

Course Outline

COURSE TITLE	:	EPIDEMIOLOGY
COURSE CODE	:	NURS 1113
DURATION	:	45 Hours
CREDITS	:	3
PRE-REQUISITE	:	Microbiology
CO-REQUISITE	:	Health Informatics

COURSE DESCRIPTION

This course introduces the student to the key concepts of epidemiology. It examines the modes of disease transmission characteristics of communicable diseases, methods of prevention, at the local, regional and international levels. Students will be guided in the identification of sources of data, the use of appropriate measures of calculations, the analysis and interpreting of data and the application of findings to infection prevention and control.

LEARNING OUTCOMES

On successful completion of this course, the student should be able to:

1. Understand the basic principles and approach of epidemiology;
2. Demonstrate knowledge of the inter-related elements of epidemiology;
3. Apply epidemiological principles to the study of diseases;
4. Explain the key components of epidemiology data;
5. Know the sources of epidemiology data;
6. Understand the measures of calculation used in epidemiology study;
7. Classify communicable diseases according to their origin;
8. Understand the characteristics of the diseases, which may cause epidemics;
9. Demonstrate knowledge of HIV/AIDS;
10. Understand the natural history of selected communicable diseases of public health significance;
11. Describe the process of transmission of micro-organisms in the health care settings;
12. Analyze data from reliable sources on the incidence and prevalence of communicable diseases of public health significance;
13. Demonstrate knowledge of screening tests which are carried out for early detection of diseases;
14. Describe methods of surveillance, calculating infection rates, and analyzing data;

15. Comprehend the calculation of the various tables and figures used to illustrate survey findings;
16. Evaluate risk factors among population groups for the occurrence of communicable diseases;
17. Apply knowledge of the dynamics of the spread of communicable diseases of public health significance to infection prevention and control;
18. Describe country-specific list of notifiable diseases;
19. Understand international, regional, and national laws and regulations applicable to the prevention and control of communicable diseases internationally and nationally;
20. Describe the prevention and control of nosocomial infections in health care facilities;
21. Describe general and specific measures for prevention and control of communicable diseases to include involvement of health care workers, patients, families, and population groups;
22. Understand epidemiological study designs, which are conducted to determine causation of diseases;
23. Formulate plans for the investigation of outbreaks of specific diseases.

CONTENT OUTLINE

UNIT I : **EPIDEMIOLOGY PRINCIPLES**
Hours : **5 Theory**

Specific Objectives

At the end of the unit, the student will be able to:

1. Define the terms epidemiology and epidemiology approach;
2. Discuss the uses of epidemiology;
3. Explain each phase of the epidemiological approach;
4. Identify the key components of epidemiology data and sources of the data;
5. Discuss the types of data, various methods of data collection, and the different means and interpretation of data;
6. Calculate incidence and prevalence rates of selected diseases;
7. Identify relation between incidence and prevalence of selected disease
8. Define screening as a measure to detect diseases;
9. Determine validity and reliability of screening tests;
10. Describe the concepts and methods of surveillance;
11. Construct the various tables and figures;
12. Present epidemiology information, using tables and figures;
13. Discuss the concept of screening, its importance and types.

Content

1. Definition

- Epidemiology
- Epidemiology approach

2. Uses of epidemiology

3. Phases of epidemiology approach

- **Descriptive epidemiology**
 - What is the problem
 - Frequency of the problem
 - Who is involved
 - Where is the problem
 - When did it occur
- **Analytic epidemiology**
 - Analysis of causes of disease
- **Experimental epidemiology**
 - Clinical or community trials
- **Evaluation epidemiology**
 - Measuring the effectiveness of different health services

4. Key components of epidemiology data

- *What*
- *Who*
- *Where*
- *When*
- *How*
- *Why*

5. Sources of epidemiology data

- Census
- Vital statistics
- Morbidity data
- Mortality data
- Reports of notifiable diseases
- Hospital records
- Private physicians' offices
- Disease registers
- Community
- Other

