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Hurdles in maintaining balanced diet and role of nutritional supplements

R Govindarajan

CIO, Adret retail (Kapiva)

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Balanced diet

ICMR-National Institute of Nutrition

Hyderabad-500 007,Telangana

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Why??

Current nutrition scenario 2024

ICMR-National Institute of Nutrition | Dietary Guidelines for Indians

Table I. Nutritional status and serum biomarkers of children aged 1 to 19 years

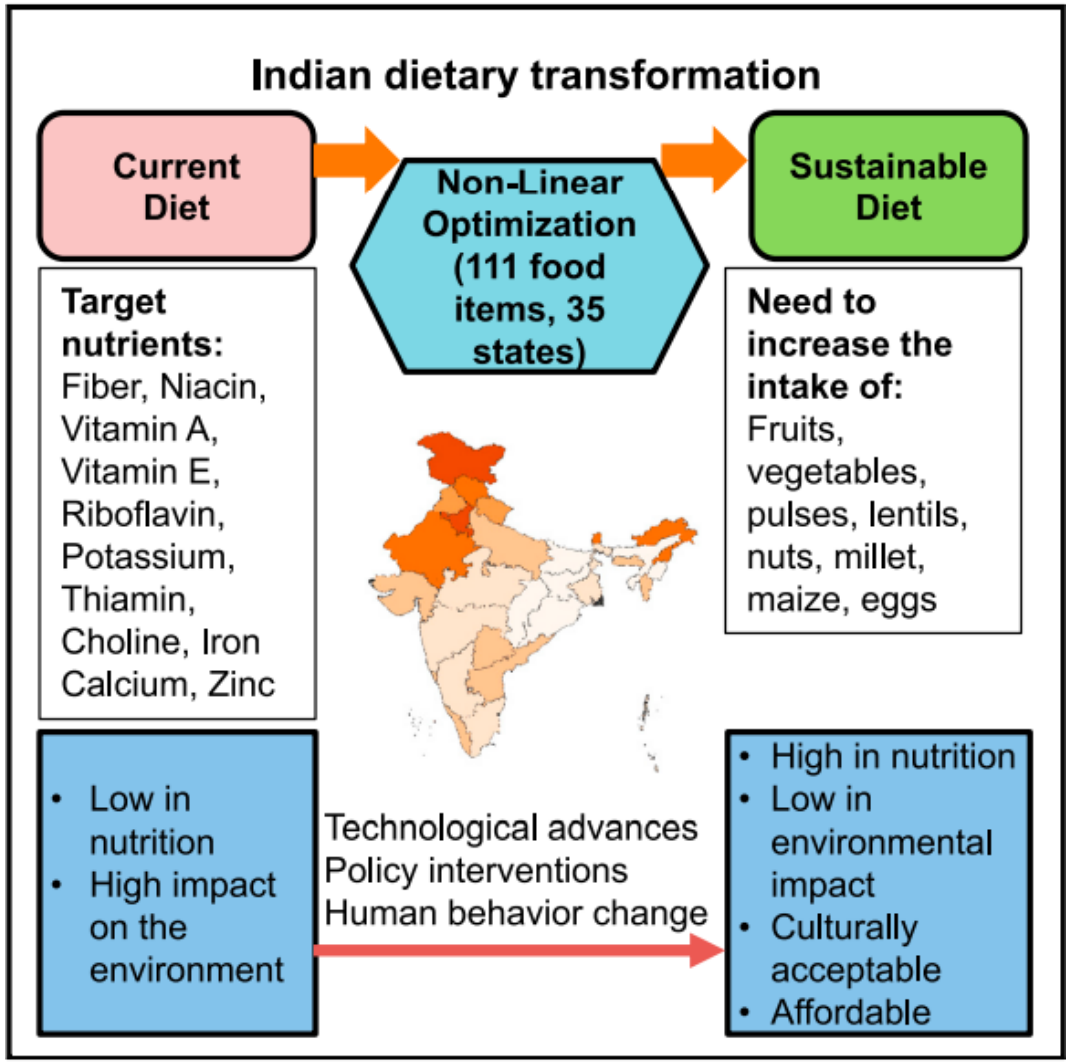
Category	Age (years)		
	1–4	5–9	10–19
Anemia (%)	40.6	23.5	28.4
Micronutrient deficiencies			
Iron deficiency (%)	32.1	17.0	21.5
Folate deficiency (%)	23.4	28.2	36.7
Vitamin B12 deficiency (%)	13.8	17.2	30.9
Vitamin A deficiency (%)	17.5	21.5	15.6
25 Hydroxy vitamin D (%)	13.7	18.2	23.9
Zinc deficiency (%)	19.0	16.8	31.7
Non-communicable diseases			
Overweight (%)	-	3.7	4.9
Obesity (%)	-	1.3	1.1
Pre-Diabetes (%)	-	10.3	10.4
Diabetes (%)	-	1.2	0.6
Elevated HbA1c (>5.8 & <=6.4%)	-	9.2	9.5
Elevated HbA1c (>6.4%)	-	0.1	0.2
High total cholesterol (%)	-	3.2	3.7
High LDL (%)	-	3.3	3.8
Low LDL (%)	-	26.1	28.2
High triglycerides (%)	-	34.0	16.1
High serum creatinine (%)	-	7.0	6.6
Hypertension (%)	-	-	4.9

