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HEINZ NUTRITION FOUNDATION INDIA

VOLUME 12 | NUMBER 1 | APRIL - JUNE 2010 | FOR PRIVATE CIRCULATION ONLY

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Safe Food – their role and guidelines

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We saw in the last issue that food is so vital for nutritional well-being which is essential at every stage of life, its presentation by way of smell, taste etc., makes it acceptable by judicious use of additives. As important as acceptability are absorbability and assimilability. Equally important is safety of food that is ingested. If the food consumed is not safe, then eating becomes counterproductive. Dr. Bhat, formerly Deputy Director (Sr. Grade) National Institute of Nutrition, Hyderabad discusses the subject from various scientific angles. Consumption of some foods on certain occasions could lead to ill health commonly referred to as food poisoning. India as a traditional nation had considered safety of food very critical. From time immemorial it had followed conventional methods to ensure safety of foods. Simple example is that of boiling of fresh milk before the days of pasteurisation for eliminating pathogens.

Ancient literature emphasised the need to consume safe food, more than for physical and physiological harm that unsafe food can cause, but for mental and spiritual safety and sanity. The entire value system of human behaviour was partly associated with the consumption of safe and *sāttvik* food. When food is classified as safe and hygienic food by scientists, nutritionists and food technologists, spiritual preceptors classified them as *sāttvik, rājasik* and *tāmasik* foods. These were the safety standards of that period. Whether we follow the ancient or the modern classification, the consumption of safe food is imperative to keep the body-mind-intellect complex in perfect condition.

American Heart Association (AHA) nutrition report highlights that apart from stress and other pathology the other common factor that contribute to the development of hypertension can be influenced by diet. Therefore one of the popular nutritionists from Mumbai is providing our readers interesting features of Hypertension and the role of food in this issue.

Safe food for all

(PART 2)

PART I WAS PUBLISHED IN IN TOUCH VOL. 11 NO. 4 (JAN-MAR 2010)

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NEWER FOOD-BORNE DISEASES: MYCOTOXICOSES:

Several food-borne illnesses of unknown origin were traced to mycotoxins, secondary metabolites produced by moulds growing on various agricultural commodities, during improper harvest and post harvest conditions. These include Aflatoxic hepatitis due to consumption of maize contaminated with aflatoxins. Enteroergotism due to consumption of pearl millet (bajra) contaminated with ergot. Deoxynivalenol mycotoxicoses due to consumption of contaminated wheat and Fumonisin mycotoxicoses due to consumption of contaminated maize and sorghum. In all these instances epidemiological investigations carried in the field, laboratory investigation, experimental reproduction of the disease in laboratory animals and pathological observations had established the relationship between ingestion of mycotoxins and acute disease outbreaks.

AFLATOXIC HEPATITIS:

An outbreak of a liver disease characterized by jaundice, portal hypertension leading to death of more than 100 tribals in over 200 villages of Banswara district of Rajasthan and Panchmahal district of Gujarat was traced to consumption of maize contaminated with aflatoxins. Subsequently outbreaks of similar nature have been described from Kenya and Malaysia. Epidemiological studies carried out in several parts of Africa and Asia such as Thailand, Philippines, China, Swaziland, Kenya indicated a correlation between exposure to Aflatoxins and liver cancer. The risks associated with exposure to aflatoxins are enhanced by simultaneous exposure to hepatitis B and possibly hepatitis C viruses. Recent studies carried out in West African countries indicate that chronic exposure of population groups and fatness to dietary aflatoxin lead to stunting, underweight and more susceptibility to infection in childhood and later life.

ERGOTISM:

Crops like pearl millet, wheat, sorghum and rye could get infected during the flowering stage by the fungus Claviceps sp. The consumption of food products prepared from such contaminated grains often result in disease ergotism. In Europe, during medieval years consumption of ergoty rye had resulted in outbreaks of the disease Saint Anthony's fire characterized by gangrenes of the extreme portion of the body such as fingers and toes. In contrast in India during the 1960-1980 period in several states such as Maharashtra, Gujarat and Rajasthan, people consuming ergoty pearl millet suffered from a disease with symptoms of nausea, vomiting, giddiness and prolonged sleepiness. The alkaloids responsible for the toxic symptoms in ergoty rye and wheat belong to the ergotoxine and ergometrine group of alkaloids while those belonging to the ergot of pearl millet belong to the clavine group. During recent years the problem of ergot contamination has been considerably reduced because of the cultivation of resistant varieties of crop plants. Though Indian varieities of wheat are resistant to ergot infection, wheat imported by India from the USA contained ergot. During the last few years the problem of ergot contamination of Sorghum had assumed epiphytic proportions in parts of Africa, Latin America and Australia.

