetic determinants of adipose mass.

Endocrine factors

There is no established endocrine cause for most cases of obesity. However, several uncommon endocrine disorders do include obesity as one of the clinical features. Cushing's syndrome is characterized by centripetal redistribution of adipose tissue and is readily recognized by other prominent stigmas. Hyperinsulinism associated with insulinoma can lead to marked obesity, presumably by stimulating hyperphagia as well as by adipotropic metabolic effects. Some individuals with hypothyroidism become obese, probably largely because of diminished catabolic activity, although the permissive role of thyroxine in lipolysis may also be important be remembered, however, that most excess gain with hypothyroidism is due to 6 myxedema. Obesity may also be associated with Klinefelter's and Turner's syndromes, male hypogonadism, and castration.

Neurologic factors

Lesions of the ventromedial hypothalamus in animals regularly produce hyperinsulinism, hyperphagia, and obesity. Diverse structural or functional lesions of this region in humans, including tumors, trauma, and inflammation, have produced a similar type of hypertrophic obesity. Hypothalamic dysfunction is also postulated in certain rare heredofamilial syndromes of obesity. **Overeating factors**

Overeating generally refers to the long-term consumption of excess food in relation to the energy that an organism expends (or expels via excretion), leading to weight gaining and often obesity. It may be regarded as an eating disorder.

Exercise Trends factors

Worldwide there has been a large shift towards less physically demanding work. This has been accompanied by increasing use of mechanized transportation, a greater prevalence of labor saving technology in the home, and less active recreational pursuits. These exercise trends are contributing to the rising rates of chronic diseases including obesity.

Sedentary Lifestyle factors

A sedentary lifestyle is a type of lifestyle with no or irregular physical activity that is cause main of obesity in modern time. A person who lives a sedentary lifestyle may colloquially be known as a couch potato. It is commonly found in both the developed and developing world. Sedentary activities include sitting, reading, watching television, playing video games, and computer use for much of the day with little or no vigorous physical exercise. Giving up smoking is associated with an average weight gain of 4-5 kilograms (8.8-11 lb) after 12 months, most of which occurs 7 within the first three months of quitting. A sedentary lifestyle can contribute too many preventable causes of death. Screen time is the amount time a person spends watching a screen such as a television, computer monitor, or mobile device. Excessive screen time is linked to negative health consequences.

Psychologic factors

Psychologic determinants are of great importance both in the etiology of obesity and its management, individuals reared in a kindred of obese people tend to regard obesity as the norm. Overeating may represent disturbed family dynamics and involve the whole family. Parents may overfeed children in an attempt to deal with guilt, as an expression of their own unmet emotional needs, or as a distorted expression of love. Such a child often becomes

passive, overdependent, and immature in later childhood and as an adult. Overeating and decreased activity leading to obesity may occur as a response to some environmental or emotional stress such as death of a loved one, disruption of a family unit, or school or job pressures or failures. Eating patterns in some obese patients ("night-eating syndrome," "eating binge syndrome") have been associated with periods of psychologic stress. Food may become a substitute for other gratifications or may serve to relieve boredom, loneliness, or anxiety. Eating may help to stave off uncomfortable feelings of anger or depression. Obesity may serve to protect an individual from normal social interaction sexual conflicts, and exposure to the possibility of failure in such interpersonal relationships.