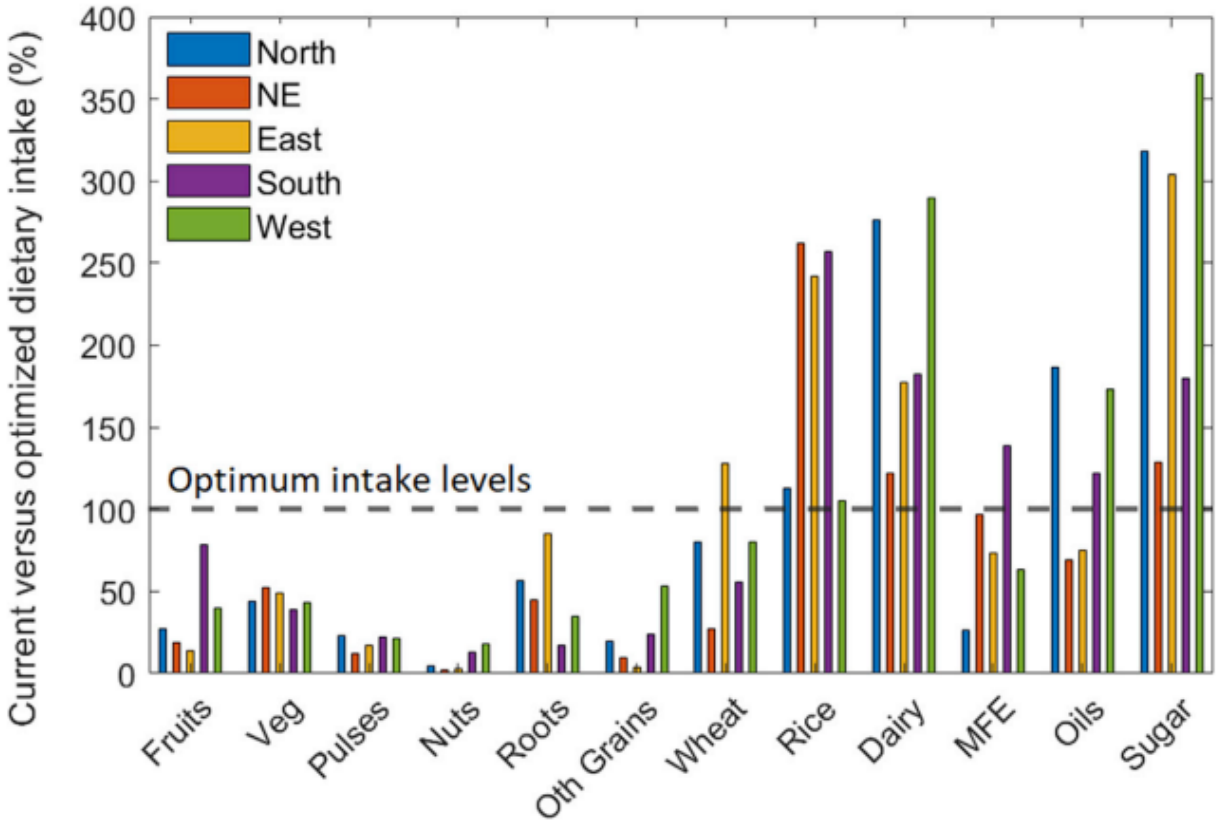
Table II. Undernutrition, overweight/obesity (WHO-Asian Cut-Offs), hypertension and diabetes among 18–69 year adults in India as per NFHS 5, 2021

Nutritional status/NCDs	Men		Women	
	2016	2021	2016	2021
CED	23.8	16.2	23.0	18.7
Overweight/obesity	21.9	22.9	28.7	24.0
Hypertension	20.2	24.0	15.3	21.3
Diabetes (Type 2)	10.5	15.6	9.7	13.5
Abdominal obesity (as per NNMB)	55.5	47.7	63.5	56.7

