

Review Article

Plant Based Foods and their Role in Prevention of Cancer and Nutritional Considerations for the Cancer Survivor

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ABSTRACT

Cancer is considered as one of the greatest killer in the world. Researchers are actively looking for the treatments to better the prognosis of the disease. It has been estimated that 30-40% of all types of cancer can be prevented by lifestyle and diet therapy alone. Foods like sugars, refined flour, consumption of red meat, imbalance between the omega - 3 and omega- 6 contribute to excess cancer risk, whereas consumption of lots of fruits and vegetables may lower the risk of cancer. Herbs or herbal medicine plays an indispensable role in prevention and treatment of cancer. Active constituent present in herbs lowers the risk of cancer. Herbs exhibit cancer fighting properties like ant proliferating, ant carcinogenic, anti inflammatory, anti oxidants, antifungal, antibacterial, antiulcer and immunomodulatory activities. This abstract provides the information regarding how herbs can fight against the cancer, intervene and retard or halt the progress of cancer at various stages of development.

Keywords

Diabetes mellitus,
Less intake of
fibre, Excessive
intake of red meat

Introduction

The word “Cancer” comes from the Latin word ‘Carcinoma’ meaning crab. It is the most dreaded disease and refers to all malignant tumours caused by the abnormal growth of a body cell or a group of cells. It is today, the second largest killer in the world, next only to heart ailments (Bakhru, 2015). It has been evaluated that thirty to forty percent of major types of cancers can be prevented by dietary measures and by lifestyle solely. Divisi *et al.*, (2006) states that factors such as

obesity and poor lifestyle can leads to the higher risk for cancer. Nutrient sporadic foods like refined wheat flour, concentrated sugars that leads to impaired metabolism of glucose which contribute to diabetes mellitus, less intake of fibre, excessive intake of red meat & imbalance of essential fats that is omega 3 and omega 6 all these faulty diet pattern results in higher risk of cancer. Consumption of good amount of fruits and vegetables, intake of flax seed especially its lignin fraction can lower the risk of cancer. Cruciferous vegetables such as broccoli

(broccoli sprouts being the concentrated source of sulforaphane), cauliflower, cabbage and sulphur containing vegetables such as onion and garlic that contains allium component are highly beneficial and can prevent tumour growth. Shetty *et al.*, (2010) states that several nutrients play an important role in the various stages of a normal cell cycle. Macro and micro nutrients are needed for the biosynthesis of the various cells components as they proliferate and divide. They contribute energy for the processes and enable the synthesis of new proteins and other cellular components as the cells advances through the cycle of replication. Specific nutrients may also function to modulate and regulate these processes. These include folic acid, which is required for DNA replication while vitamin A or retinoids can act to arrest the cycle in G1 phase. Folate is also necessary cofactor for DNA synthesis. Micronutrient such as vitamin E, D, C and minerals like selenium plays an important role in immune function. However, since many of these micronutrients function as potent antioxidants they not only prevent or reduce oxidative damage but also provide the important antioxidant defence. Thus, reducing the potential for cells and DNA damage and thus cancer. Donaldson *et al.*, (2004) states that Supplementary probiotics and use of oral digestive enzymes also has an advantage of anti cancer dietary measures. When the diet is rich in fruits and vegetables that contains higher amount of phytochemicals could decrease the risk of breast, lung and colorectal cancer.

Cancer healing herbs

Cancer is considered as one of the greatest killer in the world. Researchers are actively looking for the treatments to better the prognosis/ vaccination of the disease (Gonzalez *et al.*, 2018). Donaldson (2004) evaluated that thirty to forty percent of major

types of cancer can be impeded by lifestyle and dietary measures solely (Table 1 and 2).

