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Indian Vegetables boost Immunity and Truncate obesity: A Review

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Abstract

Universally obesity and morbidly obese are amalgamated to more demises worldwide than gaunt. India, meticulous for malnourishment, is now a homeland of obese. Obesity in our country has extended epizootic proportions in the 21st century, with morbid obese affecting 5% of the country's populace. India is ensuing an inclination of other progressive countries that are consistently becoming more obese. Carrying enormous weight increases risk of heart problem, diabetes, liver disorder, osteoarthritis and certain categories of cancer. If anyone is grappling with abdominal condition, a variety of low-calorie, high-fiber fruits and vegetables can constitute a healthy diet plan for weight loss.

Keywords: Obesity, morbidly obese, phytochemicals, vitamins, anti-oxidants, Indian vegetables

1. Introduction

Obesity and Overweight as well as their related non-communicable diseases, are largely preventable. Worldwide obesity has nearly tripled since 1975. Obesity and overweight usually lead to a plethora of fatal diseases across the globe, which ultimately lead to death. To lose weight, we need to create a calorie deficit by eating fewer calories than our body needs to maintain its current weight. The healthy way to achieve this deficit is by filling a diet with low-calorie, nutrient-dense foods that fill up while reducing calorie intake. Making healthy Indian fruits and vegetables the basis of your weight-loss diet is a good way to go.

1.1 Measure of obesity and over weight

Obesity and Overweight are defined as abnormal or ample fat agglomerate that may diminish health. Body mass index (BMI) is an only simple indicator of weight-for-height which is usually used to categorize the obesity in elders as well as children. BMI is defined as someone's weight in kilograms divided by the square of his/her height in meters (kg/m^2). Internationally, BMI over $25 \text{ kg}/\text{m}^2$ is considered overweight, normal BMI is $18.0\text{-}22.9 \text{ kg}/\text{m}^2$, and obesity is considered as BMI

$>25 \text{ kg}/\text{m}^2$.

For adults, WHO defines overweight and obesity as follows:

Morbidly obese is a BMI which is greater than or equal to 25

- Obesity is a BMI which is greater than or equal to 30.
- In case of children, age should be considered when defining overweight and obesity.
- Children below 5 years:
- Morbidly obese (overweight) is weight-for-height greater than 2 standard deviations above the world health organization (WHO) Child Growth Standards median.
- Obesity is weight-for-height greater than 3 standard deviations above the WHO Child Growth Standards median.
- Children between 5–19 years:
- Overweight (morbidly obese) is BMI-for-age greater than 1 standard deviation above the WHO Growth Reference median
- Obesity is BMI-for-age greater than 2 standard deviations above the WHO Growth Reference median.[1-6]

2.Role of Indian vegetables in reduction of obesity

The potential health benefits associated with the consumption of Indian vegetables which are nutrient-packed. Due to their high fiber contents they are very low in calories. Spinach, sweet potatoes, sweet peppers, tomatoes, broccoli, spaghetti squash, green peas, cauliflower are some healthy veggies to choose. As for example, a 100 grams pea has 79 calories, 100 grams cauliflower contains 27 calories, one small sweet potato contains 3 grams of fiber and 87 calories, 100 grams of broccoli has just 34 calories. An adult requires at least 2 to 3 cups and a child needs 1 to 3 cups of veggies per day. Include a variety of vegetables in meals, such as slices of carrots and cucumber for lunch and a green salad with bell pepper strips for dinner as a little low-fat addition to the meal.[7-10]

2.1.Spinach

Spinach is considered a powerhouse vegetable. It's lower in calories, rich in fiber, packs a nutritional punch and is versatile to use in all sorts of recipes. Dietary fiber delays digestion, which gives the feeling of fullness. It also delays secretion of a hormone ghrelin in which are responsible in feeling hungry. It is also responsible to prevent spikes in blood sugar by lowering down the sugar metabolism. Due to its diverse nutritional composition including vitamins and minerals, it is extensively considered as a functional food. Spinach is one of the richest dietary sources of quercetin which may ward off infection and inflammation. Spinach is also rich in health-promoting compounds, such as vitamin A and C, and flavonoids which are involved in reducing obesity. Its lutein and zeaxanthin compounds is linked to improved eye health, kaempferol antioxidant decrease risk of cancer and chronic diseases, high amounts of nitrates promote heart health. It is also a good source of iron & contains 2.6 milligrams of iron per 100 grams but only about 1.7% of the non-haem iron in spinach is absorbed when we consume it. Its phytochemicals and bioactive agents are capable to prevent macromolecular oxidative damage and also explore reactive oxygen species. It also modulates the expression and genes' activity which involved in antioxidant resistance, metabolism, inflammation, and proliferation. Those all

