Unit 4: Occupational Health and Drug Addiction: Issues and Solutions

Subject: Health Education–I

Unit 4: Occupational Health and Drug Addiction: Issues and Solutions

(Occupational Health—Meaning & Scope • Principles to Reduce Risks • Hazard Factors • Occupational Diseases: Symptoms & Prevention • Drug Addiction—Causes, Effects, Prevention)

4.1 Introduction to Occupational Health

Meaning. *Occupational health* is the science and practice of protecting and promoting workers' physical, mental, and social well-being in all occupations. It aims to **prevent work-related illness and injury**, adapt work to people, and people to safe work.

Scope.

- **Prevention:** hazard identification, risk assessment, control measures, surveillance.
- **Protection:** vaccination, PPE, safe equipment, ergonomic design.
- **Promotion:** fitness, nutrition, sleep, stress management, tobacco/alcohol control.
- **Rehabilitation & return-to-work:** graded duties, accommodations, follow-up.
- **Policy & ethics:** non-discrimination, confidentiality, worker participation.

Why it matters (for India & global South contexts): large **informal sector**, **agriculture**, small workshops, construction, healthcare—often with limited regulation or PPE; hence **education + low-cost engineering controls** are crucial.

4.2 Principles to Reduce Occupational Health Problems

4.2.1 Hierarchy of Controls (most to least effective)

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Elimination  →  Substitution  →  Engineering  →  Administrative  →  PPE
(remove hazard)  (safer material) (isolate people) (rules/training) (last line)
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Examples

- **Eliminate:** wet-cut stone to avoid silica dust generation.
- **Substitute:** use water-based instead of solvent-based paint.
- **Engineering:** local exhaust ventilation, machine guarding, sound enclosures.
- **Administrative:** job rotation, rest–work cycles, SOPs, signage.
- **PPE:** N95/respirators, gloves, goggles, hearing protection, safety footwear.

4.2.2 The 5-Step Risk Cycle

1. **Spot hazards** → 2) **Assess risks** (likelihood × severity) → 3) **Control** (hierarchy) → 4) **Train & document** → 5) **Review** (after incidents or annually).

4.2.3 Core Preventive Principles

- **Fit the task to the person** (ergonomics): neutral spine, proper reach, load ≤ individual capacity.
- **Dose matters:** limit **noise** time, **heat** exposure, **chemical** concentration.
- **Health surveillance:** periodic checks (audiometry, spirometry, vision, skin).
- **Emergency readiness:** first-aid kits, fire safety, spill kits, drills.

- **Worker participation:** toolbox talks, reporting culture (no blame).

4.3 Factors Responsible for Occupational Health Problems

Factor group	Typical sources	Health effects	Low-cost controls
Physical	Noise, heat/cold, vibration, radiation, poor lighting	NIHL*, heat stress, chilblains, vibration syndrome, eye strain	Enclosures, fans/shades, anti-vibration pads, task lighting
Chemical	Dusts (silica, asbestos), solvents, fumes, pesticides, metals (lead)	Pneumoconiosis, dermatitis, neuropathy, poisoning	Substitution, LEV**, closed transfer, gloves/respirators
Biological	Blood-borne pathogens, TB, zoonoses, sewage microbes	Infection (HBV/HCV/HIV), TB, leptospirosis	Vaccines, sharps safety, ventilation, hygiene, boots
Ergonomic	Awkward postures, repetition, heavy loads, poor workstation	MSDs*** (back pain, tendinopathy, CTS)	Redesign height/reach, mechanical aids, micro-breaks
Psychosocial/Organizational	Long hours, shift work, low control, bullying, job insecurity	Stress, burnout, sleep disorder, anxiety/depression	Work-time rules, participation, counselling, fair policies
Safety/Mechanical	Unguarded machines, heights, electricity	Lacerations, amputations, falls, shocks	Guards, lock-out/tag-out, harnesses, RCDs

*NIHL = Noise-Induced Hearing Loss; **LEV = Local Exhaust Ventilation; ***MSDs = Musculoskeletal Disorders.

4.4 Occupational Diseases: Symptoms & Preventive Measures

4.4.1 Quick Reference Table

Disease/Condition	Main exposure/occupations	Key symptoms/signs	Prevention (primary → tertiary)
Silicosis (pneumoconiosis)	Stone/ceramic cutting, mining	Exertional breathlessness, cough; progressive fibrosis	Wet methods, LEV, N95/respirators, health surveillance; remove from exposure if diagnosed; manage COPD features
Asbestosis/Asbestos-related disease	Shipyards, insulation (legacy)	Progressive dyspnea; pleural plaques; cancer risk (mesothelioma)	Strict avoidance/removal controls; licensed abatement; no dry cutting; medical surveillance
Occupational asthma	Flour mills, isocyanates, lab animals, hairdressing	Wheeze, cough, chest tightness worse at work, improves on off-days	Substitution/closed systems, ventilation, masks; early reporting; pharmacotherapy & redeployment if needed
Contact dermatitis (irritant/allergic)	Beauty, health care, cleaning, cement (chromates)	Itchy, cracked hands; eczematous patches	Glove choice (nitrile/neoprene), barrier creams, mild soaps, patch-test if recurrent

