

NUTRITION

by

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Nicotinic acid or niacin

This is another member of vitamin B-complex which is of considerable clinical and nutritional importance.

It is a white crystalline solid, most thermostable, most stable of all the vitamins and is not oxidised or destroyed by heat, exposure to air or by light. It can even be autoclaved without loss of potency. It is water soluble.

It occurs in all living cells. Liver, kidney, yeast, whole grain cereals, meat, eggs and groundnuts are the richest sources of nicotinic acid. Milk and white flour are poor sources. One tea spoon full of meat extract may contain as much as 10 mgm. Since it is so highly stable very little of it is lost in cooking unless the water after cooking is thrown away. Nicotinic acid content of some of the foods is given below :—

Foods.	mgm per ounce.	Quantity.
Barley	...	13
Rice	...	13
Wheat whole	...	14
Red gram	...	0.7
Almond	...	0.7
Cashewnut	...	0.6
Gingilly seeds	...	13
Groundnut	...	4.0
Mustard	...	1.1
Fish	...	1.1
Beef Meat	...	1.8
Liver	...	5.9
Mutton	...	1.9
Pork	...	0.8
Yeast	...	8.0

Nicotinic acid like riboflavin forms the complex enzyme coenzyme system for the metabolism of carbohydrates. Nicotinic acid is synthesised in the human gut by the intestinal flora. Antibiotics hinder this biosynthesis.

Nicotinic acid has a profound vasodilator effect and the sensation of tingling and itching observed all over body soon after its administration is due to the peripheral capillary dilatation and is hence used in cases of angina pectoris and coronary thrombosis. Though the effect is the same, the unpleasant effect is not observed if a salt of it viz. nicotinamide, is given in place of pure nicotinic acid.

Nicotinic acid is present in practically all tissues of the human body. Its richest store is liver. It is excreted in urine, sweat and milk.

Though it is an essential nutrient, the daily minimum requirements of an Indian has not yet been worked out but it is suggested that the daily intake should be 15-25 mgm.

Deficiency produces the disease called pellagra, common where maize is the staple diet. Maize is deficient in nicotinic acid and does not contain any tryptophane hence the disease. The disease is characterised by three "Ds" i.e., diarrhoea, dementia and dermatitis. There is deep pigmentation of the face like the wings of a butterfly, the exposed parts of the neck, arm, and hands also become pigmented. Tongue is red, raw and swollen. There may be gastrointestinal disturbances like diarrhoea. A disease called "nutritional diarrhoea" has been reported from South India. It is observed in poor people living mostly on "Congee" and tamarind; females in middle life are mostly affected; diarrhoea is intractable and not amenable to any of the drugs such as sulphas but improvement is dramatic with the administration of

nicotinic acid. In mild cases of deficiency there may be burning of the throat, oesophagus, larynx and swelling of the tongue and these are quickly relieved by this vitamin.

Vitamin-C

It is also called ascorbic acid. It is a colourless crystal, freely soluble in water, readily destroyed by light and oxygen. Tablets kept exposed turn yellow but there is very little loss of its potency. It is thermolabile and very quickly destroyed in presence of alkali such as cooking soda. It is stable in acid solutions and water soluble.

A disease called scurvy has been the greatest plague of the early seafarers and explorers since they had to live on tinned foods for long periods at a time. Thus Vasco-da-Gama in his voyage round the world lost 100 out of 160 of his crew. Jacques Cartier has reported that the Red-Indians of North America prevented the disease by drinking a decoction of pine needles, a preparation which recently has been shown to contain vitamin C. The value of fresh citrus fruits and fresh vegetables in such conditions has been known to people since the early eighteenth century and, working on this basis, Captain Cook in his voyage round the world kept his men free from scurvy as he had included fresh vegetables and fruits in their dietary. To-day whenever one takes a voyage on the sea, fresh lemon is served with breakfast. During the World War II, England depended almost entirely on potatoes for her ascorbic acid supply while concentrated rose hip syrup was given to children and infants since they could not import fruits due to shortage of shipping space. In our country with a well balanced diet and an adequate supply of fresh green leafy vegetables and fruits, there is little danger of any deficiency of vitamin C and we need not even think about its adequacy so far as the daily requirements are concerned. This condition at present is very rare and is only observed in conditions of

famine such as in Hissar a few years ago. Milk is a comparatively poor source and whatever of this vitamin is present in it is lost when the milk is boiled.

