OPTIMUM HEALTH MANAGEMENT THROUGH RIGHT FOOD INTAKE IN PARAMEDICS

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Abstract: Phyto nutrients, dietary and enzymatic antioxidants or their inducers and metabolic activators present in some known herbs may be used to (1) neutralize various free radicals produced during aerobic metabolism. (2) Therapeutic ayurvedic formulations and (3) inhibit or alter oxidative damages and reversal of nuerological , musculo skeletal , cardio vascular as well as obesity; hyper sensitivity and radiation related diseases. These along with yoga and exercise therapy enhance recovery from obesity, age related diseases and poor immunity. Thus, modern wellness industry depends on traditional medical practicianers, physio therapists, cosmetologist, dietician and masseurs. Present communication deals with these intricacies.

INTRODUCTION

In this age of inadequate diet, malnutrition, lifestyle changes, rising stress levels and decreasing energy levels and generation of free radicals (oxidants) and reactive oxygen species (Hydroxyl radical, superoxide radical, Hydrogen peroxide , lipid peroxide and Nitric oxide) during aerobic metabolization of fats, proteins and carbohydrates, oxidative burst and xenobiotic metabolism, it is our health and well being that stands at risk especially in view of demographic and epidemiological shifts. Damage caused to our bodies by radiation, pollution, smoking, drugs, illness, hypertension, obesity, strenuous exercise, allergy and increased exposure to free radicals during these and other environmental stresses, accounts for oxidative stress which plays vital role in ageing and progression of lifestyle diseases such as cardiovascular, diabetes, dementia, immune system decline and brain dysfunction. From paramedical point of view atherosclerosis, multiplesclerosis, pulmonarydysfunction, kwashiorkor, arthritis, osteoporosis, epilepsy, hemiplegia, alzheimers and parkinson disease are important (Hallwell, 1994).

Although, exercise therapy, electrotherapy, hydrotherapy, waxtherapy give relief in dealing with fractures, joint dislocations, ligament breakage, muscles weakness, cardiovascular and pulmonary trauma and neurological diseases, diet-well balanced, wholesome and antioxidative through diet supplementation, diversification and fortification is being recognized as means of improving protection from free radical related pathogenesis (Percival, 1998). In general, proteins built body; fats and carbohydrates give energy and Minerals are needed in metabolisms and bone cum muscle formation etc while antioxidants protect us from oxidants.

Antioxidants that neutralize ROS may be exogenous in origin, eg. Vitamins C, E and Caretenoids or may be constituents of Polyphenolics- flavonoids, flavones and flavonols present in plants.Endogenously produced antioxidants are Glutathione Lipoic acid and metaloenzymes-Superoxides (SOD), Catalase and Selinium dependant Glutathione peroxidase that form our defense (Ames,1994; Serdesi, 1996; Mathews et al,2000; Singh & Kaur, 2009).Besides, Phytotherapy using AYESH system of Alternate treatment helps in keeping us healthy due to (1) their capacity to lower oxidative stress (2) freedom from side effects (3) Non developing resistance against microbes (4) less phytotoxicity and (5) treating stress, anxiety, radiation, toxicity, life style and infection related ailments apart from psychosomatic, post-traumatic and digestion related diseases as earlier reported by Singh & Vats, 2006; Bamola *et al*, 2008). An update of Traditional knowledge based account of U.P and Uttarakhand has been given by Singh, *et al*., (2009).

Importance of Food

Food is very crucial in affecting the mood, senses, spirits, heart, mind, acceptability, vigour,efficiency and productivity of man. Naturally food has a link with energy and human fitness and nutriceuticals and dietary supplements protect us from oxidative stress related diseases.

