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Nutritional Quality and Health Benefits of Vegetables - A Review

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Abstract: Vegetables are annual or perennial horticultural crops, with certain sections (roots, stalks, flowers, fruits, leaves, etc.) that can be consumed wholly or partially, cooked or raw. Adequate consumption of vegetables is important for better human health due to their biochemical composition containing carbohydrates (simple sugars, starch, dietary fiber), proteins, fats, dietary fiber, water, minerals (Na, K, Ca, Fe, P), antioxidant vitamins (vitamin A, B6, C and E) and calories. The World Health Organization (WHO) recommends daily intake of 400–600 g of fruits and vegetables to reduce the risk of micro nutrient deficiency, cardiovascular diseases, cancer, cognitive impairment, and other nutritional health risks. Present review paper provides detailed account of vegetables with special emphasis on definition, classification, composition and nutritive value, health benefits, and nutritional disorders due to low consumption of vegetables. This study recommends daily intake of vegetables for better health, protection and regression of diseases as well as to reduce the risk of chronic diseases (diabetes, heart disease, high blood pressure, metabolic syndrome, obesity, some cancers, and stroke). Also, organization of awareness programmes and campaigns, and health talks on nutritional significance of vegetables among general public will prevent and cure several chronic diseases.

Keywords: Antioxidants, Dietary fiber, Health, Nutrition, Phytochemicals, Vegetables

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Introduction

All societies and ethnic groups eat vegetables because they are essential for maintaining human health and consumption of vegetables which meet basic nutritional needs in human. As the world's population grows, the demand for vegetables will continue to grow as well. Vegetable science (also called, 'olericulture'), is one of the most dynamic and important fields of the agricultural sciences

(Septembre-Malaterreb *et al.*, 2018).

Vegetables are important for human health because of their vitamins, minerals, phytochemical compounds (phenolic compounds, flavonoids, bioactive peptides, etc.), and dietary fiber content. Especially antioxidant vitamins (vitamin A, vitamin C, and vitamin E) and dietary fiber content have important roles in human health (Mallillin *et*

al., 2008). Vegetable does not include the fruits of perennial trees and the ripe seeds (peas, beans, cereal grains, etc.) (Ulger *et al.*, 2018).

Vegetables make up a major portion of the diet of humans in many parts of the world and play a significant role in human nutrition, especially as sources of phyto-nutriceuticals: vitamins (A, B1, B6, B9, C, E), minerals, dietary fiber and phytochemicals. Each vegetable group contains a unique combination and amount of these phytonutriceuticals, which distinguishes them from other groups and vegetables within their own group (Dias, 2012).

Vegetables are an indispensable part of any diet, both for vegetarians and non-vegetarians. They are plant derivatives and consist of flowers, stems and leaves. As vegetables are important sources of vitamins, minerals, micronutrients with antioxidants for the body, special emphasis is being paid to the consumption of fresh vegetables and salad. Epidemiological studies have shown the importance of a diet rich in vegetables in the prevention of various types of illness diseases (Mintah *et al.*, 2012).

According to Kays (2011), due to the diversification of agriculture and decrease in land holdings, farmers are shifting from traditional subsistence agriculture to commercial agriculture. As a result, they have adopted for vegetable production, mainly for financial gain and health benefits. Vegetable are cost effective, cheaper and forms the important part of human diet as a source of carbohydrate, proteins, minerals and vitamins. These vegetable crops are of different types such as: leafy vegetables, vegetable fruits and vegetables with below ground edible organs.

Dias (2012) noted that, as vegetables are perishable, most of them are marketed fresh with only a small proportion processed. Further, consumption shortly after harvest, guarantees optimal vegetable quality. Vegetables in all their many forms ensure an adequate intake of most vitamins and nutrients, dietary fibers, and phytochemicals.

Khan *et al.* (2017) stated that, improved cultivation technologies and availability of high yielding vegetable cultivars have enhanced the vegetable production. However, various biotic (pathogens, nematodes, insects and other pests) and abiotic (extreme temperature and moisture, mechanical damage, deficiencies or excess of chemical nutrients, salt damage and other environmental factors) factors limit the vegetable production. Nutritionally, vegetables are energy-dense foods containing vitamins, minerals, fibre and other bioactive compounds (Liu *et al.*, 2000). Consumption of vegetables, decreases the risk of several chronic disease and has resulted to make a firm policy of improved vegetable production. The dieticians recommend the consumption of at least 200 g of leafy vegetables and 150 g of root vegetable daily for balanced diet (Southon, 2000).

