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HANDOUT

BIO5102

Public Health and Nutrition

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BIO5102

Public Health and Nutrition

This handout covers the complete course topic by topic in simple, exam-focused language. Each chapter begins with learning objectives and ends with key points and exam pointers. Definitions are boxed in green-friendly format, examples are worked out step by step, and very important exam points are flagged separately. Study the highlighted points carefully before your papers.

Course Information	
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1. Introduction to Public Health

Learning Objectives

- Define public health and its core mission
- Distinguish public health from clinical medicine
- Describe the three core functions and ten essential services of public health

Public health is defined as the science and art of preventing disease, prolonging life and promoting health through the organized efforts of society.

Public health differs from clinical medicine in its focus: where a doctor treats one patient at a time, public health works to protect the health of whole populations. Its tools are prevention, health promotion, surveillance, policy and community action rather than individual diagnosis and treatment.

The three core functions of public health

- **Assessment:** monitoring health status, diagnosing community health problems and investigating hazards.
- **Policy development:** informing and empowering people, mobilizing partnerships, and developing policies that support health.
- **Assurance:** enforcing laws, linking people to care, assuring a competent workforce, and evaluating services.

Key milestones

- John Snow and the Broad Street pump (1854): mapped cholera cases in London and removed the pump handle, founding modern epidemiology.
- Germ theory and sanitation movement: clean water, sewage and vaccination cut infectious disease deaths dramatically.
- Alma-Ata Declaration (1978): "Health for All" through primary health care.
- Ottawa Charter (1986): health promotion framework — build healthy public policy, create supportive environments, strengthen community action.

Key Points to Remember

- Public health = organized societal effort for population health.
- Core functions: assessment, policy development, assurance.
- Prevention is cheaper and more effective than cure at population scale.

Exam Pointer

Very important for exams: Definitions of public health and the three core functions are repeated short questions in papers.

Core functions and essential services

- Assessment: monitor health status, diagnose community health problems.
- Policy development: inform and empower people, mobilize partnerships.
- Assurance: enforce laws, link people to care, assure a competent workforce.
- Pakistan: EPI vaccination, lady health workers and disease surveillance perform these functions.

Public health vs clinical medicine in practice

- A doctor treats one patient's heart attack; public health prevents a thousand through tobacco control.
- Public health is population-based, prevention-oriented and multidisciplinary.
- Both are needed: treatment without prevention is an endless treadmill.

Health promotion models

- Health belief model: perceived susceptibility and benefits drive action.
- Transtheoretical model: stages from precontemplation to maintenance guide interventions.
- Use theory — campaigns designed on models outperform ad-hoc messages.

Key public health achievements

- Smallpox eradication (1980) — the greatest public health triumph.
- Polio nearly eradicated; Pakistan and Afghanistan remain the last reservoirs.
- Tobacco control and seat-belt laws save millions yearly.

Alma-Ata and primary health care

- The 1978 declaration made primary care the route to "Health for All".
- It framed health as a right, not a commodity.
- Astana 2018 renewed the commitment for universal coverage.
- Pakistan's Alma-Ata alignment shaped its basic health units.
- Exam answers should cite both declarations by year.

Ottawa Charter action areas

- Build healthy public policy across all sectors.
- Create supportive environments for health.

- Strengthen community action for health.
- Develop personal skills through education.
- Reorient health services toward prevention.

2. Determinants of Health and Disease

Learning Objectives

- List the major determinants of health
- Explain the difference between communicable and non-communicable diseases

Determinants of health is defined as the range of personal, social, economic and environmental factors that influence the health status of individuals and populations.

- Biological/genetic factors: age, sex, inherited traits.
- Behavioural factors: diet, physical activity, smoking, hygiene practices.
- Social and economic factors: income, education, occupation, social support.
- Environmental factors: clean water, sanitation, air quality, housing.
- Health services: availability, accessibility and quality of care.

Communicable vs non-communicable diseases

Feature	Communicable diseases	Non-communicable diseases (NCDs)
Cause	Pathogens (bacteria, viruses, parasites)	Lifestyle, genetics, environment
Examples	TB, hepatitis, typhoid, dengue	Diabetes, hypertension, heart disease, cancer
Transmission	Person to person, vector, water/food	Not transmitted
Control	Vaccination, sanitation, treatment	Diet, exercise, screening

Pakistan faces a double burden of disease: communicable diseases such as hepatitis, TB and waterborne infections remain common, while NCDs like diabetes and heart disease are rising fast because of changing diets and sedentary lifestyles. Nutrition sits at the centre of both burdens.

Key Points to Remember

- Health is shaped by biology, behaviour, society and environment.
- Pakistan carries a double burden: infections plus rising NCDs.

Exam Pointer

Very important for exams: The double burden of disease concept and the determinants list are favourite 5-mark questions.

Measuring determinants

- Social gradient: health improves stepwise with socioeconomic position — not just rich vs poor.
- Life-course approach: early childhood conditions cast long shadows on adult health.
- In Pakistan, rural-urban and gender gaps in literacy and income drive health inequities.

Tackling determinants: policy levers

- Education, especially girls' education, is among the strongest health interventions.
- Clean water, sanitation and housing prevent more disease than hospitals cure.
- Social protection (cash transfers, food support) buffers the poorest.

Environmental health linkages

- Air pollution, unsafe water and poor sanitation remain top environmental risks in Pakistan.
- Climate change is expanding heat illness and vector-borne disease ranges.
- WASH investments pay for themselves in reduced disease burden.

Health equity in Pakistan

- Rural women and the poorest quintile face the worst indicators.
- User fees push families into poverty — financial protection matters.
- Target resources to districts with the highest burden.

Social determinants in depth

- Education predicts health more strongly than income in many studies.
- Gender norms restrict women's access to care in conservative settings.
- Housing quality drives respiratory and diarrhoeal disease.
- Employment security affects mental as well as physical health.
- Policies outside the health sector are health policies.

Health equity vs equality

- Equality gives everyone the same; equity gives what each needs.
- Equity targets avoidable, unfair differences.
- Measuring disaggregated data reveals inequities.

- Proportionate universalism balances both ideas.
- Use the terms precisely — examiners notice.

3. Basic Epidemiology for Public Health

Learning Objectives

- Define epidemiology and its uses
- Calculate basic measures: incidence, prevalence, mortality rates

Epidemiology is defined as the study of the distribution and determinants of health-related states in populations, and the application of this study to control health problems.

- Descriptive epidemiology: who gets sick, where and when (person, place, time).
- Analytic epidemiology: why — case-control and cohort studies test causes.
- Experimental epidemiology: clinical trials and community interventions.

Key measures

Measure	Definition	Formula
Incidence	New cases in a period	New cases / population at risk
Prevalence	All existing cases at a point	Total cases / total population
Mortality rate	Deaths in a period	Deaths / population x 1000
Case fatality rate	Deaths among diagnosed cases	Deaths / cases x 100

Example

In a village of 5,000 people, 50 new TB cases appear in a year. Incidence = $50/5,000 = 10$ per 1,000 per year. If 200 people currently have TB, prevalence = $200/5,000 = 4\%$.

The epidemiological triad explains disease causation through the interaction of agent (pathogen or harmful exposure), host (susceptibility, nutrition, immunity) and environment (sanitation, crowding). Good nutrition strengthens the host leg of the triad.

Key Points to Remember

- Epidemiology = distribution + determinants + control.
- Incidence counts new cases; prevalence counts all current cases.