Foods that prevent and control cancer

Foods which possess major anti cancer activities are beet, cabbage, and other cruciferous vegetables, carrots, citrus fruits, curd, garlic, green vegetables, liquorice, wheat grass, olive oil, brown rice, soya beans, tomato, watermelon, wheat bran and some other foods. The use of these foods for the prevention and controlling of various kinds of cancer are discussed below:

Nutritional requirements of cancer patients- general guidelines (Kapur *et al.*, 2008)

In view of the pathophysiology, signs and symptoms, as well as, the impact of various forms of cancer on the health and nutritional status of the patients the dietary management should aim at meeting the following objectives:-

To prevent further tissue catabolism

To meet the increased metabolic demands of the body

To provide relief from the symptoms

To prevent progression and promote recovery from cancer cachexia

Energy

Energy demands get increased during cancer due to hypermetabolic state of the disease processes. Increased requirement of energy is to spare the protein for healing of tissues and promote weight gain. Because of the inhibitory factors that are associated with intake of food (cancer cachexia); it may not be possible to promote an intake beyond

2000kcal/day. However, with the nutrition support system i.e. enteral and parenteral nutrition and with the help of appetite stimulants, malnourished patients can be prompted to consume around 30-35 kcal /kg body weight/day (3000-4000kcal/d). Energy rich diet is helpful in impeding the side effects of cancer treatment i.e. chemotherapy and cancer cachexia

Protein

There is increased in the tissue catabolism due to metabolic stress of cancer and chemotherapy. Symptoms like anaemia and hypoalbuminaemia are very common during cancer. Synthesis of protein tissue that is an essential element of healing and rehabilitation requires essential amino acid and nitrogen. Efficient protein utilization that depends upon protein: energy ratio which help to promote tissue anabolism and prevent catabolism and also help build up body reserve.

To meet the maintenance demand and proper anabolism process, adult patients with average nutritional status will require 80-100gm protein per day. However, malnourished patients must consume 100-150gm protein per day to replenish reserves and restore a positive nitrogen balance. Emphasis of course should be given on the inclusion of high biological value protein rich foods sources such as milk, eggs, marine foods and poultry.

Fat

About 15-20% of the modified energy requirements should be contributed from the fat. Fats make the meal more calories dense and improve digestibility.

More emphasizes should be given on the addition of emulsified fats and vegetable oils particles which are good source of medium

chain triglycerides (MCTs). Visible fats such as animal fat like butter, ghee, lard etc and flesh foods such as red meat should be excluded from diet. A combination of saturated fats such as cream, butter and PUFA & MUFA such as vegetable oils like olive oil, coconut, safflower etc can help in improving taste and contributing variety in terms of flavour in different meals.

Carbohydrates

60% of total energy should be provided from carbohydrates. If a calorie rich diet is being given more emphasizes should be given on the inclusion of easy to digest CHO so as to make the meal small in volume but calorie or energy dense.

Intake of fibre need to be cut down if patient is suffering from digestive disturbances or adenocarcinoma or stomach cancer. However, some patients may experience hyperglycaemia so in that condition more emphasizes should be given on the incorporation of soluble fibre in diet.

Vitamins

Vitamins are the most powerful components which can help to block cancer. Recent research has shown that certain vitamins can be successfully implied in the fight against these diseases and they can increase the life expectancy of some terminal cancer patients.

Minerals

Minerals such as zinc, selenium act as an antioxidant and fight against the cancer causing compounds. Selenium is toxic extremely highly doses (2.5-3.0g/d), but normal level of 50-200 micro gram/d is safe. It is a potent antioxidant. It reduces the risk of breast and colon cancer due to changes in prostaglandin synthesis

