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CUET · HOME SCIENCE · CLASS XII · CODE 315

Public Nutrition and Health

CUET unit: Unit II — Nutrition, Food Science and Technology

By **UniDrill** · NCERT-grounded study material

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📌 Snapshot

- Establishes "public health nutrition" as the multidisciplinary field that uses large-scale, organised action to prevent both undernutrition and overnutrition in populations.
- Frames India's "double burden of malnutrition" — coexistence of undernutrition (PEM, hidden hunger) with rising overnutrition (obesity, diabetes, hypertension).
- Builds the vocabulary CUET loves to test: low birth weight, stunting, wasting, marasmus, kwashiorkor, hidden hunger, IDA, VAD, IDD.
- Covers government strategies (POSHAN Abhiyaan, ICDS, Mid-Day Meal, PDS, Antodaya Anna Yojana) and India's three-tier health-care structure.
- Outlines the role, scope and career avenues of a public/community nutritionist — a frequent CUET application-style question.

📖 Detailed Notes

2.1 Core concepts

- Public health refers to the **collective action taken by society to protect and promote the health of whole populations**; the mission of public health nutrition is to **prevent both undernutrition and overnutrition** and maintain optimal nutritional status (NCERT Introduction, p. 46–47).
- Malnutrition is the underlying cause of **at least 50 per cent of deaths of children under five years** of age in India (NCERT Significance, p. 47).
- **Almost one-fifth of infants born in India are low birth weight (LBW)** — weighing less than 2500 g (2.5 kg); LBW may even lead to child mortality (NCERT Significance, p. 47).
- Almost half the pre-school children from socio-economically disadvantaged families suffer **mild to moderate undernutrition / growth retardation**; a large proportion also suffers **micronutrient deficiencies — "hidden hunger"**: iron, zinc, vitamin A, vitamin C, vitamin D, iodine, folic acid and B12 (NCERT Significance, p. 47).
- Productivity losses due to malnutrition are estimated at **more than 10 per cent of lifetime earnings** for individuals and **2–3 per cent of GDP** for the nation (NCERT Significance, p. 47).

- India faces the **"double burden of malnutrition"** — undernutrition + overnutrition; communicable diseases (TB, hepatitis, malaria, HIV/AIDS) hit the undernourished hardest while obesity/diabetes lower immunity in the overnourished (NCERT Significance, p. 48).
- **Public health nutrition** is multidisciplinary, built on biological and social sciences; it differs from clinical nutrition/dietetics because it addresses **community/public (especially vulnerable) groups**, not individuals (NCERT Basic Concepts, p. 48–49).
- A **community** is defined as a specific group of people who share common characteristics — language, conditions, lifestyle or health problem (NCERT box, p. 49).
- Factors related to nutritional problems include economic resources, agricultural policy, health care facilities, government policies, political will and socio-cultural factors (Fig. 3.1) (NCERT, p. 49–50).
- **PEM (Protein-Energy Malnutrition):** caused by inadequate food intake of macronutrients (energy and protein); children at greatest risk; assessed by **anthropometric measurements** — weight, height, head-chest circumference (NCERT p. 49).
- Definitional box: **underweight** = body weight less than adequate for age; **stunting** = height less than adequate for age (short stature); **wasting** = weight not adequate relative to height (NCERT box, p. 51).
- Severe undernutrition due to **deficiency of food and energy = marasmus**; that caused by **protein deficiency = kwashiorkor** (NCERT p. 51).
- **Iron-deficiency anaemia (IDA)** is the **most common nutritional disorder in the world**; vulnerable groups = women of child-bearing age, adolescent girls, pregnant women, school-age children; manifests as pallor of conjunctiva/tongue/nail beds, fatigue, breathlessness, impaired cognition in children (NCERT p. 52).
- **Vitamin A deficiency (VAD):** results in **night blindness** progressing to complete blindness; vitamin A is the **most common cause of childhood blindness**; vicious cycle exists between VAD and infection (NCERT p. 52).
- **Iodine deficiency disorders (IDD):** an ecological phenomenon due to iodine deficiency in soil; most common manifestation in adults = **goitre**; in children = **cretinism**; IDD affects about **13 per cent of world's population**, 30 per cent are at risk (NCERT p. 53).
- **POSHAN Abhiyaan** (PM's Overarching Scheme for Holistic Nutrition) was launched in **Jhunjhunu, Rajasthan in March 2018**, implemented by **Ministry of Women and Child Development**; targets stunting, undernutrition, anaemia and low birth weight (NCERT p. 53).
- Short-term interventions: ICDS, fortification (salt with iodine), low-cost nutritious food production, micronutrient control (NCERT p. 53–54).

