

## DIETETICS IN THE PREVENTION AND MANAGEMENT OF MALIGNANT DISORDERS

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### ABSTRACT

Malignant disorders are an unsolved major concern of human health. Diet and cancers are associated. While it is not yet possible to provide quantitative estimates of the overall risks, Diet remains a prime yet an avoidable cause being 35% of all the etiologies. The diet which we consume these days consists of fast foods, coloured, fried & incompatible food etc. No one knows exactly the ill effects of these foods and how many free radicals are being produced by ingesting them and their role in acting as oncogenes. Ayurveda, a holistic science of healing emphasizes on the role of diet (*Ahara*), both in causation and treatment of the disease. It is also said that *Dehasyaaharasambhava* meaning we are what we eat. Food and nutrition are critical parts of any successful cancer treatment. Nutrients support the growth of healthy cells in the body, combats symptoms, side effects of various treatments thus improving quality of life. An attempt is made to highlight the concepts of Ayurveda regarding nutrition and to get an overview of necessary dietary changes to be adopted.

**Keywords:** *Ayurvedic* Dietetics, *Arbuda*, Prevention, Management

### INTRODUCTION

‘Cancer’ is a term used to describe wide variety of malignant tumors. It is an abnormal mass of tissue and its growth is excess, uncoordinated and uncontrolled. Cancer is a leading cause of death worldwide, accounting for 7.6 million deaths (around 13% of all deaths). About 30% of cancer deaths are due to the five leading behavioral and dietary risks: high body mass index, low fruit and vegetable intake, lack of physical activity, tobacco use, alcohol use.

Is food really a major factor in preventing and causing cancer????

Yes, it is an avoidable and modifiable cause. It is estimated that one third of the cancer deaths each year in the US can be attributed to nutrition and other lifestyle factors (not including smoking). According to American Cancer Society (ACS) 30% to 40% of all cancers

may be prevented by changes in diet and physical activity. In India it is estimated that there are 2 to 2.5 million cancer patients at any given point of time with about 0.7 million new cases coming every year and nearly half die every year. The total cancer cases are likely to go up from 979,786 cases in the year 2010 to 1,148,757 cases in the year 2020<sup>1</sup>.

Most of the cancers are not due to DIET but due to WRONG DIET. Wrong diet includes: Food preparation, food Preservation, choice of food, eating habits. Modern day food includes consumption of fast foods, dried and spicy foods, incompatible and contaminated, colour and preserved foods. These are sources of carcinogens and produces free radicals in the body.<sup>2</sup>

Modern day food according to Ayurveda is *Varjya ahara* (avoidable food). Food which is

contaminated, left over, very moist, tasteless, bad smelling (*Puti*), prepared long back (*Chira sidha*), hard (*Sthira*), cold food warmed (*Sheetamanna ushnikrita punah*), stale, over cooked, charred (*Upadagha*)<sup>3</sup> deranges the *Tridoshas*, *Agni*, produces *Ama* and leads to dreadful diseases. *Arbuda* in *Ayurveda* can be correlated to cancer which is caused by vitiation of *tridoshas* (bodily humors) with the involvement of *rakta* (blood), *mamsa* (muscle), *medha* (fat) *dhatu* (body tissues).

### **Importance of Ahara in Ayurveda**

In *Ayurveda*, food is considered as God *Brahma*. It is one of the 3 basic pillars (*Trayopastambha*) of healthy life viz, Food, Sleep and *Brahmacharya*. It can be considered as the greatest medicine due to possibilities of management of various diseases solely through diet. *Ayurveda* mentions congenial and non-congenial diet in respect of particular diseases and stress that by the non-observance of those rules, the disease may not be cured easily even with effective medications.

*Ayurveda* offers some basic dietary guidelines that include choosing appropriate food, combinations of food and utensils for serving the food, eating atmosphere, hygiene and etiquette. Dietetics mentioned in *Ayurveda* is having a definite role in the prevention and management of diseases.

### **Dietetics in the prevention of malignant disorders:**

#### **Food preparation:**

Food Chosen should be in-season, locally grown produce which is not *KaalaVirudha* and *DeshaVirudha* should be taken because of the risk of preservatives and pesticides in fruits and vegetables available out of season and not native to the country. *Ayurveda* emphasises to take food in accordance with one's own *Prakriti* (body constitution).