DEOXYNIVALENOL TOXICOSES:

During the period July-September 1987 an outbreak of gastrointestinal disease which affected a considerable segment of the population of Kashmir Valley, was attributed to the consumption of bread made from mould damaged wheat. The symptoms were abdominal pain, throat irritation, diarrhoea and vomiting. The wheat sample has developed mould as a result of unseasonal rains at harvest time.

FUMONISIN TOXICOSIS:

A self-limiting, non-fatal and non-contagious disease outbreak in parts of Deccan Plateau in Andhra Pradesh which affected 1325 people was described a few years ago by two cyclonic storms which had occurred in quick succession resulting in unseasonal rains during harvest. The crops harvested and left in the fields were infected with moulds, specially Fusarium moniliforme producing Fumonisins. The grains that has been found unfit when fed to poultry also lead to toxicity. The outbreak was sequel to the consumption of damaged maize and sorghum. The illness was characterized by symptoms of borborygmi, abdominal pain and diarrhoea.

PHYCOTOXINS: SHELL FISH AND FISH POISONING IN KALPAKKAM AND MUMBAI:

Phycotoxins are toxic metabolites of the algae found in marine and fresh water environments. Algal blooms take place in certain areas during certain periods specially following ecological disturbances and concentration of polluted matter. Typical outbreaks such as paralytic shell fish poisoning had been reported in the past mostly from temperate waters. During the present decade, at least two outbreaks have been reported from India. In one of the outbreaks at Kalpakkam in Tamil Nadu in 1981, children were reported to have died due to consumption of shell fish containing the toxins. The symptoms included gastrointestinal disturbances, tingling sensation in lips, tongue and fingertips, blurred vision and sensation of floating in the air. Another outbreak was reported from the Fisheries College, Mangalore in Kumble estuary in the West Coast following the consumption of clams.

During December 1987, a foodborne disease presumably due to consumption of fish was also reported from four slums in the suburbs of Bombay. People of different age groups and both sexes, who consumed the fish caught in a particular pond were affected. The symptoms included pain in the abdomen, vomiting and diarrhoea, weakness and alternating sensation of heat and cold. The extracts from the fish Mystus singhala from the pond were to be toxic to mice and phycotoxins were identified as the aetiological factor. The pond from which the fish were caught was in an ecologically disturbed state due to its reclamation and flow of industrial effluents and had thick algal blooms, specially of Oscillatoria sp.

FOODBORNE DISEASE DUE TO NATURALLY OCCURRING TOXINS INHERENTLY IN FOODS:

LATHYRISM:

Outbreaks of neurolathyrism, an upper motor neuron degenerative disease in humans had been described in India since 1833 and in the last century over 25 outbreaks have been recorded. The disease is associated with the consumption of Lathyrus sativus. The affected persons have altered gait, exaggerated knee and ankle jerks, ankle clonus and in a few cases extensor planter reflux. They also exhibit severe pain in the lumbar region and myospasm in calf muscle. One of the earliest symptoms of the disease is spasmodic muscular contraction in calf muscle. The symptoms at the time of onset include heaviness and stiffness of the limbs, muscle cramps, tremors and involuntary movement of upper extremity, while the minimally affected persons can walk unassisted with a stiff legged gait, the more severely affected have scissor gait. Sporadic cases of Lathyrism are reported even now wherever Lathyrus sativus is grown and consumed like in Bhandara/ Ghadchiroli district of Maharashtra, Bidar of Karnataka and Medak districts of Andhra Pradesh.

> “The pond from which the fish were caught was in an ecologically disturbed state due to its reclamation and flow of industrial effluents and had thick algal blooms, specially of Oscillatoria sp.

