Iodine deficiency and brai

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IODINE deficiency is a major global health problem and its consequences can be very devastating. Insufficient consumption of iodine was and still is the most prevailing and most preventable cause of brain damage in the world. However, the situation is more alarming in the developing world than anywhere else.

Once growth of the brain is adversely affected, the process cannot be reversed. However, given proper attention, the incidence of mental retardation can be reduced substantially and can also be prevented.

There are a number of causes for mental retardation, which may start from pregnancy and can occur after birth. By taking steps to ensure that adults, particularly pregnant mothers, and children do not suffer from iodine deficiency, incidence of mental retardation can be reduced/prevented.

In Pakistan, it is unfortunate that no distinction is made between mental illness and mental retardation. The two are after all different from each other and each needs separate attention and services. It should also be kept in mind that while mental illness can now be cured, mental retardation is an irreversible process. Mentally retarded people need attention, care and guidance throughout their lives. Only families where mentally retarded people exist know what it means to live with them.

There are at least five million handicapped people in Pakistan. Therefore there are at least five million families involved. It is only after we address the problem of iodine deficiency that we will be able to avoid some addition in their population. Effort and money spent for this purpose should be worthwhile.

A lack of this mineral is also a leading cause of stillbirths, miscarriages and cretinism. Experts from the World Health Organization and UNICEF say that even cases of slight iodine deficiency can hamper the growth of children's brains, shaving up to 15 points off their IQs and caus-

To determine if one is iodine deficient or not, all one needs to do is to get a bottle of tincture of iodine from a drug store and paint a three-inch patch on one's skin (arm or belly). Be careful not to drop any on clothes, as it will stain clothes. The stain should last for 48 hours. The sooner it disappears, the more profound will be your iodine deficiency. Iodine is an essential trace element for humans. The average adult body contains between 20 to 50mg iodine, and more than 60 per cent of this is concentrated in the thyroid gland situated at the base of the neck. The rest is in thyroid hormones in the blood, ovaries and muscles.

Iodine is a component of the thyroid hormones triodothyronine and thyroxine, which determine the metabolic rate of the body. This effects the body's conversion of food into energy and also the way energy is used. Thyroid hormones are vital for growth

When body iodine stores are exhausted, the thyroid gland in the neck is influenced by the pituitary gland to increase its activity and can become enlarged. This swelling is known as a goiter. Other symptoms of hypothyroidism include fatigue, apathy, drowsiness, sensitivity to cold, lethargy, muscle weakness, weight gain and coarse skin. Young men and women in iodine-deficient areas are at the greatest risk of developing goiter and other illnesses stemming from iodine-deficiency.

A reduction of salt in the diet, combined with a growing consumption of manufactured food prepared using low iodine salt, may lead to an increased risk of deficiency in areas where there is little natural iodine.

Severe iodine deficiency in a mother's diet during pregnancy increases the risk of miscarriage and stillbirth. If the baby survives, it is likely to suffer irreversible mental retardation. This is known as cre-

tial to prevent irreversible damage. Breast milk contains more iodine than formula milk and premature babies who are formula-fed may be at risk of deficiency.

Iodine deficiency may play a role in fibrocystic breast disease. Hypothyroidism and iodine deficiency may also increase the risk of breast cancer, as a higher incidence of disease has been found in iodine-deficient areas.

Good sources of iodine include vegetables grown in iodine-rich soil like kelp and onions. Milk, milk products, salt-water fish and seafood are also good sources of iodine. The iodine content of vegetables varies widely with the iodine content of the soil in which they are grown. Symptoms of acute poisoning from ingestion of iodine (rather than iodide) are mainly due to its corrosive effects on the gastrointestinal tract and include vomiting, abdominal pain and diarrhea. Other symp-

of iodine are rare and may include a reduction of thyroid hormone secretion, acne and inflammation of the salivary glands when doses reach 1500mcg. Dietary intake of iodine should not exceed 1000mcg per day for any length of time. Toxic symptoms may result from high intakes, which occur as part of medical treatment with iodine as iodides. Patients may become hypersensitive after prolonged oral administration. Topical application of iodine-containing disinfectants may lead to hypothyroidism in newborn babies.

A disorder known as hyperthyroidism of Graves disease is due to an overactive thyroid. It is not due to over-consumption of iodine, but happens as a result of a disruption in the mechanisms that control thyroid hormone function.

Supplemental iodine is used to treat iodine deficiency disorders. On a large scale, this is often given in the form of iodized salt or as an

A lack of this mineral is also a leading cause of stillbirths, miscarriages and cretinism. Experts from the World Health Organization and UNICEF say that even cases of slight iodine deficiency can hamper the growth of children's brains, shaving up to 15 points off their IQs and causing widespread learning disabilities. The first five years of a child's life is of crucial importance and needs close watching.

About a billion people worldwide appear to be susceptible to health problems stemming from iodine deficiency. This also indicates the importance of the product throughout one's life.

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Iodine is a component of the thyroid hormones triodothyronine and thyroxine, which determine the metabolic rate of the body. This effects the body's conversion of food into energy and also the way energy is used. Thyroid hormones are vital for growth and development of all organs, especially brain, reproductive organs, nerves, bones, skin, hair, nails and teeth. The thyroid is involved in protein manufacture, cholesterol synthesis, carbohydrate absorption and the conversion of carotene to vitamin A. Thyroxine is an important regulator of body weight. Excesses of iodine are excreted through the urine.