With the rise in micronutrient deficiencies throughout the world, Food and Agricultural Organization (FAO, 2003) stated that, 'increasing fruit and vegetable consumption is a major public health challenge at the moment'. According to Amao (2018), deficiencies of micronutrients in a regular meal lead to various nutritional disorders such as birth defects, mental and physical retardation, and weakened immune systems. It was also reported that, many nutritional deficiencies occur as a result of unawareness about nutritional status of vegetables and, also due to low consumption of vegetables in the food.

According to Lintas (1992), appetizing and palatable vegetables need good quality produce and careful food preparation. Overcooked, woody-textured, and soggy vegetables are not appetizing and usually refused. Vegetable crops occupy prime importance in nutritional requirements of people. They are an important source of food and nutrition. Vegetable production constitutes roughly two-thirds of the total production of horticulture crops (Singh, 2012).

The low consumption of vegetables in many regions of the world, especially in the developing part, is a persistent phenomenon. Only a small or negligible minority of the world's population at

present consumes the generally recommended high average intakes of fruit and vegetables (WHO, 2003; Schneider *et al.*, 2007). Worldwide, about 10,000 plant species are used as vegetables. Nearly 402 vegetable crops are cultivated worldwide, of which about 50 plant species are commercially important. Vegetable plants are represented by 69 families and 230 genera (Dhaliwal, 2017).

The benefits of the daily consumption of vegetables for human health have been extensively researched and documented. Dietary guidelines in many countries contain recommendations for vegetables, due to their supply of vitamins, minerals, bioactive components and dietary fibres. Despite the extensive promotion of fruit and vegetable consumption, worldwide per capita consumption is estimated to be 20-50% short of the minimum daily recommended level of 400 g/day. The Food and Agriculture Organization (FAO) and the World Health Organization (WHO) of the United Nations have been leading the global initiative "Promotion of Fruit and Vegetables for Health" (PROFAV) (WHO, 2003; WHO and FAO, 2017).

Butnariu and Butub (2014) documented that vegetables and their products (salads, fermented and non-fermented pickles, prepared sauces, and pickled, conserved, frozen, marinated, and dried vegetables) are a good source of compounds with pharmacodynamic activity. The complex chemical content of vegetables important to the human body includes organic substances (carbohydrates, proteins, lipids, and organic acids), phytoncides and antimicrobial substances, a high content of minerals (Ca, P, Fe, K, Mg, S, Cl, Zn, and Cu), and a high content of vitamins (A, B complex, C, E, F, K, P, and PP).

Vegetables are considered a significant part of all major dietary guidance systems. Their chemical elements and compounds are known to affect thousands of physiological functions and to promote health (Hui, 2006). Consuming a diverse range of foods that provide all of the nutrients required to sustain life is essential for a healthy

human diet (Ekesa *et al.*, 2009). CDC (2011) reported that vegetables are good sources of many important nutrients, including potassium, vitamin C, folate, fiber, and numerous phytochemicals. Eating a diet high in vegetables is associated with a decreased risk of many chronic diseases. It was also noted that replacing foods of high energy density with foods of lower energy density, such as vegetables, can be an important part of a weight-management strategy.

Singh (2012) reported that more than 40 kinds of vegetables belonging to Solanaceous, Cucurbitaceous, Leguminous, Cruciferous, Bulbous, Root Crops, Leafy and Okra groups are grown in India. Potato, tomato, onion, brinjal, cabbage, cauliflower, peas, okra, chilli, beans, and melons are the important vegetable crops grown in India. Production share of major vegetable crops in India is-- Potato 27%, Tomato 12%, Onion 11%, Brinjal 8.0%, Cabbage 5%, Cauliflower 4.7%, Okra 4.0%, and others 28.3%. Production share of leading vegetable producing states include West Bengal 15%, Uttar Pradesh 12%, Bihar 10%, Andhra Pradesh 8.0%, Gujarat 6.5%, Madhya Pradesh 6.4%, Odisha 6%, Tamil Nadu 6%, Maharashtra 5.5%, Karnataka 5%, Haryana 3.2%, Chhattisgarh 3.0%, and others 13.4%.