Habit and environmental factors appear to influence appetite regulation. Thin individuals tend to eat only when hungry, whereas obese people eat in response to such stimuli as time of day, flavor, odors, etc. Another important factor is the Old world cultural view that obesity is a sign of health and prosperity. But in a society, such as ours, which favors an image of youthful slimness, obesity can cause serious psychologic problems as well as originate from them. **(Greenspan &Forsham)**

Obesity and Metabolism

Adipose tissue is an organ of metabolism that serves as a capacitor for energy-rich fatty acids. In comparison with glycogen stored in hydrated form in liver and muscle, the unhydrated triglycerides stored in adipose tissue contain over twice the available energy per unit mass. Triglycerides are laid down during times when the supply of circulating energy substrates exceeds the need; in periods of caloric deficit, their constituent fatty acids and glycerol are yielded to the plasma for catabolism at distant tissue sites. Regulation of triglyceride storage involves both neural and endocrine factors but, as would be expected, primarily reflects the net surplus of caloric substrate available to the organism. Obesity, the state of excess storage of triglycerides, in turn exerts important effects on metabolic processes in adipose tissue and

in other organs. The metabolic and pathologic consequences of obesity increase continuously with the extent of deviation above ideal weight.

Metabolism of adipose tissue

The preponderant mass of the fatty acids stored in adipose tissue appears to come from circulating triglyceride-rich lipoproteins. The triglycerides of very low density lipoproteins (VLDL) and chylomicrons are hydrolyzed by lipoprotein lipase (LPL) located on the capillary endothelium, yielding fatty acids, most of which are transported into adipocytes. Recent evidence indicates that the LPL present in adipose tissue has a different molecular weight from that in other tissues and a lower affinity for triglyceride-bearing lipoproteins. Thus uptake of fatty acids from circulating lipoproteins by adipose tissue increases as plasma triglyceride levels rise, eg, in the postprandial state. Insulin, which induces LPL activity, also facilitates the entry of glucose into adipocytes, where it is largely converted to α-glyceryl phosphate. This compound provides the glyceryl moiety for es-terification of free fatty acids to triglycerides. Adipose tissue is capable of forming fatty acids from acetate derived from ethanol. Glucose also contributes to the synthesis of fatty acids to a limited extent.

Free fatty acids and glycerol are mobilized from adipose tissue into plasma by the hydrolysis of stored triglycerides, a process mediated by an intracellular hormone-sensitive lipase system. The first step of hydrolysis, which is rate-limiting, releases 1 mol of fatty acid. The process is rapidly completed by a diglyceridase and a monoglyceridase. Hormones that stimulate the hydrolysis of triglycerides are epinephrine, norepinephrine, ACTH, glucagon, and growth hormone. Afferent autonomics serving adipose tissue, which also mediate fatty acid mobilization, represent an important pathway by which the central nervous system exerts control over the distribution of adipose mass. Many of these stimuli increase the activity of adenylate cyclase. The resulting increase in cAMP activates a protein kinase that phosphorylates inactive triglyceridase to its active form. The phosphorylation is reversible via

a phosphatase enzyme, allowing tonic control of the lipolytic process. A phosphodiesterase damps the cAMP signal by hydrolysis of the cyclic nucleotide. Inhibition of phosphodiseterase by caffeine and theophylline potentiates the hormonal stimulation of lipolysis. Thyroxine and cortisol have a permissive effect on the stimulation of lipolysis. The hormonal and neural stimuli are opposed by insulin. Thus, when blood glucose and triglyceride levels increase after a meal, insulin promotes storage of fat and inhibits lipolysis, whereas fasting and exercise promote lipolysis relatively unopposed by insulin.

Body energy balance

When any fuel is burned, it consumes oxygen and liberates heat. The -burning" of food fuels by our cells is no exception. Energy can be neither created nor destroyed—only converted from one form to another. If we apply this principle (actually the first law of thermodynamics) to cell metabolism, it means that bond energy released as foods are catabolized must be precisely balanced by As total energy output of the body. Thus, a dynamic balance exists between the body's energy intake and its energy output: Energy intake = total energy output(heat + work + energy storage) Energy intake is considered equal to the energy liberated during food oxidation. Undigested foods are not part of the equation because they contribute no energy. Energy output includes the energy (1) immediately lost as heat (about 60% of the total), (2) used to do work (driven by ATP), and (3) stored in the form of fat or glycogen. (Because losses of organic molecules in urine, feces, and perspiration are very small in healthy people, they are usually ignored.) A close look at this situation reveals that nearly all the energy derived from foodstuffs is eventually converted to heat. Heat is lost during every cellular activity—when ATP bonds are formed and when they are cleaved to do work. as muscles contract, and through friction as blood flows through blood vessels. Though the cells cannot use this energy to do work, the heat warms the tissues and blood and helps maintain the homeostatic body temperature that allows metabolic reactions to occur

efficiently. Energy storage is an important part of the equation only during periods of growth and net fat deposit.