CED: Chronic energy deficiency or undernutrition among adults

Indian Diet - requirement vs actual





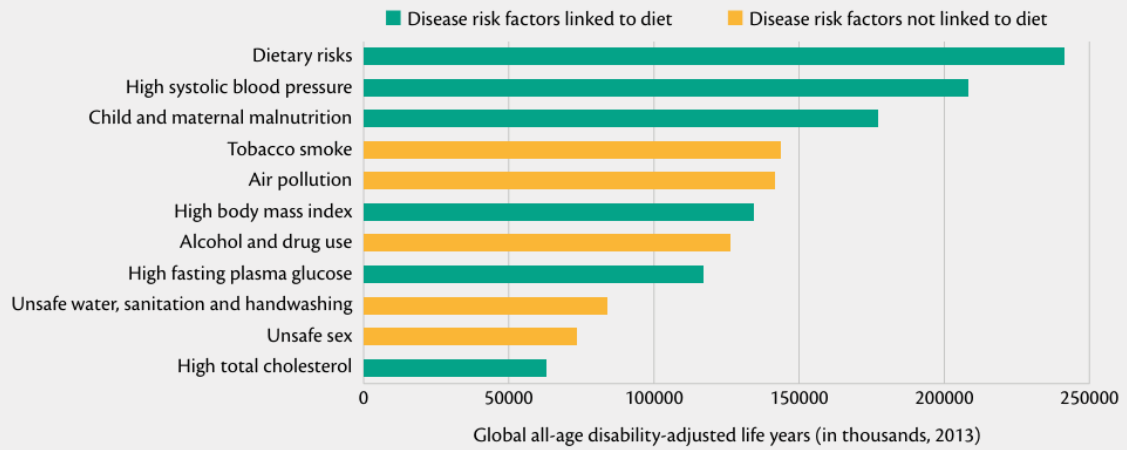
One Earth 4, 531–544, April 23, 2021

Food composition of a balanced diet (ICMR)

Food Groups	Men (Amount g/d)		Women (Amount g/d)		
	Seden-tary	Moderate /Active	Seden-tary	Moderate/ Active	Pregn-ant
Cereals & Millets	275	360	200	300	250
Pulses (Legumes)	80	120	60	90	75
Green leafy vegetables	150	150	150	150	150
Other Vegetable	200	200	200	200	200
Roots & Tubers (excluding potatoes)	100	100	100	100	100
Fruits	150	150	150	150	150

Global burden of disease related to diet

FIGURE 1: Six of the top 11 risk factors driving the global burden of disease are related to diet

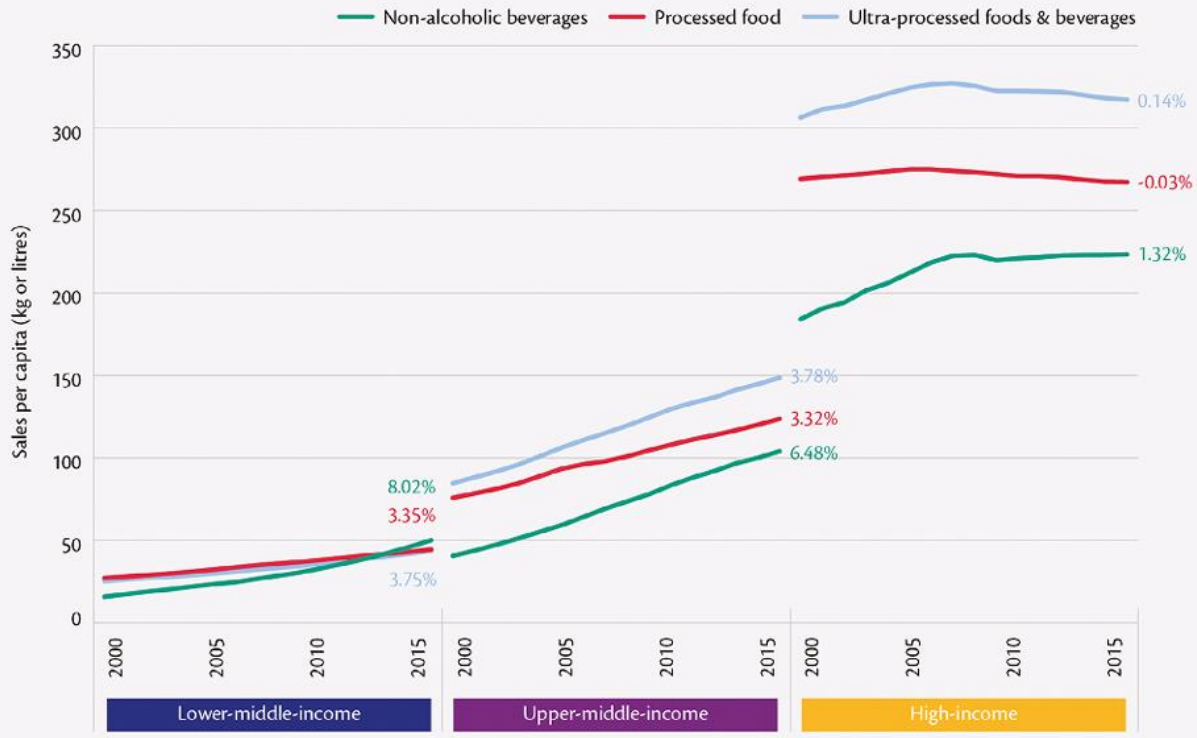


Source: Global Burden of Disease Study 2013 Collaborators (2015), Figure 5

Note: The graph shows global disability-adjusted life years (DALYs) attributed to level 2 risk factors in 2013 for both sexes combined.