Vegetarian vs Non-vegetarian Diet

Vegetarian diet namely pulses, nuts, vegetables and fruits have been reported to be superior over non-vegetarian diets like beef, mutton, eggs, chicken, salmon etc. in comparative terms of kcal, water, protein, fat, sugars, cellulose, calcium, iron, Vit. A, B, B2 and C(Karami & Nazimi, 2008).Fermented foods are particularly rich in nutrients and vitamins. As far as milk is concerned, it is a complete food with extra proteins, fat, carbohydrates, vitamins-A, B1, B2, B6, B12, D, folate and Ca, P, Mg and Zn. (Singh *et al*., 2008). Contributions of biotic properties of curd in health cannot similarlily be overstated.

What not to eat

Natural foods infected with mycotoxins should not be consumed. Junked food should be avoided because they have short shelf life, are cooked in bad frying material

and accelerate obesity. Processed foods should be taken with care.

What to eat

Eat small and eat healthy, eat fresh, local, seasonal and right food because vital nutrients may be destroyed during cooking. Good foods are foods that are full of nutrients, omega –3 fatty acids, fibers, antioxidants and are health enhancers by structural and functional modes. Spices should be grinded at low temperature. Leafy vegetables, seasonal fruits, pulses, sprouts, fermented foods and nuts should be so taken along with milk and curd that they constitute balanced diet-full of essential nutrients; fibers vitamins and minerals so that nutritional goals for Asia vision 2020 of federation of Asian nutrition societies are achieved and malnutrition is being taken care of. Protective balanced food should generate about 3000 calories of energy per day.

Benefits of raw food

As cooking does not destroy pesticides and harmful effects of growth hormones, we should go for raw foods, fruits, vegetables, juices, sprouts, dry fruits, seaweeds, salad, fish and organic foods because raw foods provide (1) Antioxidants and neutriceuticals (2) have fibers that help in digestion (3) contain natural nutrients and minerals which produce less acid and gas than cooked foods (4) contain hormones needed by pancreas for the production of insulin, eg. Cucumber, onion, garlic (5) act as cleansing agents, eg Aloe Vera and (6) fight insomnia by plants like muskmelon and pumpkin. (7) Vitamins and minerals in them are useful, e.g. Vitamin A is produced by carrots; B from cereals, peas and beans; C from lemon, orange, lettuce, tomato, cabbage, turnip and mango and Vit. E from germinating wheat while Vit, K from oats.s. Commonly used Additives in Processed foods and their roles in health are as follows;

(1) Preservatives: (nitrates, nitrites, Butylated Hydroxy Toulene (BHT), Butylated hydroxyanisole (BHA), Benzoic acid, Sulphites, ascorbic acid and calcium propionate, increase self life of product. BHA and BHT have anticancer properties.

(2) Nutrients: e.g., vitamins and minerals used in processed flour, rice, cereals, salt, milk are value additions

(3) Flavour enhancers: e.g., MSG hydrolysed vegetable protein mostly used in grains,canned vegetables , soups and make food feel good.

(4) Flavours: Vanilla, spices, artificial flavours, mostly used in soft drinks, ice creams and bakery goods. Add to taste.

(5) Colours: e.g., Annatto, Carotene, Caramel in fruit juicesare synthetic colours.

(6) Sweeteners: Fructose, corn syrup, saccharine, aspartame.

(7) Fat replacers:Oatrin, fibres, modified starch, protein based compounds.

(8) Emulsifiers: Lecithin, Mono/ Diglycerides, polysorbate. Mostly in frozen desserts gelatin puddings

(9) Stabilizers, Thickners, Texturizers: Gums, gelatin, pectin, cellulose, starch mostly in soups and desserts

(10) pH control agents: citric acid, acetic acid ,alkaline buffers. Mostly used in soft drinks.

Preservatives are used to extend shelf life, reduce rancidity and delay browning. Flavours modify taste, colours, give appeal. Sweeteners give agreeable flavours. Fat replacers give creaminess and thickness, Emulsifiers keek liquid particles .Homogeneous stabilizers improve consistency and pH controls acid and alkalinity, affecting texture and taste.