Dias (2012) recorded that regular consumption of a vegetable rich diet has undeniable positive effects on health since phytonutriceuticals of vegetables can protect the human body from several types of chronic diseases. Despite many peer reviewed scientific studies, and the consolidated knowledge about the health benefits of vegetables at the global level, there are still gaps in knowledge and information that need to be addressed regarding the micronutrient deficiencies and nutritional disorders occurring due to low consumption of vegetables (Amao, 2018). Given this background, the aim of the present study was to overcome the knowledge gaps and further research on role of vegetables in human nutrition and disease prevention.

The present paper provides an overview of the definition, classification, composition and nutritive value, health benefits and nutritional disorders due to low consumption of vegetables.

Definition of Vegetables:

Definitions of vegetables according to health professionals and consumers are heavily influenced by cultural customs and norms related to food selection and preparation. Even within a particular country, consumers vary widely in the categories they use to describe various foods. Lack of common agreement within and across countries has led to varying operational definitions in guidelines and guidance (Thompson *et al.*, 2011). Botanical definitions for vegetables are more precise than culinary definitions (Table 1). However, culinary definitions are based on cultural uses of vegetables and are more commonly understood by nutrition researchers and by participants in epidemiological studies (IARC, 2003).

Methodology:

This article reviews the vegetables with respect to definition, classification, biochemical composition, health benefits and nutritional disorders due to low consumption of vegetables. Review method adopted was based on the scientific literature survey from databases such as Scopus, Medline, EMBASE, Web of Science and Science Direct. The relevant data and information were collected from the thorough study of the journal articles, research papers, reports and various literatures. The keywords used for reviewing the literature were the ones that refer to the issues concerning the vegetables. For literature search, keyword "vegetables" is combined with: definition, classification, biochemical composition, health benefits and nutritional disorders.

Classification of vegetables:

Lintas (1992) stated that vegetables can be classified according to the part of the plant used for nutrition and the specific nutritional value (Table 2). Subgroups may differ from country to country and classifications in nutritional

guidelines which are based on nutritional content in different countries (Ulger *et al.*, 2018).

According to Dhaliwal (2017), vegetables that share some characteristics are grouped together (Table 3). Broadly, vegetables are classified by five methods and they are based on: Botanical classification, Hardiness or temperature, Plant part used, Culture, and Life cycle. On the basis of family groups and growth habits, vegetables are classified into Perennial vegetables, Starchy crops, Root crops, Legumes, Bulb crops (Alliums), Salad crops, Greens, Cucurbits, Cole crops, and Solanaceous.

Composition and Nutritive value of vegetables:

Dias and Ryder (2011) argued that vegetables make up a major portion of the diet of humans and play a significant role in human nutrition, especially as sources of phyto-nutriceuticals: vitamins (A, C, B1, B6, B9, E), minerals, dietary fiber and phytochemicals. According to Hoejskov (2014), colour of the vegetables signifies their biochemical composition and nutritive properties e.g. Purple/blue vegetables: Antioxidant properties; Red vegetables: Improves heart health; Orange/yellow vegetables: Carotenoids; Brown/white vegetables: Phytochemicals and Potassium; and Green vegetables: Phytochemicals.

Biochemical composition of vegetables consists of water, proteins, fats, carbohydrates, dietary fiber, minerals and vitamins (Lintas, 1992). Vegetables have a low energy value and provide 10 - 50 Kcal per 1 g. They offer a high concentration of micronutrients for low contents of calories and fat. Eating a balanced diet containing vegetables is considered the best way of ensuring good health. Vegetables are not just tasty and nutritious but they also enhance the immune system of our body (Pem and Jeewon, 2015).

In general, vegetables play major role in nutrition since they are good sources of provitamin A (carotene), ascorbic acid, folic acid, calcium, starch, protein and minerals (Table 4). Vegetables are a variety of food that provides

Table 1: Common definition of vegetables

Reference	Definition of Vegetables
IARC Press (2003)	Edible plant parts including stems and stalks, roots, tubers, bulbs, leaves, flowers and fruits; usually includes seaweed and sweet corn; may or may not include pulses or mushrooms; generally consumed raw or cooked with a main dish, in a mixed dish, as an appetizer or in a salad.
Grosch (2008)	Fresh parts of plants which, raw, cooked, canned or processed in some other way, provide suitable human nutrition.
Welbaum (2015)	Annual or perennial horticultural crops, with certain sections (roots, stalks, flowers, fruits, leaves, etc.) that can be consumed wholly or partially, cooked or raw.
Khan <i>et al.</i> (2017)	Dibble plants or plant parts commonly collected and/or cultivated for their nutritional value for humans.
Amao (2018)	Edible portions of a plant that can be eaten such as the leaves, stem, tubers, roots and bulbs, the sweet and fleshy product of a tree or other plant that contains seed and can be eaten as food.
Ebabhi and Adebayo (2021)	Segments of plants that serve as food to humans and other animals. It is often regarded collectively as edible plant matter, including flowers, fruits, stems, leaves, roots, and seeds.
Culinary definition	Edible plant foods excluding cereal grains, nuts, seeds, coffee, tea, cacao and herbs and spices.