Global Panel on Agriculture and Food Systems for Nutrition. 2016. www.glopan.org/foresight

FIGURE 3: Trends in per capita sales volumes of non-alcoholic beverages, processed foods and ultra-processed foods by country income group, 2000–2015



Source: GLOPAN, 2016[7]

Why relevant today

- Time is gold
- Stress levels
- Nuclear Family
- Work demands
- Globalization

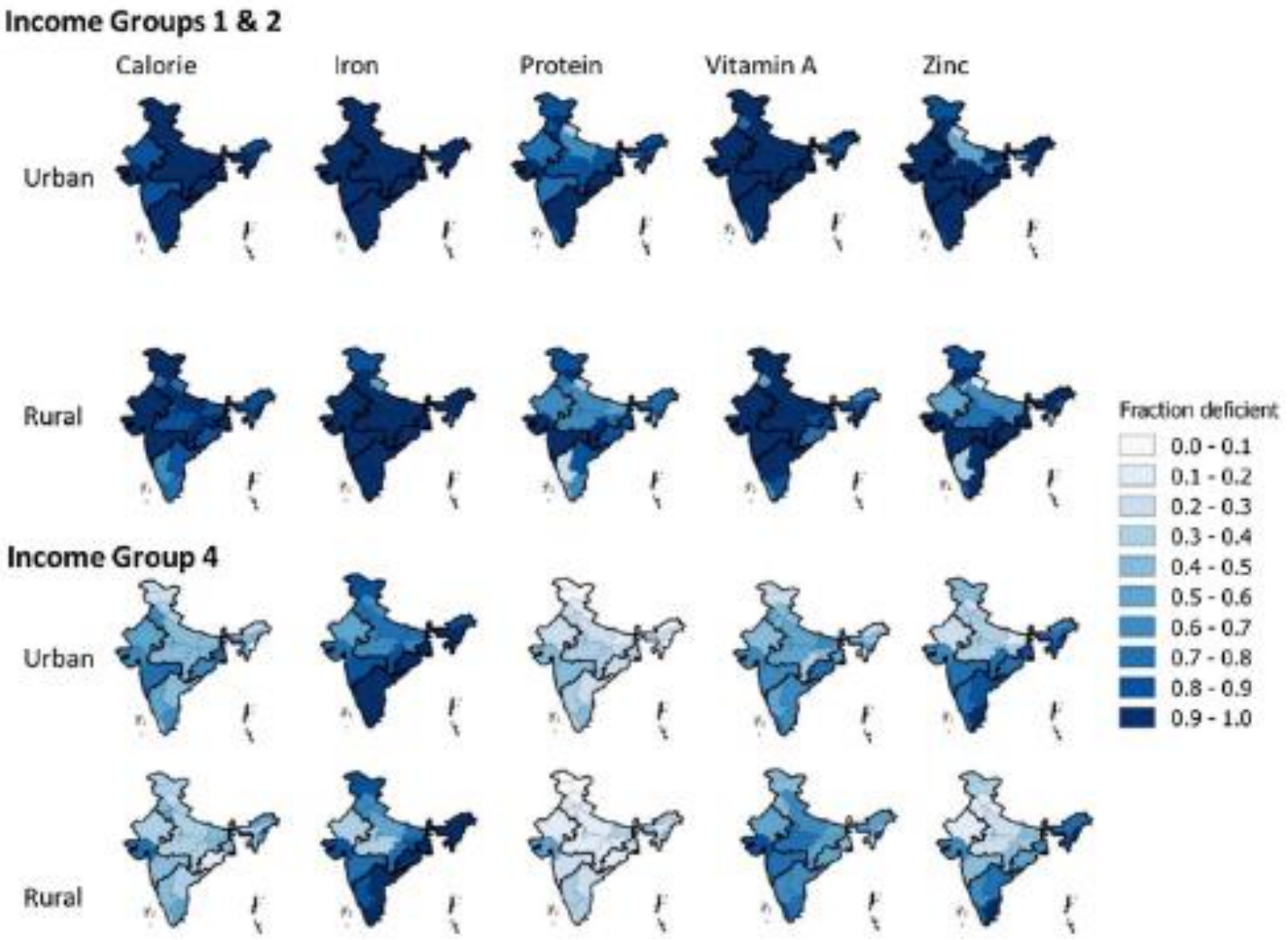
Barriers in eating

- Over the last few years, the quality of the adolescent diet globally especially in the western world has become of increasing concern to researchers and health professionals.
- Obesity rates have doubled in the UK and USA in the last twenty years (e.g. British Medical Association [BMA], 2003; Flegal, Carroll, Kuczmarski, & Johnson, 1998) and obesity is now considered to be the most common childhood health problem in Europe (International Obesity Taskforce & European Association for Obesity, 2002).
- This is particularly important given the link between childhood and adult obesity and the associated increase in morbidity risk.
- Despite concerns regarding this problem of “epidemic proportion” (e.g. BMA, 2003; Irving, & Neumark-Sztainer, 2002), the psychosocial factors that contribute to the development of obesity in children and adolescents are not fully understood.

