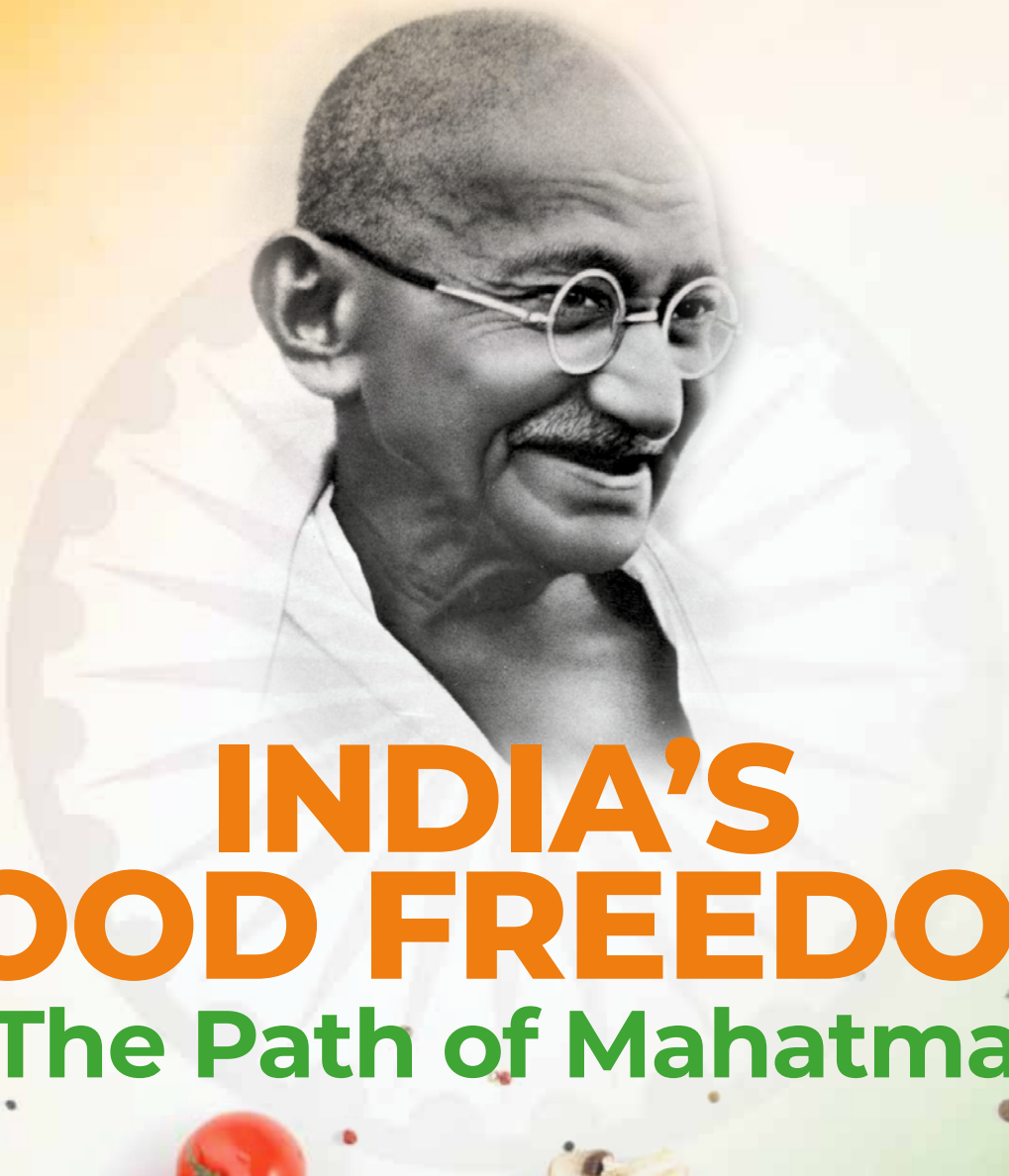


Aahaar Kranti

UTTAM AAHAAR, UTTAM VICHAAR



INDIA'S FOOD FREEDOM The Path of Mahatma



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Editorial Board

Nakul Parashar
Nimish Kapoor
Sumita Mukherjee

Design

PealiDezine

Address for Correspondence

Vigyan Prasar, A-50, Institutional Area,
Sector-62, Noida-201 309, U.P., India
Tel: +91-120-2404430, 35

E-MAIL

aahaarkranti@vigyanprasar.gov.in

WEBSITE

www.vigyanprasar.gov.in

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EDITORIAL

Freedom from Malnutrition

Nakul Parashar

Aaahaar Kranti marches ahead with yet another milestone. It successfully organized a national-level programme, Guru Vandan, to reach out to the teachers of the country on 24 July, on the occasion of Guru Purnima. This way, the word about its aims and objectives are spreading all over quite rapidly. Shiksha Shilpi, Vidyarthi Vigyan Manthan and VIPNET clubs of Vigyan Prasar have embarked upon the project in a big way. Their constituents are working hard to ensure that through their wide network, the word of awareness about correct diet reaches one and all. In the Programme, representatives of these teams spoke about how their members would do their bit in enhancing the outreach of the program.

