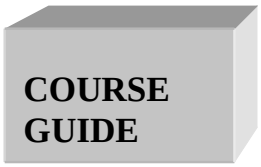
NATIONAL OPEN UNIVERITY OF NIGERIA

SCHOOL OF SCIENCE AND TECHNOLOGY

COURSE CODE: CHS 511

COURSE TITLE: EPIDEMIOLOGY FOR COMMUNITY HEALTH



CHS511
EPIDEMIOLOGY FOR COMMUNITY HEALTH

Course Team Prof. D. B Parakoyi (Writer) - UNILORIN
Kayode S. Olubiyi (Co-writer/Coordinator) - NOUN
Prof. Afolabi Adebanjo (Programme Leader) - NOUN

NATIONAL OPEN UNIVERSITY OF NIGERIA
National Open University of Nigeria
Headquarters
14/16 Ahmadu Bello Way
Victoria Island
Lagos

Abuja Office
No. 5 Dar es Salaam Street
Off Aminu Kano Crescent
Wuse II, Abuja

e-mail: centralinfo@nou.edu.ng
URL: www.nou.edu.ng

Published By:
National Open University of Nigeria

First Printed 2012

ISBN: 978-058-839-6

CONTENTS **PAGE**

Introduction

Epidemiology is the study of the distribution and determinants of diseases and injuries in human population. It is a scientific research discipline concerned with observing, measuring and analysing health-related occurrences in human populations. Epidemiological studies can be applied to all diseases, conditions and health-related events.

Historically, the impact of epidemiology on the health of the nation has been far-reaching. Its origins can loosely be traced to the time of Hippocrates (460-377 BC) who, as a physician, attempted to investigate the occurrence of disease on a rational basis (Valanis, 1992).

Epidemiological research is of immense value in determining the health of populations. Epidemiology is traditionally seen as a discipline associated with medicine and public health. Many other health-related disciplines are now seen to be using and adapting it for their own purposes and reaping its benefits.

The questions that we will be answering in this course include:

- to what degree are epidemiological perspectives currently used?
- what dilemmas does it pose for community health practitioners?
- how can community medicine move forward in establishing itself as a contributor in this area of research?

Epidemiology for Community Health is a two- credit unit course for those offering the Bachelor of Science in Community Health programme. The course is broken into 3 modules with 11 study units. It will introduce the students to epidemiology in general. The course is aimed primarily at people who wish to use the academic study to deepen their understanding and increase their potential for career development.

At the end of the course, the learner is expected to demonstrate clear understanding of epidemiology in relation to disease causation and the expected role of the students in the overall attainment of health.

This Course Guide provides you with what to expect in the course, how to work through the course material as a distance learner saddled with the responsibility of studying on your own and your overall responsibilities and expectations. Tutorial sessions are also linked up with the course to provide the needed support you required.

What You Will Learn in This Course

Today, Nigeria has a growing population of over 140 million people. There is still a great imbalance in the provision of medical care facilities for the larger population. The overall aim of this course is to help you appreciate the relevance of epidemiology in the understanding of disease causation and determinant factors.

Course Aim

This course aims at providing the learners with in-depth understanding of epidemiology and its place in real and general practice, so as to be better equipped to contribute to meaningful health living for all.

Course Objectives

To achieve the aims set out above, the course has some specific objectives. In addition, each unit has specific objectives stated at the beginning of a unit. You are advised to read them carefully before going through the unit. You will have to refer to them during the course of your study to monitor your progress. You are encouraged to always refer to the unit objectives after completing a unit. This is the way you can be certain that you have done what is required of you**.**

The wider objectives of the course are set below. By meeting these objectives, you should have achieved the aims of the course as a whole. On successful completion of the course, you should be able to:

- highlight the principles of epidemiology
- describe epidemiology types of epidemiological studies
- know the basic measurements in epidemiology
- describe the strategies of epidemiology
- discuss the epidemiology of communicable and non-communicable diseases
- determine the relationship between epidemics and surveillance
- describe the signs and symptoms as well as management of HIV/AIDS
- discuss the epidemiology of HIV/AID
- explain the associated consequences of sexually transmitted infections.

