



Needs, Guidelines, Interventions

Nutritional status of preschool children under 5 years in India

NHFS-5 DATA¹

8% rise in children suffering from **anemia¹**

59% NFHS-4, 2015-16

67% NFHS-5, 2019-21

35.5% children are **stunted¹**

32.1% children are **underweight¹**

19.3% children are **wasted¹**

3.4% children are **overweight¹**

Micronutrient requirements in preschoolers (age group 4-6 years): Guideline recommendation

Recommendations as per ICMR-NIN guidelines²

500 mg/d	1000 mg/d	11 mg/d	4.5 mg/d	35 mg/d	510 µg/d	600 IU/d	55 µg/d
Calcium	Phosphorus	Iron	Zinc	Vit C	Vit A	Vit D	Vit K

Both **macro** & **micronutrient deficiencies** have a significant **impact** on the functioning & **physiology** of the **human body**, especially on **growth³**.

Micronutrient deficiencies in India commonly seen among children are: **Anaemia (41%)**, **Vitamin A deficiency (18%)**, **Zinc (19%)** and **Vitamin D (14%)** deficiency.⁴

Micronutrients

Signs of deficiency^{3,5,6}

Fe Iron

C Vitamin A

D Vitamin D

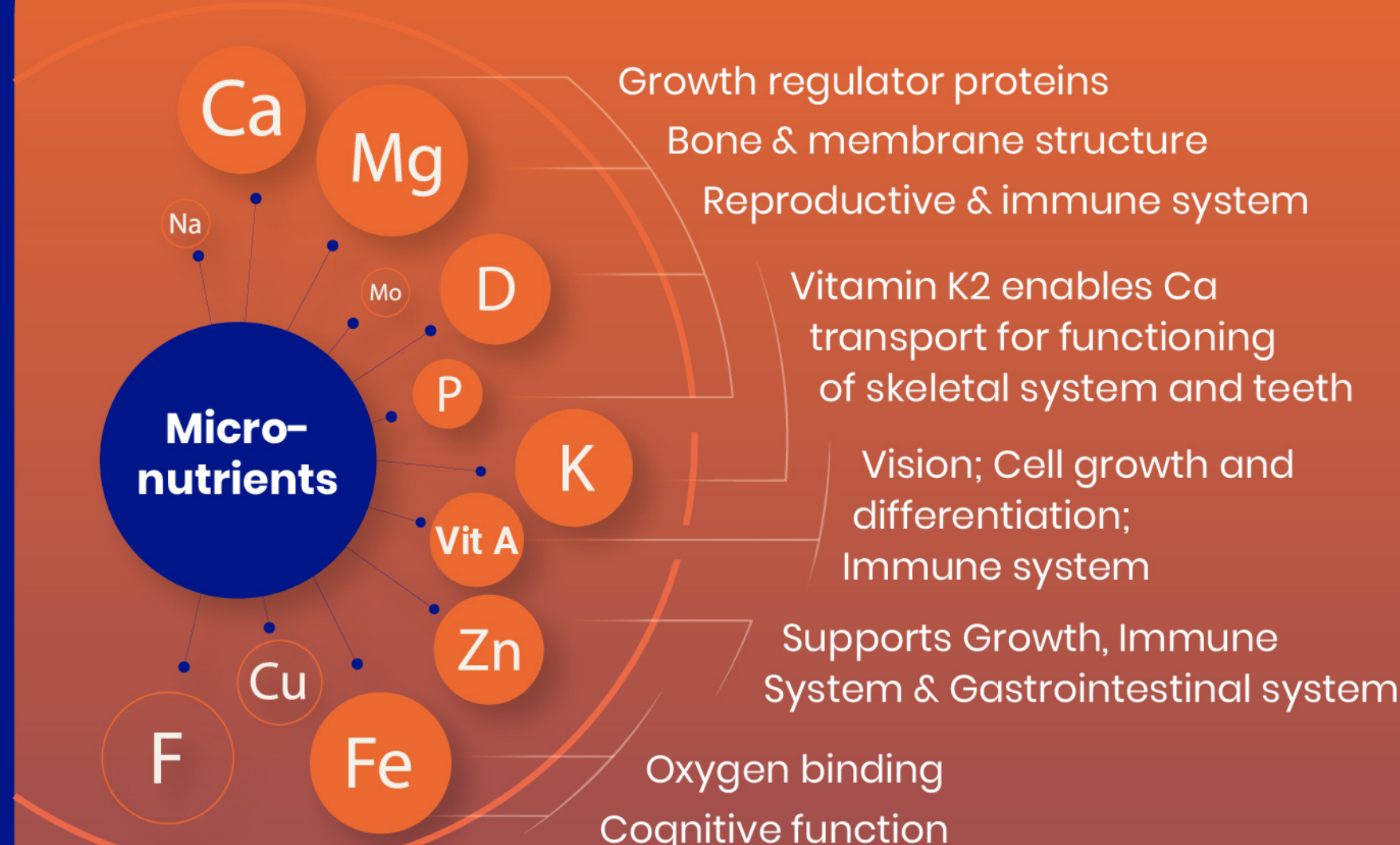
Zn Zinc

- Anemia, impaired cognitive development
- Night blindness, weakened immune response
- Osteoporosis, poor Ca absorption
- Growth failure, hypogonadism, impaired resistance to infection

Addressing the micronutrient deficiencies

Micronutrients = Vitamins + Minerals + Trace elements⁷

Significance of different micronutrients: Role in different biological functions^{5,7,8}



While it is important to provide essential nutrients, ensuring nutrient absorption is equally crucial and one of the key strategies to prevent hidden hunger in children.

Micronutrient absorption

Role of prebiotics^{9,10}

- Micronutrient absorption depends on **GI health & inter-nutrient interactions**
- Prebiotics restore the gut health by promoting essential bacteria
- Prebiotics promote mineral absorption
- scGOS & lcFOS - builds bone mass by decreasing osteoclast activity & increasing osteoblast activity



Role of inter nutrient interactions^{11,12,13}

- Iron absorption is better in presence of vitamin C.
- Optimal vitamin C : iron molar ratio= 2 : 1
- **Vit K2**, which helps transfer calcium to bones, is better absorbed than **Vit K1**

Interventions for Micronutrient deficiencies

Deficiency

Fe Iron

A Vitamin A

D Vitamin D

Interventions^{7,12,14}

- Dietary diversification
- Including ascorbic acid
- Food fortification
- Supplementation with 1-2 mg/kg/day iron
- Milk products, eggs, liver, fruits and vegetables
- Mega-dose of 2 lakh IU till three years of age
- Supplementation
- Fortifications with foods like fatty fish, egg yolk

Key Takeaways

Preschool children have a more critical requirement for energy and nutrients to support the body's growth and development.

Better absorption of micronutrients, such as iron and calcium support important everyday functions in preschoolers.

Appropriate dietary interventions & supplementation will provide adequate nutrients & in turn, aid in the child's overall growth and development.



Abbreviations:

BP: Blood pressure; Ca: Calcium;
D: Vitamin D; Fe: Iron; GI: Gastrointestinal;
lcFOS: Long chain fructooligosaccharides;
ICMR-NIN: Indian council of the medical research-national institute of nutrition;
IU: International units; K: Potassium;
Mg: Magnesium; NHFS: National family health survey; P: Phosphorus; scGOS: Short chain galactooligosaccharides.

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