- Strategies are broadly classified as **(a) Diet/food-based** (preventive, sustainable, cost-effective, no overdose risk) and **(b) Nutrient-based/medicinal approach** (supplementation — short-term, used for vit A, iron, folic acid) (NCERT p. 54).
- Nutrition programmes in India: ICDS, Nutrient Deficiency Control Programmes (National Prophylaxis for Blindness due to VAD, Nutritional Anaemia Prophylaxis, IDD Control), Mid-Day Meal Programme, Food Security Programmes (PDS, Antodaya Anna Yojana, Annapurna, National Food for Work), Self/wage-employment schemes (NCERT p. 56–57).
- Health care in India is provided at **three levels**: **Primary** (Primary Health Centres — first contact), **Secondary** (district hospitals and community health centres — first referral), **Tertiary** (medical college hospitals, regional/specialised hospitals, AIIMS — highest level) (NCERT Health Care, p. 57).
- Scope/Role of a public (community) nutritionist: key areas include nutritional science, life-cycle nutritional needs, assessment, care, food science, education methods, mass media, programme management; work avenues include hospital outreach, ICDS, government consultancies, NGOs (UNICEF, USAID, GAIN, TATA Trust, IFPRI), feeding programmes, school health, CSR (NCERT Scope, p. 57–58).

Public Nutrition and Health is the macro counterpart of Clinical Nutrition (chapter 2). Where the clinical nutritionist works one-to-one with a hospitalised patient, the public nutritionist works with whole populations through schemes, surveys and programmes — moving from individual diet therapy to population-level food systems, policy and programme management.

The 'double burden of malnutrition' in India is statistically supported by NFHS, ICMR-INDIAB and CNNS (Comprehensive National Nutrition Survey 2016-18) data. Stunting at ~35% of under-5 children (NFHS-4 baseline), wasting at ~21%, underweight at ~36% — and simultaneous rising adult overweight/obesity, hypertension and diabetes. The 'productivity loss' framing — >10% of lifetime earnings for individuals and 2-3% of GDP nationally — is a powerful economic argument for nutrition intervention drawn from Lancet Series on Maternal and Child Nutrition.

Three categories of nutritional problems dominate Indian public health: (1) Macronutrient — Protein-Energy Malnutrition (PEM), classified by anthropometric Z-scores (weight-for-age = underweight; height-for-age = stunting; weight-for-height = wasting). Severe PEM manifests as marasmus (energy and food deficiency — visible emaciation, no oedema) or kwashiorkor (predominant protein deficiency — oedema, fatty liver, hair and skin changes). (2) Micronutrient — 'hidden hunger' covering iron deficiency anaemia (the world's most prevalent nutritional disorder), vitamin A deficiency (the leading cause of childhood blindness; vicious cycle with infection), iodine deficiency disorders (goitre in adults, cretinism in children), and emerging zinc, vitamin D, vitamin B12 and folate deficiencies. (3) Diet-related NCDs — obesity, type 2 diabetes, CVD, hypertension — flowing from sedentary urban life, processed-food consumption and low fruit/vegetable intake.

India's flagship nutrition schemes: ICDS (1975-onwards, world's largest community-based nutrition programme, delivers Supplementary Nutrition, growth monitoring, immunisation, health check-ups, referral, preschool education through Anganwadi centres for 0-6 children + pregnant/lactating women); POSHAN Abhiyaan (launched Jhunjhunu Rajasthan March 2018 by PM, implemented by MWCD, targets stunting/undernutrition/anaemia/LBW with annual reduction targets of 2%, 2%, 3%, 2% respectively); Mid-Day Meal / PM POSHAN (Classes I-VIII, since 1995); PDS (Public Distribution System through ~5.5 lakh Fair Price Shops); Antodaya Anna Yojana (poorest households); Annapurna scheme (free food grains for destitute elderly); MGNREGA (rural employment for food access); National Food Security Act 2013 (legal right to 5 kg/month of foodgrains at ₹1/2/3 per kg). The nutrient-deficiency control programmes — National Programme for Prevention of Blindness, National Iron-Plus Initiative / Anaemia Mukt Bharat, National Iodine Deficiency Disorders Control Programme — operationalise the medicinal strategy.