Exam Pointer

Very important for exams: Numerical questions on incidence vs prevalence appear regularly — learn the formulas.

Study designs in epidemiology

Design	Direction	Strength
Cohort	Exposure -> disease (forward)	Measures incidence, establishes temporality
Case-control	Disease -> exposure (backward)	Fast, good for rare diseases
Cross-sectional	Snapshot	Prevalence estimates
RCT	Intervention assigned	Gold standard for causality

Bias, confounding and causation

- Bias: systematic error (selection bias, recall bias) distorts results.
- Confounding: a third factor mixes with the exposure — control by design or analysis.
- Bradford Hill criteria (strength, temporality, dose-response) argue for causation.

Screening principles

- Screen when early treatment improves outcomes (e.g. newborn screening, TB contact tracing).
- Criteria: important condition, acceptable test, available treatment.
- Beware lead-time bias when evaluating screening programs.

Outbreak investigation steps

- Confirm the outbreak, define a case, count cases by time/place/person.
- Formulate and test hypotheses; implement control measures.
- Communicate findings — dengue responses in Punjab follow this cycle.

Reading an epidemic curve

- The x-axis is time of onset; the y-axis is case counts.
- A point-source outbreak rises and falls sharply.
- Person-to-person spread shows successive waves.
- Propagated epidemics have a longer, flatter tail.
- Median incubation period can be read off the curve.

Surveillance systems

- Passive surveillance relies on routine reports.

- Active surveillance seeks cases deliberately.
- Sentinel sites monitor trends cheaply.
- Pakistan's DEWS tracks epidemic-prone diseases.
- Timeliness matters more than completeness.

4. Fundamentals of Human Nutrition

Learning Objectives

- Define nutrition and nutrients
- Classify nutrients and state their functions

Nutrition is defined as the science of nutrients in food, their action, interaction and balance in relation to health and disease, and the processes of ingestion, digestion, absorption, transport, utilization and excretion.

Nutrient is defined as a chemical substance in food that nourishes the body by providing energy, building materials or factors that regulate body processes.

- Macronutrients (needed in large amounts): carbohydrates, proteins, fats — provide energy and building material.
- Micronutrients (needed in small amounts): vitamins and minerals — regulate processes and prevent deficiency diseases.
- Water: often forgotten, but the most essential nutrient.
- Essential nutrients: the body cannot make them (or not enough) — must come from food, e.g. essential amino acids, essential fatty acids, vitamins.

Functions of nutrients

- Energy-yielding: carbohydrates, fats and proteins provide calories.
- Body-building: proteins build muscle, enzymes and tissues; minerals build bones and teeth.
- Protective/regulatory: vitamins, minerals and water regulate metabolism and immunity.

Energy: 1 g carbohydrate = 4 kcal | 1 g protein = 4 kcal | 1 g fat = 9 kcal | 1 g alcohol = 7 kcal

Example

A meal with 60 g carbs, 20 g protein and 15 g fat provides $(60 \times 4) + (20 \times 4) + (15 \times 9) = 240 + 80 + 135 = 455$ kcal.

Key Points to Remember

- Macro = carbs, protein, fat; micro = vitamins, minerals.
- Fat gives more than double the energy of carbs or protein per gram.

Exam Pointer

Very important for exams: The 4-4-9 kcal rule and the classification of nutrients are guaranteed short questions.

Energy balance in practice

- Basal metabolic rate is the largest energy cost; physical activity is the most variable.
- 1 kg of body fat stores roughly 7,700 kcal — small daily surpluses accumulate.
- Pakistani diets: energy-dense oils and sweets with falling activity drive weight gain.

Reading nutrition labels

- Check serving size first — all numbers scale with it.
- Watch added sugars, sodium and trans fats; prefer fibre-rich options.
- Ingredient lists run by weight: first ingredients dominate.

Macronutrient distribution ranges

- Typical guidance: 45-65% carbs, 10-35% protein, 20-35% fats of energy.
- Individual needs vary with activity, age and health status.
- Very important for exams: no single macro ratio suits everyone.

Dietary guidelines essentials

- Eat a variety of foods; make half the plate vegetables and fruit.
- Limit salt, sugar and saturated fat; choose whole grains.
- Pakistan's dietary guidelines adapt these to local foods.

Digestion of nutrients

- Carbohydrate digestion begins with salivary amylase.
- Protein digestion starts in the stomach with pepsin.
- Fat digestion needs bile emulsification in the duodenum.
- Most absorption happens in the jejunum.
- Fibre resists digestion and feeds gut microbes.

Energy balance

- Weight change reflects energy in minus energy out.
- Basal metabolic rate dominates expenditure.
- Small daily surpluses compound into obesity.
- Physical activity is the adjustable component.
- Crash diets fail because metabolism adapts.

5. Macronutrients: Carbohydrates, Proteins and Fats

Learning Objectives

- Describe the types and roles of each macronutrient
- Identify good food sources and deficiency/excess effects

Carbohydrates

- Simple carbs: sugars (glucose, fructose, sucrose) — quick energy; excess linked to obesity and diabetes.
- Complex carbs: starches and fibre (whole grains, pulses, vegetables) — preferred staple energy source.
- Dietary fibre: indigestible plant material that prevents constipation, controls blood sugar and lowers cholesterol.

Proteins

- Built from amino acids; 9 are essential and must come from food.
- Functions: growth and repair, enzymes, hormones, antibodies, transport.
- Sources: meat, eggs, milk, pulses, beans, nuts. Animal proteins are "complete"; plant proteins should be combined (e.g. rice + lentils).
- Deficiency: protein-energy malnutrition — kwashiorkor (protein deficiency) and marasmus (overall energy deficiency) in children.

Fats

- Saturated fats (ghee, butter, fatty meat): raise LDL cholesterol — limit intake.
- Unsaturated fats (oils, nuts, fish): healthier; omega-3 fatty acids protect the heart.
- Trans fats (hydrogenated oils, vanaspati): most harmful — raise bad cholesterol and lower good cholesterol.
- Functions: concentrated energy, vitamin A/D/E/K absorption, insulation, cell membranes.

Key Points to Remember

- Combine cereals + pulses to get complete protein from plant foods.
- Prefer unsaturated oils; avoid trans fats and excess saturated fat.

Exam Pointer

Very important for exams: Kwashiorkor vs marasmus differences and the essential amino acid concept are classic questions.

Protein quality and complementation

- Complete proteins (egg, milk, meat) supply all essential amino acids.
- Plant proteins complement each other: daal + rice/chapati together improve amino acid score.
- Children, pregnant women and the ill need extra protein for growth and repair.

Vegetarian protein planning

- Combine legumes with cereals across the day for complete amino acids.
- Milk, yogurt and eggs (for lacto-ovo vegetarians) simplify planning.
- Watch B12 and iron; pair iron foods with vitamin C.

Cooking and nutrient retention

- Vitamin C and B vitamins leach into cooking water — use minimal water, reuse it in curries.
- Overcooking vegetables destroys heat-sensitive vitamins.
- Traditional slow cooking preserves minerals; avoid repeated reheating of oils.

Amino acid essentials

- Nine amino acids are essential — the body cannot make them.
- Animal proteins are complete; plant proteins need combining.
- Growing children need more per kg than adults.

Glycaemic index

- GI ranks foods by blood-glucose response.
- Low-GI foods suit diabetics and weight control.
- Whole grains and legumes are typically low GI.
- GI interacts with portion size (glycaemic load).
- Pakistani staples like brown rice beat white rice on GI.