Evident changes in diet

- Evident changes in diet in the Western world have been linked to the prevalence of obesity.
- Increasingly, diets are marked by the consumption of high fat, high sugar and high salt foods which in turn are linked to cardio-vascular disease and sodium hypertension
- Much of the recent growth over the 2000–15 period in ultra processed foods and beverages in lower-middle-income countries and upper-middle-income countries can be explained by the East Asia and Pacific and South Asia regions, which together are home to four of the world's six most populous countries (i.e. China, India, Indonesia and Pakistan).

State-wise macronutrient and micronutrient deficiencies by income and urban/rural



- It was found that current Indian diets of almost all states are deficient in 11 out of 25 essential nutrients.
- The carbon footprint of urban diets is higher than rural diets for most states and exceeds planetary boundaries in many cases.
- With rising population and incomes, if current dietary patterns continue, the food-related environmental impacts will only increase along with the numbers of malnourished people.
- It was found that transitioning toward sustainable diets identified can be an important component for addressing India's malnutrition problem and substantially reduce the diet-related carbon footprint,

Global Environmental Change 49 (2018) 154–165

Dietary guidelines

GUIDELINE 1 Eat a variety of foods to ensure a balanced diet

GUIDELINE 2 Ensure provision of extra food and healthcare during pregnancy and lactation

GUIDELINE 3 Ensure exclusive breastfeeding for the first six months and continue breastfeeding till two years and beyond

GUIDELINE 4 Start feeding homemade semi-solid complementary foods to the infant soon after six months of age

GUIDELINE 5 Ensure adequate and appropriate diets for children and adolescents both in health and sickness

GUIDELINE 6 Eat plenty of vegetables and legumes

GUIDELINE 7 Use oils/fats in moderation; choose a variety of oil seeds, nuts, nutricereals and legumes to meet daily needs of fats and essential fatty acids (EFA)

GUIDELINE 8 Obtain good quality proteins and essential amino acids (EAA) through appropriate combination of foods and avoid protein supplements to build muscle mass

GUIDELINE 9 Adopt a healthy lifestyle to prevent abdominal obesity, overweight and overall obesity

GUIDELINE 10 Be physically active and exercise regularly to maintain good health

GUIDELINE 11 Restrict salt intake

GUIDELINE 12 Consume safe and clean foods

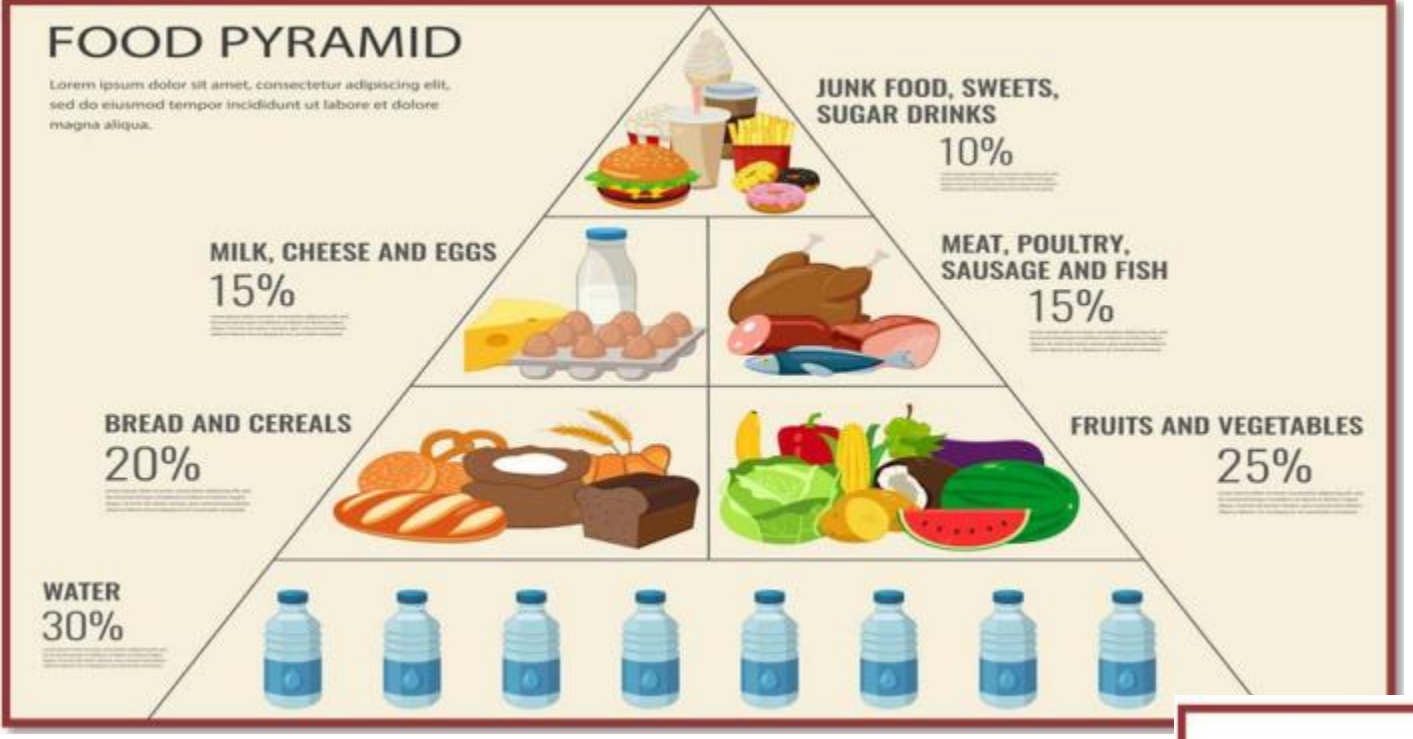
GUIDELINE 13 Adopt appropriate pre-cooking and cooking methods