Lathyrism has been reported from Bangladesh, India, China, Nepal, Ethiopia, Algeria, Spain, France, Germany, Italy and Russia. Over 800 Jews fed with Lathyrus in a Labour Camp during 2nd World War developed topical Lathyrism symptoms and some of them are still living in Israel. An unusual amino acid βeta oxalyl aminoalanine has been implicated in the causative of the disease. It has been shown to be a neuro exitant toxin in a number of animal species.
The motor neuron diseases have been claimed to be reproduced in horse, goat and sheep in Ethiopia by feeding L.sativus seeds. Currently, feeding trials in goats

are in progress at the National Institute of Nutrition, Hyderabad. The sale of the seeds is banned under the PFA rules but a sustained campaign is under progress for lifting the ban in Maharashtra.

EPIDEMIC DROPSY:

Several outbreaks of epidemic dropsy due to consumption of mustard oil contaminated with oil obtained from the seeds of the plant Argemone mexiciana have been described in India during the last one century. The most recent outbreak of epidemic dropsy occurred in the districts of Shivapuri and Sheopur in Madhya Pradesh during June 2003. About 500 persons were affected. A field investigation

carried out jointly by the National Institute of Nutrition and National Institute of Communicable Disease and Ram Manohar Lohia Hospital revealed that the disease is due to consumption of a mixture of edible oils contaminated with argemone oil. Ten out of fourteen oil samples examined showed argemone oil contamination ranging from 0.11 to 17.6%. Sanguinarine, was detected in 4 out 18 serum samples in the range of 12-30 µg/100 ml.

VENO-OCCLUSIVE DISEASE (VOD):

Veno-occlusive disease of the liver is a well recognized form of toxic injury produced by pyrrolizidine group of alkaloids. Prof. Tandon and his group from All India Institute of Medical Science (AIIMS) have reported the largest epidemic of VOD from Afghanistan which affected 5000 persons with a mortality rate 9.25%. It was due to the consumption of wheat contaminated with Heliotropium sp.

During the 70's, an outbreak of VOD in India was described independently by scientists from AIIMS and National Institute of Nutrition (NIN). The outbreak occurred in a remote tribal areas of Kusmi Block in Sarguja district of Madhya Pradesh. It was characterized by ascites, pain in the epigastrium and death. Over 70 persons have died of the disease. The incident occurred due to the consumption of a minor millet "gondhli" Panicum miliare contaminated with toxic weed seeds of Crotalaria.

FOOD BORNE DISEASE DUE TO CHEMICAL TOXINS:

Outbreaks of food borne disease in India due to chemical toxins though occurring frequently are rarely investigated. As a selected case study recently chemical poisoning in three Telangana districts of Andhra Pradesh was undertaken. During 1994-1998 a total of 5452 medico-legal death cases due to toxins were recorded with an average figure of 300 cases per district per year, which was attributable to chemical toxins, mostly pesticides. It is interesting to note that all these were cases of suicide/ homicide, for a variety of reasons. But none was a typical foodborne disease due to accidental contamination. On the other hand, several sporadic acute disease outbreaks in humans due to consumption of food contaminated with pesticides. These include the outbreak in Kerala wherein over 100 people died due to parathion contamination of wheat and sugar, in an outbreak in 36 villages in Uttar Pradesh due to mixing up of Gamaxin (BHC) in food grains during storage.

A typical foodborne disease outbreak characterized by vomiting, abdominal pain and diarrhoea mostly among children due to consumption of rancid biscuits in Hyderabad occurred in 1995. The offensive flavours of rancidity were masked by the strong pineapple flavour used in biscuit. Rancidity of the biscuits was confirmed by high peroxide value and acidity of extracted fat.

Traditionally copper vessels used for cooking/storage are tinned periodically to avoid leaching of copper into food. There is a possibility of contamination of food with copper, lead and tin due to use of such tinned copper vessels. Foodborne disease outbreak due to cooking of food during mass catering and specially in rural area is common even now. A disease outbreak in Students' Hostel in Osmania University was found to be associated with consumption of rice and soup contaminated with lead and copper cooked in improperly coated copper vessel used for cooking.

An accidental food poisoning outbreak resulting in the death of 14 of the 22 affected persons was reported from Hyderabad due to accidental use of sodium nitrite and potassium arsenate instead of table salt in the preparation of tamarind soup. All these outbreaks were recorded only because proper epidemiological investigations were carried out, food and biological samples could be collected and analysed for possible chemical contaminants. Normally in the Indian context such research investigations are not undertaken and thus valuable information is lost.