I mentioned earlier about the usage of print-electronic-social-digital media in our endeavours with Aahaar Kranti's progression. Vigyan Prasar's IndiaScience (nation's OTT channel; <https://www.indiascience.in/>) in this direction has been continuously producing relevant short films. To know more about it, you may please download the IndiaScience app on your mobile phone and enjoy the free-to-use rich content that is available in its repository. Similarly, on the print publishing side, DREAM 2047 continues to lead the chart of most subscribed popular science monthly of the nation. Available in Hindi and English, Dream 2047's July issue was all about Aahaar Kranti. Thus, don't miss it and download your copy from Vigyan Prasar's website <https://vigyanprasar.gov.in/>

As we enter the 75th year of India's independence, we continue to fight against a number of things that still plague our society. Malnourishment continues to be one. Nearly 15 per cent of India's total disease burden is due to child and maternal malnourishment. Statistics show that more than 44 per cent of children under the age of five are underweight. This clearly means that we have a long way to go in eradicating malnourishment from the country.

Creating general awareness about nutrition, increasing mid-day meals and investments in social welfare are some of the commonly thought ways to raise the fight against malnutrition in the country. Aahaar Kranti, thus, plays a critical role in this direction. To educate people, who can then go and train others, various modules have been prepared by Team Aahaar Kranti. These Train-the-Trainer Modules were launched at the Guru Vandan Programme. Representatives of the national movement called Shiksha Shilpi spoke at the event thereby taking this movement to its large teacher database spread all across the country. Wall charts displaying various fruits and vegetables with their nutrition value were prepared and distributed by Aahaar Kranti team earlier in April this year.

After all, it's all about getting freedom from malnutrition. ■



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Train the Trainers:
Teachers Module 1

Email: nakul.parashar@vigyanprasar.gov.in

India's Food Freedom

The Path of Mahatma

Neha Tripathi

India's struggle for political independence largely adopted the path of *ahimsa* and *andolans*, but one more thing that co-existed was the struggle for food. Independent India's first economic crisis was a major challenge for the country. Post-1947 India saw major problem with its agriculture. Partition left India with 82% of the total population of undivided India but only 75% of its cereal production. The main cause of food shortage was that the food surplus areas of west Punjab and Sindh went to Pakistan. These two provinces together used to supply about ten lakh tons of food grains to other provinces.

The 1950s constituted to be a critical period in India's agricultural evolution. Immediate actions were taken in response to the deepening food crisis. The scenario however started to change after '60s when the positive effects of Green Revolution were reaped by the nation. Similarly, after successful launch of the milk cooperatives, which brought in the White Revolution, India became a leader in production of milk and milk products. Now we are entering into organic revolution via organic farming and advanced agricultural techniques.

On completion of the 74 years of Independence, we will try to highlight the path to India's food freedom



Photo: Publications Division

GANDHIAN STANDARD OF HEALTH

He is a healthy man whose body is free from all disease; he carries on his normal activities without fatigue. Such a man should be able with ease to walk ten to twelve miles a day and perform ordinary physical labour without getting tired. He can digest ordinary simple food. His mind and his senses are in a state of harmony and poise. This definition does not include prize fighters and such like. A man with extraordinary physical strength is not necessarily healthy. He has merely developed his musculature, possibly at the expense of something else.



Excerpt from *Keys to Health* by M.K. Gandhi; Translated by Sushila Nayar

taking inspiration from the Father of the nation - Mahatma Gandhi.

Gandhiji always advocated to fulfil our own vital wants and grow our own food crops for nutrition and cotton for clothing. He also emphasized on the need to lessen hunger and malnourishment and importance of food security. For Gandhiji, food security meant that food production was done at the village level and fair access to locally grown foods was provided. He believed that this helps in making the villages self-sufficient and to achieve food and nutrition security for health. He even used to plan diet that is sustainable keeping in mind the essential nutrients and affordability.

Gandhiji's philosophy of keeping wants and needs at a low and aim for contentment and happiness took a leap in such gross situation. Apart from



voluntary limiting of wants, he talked about need for having self-reproducing village communities and bearing a better balance between man and nature. As he led the baton for India's struggle for Independence, for nutrition he made his life a lesson for the people at large. Best part is he experimented on himself and then demonstrated the world to follow the same path. Following his footsteps might help us manage the food crisis we face today and be a true example of a healthy nation to the world.

Here is an insight on how we must follow Mahatma Gandhi's footsteps to mobilise the nation towards a single goal - bring people from all walks of life together in a *Jan Andolan* towards a healthier, happier India. This is the motto of Eat Right movement in India launched by Food Safety and Standards Authority of India (FSSAI). Here, many instances of Gandhiji's life have been described

During his political campaigns from 1913 to 1948, Gandhiji walked a total of 79,000 km, which is equivalent to walking around the earth twice.

that was researched by ICMR on their journals, health practices and books.

First and foremost, Gandhiji believed as we breathe air for life and drink water to quench our thirst, we should only have food to satisfy hunger. He advocated a simple diet, consuming seasonal produce, eating raw fruits and vegetables to maximize their nutritional benefits. He limited the intake of sugar and salt. He also strongly believed in and

practiced fasting for Satyagraha and for its numerous health benefits such as detoxification.

For good health we must focus on fitness and nutrition. Some of the basic actions to choose are walking, physical activity, consuming fresh vegetables and fruits, limit intake of low sugar, low salt, low fats, avoid tobacco and alcohol, maintaining cleanliness and hygiene, etc. There is one more factor which is very important to maintain good health and that is fasting. Gandhiji showed this with his life.