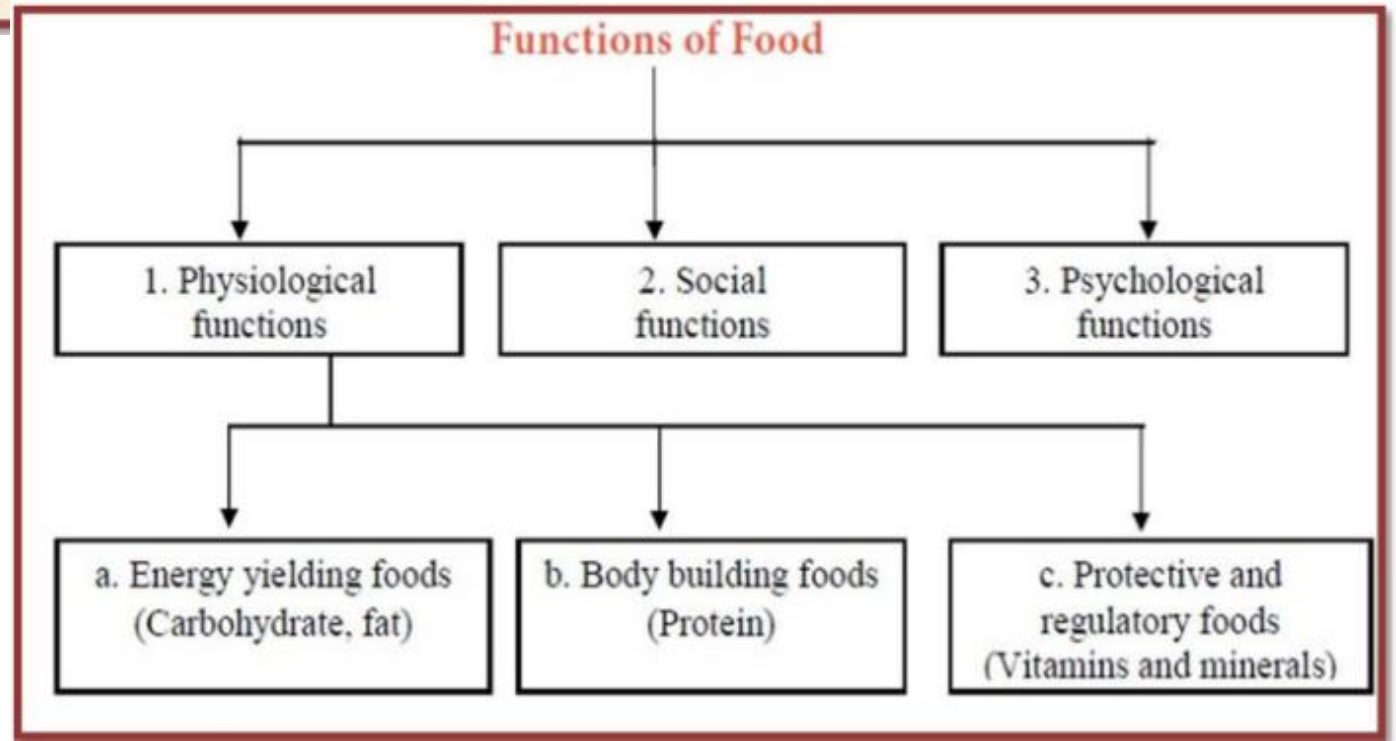
GUIDELINE 14 Drink adequate quantity of water

GUIDELINE 15 Minimize the consumption of high fat, sugar, salt (HFSS) and ultra-processed foods (UPFs)

GUIDELINE 16 Include nutrient-rich foods in the diets of the elderly for health and wellness

GUIDELINE 17 Read information on food labels to make informed and healthy food choices