HAZARD FROM CHEMICAL TOXINS

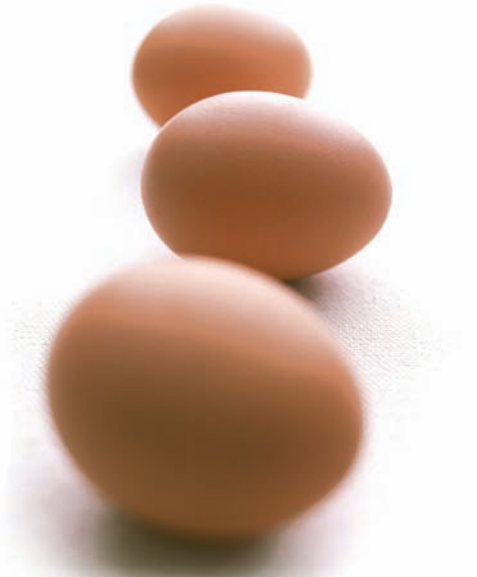
A variety of chemicals could be present in food making them injurious to health. These include pesticides, veterinary drug residues, dioxins, anabolic steroids.

PESTICIDE RESIDUES

Outbreaks due to accidental pesticide poisoning had been reported in India. However, the pesticide residues present in foods leading to diseases in humans has not been recorded. The harmful effects of consuming small quantities of pesticide for prolonged periods is yet to be fully documented, though the ill effects of pesticides on health is well known.

VETERINARY DRUG RESIDUES

The presence of these chemicals in the feed or fodder consumed by the animals results in their secretion in the milk. There is also an indirect risk due to the transfer of toxins and their metabolites to edible animal products such as milk, meat, and



eggs. The excretion of toxins and their metabolites in milk represents another route by which these compounds may be eliminated from the animal. This process may involve intercellular filtration, passive diffusion across membranes or active transport via secretion vesicles.

The two most frequently used veterinary formulations were oxytocin, a hormone used for milk–let down and oxytetracycline, an antibiotic for mastitis treatment. Analysis of milk samples in a semi urban area around Hyderabad had indicated that at various points revealed that 72 percent of the samples from small dairy farmers compared to 9 per cent from market samples had oxytetracycline residues ranging from 0.2-6.4 microgram/ml. In order to minimize the problem, farmers must take care while treating milch cattle with antibiotics and they should refrain from using milk obtained from cattle injected with antibiotics at least for a period of seven days.

Recombinant Bovine Growth Hormone is a genetically engineered copy of a naturally occurring hormone produced by cows. When rBGH gets injected into dairy cows, milk production increases by as much as 10-15%. Although there have been no long-term tests of the hormone's health effects on humans, some preliminary studies link BGH with increased risks of breast cancer, colon cancer, diabetes and hypertension. BGH treated cows are more susceptible to "mad cow disease", udder infections and birthing deformed calves. Milk and other products from BGH treated cows may contain less protein and higher levels of saturated fat as well as pus, bacteria and antibiotics. Even though the Food and Drug Administration in the USA has acknowledged some of these dangers, they maintain approval of BGH's use in beef and dairy products since 1993 and have refused to require labeling of products derived from use of BGH. However, rBGH is banned in Europe and Canada, and has been boycotted by 95 percent of US dairy farmers.

Various chemicals used in veterinary practice need to be regulated by the food control regulatory authorities by establishing safe limits in milk under Prevention of Food Adulteration Act and implementing them.

ADULTERANTS

According to official statistics, from the Ministry of Health, Government of India milk is one of the most adulterated commodities. Water, salt, sugar, starch, ammonium sulphate, sodium bicarbonate, sodium hydroxide ,gelatin, cane sugar and residual detergents are the most common forms of milk adulterants besides formalin, nitrate fertilizers and ammonia compounds. Neutralizers (sodium bicarbonate or sodium hydroxide) are added to increase the shelf life of the milk. One of the public health problem of adulteration of edible oils with Argemone oil is the outbreak of epdemic dropsy in humans.

Addition of inferior quality substances or removal of good quality substances with a motive of profit is called 'Adulteration'. Milk, oil and many items of daily use are the most common foods adulterated. Addition of water, removal of fat is the most common form of adulteration. There are certain adulterants like argemone oil which are added to edible oil like mustard oil. This is a good example of injurious adulterant affecting the human health. Addition of synthetic colours like metanil yellow to sweets is another example. Different classes of adulterants include coal tar dyes, cheaper oils or agriculture produce mixed with more expensive edible oils/agricultural produce, chemicals, extraneous matter, metal contaminants, insect infestation, various pesticide/agricultural produce. Simple physical and chemical methods of detection of adulterants are available. Use of packaged commodities, buying only branded items, purchasing from reliable shops minimise the problem of adulteration.