biological activities contribute to the hypolipidemic and hypo-glycemic, anti-cancer, anti-obesity properties of this powerhouse vegetable. The spinach derived non-essential phytochemicals and bio-actives such as thylakoids and glycolipids which can impart as health utilities.

2.2.Broccoli

Broccoli can be designated as an palatable green vegetable which is rich in a dozen of supplements that also play their own contribution to lose weight. Whenever we are thinking about to add green veggies in regular diet, broccoli is one of the principal vegetable come to our mind. Broccoli has many nutrients. This cruciferous and good carb vegetable is reputed to help with weight loss, cardiovascular system, digestion, inflammatory problems and many others. Antioxidant-rich broccoli is also famous for its ability to prevent certain types of cancer. Broccoli is a brilliant choice for a weight loss diet because it is very low in calories. The versatile vegetable is high in fiber, which is a key nutrient that helps you fight fat and lose weight. Real truth is the fiber can help to reduce appetite and contribute to satiety, helping to eat less without trying. This fiber-rich vegetable also improves digestion and prevents various stomach disorders, including constipation. Of course, the vegetable is extremely rich in vitamin C, vitamins A and B6, calcium, potassium, selenium, and several micronutrients are known to support weight loss. The presence of these nutrients makes broccoli a very good natural detoxifier and calcium can reduce the new fat cells production and revive the stored fat breakdown.

The phytochemicals in broccoli show potential for breaking down fats and good for the immune system. The health benefits of broccoli are not limited to weight loss. For instance, while the concentrated sulforaphane - a chemical found in broccoli - can reduce blood glucose levels in type two diabetes. Broccoli also contains significant amounts of beta-carotene, omega-3 fatty acids, and other compounds that help reduce bad cholesterol, regulate blood pressure and keep the heart healthy. Broccoli can also reduce the blood LDL-cholesterol levels. It is also full of soluble fiber which helps to bind bile acids in the digestive tract that makes cholesterol to excrete out of our body easily. Its kaempferol compound capable to

reduce the effect of allergy-related compounds on our body and along with this, its sulforaphane chemical can help to get rid of arthritis as this chemical blocks the enzymes which cause joint demolition. In addition to this, broccoli contains cancer fighting and immune boosting properties. It's isothiocyanates, including sulforaphane and indole-3-carbinol, boost detoxifying enzymes and act as antioxidants, which depletes estrogen levels and help to diminish the breast and uterus cancer risk. The anti-inflammatory properties of sulforaphane, one of the iso-thiocyanates (ITCs) in broccoli, may be able to prevent (or even reverse) some of the damage to blood vessel linings that can be caused by inflammation due to chronic blood sugar problems.[11-16]

It is also boost with powerful antioxidant like zeaxanthin, beta-carotene and carotenoids lutein which can help our body in a various ways. Broccoli is enriched with concentrated vitamin C which boosts the immunity. Its flavonoid content helpsto recycle the vitamin C efficiently. It'senriched with calcium and vitamin K which are important for bone health and prevention of osteoporosis. Along with calcium, broccoli is also full of other nutrients like magnesium, phosphorousand zinc. Because of those properties, broccoli is extremely suitable for children, elderly and lactating mothers. Since broccoli is enriched with vitamin C which is also great for anti-ageing byminimizing the fine lines, wrinkles, skin issues like acne and even pigmentation. Since broccoli is a potent of antioxidants and nutrients like vitamin C, amino acids, vitamin K and minerals such as copper and zinc which help in maintaining a healthy skin immunity as well as keep the natural glow of the skin and also protects the skin from getting infections. Itsricher phosphorous vitamin A, beta-carotene, and other vitamins such B complex, vitamin C and E are superb for eye health as these help in protecting the eyes against musculardeterioration cataract and evenhelps to repair the damage done by harmful radiations when we go through by being constantly on our phones or being in front of a computer or laptop screen.