Working through This Course

To complete this course, you are required to study through the units, the recommended textbooks and other relevant materials. Each unit contains some Self-Assessment Exercises and Tutor-marked Assignment (TMA). At some point in this course, you would be required to submit the Tutor-Marked Assignment. This will be followed by an end-of-term examination.

Course Materials

The following are the components of this course:.

1. The Course Guide
2. Study units
3. Textbooks
4. Assignment file
5. Presentation schedule

Study Units

This course is made up 11 study units in 3 modules. These are:

Module 1 Introduction to Epidemiology

Unit 1 Introduction to Epidemiology
Unit 2 Types of Epidemiological Studies
Unit 3 Basic Measurements in Epidemiology

Module 2 Epidemiology and Communicable/Non Communicable Disease

Unit 1 Strategies of epidemiology
Unit 2 Epidemiology of Communicable Diseases
Unit 3 Epidemics

Module 3 Sexually Transmitted infections and HIV/AIDS

Unit 1 Sexually Transmitted Infection
Unit 2 Human Immuno-Virus/Acquired Immune Diseases Syndrome
Unit 3 Demographic Incidence and Prevalence of HIV/AIDS
Unit 4 Tests for HIV
Unit 5 Prevention, Treatment and Control of HIV/AIDS

Textbooks and References

Alakija, W. (2000). *Essentials of Community Health Primary Health Care and Health Management*. Medisuccess Publication.

Last, J. (1994). *The Uses of Epidemiology*. In Ashton J (ed.) *The Epidemiological Imagination*. Buckingham: Open University Press.

Lucas, & Gilles (2003). *Short Textbook of Public Health Medicine for the Tropics*. London: Oxford University Press.

Lucas & Gilles (1989). *A Short Textbook of Preventive Medicine for the Tropics*. ELBS.

Park, K. (2000). *Textbook of Preventive and Social Medicine*. India: M/s Banarsidas Bhanot Publishers.

Assignment File

The assignment file will contain the Tutor- marked Assignment (TMA) which will constitute part of the continuous assessment of the course. There are 15 assignments in this course with each unit having an activity/exercise for you to do to facilitate your learning as an individual.

Presentation Schedule

The presentation schedule in this course provides you with important dates for completion of each tutor marked assignment. Please try to meet the deadlines.

Assessment

There are two aspects to the assessment of the course. These are the Tutor- Marked Assignment and written examination. In tackling the assignments, you are expected to apply information, knowledge and strategies gathered during the course. The assignments must be turned in to your tutor for formal assessment in accordance with the stated presentation schedules. The works you submit to your tutor for assessment will count for 30% of your total course work.

At the end of the course, you will need to sit for a final written examination of three hours duration. This examination will also count for 70% of your total course mark.

Tutor-Marked Assignment (TMA)

There are Tutor-Marked Assignments in each of the unit of this course. You are advised in your own interest to attempt and go through all the assignments at your own pleasure. You will be able to complete the assignments from the information and materials contained in your reading and study units. Those to be submitted for evaluation will be communicated to you through the Study Centre. There is other self activity contained in the instructional material to facilitate your studies. Try to attempt it all. Feel free to consult any of the references for you to have a broader view and a deeper understanding of the course.

Final Examination and Grading

The final examination of CHS511 will be of 2 hours duration and have a value of 70% of the total course grade. The examination will consist of questions which have bearings with the attempted Self-Assessment Exercise and Tutor-Marked Assignments that you have previously encountered. Furthermore, all areas of the course will be evaluated. Make sure you give enough time to revise the entire course.

Course Marking Scheme

The following table shows the course marking scheme.