6. Health indicators

- Crude Birth Rate
- Crude Death Rate
- Infant Mortality Rate
- Morbidity Rate

- Perinatal Mortality Rate
- Neonatal Mortality Rate
- Maternal Mortality Rate
- Incidence Rate
- Prevalence Rate
- Life Expectancy
- General Fertility Rate

7. Surveillance

- Definition
- Methods
- Approaches

8. Measurements & their calculations

- Ratios
- Proportions
- Incidence rates
- Prevalence rates
- Demographic rates

9. Relationship between predictive value & disease prevalence

10. Preparation of tables & graphs

- Graphs
- Tables
- Histograms
- Population pyramids
- Charts: bar, pie
- Scatter diagrams
- Maps

11. Screening

- Definition
- Screening tests
- Validity and reliability of screening tests
- Screening programmes.

UNIT 2 : INFECTIOUS DISEASE PROCESS
Hours : 5 Theory

Specific Objectives

At the end of the unit, the student will be able to:

1. Define related terms;
2. Discuss the dynamics of disease transmission;
3. Identify the inter-related elements of epidemiology;

4. Classify the mechanisms of disease transmission;
5. Discuss the concepts of infection and infectivity;
6. Define the term nosocomial infection;
7. Explain the methods of transmission of nosocomial infections;
8. Describe the methods of preventing the transmission of nosocomial infections;
9. Discuss the risk factors among population groups for the occurrence of communicable diseases.

Content

1. Definition
 - Carrier
 - Endemic
 - Epidemic
 - Pandemic
 - Immunity
 - Immune response
 - Herd immunity
 - Immunoglobulin
 - Host response
 - Hypersensitivity
 - Infection
 - Infectivity
 - Pathogenicity
 - Virulence
 - Immunogenicity
 - Sporadic
2. Dynamics of disease transmission
 - Chain of infection
3. Elements of epidemiology
 - Sources
 - Susceptible host
 - Modes of transmission
4. Modes/classification of the mechanisms of disease transmission
 - Contact transmission
 - Droplet transmission
 - Airborne transmission
 - Common vehicle transmission
 - Vectorborne transmission
5. Description
 - Immunity
 - Host response
 - Herd immunity
 - Carrier

6. Nosocomial infection
 - Definition
 - Modes of transmission
 - Preventive measures

7. Risk factors for the occurrence of communicable diseases among population groups
 - **Extremes of age**
 - Newborn
 - Elderly

 - **Presence of underlying disease/infection**
 - Cancer
 - Auto-immune disorders
 - Other

 - **Natural/Passive immunity**
 - E.g., chickenpox

 - **Trauma/Invasive procedures**

 - **Medications**
 - Steroid
 - Chemotherapy

 - **Lifestyle**
 - Nutrition
 - Exercise
 - Substance abuse
 - Sexual practices

 - **Cultural**
 - Health beliefs
 - Religious practices

 - **Socio-economic**
 - Poverty
 - Literacy

 - **Environmental**
 - Poor housing
 - Inadequate water supply
 - Sanitation

 - **Organization of health services**
 - Inadequate immunization coverage
 - Inadequate health services.

UNIT 3 : THE EPIDEMIOLOGY OF SELECTED DISEASES OF PUBLIC HEALTH SIGNIFICANCE

Hours : 10 Theory

Specific Objectives

At the end of the unit, the student will be able to:

1. Name the diseases on the country-specific list of notifiable diseases;
2. Describe the natural history of communicable diseases of public health significance;
3. Describe several common resistant organisms and problem infections.

Content

1. Notifiable diseases list
2. Natural history of the following diseases (*to be modified according to Jamaica list*)
 - **Viral diseases**
 - HIV/AIDS
 - Measles (rubella)
 - Rubeola
 - Poliomyelitis
 - Mumps
 - Smallpox
 - Influenza
 - Viral haemorrhagic fevers
 - Viral hepatitis
 - Herpes
 - Meningitis
 - Diarrhoeal diseases
 - Arthropod-borne viral disease
 - Dengue
 - Encephalitis
 - **Parasitic diseases**
 - Malaria
 - Filariasis
 - Pediculosis
 - Scabies
 - Schistosomiasis
 - Amoebiasis
 - Helminthic infestations
 - **Bacterial diseases**
 - Staphylococci
 - Streptococci
 - Rheumatic fever
 - Acute nephritis
 - Scarlet fever
 - Conjunctivitis
 - Erysipelas
 - Tetanus
 - Diphtheria
 - Pertussis
 - Food poisoning
 - Typhoid fever
 - Cholera
 - Sexually transmitted infections