Fruits and vegetables should be rinsed with water mixed with *Hingu* (*Asafoetida*)<sup>4</sup> and remove outer leaves before eating. To avoid agricultural contaminants like pesticides (*Dooshi visha*-toxins which accumulate and selectively targets cells or tissues) like chlordane, organochlorides, arsenic compounds, which Bio accumulates, attaches many of enzymes, mitochondria and persists in fat tissue, is absorbed through skin, gut, lungs and produces various cancers.<sup>5</sup>

Cooking oils on high heat (deep frying,) releases carcinogens<sup>6</sup> in air & free radicals with in oil. Consuming rancid oil leads to increased free radical production which causes heart disease and cancer. Grilling or smoking meat and fish which produces poly cyclic aromatic hydrocarbons (PAHs), benzopyrenes should be avoided which are *Samskar* and *Paak Virudha*. Poly unsaturated oils like sunflower oil, safflower oil and corn oil should not be reused for frying. All these are *Vidahi* (*irritant causing burning sensation*) and *Atiushna* (*very hot*) which causes vitiation of *Rakta dhatu*.<sup>7</sup> All food stuffs have to be cooked on a small flame.<sup>8</sup> Use a mixture of saturated oils like coconut oil, mono and di unsaturated oils like olive oil, peanut oil, mustard oil, sesame oil and polyunsaturated oils like safflower or sunflower oil. Cooking methods like Baking, Boiling (*kwathana*), Braising, Pouching, Steaming (*swinnam*) and Stewing can be used.<sup>9</sup> Saturated oils like ghee, coconut oil, may be reused a few times for frying.

Utensils with teflon coating and aluminium are avoided. The use of Teflon coated non-stick utensils, suppresses immunity and increases the risk of cancers of the blood like leukaemia especially in children. Aluminium dissolves faster into acidic foods than into basic foods. It is always unwise to cook acidic foods like tomatoes, tea & coffee in aluminium ves-

sels.<sup>10</sup> Heating food using plastic containers in microwaves is avoided as high heat in plastics containers with fatin food releases dioxins and synthetic glycoproteins in to food which are

carcinogenic, and sticks to the lining of colon causing irritation that can lead to polyps in colon and colon cancer<sup>11</sup> can be replaced with glassware (*kaacha*), cast iron (*loha*) vessels.

Table 1: List of utensils for cooking and preserving foods<sup>12a, b.</sup>

Food items	Type of utensils/ vessels used
Ghee	Wooden / Iron
Meat and its juice	Silver/ Golden/ Wooden / Iron
Leafy vegetables and edible plants	Wooden / Iron/ Stone
Water, Milk dishes and buttermilk	Earthen containers
Raita, Khadava powder and Sattaka	Glass( <i>Kaacha</i> ) / Crystal( <i>Sphatika</i> ) / Studded <i>Vaidurya</i> )

Precautions while cooking vegetables:

- Any vegetable that is hard, astringent, bitter or pungent in taste must boil in water first and then in buttermilk and after that cook it in oil.<sup>13</sup>
- Vegetables which are too old (*Atijirna*), out of season (*Akalotham*), dry (*Rukasham*), improperly cooked (*Asiddham*), non-terrestrial (*Abhumijam*), too soft or ripe, those grown in unsuitable place and out of season (*Adeshakalaja*) are avoided.<sup>14</sup>
- Use of salt is limited; more than 2,400 milligrams a day seems to increase the risk of stomach cancer and it can be replaced with *Saindhavilavan* (Rock salt).
- In many recipes, use of rock salt (*Saindhava*), Turmeric (*Haridra*), Asafoetida (*Hingu*), Cumin seeds (*Jiraka*), Black pepper (*Maricha*), wet ginger (*Adraka*) etc. are mentioned which are mainly having properties like *Dipana*, *Pachana* etc. which helps in *Agnidipana* and digestion of food.<sup>15</sup>

**Food preservation:**<sup>16</sup>

Food packed in plastic bags or bottles should be avoided. The indigestible plastic layer sticks to the intestines, irritates and predisposes to colon cancer, anaemia. Foods with chemical sweeteners like aspartate, saccharine are associated with greater risk of liver and bladder cancer. Replaced with natural sweeten-

ers like *Stevia rebaudiana* (*Madhupatra*<sup>17</sup>) and increase the use of honey (*Madhu*) and jaggery (*Guda*).