Assessment	**Marks**
Assignment 1 – 15	10% x 3 = 30%
Final examination	70% of overall course marks
Total	100% of course marks

Course Overview

This table shows the units and the number of weeks required to complete the assignments.

Unit	Title of Work	Week Activity	Assessment
	Course Guide	Week 1	
Module 1	**Introduction to Epidemiology**		
1	Introduction to Epidemiology	Week 2	
2	Types of Epidemiological Studies	Week 3	
3	Basic Measurement in Disease Frequency	Week 4	

Module 2	**Epidemiology and Communicable/Non Communicable Disease**		
1	Strategies of Epidemiology	Week 5	
2	Epidemiology of Communicable Disease	Week 6	
3	Health Statistics	Week 7	
4	Epidemics and Surveillance.	Week 8	
Module 3	**Sexually Transmitted infections and HIV/AIDS**		
1	Sexually transmitted Infections	Week 9	
2	Sexually Transmitted Infections and Consequences	Week 10	
3	Human Immuno-Virus/Acquired Immune Deficiency Syndrome	Week 11	
4	Demographic Incidence and Prevalence of HIV/AIDS	Week 12	
5	Prevention, Control and Treatment of HIV/AIDS	Week 13	

How to Get the Most Out of This Course

In distance learning, the study units replace the university lecture. This is one of the greatest advantages of distance learning. You can read and work through specially designed study materials at your own pace and at time and place that suit you best. Think of it as reading the lecture notes instead of listening to a lecturer. In the same way that a lecturer might set you some reading task, the study units tell you when to read your other material. Just as a lecturer might give you an in-class exercise, your study units provide exercise for you to do at appropriate points.

The following are practical strategies for working through the course:

- read the course guide thoroughly
- organise a study schedule
- stick to your own created study schedule
- read the introduction and objectives very well
- assemble your study materials
- work through the unit
- keep in mind that you will learn a lot by doing all your assignment carefully
- review the stated objectives
- do not proceed to the next unit until you are sure you have understood the previous unit
- keep to your schedules of studying and assignments
- review the course and prepare yourself for the final examination.

Facilitators/Tutors and Tutorials

There are 8 hours of effective tutorial provided in support of this course. Details will be communicated to you together with the name and phone number of your facilitator through the study centre.

Your tutor will mark and comment on your assignments, keep a close watch on your progress and any difficulties you might encounter and also provide assistance to you during the course. You must ensure that you submit your assignment when due. You will get a feedback from your tutor as soon as possible to the assignments.

Do not hesitate to contact your tutor or study centre on phone or email in any of the following circumstances:

- you do not understand any part of the study units or the assigned reading
- you have difficulty with the self test or exercises
- you have questions or problems with an assignment, tutors comments or grading of an assignment.

You are encouraged to attend the tutorials to have a face-to-face contact with your tutor and ask questions which you needed answers immediately. It is also an opportunity to discuss any grey area with your tutor. You can equally prepare questions to the tutorial class for meaningful interactions. You are sure to gain a lot from actively participating in the discussion. Best of Luck.

Course Code CHS511
Course Title Epidemiology for Community Health

Course Team Prof. D. B Parakoyi (Writer) - UNILORIN
Kayode S. Olubiyi (Co-writer/Coordinator) - NOUN
Prof. Afolabi Adebanjo (Programme Leader) - NOUN

NATIONAL OPEN UNIVERSITY OF NIGERIA

National Open University of Nigeria
Headquarters
14/16 Ahmadu Bello Way
Victoria Island
Lagos

Abuja Office
No. 5 Dar es Salaam Street
Off Aminu Kano Crescent
Wuse II, Abuja

e-mail: centralinfo@nou.edu.ng
URL: www.nou.edu.ng

Published By:
National Open University of Nigeria

First Printed 2012

ISBN: 978-058-839-6

CONTENTS **PAGE**

MODULE 1 INTRODUCTION TO EPIDEMIOLOGY

UNIT 1 INTRODUCTION TO EPIDEMIOLOGY

CONTENTS

1.0 INTRODUCTION

This is CHS511: Epidemiology for Community Health. Having successfully gone through CHS 241: Introduction to Biostatistics, a sure foundation has been laid to prepare you for epidemiological studies. Most epidemiological research informs the planning and implementation of health-related policy and this policy has a fundamental impact on the way health practitioners deliver care. Many are unaware of the impact that epidemiology has on their working practice. This unit therefore hopes to unfold the concept of epidemiology and its place in nursing and health service delivery.