- Bovine-spongiform encephalitis (BSE)
- **Other bacterial diseases**
 - Yaws
 - Meningitis
 - Leptospirosis
 - Tuberculosis
 - Leprosy
 - Fungi
 - Candidiasis (moniliasis)
 - Gonorrhoea
 - Non-specific urethritis
 - Plague
 - Rabies
 - Anthrax

3. Common resistant organisms & related treatment problems.

UNIT 4 : PREVENTION & CONTROL OF COMMUNICABLE DISEASES OF PUBLIC HEALTH SIGNIFICANCE

Hours : 15 Theory

Specific Objectives

At the end of the unit, the student will be able to:

1. Describe general measures for prevention of communicable and specific diseases;
2. Describe country-specific disease surveillance process;
3. Discuss international and national laws and regulations, which are enacted for prevention of communicable diseases;
4. Conduct investigations of epidemics of specific communicable diseases;
5. Collect relevant data on the occurrence of communicable diseases;
6. Use data on the occurrence of communicable diseases in planning programmes for infection prevention and control.

Content

1. General measures of prevention of communicable diseases
 - Environmental conditions
 - Food & milk hygiene
 - Sanitation
 - Adequate housing
 - Water supply
 - Pests control
2. Specific measures to prevent specific diseases
 - Health education
 - Immunization
 - Sexually Transmitted Infections (STIs) programmes
 - Quarantine

- Environmental control programmes
 - Infection prevention & control
3. International & national laws & regulations for prevention of communicable diseases
 - International laws & regulations
 - International quarantinable diseases
 - WHO international vaccination requirements
 - National laws
 4. Investigation of epidemics
 - Team approach
 - Procedures
 - Laboratory diagnosis
 - Collection, storage & transportation of specimens
 - Analysis of data
 - Documentation
 - Reporting
 5. Relevant sources of data on the occurrence of communicable diseases
 - Ministry of Health surveillance & epidemic investigation reports
 - PAHO/WHO surveillance reports
 - CAREC surveillance reports
 - CDC surveillance reports
 - WHO surveillance reports
 6. Use of data in programme planning for disease prevention & control
 - Data analysis manually & electronically
 - Interpretation
 - Application.

UNIT 4 : **HIV/AIDS**
Hours : **10 Theory**

Specific Objectives

At the end of the unit, the student will be able to:

1. Provide background information on HIV/AIDS;
2. Discuss the epidemiology of HIV/AIDS;
3. Explain the pathology of HIV/AIDS;
4. Discuss the ethical and legal issues of HIV/AIDS;
5. Explore the current management of HIV/AIDS.

Content

A. Background

1. History of HIV/AIDS

2. Epidemiology
3. Demography

B. Pathophysiology

1. Viruses
2. Retroviruses

C. Transmission of HIV

1. Sexual
2. Bloodborne
3. Mother/Parent-to-child

D. Effects of HIV/AIDS

E. AIDS-related conditions/Opportunistic infections

F. Sexuality concepts relative to HIV/AIDS

1. Gender & HIV/AIDS
2. Power
3. Negotiation
4. Consensus

G. Stigma & HIV/AIDS

1. Definition of stigma
2. Stigma in health sector
3. Patient relationship (e.g., respect, non-judgmental, empathy)
4. Management

H. Socio-economic burden of HIV/AIDS for the

1. Individual
2. Family
3. Community
4. Country

I. Ethical & legal aspects of HIV/AIDS

J. Human Rights & HIV/AIDS

1. Overview of human rights
2. UN HIV/AIDS human rights guidelines
3. Human rights analysis of HIV/AIDS
 - Right to health
 - Non-discrimination
 - People with HIV/AIDS
 - Gender
 - Other marginalized groups
 - Right to safe workplace
 - Other