Protein quality

- Biological value measures how well protein is used.
- Eggs score highest among common foods.
- Combining pulses with cereals completes amino acids.
- Digestibility-corrected scores guide fortification.
- Quantity without quality still leaves deficiency.

6. Micronutrients: Vitamins

Learning Objectives

- Classify vitamins and state one key function and deficiency disease for each major vitamin
- Fat-soluble vitamins (A, D, E, K): stored in body fat and liver; excess can be toxic.
- Water-soluble vitamins (B-complex, C): not stored much; needed regularly; excess excreted in urine.

Vitamin	Key function	Deficiency disease	Sources
A	Vision, immunity, skin	Night blindness, xerophthalmia	Liver, eggs, mango, carrots
D	Calcium absorption, bones	Rickets (children), osteomalacia	Sunlight, fish, fortified milk
E	Antioxidant	Rare; nerve problems	Vegetable oils, nuts
K	Blood clotting	Bleeding disorders	Green leafy vegetables
B1 (thiamine)	Nerve function, energy	Beriberi	Whole grains, pulses
B3 (niacin)	Energy metabolism	Pellagra (3 Ds)	Meat, peanuts, grains
B9 (folate)	Cell division, pregnancy	Neural tube defects, anaemia	Leafy greens, lentils
B12	Nerves, red blood cells	Pernicious anaemia	Animal foods only
C	Immunity, iron absorption, gums	Scurvy	Citrus, guava, amla

Vitamin A deficiency is a major public health problem in Pakistan, causing preventable childhood blindness; vitamin D deficiency is widespread despite sunshine because of indoor lifestyles and covered clothing; iron and folate deficiencies drive anaemia in women.

Key Points to Remember

- Fat-soluble: A, D, E, K (can accumulate). Water-soluble: B-complex, C.
- Match each vitamin to its classic deficiency disease.

Exam Pointer

Very important for exams: One-mark questions almost always ask: night blindness = A, rickets = D, beriberi = B1, scurvy = C, pellagra = B3.

Anaemia: a closer look

- Iron-deficiency anaemia: fatigue, pallor, poor concentration — common in Pakistani women.
- Boost absorption: vitamin C with meals; avoid tea with meals (tannins block iron).
- Folate and B12 deficiencies also cause anaemia; deworming helps where parasites prevail.

Vitamin D and calcium partnership

- Vitamin D enables calcium absorption — deficiency weakens bones even with enough calcium.
- Sunlight is the main source; indoor lifestyles in cities cause widespread deficiency.
- Supplementation programs target pregnant women and adolescent girls.

Hydration essentials

- Water needs rise with heat, activity and illness — Pakistan's summers demand attention.
- Dehydration signs: dark urine, dizziness, fatigue.
- Sugary drinks hydrate poorly and add empty calories.

Micronutrient deficiencies map

- Iron, vitamin A, iodine and zinc deficiencies cluster in South Asia.
- Multiple deficiencies often coexist — address diets holistically.
- Supplementation is a bridge; dietary diversity is the destination.

Vitamin deficiency spot signs

- Night blindness points to vitamin A deficiency.
- Bleeding gums suggest scurvy (vitamin C).
- Bow legs in children indicate rickets (vitamin D).
- Beriberi's nerve signs flag thiamine deficiency.

- Examiners love these one-line clinical links.

Antioxidant vitamins

- Vitamins C and E neutralize free radicals.
- Beta-carotene doubles as provitamin A.
- Whole foods beat supplements in trials.
- Smokers should avoid beta-carotene supplements.
- Colourful diets deliver the full spectrum.

7. Micronutrients: Minerals and Water

Learning Objectives

- State functions and deficiency signs of key minerals
- Explain the importance of safe water

Mineral	Key function	Deficiency	Sources
Iron	Haemoglobin, oxygen transport	Anaemia (fatigue, pallor)	Red meat, liver, spinach, lentils
Iodine	Thyroid hormones	Goitre, cretinism in children	Iodized salt, fish
Calcium	Bones, teeth, muscle contraction	Osteoporosis, weak bones	Milk, yogurt, sesame
Zinc	Immunity, wound healing, growth	Stunting, poor immunity	Meat, nuts, whole grains
Sodium/Potassium	Fluid balance, nerves	Imbalance affects BP	Salt, fruits, vegetables
Fluoride	Tooth enamel	Dental caries	Fluoridated water, tea

Iron deficiency anaemia is the most common nutritional disorder in the world and in Pakistan, especially among women of reproductive age and children. Vitamin C-rich foods eaten with meals improve iron absorption from plant foods, while tea taken with meals reduces it.

Water

- Adults need about 2-3 litres of fluids daily; needs rise in heat, illness and pregnancy.
- Unsafe water spreads cholera, typhoid, hepatitis A and E, and diarrhoea — still leading killers of Pakistani children.
- Very important for exams: boiling, chlorination and filtration make water safe; ORS (oral rehydration salts) saves children dying of diarrhoea.

Key Points to Remember

- Anaemia: iron + folate + B12; take vitamin C with iron-rich meals.
- Iodized salt prevents goitre; safe water prevents waterborne disease.

Exam Pointer

Very important for exams: Goitre = iodine, anaemia = iron, and the ORS composition are standard short questions.

Oral rehydration therapy

- ORS: clean water + precise salt-sugar mix — glucose drives sodium and water absorption.
- Homemade ORS only as a stopgap; zinc for 10-14 days reduces recurrence in children.
- Very important for exams: ORS saves millions of lives yearly and costs almost nothing.

Breastfeeding promotion

- Exclusive breastfeeding for 6 months, continued to 2 years with complementary foods.
- Barriers: aggressive formula marketing, lack of maternity leave, myths about "insufficient milk".
- Baby-friendly hospitals and lady health workers promote correct practice.

Complementary feeding (6-24 months)

- Start at 6 months with thick porridge (kitchri, suji); increase texture with age.
- Feed frequently: 2-3 meals plus snacks for 6-8 months, more after.
- Continue breastfeeding; add animal-source foods when affordable.

Severe acute malnutrition management

- Ready-to-use therapeutic food (RUTF) treats SAM at home.
- Community-based management scales better than hospital-only care.
- Appetite test and oedema check guide admission.

Water hardness and health

- Hard water carries calcium and magnesium.
- Some evidence links hard water to less heart disease.
- Very hard water causes scaling, not illness.
- Fluoride at 0.7-1.2 ppm protects teeth.
- Excess fluoride causes dental and skeletal fluorosis.

Oral rehydration therapy

- ORS exploits glucose-sodium co-transport.
- It has saved an estimated 50 million lives.
- Low-osmolality formula is now standard.
- Zinc for 10-14 days cuts repeat episodes.
- Homemade sugar-salt solution works in emergencies.

8. Malnutrition: Undernutrition

Learning Objectives

- Define malnutrition in its forms
- Describe protein-energy malnutrition and its management

Malnutrition is defined as any disorder of nutritional status resulting from deficiency or excess of nutrients — it includes undernutrition, micronutrient deficiencies ("hidden hunger") and overnutrition.