Food with preservatives, usually contain sodium nitrates and amines, to preserve the color of the meat and stop it from putrefying and turning gray. In the body they are converted into substances called nitrosamines with the action of bacteria in the gut, which are highly carcinogenic and lead to leukemia in children, colon and pancreatic cancer.<sup>16</sup> Foods with artificial colors and additives like MSG (monosodium glutamate), irritates the intestines and has a strong link to stomach and colon cancer.<sup>17</sup> Usage of Turmeric (*Haridra*), Saffron (*kumkum*), Red sandalwood powder (*Raktachandan*), Beetroot (*Palakya*) as colouring agents can minimise the effects.<sup>18</sup>

Ripening agents for fruits, vegetables like ethylene oxide causes leukaemia are better avoided and replaced with fresh, seasonal and naturally ripened foods. A food with contaminants like Aflatoxins which thrives on improperly stored corn, rice, peanuts is a potent hepatic carcinogen is avoided by using dry Neem powder for storage.<sup>19</sup> These preservatives, additives, ripening agents can be considered as *Dooshi vishas*, which doesn't produce disease instantaneously, rather accumulates and selectively targets cells or tissues.

### Choice of food:

Appropriate food is chosen according to *Ahara Vidhi visheshanas - Hita and Ahita* aspects of *Ahara*.<sup>20</sup> Food containing all the 6 *rasas* which is warm (*Ushna*), unctuous (*Snigdha*), accustomed (*Satmya*) pleasing to mind (*Manoghna*), freshly prepared should be consumed. Intake of very hot drinks & foods (*Ati ushna anna* and *paana* can vitiate *rakta dhatu*<sup>21</sup>) has risk of oesophageal cancer.

Eating the food prepared before long time (*Chira sidha*), left over, stale food is avoided as it causes *Stambha* (stiffness), *Agni-mandya* (loss of digestive power), loss of taste, nausea etc<sup>22</sup>, due to the growth of bacteria and fungus which produces *Ama*.

Intake of refined, polished and processed foods is avoided which leads to obesity has a risk of breast cancer due to increased circulatory oestrogen levels as these contain low fibre and high fats<sup>23</sup>, where excessive fat food vitiates *Medho dhatu*<sup>24</sup>, are replaced with fibre rich diet-whole cereal grains, brown rice, whole wheat chapattis, barley, millets, oats, corn etc. High intake of Trans fats and saturated fats is avoided which are associated with increased risk of obesity – ↑ LDL – ↑ TGF. Increased fat diet leads to increased bile production, causes bile stagnation, which produces apocholic acid with the action of bacteria<sup>25</sup>, are replaced with low fat diet – higher omega 3 fats, olive oil, *Tila taila* (sesame oil), *Katu taila* (mustard oil)

### Cancer-fighting foods<sup>31</sup>

Foods	Effects on cancer
Avocados	May attack free radicals in the body by blocking intestinal absorption of certain fats; may be useful in treating viral hepatitis (a cause of liver cancer)
Beans	May prevent or slow genetic damage to cells, prevent prostate cancer, and lower the risk of digestive cancers
Raddish( <i>Mulaka</i> ),pumpkin	Contains zn, selenium; Improves immunity

that contains omega 6 fatty acids and natural antioxidants.

Preserved and packaged non vegetarian is avoided, red meat, pork and beef are limited which usually contains hormone residues which are used to promote quick weight gain, has increased risk of getting cancer of breast, thyroid, vagina, uterus and prostate.<sup>26</sup> Dry meats (*Parishushka mamsa*), milled meat, charred meat or over cooked (*Paridagdha mamsa*) are avoided as they are hard for digestion<sup>27</sup> are replaced with lean cuts and smaller portions of meat. Excessive intake of non-veg diet is major cause for *Mamsaarbuda* while seafood's with vitiation of *Pitta* and *Rakta* causing *Raktaja arbuda*.<sup>28</sup>

A meal plate with 3/4plant based foods and 1/4 animal origin – fish, poultry is considered as ideal- American cancer society (ACS).<sup>29</sup> Vegetarian diets have pulses (*Shami dhanya varga*) as source of protein which has been associated with reduction in cancer.<sup>30</sup>

Too much of beverages like cool drinks, artificial drinks, soda, colour tea etc., stored in aluminium cans should be avoided and replaced with plenty of pure warm water, butter milk, green tea (polyphenols), which reduces the risk of stomach cancer. Alcohol, chewing tobacco is avoided which increases the risk of cancers of oral cavity, pharynx, oesophagus, liver. Combined use of alcohol and tobacco greatly increases risk compared to drinking or smoking alone.