2.0 OBJECTIVES

At the end of this unit, you should be able to:

- define epidemiology
- describe the uses of epidemiology
- determine its relevance to community health practitioners.

3.0 MAIN CONTENT

3.1 Definition of Epidemiology

Epidemiology is the study of the distribution and determinants of health-related events in specified populations and the application of this study to the control of health problems (J. M Last, 1995). Epidemiology was coined from a Geek word meaning 'the science of people'. Historically, the impact of epidemiology on the health of nations has been long-standing and far-reaching. Its origin can loosely be traced to the time of Hippocrates (460-377 BC) who, as a physician, attempted to investigate the occurrence of disease on a rational basis (Valanis 1992). In Britain, its formative roots can be traced back to isolated studies of specific diseases in the early 19th century. These investigations culminated in the celebrated study by John Snow (referred to as the father of epidemiology) who, around the 1850s, observed patterns of incidence of a cholera outbreak in central London. As a result of his recording of the incidence of cholera and mortality in the area, Snow was able to isolate the cause of the cholera epidemic which was attributed to a communal water-pump in Broad Street, Soho. After removing the pump handle, Snow observed that new cases of cholera in the area ceased and the epidemic declined.

Although dismissed by most scientists of the time, this finding and others related to disease and the environment had a profound effect on the formation of the public health movement and the early Public Health Acts of 1848 and 1875.

Originally, the term epidemiology meant the study of epidemics, but the techniques have long been improved upon. It is an applied discipline and a basic science of preventive and social medicine (not theoretically) and methods are essentially observational. Thus, the modern definition of epidemiology accommodates three important elements namely: inclusion of all diseases, populations, and ecological approach. Please note the three components (3Ds) common to the definition of epidemiology: disease frequency, distribution and determinants.

The major questions that are usually asked in epidemiology are: who are the group of person (s) affected by the disease, where has the incidence occurred? And when (time) did it occur?

SELF-ASSESSMENT EXERCISE

Highlight the 3 important component of epidemiology

3.2 Why Do We Study the 3 Components in Epidemiology?

The following reasons have been adduced for studying these three **'Ds': disease frequency, distribution and determinants of diseases** in human population:

- for planning and evaluation of health care
- for identification of the determinants of diseases
- for evaluation of method of controlling disease
- for observation of the natural history of a disease-making up of diagnosis and prognosis
- for classification of a disease.

3.3 Uses of Epidemiology

You may recall from the activity above that the study of disease distribution and causation is central to epidemiology. The broad grouping of the uses occurs in the following areas namely:

i. understanding the causation of the disease and the development of hypothesis and their testing
ii. understanding of geographical or local patterns of the diseases
iii. administration (i.e.) the planning of health activities and direction of programme to relevant sub-group identified to be at risk.

However, epidemiology is used for the following:

- to analyse the respective role of agent, host and the environment in the development and the natural history of disease
- to analyse the occurrence and distribution of disease according to characteristics such as age, sex, race, occupation and heredity
- to study, outline and define problems of health and disease by the analysis of incidence, prevalence and mortality
- to help complete the clinical feature and natural history of disease by group analysis
- to estimate an individual's risk of developing a disease and his survival chances
- to search for factors related to health and disease through the observation of group custom and habits
- for planning and allocation of resources

- to evaluate the need for and the effectiveness of health service through field studies.