Protein-energy malnutrition (PEM) in children

Feature	Marasmus	Kwashiorkor
Cause	Severe energy deficiency	Protein deficiency with some energy
Age	Under 1 year typical	1-3 years typical
Appearance	Severe wasting, "skin and bones"	Oedema (swelling), moon face
Hair/skin	No major change	Discoloured hair, flaky skin
Appetite	Hungry	Loss of appetite

- Stunting (low height for age) = chronic undernutrition; wasting (low weight for height) = acute; underweight = combined indicator.
- Management: therapeutic feeding with F-75/F-100 or ready-to-use therapeutic food (RUTF), treatment of infections, deworming, nutrition counselling of mothers.
- Prevention: exclusive breastfeeding for 6 months, timely complementary feeding, growth monitoring, immunization.

Key Points to Remember

- Marasmus = wasting without oedema; kwashiorkor = oedema present.
- First 1,000 days (conception to age 2) decide lifelong health.

Exam Pointer

Very important for exams: Marasmus vs kwashiorkor table and the definitions of stunting/wasting are core exam material.

The double burden of malnutrition

- Pakistan faces undernutrition AND rising obesity — often in the same households.
- Stunted children face higher later risk of obesity and diabetes.
- Policy must tackle food insecurity and junk-food marketing together.

Preventing childhood stunting

- First 1000 days (conception to age 2) are the critical window.
- Interventions: maternal nutrition, exclusive breastfeeding, timely complementary feeding, infection control.
- Stunting is largely irreversible after age 2 — prevention beats treatment.

Adolescent nutrition

- Growth spurt raises needs for iron, calcium and protein.
- Anaemia in adolescent girls predicts low birth-weight babies later.
- Weekly iron-folic acid supplementation works in school programs.

Nutrition surveillance

- Regular surveys track stunting, wasting and anaemia trends.
- Early warning systems flag food crises before famine.
- Pakistan's National Nutrition Surveys (2011, 2018) guide policy.

Severe acute malnutrition (SAM)

- Defined by WHZ below -3 or MUAC under 115 mm.
- Appetite test decides inpatient vs community care.
- Ready-to-use therapeutic food revolutionized treatment.
- Complications (infection, oedema) need stabilization first.
- Pakistan runs OTP sites through the Lady Health Worker network.

Stunting vs wasting

- Stunting reflects chronic undernutrition.
- Wasting reflects acute food shortage or illness.
- Underweight mixes both signals.
- Stunting predicts schooling and earnings losses.
- The first 1000 days decide stunting risk.

9. Overnutrition and Non-Communicable Diseases

Learning Objectives

- Explain the nutrition transition
- Relate diet to diabetes, hypertension and heart disease

Nutrition transition is defined as the shift in populations from traditional diets and active lifestyles to processed, energy-dense diets and sedentary living, driving obesity and NCDs.

- Overweight: BMI 25-29.9; obesity: BMI 30+. Formula: $BMI = \text{weight(kg)} / \text{height(m)}^2$.
- Central (abdominal) obesity is the most dangerous pattern for heart disease and diabetes.
- Causes: sugary drinks, fast food, large portions, refined flour, physical inactivity.

Diet-related NCDs

- Type 2 diabetes: excess weight and sugary diets cause insulin resistance; controlled by weight loss, whole grains, and less sugar.
- Hypertension: excess salt, obesity and inactivity raise blood pressure; reduce salt below 5 g/day.
- Coronary heart disease: saturated and trans fats raise LDL cholesterol; fruits, vegetables, whole grains and fish protect.
- Cancers: high fibre, fruit and vegetable intake lowers risk; processed meats and alcohol raise it.

Example

A person weighing 85 kg at 1.70 m has $BMI = 85 / (1.7 \times 1.7) = 29.4$ — overweight, borderline obese. A 5-10% weight loss already improves blood sugar and blood pressure.

Key Points to Remember

- BMI 25+ overweight, 30+ obese; waist fat matters most.
- Less sugar, less salt, less trans fat; more fibre, fruits and vegetables.

Exam Pointer

Very important for exams: BMI formula and cut-offs, plus one dietary risk factor per NCD, are frequently asked.

Antenatal nutrition checklist

- Extra 350 kcal/day and 0.5 g/kg protein in pregnancy.
- Folic acid before/during early pregnancy prevents neural tube defects.
- Avoid alcohol and smoking; limit caffeine; ensure clean water.

Growth monitoring in practice

- Weigh and measure children monthly in the first year, quarterly after.
- Counsel mothers on the spot — the chart is a conversation tool, not just a record.
- Refer faltering children to health facilities promptly.

Nutrition counselling skills

- Listen first: understand household constraints before advising.
- Negotiate small doable actions, not ideal diets.
- Use visual aids and local foods in counselling.

Infant feeding in emergencies

- Protect breastfeeding — it is safest when water is unsafe.
- Avoid untargeted formula distribution; support relactation.
- Set up baby-friendly spaces in relief camps.

Metabolic syndrome

- Cluster: central obesity, hypertension, dyslipidaemia, high glucose.
- It multiplies diabetes and heart-disease risk.
- Waist circumference is the simplest screening tool.
- South Asians develop it at lower BMI thresholds.
- Lifestyle reversal works best before drugs are needed.

Salt reduction strategies

- Most salt comes from processed food, not the shaker.
- Reformulation targets cut population intake silently.
- Front-of-pack labels steer choices.
- WHO target: under 5 g per day.

- Pakistan's bread and pickles are hidden sources.

10. Maternal, Infant and Child Nutrition

Learning Objectives

- State nutritional needs in pregnancy and lactation
- Explain breastfeeding and complementary feeding recommendations
- Pregnancy: needs rise for iron, folate, calcium and energy (about +300 kcal/day). Folate before and during early pregnancy prevents neural tube defects.
- Anaemic mothers risk low-birth-weight babies; iron-folate supplements are routine in antenatal care.
- Lactation: needs are even higher than pregnancy — about +500 kcal/day plus extra fluids, calcium and vitamins.

Infant feeding — the global recommendations

- Initiate breastfeeding within the first hour of birth; give colostrum (first milk, rich in antibodies).
- Exclusive breastfeeding for the first 6 months — no water, no ghutti, no formula.
- From 6 months: start complementary foods (soft khichri, mashed banana, yogurt) while continuing breastfeeding to 2 years.
- Very important for exams: breastfeeding protects against diarrhoea, pneumonia and malnutrition, and benefits mothers too.

Key Points to Remember

- First hour, first milk; exclusive for 6 months; complementary from 6 months; continue to 2 years.

Exam Pointer

Very important for exams: The breastfeeding timeline (1 hour, 6 months, 2 years) is a classic one-mark-per-point question.

Five keys to safer food (WHO)

- Keep clean; separate raw and cooked; cook thoroughly; keep food at safe temperatures; use safe water.
- Street food: choose freshly cooked, piping-hot items from clean vendors.

Food fortification successes

- Iodized salt virtually eliminated iodine deficiency where enforced.
- Folic acid in flour prevents neural tube defects.
- Fortification is cheap, passive and reaches everyone — ideal public health nutrition.

Food adulteration in Pakistan

- Common issues: watered milk, contaminated spices, reused cooking oil.
- Punjab Food Authority raids show enforcement is active but patchy.
- Consumers: buy from reputable sources, check packaging and dates.

Street food safety

- Choose vendors with clean water, covered food and high turnover.
- Freshly cooked hot food is safest; avoid pre-cut fruit of unknown handling.
- Municipal licensing and training raise standards.

Breastfeeding positions and latch

- Good latch prevents sore nipples and poor milk transfer.
- Cradle, cross-cradle and football holds suit different mothers.
- Skin-to-skin contact in the first hour boosts initiation.
- Hospitals certified baby-friendly train staff in these skills.
- Counselling doubles exclusive breastfeeding rates.