Ascorbic acid is present in all fruits, fresh vegetables and germinated pulses or grains. Citrous fruits such as oranges etc. are very rich sources. Guava is another rich source—an ounce contains 85 mgm while 'Amla' is richest with 175 mgm per ounce. A good size banana contains 15 to 20 mgms while 20 to 30 mgm are present in a big orange. Rose hips are rich sources and potatoes contain a considerable amount provided it is cooked properly i.e., cooked rapidly and eaten immediately.

One of the functions of vitamin C is the formation of intercellular collagen fibres that bind the tissues together thereby acting as the cementing substance. As such is it of use in the healing of fractures and wounds and proper formation of the dentine of teeth.

In conditions of deficiency the walls of capillaries become weak and break down leading to small petechial haemorrhages under the skin, from the gums and in big joints of the body. It is intimately connected with the phagocytic activity of the W. B. C. It has an attenuating effect on bacillus tuberculosis and other types of organisms.

Absorption and utilisation of iron is defective in conditions of deficiency. It is essential for the maturation of the red blood cells.

It has been observed that vitamin C stimulates the formation of antibodies in cases of passive immunity. Some toxic effects of Sulphanamides can be relieved by 0.5 gm of vitamin C given intravenously. It is concerned with the proper functioning of the adrenals and ovaries, and for carbohydrate metabolism.

It is absorbed from small intestine and unlike some other vitamins it is not stored in our system. The excess

is excreted through the kidneys. It is present in blood, cerebrospinal fluid, saliva and aqueous humour. In the blood more of it is present within the White Blood Cells.

The daily human requirement is 50 mgm a day. In infancy, pregnancy and lactation, requirements are considerably increased. The vitamin C supply of the infant is met from mother's milk hence those babies put on artificial diet should have a supplement of it in the form of orange juice or tomato juice. Daily requirements are also increased in cases of infection either acute or chronic.

Vitamin C content of some of the important foods is given as follows :—

mgm per ounce (raw foods).		
<u>Foods</u>		<u>Quantity</u>
Amaranth tender	...	49
Amla	...	170
Brussel sprouts	...	20
Cabbage	...	35
Chillies green	...	31
Cluster leaves	...	14
Coriander leaves	...	38
Drumstick	...	34
Drumstick leaves	...	62
Guava	...	85
Knol Khol	...	24
Lemon Juice	...	11
Lime Juice	...	18
Orange	...	19
Papaya	...	13
Parsley	...	80
Pineapple	...	18
Pomatoes	...	39
Sprouted pulses	...	3.4
Strawberry	...	15

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physical examinations, recommendations, monthly weights, dates of inoculations, laboratory reports, X-ray reports and summary of the in-patient and out-patient treatments. These are kept as permanent records and are very useful for future references.

We should also bear in mind the various other factors responsible for good health. The students live in the nurses home which is provided with good living conditions. A well balanced diet is given and students who desire extra nourishment get them on payment. Facilities also are available for outdoor and indoor games, music and reading. There are also opportunities to broaden their interests in social life. If every school of nursing in our country could provide a similar programme or still a better one, we could be sure of hav-

ing a better standard of health among our nurses.

It is true that we have problems in every field of work. It could not call our health services quite an adequate one though the 'programme' is ideal. Sufficient personnel for counselling with students and provision for a room preferably in the nurses home to take care of convalescent students and those who need just a day or two rest may meet our needs. In the same room medicines also can be kept whereas now a part of the service room is used for this purpose. Above all, every student should realise the importance of maintaining good health and co-operate in carrying out the programme as she has an obligation not only to herself but also to the patients for whom she is caring.

T. N. A. I. Hand Book

Every member of the Association should possess a copy, and a copy should be included in all School of Nursing Libraries.

Price Rs. 2/-. Sent V. P. P. (Rs. 2/8/-) on request to the General Secretary, 28 Alipur Road, Delhi-8.