Annals of R.S.C.B., ISSN:1583-6258, Vol. 25, Issue 7, 2021, Pages. 889 - 896

Nutritional supplements

- Dietary supplements are products that are ingested in addition to the regular diet to provide additional health-promoting nutrients.
- According to the Dietary Supplement Health and Education Act (DSHEA), a dietary supplement is a product that is intended to supplement the diet; contains dietary ingredients including vitamins, minerals, amino acids, herbs, and botanicals; is intended to be ingested as a pill, capsule, tablet, or liquid; and is labeled as being a dietary supplement (ODS 2011; Ronis et al. 2018).
- Dietary supplements are widely used.
- They are generally taken to improve and maintain overall health.
- For women in particular, supplements are intended to support bone integrity and prevent osteoporosis.
- The most commonly used supplements are multivitamins, mineral supplements, calcium supplements, and omega-3 fatty acids or fish oil
- About a quarter of the supplements are used based on the advice of health-care providers
- Thus, most decisions to use supplements are made by the consumers themselves.

Contd.

- Despite their popularity, the health benefits of dietary supplements are questionable.
- Lack of vitamins will certainly cause deficiency diseases such as scurvy, beriberi, pellagra, and rickets.
- However, the vitamin content of a normal well-balanced diet is sufficient to avoid these diseases.
- Studies aimed at determining effects of supplements often give conflicting results.
- There seems to be no current scientific consensus whether vitamins or any other dietary supplements prevent disease or have health benefits in well-nourished individuals

C. Egbuna, G. Dable-Tupas (eds.), Functional Foods and Nutraceuticals, https://doi.org/10.1007/978-3-030-42319-3_3

Supplement Formulations

- Food supplements are in various packages, sizes and types, depending on how they are taken.
- There are tablets, capsules, powders, oral ampoules, effervescent tablets, chocolates and mastics which is available in syrup form or other wise.
- More specifically, food supplements can be taken in any of the following forms:
  - (a) oral pills or powders for relatively quick absorption;
  - (b) sublingual drops or oral disintegrated tablets, for ease of intake and to limit the damage of their active substance;
  - (c) nose spray or drops to further improve their absorption;
  - (d) injectables through intravenous and intramuscular injections for quick absorption and action;
  - (e) bone- anchored for slow and gradual absorption and prolonged action (American Diabetes Association ADA 2001)

Classification of supplements, examples and contents

Class	Example	Contents
Activator	Amino acids	Contains growth hormone and other hormones
Carbohydrate	Dextrose	May contain vitamins and electrolytes
Food and Food stuff	Fish oils, mineral and vitamins	Contain garlic, kelp, royal jelly, yeast
Herbs	Ginseng, Fiber	Contains amino acids, other plant source
Minerals	Selenium, multimineral tablets	Contains only minerals
Multivitamins and multiminerals	Vitamin D, calcium supplement	Contains both mineral and vitamins
Oil supplements	Cod liver oil, primrose oil	Contains oil base, with vitamins, minerals
Vitamins	Vitamin C, vitamin B	Contains only vitamins