Complementary feeding principles

- Start at 6 months with small, frequent meals.
- Increase texture and variety with age.
- Animal-source foods add iron and zinc.
- Responsive feeding respects hunger cues.
- Hygiene during preparation prevents diarrhoea.

11. Food Safety, Hygiene and Sanitation

Learning Objectives

- List causes of foodborne illness and their prevention
- Describe WASH and its health impact

- Biological hazards: bacteria (Salmonella, E. coli), viruses (hepatitis A, norovirus), parasites.
- Chemical hazards: pesticide residues, adulterants (e.g. in milk, spices), heavy metals.

- Physical hazards: glass, stones, metal fragments.

Five keys to safer food (WHO)

- Keep clean — wash hands, surfaces and utensils.
- Separate raw and cooked foods.
- Cook thoroughly (above 70 C).
- Keep food at safe temperatures (below 5 C or above 60 C).
- Use safe water and raw materials.

WASH — water, sanitation and hygiene

- Open defecation and poor latrines contaminate water and food with faeces, spreading diarrhoea, typhoid and worms.
- Handwashing with soap at critical times (after toilet, before eating/cooking) cuts diarrhoea by about one third.
- In Pakistan, waterborne diseases remain a top cause of child death — safe water plus sanitation plus hygiene together give the biggest gain.

Key Points to Remember

- Five WHO keys to safer food; handwashing with soap is the single cheapest lifesaver.

Exam Pointer

Very important for exams: The five keys to safer food are a ready-made 5-mark question.

Interpreting growth charts

- Plot weight-for-age, height-for-age and weight-for-height on WHO charts.
- Falling across percentile lines matters more than one low reading.
- MUAC tapes let community workers screen quickly — under 11.5 cm signals severe acute malnutrition.

Community nutrition assessment

- Surveys: 24-hour recall, food frequency questionnaires, anthropometry.
- Cluster sampling lets teams survey districts efficiently.
- Repeat surveys track whether programs actually work.

Data sources for nutrition planning

- National Nutrition Survey, PDHS, and district health information systems.
- Use local data — national averages hide district gaps.

- Disaggregate by gender, rural/urban and wealth quintile.

Qualitative methods in nutrition

- Focus groups reveal why mothers stop exclusive breastfeeding.
- In-depth interviews uncover intra-household food allocation.
- Combine with surveys for complete understanding.

Street food safety

- Street food feeds millions but carries real risks.
- Vendor training plus clean water points cut contamination.
- Licensing schemes formalize the informal sector.
- Consumer awareness of "fresh and hot" rules helps.
- Pakistan's food authorities now inspect street vendors.

Five keys to safer food

- Keep clean: hands, surfaces, equipment.
- Separate raw and cooked foods.
- Cook thoroughly, especially meat and eggs.
- Keep food at safe temperatures.
- Use safe water and raw materials.

12. Nutrition Assessment and Surveillance

Learning Objectives

- Describe ABCD methods of nutrition assessment
- Interpret growth charts and BMI

Nutrition assessment is defined as the systematic evaluation of nutritional status using anthropometric, biochemical, clinical and dietary methods (the ABCD approach).

Method	What it measures	Examples
Anthropometric	Body size and composition	Weight, height, MUAC, BMI, growth charts
Biochemical	Nutrient levels in body fluids	Haemoglobin, serum vitamin A, urinary iodine
Clinical	Physical signs of deficiency	Goitre, night blindness, oedema, pallor

Method	What it measures	Examples
Dietary	Food intake patterns	24-hour recall, food frequency questionnaire

- Growth monitoring: children are weighed regularly and plotted on WHO growth charts; flattening curves trigger action.
- MUAC (mid-upper-arm circumference) tapes quickly screen under-5 children for acute malnutrition in communities.
- Nutrition surveillance tracks population trends so programs can respond early, e.g. during floods or droughts.

Key Points to Remember

- ABCD: Anthropometric, Biochemical, Clinical, Dietary.
- Growth charts and MUAC are the frontline community tools.

Exam Pointer

Very important for exams: Expand the ABCD mnemonic with one example each — a standard short question.

Pakistan's nutrition programs

- Benazir Income Support Programme: cash transfers with nutrition conditions.
- School meal pilots and deworming in several provinces.
- Salt iodization and wheat flour fortification are mandatory on paper — enforcement varies.

Nutrition in emergencies

- Floods and displacement spike acute malnutrition — Pakistan's 2022 floods showed this.
- Response: therapeutic feeding, micronutrient powders, safe water.
- Protect breastfeeding; control untargeted formula distribution.

Behaviour change communication

- Mass media raises awareness; interpersonal counselling changes practice.
- Lady health workers are Pakistan's most trusted nutrition messengers.
- Repeat messages across channels for effect.

Advocacy for nutrition

- Frame stunting as an economic issue — it cuts future earnings.
- Coalitions (Scaling Up Nutrition movement) amplify voice.

- Media campaigns shift norms on breastfeeding and junk food.

Growth monitoring tools

- Growth charts plot weight-for-age over time.
- Falling across percentile lines warns before wasting shows.
- MUAC tapes enable community screening by volunteers.
- Digital tools now sync data to district dashboards.
- Counselling must follow measurement — data alone changes nothing.

Nutrition surveys

- SMART methodology standardizes emergency surveys.
- Cluster sampling reaches scattered populations.
- Pakistan's NNS runs roughly every seven years.
- Seasonality can bias one-off surveys.
- Report confidence intervals, not just point estimates.

13. Public Health Nutrition Programs and Policy

Learning Objectives

- Name major nutrition programs in Pakistan
- Explain food fortification and nutrition policy

- Lady Health Worker (LHW) program: community workers deliver nutrition counselling, growth monitoring, iron-folate and immunization.
- Micronutrient programs: vitamin A supplementation for children, iron-folate for pregnant women, iodized salt legislation.
- Benazir Income Support / Ehsaas Nashonuma: conditional support addressing stunting in poor households.
- School health and deworming; breastfeeding promotion under the Protection of Breastfeeding laws.

Food fortification

- Adding micronutrients to staple foods reaches whole populations cheaply.
- Examples: iodized salt (goitre), fortified wheat flour with iron and folic acid (anaemia, neural tube defects), vitamin A in cooking oil.
- Very important for exams: fortification is the most cost-effective population strategy against hidden hunger.

Nutrition policy essentials

- Policies set standards: food safety laws, salt iodization, marketing restrictions on breast-milk substitutes, sugar taxes debated globally.
- Multisectoral action is needed — health, agriculture, education, water and social protection together.
- Pakistan's nutrition targets align with the WHO Global Nutrition Targets and the Sustainable Development Goals (SDG 2: Zero Hunger, SDG 3: Good Health).

Key Points to Remember

- LHWs, vitamin A, iron-folate, iodized salt, fortified flour — know each program's target group.
- Fortification = cheapest population-level fix for hidden hunger.

Exam Pointer

Very important for exams: Match programs to target groups and nutrients — a favourite applied question.

Careers in public health nutrition

- Roles: district nutrition officer, hospital dietitian, NGO program manager, researcher.
- Employers: health departments, WHO/UNICEF, universities, food industry.
- Skills valued: survey methods, counselling, program management and data analysis.

Writing a nutrition project proposal

- Define the problem with local data, set SMART objectives.
- Budget realistically; include monitoring indicators.
- Plan sustainability: who continues after donor funding ends?