Table.1 Cancer healing herbs

Type of cancer	Herbs	Scientific names	Active compounds	Biological effects	References
Stomach cancer	Alfalfa (also known as king of sprouts and father of all foods) /	Medicago sativa	Tannins, pectin substances, saponins, amines. Coumarin derivatives, phytoestrogen (coumesterol), liquiritigenin, isoliquiritigenin, loliolide, 4-hydroxy-6-pentadecyltetrahydropyr-2 triterpene, glycosides, carotenoids, purines base, flavones, isoflavonoids and phenolic compounds	Valuable source of vitamin A, B, D, C, E, G, K and U. Vitamin U prevents injury to the gastric mucosal lining. Detoxifying effect. Valuable in building immune system. All alfalfa extracts are free radical scavengers. It increases the life span of cancer survivor except coumesterol ASEA suppresses the production of pro-inflammatory cytokines & alleviate acute inflammatory hazards Posses antigungal and hypoglycaemic properties	Bakhru, 2015 Cauni et al., 2012 Hong et al., 2010
Blood cancer, tumor formation in any part	Echinacea (Purple coneflower angustifolia, purpurea and pallid)	Asteraceae	Alkamides, and two cyclooxygenase – (cox-I), (cox-II)	Anti oxidant activity, Anti inflammatory agent, Protection against radiation induced damage in DNA, Potent stimulation of NK cells. Increase phagocytosis, chemotaxis activity and oxidative burst of either macrophages or neutrophils.	Sandra C. miller, 2012 Percival et al., 2000 Clifford et al., 2002
All types of cancer	Leaves of papaya	Carica papaya	Papain , Saponins , glycoside, Alkaloids carpain, pseudocarpain and dehydrocarpaine I and II, choline, carposide, vitamin C and E	Chemical component present in papaya tree that is one million times stronger than the strongest anti-cancer medicine. Leaf extract of carica papaya can arbitrate a Th1 type shift in human immune response.	Bakhru, 2015 Vuong et al., 2014

				Higher antioxidant activity and ion reducing capacity. improves thrombocyte counts in dengue patients	
All types of cancer	Margosa leaves	Azadirac htaindica	Flavonoids, steroids, glycosides, antiquinone, terpenoids and alkaloids	Leaves of margosa purifies the blood and helps in reducing heat as cancer medicine makes the blood toxic and increases the body heat	Bakhru, 2015 Otsuki et al.,2010 Raphael et al., 2012
Skin, liver, oral, stomach, pancreatic and lung cancer	Holy basil	Ocimum sanctum	eugenol, apigenin, limonene, ursolic acid, methyl cinnamate, , α -terpinene, myretenal, luteolin, carnosic, anthocyanins, β -sitosterol, caryacrol, cintronellol, famesol, geraniol, kaempherol, menthol, p-coumaric acid, quercetin, rosmarinic acid, rutin, safrole, orintin, vicenin	Exhibit anti-inflammatory, analgesic, antipyretic , hypolipidemic, antidiabetic, antistress & immunomodulatory activities. Alters the gene expression, induce apoptosis, inhibit angiogenesis and metastasis. Protect the normal tissue against the tumoricidal effects of radiation. posses strong superoxide anion scavenging activity, Fe^{2+} chelating activity, Decrease the tumorigenicity of orthotopic transplanted PC cells Prevent radiation induced DNA damage Decreases the incidence, multiplicity and cumulative no. of papillomas.	Kaefer et al., 2007 Bakhru, 2015, baligaet al., 2013 Bhattacharya et al., 2013 Shimizu et al., 2013
Cervical cancer	Indian gooseberry (also known as Amla)	emblicaof ficinalis /phyllanth usemblica (PE)linn	Phyllaemblic compounds, quercitin, gallic acid, tannin, ascorbic acid, flavonoids, pectin, polyphenolic compounds	Rich source of vitamin C, used in fighting against cancer especially dehydrated berries. Fresh fruits containing 470-680mg of vitamin C/100gm whereas dehydrated berries	Bakhru, 2015 Mahata et al., 2013 Singh et al., 2011