SAFETY OF FOOD ADDITIVES

India had a tradition since centuries of using oils and spices for preservation. Advances in Chemistry led to the development of many different chemicals used as additives to foods to help in preservation of the foods, to retain or add color to foods, to emulsify food ingredients, or serve many other food preservation and process food improvement functions. Most processed foods contain some food additives, and approvals from regulatory authorities are required for additives so that they will not cause any food safety problems. The risk from food additives is mainly because of the usage of additives that are not permitted and their usage above the permissible limits. A good example is the use of metanil yellow as a food colour which is not approved.

RECENT INCIDENCES RAISING ALARM ON FOOD SAFETY AROUND THE GLOBE

1. MELAMINE SCARE IN MILK AND MILK PRODUCTS:

The most recent incidence of deliberate adulteration leading to a worldwide scare is the melamine contamination in milk. Melamine is a small, nitrogen-containing molecule that has a number of industrial uses, including as a binding agent, flame retardant, and as part of a polymer in the manufacture of cooking utensils and plates, plastic resins, and components of paper, paperboard, and industrial coatings. Melamine is a by-product of the coal industry. The contamination was first reported in 2007 in pet food produced in China. It became a scare following infant deaths in China from melamine adulterated baby milk powder in August/

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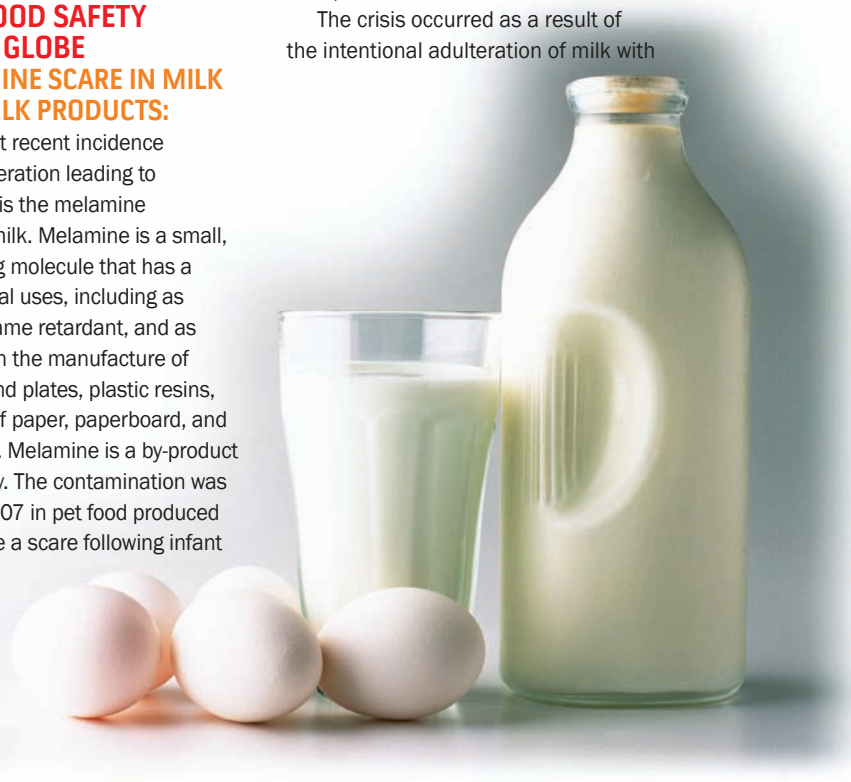
September 2008. Chinese Ministry of Health, reported that 294 000 infants had been affected by melamine contaminated infant formula by the end of November 2008. More than 50000 infants have been hospitalized and six deaths have been confirmed. The symptoms that have been observed in infants affected by the melamine-contaminated infant formula in China include unexplained crying in infants, especially when urinating, possible vomiting, macroscopic or microscopic haematuria, acute obstructive renal failure, oliguria or anuria and stones discharged while passing urine. Melamine produces crystals in urine when its concentration exceeds a threshold. Exposure below this threshold will generally not result in adverse health effects. Many of the affected infants in the Chinese incident had stones, or calculi, in the kidney, ureter or bladder. These calculi were composed of uric acid (a normal waste product in human urine) and melamine.