Monitoring and evaluation basics

- Inputs -> activities -> outputs -> outcomes -> impact: the results chain.
- Choose a few meaningful indicators and measure them well.
- Evaluate to improve, not just to report to donors.

Ethics in public health nutrition

- Do no harm: poorly designed programs can worsen inequity.
- Respect food cultures while promoting change.
- Informed consent and confidentiality apply to surveys too.

Double-duty actions

- Actions that tackle under- and overnutrition together.
- Example: promoting breastfeeding prevents both stunting and obesity.
- School meals with nutrition standards serve both goals.
- Regulating marketing of formula and junk food is double-duty.
- WHO's 2017 brief made this a policy buzzword.

Food fortification vehicles

- Salt iodization is the classic success story.
- Wheat flour carries iron and folic acid.
- Oil fortification delivers vitamins A and D.
- Vehicles must reach the deficient population.
- Monitoring at mills ensures compliance.

Glossary of Key Terms

Learning Objectives

- Revise all key terms quickly before exams

Term	Meaning
Public health	the science and art of preventing disease, prolonging life and promoting health through the organized efforts of society.
Determinants of health	the range of personal, social, economic and environmental factors that influence the health status of individuals and populations.
Epidemiology	the study of the distribution and determinants of health-related states in populations, and the application of this study to control health problems.
Nutrition	the science of nutrients in food, their action, interaction and balance in relation to health and disease, and the processes of ingestion, digestion, absorption...
Nutrient	a chemical substance in food that nourishes the body by providing energy, building materials or factors that regulate body processes.
Malnutrition	any disorder of nutritional status resulting from deficiency or excess of nutrients — it includes undernutrition, micronutrient deficiencies ("hidden hunger") a...

Term	Meaning
Nutrition transition	the shift in populations from traditional diets and active lifestyles to processed, energy-dense diets and sedentary living, driving obesity and NCDs.
Nutrition assessment	the systematic evaluation of nutritional status using anthropometric, biochemical, clinical and dietary methods (the ABCD approach).

Exam Pointer

Very important for exams: Revise this glossary the night before the paper.

Practice Questions for Exams

Learning Objectives

- Test your preparation with these exam-style questions

Short questions with model answers

Example

Q: Explain: define public health and its core mission
Model answer: Public health = organized societal effort for population health. Core functions: assessment, policy development, assurance. Prevention is cheaper and more effective than cure at population scale.

Example

Q: Explain: distinguish public health from clinical medicine
Model answer: Public health = organized societal effort for population health. Core functions: assessment, policy development, assurance. Prevention is cheaper and more effective than cure at population scale.

Example

Q: Explain: list the major determinants of health
Model answer: Health is shaped by biology, behaviour, society and environment. Pakistan carries a double burden: infections plus rising NCDs.

Example

Q: Explain: explain the difference between communicable and non-communicable diseases
Model answer: Health is shaped by biology, behaviour, society and environment. Pakistan carries a double burden: infections plus rising NCDs.

Example

Q: Explain: define epidemiology and its uses Model answer: Epidemiology = distribution + determinants + control. Incidence counts new cases; prevalence counts all current cases.

Example

Q: Explain: calculate basic measures: incidence, prevalence, mortality rates Model answer: Epidemiology = distribution + determinants + control. Incidence counts new cases; prevalence counts all current cases.

Example

Q: Explain: define nutrition and nutrients Model answer: Macro = carbs, protein, fat; micro = vitamins, minerals. Fat gives more than double the energy of carbs or protein per gram.

Example

Q: Explain: classify nutrients and state their functions Model answer: Macro = carbs, protein, fat; micro = vitamins, minerals. Fat gives more than double the energy of carbs or protein per gram.

Example

Q: Explain: describe the types and roles of each macronutrient Model answer: Combine cereals + pulses to get complete protein from plant foods. Prefer unsaturated oils; avoid trans fats and excess saturated fat.

Example

Q: Explain: identify good food sources and deficiency/excess effects Model answer: Combine cereals + pulses to get complete protein from plant foods. Prefer unsaturated oils; avoid trans fats and excess saturated fat.

Example

Q: Explain: classify vitamins and state one key function and deficiency disease for each major vitamin Model answer: Fat-soluble: A, D, E, K (can accumulate). Water-soluble: B-complex, C. Match each vitamin to its classic deficiency disease.

Example

Q: Explain: state functions and deficiency signs of key minerals Model answer: Anaemia: iron + folate + B12; take vitamin C with iron-rich meals. Iodized salt prevents goitre; safe water prevents waterborne disease.

Example

Q: Explain: explain the importance of safe water Model answer: Anaemia: iron + folate + B12; take vitamin C with iron-rich meals. Iodized salt prevents goitre; safe water prevents waterborne disease.

Example

Q: Explain: define malnutrition in its forms Model answer: Marasmus = wasting without oedema; kwashiorkor = oedema present. First 1,000 days (conception to age 2) decide lifelong health.

Example

Q: Explain: describe protein-energy malnutrition and its management Model answer: Marasmus = wasting without oedema; kwashiorkor = oedema present. First 1,000 days (conception to age 2) decide lifelong health.

Example

Q: Explain: explain the nutrition transition Model answer: BMI 25+ overweight, 30+ obese; waist fat matters most. Less sugar, less salt, less trans fat; more fibre, fruits and vegetables.

Example

Q: Explain: relate diet to diabetes, hypertension and heart disease Model answer: BMI 25+ overweight, 30+ obese; waist fat matters most. Less sugar, less salt, less trans fat; more fibre, fruits and vegetables.

Example

Q: Explain: state nutritional needs in pregnancy and lactation Model answer: First hour, first milk; exclusive for 6 months; complementary from 6 months; continue to 2 years.

Example

Q: Explain: explain breastfeeding and complementary feeding recommendations Model answer: First hour, first milk; exclusive for 6 months; complementary from 6 months; continue to 2 years.

Example

Q: Explain: list causes of foodborne illness and their prevention Model answer: Five WHO keys to safer food; handwashing with soap is the single cheapest lifesaver.

Example

Q: Explain: describe WASH and its health impact Model answer: Five WHO keys to safer food; handwashing with soap is the single cheapest lifesaver.

Example

Q: Explain: describe ABCD methods of nutrition assessment Model answer: ABCD: Anthropometric, Biochemical, Clinical, Dietary. Growth charts and MUAC are the frontline community tools.

Example

Q: Explain: interpret growth charts and BMI Model answer: ABCD: Anthropometric, Biochemical, Clinical, Dietary. Growth charts and MUAC are the frontline community tools.

Example

Q: Explain: name major nutrition programs in Pakistan Model answer: LHWs, vitamin A, iron-folate, iodized salt, fortified flour — know each program's target group. Fortification = cheapest population-level fix for hidden hunger.

Example

Q: Explain: explain food fortification and nutrition policy Model answer: LHWs, vitamin A, iron-folate, iodized salt, fortified flour — know each program's target group. Fortification = cheapest population-level fix for hidden hunger.

Long questions

- Write a detailed note on Introduction to Public Health.
- Write a detailed note on Determinants of Health and Disease.
- Write a detailed note on Basic Epidemiology for Public Health.
- Write a detailed note on Fundamentals of Human Nutrition.
- Write a detailed note on Macronutrients: Carbohydrates, Proteins and Fats.
- Write a detailed note on Micronutrients: Vitamins.
- Write a detailed note on Micronutrients: Minerals and Water.
- Write a detailed note on Malnutrition: Undernutrition.
- Write a detailed note on Overnutrition and Non-Communicable Diseases.
- Write a detailed note on Maternal, Infant and Child Nutrition.

