

Unit 5. Bala Poshana (Child Nutrition) & Vyadhikshamatva (Immunity) Topic 1, 2

Unit 5 — Bala Poşana (Child Nutrition) & Vyādhikṣamatva (Immunity)

Topic 1 & 2 — Importance of $\bar{A}h\bar{a}ra$ in health and disease; Age-related nutritional needs (incl. micronutrients & vitamins); Nutritional assessment

1) Classical orientation: why Āhāra is the first medicine

In Kaumarabhritya, **āhāra** (food) is the *primary upastambha* (pillar) sustaining **bala** (strength), **varṇa** (complexion), **medhā** (cognition) and **ojas** (vital essence). The triad of daily pillars is classically stated as:

"आहारनिद्राब्रह्मचर्याणि त्रयोपस्तम्भाः ..." — Aṣṭāṅgahṛdayam, **Sūtrasthāna** (Mātrāśītya/Ahāra-vidhi context). (Sense: Food, sleep and regulated conduct are the three sustaining pillars of life.)

Link to **Vyādhikṣamatva** (disease resistance): good āhāra nourishes rasa and downstream dhātus, culminates in ojas, and manifests clinically as fewer infections, better convalescence and growth. Modernly, this aligns with adequate energy-protein-micronutrient intake, optimal breastfeeding and timely, diverse complementary feeding.

PART A — Importance of Āhāra in health and disease

- 1. **Sustains growth & development**: In infants/children, nutrient deficits quickly present as **growth faltering**, impaired neurodevelopment, anaemia, rickets and recurrent infections.
- 2. Builds Vyādhikṣamatva:
 - Ayurveda: Well-digested, doşa-balancing diet → clear srotas → robust ojas → bala and vyādhikṣamatva.
 - Modern: Adequate protein, iron, zinc, vitamin A, vitamin D, B12, folate, essential fatty acids and iodine support innate & adaptive immune function (barrier integrity, antibody production, cytokine balance).
- 3. Prevents both ends of malnutrition:
 - Deficits → SAM/MAM, micronutrient deficiencies, infections.
 - $\circ \ \ \textbf{Excess/poor quality} \rightarrow \text{overweight/obesity, NAFLD, metabolic risk in adolescents}.$
- 4. **Therapeutic role**: Diet is the *first-line* in diarrhoea (continued feeds + zinc), anaemia (iron-rich foods + IFA), rickets (calcium + vitamin D), protein-energy malnutrition (bṛṃhaṇa pathya).

PART B — Age-related nutritional needs (Indian context with ICMR-NIN 2020 & WHO)

Note: Values below use **ICMR-NIN 2020** energy and protein recommendations for children; micronutrient priorities are highlighted with practical targets and sources. For detailed planning, consult the full ICMR tables.

1) Energy & protein (daily needs) — remember these anchors

Age group Energy (kcal/day) $\begin{array}{ccc} & \text{Protein (RDA} \\ & \text{g/kg/day})^* \end{array}$ What this means in practice

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Age group	Energy (kcal/day)	Protein (RDA g/kg/day)*	What this means in practice
6-12 mo	~660	1.23	Start iron-rich complementary foods; 2-3 meals + BF
1-3 y	~1110	0.97	3 meals + 1-2 snacks; increase variety & fats
4-6 y	~1360	0.87	Family foods; ensure calcium/iron
7-9 y	~1700	0.92	School tiffin with protein
10-12 y (boys/girls)	2220 / 2060	0.91 / 0.90	Growth spurt prep; iron focus in girls
13-15 y (boys/girls)	2860 / 2400	0.89 / 0.87	High appetite; calcium, iron, zinc
16-18 y (boys/girls)	3320 / 2500	0.86 / 0.83	Peak bone mass window; sports nutrition

^{*}ICMR-NIN 2020; for low-quality cereal-heavy diets, protein needs trend toward ≈1 g/kg/day.

Meal-building rule (ICMR 2020): improve protein quality with a **3:1:2.5** mix of **cereals : pulses : milk** across the day (rotis + dal + curd/paneer), and include nuts/seeds.