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Severe iodine deficiency in a mother's diet during pregnancy increases the risk of miscarriage and stillbirth. If the baby survives, it is likely to suffer irreversible mental retardation. This is known as cretinism and is a major cause of preventable intellectual impairment in low iodine areas. Mildly iodine-deficient children have learning disabilities and poor motivation. The developing fetus, newborn and young children are most susceptible to the effects of an iodine-deficient diet and treatment before conception or in early pregnancy is essen-

widely with the iodine content of the soil in which they are grown. Symptoms of acute poisoning from ingestion of iodine (rather than iodide) are mainly due to its corrosive effects on the gastrointestinal tract and include vomiting, abdominal pain and diarrhea. Other symptoms may include metallic taste, sore teeth, gum and mouth, and severe headache. Eventually the kidneys fail to produce urine. Two to 3g of iodine should be avoided as it can prove to be fatal. Treatment is with large volumes of milk and starch solutions with one per cent solution of potassium thiosulfate.

Toxic effects from the iodide form

an overactive thyroid. It is not due to over-consumption of iodine, but happens as a result of a disruption in the mechanisms that control thyroid hormone function.

Supplemental iodine is used to treat iodine deficiency disorders. On a large scale, this is often given in the form of iodized salt or as an iodized oil injection.

Iodine is an antiseptic and can be used to kill bacteria and fungi. Iodine used topically as a douche is effective against a wide range of organisms including Candida and Chlamydia. Excessive use should be avoided since some iodine will be absorbed into the system and can cause suppression of thyroid function

n damage

Iodine tablets are frequently sed to disinfect water. Iodine can lso be used to prevent radioactive amage to the thyroid gland. In uclear accidents, radioactive odine is released into the atmos- here and can be taken up by the hyroid, possibly causing cancer. mmediate treatment with iodine revents this uptake.

Potassium iodide supplements hould be used with caution in cases f dehydration, acne, heat cramps, drenal insufficiency, and cardiac dis- ase. Prolonged use during pregnancy s not advisable.

Iodine is also found in the soil. Hence, depending on the amount of odine that exists in the soil, it will be absorbed by plants and animals as hey eat their food. Seafood usually is a reliable source. Dairy products, meat and poultry usually have moder- ate amounts of iodine, but it depends on how the animals are fed. In most developed countries animals are sup- plemented, but this may not be the case elsewhere. Some prepared foods have iodine added in the salt.

Other sources of iodine aside from iodized salts are iodized oil, food colouring (may not all be bio- available); vitamin supplements; medications; topical antiseptics; iodine treatments for domestic ani- mals (eg for foot rot) and water purification tablets.

Excess of iodine is excreted and most people can tolerate fairly large amounts without problems. People with a tendency towards autoim- mune thyroid disease (Graves' Disease, Hashimoto's Thyroiditis) are less tolerant. Up to a milligram of iodine is probably safe for almost everyone. However, if an individual has previously been iodine deficient, he or she may be at risk for iodine- induced hyperthyroidism when the iodine deficiency is corrected. This occurs most typically in older sub- jects with thyroid nodules. The hyperthyroidism can usually be treated satisfactorily.

How much iodine in iodized salt [illegible] while cooking depends

Storage of iodine depends on con- ditions of storage (heat, humidity, exposure) and purity of salt. The range is so great that one can answer this only for specific condi- tions. In the US, iodized salt is fairly stable and little is lost in storage under normal conditions.

If one takes large amounts of salt and if the salt has inappropriately high iodine content. Or if one is at risk for iodine-induced hyperthy- roidism, for most people, even fairly high amounts of iodine in salt (about 76 mcg/g) are not going to give prob- lems. Most people do not eat more than 10g of salt a day. If we take 1000mcg iodine per day as a safe level, then iodized salt is unlikely to provide that high amount.

Of course, if one is getting large amounts of iodine from other sources as well, the effect is additive.

Salt being essential ingredient of food is considered the best way of correcting iodine deficiency by adding iodine to it in measured doses. And those who wish to avoid use of salt can resort to sea food. In this connection it may be relevant to point out that whereas a , tea- spoon of iodized salt provides 95 micrograms of iodine, six ounce por- tion of sea fish provides 650 micro- grams of iodine. Therefore, apart from iodized salt, people can use seafood, seaweed and plants grown in iodine rich soil.

In Pakistan, the problem of iodine deficiency has been receiving atten- tion for quite sometime. Efforts have been made to popularize the use of iodized salt. It is understood that manifold problems have been experi- enced with salt processors particular- ly with small crushing units of rock salt, who cannot be relied upon to add measured doses of iodine to the crushed salt. Another problem that is experienced is with the dietary habits of people, which are indeed difficult to change.

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How much iodine in iodized salt is destroyed while cooking depends on the cooking conditions and the salt. Potassium iodide (KI), used in the US, Canada and much of northern Europe, is more likely to be lost than potassium iodate (KI03), which is used in most of the developing world. Conditions of acidity and other contents of the cooking pot can have an effect. In general, boiling salted water with KI03 gives fairly little loss.

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If we are to remove this problem, it is important that all aspects of the problem are examined in depth and fresh programmes are prepared. Before accepting salt as the only vehicle for adding iodine, other vehicles which should be considered for iodization are milk, bread, flour and condiments.

Iodine deficiency is a very serious problem. A debate should ensue in the electronic and print media to evolve a national programme for addressing this problem at all levels of the society in Pakistan. ■