2.3.Green peas

Green peasare enriched with nutrient and this green legume seeds found in hard pods. Due to their starch content they have a slightly sweet

taste.They also enrich with high concentrated starch, protein ,dietary fiber, vitamins B(niacin,folate,B6 , thiamin),vitamin A ,vitamin C, vitamin E, vitamin K and phytochemicals which are very useful for many benefits of our health. They are rich in minerals, like selenium, zinc and phytonutrients like lutein-zeaxanthin, β -carotene,flavanols such as phenolic acids (caffeic and ferulic acid),catechin and epicatechinand saponins as phytonutrients .

As green peas enrich withunsaturated carbohydrates which are good for managing blood sugar levels and as they are rich in starch and fiber which lower the glycemic index. Foods with a low glycemic index help torelease sugar into the blood slowly which are very usefull in managementand prevention of type 2 diabetes.Its rich iron helps todiminishdeficiency of haemoglobin and uplift energy.Its vitamin and mineral contents play prime roles in the prevention of deficiency-related diseases.

The fibers present in peas help in the gesture of food through our digestive tract which is essential to fulfil the digestion and eliminate the toxic compounds. Its high a fiber contents also help (a product of fiber fermentation, Propionate)to diminish the level of blood cholesterol which prevent cardiovascular diseases. Fibre from its seed coat and the cell walls of the cotyledon contributes the gastrointestinal function and reduces the starch digestibility..

Its prebiotic sugars and dietary fiber are also beneficial in the digestive process. The prebiotic type sugars become fodder for the probiotic bacteria during digestion which helps the good bacteria to convert them to products which are beneficial for our body. The galactose oligosaccharide content helps in digestion in the large intestine. Pea protein, when hydrolyzed, yield peptides with bioactivities, including angiotensin I-converting enzyme inhibitor and antioxidant activity. Peas contain a variety of phytochemicals which act asantinutritive factors.

Peas also can effect against antimicrobial and the phenolic extracts of sprouted peas inhibited the growth of ulcer-causing bacteria (*helicobacter pylori*). Hence, inclusion of green peas in regular diet can boost the overall gastrointestinal function. Peas could reduce the plasma levels LDL(low-density lipoprotein) cholesterol on a high

cholesterol diet. The risk of cardiac disease can also be lowered by soluble fiber in green peas .

The powerful anti-inflammatory and antioxidant properties of green peas can fight against oxidative stress, chronic inflammation and reduce all kinds of cancer risk. These antioxidants help to free radicals and reduce their evil effects on our body. Its lectins and saponins compounds prevent the causation of colorectal cancer. Peas are also said to be very effective in nourishing sperm count and motility. These are all the major health benefits from green peas.

Green peas are especially a good option for vegetarians for its enriched protein content. Its rich insoluble fibers contents take a long duration to digest and induce the feeling of fullness of stomach. Vegetarians often face a paucity of protein sources. Hundred grams of peas contains about five grams of protein, which makes it a superb source of plant protein. Since they are very effective in losing weight, we can use peas as the nutritional content of any heavy dish. For instance, to make pasta we can use in a cup of boiled peas instead of chunks of sausages and bits of bacon, which would not only save the calories but also make the dish more stuffing.

2.4. Cauliflower

Cauliflower is one of most preferred vegetables in diet plans made in order to achieve weight loss. The reason being the vegetable's ability to promote satiety feeling or in other words, a feeling of fullness which prevents consumption of higher quantity of food, thus facilitating weight reduction. Replacing carbohydrates with this vegetable basically forms the basis of a cauliflower diet, as this vegetable contains less carbohydrate than rice or flour which constitutes the carbohydrates in usual meals.