Health concerns of additives

(1) NO_3 and NO_2 promote cancer in lab animals.

(2) Sulphites may cause allergy.

(3) Colours may cause allergy.

(4) Sauerkraut (fermented cabbage) protects against cancer.

(5) Carotenoids- carotene, lycopene and luten ward off cold.

(6) Oil free pickles, more fibers, soyamilk, toned milk are good.

Junk food and Health concern-These are not good for health due to harmful frying material and lead to obesity enhancement.

Dietary supplementations and Fortifications for good health

To protect the cells and organs of the body against ROS, there is sophisticated antioxidant protection system. Nutrient derived antioxidants include ascorbic acid (Vit c) tocopherols and tocotrienols (Vit E) carotenoids (Beta carotene and noncarotenes) oxy-carotenoids like lycopene, lutein, glutathione and lipoic acid. Besides copper, zinc and manganese dependent SOD, iron dependent catalase and selenium dependent glutathine peroxidase. In addition, polyphenols e.g. flavonoids, flavones, flavonols, and proanthocyanidins are dietary antioxidants of vegetable origin. Sources of them in plants have been discussed herein.

Vit C, glutathione, flavonoids are antioxidants which neutralize H_2O_2, superoxide radical and hydroxyl radicals. Carotenes, Vit E particularly neutralizes H_2O_2 and lipid peroxides. Lipoic acid neutralizes hydroxyl and hydrogen peroxide. Fruits and vegetables and whole grains are major source of Vit C, B and carotinoids as shown in adjoining table

Table 1- Carotenoids rich plants

1	*Aegle marmelos*	(Bel)
2	*Emblica officinalis*	(Amla)
3	*Ocimum sanetum*	(Tulsi)
4	*Solanum nigrum*	(Makoi)
5	*Spinacea oleracea*	(Spinach)
6	*Lactuca sativa*	(Lettuce)
7	*Daucos carota*	(Carrot)
8	*Citrullus reticulata*	(Orange)
9	*Dunaliella baradawd*	
10	*Amaranthus gangeticus*	

Spinach is good source of minerals. Vitamin B complex, C, carotenoids-B-cartene, luteine, zeaxanthin, selenium and flavonoids.

Amaranthus paniculatus is also a rich source of carotenoids, Vitamin C, folate lysine. And methionine.

Table 2- Fruits rich in Vitamins

FRUITS	SOURCE OF
1 Apple (*Pyrus malus*)	Vit A, E and Silicon
2 Papaya-(*Carica papaya*)	Vit C, B
3 Orange-(*Citrullus reticulatus*)	Vit C
4 Banana-(*Musa paradisiaca*)	Vit A, C
5 Watermelon-(*Citrullus vulgaris*)	Vit B, E, Lycopene
6 Grapes-(*Vitis nucifera*)	Vit E, B
7 *Ananas Comosus*	Vit B, E, C
8 *Mentha pipirita*	Vit E

Table 3- Vegetables rich in Antioxidants

VEGETABLE	COMMON NAME	SOURCES OF
1 *Lycopericon esculentum*	Tomato	Vit A, B, B_2 and C
2 *Abelmoschus esculentum*	Okra	Vit A, C, B_1, B_2
3 *Allicum cepa*	Onion	Vit B_1, B_2, C
4 *Lactuca sativa*	Lettuce	Vit C, A
5 *Brassica oleracea*	Cauliflower	Vit A, B, C
6 *Spinacia oleracea*	Spinach	Vit A, C

Table 4- Spices with Dietary Antioxidants

SPICES	COMMON NAME	SOURCE OF
1 *Curcuma domestica*	Turmeric	Vit C Riboflavin, B_1, Thiamine (B_2)
2 *Capsicum annuum*	Chilli	Vit A, B_2, C
3 *Cinnamomum verum*	Tejpat	Vit B_1, B_2, C, Niacin
4 *Coriandrum sativum*	Dhania	Vit B_1, B_2, C
5 *Carum carni*	Jira	Vit B_1, B_2, Niacin
6 *Zingiber officinale*	Adrak	Vit B_1, B_2, C