Disease/Condition	Main exposure/occupations	Key symptoms/signs	Prevention (primary → tertiary)
Lead toxicity	Battery recycling, paint, e-waste	Abdominal pain, neuropathy, anemia; in children—neurodevelopment	Substitution, hygiene (no eating in work area), chelation under medical care
Solvent neurotoxicity	Printing/painting, degreasers	Headache, dizziness, cognitive slowing	Water-based products, LEV, masks; limit time & ensure breaks
Noise-induced hearing loss	Mills, construction, music venues	High-frequency hearing drop, tinnitus	Engineering controls; hearing protection; **audiometry** annually
Heat stress/heat stroke	Foundries, fields, kitchens	Cramps → exhaustion → collapse (severe)	Shade, hydration plan, work–rest cycles, buddy checks
Radiation injury (ionizing)	Radiology, NDT, nuclear	Skin/organ damage, cancer risk	Shielding, time–distance rules, dosimeters
Biological exposure (HBV/HCV/HIV, TB)	Health care, labs, mortuaries	Post-exposure seroconversion; TB cough	Vaccination (HBV), sharps containers, PEP protocols; N95 in TB wards, ventilation
Low back pain/RSI/CTS	Drivers, IT, sewing, cashiers	Pain, numbness/tingling, reduced grip	Neutral posture, task rotation, stretching micro-breaks, ergonomic tools
Pesticide poisoning	Agriculture	Nausea, sweating, miosis, bronchospasm (organophosphates)	PPE, correct dilution, no bare-hand mixing, decontamination education
Work stress/burnout	All sectors; high demand/low control	Exhaustion, cynicism, sleep problems	Job redesign, fair workload, EAP/counselling, relaxation training

4.4.2 Applied Anatomy & Yoga-Naturopathy Integration (selected)

- **Back-dominant work:** teach **hip-hinge**, neutral spine, and **micro-breaks (60–90 s)** with shoulder rolls and diaphragmatic breathing.
- **Heat-exposed work:** emphasize **pre-hydration**, shade, salted water or ORS when appropriate, and **cooling pranayama** (gentle, not forceful).
- **Screen work: 20-20-20** rule (every 20 min, look 20 feet away for 20 s), wrist neutral, forearms supported; eye palming for fatigue.
- **Night shifts:** protect **sleep window**, light control, short **daytime naps**, caffeine timing, and light evening yoga stretches.

4.5 Drug Addiction (Substance Use Disorders): Causes, Effects, Prevention

4.5.1 Definitions (clear & respectful)

- **Use:** consumption of a psychoactive substance.
- **Harmful use/misuse:** pattern causing health or social problems.
- **Dependence (addiction):** impaired control, craving, tolerance/withdrawal, continued use despite harm.

4.5.2 Why people develop addiction (multi-level model)

Level	Examples
Biological	Genetic susceptibility; early brain exposure; pain disorders
Psychological	Trauma, anxiety/depression, poor coping, sensation-seeking
Social	Peer use, workplace culture, availability, advertising, stigma
Environmental/Policy	Low price/high access, weak regulation, poverty
Work-related	Irregular hours, high strain/low control, injury pain → opioid risk

4.5.3 Common substances & adverse effects

Substance	Acute effects	Chronic/long-term harms	Work & community impact
Alcohol	Disinhibition, impaired coordination	Liver disease, hypertension, cancers, depression	Accidents, absenteeism, violence
Tobacco/Nicotine	Alertness, short relief of craving	Cancers, COPD, heart disease	Healthcare costs, productivity loss
Cannabis	Euphoria, altered perception	Cognitive/motivation issues, psychosis risk in vulnerable	Safety-critical tasks impaired
Opioids (heroin, misused pain pills)	Analgesia, sedation	Dependence, overdose, constipation, infections (if injected)	High mortality, theft/crime risk
Stimulants (cocaine, meth, amphetamines)	Energy, confidence	Cardiovascular strain, anxiety, crash insomnia	Risk-taking, conflict
Sedatives/hypnotics	Calm, sleepiness	Dependence, accidents (falls), memory issues	Machinery/drive risks
Inhalants	Brief high	Brain/liver damage, sudden death	Adolescents at risk

4.5.4 Prevention & Response (public health + clinical)

Universal (everyone):

- Raise **age/price** barriers for alcohol/tobacco; restrict marketing and availability.
- **School & college programmes**: life-skills, refusal skills, peer leaders.
- **Workplace policy**: no use on duty; testing where safety-critical; confidential help pathways.

Selective (at-risk groups):

- Youth with academic or behaviour problems; families with substance use—**mentoring**, counselling, recreation access.

Indicated (early problems):

- **SBIRT** (Screening, Brief Intervention, Referral to Treatment) using simple tools (e.g., **AUDIT**, **CAGE**).
- **Brief advice**: **5 A's** for tobacco (Ask, Advise, Assess, Assist, Arrange).

