Managing Occupational Health Risks

Lecture Title: OHMS and Epidemiology

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Occupational Health and Safety

Occupational Health Management Systems

- A structured system for managing work-related health risks
- Focuses on prevention of occupational ill health
- Covers physical, chemical, biological, ergonomic, and psychosocial hazards
- Integrated into overall health and safety management

Link for OHMS

- https://www.youtube.com/watch?v=fj_GoInuaVI&t=80s

Key Elements

- Occupational health policy and leadership commitment
- Health hazard identification and risk assessment
- Exposure monitoring and measurement
- Health surveillance where required
- Control measures using the hierarchy of controls
- Worker consultation, training, and communication
- Documentation and record keeping

Planning and Implementation

- Identify activities that may cause ill health
- Assess exposure levels and vulnerable workers
- Set occupational health objectives and targets
- Implement preventive and control measures
- Define roles and responsibilities
- Integrate health controls into daily work activities

Monitoring, Review, and Continuous Improvement

- Monitor exposure data and health surveillance results
- Review effectiveness of controls
- Investigate cases of occupational ill health
- Conduct audits and management reviews
- Update the system when changes occur

Benefits of Occupational Health Management Systems

- Prevention of occupational diseases
- Protection of physical and mental wellbeing
- Reduced absenteeism and compensation claims
- Improved productivity and morale
- Legal compliance and due diligence
- Stronger health and safety culture

Group Activity: Importance of Occupational Health

- Each group acts as an occupational health advisory team
- Identify a workplace (e.g. construction site, hospital, factory, office, hotel, warehouse).
- Discuss why occupational health is important in that workplace, considering:
  - Prevention of occupational diseases
  - Protection of physical and mental health
  - Long-term health effects
- Identify at least three occupational health risks present.
- Explain what could happen if occupational health is ignored.
- Suggest simple occupational health measures to protect workers.

Link

- https://www.youtube.com/watch?v=Jd3gFT0-C4s

Introduction to Occupational Epidemiology

- Occupational epidemiology is the study of work-related diseases and ill health
- Focuses on groups of workers, not individuals
- Examines the relationship between workplace exposures and health outcomes
- Supports prevention of occupational disease

What Occupational Epidemiology Examines

- Types of work-related diseases and disorders
- Levels and duration of workplace exposure
- Differences in disease rates between occupations
- Long-term and cumulative health effects

Different types of Epidemiology Studies

- Descriptive epidemiology
- Analytical epidemiology
- Causal epidemiology
- Case–control studies
- Cohort studies
- Experimental (interventional) epidemiology
- Occupational epidemiology

Descriptive and Analytical Epidemiology

Descriptive epidemiology:

- Describes who is affected, where, and when
- Identifies patterns and trends

Analytical epidemiology:

- Investigates why disease occurs
- Compares exposed and non-exposed groups
- Tests hypotheses about risk factors

Causation in Epidemiology

- Causation examines whether an exposure actually causes disease
- Based on strength, consistency, and timing of association
- Considers dose–response relationships
- Supports prevention and regulatory decisions

Case–Control Studies

- Start with people who have the disease (cases) and those without the disease (controls)
- Look back to identify past exposures
- Useful for rare diseases
- Faster and less expensive than cohort studies

Cohort Studies

- Start with exposed and non-exposed groups
- Follow groups over time to observe disease development
- Can study multiple health outcomes
- Strong evidence for exposure–disease relationships

Experimental Studies

•Experimental studies are epidemiological studies where the **researcher actively intervenes**
•The exposure is **deliberately introduced or controlled**
•Participants are **assigned to different groups**
•Used to test **cause-and-effect relationships**

- **Researcher controls the exposure**
- **Includes intervention and comparison groups**
- **Often involves random allocation**
- **Outcomes are measured after the intervention**
- **Provides strong evidence of causation**

Ecologic Studies

- What Are Ecologic Studies?
- Ecologic studies examine health outcomes in groups or populations, not individuals
- The unit of analysis is a population (e.g. country, region, workplace, industry)
- Exposure and disease data are analysed at the group level
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- Key Characteristics
- Data are aggregated, not individual-based
- Compare populations with different exposure levels
- Often use existing data sources (statistics, records, surveys)
- Useful for identifying patterns and trends

Ecologic Studies Cont ;

- How Ecologic Studies Work
- Compare disease rates between:
  - Different countries
  - Different regions
  - Different industries or workplaces
- Examine associations between average exposure levels and health outcomes
- Example variables:
- Average noise levels vs hearing loss rates
- Air pollution levels vs respiratory disease
- Working hours vs stress-related illness

Ecologic Studies

- Examples in Occupational Health
- Comparing rates of lung disease in industries with high dust exposure
- Comparing MSD rates between office-based and manual labour sectors
- Examining stress levels across different job sectors
- Comparing absenteeism rates between organisations

- Strengths of Ecologic Studies
- Quick and relatively low cost
- Useful for generating hypotheses
- Can analyse large populations
- Helpful when individual data are unavailable

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- Limitations
- Cannot confirm causation at the individual level
- Risk of ecological fallacy (assuming group trends apply to individuals)
- Limited control over confounding factors
- Less precise than cohort or case–control studies

Cross-sectional Studies

- A cross-sectional study examines exposure and health outcomes at one point in time
- Provides a snapshot of a population or workforce
- Measures prevalence of disease or health conditions
- Exposure and disease are assessed simultaneously
- Commonly uses questionnaires, surveys, and health assessments
- Widely used in occupational health surveillance

Key limitation:

- Cannot determine cause-and-effect relationships.

Comparison of Epidemiological Study Types

Feature	Cross-Sectional	Cohort	Case-Control
time frame	Single point in time	Forward in time	Backward in time
Starts with	Exposure & disease together	Exposure status	Disease status
Measures	Prevalence	Incidence	Association
Causation	❌ Cannot prove	✓ Strong evidence	✓ Moderate evidence
Best used for	Health surveillance	Studying long-term effects	Rare diseases
Cost & duration	Low & short	High & long	Moderate & shorter

Importance in Occupational Health

- Identifies work-related causes of disease
- Supports risk assessment and control measures
- Informs health surveillance and exposure limits
- Provides evidence for prevention strategies

Group Activity: Applying Epidemiology in Occupational Health

- A metal fabrication workshop employs 80 workers. Several employees working in the cutting and grinding area have recently reported ringing in the ears and difficulty hearing conversations.

Key observations:

- Cutting and grinding machines operate throughout the day
- Noise levels are consistently high
- Hearing protection is available but not always worn
- Office and stores staff in the same company do not report hearing problems

Case Study

- A waste management facility employs workers across waste collection, sorting, and administrative roles. Over several months, workers in the sorting area report skin irritation, respiratory discomfort, and frequent minor illnesses. Office-based staff do not report similar symptoms. Management collects health complaints informally but has never analysed the data systematically. No comparison has been made between worker groups, and exposure patterns have not been reviewed.

Discuss

- How descriptive epidemiology could be used to identify patterns
- How cross-sectional or cohort approaches could help assess exposure–health relationships
- Importance of comparing exposed and non-exposed groups
- How epidemiological findings can inform occupational health controls

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