Gandhian philosophy on healthcare decodes many myths and also puts light on many scientific practices that have not changed over the decades in thought and actions, as far as health and nutrition is concerned.

At the age of 70, he weighed 46.7 kg. He was 5-feet-5-inches tall, which means he had a Basal Metabolic Rate of 17.1. All this made him fall in the underweight category. Also, during various phases of his life, he struggled with several health issues like pleurisy, a condition in which there is inflammation of the lung lining (1914), malaria (1925, 1936 and 1944), gastric flu (1939) and influenza (1945). He was operated on for piles (1919) and severe appendicitis (1924) as well. He had an issue of high blood pressure. His blood pressure readings were higher than the normal levels between 80 and 120. For example, it was 194/130 on 26 October 1937, at the age of 68 and 220/110 on 19 February 1940, at the age of 70.

His blood sugar levels were often significantly lower: 41, 71 and 115 on



different dates in 1936, 1937 and 1938. Still we are discussing his fitness mantras, because, every time he fell sick, he was back on his feet. Experts believe that this is largely due to his disciplined lifestyle, which included focusing on physical fitness and a balanced diet. No doubt he believed, “Anyone who observes the rules of health will not need to knock the doors of doctors from day to day.”

Gandhiji’s books on diet and nutrition, ‘Key to Health’ and ‘Diet and Diet Reforms’, confirmed that he limited his diet to raw vegetables, curd, fruits, fresh organically grown food, unpolished rice and coarse grains, millets, leafy vegetables, soya beans, neem seeds, jaggery, guava seeds, tamarind, groundnut cake and boiled vegetables with a hint of salt.

Walking Tips

The secret of Gandhiji’s health was walking. He used to walk early morning for an hour or so. He even used to walk 30-45 minutes before going to sleep. He used to walk around 18 km every day for nearly 40 years. During his political campaigns from 1913

to 1948, he walked a total of 79,000 km, which is equivalent to walking around the earth twice (Source: ICMR-IJMR Report 2019). The World Health Organization recommends walking 8,000-10,000 steps a day to stay healthy. Gandhiji emphasised on all kinds of movements like moving around, climbing stairs, doing household chores, adding a short brisk walk etc. Such activities help us in maintaining the flexibility of the body, increase stamina and improve metabolism.

Fasting Tips

Fasting has well-established scientific background. Elders at home opine that fasting gives some rest to the stomach. Gandhiji stated the following points on the basis of his personal experiences. He said, fasting is advised if you are constipated; if you are anaemic; if you feel feverish; if you have indigestion; if you have headache; if you are rheumatic; if you are gouty; if you are fretting and fuming; if you are depressed and if you are overjoyed. (Source: ICMR-IJMR Report 2019)

Knowing more about Gandhiji’s fitness mantra would be a

CRUX OF MAHATMA'S TEACHINGS

- Walking: Be active, Stay Healthy
- Balanced Diet: Key to health
- Meditation: To fight daily stress
- De-Addiction: Avoid alcohol and Tobacco
- Think Positive: Enhance Mental Strength
- Compassion for Others: Makes world a healthy place
- Forgiveness: Promotes inner peace
- Non-violence: Healthy way to sort issues
- Early to Bed, Early to rise: Balancing the body clock
- Fasting: To reset your body and promote discipline

Source: ICMR-IJMR Report 2019

delight for the people today. Honouring his philosophy on health will not only help the present society on improving their well-being but will also help them imbibe a lifestyle that is disciplined and rewarding. Thus, India can achieve its food freedom from Mahatma Gandhi’s philosophy. ■

The author is a science journalist, writer and filmmaker.
neha_tripathi@icloud.com

GANDHIJI'S DAILY ROUTINE

Gandhiji’s daily routine included his meals, attending visitors, spinning, writing or reading work, prayers and last but not the least, it mentions, that even Gandhiji was left with pending works that he used to complete by keeping silence on Mondays.

Source: ICMR-IJMR Report 2019

Hidden Hunger

N. Thamizh Selvam

We know what hunger is and how to satisfy it. Hunger vanishes immediately after we take sufficient quantity of food. But to really satisfy hunger the food must be balanced; that is, it must comprise of carbohydrates, proteins, and lipids in required amounts. Further, our food must also contain sufficient quantities of 'micronutrients' – essential elements and vitamins required in small quantities for a

healthy life. Hidden hunger is malnutrition caused by deficiencies of vitamins and minerals.

Scientifically, micronutrients are vitamins and minerals required in small amounts for healthy development and growth. As our body cannot produce vitamins and minerals (except a few), they have to be obtained from food sources. Hence, micronutrients are also known

as essential nutrients. The World Health Organization (WHO) has reported that more than 2 billion people in the world today suffer from micronutrient deficiency and related health consequences. Especially, pregnant women, lactating mothers, and young children are highly affected by the micronutrient deficiency which influences foetal and child growth, cognitive development and resistance to infection.



Scientifically, micronutrients are vitamins and minerals required in small amounts for healthy development and growth. As our body cannot produce vitamins and minerals, they have to be obtained from food sources.

Micronutrients

Broadly, micronutrient comprise of two major sets of components - vitamins (both fat-soluble and water-soluble vitamins) and minerals. Minerals are divided further into two types such as 'microminerals' and 'macrominerals'. Microminerals, also known as trace elements, are required in amounts less than 50 mg/day. They include iron, cobalt, chromium, copper, fluoride, iodine, manganese, selenium, zinc and molybdenum. Minerals such as calcium, phosphorous, sodium, potassium, magnesium and chloride are considered as major or macro minerals as they are

present in the body at levels greater than 0.01% and required in amounts greater than 100 mg/day.