Long questions with model answer outlines

Example

Q: Write a detailed note on Introduction to Public Health. Answer outline: • Assessment: monitoring health status, diagnosing community health problems and investigating hazards. • Policy development: informing and empowering people, mobilizing partnerships, and developing policies that support health. • Assurance: enforcing laws, linking people to care, assuring a competent workforce, and evaluating services. • John Snow and the Broad Street pump (1854): mapped cholera cases in London and removed the pump handle, founding modern epidemiology. • Germ theory and sanitation movement: clean water, sewage and vaccination cut infectious disease deaths dramatically.

Example

Q: Write a detailed note on Determinants of Health and Disease. Answer outline: • Biological/genetic factors: age, sex, inherited traits. • Behavioural factors: diet, physical activity, smoking, hygiene practices. • Social and economic factors: income, education, occupation, social support. • Environmental factors: clean water, sanitation, air quality, housing. • Health services: availability, accessibility and quality of care.

Example

Q: Write a detailed note on Basic Epidemiology for Public Health. Answer outline: • Descriptive epidemiology: who gets sick, where and when (person, place, time). • Analytic epidemiology: why — case-control and cohort studies test causes. • Experimental epidemiology: clinical trials and community interventions. • Bias: systematic error (selection bias, recall bias) distorts results. • Confounding: a third factor mixes with the exposure — control by design or analysis.

Example

Q: Write a detailed note on Fundamentals of Human Nutrition. Answer outline: • Macronutrients (needed in large amounts): carbohydrates, proteins, fats — provide energy and building material. • Micronutrients (needed in small amounts): vitamins and minerals — regulate processes and prevent deficiency diseases. • Water: often forgotten, but the most essential nutrient. • Essential nutrients: the body cannot make them (or not enough) — must come from food, e.g. essential amino acids, essential fatty acids, vitamins. • Energy-yielding: carbohydrates, fats and proteins provide calories.

Example

Q: Write a detailed note on Macronutrients: Carbohydrates, Proteins and Fats. Answer outline:

- Simple carbs: sugars (glucose, fructose, sucrose) — quick energy; excess linked to obesity and diabetes.
- Complex carbs: starches and fibre (whole grains, pulses, vegetables) — preferred staple energy source.
- Dietary fibre: indigestible plant material that prevents constipation, controls blood sugar and lowers cholesterol.
- Built from amino acids; 9 are essential and must come from food.
- Functions: growth and repair, enzymes, hormones, antibodies, transport.

Example

Q: Write a detailed note on Micronutrients: Vitamins. Answer outline:

- Fat-soluble vitamins (A, D, E, K): stored in body fat and liver; excess can be toxic.
- Water-soluble vitamins (B-complex, C): not stored much; needed regularly; excess excreted in urine.
- Iron-deficiency anaemia: fatigue, pallor, poor concentration — common in Pakistani women.
- Boost absorption: vitamin C with meals; avoid tea with meals (tannins block iron).
- Folate and B12 deficiencies also cause anaemia; deworming helps where parasites prevail.

Example

Q: Write a detailed note on Micronutrients: Minerals and Water. Answer outline:

- Adults need about 2-3 litres of fluids daily; needs rise in heat, illness and pregnancy.
- Unsafe water spreads cholera, typhoid, hepatitis A and E, and diarrhoea — still leading killers of Pakistani children.
- Very important for exams: boiling, chlorination and filtration make water safe; ORS (oral rehydration salts) saves children dying of diarrhoea.
- ORS: clean water + precise salt-sugar mix — glucose drives sodium and water absorption.
- Homemade ORS only as a stopgap; zinc for 10-14 days reduces recurrence in children.

Example

Q: Write a detailed note on Malnutrition: Undernutrition. Answer outline:

- Stunting (low height for age) = chronic undernutrition; wasting (low weight for height) = acute; underweight = combined indicator.
- Management: therapeutic feeding with F-75/F-100 or ready-to-use therapeutic food (RUTF), treatment of infections, deworming, nutrition counselling of mothers.
- Prevention: exclusive breastfeeding for 6 months, timely complementary feeding, growth monitoring, immunization.
- Pakistan faces undernutrition AND rising obesity — often in the same households.
- Stunted children face higher later risk of obesity and diabetes.

Example

Q: Write a detailed note on Overnutrition and Non-Communicable Diseases. Answer outline: • Overweight: BMI 25-29.9; obesity: BMI 30+. Formula: $BMI = \frac{\text{weight(kg)}}{\text{height(m)}^2}$. • Central (abdominal) obesity is the most dangerous pattern for heart disease and diabetes. • Causes: sugary drinks, fast food, large portions, refined flour, physical inactivity. • Type 2 diabetes: excess weight and sugary diets cause insulin resistance; controlled by weight loss, whole grains, and less sugar. • Hypertension: excess salt, obesity and inactivity raise blood pressure; reduce salt below 5 g/day.

Example

Q: Write a detailed note on Maternal, Infant and Child Nutrition. Answer outline: • Pregnancy: needs rise for iron, folate, calcium and energy (about +300 kcal/day). Folate before and during early pregnancy prevents neural tube defects. • Anaemic mothers risk low-birth-weight babies; iron-folate supplements are routine in antenatal care. • Lactation: needs are even higher than pregnancy — about +500 kcal/day plus extra fluids, calcium and vitamins. • Initiate breastfeeding within the first hour of birth; give colostrum (first milk, rich in antibodies). • Exclusive breastfeeding for the first 6 months — no water, no ghutti, no formula.

Exam Pointer

Very important for exams: Practice writing answers within the exam time limit.

MCQ Practice Test

Learning Objectives

- Test your recall of the key points from every chapter

Q1. Which of the following was listed as a key point of 'Introduction to Public Health' in this handout?

- A. Epidemiology = distribution + determinants + control.
- B. Public health = organized societal effort for population health.
- C. Health is shaped by biology, behaviour, society and environment.
- D. Pakistan carries a double burden: infections plus rising NCDs.

Q2. Which of the following was listed as a key point of 'Introduction to Public Health' in this handout?

- A. Epidemiology = distribution + determinants + control.
- B. Core functions: assessment, policy development, assurance.
- C. Health is shaped by biology, behaviour, society and environment.
- D. Pakistan carries a double burden: infections plus rising NCDs.

Q3. Which of the following was listed as a key point of 'Introduction to Public Health' in this handout?

- A. Prevention is cheaper and more effective than cure at population scale.
- B. Health is shaped by biology, behaviour, society and environment.
- C. Pakistan carries a double burden: infections plus rising NCDs.
- D. Epidemiology = distribution + determinants + control.

Q4. Which of the following was listed as a key point of 'Determinants of Health and Disease' in this handout?

- A. Public health = organized societal effort for population health.
- B. Prevention is cheaper and more effective than cure at population scale.
- C. Health is shaped by biology, behaviour, society and environment.
- D. Core functions: assessment, policy development, assurance.

Q5. Which of the following was listed as a key point of 'Determinants of Health and Disease' in this handout?

- A. Prevention is cheaper and more effective than cure at population scale.
- B. Core functions: assessment, policy development, assurance.
- C. Pakistan carries a double burden: infections plus rising NCDs.
- D. Public health = organized societal effort for population health.

Q6. Which of the following was listed as a key point of 'Basic Epidemiology for Public Health' in this handout?