2) Micronutrients & vitamins — what to prioritise by age

Below are **practical priorities** with indicative Indian RDA ranges and sources (drawn from ICMR-NIN 2020 summaries and WHO CF guidance). Use these to justify diet charts in exams.

a) 0-6 months (exclusive breastfeeding)

- Breastmilk suffices for most micronutrients except vitamin D; IAP recommends 400 IU/day vitamin D in infancy.
- Maternal diet determines B-vitamins, iodine, fatty acid profile; ensure maternal adequacy.

b) 6-23 months (complementary feeding with BF)

- Iron (critical): introduce heme iron (egg/meat where acceptable) OR fortified cereals/pulses + vitamin C; WHO flags iron, zinc, **B12** as commonly limiting at this age.
- **Zinc**: pulses, millets, nuts/seeds, dairy, eggs/meat.
- Vitamin A: orange-yellow veg (pumpkin, carrot), mango, dairy; continue national supplementation where applicable.
- Vitamin D & Calcium: curd/paneer, til & ragi, sunlight prudently; continue vitamin D 400 IU/day in infancy.
- lodine: use iodised salt at household level.

c) 2-5 years (preschool)

- Calcium trend ~500-550 mg/day (ICMR 2020): milk/curd/paneer, ragi/til.
- **Iron**: green leafy veg + pulses + vitamin C; heme sources where acceptable.
- Essential fats: add ghee/oils (visible fat within total limits) and nuts/seeds paste.

d) 5-9 years (school age)

- Protein quality and zinc for immunity and growth; tiffin must include dal/egg/milk/nuts.
- **Calcium** rises (~650 mg/day by 7-9 y).

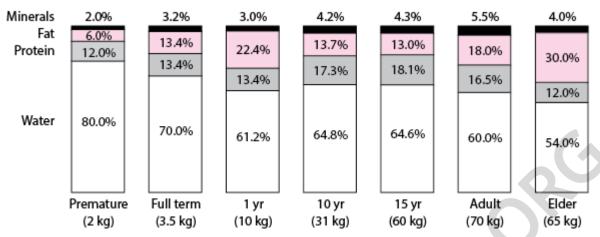
e) Adolescents (10-18 years)

- Iron: girls need special attention (menarche); integrate weekly IFA where programmatically indicated.
- Calcium: climbs to ~850-1050 mg/day as bone accrual peaks; ensure milk/curd/paneer, ragi/til.
- Vitamin D: meet ~400-600 IU/day from diet + sunlight; supplement if deficient.
- Energy density for athletes; avoid sugary drinks/ultra-processed snacks.

WHO CF 2023 emphasises *thick* complementary foods, **iron-rich** options from day one of CF, and 2-3 meals at $6-8 \text{ mo} \rightarrow 3-4 \text{ meals} + 1-2 \text{ snacks}$ at 9-23 mo (breastfed). Use this language in short notes.

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Changes in Body Composition With Growth and Aging

Adapted from Puig M: Body composition and growth. In *Nutrition in Pediatrics*, ed. 2, edited by WA Walker and JB Watkins. Hamilton, Ontario, BC Decker, 1996.

PART C — Practical diet building (India-friendly templates)

- **6-8 mo**: mashed dal-khichri with ghee; mashed egg yolk or paneer; fruit mash (banana/mango) + curd; avoid thin gruels.
- 9-12 mo: upma with moong-dal powder; idli + sambar; suji halwa with ground peanuts/til.
- 1-3 y: chapati soaked in dal + sabji; curd rice; veg poha + peanuts; fruit.
- **4-9 y**: roti/dal/sabji + curd; egg/paneer roll; sprouts chaat; fruit.
- 10-18 y: 3 meals + 1-2 snacks; add milk (300-600 ml/day) or curd/paneer portions; egg/fish/chicken where acceptable or dal + nuts otherwise.

Protein-quality hacks: cereal-pulse pairing (roti-dal, khichri), dairy, soy/tofu, nuts & seeds (powders/pastes in younger children).