The crisis occurred as a result of the intentional adulteration of milk with



melamine at primary production level in rural China. Melamine is a high nitrogen compound. It has been deliberately added to misguide the nitrogen content of milk diluted with water as protein. The intentional adulteration of milk may have been happening for many months in China. Several Countries have also reported finding melamine in milk containing products, dairy and non-dairy products manufactured in China. Many countries have introduced limits for melamine in infant formula and other foods. According to WHO limits for melamine in powdered infant formula (1 mg/kg) and in other foods (2.5 mg/kg) would provide a sufficient margin of safety for dietary exposure relative to the TDI.

2. ACRYLAMIDE

The recent discovery in Sweden that acrylamide, a substance known to cause cancer in laboratory animals, is formed through normal heat-treatment of baked and fried starchy foods, led to widespread recognition of significant exposure of consumers via a range of food types. Scientific studies showed that reducing cooking temperatures and/or times can lower consumer exposure levels. Modification of commercial food processes was instituted on this basis, even though the actual risk and the impact of process changes on risk reduction are still not fully known.

3. SOUTHAMPTON STUDY ON FOOD COLOURS

There were reports since 1970's linking consumption of food additives and hyperactivity in children. The Southampton study published in 2007 provided fresh evidences for certain food colours and the preservative sodium benzoate having an effect on children's behaviour, especially in causing hyperactivity. European Parliament has passed a legislation that Foods containing artificial colours tartrazine (E102), quinoline yellow (E104), sunset yellow (E110), carmoisine (E122), ponceau 4R (E124) and allura red (E129), will have to be labelled with a health warning "may have an adverse effect on activity and attention in children.

4. NOVEL FOODS

Noel foods are foods and food ingredients that have not been used for human consumption to a significant degree. In order to ensure the highest level of protection of human health, it is necessary to impose certain restrictions on use of Novel foods or novel food ingredients till such time as they are proved safe. Novel foods may follow a simplified procedure, only requiring notification, when they are considered by a national food assessment body as "substantially equivalent" to existing foods or food ingredients as regards their composition, nutritional value, metabolism, intended use and the level of undesirable substances or must undergo a safety assessment before being placed on the market. Only those products considered to be safe for human consumption should be authorised for marketing. Examples of novel foods include genetically modified foods, foods derived using nanotechnology or even natural products like sugar replacer Stevia or simple Lucerne extracts.

Genetically Modified Foods: A large number of genetically modified foods are entering the market all over the world, especially in the North American continent. Health risk assessment of genetically modified organisms (GMOs) cultivated for food or feed is widely debated throughout the world, and very little data have been published on mid- or long-term toxicological studies with mammals. They have been claimed to be safe for human consumption by the developers of the technology mainly based on the argument of substantive equivalence to conventional foods. However they had received mixed reaction from the consumers regarding their safety. The controversy over the release and subsequent withdrawal of star link variety of genetically modified corn is a good example of the uncertainty which exists over such products.

Corn Soy Blend imported from USA for distribution in India was believed to have contained transgenic events like Star link maize and hence were not permitted to be distributed in India. The cultivation and use of Bt brinjal for food purposes is still debated in India. Issues of possible toxicity and allergenicity of some of the events of GM category are yet to be conclusively solved.

Nanotechnology refers to the control of matter at an atomic or molecular scale of between one and 100 nanometres (nm) - that's one millionth of a millimetre. Applications for the use of nanotechnology in food products, dietary supplements and their packaging offer tremendous potential. Uses and benefits include improved uptake of low bioavailability nutrients or bioactive food compounds, enhanced uptake of nutrients in individuals with absorption disorders, alter hydrophobicity/ lipophilicity of nutritional fortifications and improved stability and sensory qualities of fortified food. Nanosized food additives including colour additives are finding application in food. Nutritional products claiming to use nanotechnology are available in the market.