Major Functions of Micronutrients

The micronutrients, especially minerals and metals, bind with the enzymes and make them fully functional; so here they function as cofactors. Similarly, micronutrients such as vitamins and their derivatives help in conversion of apo-enzymes (non-active precursor of enzymes) into holo-enzyme (active and functional enzymes) and here they are called as coenzymes. They are also involved in gene regulation and also work as antioxidants in scavenging of free radicals.

Micronutrient Deficiency

Micronutrient deficiency is caused due to various reasons such as lack of healthy diet, intake of unbalanced diet, poor bioavailability, lack of absorption, poor preparation or cooking method of food, frequent infection with parasites, diarrhoea, and various malabsorption disorders. The deficiency of micronutrients causes various health issues such as neurological complications, skin diseases, mental illness and the body loses its capacity to maintain metabolic equilibrium by complex biological mechanisms that operate via the

Micronutrients play a vital role during pregnancy and lactation period and in the adolescent stages of children.

autonomic nervous system under certain extreme conditions of deficiency.

Indian Scenario

Even though India has made enormous strides in different areas, the Public Health System is yet to be properly addressed. The Food and Agriculture Organisation report on State of Food Security and Nutrition in the World states that 190.7 million (14.5%) people were undernourished in India during 2014-2016 (IJMR 2018). Several programmes or schemes such as Integrated Child Development Services (ICDS) scheme, Mid-Day Meal Programme, National Iron Plus Initiative (NIPI), National Iodine Deficiency

Disorders Control Programme (NIDDPC) and National Prophylaxis Programme against Nutritional Blindness due to Vitamin A deficiency have been implemented over the years for the nutritional improvement and health status of the Indian population.

Micronutrient Toxicities

The overdose of micronutrients causes some toxicity symptoms but it is less common than deficiencies. Diarrhoea, nausea, vomiting, abdominal cramps, and liver and muscle damages are the commonly reported toxicity symptoms of excessive consumption of micronutrients, especially iron, zinc and selenium. The safest and most effective and appreciable way to get adequate vitamin and mineral intake is from food sources.

What Needs to be Done

It is very much essential to be aware of importance of micronutrients in our daily food. As micronutrients play a vital role during crucial stages of life such as during pregnancy and lactation period and in the adolescent stages of children, frequent consultation of physician and nutritionist and compliance of their suggestions can bring about significant improvement in health of the entire family. It is also the responsibility of the senior family members to inculcate the value of balanced and nutritional diet to their children and helping them to be away from junk food. If every family does this, we can wipe out 'Hidden hunger' from India. ■

Dr. N. Thamizh Selvam is Assistant Director-Biochemistry, National Ayurveda Research Institute for Panchakarma (Central Council for Research in Ayurvedic Sciences, Ministry of AYUSH, Govt. of India).
nthamizhselvam@gmail.com

Sadabahaar

A Mango which Yields Fruits the Whole Year

India Science Wire

Mango, lovingly called 'the king of fruits', generally yields fruits once in a year. People who love the aromatic, juicy, sweet fruit wait patiently for their yearly quota of Dasherri, Chausa, Himsagar, Langra, Badami, Kesari or the Alphonso or Hapus. A piece of good news for them: a farmer from Rajasthan has now developed a variety of mango which would bear fruits throughout the year. This variety, named 'Sadabahaar' has been developed by Shri Krishna Suman, a 52-year-old farmer from Kota district. It is resistant to many of the major diseases of mango. The crop is being cultivated in many states along with Rajasthan, Chhattisgarh, Delhi and Haryana.

The tree bearing Sadabahaar is a dwarf variety. The trees can be grown in the kitchen garden as they are not so huge. It can be grown in the pots initially. It is suitable for high-density plantation as well. The fruits are sweeter than Langra. The pulp of this mango is sweet and deep saffron in colour. Moreover, its pulp contains very

little fibre which distinguishes it from other varieties. This variety of mango has ample nutritional values. Additionally, production of around 5-6 ton/hectare makes this variety unique and profitable.

This variety has been developed through grafting and selection methods. Many experimentalist farmers continue to improve their crops this way. After grafting, the trees start bearing fruits just after two years. It was in 2000, when Shri Krishna Suman, a farmer from

the village of Ladpura Taluka of Kota, spotted a mango tree in his orchard that bloomed in three seasons. The growth rate of the tree was more than other varieties.

He constantly observed and scrutinized this variety. He prepared five cuttings. It took

around 15 years for Suman to develop these varieties. During the process from preparation of their cuttings to their conservation and augmentation he found that this variety of mango starts yielding fruits only after two years of grafting. Suman had dropped out of school after his second grade and took up the family profession of gardening.

The variety has been validated by National

It took around 15 years for Suman to develop these varieties, from preparation of their cuttings to their conservation and augmentation.



Innovation Foundation (NIF), an autonomous organization working under the Department of Science and Technology.

Also, it has been evaluated by The Indian Institute of Horticultural Research, situated in Bengaluru. It has gone under field testing too by the specialists of SKN Agricultural University situated at Jobner in Jaipur district. The process of

organizations, state agriculture departments and voluntary organizations through various channels.