				<p>provides 2428-3470mgs of vitamin C /100gm.</p> <p>PE inhibit HPV (human pappillomavirus) and AP - 1 (activator protein-1) which are responsible for tumorigenicity of cervical cancer cell.</p> <p>It targets viral oncogenes transcription which is responsible for development and progression of cervical cancer</p>	
All types of cancer	Brahmi	Herpestis monniera or bacopam onniera (20mg/kg bw)	Phytosterols, saponins, alkaloids, betulic acid	<p>Increases vitality, strengthens mental faculties and various organs of body, Brahmiherbal supplements stimulate production of IgA, IgG and IgM and lymphocytes.</p> <p>Promotes or increase the antioxidant enzyme status. Reduce the rate of lipid peroxidation.</p>	Dr. H.K bakhru, 2015 Yamada et al., 2011 Rohini et al., 2004
Colorectal cancer	Ginseng	Panax ginseng	Saponins, panaxytriol, panaxydol, panaxytriol	<p>Active constituent is ginsenosides and saponins that reduce the proliferation of cancer cells and sensitized cancer cells to chemotherapeutics agents.</p> <p>Ginesoid induced apoptosis in cancer cellslines and sensitized drug resistant breast cancer cells to paclitaxel and also inhibit the proliferation of prostate and colon cancer cells</p>	Wang et al., 2008
Skin cancer, non-Hodgkin'	Podophyllum (papi)	Podophyl lumhexa andrum 200mg/kg	Podphyllotoxin, etoposide	<p>Treats various skin diseases and controls tumour growth. Halt proliferation</p>	Agarwal et al., 2011 Alam et al., 2013





lymphoma, leukaemia, bronchogenic carcinoma, ovary and testis cancer, lung cancer, neuroblastoma, hepatoma and other tumors		of bw		multiplication of the cancerous cells by breaking down the microtubules in to smaller subunits. Thus impeding the division of cells in to the abnormal growth.	
Various types of cancer and arthritis	<i>Colchicum luteum baker</i>	Liliaceae	3demethylcolchicine, 2demethylcolchicin, eN-deacetyl-N-methylcolchicine, alpha & beta-lumicolchicine, N-deacetyl-N-formylcolchicine, colchicines, colchamine, colchiceine, colchocerine, and demecolcine.	Inhibit the tumour growth and relief from joint pain, muscles pain, gout, hepatic cirrhosis, primary biliary cirrhosis enhancing action of central depressants. Activate the t-lymphocytes Anti inflammatory and antigranuloma activity	Akram et al., 2012 Nair et al., 2011 Akhtar et al., 2018
Breast, ovarian Hepatic cancer	<i>Scutellaria arbatae</i>	Lamiaceae	Pheophorbide, apegenin and luteolin	cytotoxic to 100% of actively proliferating ovarian lines tested and 50% (2 of 4) of actively proliferating breast cell lines. Pheophorbide photodynamic activities by inducing apoptosis in hepatocellular carcinoma. PDT (photodynamic therapy) i.e. effective treatment for apoptosis and necrosis of target cancerous cells whereas apegenin and luteolin possess antibacterial	Powell et al., 2003 Tang et al., 2006 Sato et al., 2000




				property	
All types of cancers	<i>Neem</i>	Azadirac htaindica	Azadirachtin and nimbolide	Chemo preventive and antitumor effect. Inhibition of cell proliferation. Induction of cell death. Suppression of cancer angiogenesis. Restoration of cellular redox balance. Sensitize the cancer cells to immunotherapy and radiotherapy. Enhance therapeutic efficacy of anticancer agent. Exhibit immunomodulatory, anti-inflammatory, antihyperglycaemic, antiulcer, antimalarial, antifungal, antibacterial, antiviral, antioxidant, antimutagenic and anticarcinogenic properties	Hau et al., 2014 Subrapriya et al., 2005