Table 2: Classification of vegetables (Ebabhi and Adebayo, 2021)

Group	Sub-group	Examples
Green vegetables	Leaf vegetables	Amaranth, Brussels sprouts, Cabbage, Cassava leaves, Chard, Chicory, Curly lettuce, Endive, Escarole, Fenugreek, Jute plant, Leaf beet, Lettuce, Pumpkin leaves, Purslane, Romaine, Spinach, Waterleaf, etc.
	Stalk vegetables	Asparagus, Celery, Knol-khol, etc
	Flowering vegetables	Artichoke, Broccoli, Cauliflower,
	Fruit vegetables	Bell pepper, Chilli, Cucumber, Eggplant, Okra, Peppers, Squash, Sweet corn, Tomatoes, Zucchini, etc.
Root vegetables	Root, bulb, and tuber vegetables	Beet, Carrot, Fennel, Garlic, Onion, Parsnip, Potato, Radish, Rutabaga, Sweet potato, Turnip, Yam, etc.
Seed vegetables	Legumes	Legumes,
	Pods	Beans, Okra, Peas, Snap pea, Snow pea, Soya beans, etc.

Table 3: Classification of vegetables based on Culture (Dhaliwal, 2017)

Type	Characteristics	Examples
Bulb vegetables	- Bulb vegetables. - Species of Allium. - Belong to the family Alliaceae. - Winter season crops.	Garlic, Leek, Onion, etc.
Cole crops	- Belong to the family Cruciferae. - Called crucifers or Brassicas. - Winter season and transplanted crops.	Brussels sprouts, Cabbage, Cauliflower, Chinese cabbage, Knol-khol, Sprouting broccoli.
Cucurbit crops	- Cucurbit crops. - Belong to Cucurbitaceae (gourd family). - Plants have tendrils and produce fleshy fruits. - Direct seeded summer season crops.	Cucumber, Gourds, Melons, Pumpkin, Summer squash.
Leafy vegetables	Direct seeded crops.	Amaranth, Coriander, Fenugreek, Leaf beet, Spinach, Swiss chard, etc.
Okra	Represented by an independent group.	Okra
Perennial vegetables	Crops remain in the field for more than two years.	Artichoke, Asparagus, Chayote, Ivy gourd, Jerusalem artichoke, Pointed gourd.
Pod vegetables (Pea and beans)	- Legume vegetables. - Belong to Fabaceae (pea family). - Directly seeded vegetables.	Broad bean, Cluster bean, Cowpea, Dolichos bean, Pea, French bean, Lima bean, Winged bean, etc.
Root vegetables	- Have prominent and fleshy underground structures. - Direct sown winter season crops.	Beetroot, Carrot, Parsnip, Radish, Rutabaga, Turnip, etc.
Salad vegetables	Eaten raw.	Celery, Chicory, Lettuce, Parsley, etc.
Solanaceous crops	- Solanaceous crops. - Belong to Solanaceae (nightshade family). - Summer season transplanted crops.	Bell pepper, Chilli, Eggplant, Tomato,
Tuber vegetables	Forms tuber in the soil.	Cassava/ tapioca, Potato, Sweet potato, Taro, Yams.

nourishment of essential vitamins and minerals to the body (Ebabhi and Adebayo, 2021). The nutritive value of vegetables (Range of values per 100 g) is presented in Table 5.

Health benefit of vegetables:

Consumption of vegetables provides valuable health benefits to human. Metabolic activities of the human body are enhanced when vegetables are consumed in large quantities. Vegetables can be eaten either raw or cooked and play an important role in human nutrition (Ebabhi and

Adebayo, 2021). Some of the health benefits of vegetables are presented in Table 6.

Therapeutic benefits of Phytochemicals in vegetables:

According to Ebabhi and Adebayo (2021), 'Phytochemicals' or 'secondary metabolites' are non-nutritive chemical compounds produced by plants via several chemical pathways. Large numbers of phytochemicals are beneficial to the function of human cells and to improve health (Singh and Rao, 2012).