During 2017 to 2020 Shri Krishna Suman has received more than 8000 orders for the cuttings of Sadabahaar mango from India and abroad. During 2018 to 2020, Suman has sent more than 6000 plants of this variety of mango to Andhra Pradesh, Goa, Bihar,



registration is going on for this kind of mango under The Indian Council of Agricultural Research (ICAR) and National Bureau of Plant Genetic Resources (NBPGR), New Delhi.

This unique tree has also been planted in the Mughal Garden situated at Rashtrapati Bhavan. For inventing Sadabahaar mango Shri Krishna Suman was conferred with 9th National Grassroot Innovation and Traditional Knowledge award of NIF. His work has been appreciated by several other platforms as well. NIF is trying to spread the knowledge about this new variety of mango to farmers, networks of farmers, government

Chhattisgarh, Gujarat, Punjab, Himachal Pradesh, Jharkhand, Kerala, Karnataka, Madhya Pradesh, Maharashtra, Odisha, Rajasthan, Tamil Nadu, Tripura, Uttar Pradesh, Uttarakhand, West Bengal and many other states including Delhi. Apart from that, these plants have been grown in various Krishi Vigyan Kendras and research centres. ■

To place an order for the plant Shri Krishna Suman can be contacted at his address Village Girdharpura, Ward-1, Taluka Ladpura, District Kota, Rajasthan.

Translated by Kshama Gautam

BENEFITS OF MANGO

01 Mango is rich in polyphenolic flavonoid antioxidant compounds, pre-biotic dietary fibre, vitamins, and minerals.

02 It protects from colon, breast, and prostate cancers and leukaemia.

03 Mango is an excellent source of vitamin A and flavonoids like β -carotene, α -carotene, and β -cryptoxanthin. These have antioxidant properties and are essential for vision. Rich in carotenes it protects from lung and oral cavity cancers.

04 Every 100 g of fresh fruit provides 36% or 1080 IU of recommended daily levels of vitamin A. Vitamin A is also needed for maintaining healthy mucosa and skin.

05 Fresh mango is a good source of potassium. 100 g fruit provides 168 mg of potassium while just 1 mg of sodium. Potassium is an important component of cell and body fluids that helps controlling heart rate and blood pressure.

06 It is also an excellent source of vitamin-B6 (pyridoxine), vitamin C and vitamin E.

07 Mango has moderate amounts of copper which is essential for developing many vital enzymes, including cytochrome c-oxidase and superoxide dismutase. Copper also required for production of red blood cells.

Pre-Conception Diet & Health

An Ignored Topic

Anjali A. Kulkarni

A lot of importance is given to nutrition of pregnant women in our communities in general. However, nutrition and health before conception is often ignored. The onus of having good nutrition and health falls on the woman, but recent research has shown that pre-conception nutrition and health of the father also plays an important role in determining the health of the future child.

In 2016, the United Nations (UN) declared a 'Decade of Action on Nutrition' and committed to 'end all forms of malnutrition, especially the stunting and wasting in children under 5 years, and addressing the nutritional needs

of adolescent girls, pregnant and lactating women'.

Presently Indian population can be grouped into two different cohorts. One is of women and men who have over-abundance of nutrition, are obese with high Body Mass Index (BMI) but still

their bodies are nutritionally starved; while the other is of women and men who are under-nourished and under-weight with symptoms like anaemia, micronutrient deficiencies etc. In both the cohorts, the outcomes of pregnancy could be worrisome.

For the first cohort, overweight mothers are highly likely to develop gestational diabetes (diabetes associated with pregnancy) and pre-eclampsia (high blood pressure associated with



The Indian population sadly lacks in eating sufficient amount and variety of fruits and vegetables.

Healthy BMI Equals Healthy Pregnancy



Improved Fertility

- Lower rates of...
- Infertility
 - Sub-fertility
 - IVF failure



Healthier Pregnancies

- Lower rates of...
- Miscarriage
 - Pre-eclampsia
 - Gestational diabetes
 - Pre-term labor



Safer Deliveries

- Lower rates of...
- Stillbirth
 - Failure to progress in labor
 - C-section
 - Maternal blood clots
 - Maternal mortality



Healthier Infants

- Lower rates of...
- Difficulty breathing independently
 - NICU admissions
 - Congenital heart defects
 - Cleft palates



Healthier Kids & Beyond

- Lower rates of...
- Autism Spectrum Disorders (ASD)
 - Asthma
 - Obesity
 - Type II Diabetes
 - Cardiovascular disease

pregnancy). These diseases put the foetus under stress. Both of these conditions lead to overweight infants who show markers of insulin resistance right after birth and also need to be delivered by a Caesarean section and may require a stay in Neonatal Intensive Care Unit (NICU). Infants of mothers who were overweight and obese during pregnancy had lower resting energy expenditure and increased BMI and body fat during the first 3-6 months post-natally compared to infants of lean women. The babies also showed markers of inflammation showing stress felt by them *in utero*.

Even minor BMI improvements during pre-conception period have shown to improve the outlooks of pregnancy later, hence extensive counselling in this regard needs to be undertaken.

Obese/overweight fathers are shown to have reduced fertility and low quality sperms. The genetic information of the parental obesity is faithfully transmitted to the foetus impacting both metabolic and reproductive health in later life.