Table.2 Method of use and dosage of herbs that is mentioned above

Herbs	Method of use	Dosage	References
Alfalfa	Sprouts, Vegetable salad, seed powdered form, supplement as capsules/tablet	Dried herb- 5-10gm (3 times/d) Liquid extract-5-10ml (3 times/d) Seed- 40g heated prepared mixed with food	Hong et al., 2009 Basch et al., 2009
Echinacea (Purple coneflower angustifolia, purpurea and pallida)	Powder, juice, herbs and roots	E. pallid- 900mg crude drug E. puepurea herb- 6-9ml expressed juice daily E. angustifolia root- 1-3g daily E. purpurea root- 3 * 60 drops of tincture	Barnes et al., 2010
Leaves of papaya (pawpaw)	Leaves juice , leaves fine paste, infuser, decoction	20mg /ml leaf extract with 22.8µg/ml pure Lycopene causing cell death in liver cancer One leaf of papaya gives one table spoon of juice	Kala et al., 2012 Naguyen wet al., 2012
Holy basil	Leaves, leaf powder	50mg	Geetha et al., 2003
Neem	Powder, juice, leaf extract	250-500mg/kg/bw	Dasgupta et al., 2004

Table.3

Food products/ scientific names	Plant picture	Active compounds	Impact on health	References
Beet (beta vulgaris)	 <p>Source: indiamart.com</p>	caretenoids, glycine betaine, saponins, betacyanine, folates, betanin, polyphenols and flavonoids, betacyanin	Have antimicrobial and antiviral activity and also inhibit the cell proliferation of human tumour cell stimulate liver and its detoxifying activity chemopreventive properties. Enhancing apoptosis in cancer cells	Singh et al., 2014 Das et al., 2014
Cabbage and Cruciferous vegetables/ brassicaceae	 <p>Source: indiamart.com</p>	isothiocyanates and indole-3-carbinol	Active coumpounds present In Cruciferae family influence carcinogenesis during initiation and promotion phases of cancer development Cauliflower and brussel sprouts help to immunize against breast cancer by managing oestrogen	Murillo et al., 2014 H.K bhakru et al.,2015
Carrot/ daucuscarota subsp. sativus	 <p>Source:indiamart.com</p>	Beta carotene	Beta carotene acts as antidote lung and breast cancer, thus scavenging free radical	Longnecker et al., 1997
Curd & yogurt	 <p>Source: indiamart.com</p>	Streptococcus thermophilus and Lactobacillus delbrueckii subsp. bulgaricus Lactobacillus acidophilus	Lactobacillus acidophilus helps to suppress enzyme activity needed to convert otherwise harmless substance into cancer causing chemicals in the colon. Thus, antidote for colerectal cancer. Streptococcus thermophilus and Lactobacillus delbrueckii	Pala et al., 2011 Dr. HK bhakru 2015

			subsp. bulgaricus are the two lactic acid bacteria have been shown to be effective in preventing the initiation of carcinogenesis. Thus, capable of stimulating the immune system	
Garlic/ allium sativum	 <p>Source:hgtv.com</p>	Allicin, phytoncides, sulfur-containing compounds alliin, ajoene, diallyl polysulfides, vinyl dithiols, S-allyl cysteine, saponins, flavonoids,	Allicin which inhibits the growth of transplantable tumors and to reduce the incidence of certain spontaneously-occurring tumors, has a deep effect on liver detoxification enzymes, which break down toxic substances. It protects against radiation-induced cancer	Lau et al., 1990 Dr HK bhakru et al., 2015
Green vegetables (such as spinach, fenugreek, dark green lettuce, broccoli)	 <p>Source: indiamart.com</p>	Lutein, saponins, flavonoids, tannins, steroids, alkaloids	Blanching and cooking process increases the phenol content and antioxidant activities. GLVs are a rich source of lutein which is more powerful than carotenoids.	<i>Adefegha et al., 2011</i> Dr HK bhakru et al., 2015
Liquorice / glycyrrhiza glabra	 <p>Source: herbgarden.co.za</p>	glycyrrhetic acid (GA), triterpenoids	glycyrrhetic acid (GA) extract which possesses anti-inflammatory activity and also inhibits hepatic tumor growth, reduces the rate of proliferation of LNCaP androgen-dependent prostate cancer cells. Triterpenoids which may block quickly-growing cancer cells and cause some precancerous cells to return to normal growth.	Hawthorne et al., 2010 Dr HK bhakru et al., 2015