Table 5- Foods rich in Calcium

1	Alfalfa*
2.	Turnip
3.	Cabbage
4.	Mustard
5.	Figs
6.	Soyabean
7.	Oranges
8.	Pomegranate
9.	Banana
10.	Pulses

*Alfalfa is particularly rich in Ca, Mg, K, Na, Vit A,B,C,D,E.

Table 6- Nuts as Dietary Supplements:

Nut	Calories	Folate	Vitamins	Minerals
Almond (*Prunus amydalus*)	164	8	7.8	0.0
Cashew	166	7	1.9	0.02
Peanut	160	68	1.9	0.05
Pistachio	158	14	7.3	0.07
Walnut (*Juglans regia*)	185	28	6.7	2.6

Brazilian nut is rich in Selenium.

Table 7- Nutritive value of Pulses:

Name of Pulses	Comman name	Protein%	Carbohydrate	Fat	Fibre	Minerals
Vigna aconitifolia	Moth	23.0	59.0	0.7	4.0	4.0
Vigna unguiculata	Lobia	24.6	55.7	1.3	3.8	3.2
Phaseolus vulgaris	Lobia	22.0	57.8	1.6	4.0	3.6
Lens culinauis	Mong	20.2	59.7	0.7	4.0	2.1
Vigna mungo	Urd	23.4	57.3	1.0	3.8	4.8
Vigna radiata	Mung	23.6	58.2	1.2	3.3	4.0
Cicer aritinum	Channa	17.1	61.2	5.3	3.9	2.7
Cajanas cigar	Arhar	22.3	57.2	1.7	3.6	3.6
Glycine max	Soyabean	Is the best of all.				

Probiotics as Biotherapeutics:

Probiotics are live microorganisms (e.g. *Lactobacillus lactis, L. acidophilus, L. plantarum, L. casei* and *Bifidobacteria longum*) which when administered in adequate amount as skimmed milk, curd or cereal based yoghurt or probiotic ice cream, lower blood lipid, enhance phagocytosis, eliminate lactose intolerance, food allergy, constipation, ameroid rate, athero sclerosis. Biocictive isoflavones is low, fortified milk-soya confers health benefit on the recepient They exhibit immunomodulatory, antimicrobial, anticarcinogenesis, antidiarrheal and antioxidant activities provided they survive acidic stomach and alkaline conditions of duodenum. (De Roos and Katan, 2000; Kaur, Chograk and Saini, 2002; Yadav *et al.*, 2005; Kumar *et al*., 2007). Foods with a low glycemic index (like dahi are beneficial in obesity, diabetics and cardiovascular diseases.

Plants derived Polyphenols as Antioxidants: These are given below:-

Plants	Source of
Mentha piperita	Eugenol, cafferic acid,-tocophenol
Ocimum sanctam	Flaonoids, orientia vicinin, Beta-caroteen, eugenol and vit C
Phyllanthus niruri	Flavone, ellagic acid
Ageratum conyzoids	Flavone eugenol
Pragana versea, black, white, green & red Tea	Catechin
Aloe veera	Epicatechin

Cited from L. Singh & Amneet Kaur, 2009 (In Press).

MG Detoxification by Glyoxalase system:

Under environmental stresses spontaneous production of methyglyoxal (MG) is a consequence of glycolysis pthway. MG is cytotoxic and impairs biochemical functions of macromolecules. Most organisms protect themselves from bad effects (including cell death) of MG by detoxifying it with help of glyoxalase pathway which comprises of the two enzymes-*GlyI* that uses GSH as a cofactor for the conversion of MG to S-D_lactoylglutatunine and *GlyII* that gives GSH back to the system leading to the production of D-lactate and has been reported in humans, mouse, protozoa, fungi, bacteria and plants (yadav *et al*., 2005).