seeds,bitter gourd( <i>Karavelaka</i> ),snake gourd	May help prevent skin, bladder, lung, and breast cancers and slow the reproduction of cancer cells
Cabbage and cauliflower ( <i>Kapisaka and gojihva</i> )	May slow cancer growth and development and help to reduce the risk of lung, prostate, and bladder cancers
Broccoli	May prevent some types of cancer, including stomach, colon and rectal
Carrots ( <i>Grunjanam</i> )	May reduce a wide range of cancers including lung, mouth, throat, stomach, intestine, bladder, prostate and breast
Chili peppers	May prevent cancers such as stomach cancer
Dark green leafy vegetables	May reduce the risk of lung and breast cancer
Figs	May shrink tumors
Flax( <i>Atasi</i> )	May reduce the risk of breast, skin, and lung cancer
Garlic ( <i>Lashuna</i> )	May increase the activity of immune cells that fight cancer and indirectly help break down cancer causing substances
	May help block carcinogens from entering cells and slow tumor development. May render carcinogens in the liver inactive.
Grapes Peel-resveratol <i>Draksha</i>	May prevent cancer by sweeping carcinogens out of the body and inhibit the proliferation of breast-cancer cells in vitro
	May inhibit the enzymes that can stimulate cancer-cell growth and suppress immune response
Pomegranate( <i>Dadima</i> )-allagitanin Licorice root	Best anti-cancer diet May prevent the growth of prostate cancer
Oranges and lemons( <i>Nimbuka</i> )	May stimulate cancer-killing immune cells like lymphocytes that may function in breaking down cancer-causing substances
Papayas( <i>Karkati</i> )	May reduce absorption of cancer-causing nitrosamines from the soil or processed foods. May minimize cervical dysplasia and certain cancers
Sweet potatoes	May prevent cancer cells from dividing, reduce the risk of cancer of the stomach, lung, colon, rectum, liver and pancreas, and protect against various types of cancer
Tomatoes	May combat prostate cancer and protect against breast, lung, mouth, stomach, and pancreatic cancer. May reduce risk of breast, prostate, pancreas and colorectal cancer. May prevent cellular damage that leads to cancer
Turmeric( <i>Haridra</i> )	May inhibit the production of the inflammation-related enzyme cyclooxygenase 2 (COX-2), which reaches abnormally high levels in certain inflammatory diseases and cancers, especially bowel and colon cancer
Whole grains ( <i>Shami , shuka dhanya varga</i> )	May help decrease the risk of developing most types of cancer

### Eating habits:

One should eat the *Matravat and Hitakara Ahara*. Food consumed in righteous manner serves as nectar to rejuvenate the body and maintaining health. Ayurveda explains about *Aahar Vidhi Vidhan* (the conducts and rules for taking food)<sup>32</sup> like the meal is to be eaten at a quiet, pleasant, un-crowded, illuminated holy place. Time of meal – 2 *Anna Kalas* and should be taken at proper time (*Kaala bhojana*) after the digestion of previous meal. Food articles should be consumed in proper sequence. Quantity of food should be according to the power of digestion (*Agnibala*). *Viruddha Ahara* is avoided. “Incompatible foods” (*Viruddha Ahara*) can disturb *Agni* and lead to vitiation of *Doshas* mainly *rakta*. Indeed, certain useful foods can be pathogenic if ingested in certain combinations or in specific situations. For example, fruits and milk are useful, but their combination is difficult to digest and can vitiate *Kapha Dosh* and lead to *Agnimandya* (weak *Agni*).<sup>33</sup> Proper eating habits helps in proper digestion and assimilation and thereby no production of *Ama* (free radicals).

### Diet in the management of cancer:

“Unfortunately, there is no single food that will cure cancer. Still, what we eat is very important”. Diet which inhibits the growth or helps in regression of tumour cells, which helps to combat the side effects of other treatments and that serves as immune modulators and antioxidants is beneficial.

Commonly used spices have been found to increase glutathione s-transferase by more than 78%, a detoxifying enzyme. *Cuminum cyminum* (*Jeeraka*) - Cumin seeds, *Ferula narthex* - oily resin from *asafetida* (*Hingu*), *Ocimum basilicum* - Basil leaves (*Tulasi*), Black Pepper - *Piper nigrum* (*Maricha*) and Cardamom – *Elettaria cardamom* (*Ela*) increases cytotoxic activities. Turmeric induces apoptosis and is anti

angiogenic. Ginger (*Shunti*), Garlic (*Lashuna*) induces apoptosis of TNF.