<p>Watermelon / <i>Citrullus lanatus</i></p>	 <p>Source: gardnerpath.com</p>	<p>cis- isomeric Lycopene, flavonoids, phenols</p>	<p>Highly concentrated in cis-isomeric lycopene Effective in reducing the extent of cancer insurgence, cardiovascular disorders, diabetes and macular diseases. Pure lycopene was found to cause 50% HepG2 liver cancer cell while watermelon juice had anticancer properties upon breast cancer cell lines too</p>	<p>Naz et al., 2014 Rahmat et al., 2002</p>
<p>Soya beans/ <i>Glycine max</i></p>	 <p>Source: britannica.com</p>	<p>Isoflavone, Genistein, phytoestrogens</p>	<p>Soybeans contain a number of anticarcinogens, unique dietary source of the isoflavone genistein, which suppresses the growth of a wide range of cancer cells. One soya bean compound, phytoestrogens is quite similar chemically to the drug tamoxifen which is given to certain women to help to prevent breast cancer and its spread. Helps to block the growth of cancer cells</p>	<p>Messina et al., 2009 Dr HK bhakru et al., 2015</p>
<p>Tomatoes/ <i>Solanum lycopersicum</i></p>	 <p>Source: almanac.com</p>	<p>Lycopene</p>	<p>Regarded as anti cancer drug. Lycopene in tomatoes is twice as powerful as beta carotene at quenching singlet oxygen. Tomatoes contained, primarily as conjugates, quercetin and kaempferol. Tomato juice and tomato purée were rich in flavonols, containing 14–16 µg/mL and 70 µg/g, respectively.</p>	<p>Dr. H.K bakhru, 2015 Stewart et al., 2000</p>


Wheat bran/ triticum	 Source: indiamart.com	Lignans, flavonoids	Rich source of dietary fibres, phenolic compounds such as lignans, flavonoids, phytochemicals that protect against colon and breast cancer especially	Ferguson et al., 1998
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Table.4

Vitamins	Role
Vitamin C	<ul style="list-style-type: none"> ✓ Most potent anti toxin known. ✓ Effectively neutralize or minimize the damaging effect of most chemical carcinogens in foods. ✓ Block the transformation of amines and nitrite in to nitrosamines which are deadly carcinogens. ✓ Helps in neutralizing the free radical cancer causing agents in the cell membranes. ✓ Regulate immunity. ✓ Prophylactic agent against cancer. ✓ Increasing synthesis of prostaglandin. ✓ Enhancement of IgA, IgM. ✓ Enhancing lymphocytes function and rapid mobilization of phagocytes. ✓ Potent anti viral & antibacterial activity. ✓ Prevent lipid peroxidation.
Vitamin A	<ul style="list-style-type: none"> ✓ Improves the functioning of the immune system ✓ Helps in the elimination of oxygen-types free radicals.
Vitamin B complex	<ul style="list-style-type: none"> ✓ Increases the body's resistance to oxygen deficiency. ✓ Important for the prevention of cirrhosis of the liver. ✓ Help the body in inhibiting the activity of the enzyme hyaluronidase, found in cancerous tissue.
Vitamin E	<ul style="list-style-type: none"> ✓ Also increase the oxygenation of cells. ✓ Valuable in preventing prostate cancer

Antioxidants

Antioxidants are important naturally occurring nutrient which help to protect body certain type of cancer. As cells function normally in the body, they produce damaged molecules called free radicals. These free radicals are highly unstable and steal compounds from other cellular molecules such as fat, proteins, or DNA, thereby spreading the damage. This damage

continues in a chain reaction, and entire cells soon become damage and die. This process is called peroxidation. Peroxidation is useful because it helps the body destroy the cells that have outlived their usefulness and kills germs and parasites. However, peroxidation, when left unchecked also destroys or damages the healthy cells. Antioxidants help to prevent widespread cellular destruction by willingly donating compounds to stabilize free radicals. More importantly, antioxidants

return to the surface of the cells to stabilise rather than damage other cellular components such as Lycopene, carotenoids, phenols etc.