Table 4: Composition and Nutritive value of vegetables (Ulger *et al.*, 2018)

Group	Sub-group	Nutritional value
Green vegetables	Leaf vegetables	- Minerals: Iron, Copper, Calcium, Manganese. - Vitamins: A, B2 (Riboflavin), B6, C, and K. - Dietary fiber. - Lutein + zeaxanthin, flavones. - Anthocyanidins. - Cellulose
	Stalk vegetables	- Minerals - Vitamins
	Flowering vegetables	- Minerals: Calcium, Iron, Phosphorus, Potassium etc. - Vitamins: A, B2 (Riboflavin) and C. - Dietary fiber.
	Fruit vegetables	- Vitamin: C. - Beta-carotene content.
Root vegetables	Root, bulb, and tuber vegetables	- Beta-carotene. - Vitamin: A, C, etc.
Seed vegetables	Legumes and Pods	- Minerals: Iron, Copper, Calcium, Magnesium, Manganese, Zinc, etc. - Saponin. - Soluble fiber. - Vitamin: B6

Table 5: The nutritive value of vegetables (Range of values per 100 g)

Nutrient	Types	Content
Carbohydrates	Simple sugars, Starch, Dietary fiber	4.0 – 18.0 g
Dietary fiber		0.8 – 8.0 g
Fats		0.1 – 1.7 g
Proteins		0.2 – 7.0 g
Water		79 – 92 g
Minerals	Calcium	5 – 500 mg
	Iron	0.1 – 16.0 mg
	Phosphorus	12 – 125 mg
	Potassium	200 – 600 mg
	Sodium	2 – 150 mg
Vitamins	B6 (Pyridoxine)	0.1 – 0.2 mg
	Beta-carotene (Provitamin A)	0.1 – 5.0 mg
	C (Ascorbic acid)	3 – 20 mg
Calories		14 – 160 Kcal

Gonzalez-Vallinas *et al.* (2013) reported that phytochemicals are found in plant-based foods (fruits, vegetables, whole grains, nuts, seeds, and legumes) and give colour, flavour, and aroma to plants. They are of different types such as Anthocyanins, Carotenoids (beta-carotene,

lycopene), Flavonoids, Isothiocyanates (sulforaphane), and Lutein and zeaxanthin (Shen *et al.*, 2012). Phytochemicals play important role in human health (Table 7) and it was proved that people who eat mainly the plant based diets, shown to have significantly lower rates of certain

Table 6: Health benefits of vegetables

Reference	Health benefits
Hui (2006)	• Decrease the overall nutrient absorption rate. • Reduce the absorption of nutrients and phytochemicals. • Management of blood glucose. • Reduce the absorption of cholesterol. • Increase the absorption of minerals. • Maintain the health of immune system. • Reduce the risk of developing heart disease and breast and prostate cancers.
Boffetta <i>et al.</i> (2010)	• Greater lifespan. • Improved mental health. • Better cardiovascular health.
Caunii <i>et al.</i> (2010)	• Enables full assimilation of vitamins in the human body. • Provide alkalizing effects, and neutralize the acidity produced by foods of animal origin.
CDC (2011)	• Decrease risk of many chronic diseases (heart disease, stroke, high blood pressure, diabetes, and some cancers).
Dias (2012)	• Improvement of gastrointestinal health and good vision. • Reduced risk of heart disease, stroke, diabetes, and cancer. • Reduce risk of chronic disease by modifying metabolic activation and detoxification of carcinogens. • Health benefits such as: Improving bowel transit, lowering cholesterol, and manage blood glucose concentrations. • Reduce the intake of saturated fats, trans fats, and foods with higher caloric density.
Hossain <i>et al.</i> (2015)	• Antioxidants prevent the infection. • Helps in digestion. • Prevents constipation, haemorrhoids and diarrhoea.
Conner <i>et al.</i> (2017)	• Reduced risks of some cancers. • Weight management. • Lower risk of obesity.
FAO and WHO (2017)	• Reduce risk of Alzheimer disease, Cataracts and Age related functional decline. • Help in reducing hypertension. • Helps in improving immune system. • Prevent cancer, heart disease and arthritis. • Prevent micronutrient deficiency and non-communicable diseases (NCDs). • Prevent unhealthy weight gain.
Amao (2018)	• Improve overall health • Protect the vital organs of the body. • Weight control. • Promote healthy skin and hair.
Ulger <i>et al.</i> (2018)	• Protection against Diabetes mellitus (DM), Obesity, and Metabolic syndrome (MS). • Regulation of enzymes of carbohydrate metabolism. • Increase in insulin secretion and sensitivity. • Increase activities of NADP⁺ and NADPH. • Protection against dyslipidemia and oxidative stress. • Protection against Cardiovascular diseases (CVD). • Protection against Cancer.
Ramya and Patel	• Overall good health.