- A. Prevention is cheaper and more effective than cure at population scale.
- B. Core functions: assessment, policy development, assurance.
- C. Public health = organized societal effort for population health.
- D. Epidemiology = distribution + determinants + control.

Q7. Which of the following was listed as a key point of 'Basic Epidemiology for Public Health' in this handout?

- A. Incidence counts new cases; prevalence counts all current cases.
- B. Core functions: assessment, policy development, assurance.
- C. Prevention is cheaper and more effective than cure at population scale.
- D. Public health = organized societal effort for population health.

Q8. Which of the following was listed as a key point of 'Fundamentals of Human Nutrition' in this handout?

- A. Core functions: assessment, policy development, assurance.

- B. Public health = organized societal effort for population health.
- C. Prevention is cheaper and more effective than cure at population scale.
- D. Macro = carbs, protein, fat; micro = vitamins, minerals.

Q9. Which of the following was listed as a key point of 'Fundamentals of Human Nutrition' in this handout?

- A. Public health = organized societal effort for population health.
- B. Prevention is cheaper and more effective than cure at population scale.
- C. Core functions: assessment, policy development, assurance.
- D. Fat gives more than double the energy of carbs or protein per gram.

Q10. Which of the following was listed as a key point of 'Macronutrients: Carbohydrates, Proteins and Fats' in this handout?

- A. Combine cereals + pulses to get complete protein from plant foods.
- B. Core functions: assessment, policy development, assurance.
- C. Public health = organized societal effort for population health.
- D. Prevention is cheaper and more effective than cure at population scale.

Q11. Which of the following was listed as a key point of 'Macronutrients: Carbohydrates, Proteins and Fats' in this handout?

- A. Core functions: assessment, policy development, assurance.
- B. Prevention is cheaper and more effective than cure at population scale.
- C. Prefer unsaturated oils; avoid trans fats and excess saturated fat.
- D. Public health = organized societal effort for population health.

Q12. Which of the following was listed as a key point of 'Micronutrients: Vitamins' in this handout?

- A. Core functions: assessment, policy development, assurance.
- B. Public health = organized societal effort for population health.
- C. Prevention is cheaper and more effective than cure at population scale.
- D. Fat-soluble: A, D, E, K (can accumulate). Water-soluble: B-complex, C.

Q13. Which of the following was listed as a key point of 'Micronutrients: Vitamins' in this handout?

- A. Prevention is cheaper and more effective than cure at population scale.
- B. Public health = organized societal effort for population health.
- C. Core functions: assessment, policy development, assurance.
- D. Match each vitamin to its classic deficiency disease.

Q14. Which of the following was listed as a key point of 'Micronutrients: Minerals and Water' in this handout?

- A. Core functions: assessment, policy development, assurance.
- B. Public health = organized societal effort for population health.
- C. Anaemia: iron + folate + B12; take vitamin C with iron-rich meals.
- D. Prevention is cheaper and more effective than cure at population scale.

Q15. Which of the following was listed as a key point of 'Micronutrients: Minerals and Water' in this handout?

- A. Iodized salt prevents goitre; safe water prevents waterborne disease.
- B. Prevention is cheaper and more effective than cure at population scale.
- C. Core functions: assessment, policy development, assurance.
- D. Public health = organized societal effort for population health.

Q16. Which of the following was listed as a key point of 'Malnutrition: Undernutrition' in this handout?

- A. Prevention is cheaper and more effective than cure at population scale.
- B. Marasmus = wasting without oedema; kwashiorkor = oedema present.
- C. Core functions: assessment, policy development, assurance.
- D. Public health = organized societal effort for population health.

Q17. Which of the following was listed as a key point of 'Malnutrition: Undernutrition' in this handout?

- A. Prevention is cheaper and more effective than cure at population scale.
- B. Core functions: assessment, policy development, assurance.
- C. First 1,000 days (conception to age 2) decide lifelong health.
- D. Public health = organized societal effort for population health.

Q18. Which of the following was listed as a key point of 'Overnutrition and Non-Communicable Diseases' in this handout?

- A. Prevention is cheaper and more effective than cure at population scale.
- B. Public health = organized societal effort for population health.
- C. BMI 25+ overweight, 30+ obese; waist fat matters most.
- D. Core functions: assessment, policy development, assurance.

Q19. Which of the following was listed as a key point of 'Overnutrition and Non-Communicable Diseases' in this handout?

- A. Public health = organized societal effort for population health.

- B. Prevention is cheaper and more effective than cure at population scale.
- C. Less sugar, less salt, less trans fat; more fibre, fruits and vegetables.
- D. Core functions: assessment, policy development, assurance.

Q20. Which of the following was listed as a key point of 'Maternal, Infant and Child Nutrition' in this handout?

- A. Core functions: assessment, policy development, assurance.
- B. Prevention is cheaper and more effective than cure at population scale.
- C. First hour, first milk; exclusive for 6 months; complementary from 6 months; continue to 2 years.
- D. Public health = organized societal effort for population health.

Q21. Which of the following was listed as a key point of 'Food Safety, Hygiene and Sanitation' in this handout?

- A. Public health = organized societal effort for population health.
- B. Core functions: assessment, policy development, assurance.
- C. Prevention is cheaper and more effective than cure at population scale.
- D. Five WHO keys to safer food; handwashing with soap is the single cheapest lifesaver.

Q22. Which of the following was listed as a key point of 'Nutrition Assessment and Surveillance' in this handout?

- A. Public health = organized societal effort for population health.
- B. ABCD: Anthropometric, Biochemical, Clinical, Dietary.
- C. Core functions: assessment, policy development, assurance.
- D. Prevention is cheaper and more effective than cure at population scale.

Q23. Which of the following was listed as a key point of 'Nutrition Assessment and Surveillance' in this handout?

- A. Core functions: assessment, policy development, assurance.
- B. Prevention is cheaper and more effective than cure at population scale.
- C. Public health = organized societal effort for population health.
- D. Growth charts and MUAC are the frontline community tools.

Q24. Which of the following was listed as a key point of 'Public Health Nutrition Programs and Policy' in this handout?

- A. LHWs, vitamin A, iron-folate, iodized salt, fortified flour — know each program's target group.
- B. Public health = organized societal effort for population health.
- C. Prevention is cheaper and more effective than cure at population scale.

D. Core functions: assessment, policy development, assurance.

Answer Key

1. B 2. B 3. A 4. C 5. C 6. D 7. A 8. D 9. D 10. A 11. C 12. D 13. D 14. C 15. A 16. B 17. C 18. C 19. C 20. C 21. D 22. B 23. D 24. A

Exam Pointer

Very important for exams: Attempt all MCQs without looking back, then check the answer key.

Exam Strategy Guide

Learning Objectives

- Attempt papers with a winning strategy

Before the exam

- Revise the Key Points boxes and glossary first — they carry the highest marks per minute.
- Practice one past paper under timed conditions; examiners repeat question styles.
- Sleep well the night before — an exhausted brain recalls far less.

Attempting the paper

- Read the whole paper first; start with your strongest question to build momentum.
- Allocate time by marks: a 10-mark question deserves roughly double a 5-mark one.
- Structure long answers: definition, explanation, example/diagram, conclusion.

Presentation matters

- Use headings, underline key terms, and draw labelled diagrams where possible.
- Attempt all questions — partial credit beats a blank page.
- Review your paper in the last 10 minutes for missed parts.

Exam Pointer

Very important for exams: Very important for exams: neat, structured answers consistently score higher than longer messy ones.