This low calorie vegetable facilitates elimination of edema, a condition which can lead to obesity. Vitamin C and E, in addition to minerals like iron and molybdenum, which are present in cauliflower, are actively involved in relieving edema. Vitamin E and C promotes blood circulation and improves metabolism. Iron transports oxygen to various organs smoothly, hence, improving metabolism. Molybdenum is involved in hematopoiesis, again contributing towards improved blood circulation.

Presence of Vitamin K in cauliflower could play a role in maintenance of bone homeostasis. It also

contains smaller amounts of thiamin, riboflavin, niacin, pantothenic acid, calcium, magnesium, phosphorus, potassium, and manganese. Furthermore, its richness in fiber and water prevents constipation as well. Intake of high fiber content could reduce risk of cardiovascular disease and diabetes.

This cruciferous vegetable is particularly high in glucosinolates and isothiocyanates, two groups of anti-oxidants which have been researched to slow growth of lung, breast and prostate cancer cells, specifically. Cauliflower is capable of providing sulforaphane which not only, boosts up detoxification enzymes in the liver, but also, as research suggests, prevents progression of cancer. Choline is a vitamin-like-factor, present in cauliflower, which allows improved memory, sleep, muscle movements, as it is involved in neurotransmitter formation, maintenance of cell membrane, synthesis of DNA and prevention of cholesterol accumulation in liver.

Dieticians recommend eating cauliflower along with meat and eggs, as these are rich in iron content and the Vitamin C rich cauliflower helps absorption of iron into the human body. So, the effect of elimination of edema is doubled. Also, it is also recommendable to cook cauliflower in vegetable oil as this allows an enhanced absorption of the nutrients in the cauliflower. As cauliflower, is known to contain a plethora of health promoting phenolic compounds which include protocatechuic acid, quercetin, pyrogallol, vanillic acid, coumaric acid, and kaempferol, different styles of cooking the vegetable can obviously affect the availability of these compounds and the other nutrients in it in raw form. While blanching and boiling in water has been seen to cause significant loss in the components causing health benefits, steam treatments (blanching and cooking), microwaving and stir-frying were seen to cause lowest reductions in the nutrient value of the vegetable.

2.5 Sweet potato

Enriched with dietary fiber, sweet potatoes form another constituent of weight loss diet plans. As it is a low-calorie vegetable and an excellent source of fiber, they quickly bring in a feeling of fullness and prevent overeating. Sweet potatoes have the ability to keep the cholesterol levels under control, hence facilitating weight loss and also preventing cardiovascular diseases. High water content in

sweet potatoes helps rehydrate cells, boost metabolic activity and hence, prevent the body from accumulating fat.

Sweet potatoes are packed with vitamin A, B6 and C, which provide a number of health benefits. Presence of β -carotene proves beneficial to eye health. Presence of β -carotene in sweet potatoes scavenges free radicals and thus, prevents skin ageing. High potassium level in the vegetable allows maintenance of heart beat rate and combats stress levels. Regular consumption of sweet potatoes has also been known to boost the immune system.

This vegetable comes in different colors- orange-fleshed sweet potatoes which are rich in β -carotene and purple-fleshed sweet potatoes which are enriched with anthocyanins. Sweet potatoes are known to contain ample amounts of carotenoids, anthocyanins and phenolic acids, all of which are known as anti-oxidants. Various anti-oxidants in sweet potatoes contribute to the anti-tumor and anti-inflammatory property of this vegetable.

If consumed moderately, sweet potatoes can be considered safe for consumption by Diabetic patients as it has low glycemic index (GI). GI is scale which measures the carbohydrates in foods which can bring about an increase in the blood glucose levels. Hence, taking foods of lower GI index is highly recommended for Diabetic patients. It is also known to contain the hormone adiponectin which keeps the blood sugar level steady.

Future Perspectives as conclusion

More research needs to be done regarding the quantification of nutrients and bio-active agents in each of these vegetables. The awareness of low-calorie and fibre-rich vegetable diet should be even more widespread in order to facilitate and encourage more number of obese people to take up this diet. Indian meals usually consist of high carbohydrates, the progression of which should be discouraged. Also, deeper insights into the methods of cooking which will cause minimal reduction in the nutrient value of these vegetables, is mandatory.

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