(2019)	• Improvement of gastrointestinal health and vision. • Reduce risk for chronic diseases (cancer, heart disease, stroke, diabetes, anaemia, gastric ulcer, and rheumatoid arthritis).
Abobatta (2021)	• Reduce the negative effects induced by free radicals. • Decrease inflammation. • Maintain body health. • Prevent various chronic diseases (CVD, NCDs).
Ebabhi and Adebayo (2021)	• Reduction in chronic ailments (cancer, stroke, CVD, etc). • Hunger check by fiber contents as it fills the stomach. • Positive effect on the blood sugar of consumers. • Control of high cholesterol levels and blood pressure. • Reduce inflammation and helps in digestion.
Kibr (2022)	• Source of vitamin A, for metabolic processes in the body. • Protect against NCDs (cardiovascular disease, type II diabetes, some cancers, and obesity). • Fiber adds bulk to fecal bolus, solidifies feces, aids bowel movements, and has beneficial physiological effects. • Fiber promotes and increases satiety, decreases hunger and energy intake, and lower the hyperglycemia. • Prevent the risks of hypertension.
Smith <i>et al.</i> (2022)	• Reduce risk for NCDs (chronic lung disease, CVDs, diabetes, hearing problems and visual impairment). • Lower risk for depression and asthma.

Table 7: Therapeutic benefits of Phytochemicals in vegetables

Reference	Therapeutic benefits of Phytochemicals
Hui (2006)	• Growth and daily maintenance of the body, • Promote health and help to prevent disease.
Dias (2012)	• Reduce the risk of chronic disease. • Prevent blood clot formation. • Reduce the risk of heart attacks and strokes. • Have antioxidant activity.
Pem and Jeewon (2015)	• Anti-obesity agents.
Probst <i>et al.</i> (2017)	• Aid the function of the immune system. • Protect cells and DNA from damage that may lead to cancer. • Improve the health conditions. • Reduce inflammation. • Slow the growth rate of some cancer cells. • Help to regulate the hormones.
Ulger <i>et al.</i> (2018)	• Have antiviral, anticancer and antibacterial properties. • Reduce the risk of chronic diseases (CVD, diabetes, certain cancers, and obesity). • Strengthen the immune system. • Protect against carcinogenic substances. • Reduce inflammation and oxidative stress that causes cancer. • Reduce DNA damage and prevent the growth of cancer cells. • Inhibit angiogenesis which is effective in tumour growth and regulate hormones. • Modify the cellular function.
Ramya and Patel (2019)	• Promote health. • Disease protection and regression. • Biological activity against chronic diseases.
Abobatta (2021)	• Maintain human health.
Ebabhi and Adebayo (2021)	• Help the body to fight against diseases.

	• Reduce the incidence of occurrence of diseases. • Inhibit growth of cancer cell. • Reduce risk of CVD and boost immunity. • Help to lower the blood pressure. • Promote the eye health.
Kibr (2022)	• Prevent NCDs (cancer, heart disease, etc). • Treat cancer by neutralizing free radicals. • Block or suppress active carcinogens or tumour promoters from reaching target tissue. • Health-promoting functions.

types of cancers and heart disease (Craig and Beck, 1999; Talalay and Fahey, 2001).

Conclusion

This review discusses the definition, classification, composition and nutritive value, health benefits and nutritional disorders due to low consumption of vegetables. This study recommends daily intake of vegetables for better health, protection and regression of diseases as well as to reduce the risk of chronic diseases (diabetes, heart disease, high blood pressure, metabolic syndrome, obesity, some cancers, and stroke). Also, organization of awareness programmes and campaigns; health talks on nutritional significance of vegetables, healthy life style, health benefits of vegetables and nutritional disorders due to low consumption of vegetables is needed to prevent and cure several diseases. The general public should be encouraged for adequate vegetable consumption for better health.

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