### Diet in alleviating side effects of cancer treatment:

Appetite changes – frequent meals in smaller portions and Gruel (*Yavagu*) prepared with *Panchakola*<sup>34</sup>. Nausea/vomiting – bland food, *Shunti* tea, avoiding strong flavours, spices and acidic foods. Dry mouth, mouth sores – *Sourava* (scum of meat soup) – relieves thirst & hunger. *Mudgayusha* + *dadima* – *raaga*, *mudgayusha* + *mridvika* – *Shadava*.<sup>35</sup> Gruel prepared with *Mridwika*, *Sariva*, fried long pepper, honey and dry ginger allays thirst. Diarrhoea - Barley water, tender coconut water, *Dadima rasa*, *Takra* and *Takrarishta*. Curd and curd based liquid preparations help restoration of lost gut flora. Constipation - Fresh green leafy vegetables, fruits, warm milk with dates or dry grapes. Chewing & swallowing difficulty – liquid and semisolid food, *Pathyakalpanas* (clinical nutrition), viz *Manda*, *Peya* (thin rice gruel), *Vilepi* (thick rice gruel), *Supa* (soup of pulses) thick liquids and semisolid foods are less likely to cause aspiration, provides calories and hydration. *Manda* – Carminative, digestive, *Peya* – Quickly digestible, stops loose motions, nourishes the tissues, *Vilepi*- Strengthening, nourishing, good for heart, delicious, diuretic, *Yavagu*- Strengthening, nourishing.<sup>36</sup> Weight loss & muscle wasting - *Balya*, *brimhana* dravyas *Ksheera* (milk), *Ghrita* (ghee), meat soup (*Krita & akritamamsa rasa*). *Snehapana* (intake of medicated ghee) - Prior to chemotherapy has proven to lessen the toxic effects (*Triphalaghrita*, *Indukantaghrita*).<sup>37</sup>

### Immunomodulators and Antioxidants<sup>38</sup>:

Plant foods probably offer protection in a number of ways. They provide thousands of phytochemicals, which are natural plant compounds. Many are antioxidants, which seem to protect and repair our DNA. An agent

might interact directly with the genome and regulate expression (as a genetic or epigenetic regulator) or indirectly by influencing DNA 'repair' responses and so improve genomic stability. Some antioxidants appear to affect cancer cells, controlling how they grow or spread. The vitamins and minerals in vegetables, fruits, whole grains, and beans also help produce and repair DNA and control cell growth.

*Emblica officinalis* (Amalaki), *Osmium sanctum* (tulasi), *Tinospora cordifolia* (Guduchi) – improves the phagocytosis. *Withania somnifera* (Ashwagandha), *Zingiber officinale* (Shunti), *Crocus sativus* (Kumkuma), *Curcuma longa* (Haridra), *Momordica charantia* (Karavel-laka), *Plumbago zeylanica*, *Psoralea corylifolia*, *Allium sativum* (Lashuna), *Allium cepa* (Palandu), *Asparagus racemosus* (Shatavari), *Azadirachta indica*, *Curcuma longa* (Haridra), *Mangifera indica*, *Piper betel*, *Sesamum indicum* (tila).

## CONCLUSION

Ahara is the best preventive medicine and solely responsible for health and illness, sorrow and happiness. It has been considered equally essential to follow the dietetics rules and regulations for a successful treatment. Ayurveda also offered a number of nutritional preparations, a variety of food preparations in classical texts considering the different needs of healthy and diseased. It says that unwanted accumulation of Ama (metabolic toxins) is the primary cause for any disorder and so in cancer. Restriction or modification of dietary habits would help in preventing or/and curing disease. The description of choosing appropriate food in accordance with their prakriti, satmya (compatible) and satvika diet, utensils for cooking food, Astha ahara vidhi vishesha ayatanas (factors to be considered in the intake of food) Aahara parinamakara bhavas (factors which helps in transformation of food) mentioned in

various Ayurveda texts provides a complete solution to the healthy way of food intake that results in the proper digestion and assimilation without Ama production. This enhances the immune system in the body, thus prevent the multiplication of cancer cells. To conclude the strong areas of Ayurveda are prevention and palliative care, so having a rich knowledge pertaining to the dietetics, Ayurveda can contribute promising attributes for the restoration of health through prophylactic and interventional dietetics. We are, what we eat (Dehe ahara sambhava). Decrease or avoid wrong diet, eat healthy food in a right way and one can lead a lengthy and healthy life.

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