4.0 CONCLUSION

The scope of epidemiology, its range of designs and impact on healthcare formation and reformation has been immense. Many healthcare related strategies and policies that have influenced community health practice over the past century or so have been established as a consequence of epidemiological study. Its uses also have contributed to increasing knowledge on healthcare. The fact that epidemiology is seen to be more holistic, less structured, focusing not just on individuals, but on communities, and looks towards preventive strategies, instead of curative ones, makes it an ideal strategy to be incorporated into day-to-day life experiences and professional practice.

5.0 SUMMARY

This unit has touched on epidemiology, rationale for studying the **3 Ds** namely: the disease frequency, distribution and determinants as well as the uses for the overall improvement of our healthcare.

6.0 TUTOR-MARKED ASSIGNMENT

Discuss five (5) importance of epidemiology.

7.0 REFERENCES/FURTHER READING

Last, J. (1994). *The Uses of Epidemiology*. In: Ashton, J. (Ed.). *The Epidemiological Imagination*. Buckingham, Open University Press.

Lucas & Gilles (2003). *Short Textbook of Public Health Medicine for the Tropics*. London: Oxford University Press.

Park, K. (2000). *Textbook of Preventive and Social Medicine*. India: M/s Banarsidas Bhanot Publishers.

UNIT 2 TYPES OF EPIDEMIOLOGICAL STUDIES

CONTENTS

1.0 INTRODUCTION

The epidemiologist is concerned with studying disease occurrence in people and the numerous factors which people are often exposed to that play a significant role in disease occurrence. Thus, the epidemiologist employs carefully designed strategies to determine this. This unit aims at exposing you to different methods of epidemiological studies. In all, it is crucial that you have a clear definition of the case under review and of the person involved. Failure to obtain the required information will make the interpretation of data difficult.

2.0 OBJECTIVES

At the end of this unit, you should be able to:

- highlight the methods of epidemiology
- describe the importance of these methods.

3.0 MAIN CONTENT

3.1 Types of Epidemiological Studies

Epidemiological studies comprises of the following:

1. Descriptive Epidemiology

a. Cross Sectional Study (Prevalence) with individuals as unit
b. Longitudinal (Incidence)

2. Analytical Epidemiology

a. Case-control (Case-reference) with individuals as unit of study
b. Cohort (absolute, relative, attributable risk or follow-up with individuals as unit of study)

3. Experimental / Interventional Studies

a. Randomised controlled trials/or Clinical trials with patients as unit of study
b. Field trials or community intervention studies with healthy people as unit of study
c. Community trials with communities as unit of study.

3.2 Observational Studies

This is made up of the descriptive and analytical studies.

3.2.1 Descriptive Studies

This is the study of the frequencies and distribution of a disease within a population by persons, place and time. The three broad questions necessary to describe the occurrence of a disease fully relating to persons, place and time are:

Person-who is getting the disease (person characteristics)? i.e. male or female, the age range, ethnicity, marital status, social and economic factors, social class, education, occupation, income level, family variables such as size, type, birth order, maternal age, parental deprivation and personal habits.

Place- where is it occurring (place characteristics)? This will answer for region, state, district, LGA, local community, towns, village and wards either in the city or rural areas. Boundaries are also considered with precise location.

Time-when is the disease occurring (time characteristics)? This includes the year, season, and day of the week, month and the time of the day. Certain diseases are common during the year for example measles in dry season.

The procedures in descriptive studies are:

- defining the population to be studied
- defining the disease under study

- describing the disease by: time, place and person
- measurement of disease
- comparing with known indices
- formulation of an aetiological hypothesis.