PART D — Nutritional assessment (anthropometry + diet + clinical + labs)

1) Anthropometry (how to measure correctly)

- Length (<24 mo) on infantometer; height (≥24 mo) on stadiometer; weight on calibrated scale; MUAC (6-59 mo) with standardized tape; head circumference (infants).
- Plot on WHO Growth Standards; interpret Z-scores (number of SD from the median).

Key cut-offs (6-59 months):

- SAM: WHZ < -3 or MUAC < 115 mm or bilateral pitting oedema.
- MAM: WHZ \geq -3 and < -2 or MUAC 115-124 mm.

BMI-for-age (5–19 y) for thinness/overweight; track **velocity** (crossing down ≥2 major centile lines signals growth faltering).

2) Dietary assessment (what to ask)

- 24-hour recall + 7-day food frequency (milk, pulses, eggs/flesh foods, fruits/veg; junk/UPFs).
- Texture/portion suitability for age; **meal frequency** vs WHO CF guidance.

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- Household measures: cups, katoris, spoons; verify oil/ghee use (energy density).
- Feeding behaviours (responsive feeding, distractions, bottle use), appetite, illness days.

3) Clinical signs (quick head-to-toe)

- Anaemia: pallor, fatigue, pica, spoon nails.
- Vitamin A: night blindness (older child), xerosis/Bitot's spots.
- Vitamin D/Calcium: bone pain, delayed motor milestones, wrist/ankle widening, bowing.
- **Zinc**: frequent infections, poor growth, periorificial dermatitis.
- B-complex: angular stomatitis, glossitis, dermatitis.
- Protein-energy: wasting/oedema, hair changes.

4) Laboratory basics (context-specific)

- **Hb** (anaemia); **ferritin/CRP** where feasible to assess iron status; **25-OH-D** if rickets/low-sunlight risk; **TSH**, **celiac screen** in selective growth faltering; stool (parasitic).
- Always **triangulate** with anthropometry + diet + clinical.

PART E — Immunity (Vyādhikṣamatva) and nutrition: integrate in your answer

- Ayurvedic construct: vyādhikṣamatva = vyādhi-bala-virodhitva (resistance to disease) + vyādhi-utpādapratibandhakattva (aversion to disease generation); it is bala/ojas-centric.
- Modern mapping: nutrition drives barrier integrity (skin/mucosa), microbiome (HMOs, fibre), cell-mediated
 humoral responses (iron, zinc, vitamins A/D/B12/folate), and immunometabolism (PUFAs). Contemporary reviews explicitly connect Vyādhikṣamatva-Ojas-Dhātu-poshana with immunity.

Counselling line (write as is): "Balanced āhāra that is age-appropriate, diverse and digestible is the daily 'rasāyana' for a child's vyādhikṣamatva."

PART F — **Putting it to practice (quick algorithms)**

1) For infants 6-23 months (breastfed)

- Ensure meal frequency per WHO (2-3 → 3-4 + 1-2 snacks), thick consistency, one iron-rich food each day, vitamin C with plant iron, regular milk/curd/paneer, and iodised salt.
- Continue vitamin D 400 IU/day in infancy; review need thereafter.

2) For preschool/school age

- 3 meals + 1-2 snacks; each meal = grain + protein (dal/egg/milk/paneer) + veg; one fruit/day.
- Calcium to target age-band values (≈500-650 mg/d 1-9 y).

3) For adolescents

- Breakfast mandatory; protein at each meal; 600-1000 ml/day milk equivalent or ragi/til alternatives.
- **Menstrual girls**: iron-rich foods + IFA as per program; screen for symptomatic anaemia.

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PART G — Case-style examples (write in short answers)

- Case 1 (9-mo): BF + thin rice water 2×/day → WHZ -2.1. Fix: move to thick khichri with ghee, add dal powder, egg/Paneer or fortified cereal, fruit; recheck weight in 2 weeks per WHO CF.
- Case 2 (12-y girl): pallor, low diet diversity. *Plan*: diet with heme/fortified iron + vitamin C, screen Hb, start IFA if indicated; add milk/curd for calcium; outdoor play (vit D).
- Case 3 (3-y boy): MUAC 12.3 cm (MAM), recent diarrhoea. *Plan*: energy-dense foods, pulse-based snacks, **zinc** during diarrhoea; weekly follow-up; red-flag if MUAC drops.