Glutathione related metalloenzymotic antioxidants

Glutathione is watersoluble tripeptide synthesized and is found in most cells. If two thiol group become oxidized,they can be reduced nonenzymatically by glutathione Oxidised glutathione GSSG is reduced by the NADPH dependent enzyme glutathione reductax.

Glutathione carries out the reduction of H_2O_2 enzymatically by glutathione peroxidase (antioxitated enzyme which is selenium dependent)

Through the action of glutathione S-transferases detoxification of xenobiotics is carried out. Superoxide dimulase, (SOD)and its isoenzymes (antioxidal) have been reported in blue green algae, yeast, plants and human beings. SOD producing herbs comprise *Hordeum vulgare, Camella sinensis, Allium spp, Petrosolinum crispum* and *Ocimum basilicum* while, SOD inducers are *Curcuma longa, Emblica officinalis, Glycyrrhiza glabra* and *Acacia catechu, Terminalia chebulae, Bacopa monierra* and *Withamia somnifera*.

SOD enzymes are found in papaya, apple, cherry, watermelon, peach, pear, pineapple and fig. SOD protect from senescence, aging, ischemia,lipid peroxidation, radiation damage and protein denaturation and may be used in herbal preparations like Liv-52 Abana and other polyherbal drugs.

Three main classes of SOD are:

(1) Cu-Zn SOD in cytoplasm with 2 subunits is sensitive to H_2O_2 and cyanide.

(2) Mn SOD in mitochondria matrix of prokaryotes is insensitive to cyanide.

(3) Fe SOD found in the prokaryotes and in the chloroplasts of plants is not sensitive to cyamine but is inhibited by H_2O_2 (Mathews, Holde & Ahern, 2001).

Gluthione and vitamin C are known to work interactively.

Lipoic acid,a biothiol is a sulphur containing molecule. Lipoic acid and its reduced form dihydrolipoic acid (DHLA) quench free radicals. Supplemental lipoic acid protects against symptoms of Vit.E or Vit. C defiency.

Important Antioxidative properties containing plants being used in Ayurvedic medicines have been tabulated below;

Scope and screening of plants with antioxidative properties for ayurvedic medicines/products

Sr.No.	Disease/Condition	Plants/Products
1.	Hypertension protection	Herbal tea -catechin,epicatechin (Rizvi and Kumar, 2005) Beet roots, Beans, Cabbage, Carrots, Cauliflower, Onions, Pepper, Spinach, Arjun trees Bark, Garlic, Ephedra (Ephedrine), *Coffea arabica.*
2.	Hepatoprotection (antioxidants) Hepatoglycemic & Hepatoprotective	*Andrographis paniculate, Bacopa monnieri, Terminalia chebula, Picrorhiza kurroa, Embellica officinalis, Zingiber officinalis, Piper nigrum, Hippophae rhamnoides, Limonium sinensis, Cucumber domestica*, Liv-52.
3.	Radioprotection	*Glycyrrhiza glabra, Tinospora cordifolia, Alliumcepa, Withania somnifera, Hernidismus indicum, Mangifera indica, Ocimum sanctum, Aloe camells* (green tea), *Podophyllum hexandrum*, Brahm rasayan.