Strategies fall into two buckets. Food-based strategies (preventive, sustainable, cost-effective, culturally adaptable, no overdose risk) — dietary diversification, kitchen-garden promotion, food fortification (iodised salt, double-fortified salt with iron, fortified atta, fortified milk, fortified oil), nutrition education, behaviour change communication. Nutrient-based / medicinal strategies (rapid, short-term, used when deficiency is severe) — vitamin A megadoses for children under 5 every 6 months, iron-folic acid (IFA) tablets weekly to adolescents and adults, daily IFA in pregnancy, iodised salt as the population-wide fortification anchor.

The Indian three-tier health-care system anchors all nutrition programmes. At the primary level — Sub-centre (per 5,000 population in plains, 3,000 in hill/tribal), PHC (per 30,000 plains, 20,000 hill/tribal, with 6 beds), CHC (per 1.2 lakh, 30 beds with specialist care). At the secondary level — Sub-district / district hospitals (100-500 beds, multi-specialty). At the tertiary level — Medical college hospitals, AIIMS, regional super-speciality centres. The public nutritionist works most intensively at the primary level (Anganwadi, ASHA worker liaison), feeding into secondary referral when needed.

Career avenues for the public nutritionist include government posts (MWCD, NIN, ICMR, NHM), UN agencies (UNICEF, WHO, FAO, WFP), Indian NGOs (Naandi, GAIN India, Tata Trusts, IFPRI), academic teaching/research, food fortification industry, programme monitoring & evaluation, mass-media nutrition communication, and CSR nutrition projects.

2.2 Definitions to memorise

Term	Definition	Page
Public health	Collective action taken by society to protect and promote the health of whole populations	46
Low birth weight (LBW)	Birth weight less than 2500 g (2.5 kg)	47

Term	Definition	Page
Hidden hunger	Micronutrient deficiency (iron, vit A, iodine, zinc, etc.)	47
Double burden of malnutrition	Coexistence of undernutrition and overnutrition in the same country	48
Community	Specific group of people sharing common characteristics — language, lifestyle, conditions or health problem	49
PEM	Protein-Energy Malnutrition — inadequate intake of energy and protein	49
Underweight	Body weight less than adequate for age	51
Stunting	Height less than adequate for age (short stature)	51
Wasting	Weight not adequate relative to height	51
Marasmus	Severe undernutrition due to deficiency of food and energy	51
Kwashiorkor	Severe undernutrition caused by protein deficiency	51
IDA	Iron-deficiency anaemia — reduced haemoglobin production; most common nutritional disorder in the world	52
VAD	Vitamin A deficiency — causes night blindness, leading cause of childhood blindness	52
IDD	Iodine deficiency disorders — spectrum of conditions from fetal life to adulthood due to inadequate iodine	53
Goitre	Enlarged thyroid; most common adult manifestation of iodine deficiency	53
Cretinism	Iodine deficiency manifestation in children	53
POSHAN Abhiyaan	PM's Overarching Scheme for Holistic Nutrition, launched March 2018, Jhunjhunu, Rajasthan	53

2.3 Diagrams / processes to remember

- **Fig. 3.1 — Factors Related to Undernutrition** (p. 50): pyramid linking immediate causes (insufficient access to food, inadequate health services) to underlying socio-economic-political causes.
- **Vicious Cycle of Vitamin A Deficiency and Infection** (p. 52): vit A deficiency → increased susceptibility to infection → increased losses of vit A → deeper deficiency.
- **Table 3.1 — Different Interventions for Tackling Malnutrition** (p. 56): compares Medicinal/Nutrient-based (Nutrient Supplementation) vs Food-based (Fortification, Dietary Diversification) on appropriateness, advantages and challenges.
- Photo set p. 51 — Victims of (a) PEM and (b) Micronutrient Deficiency; p. 55 — yellow/green/orange fruits and vegetables as good sources of vitamin A.