Assessment

Long answer (10 marks)

Explain the role of Āhāra in building Vyādhikṣamatva in children. Correlate Ayurvedic concepts (rasa→ojas)
with modern immunity, then tabulate age-wise nutrient priorities and outline a nutritional assessment
protocol including WHO growth charts and MUAC.

Short essays (5 marks each)

- 1. Age-related needs (0-2 y): energy, protein, iron, zinc, vit A/D; include WHO CF frequency & consistency.
- 2. **Adolescent nutrition**: energy, protein quality, **calcium** peak bone mass, **iron** for girls; vitamin D sunlight policy with IAP note.
- 3. **Nutritional assessment**: steps, cut-offs for SAM/MAM and actions.

Short answers (3 marks each)

- Define **Vyādhikṣamatva** and list **three** dietary determinants.
- Write **two** indicators of adequate complementary feeding at 9-12 months.
- Give ICMR-NIN 2020 protein RDA (g/kg/d) for 1-3 y and 7-9 y.
- State **SAM** criteria (any one suffices).
- Name **four** clinical signs of micronutrient deficiency (any).

MCQs (1 mark each)

- 1. ICMR-NIN 2020 daily **energy** for a **1-3 y** child is closest to:
 - a) 800 kcal b) **1100 kcal** c) 1500 kcal d) 1800 kcal.
- 2. **SAM** can be diagnosed when MUAC is:
 - a) 130 mm b) 125 mm c) **<115 mm** d) 140 mm.
- 3. Vitamin D routine prophylaxis in infancy (IAP) is:
 - a) 200 IU/day b) 400 IU/day c) 800 IU/day d) 1200 IU/day.
- 4. WHO CF stresses complementary foods must be:
 - a) Thin and watery b) **Thick (spoon holds)** c) Given once daily d) Fruit only.
- For protein quality, ICMR suggests daily mix of cereal:pulse:milk ≈ a) 5:1:0.5 b) 1:1:1 c) 3:1:2.5 d) 11:1:3.

References

Classical

- Aṣṭāṅgahṛdayam (Vāgbhaṭa) Sūtrasthāna (Mātrāśītya / Ahāra-vidhi context): Tri-upastambha (āhāra, nidrā, brahmacarya).
- Kāśyapa Saṃhitā sections on Bāla-poṣaṇa and Annapāna/Lehana (conceptual links between nourishment and bala/ojas).

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Caraka Samhitā — Sūtrasthāna 27 (Annapānavidhi): principles of dietetics supportive of infant and child feeding transitions.

Modern / Guidelines

- ICMR-NIN (2020). Nutrient Requirements for Indians: RDA & EAR Brief note (energy & protein by age; protein quality mix).
- WHO (2023). Guideline for Complementary Feeding of Infants and Young Children 6–23 months (meal frequency, iron-rich foods, consistency).
- WHO ELENA / Nutrition Journal: SAM/MAM diagnostic thresholds (WHZ and MUAC).
- IAP (2021/2022). Vitamin D in Childhood: Revised Guidelines (400 IU/day in infancy; diet/sunlight thereafter).
- NIN (2024). Dietary Guidelines for Indians child diet charts and practical messaging.
- NIN/secondary summaries: Child calcium RDAs (≈500 mg in 1-3 y → ≈1050 mg in 16-18 y).

60-second recap

Āhāra is a *pillar* of paediatric health. Use ICMR-NIN 2020 anchors for energy/protein, ensure iron-zinc-vit A/D-B12 sufficiency by age, and apply WHO guidance for complementary feeding. Assess every child with anthropometry (Z-scores, MUAC), dietary recall, clinical signs and targeted labs. In Ayurvedic language, well-digested, diverse food sustains rasa → ojas, and thus Vyādhikṣamatva.

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