Fluids

Adequate fluid intake is imperative to replace losses due to gastrointestinal disturbances, infection/fever can also help the kidney's dispose off the metabolic breakdown products from the destroyed cancer cells as well as from the toxic drugs used in the treatment. Certain drugs such as cyclophosphamide require 2-3 litres fluid to prevent cystitis. It helps in providing the relief from xerostomia and other swallowing problems

Preoperative Nutrition Strategies

Prior to surgery, adequate nutritional status and normal metabolic state should be concerned. If metabolic state of body is appropriate than better outcomes of surgical procedures being observed. Anthropometric measurements or nutritional screening process should be executed prior to surgery (Evans *et al.*, 2014; Schlag and baumann *et al.*, 1991).

Post-operative nutritional strategies

After the surgery or during the post-operative period, when food is swallowed or ingested some patients experience numerous signs and symptoms known as "dumping syndrome". This syndrome varies with the severity or condition of the patient. Normally the signs and symptoms arise within 15-30min following ingestion of food. The patient may experience with the symptoms like bloating, tachycardia, abdominal cramping, faintness and sweating. Mental confusion may occur. These signs and symptoms are correlated with the release of catecholamine. This catecholamine release is arbitrated by hypoglycaemia influenced by insulin

response to the entry of the meal in to upper small bowel. Steatorrhoea & malabsorption of other nutrients occurs in this condition. Malabsorption leads to iron, calcium & fat soluble vitamins deficiency.

Antidumping diet should be recommended that is generally protein rich, adequate fats, low in carbohydrates, especially simple CHO restricted in fluids at meal time

The use of soluble fibre such as pectin derivative has been reported to prolong gastric emptying, to decrease dumping and to minimize the fall in blood sugar

If steatorrhoea is significant, replacement of a portion of LCT with MCT will be helpful.

Glucose oligosaccharide may also help to increase the calorie intake and absorption among patients with pancreatic insufficiency.

Nutrition support management during radiation therapy, chemotherapy

Radiation therapy and nutrition support

Radiation therapy is one of the options for the treatment of various therapies. During the administration of radiation, patients experience acute radiation toxicity. This toxicity is manifested as nausea, vomiting and diarrhoea. This type of toxicity will subside usually within weeks of ending the radiation therapy. After 2-3 weeks of RT, abdominal cramping and watery diarrhoea may occur. Weight loss is common. Malabsorption of water, fats, bile, salt, CHO, calcium, magnesium, iron and vitamin B12 occur during. Several factors contribute to the malabsorption that occurs in radiation damage. These include:-

Decreased available absorptive surface area due to radiation damage

Chronic lymphatic obstruction causing steatorrhoea and protein loss

Bile salts malabsorption leading to choleric diarrhoea

Rapid intestinal transit

Nutritional support management

Administration of broad spectrum of antibiotics for bacterial overgrowth

Diet should be low in fat and lactose

Ant diarrhoea medications and anticholinergic and antispasmodic preparation

During chronic radiation enteritis, dietary management includes the restriction of fat, fibres, lactose and glutens

Chemotherapy and nutrition support

Chemotherapy results in lot of side effects. This is because the drugs are not specific to cancer cells alone. Even the host cells will be affected by chemotherapy. The severity of these side effects depends on factors such as the type of drugs, dosage, and duration of treatment, patient's nutritional status and individual susceptibility. The nitrogen equilibrium present before chemotherapy changes to negative nitrogen balance. Protein turnover, synthesis and catabolism decrease with the drug therapy despite continuing intravenous nutrition support.

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