For the population in the second cohort, special interventions are essential. Different studies all over the world involving women of multiple nationalities in reproductive age have shown that supplementation and fortification of their diet with energy-rich and micronutrient-rich food substantially improves their own health as well as their

future babies' health. Same is true about prospective fathers. Good nutrition helps to improve the health of the egg from the mother and the sperm from the father, reducing chances of genetic abnormalities. Bad habits like tobacco and alcohol consumption also need to be stopped by prospective parents, well before the actual pregnancy is planned. Since the foetal brain development begins in second week after conception, it is essential that the mother's body already has all the essential

micronutrients because at this time the mother is unaware of her pregnancy. Detailed analysis has shown that any kind of deficiency leads to problems of cognitive development including Autism Spectrum Disorders (ASD), Attention Deficit and Hyperactivity Disorders (ADHD) and other neurological problems.

Multiple studies have shown a strong correlation between Low Birth Weight (LBW) of the infants and increased incidences later in life of obesity and glucose intolerance leading to diabetes, disturbed lipid profile and early development of coronary heart diseases.

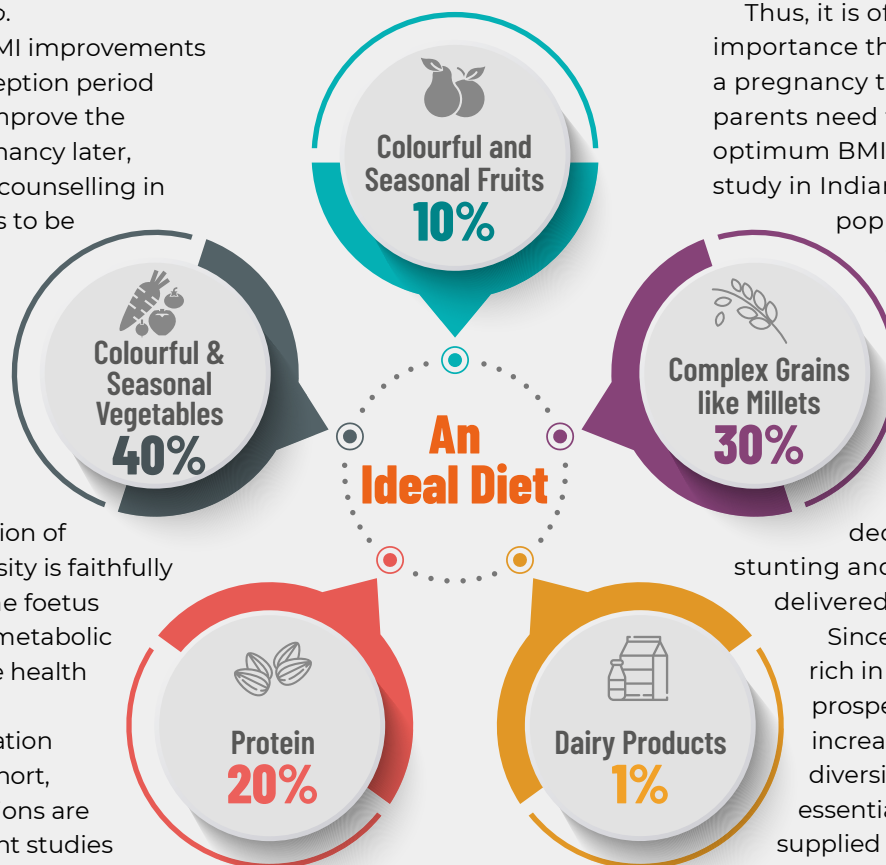
Thus, it is of utmost importance that before planning a pregnancy the prospective parents need to be in the optimum BMI range. A large study in Indian and Pakistani

population has shown that commencing a comprehensive nutrition supplement at pre-conception level for women was associated with decreases of 44% in stunting and 24% in wasting of delivered babies.

Since India is a country rich in biodiversity, prospective parents can increase their dietary diversity so that all the essential nutrients are supplied through the diet and the external dependence on supplements is reduced.

Major emphasis (50%) should be on fresh and seasonal fruits and vegetables of different colours because each colour provides different vitamins, micronutrients and medicinally

Suitable Diet Composition during Pre-conception Period



Source: www.myplate.gov

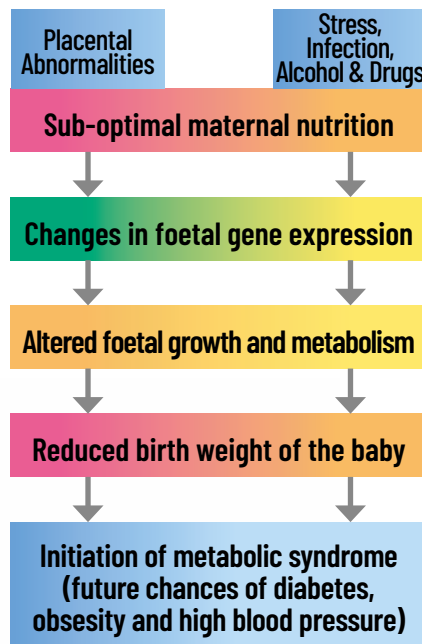
Since India produces many varieties of Dals, the protein need can be easily fulfilled.