Hormones

Wood levels of hormones that regulate plasma nutrient levels during the absorptive and postabsorptive states may also serve as negative feedback signals to the brain. Insulin, released during food absorption, depresses hunger and is presumed to be an important satiety signal. In contrast, glucagon levels rise during fasting and stimulate hunger. Other hormonal controls include epinephrine (released during fasting) and cholecystokinin, an intestinal hormone secreted during food digestion. Epinephrine triggers hunger while cholecystokinin depresses it.

Complication of obesity

❖ Osteoarthritis of knees

In almost any obese individual some degree of osteoarthritis of the knees is inevitable so that they develop pain in knees by the age of 50 and walk with a wadding gait.

❖ Varicose veins

Torturous veins in the legs result from damage to their directly related with obesity and it has been documented that a weight reduction brings the blood pressure down without the use of drugs.

❖ Hiatus hernia

A large accumulation of fat in the abdominal cavity pushes the uppermost part of stomach into the thorax through the diaphragmatic aperture. This can lead to symptoms such as heartburn and sour regurgitation.

❖ Breathlessness

An average obese individual is all time carrying an extra load of fat of about 15-20 kg. For this reason alone one can become breathless while climbing up stairs. However, this is not all. The extra fat has its own blood supply and in this way puts some demand on the heart. There is an associated increase in blood pressure. All these factors may lead to a mild heart failure; which also may contribute to the breathlessness experienced by obese individuals. Weight reduction may reduce the symptoms.

❖ Sleep Apnea

A grossly obese individual who has about 20 kg extra fat in the body has about 300-400 gms. extra fat in the tissues of the throat and back of tongue. Snoring is a common problem. In these individuals; when they sleep, the tongue falls back and closes the throat. A chocking sensation results which awakes the patient from sleep. There are almost 20-50 awakenings per night with the resultof that the individual becomes sleep-deprived and feels drowsy in the daytime. Of late

'CPAP therapy' has been developed for such sufferers. It is given using a machine which delivers positivespressure breathing a tube fitted in the mouth. The person has to sleep with the gadget put on with the tube in his mouth and tied securely to the head.

❖ Coronary heart Disease

Both sudden death and clinically documented heart attacksare more common in obese people especially males while femalessuffer from coronary heart disease.

❖ Diabetes-(NIDDM)

It is not unusual to see an obese person becoming a diabetic. In fact obesity is always associated with insulin resistance lack of affectiveness of insulin-the blood sugar lowering hormone

❖ Back Problems

Since the enlarges protuberant abdomen changes the way a person stands it deforms the backbone and leads to what is known as spondylolisthesis. Once acquired the wrong posture cannot becorrected unless the excess of body fat is got rid of.

Management of Obesity

❖ Behavior change

Behavior change focuses on learning about eating and physical activity behaviors. The first step is to aware about the eating and physical activity habits, which tends to overeat or be inactive (such as television watching and consuming more and more spicy foods such as chips etc) and to learn to change those behaviors. Changing or modifying the eating and physical activity behaviors helps in decreasing weight.

❖ Dietary Management

By definition "diet" refers to what a person eats or drinks during the course of a day. A diet that limits portions to a very small size or that excludes certain foods entirely to promote weight loss may not be effective over the long term. Rather, one is likely to miss certain foods and find it difficult to follow this type of diet for a long time. Instead, it is often helpful to gradually change the type and amounts of food eaten and maintain these changes for the rest of ones life. The ideal diet is one that takes into account ones like and dislike and includes a wide variety of foods with enough calories and nutrients for good health.