4.	Cardiovascular protection 4.1 Lipid Lowering 4.2 Lipoic acid 4.3 Blood purifier 4.4 Anticoagulant 4.5 Anticholesterolaemic 4.6 Treatment of blood pressure 4.7 Athero sclerosis 4.8 Antithrombolytic 4.9 Omega 3 Fatty acid providers	Diet rich in Vitamin E is Beneficial Abana (plant product). Garlic Cabbage sprouts *Chlorophytum borivilianum* Alfaalfa, Ginseng *Commiphora wightii*, *Hibiscus mulbaris* (gurhal) *Rauwolfia serpentena, Salix alba* S-containing cabbage,berries,mustard & neem seeds *Ginkgo biloba* Flax seeds, nuts (Nuttal *et al*., 1999)
5.	Pulmonary disorders Asthma	Vitamin E & Betacarotene, *Tribulus terrestris*, *Syzygium cumino, Solanum surattense, Portulaca oleracea, Acacia nilotica, Adhotoda zeylania, Ailanthus excisa* Diet rich in Vit C, Carotenoids & Vit E.
6.	Antihistamine (Antiallergic)	Henbane, Epicatechin (Rizvi & Kumar, 2005)
7.	Cancer (Breast & Colon)	Taxol, High Vit.C diet, e.g, Olive, Tomato, Beet, Taxus, *Hetrotropium indicum, Gloriosa*, Tejpatta and Rajma Capsaicin in pepper prevents heart damage
8.	Ostereoporosis Bone density	Calcium rich balanced diet Vitamin K in grasses and whole grains.
9.	Arthritis and Rheumatism	*Withania somnifera, Piper nigrum* (fruit green sp.), *Abrus precatorius, Ficus benghalensis, Codonopsis sp, Sida alva* & Vit D.
10.	Bone fracture	*Terminalia arjuna* (bark), *Woodfordia* sp., *Cylista scariosa, Eclipta prostata.*
11.	Neprotoxicity	Vit. C & E protect against cadmium.
12.	Diabetes	Acacia nilotica, Adiantum caudatum, Dillemia indica, Indigofera latetolia, Tephrosia villosa and Methi
13.	For Nervous system 13.1 Epilepsy 13.2 Migraine 13.3 Insomnia 13.4 Endemetous Kwashiorkar 13.5 Memory enhancer	*Cardiospermum helicabum, Cannabis sativa, Datura metal.* *Beuncasa hispida, Datura innoxia.* *Ocimum cannum, Clerodendron sp., Withania somnifera.* *Biophytum reinwardii, Cannabis sativa.* Vit. E, A, Zn & Fe containing food. *Centella asiatica, Evolvulus alsinoides.*
14.	Health of blood vessels & nerve tissue	Sulphur containing plants cabbage, berries, mustard seeds, onion, methi, carrot.
15.	Gastrointestinal system (Antacids, Laxative)	Alfalfa, Garlic, Aloe, Senna
16.	Endocrine system (Hormones)	Fucus, Alfalfa
17.a	Calcium (for bone)	Banana, pulses, fig, spinach, fish, soyamilk
17.b	Vit D for skeletal mass	Mushroom, Tuna, Fortified cereal with milk, Yoghurt, Sardines, Mackerel
18.	For muscles	Raisins, Apricot, Sunflower seeds, Peanuts, Almonds, Walnuts
19.	Cataract	Vit E, C & Carotene rich golden rice are good
20.	Cosmetics	Aloe, Barbidense, Citrus, lemon,Vit A for healthy skin
21.	Ageing, Skin, Hair	B-carotene, Vit E niacin, Vit B, Folate in tomato,N-acetylCarnitine, Lycopene, betacarotene, Pulses, Fish, Flax seeds improve glutathione synthesis
22.	Role of micronutrients	Iron is needed in O_2 transport and energy product (Beets, Cheeries and Dates). Zinc affects Vit. A metabolism. Silica in Lettuce, onion, tomato Figs & Asparagus.

Based on Singh, Pandey & Jain 1995; Triwedi 2002; Goel 2004; Bhatia and Jain 2004; Kumar, Singh & Singh 2008.

Thus, for socioeconomic development , healthcare using protective balanced diet rich in natural antioxidants is a must of all National Rural Health Mission, Jan Swasthya Abhiyan and Malnutrition Eredication Programmes in the light of Alma Ata Decleration, 1978, Also, otherwise ''Health for All'' is common concern of all.

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