Essential Micronutrient Supplementation during Pre-Conception and Pregnancy

<p>Folic Acid</p> <p>Folic acid supplements taken before and during pregnancy reduce the risk of birth defects and neuronal anomalies. It also helps in DNA & RNA synthesis.</p>	<p>Vitamin B12</p> <p>A risk factor for neural tube defects in humans. Strict vegetarians must take a supplement of vitamin B12 as plant diet is insufficient in this vitamin.</p>	<p>Calcium</p> <p>The foetus uses a relatively large amount of calcium during development. Calcium supplementation reduces the risk of pre-eclampsia (high blood pressure) and osteoporosis later.</p>	<p>Choline</p> <p>Involved in repair of cellular membranes and for normal brain and heart development of the foetus.</p>	<p>Vitamin D</p> <p>Required for calcium absorption and utilization. Low levels lead to high blood pressure during pregnancy.</p>	<p>Zinc</p> <p>Low zinc in expecting mothers leads to prolonged labour, heavy blood loss post-delivery, pregnancy-induced hypertension and pre-term labour. Zinc deficiency associated with intrauterine foetal growth retardation, congenital malformations and low birthweight.</p>	<p>Iron</p> <p>Iron needs increases during pregnancy due to increased blood volume, increased needs of the foetus for brain development and blood losses during delivery. 30 mg/day iron supplement prevents maternal anaemia.</p>	<p>Iodine</p> <p>Iodine deficiency leads to foetal brain abnormalities and thyroid malfunction. Iodine-supplemented salt to be included in diet.</p>
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important phytochemicals. India is one of the highest producers of fruits and vegetables in the world. But the Indian population sadly lacks in eating sufficient amount and variety of fruits and vegetables. This is a major lacuna and large-scale sensitization drives need to be undertaken to correct this situation. Nearly 30% of the remaining nutrition of prospective parents usually comes from the carbohydrates provided by cereals like rice and wheat. Here the daily requirement gets fulfilled and even exceeds in many urban areas. So, the prospective

Maternal Nutrition and Foetal Development



Supplementation and fortification of women's diet with energy-rich and micronutrient-rich food improves their and their future babies' health.

parents need to include some local millet in their diet that would provide complex carbohydrates and reduce the overall glucose burden on the body. Remaining 20% of the daily diet should have proteins. Since India produces many varieties of Dals, the need can be easily fulfilled. Inclusion of 1% of dairy products in daily diets of prospective parents is very essential because these products are rich in good quality fats, amino acids and vitamins to balance pure vegetarian diet of a large portion of the Indian population.

The 'Aahaar Kranti' initiative aims to throw a spotlight on this neglected aspect of nutrition of prospective mothers as well as fathers so that our new generation would become agile, both physically as well as cognitively. ■

Dr Anjali A. Kulkarni is Assistant Professor, Department of Botany, Savitribai Phule Pune University (Formerly University of Pune). anjali.uop@gmail.com





Moringa

The Balanced Food for Everyone

G.S. Unnikrishnan Nair

Moringa (*Moringa oleifera*), popularly known as 'shahjna', originated in India. Moringa trees are cultivated and used in our country since very ancient time. Moringa leaf and drumstick remain an integral part of the traditional south Indian cuisine. Now the whole world has accepted moringa as a functional food capable of promoting human health.

Ancient Tree

Nutritional and medicinal properties of this tree were recognized by Indians thousands of years ago. Roman historians recorded that the ancient Maurya warriors of India drank the leaf extract of moringa daily for strength. These warriors needed

less sleep and hardly got sick. They repeatedly attacked King Alexander's armies in over 60 battles in a span of two years. Even before the Maurya dynasty, curative properties of moringa were realised by ancient Indian systems of medicine.

Ayurveda describes moringa as a food-cum-medicine and it is part of over 160 Ayurvedic medicinal combinations. According to Ayurveda, the plant has significant detoxifying and cleansing effects, particularly for the blood and fat tissues. In fact, in the ancient textbook

Moringa products are said to have high efficiency to fight lifestyle diseases.

of Ayurveda, *Bhava Prakash*, Moringa is described as 'Sigrū', one that moves like an arrow. Moringa has the unique and mysterious effect of being a tonic also. After cleansing, the plant strengthens the heart and blood to function optimally. During 3000 BCE the Ayurvedic Acharya Sushruta wrote about the medicinal quality of moringa oil.

Siddha is another system of medicine which evolved along with the Dravidian culture in the South Indian state of Tamil Nadu. The Sage Agastya, considered as the first Siddha practitioner, has written a lot about moringa tree. He stated that one who consumes it regularly will become strong as a 'Yali' (Mystical creature that ate elephants as its meal) and won't need any walking stick or support even after attaining

90 years of age. Practitioners of Siddha system consider moringa as an elixir of life. Many medicinal uses of moringa have been described about 7,000 years back in the Siddha system.

Nutritional Powerhouse

What makes moringa unique is this incomparable rejuvenating power resulting from the presence of nutrients in high proportion. It is a well-known fact that moringa leaves can provide 7 times more Vitamin C than oranges, 10 times more Vitamin A than carrots, 17 times more calcium than milk, 9 times more protein than Yoghurt, 15 times more potassium than bananas and 25 times more iron than the 'green Iron'-Spinach.

Other than these the leaves of *M. oleifera* are rich in minerals like zinc, magnesium and copper. Vitamins like vitamin B such as folic acid, pyridoxine and nicotinic acid, vitamin D and E are also present in *M. oleifera*. Phytochemicals in moringa include tannins, sterols, terpenoids, flavonoids, saponins,

anthraquinones, and alkaloids. Anti-cancerous agents like glucosinolates, isothiocyanates, glycoside compounds and glycerol-1-9-octadecanoate are also found in moringa leaves. Moringa leaf contain 15 kinds of amino acids and essential amino acids including threonine, lysine, histidine, leucine, isoleucine, phenylalanine, valine, methionine and tryptophan. Non-essential amino acids include histidine, proline, tyrosine, aspartic acid, aspartate, glycine, arginine, alanine, glutamate, serine and cysteine.