Nano-sized particles were found to traverse through heart, lung, transported along nerves, pass through blood brain, blood retinal and blood placental barriers etc. opening the area of nano-toxicology. Potential toxicity could include, a) generation of reactive oxygen species with concurrent inflammatory response, b) mitochondrial perturbation producing inner membrane damage, c) uptake by reticuloendothelial cells in various organs producing asymptomatic enlargement and potential dysfunction, d) protein denaturation and degradation, e) uptake in neuronal tissue and f) DNA damage. At present there is insufficient data publicly available to reach meaningful conclusions on the potential toxicity of food or color additives incorporating nanomaterials. For adequate risk management, nanoparticles nearing commercialization should be subjected to a battery of short-term in vitro and in vivo tests to determine broadly the effects on key target organs and possible molecular mechanisms of toxicity.

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Nutrition in hypertension

Part I

BY DR. SHWETA RASTOGI
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Hypertension is a consistent elevation in blood pressure. It is defined as an average systolic blood pressure above 140 mm Hg and a diastolic blood pressure above 90 mm Hg, or both. It is called "a silent killer," because people are often unaware of having high blood pressure until a stroke or heart attack happens. It is an important part of the etiology and pathogenesis of myocardial infarction, cerebrovascular accidents, congestive heart failure and renal failure. It has been estimated that among adults > 50 years of age, the lifetime risk of developing hypertension approaches 90%.

Hypertension has emerged as a major public health problem in India and many developing countries. Clinical and epidemiological evidence shows that hypertension is increasing in India. It has been reported that hypertension prevalence in India quadrupled in urban as well as rural population over a period from early 1950s to late 1990s. High blood pressure is directly related to about 40% of cardiovascular disease burden. Increasing hypertension in India and other developing countries has been related to sedentary lifestyle, excess dietary salt, calorie and alcohol intake, increasing generalized and central obesity and stress of migration and urbanization and genetic predisposition.

High blood pressure can be influenced by factors like age, ethnicity, and sex and socio economic status. Most of the factors that contribute to the development of hypertension can be influenced by diet as stated in the American Heart Association (AHA) nutrition report. For these reasons, it has become necessary to try to identify the mechanisms by which a given nutrient may prevent or trigger hypertension and also the possible interactions between different groups of nutrients. The nutritional factors (or nutritionally induced dysfunctions) include obesity, insulin resistance and excessive consumption of alcohol or salt. Some nutrients have thus been incriminated in spite of a very poor scientific file able to demonstrate the direct link between this specific consumption and the development of hypertension (excess fat intake, saturated fatty acids (SFA); excess carbohydrates, simple sugars, etc.). However, in addition to this excess in fat consumption, the nature of these fats is a major issue, which is not sufficiently controlled. The ARIC study (Atherosclerosis Risk in Communities) showed that in hypertensive men, the cholesterol esters are characterized by a significantly higher content in palmitic acid and lower content in linoleic acid, which could be characteristic of a saturated fat diet

RISK FACTORS AND PREDICTORS OF HYPERTENSION

As per W.H.O the following factors increase an individual's risk for high blood pressure:

- Heredity
- Genetic factors
- Body weight
- Central obesity and metabolic syndrome
- Nutritional factors*
- Alcohol intake
- Physical inactivity
- Increased heart rate
- Psychosocial factors (mental stress)
- Environmental factors (pollution)

*NUTRITIONAL FACTORS INCLUDE THE FOLLOWING:

- Salt or sodium chloride
- Potassium
- Mineral (Calcium, Magnesium, Zinc)
- Macronutrients (fat, fatty acids, carbohydrates, fiber and protein)

TREATMENT:

The goal in treating hypertension is to reduce the risk of serious complications, including heart disease and stroke, by getting blood pressure under control. Ideally that means reducing blood pressure to 120/80 mm Hg, but even a partial lowering of blood pressure brings benefits. One may need prescription medications to treat hypertension, but lifestyle changes including diet, exercise and relaxation are also necessary.

Often, in the early stages of hypertension when blood pressure elevation is mild, lifestyle modifications are recommended alone for 6 - 12 months. In uncomplicated stage I hypertension (systolic BP of 140 to 159 mm Hg or diastolic BP of 90 to 99 mm Hg), dietary changes can serve as initial treatment before the start of drug therapy. Among hypertensive individuals who are already on drug therapy, dietary changes, particularly a reduced salt intake, can further lower BP and facilitate medication step-down. In general, the extent of BP reduction from dietary therapies is greater in hypertensive than in nonhypertensive individuals.