K. Advocacy

1. Definition
2. Overview

3. Strategies

L. Organizations/Agencies & their responses to HIV/AIDS

1. International

- WHO
- UNAIDS
- UNICEF
- World Bank
- Global Fund to Fight AIDS, Tuberculosis & Malaria
- PEPFAR
- Other

2. Regional

3. National

4. Community

M. HIV/AIDS at the workplace

1. Screening

- Pre-employment
- Periodic
- End of employment

2. Confidentiality

3. Safety

- Infection prevention & control to include:
 - Safe injection practice
 - Sharps injury
 - Post-exposure prophylaxis (PEP) policy & programme
 - Waste management
 - Exposure to tuberculosis
- Iatrogenic infection
 - Monitoring
 - Investigating
 - Reporting
- Stress & stress management
- Staff welfare programme (s)

N. Clinical management of HIV/AIDS

1. Focus of care

- Individual
- Family
- Community

2. Arenas of care

- Hospital: in-patient based care
- Private homes: home-based care
- Community: community-based care

3. Areas of activities

- Assessment of HIV/AIDS

4. Planning of services and care

a. **Levels of prevention**

- Primary prevention: status of vaccine, health promotion activities
 - Lifestyle/behavioural changes
 - Sexuality
 - Information on protective devices such as condoms & their availability
 - Counselling: pre & post-test counselling
 - Health education
 - Nutrition
 - Exercise
 - Mental integrity
 - Infection prevention & control in health care facilities
 - Blood screening
 - Training of health care workers

b. Secondary prevention

- Screening for early detection of HIV
- Education on recognition of symptoms
- Risk reduction of pathological changes

5. Implementation of services and care

a. **Tertiary prevention**

- Care initiatives
 - Psychosocial
 - Physical (ADLs)
 - Team approach to care
 - Anti-retroviral therapy
 - Diet & nutrition
 - Rest and exercise
 - Education
 - Counselling
 - Complimentary therapy
 - Treatment modalities & specific interventions relative to the type of opportunistic infection (s)
 - Rehabilitative care/maintenance

6. Evaluation

- Outcome of services & care
- Impact of services & care

O. Management of resources

1. Allocation/deployment of staff
2. Training of staff
3. On-going in-service education
4. Management of scarce resources
5. Community mobilization/involvement/resources
6. Maintenance/sustainability of services & care
7. Supervision/monitoring
8. Evaluation: use of indicators

- Structure (infrastructure)
- Process (provision of services & care)
- Outcomes (impact of services & care)

P. Development & submission of projects for mobilizing resources for HIV/AIDS

Q. Development of an Action Plan for the management of HIV/AIDS at national, regional/provincial, & community levels

R. Coordination of services for HIV/AIDS at global, regional, national, & community levels

S. Research.

Teaching/Learning Methodologies

- Lecture/Discussion
- PowerPoint presentation
- Individual study guide activities
- Individual/Small group activities

Areas used for Learning

- Classroom
- Library
- Clinical Learning Centre (Nursing Skills Laboratory)
- National Public Health Laboratory
- Hospitals, health centres/clinics
- Community agencies, homes

Learning Experiences

- Review of records of specific communicable diseases
- Surveys

Required Skills

- Surveillance studies
- Rates calculation

Student Assessment

- Midterm examination: Objective-type items 40%
- Final examination: Objective- type items 60%

Required Reading

Swanson Janice M. & Albrecht, Mary M. (1990). Community health nursing. Philadelphia: W.B. Saunders.

Valanis, Barbara (1999). Epidemiology in nursing and health care. Stamford, Connecticut: Appleton & Lange.

Recommended Reading

World Health Organization (Current Ed.) International travel and health vaccination requirements and advice. Geneva: Author.

Caribbean Epidemiology Centre/Pan American Health Organisation/World Health Organization (Current Ed.). Public health surveillance: A Caribbean communicable disease surveillance manual for action. Port of Spain, Trinidad & Tobago: Author.

List of Jamaica Notifiable Diseases.

Surveillance and other reports from Ministry of Health, etc.

ILO, UNAIDS, WHO websites on HIV/AIDS.