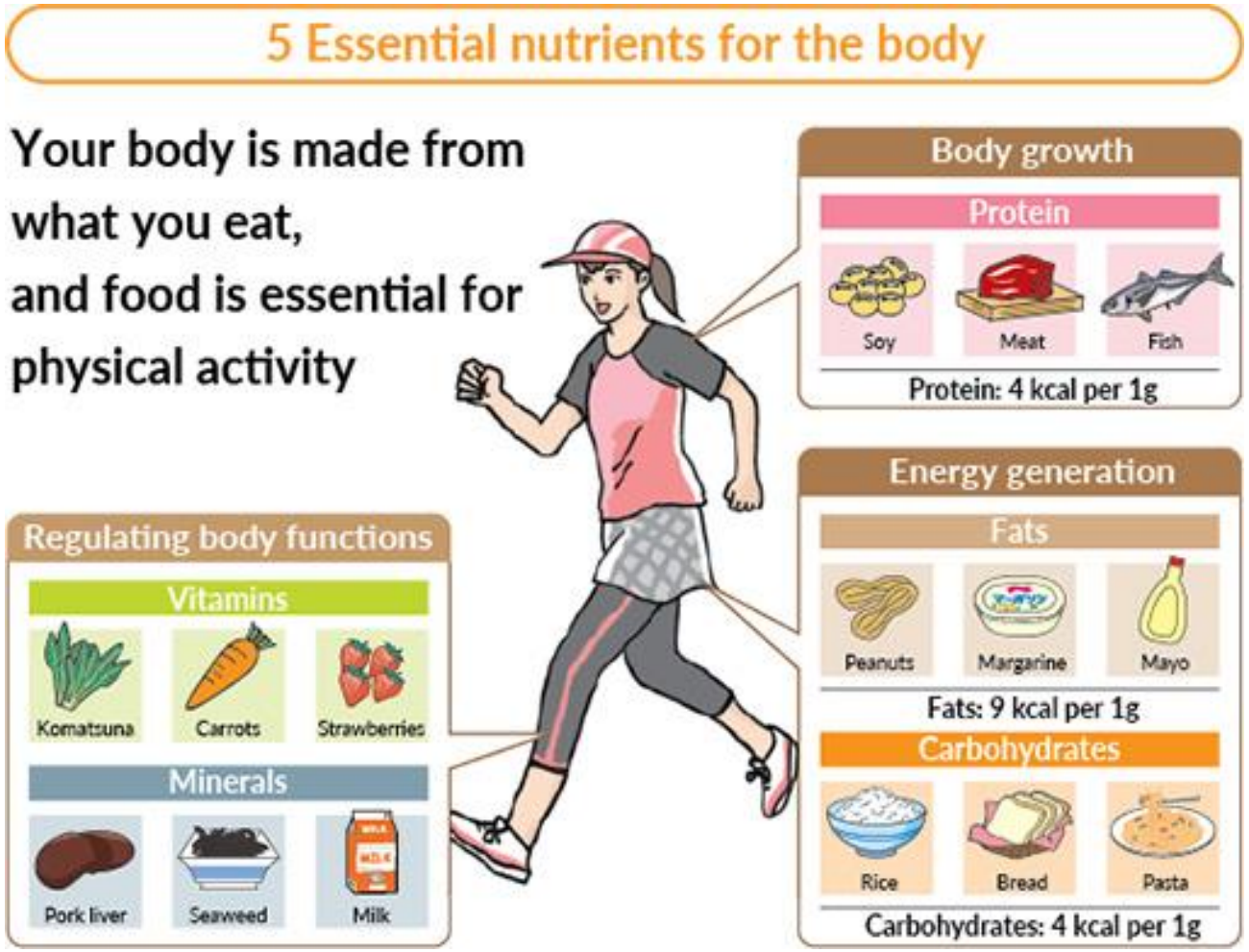
Commonly used botanical supplements

Scientific name	Common name	Uses	Active components	References
Genus *Echinacea*	Echinacea	Imuno-stimulant	Chicoric acid, alkylamides	(Hermann and von Richter 2012)
Allium sativum	Garlic	Antioxidant; antihypertension	Allicin, adenosine	(Hermann and von Richter 2012)
Ginkgo biloba	Ginkgo biloba	Memory improvement; lowering blood pressure	Terpenoids (ginkgolides)	(Mayo Clinic 2013a)
Panax ginseng	Ginseng	Overall health; antistress	Ginsenosides	(Hermann and von Richter 2012)
Camellia sinensis	Green tea extract	Antiproliferative; antioxidant	Catechins (ECGC, ECG)	(Chen et al. 2016)
Serenoa repens	Saw palmetto	Treatment of benign prostatic hypertrophy	Various phytosterols	(Mayo Clinic 2013b)
Hypericum perforatum	St. John's wort	Antidepressant	Hyperforin, hypericin	(Mayo Clinic 2013c)
Silybum marianum	Milk thistle	DILI; high cholesterol	Silymarin	(Mayo Clinic 2013d)
Piper methysticum	Kava kava	Reducing anxiety	Kavalactones	(Teschke 2010)
Cimicifuga racemosa, Actaea racemose	Black cohosh	Alleviating postmenopausal symptoms	Triterpene glycosides	(Mayo Clinic 2013e)
Valeriana officinalis	Valerian	Reducing anxiety	Valepotriates (terpene alcohols)	(Gharib et al. 2015)
Pausinystalia yohimbe	Yohimbe	Stimulant; erectile dysfunction treatment	Yohimbine	(Hermann and von Richter 2012)
Hydrastis canadensis	Goldenseal	Treatment of cold/ respiratory infection; alleviate menstrual complications	Hydrastine, berberine	(Hermann and von Richter 2012)

Future

- Scientists and health professionals agree that dietary supplements can be under certain conditions beneficial to human health but should not replace complete and balanced daily meals of food substances.
- The market for dietary supplements taken to improve the health or well-being of the customer is enormous.
- However, these products are not necessarily safe for everybody – there are active ingredients that provide a physiological or pharmacological effect- are likely to also cause undesired effects in susceptible individuals.
- More attention to adverse effects and potential interactions is needed to avoid serious medical outcomes.
- Users and physicians alike should consult updated literature before beginning or advising a regimen involving these substances.
- Medical providers should be aware that a large fraction of the general population takes dietary supplements.
- They should therefore request information from patients about their supplement intake to provide optimal medical care.
- Self-prescription of dietary supplements should be avoided especially in older people, pregnant women, young persons and people livng with disabilities should be informed and advised by their doctors or pharmacists on dietary supplementation

Thanks


5 Essential nutrients for the body
Your body is made from what you eat, and food is essential for physical activity
Body growth
Protein
Soy
Meat
Fish
Protein: 4 kcal per 1g
Energy generation
Fats
Peanuts
Margarine
Mayo
Fats: 9 kcal per 1g
Carbohydrates
Rice
Bread
Pasta
Carbohydrates: 4 kcal per 1g
Regulating body functions
Vitamins
Komatsuna
Carrots
Strawberries
Minerals
Pork liver
Seaweed
Milk