Harm reduction (when use continues):

- **Needle–syringe programmes**, **opioid substitution therapy** (buprenorphine/methadone), **naloxone** access for overdose reversal, **designated driver** campaigns.

Recovery & relapse prevention:

- **Integrated care**: counselling (CBT, motivational interviewing), peer support, family therapy, treatment of co-occurring mental illness.
- **Lifestyle anchors**: sleep schedule, regular meals, exercise, **breathwork/meditation** for craving regulation, purpose/skill building.
- **Relapse plan**: trigger mapping (HALT—Hungry, Angry, Lonely, Tired), coping scripts, emergency contacts.

Language matters: use non-stigmatizing terms (“person with alcohol use disorder”, not “alcoholic”).

4.6 Mini-Charts & Checklists

4.6.1 Heat Risk Response

Condition	Signs	Action
Heat cramps	Muscle spasms, sweating	Shade, oral fluids with salts, gentle stretch
Heat exhaustion	Heavy sweat, dizziness, rapid pulse	Cool area, loosen clothing, cool packs, fluids, monitor
Heat stroke (emergency)	Hot dry skin or altered sensorium	**Call emergency**, aggressive cooling, no return to work

4.6.2 Simple Risk Matrix (decide priority)

Likelihood \ Severity	Minor	Serious	Severe
Unlikely	Low	Medium	High
Likely	Medium	High	**Urgent**

4.6.3 Return-to-Work (RTW) Snapshot

- Medical clearance → **graded duties** → ergonomic tweaks → **weekly review** → finalize **full duty** when safe.

Unit Summary

Occupational health protects **people at work** by identifying hazards and **controlling risks** through a clear hierarchy: **eliminate/substitute** first, then **engineering and administrative** controls, with **PPE** as the last barrier. Hazards span **physical, chemical, biological, ergonomic, psychosocial, and safety** domains, producing predictable conditions—from **silicosis, dermatitis, asthma, NIHL, and heat stress** to **back pain and burnout**.
Drug addiction is a **multifactorial, treatable** health condition. Effective responses combine **policy action, education, screening/brief intervention, treatment access, and harm reduction**, supported by **stigma-free language** and **recovery-oriented lifestyles**. Yoga and naturopathy contribute by improving **sleep, stress regulation, posture, and resilience**—but always alongside appropriate medical care.

Key Terms

- **Occupational health • Hierarchy of controls • Risk assessment**
- **LEV (Local Exhaust Ventilation) • PPE • MSDS (safety data sheet)**
- **NIHL • Pneumoconiosis • Occupational asthma • Dermatitis**
- **MSDs • Burnout • Sharps safety • PEP**
- **Substance use disorder • SBIRT • AUDIT/CAGE • Harm reduction**
- **Opioid substitution therapy • Naloxone • Relapse prevention**

Self-Assessment

A. MCQs

1. The **most effective** control in the hierarchy is:
   a) PPE b) Administrative control c) **Elimination** d) Engineering control

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2. **Noise-induced hearing loss** is best prevented by:
   a) Cotton in ears b) **Engineering noise reduction + hearing protection + audiometry** c) Short breaks only d) Vitamins
3. A welder with **itchy, cracked hands** likely has:
   a) Asthma b) **Contact dermatitis** c) NIHL d) Silicosis
4. After a **dog bite in a waste-handling worker**, the **first** step is:
   a) Antibiotics immediately b) **Soap-and-water wash for 15 minutes** c) Bandage tightly d) Ignore if small
5. In substance-use care, **SBIRT** stands for:
   a) Safe Breathing In Recovery Training
   b) **Screening, Brief Intervention, Referral to Treatment**
   c) Standard Behavioural Inpatient Recovery Therapy
   d) Substance Ban Including Random Testing
6. A pattern of **craving, tolerance, withdrawal**, and continued use despite harm defines:
   a) Harmful use b) Experimentation c) **Dependence** d) Remission

Answer key: 1-c, 2-b, 3-b, 4-b, 5-b, 6-c

B. Short Answer

1. Draw the **hierarchy of controls** and give one example from a workshop for each level.
2. Outline an **ergonomic checklist** for a computer workstation (chair, monitor, keyboard, mouse, breaks).
3. List **four occupational diseases** with their **primary preventive measure**.
4. Explain **SBIRT** with a campus example for alcohol.
5. Describe a **heat-stress prevention plan** for outdoor workers in summer.

C. Reflective/Application

1. Visit a local small enterprise (e.g., metal workshop). Identify **three hazards** and propose **control measures** using the hierarchy.
2. Draft a **one-page workplace substance policy** (purpose, prohibited behaviours, help pathways, confidentiality).
3. Prepare a **10-minute toolkit** for shift workers: sleep hygiene, quick stretches, hydration, and two breath practices.

End of Unit 4: Occupational Health and Drug Addiction—Issues and Solutions

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