Zeatin is one of the most common forms of naturally occurring cytokinin in plants. Fresh moringa leaves have been shown to have high zeatin content. Cytokinins, especially

Moringa leaves have the power to stimulate breast milk production and increase its quantity and quality.

zeatin, delay the process of aging in plants. When applied to cultured human cells, they have been shown to delay the aging process. Zeatin also has specific powerful antioxidant properties that protect the skin by increasing the activity of antioxidant enzymes that naturally combat aging.

Though moringa pods and leaves are consumed in India, the world is more interested in moringa leaf and its by-products. Major by-products from the moringa tree include: moringa leaf powder followed by moringa leaf tablets, moringa capsules, moringa oil, moringa tea, moringa energy bars, moringa gum powder, moringa drops and moringa oil cake.

For Women and Children

According to the (Food and Agriculture Organization) FAO, moringa leaves are rich in protein, vitamins A, B and C, and minerals that are highly recommended for pregnant women, nursing mothers as well as young

children. Moringa has great potential to be used as a nutritional supplement for children and women. Iron-folic acid supplement can effectively be replaced by moringa leaf powder.

By doing so not only the under-nourished but also the farmers who cultivate moringa will be benefitted. Countries like Zambia are giving moringa a central place in their programmes to end malnutrition. If moringa leaf soup is





given to children, their body growth and brain growth will be enhanced. Moringa powder can be blended in dishes like roti, dosa and snacks or can be mixed with dal powder, ghee and given to children. In one week the fatigue will be gone and they will be full of energy. Same is the case with pregnant women. Studies have made it clearer that moringa leaves can greatly improve breast milk production. Consuming moringa fresh leaves or moringa leaf powder can benefit pregnant women.

Good Bye to Lifestyle Ailments

According to Ayurveda, *M. oleifera* can prevent and cure about 300 diseases. It detoxifies the body, enhances immunity and gives radiant skin and hair. FAO says "Moringa products have antibiotic, anti-trypanosomal, hypotensive, antispasmodic, antiulcer, anti-inflammatory, hypo-cholesterolemic, and hypoglycemic properties." Moringa Leaf has many anti-inflammatory compounds.

Several clinical studies are going on to check its efficiency to fight life-style diseases. In one study reported in the *Journal of Food Sciences and Technology*, it is indicated that Moringa leaf

Moringa powder can be blended in dishes like roti, dosa and snacks or can be mixed with dal powder, ghee and given to children.

powder possesses antioxidant and curative potential to prevent complications related to post menopause. According to *Journal of the American College of Nutrition*, findings in human subjects indicated the lowering effect of *Moringa oleifera* leaves consumption on the 'after meal BP' and showed a potential lowering effect on both systolic blood pressure and diastolic blood pressure despite prior high consumption of salt (7g/d).

A study by Acharya Ranga Agricultural University, Hyderabad revealed significant reduction in the mean blood lipid levels of the subjects who were administered Moringa *oleifera* leaf powder. The study was designed to investigate clinically the hypoglycemic effect of seeds of *Moringa oleifera* in Type 2 Diabetes.

Moringa flower and stem bark also are source of valuable medical compounds. Moringa flower is a natural aphrodisiac and is also good for the eyes. Bark extract has anti-inflammatory property and ability to suppress urinary tract infection. Clinical trials reveal that moringa bark extract is a potential source for the treatment of different infections caused by the antibiotic resistant microbes.

Moringa oleifera seeds are a promising resource for food and non-food applications, due to their content of monounsaturated fatty acids with a high monounsaturated/saturated fatty acids (MUFA/SFA) ratio, sterols and tocopherols, as well as proteins rich in sulphated amino acids. Moringa seed oil is very special as it contains Omega 3, 6 and 9 fatty acids. It also contains phenols, and in particular flavonoids with free-radical scavenging activity. Moringa oil is widely used as cosmetic and medicinal oil.

Moringa has emerged as a cheaply available super food which has high potential to be incorporated in malnutrition eradication programmes. For economically weaker sections of our



country, moringa tree could be the readily available, cheap nutritional source in their backyard. Moringa also has great prospective as a protective food that can prevent lifestyle diseases. Let us embrace nature's panacea for lifelong health, the Moringa. ■

The author is retired Additional Director of Agriculture and a science writer.
unnikrishnangsnair@gmail.com

Train the Trainers Teachers Module 1

What is Positive Nutrition?

- Positive Nutrition fulfils all nutritional requirements of a body—nothing less, nothing more.
- Nutrition is the single most important factor that we could control for our health & wellbeing.
- Healthy nutrition is more important than medicines that any doctor could prescribe.
- Nutrition alone could be used to alter or reverse diseases including even chronic ones.



Source: European Journal of Nutrition Washington State University

Seven Steps to Your Health, Starting Today!



1 Eat a mindful balanced diet



3 Avoid processed/preserved foods



5 Drink enough water every day



7 Exercise regularly and stay active



2 Eat a rainbow of fruits & vegetables



4 Eat before extreme hunger and cravings



6 Get enough sleep and reduce stress