How much we eat and what we eat play a major role in how much we weigh. So, when planning our diet, we should consider. What calorie level is appropriate? Is the diet we are considering nutritionally balanced? Will the diet be practical and easy to follow? Will be able to maintain this eating plan for the rest of life?

According to the condition and the weight, a proper chart may be got prepared in consultation with physician, which shall be followed for a specific period of time.

❖ Yogic management

In Yoga thereby we practice asanas not only for the sake of burning extra calories, but also to develop body awareness to understand the language of our body the way it works and whatsuits it best. From this understanding we can modify or adjust our diet and lifestyle to suit

the needs of our body and mind. Even though the aim of Yoga is not just reduction of weight this isbound to happen as an outcome of our increased self-awareness. Surya Namaskar (salutation to the sun)is most important for the treatment of obesity. Surya Namaskar is a complete practice itself because it is a combination of asana, pranayama, mantra and meditation. This practice has a unique influence on the endocrine and nervous system helping to correct metabolic imbalance that cause and perpetuate obesity. Being a dynamic practice it is also an excellent exercise equated to cycling jogging or swimming.

The best asanas for obesity are the Pawanamuktasana. Series for the digestive system which help to remove extra fat from the abdomen hips and thighs and activate the energy in the lower pranic centers. These practices are very good for strengthening the abdominal muscles which are usually very flaccid in the obese patient. It also helps to burn the extra fat tissue of the momentum which is fold of peritoneum in the abdomen very rich in fat tissue.

The practices from the shakthi bandha series are also effective in reducing obesity Kriyas like jaladhauti, shankha, prakshalana etc. and asanas like halasana, paschimottansana, dhaurasana, sarvangasana, matsyasana, padhastasana, Yogamudra massage the abdominal organ and to release the power of the manipurak chakra the source of willpower and self-assertiveness(which is often weak in the obese patient) and that governs all ourmetabolic processes.

The pranayama practices recommended for obesity are also the more dynamic forms which stimulate the metabolism they include bhastrika, kapalabhati and suryabhedi which are performed along with balancing practices like nadishodhan, ujjayi, sheetali and sheetkari are relaxing cooling practices which influence different hypothalamic centers which give control over thirst and the feeling of satisfaction with healthy quantities and qualities of food.

Yoga cleanses the Digestive System. Your metabolism will increase through the use of yoga. The sequences of postures are designed to cleanse the digestive system. You will find that

your body starts to burn away toxins and fat more efficiently you will feel everything in your body emptying out and revving up.

Yoga stimulates Digestion. you will work to stimulate digestion through the use of various motions specifically used in Yoga to increase blood and lymph flow to the stomach and intestine. Through a variety of posture and movements, you will ring out your digestive tract. The posture work just like the wringing out of a sponge. You will twist and purge the toxins and chemicals in your stomach, intestine, and colon, to then untwist and increase new blood flow. You will begin to create space for yourself and your food. You will stop the cycle of needing to be "full" as you will be filled with increased energy and happiness.

Yoga increases metabolism. Human body will build internal heat which will help a person to burn fat more efficiently. One of the first rules off yoga is "tapas". "Tapas" is stoking the desire and internal heat to effect change. Getting on your mat day after day is "tapas". It is reverence for yourself, your body, your life. You will turn on your metabolism and start to sweat. you will heat up. You will burn away the urge to fill your stomach with empty calories. You will lose weight in the process.

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Contact Us:

University Campus Address:

Jayoti Vidyapeeth Women's University

Vadaant Gyan Valley, Village-Jharna, Mahala Jobner Link Road,

Jaipur Ajmer Express Way, NH-8, Jaipur- 303122, Rajasthan (INDIA)

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