2.5 Key data / public-nutrition processes table (Indian context)

Item	Value / fact	Source
Malnutrition cause of under-5 deaths	⩾50%	NCERT p. 47
Indian LBW share of births	~1/5 (20%)	NCERT p. 47
LBW cut-off	<2500 g	NCERT p. 47
Productivity loss to individuals	>10% of lifetime earnings	NCERT p. 47
Productivity loss to GDP	2–3%	NCERT p. 47
World population affected by IDD	~13%	NCERT p. 53
World population at risk of IDD	30%	NCERT p. 53
Anthropometric indicator for stunting	Height-for-age	NCERT p. 51
Anthropometric indicator for wasting	Weight-for-height	NCERT p. 51
Anthropometric indicator for underweight	Weight-for-age	NCERT p. 51
Severe PEM with food/energy deficiency	Marasmus	NCERT p. 51
Severe PEM with protein deficiency	Kwashiorkor	NCERT p. 51
Most common nutritional disorder worldwide	Iron-deficiency anaemia	NCERT p. 52
Most common cause of childhood blindness	Vitamin A deficiency	NCERT p. 52
Adult manifestation of IDD	Goitre	NCERT p. 53
Child manifestation of IDD	Cretinism	NCERT p. 53
POSHAN Abhiyaan launch	March 2018, Jhunjhunu, Rajasthan	NCERT p. 53
POSHAN Abhiyaan ministry	MWCD	NCERT p. 53

Item	Value / fact	Source
Health care tiers	Primary (PHC); Secondary (district hospital/ CHC); Tertiary (medical college/AIIMS)	NCERT p. 57
ICDS launch year	1975 (India context)	India context
Mid-Day Meal launch year	1995 (India context)	India context
NFSA year	2013 (India context)	India context
Indian nutrition apex institute	NIN, Hyderabad (ICMR)	India context
Anganwadi worker per population	1 per 1,000 (India context)	India context

2.4 Common confusions / NTA trap points

- **Marasmus vs Kwashiorkor:** marasmus = energy/food deficiency (visible wasting); kwashiorkor = protein deficiency. Don't swap them.
- **Stunting vs Wasting vs Underweight:** stunting is height-for-age, wasting is weight-for-height, underweight is weight-for-age. NTA loves swapping these.
- **Goitre vs Cretinism:** goitre is the adult manifestation of iodine deficiency; cretinism is the childhood form.
- **POSHAN Abhiyaan ministry:** implemented by **Ministry of Women and Child Development** (not Ministry of Health). Launched **March 2018 in Jhunjhunu, Rajasthan**.
- **LBW cut-off:** less than **2500 g / 2.5 kg** — not 2000 g.
- **Levels of health care:** Primary = PHC, Secondary = district hospital/CHC (first referral), Tertiary = medical college/AIIMS. Don't confuse "first level of contact" with "first referral level".
- **Food-based vs Nutrient-based strategy:** food-based is **long-term, sustainable, no overdose risk**; nutrient-based (supplementation) is **short-term, used for vit A/ iron/folic acid**, but expensive and limited coverage.
- **Hidden hunger is micronutrient deficiency**, NOT food insecurity broadly.
- **POSHAN Abhiyaan is March 2018**, NOT October 2017 or 2019.
- **Goitre in adults, cretinism in children** — NTA's classic swap.
- **Marasmus = energy/food deficiency; Kwashiorkor = protein deficiency** — never swap.
- Iron-folic acid (IFA) tablets are **weekly** for adolescents and **daily** during pregnancy — a frequent dosage trap.

🎯 Practice MCQs

📊 PYQ Alignment

This chapter is consistently mined for CUET Home Science Unit II (Nutrition, Food Science and Technology). Past papers (2023–25) regularly feature direct factual recall on LBW cut-off, marasmus vs kwashiorkor, IDA/VAD/IDD facts, POSHAN Abhiyaan launch year and ministry, and the three-tier health-care system, along with statement-based and match-the-following items on stunting/wasting/underweight and food-based vs nutrient-based strategies.