BENEFITS OF TREATING HYPERTENSION:

As per Canadian Recommendations for the Management of Hypertension, there are age related benefits of treating hypertension which are mentioned below:

- Younger than 60

- reduces the risk of stroke by 42%
- reduces the risk of coronary event by 14%

- Older than 60

- reduces overall mortality by 20%

- reduces cardiovascular mortality by 33%
- reduces incidence of stroke by 40%
- reduces coronary artery disease by 15%

Older than 60 with isolated systolic hypertension

- (SBP ≥160 mm Hg and DBP <90 mm Hg)
- 36% reduction in the risk of stroke
- 25% reduction in the risk of coronary events

DIETARY FACTORS THAT LOWER BP

According to the American Heart Association's scientific statement, diet-related lifestyle modifications that effectively lower BP are as follows:

WEIGHT LOSS

A substantial and largely consistent body of evidence from observational studies and clinical trials documents that weight is directly associated with BP. In one meta-analysis that aggregated results across 25 trials, mean systolic and diastolic BP reductions from an average weight loss of 5.1 kg were 4.4 and 3.6 mm Hg, respectively. In aggregate, available evidence strongly supports weight reduction, ideally attainment of a BMI 25 kg/m2, as an effective approach to prevent and treat hypertension.

REDUCED SALT INTAKE

On an average, as dietary salt (sodium chloride) intake rises, so does BP. Evidence include results from animal studies, epidemiological studies, clinical trials, and meta-analyses of trials. To date, 50 randomized trials have been conducted. In one of the most recent meta-analyses, a median reduction in urinary sodium of _1.8 g/d (78 mmol/d) lowered systolic BP and diastolic BP by 2.0 and 1.0 mm Hg in nonhypertensive and by 5.0 and 2.7 mm Hg in hypertensive individuals respectively.

Some salt intake is required. Recently, an Institute of Medicine committee set 1.5 g/d (65 mmol/d) sodium as an adequate intake level, primarily to ensure nutrient adequacy.

INCREASED POTASSIUM INTAKE

High potassium intake is associated with reduced BP. Evidence includes animal studies, observational epidemiological studies, 30 clinical trials, and meta-analyses of these trials.

Although data from individual trials have been inconsistent, 3 meta-analyses of these trials have documented a significant inverse relationship between potassium intake and BP in non-hypertensive and

hypertensive individuals. In the meta-analysis by Whelton et al, average systolic and diastolic BP reductions associated with a net increase in urinary potassium excretion of 2 g/d (50 mmol/d) were 4.4 and 2.5 mm Hg in hypertensive and 1.8 and 1.0 mm Hg in non-hypertensive individuals respectively.

Because a high potassium intake can be achieved through diet rather than pills and because potassium derived from foods is also accompanied by a variety of other nutrients, the preferred strategy to increase potassium intake is to consume foods such as fruits and vegetables that are rich in potassium, rather than supplements.

MODERATION OF ALCOHOL INTAKE

Available evidence supports moderation of alcohol intake (among those who drink) as an effective approach to lower BP. Alcohol consumption should be limited to 2 alcoholic drinks per day in most men and 1 alcoholic drink per day in women and lighter-weight persons. Note that 1 drink is defined as 12 oz of regular beer, 5 oz of wine (12% alcohol), and 1.5 oz of 80-proof distilled spirits.

THE PART 2 OF THE ARTICLE DEALING WITH DIETARY PATTERNS AND DIETARY FACTORS WITH LIMITED OR UNCERTAIN EFFECT ON BP WOULD BE PUBLISHED IN THE NEXT ISSUE.

DR. Y. K. AMDEKAR,
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Food safety – food for thought, hitherto ignored

Community is generally aware about "junk" unhealthy food but it is taken for granted that "healthy" food is safe. It is an irony that "healthy" food may not be safe and so turns out to be unhealthy. Biological, chemical and physical agents can contribute to adverse effects on health, Food borne diseases are not uncommon but newer diseases are emerging that may affect not only the intestines but also liver and other organs of the body. There have been many such outbreaks in India. Some of the foods may contain naturally occurring chemical toxins or they may get added during cultivation processes through pesticides. Preservatives and additives may also pose a health hazard. Besides, adulteration is a real danger and milk is most adulterated item in India. Community needs to be educated about food safety though multidisciplinary approach is necessary including regulatory role.

Correspondence is welcome. Please write to: Heinz Nutrition Foundation India, D-Shiv Sagar Estate, 7th floor, Dr. Annie Besant road, Worli, Mumbai 400 018.
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