The description of diseases is usually done based on some characteristics which are shown in the table below:

Table 2.1: Characteristics Frequently Examined

Time	**Place**	**Person**	
Year, season	Climatic zones	Age	Birth order
Month, week	Country, region	Sex	Family Size
Day, hour of onset	Urban/rural, local community	Marital state	Height; Weight
Duration	Towns, Cities and Institutions	Occupation, Social status, and Education	Blood pressure, Blood cholesterol and personal habits

3.2.2 Analytical Studies

This is the second major type of epidemiological studies. While descriptive studies look at the entire population, analytic studies only look at the individuals so affected within the population. The focus is not to formulate but to test hypothesis. However, even though individuals are evaluated in analytical studies, the inference is made in respect of the population so selected.

Analytical studies comprises of two distinct types of observational studies. These are: **retrospective or case study and prospective or cohort study**. From here, we can determine whether or not a statistical association exists between a disease and a suspected factor and if it does, what is the strength of association. In prospective or cohort studies, a group of persons are exposed to causative factors while others are not. A follow-up is made in the nearest future to check the proportion of effects on the exposed and the non-exposed and comparism is then made.

SELF-ASSESSMENT EXERCISE

Outline the procedures in descriptive studies.

3.3 The Experimental/Interventional Studies

This is a study in which one group deliberately subjected to an experience is compared with a control group which has not had a similar experience. The use of experimental study is done with ethical considerations. It usually involves selection of an individual or communities. The principle of conducting experimental trials is that under the control of the investigator, some system is subjected to manipulation, creating an *independent variables* whose effect is then determined by the measurement of subsequent events or outcome this is known as the *dependent variable*.

4.0 CONCLUSION

All the epidemiological studies complement one another. An observational study allows nature to take its course. The investigator measures do not intervene. Descriptive study is limited to describing disease occurrence in a population. Analytical goes on to examine the relationship between health status and variables. Experimental or interventional studies involve an active attempt to change disease determinant or the progress of a disease. It is clearly acknowledged that epidemiology is a major tool in the formulation and implementation of national, regional and local health policy and providing evidence on which policies can be based.

5.0 SUMMARY

This unit has touched on the various types of epidemiological studies with particular reference to their importance.

6.0 TUTOR-MARKED ASSIGNMENT

Describe the cohort and observational studies. What are the advantages and disadvantages of cohort studies?

7.0 REFERENCES/FURTHER READING

Alakija, W. (2000). *Essentials of Community Health, Primary Health Care and Health Management.* Medisuccess Publication.

Lucas, & Gilles (2003). *Short Textbook of Public Health Medicine for the Tropics*. London: Oxford University Press.

Lucas, & Gilles (1989). *A Short Textbook of Preventive Medicine for the Tropics*. ELBS.

UNIT 3 BASIC MEASUREMENTS IN EPIDEMIOLOGY

CONTENTS

1.0 INTRODUCTION

The basic tool of epidemiology is the rate which relates to the number of cases of the population at risk. In CHS 241: Introduction to Biostatistics, you were introduced to different rates used in statistics. Please follow up the discussions in this unit, with a view to understand the importance of the basic measurements in disease frequency.

2.0 OBJECTIVES

At the end of this unit, you should be able to:

- identify the basic measurements in disease frequency
- explain the differences between each of them
- interpret the measurements for your clients care.
- describe health statistics
- distinguish between data and information
- highlight the sources of data
- describe the uses of data in nursing practice.

3.0 MAIN CONTENT

The basic measurements used in disease frequency are referred to as rates. These are incidence and prevalence rates. The mode, median and mean has been extensively discussed in CHS241.

3.1 Definition of Rate

In defining a rate, it is important to know the number of people (denominator) affected in the entire population (numerator) to be multiplied by 100. Rates help to determine spread. In order to compare populations of different sizes easily, the rate is usually expressed as the number of events in an arbitrary total such as 1000 or 100,000.

In general, the rate is equal to the number of cases over the number of population in a given unit of time:

Rate: $\frac{\text{Number of cases or events}}{\text{Population in the same area}}$ **X** 100,000

Incidence Rates (IR)
This is the frequency of the occurrence of events related to a disease such as the onset of symptoms related to the size of the population. It provides a measure of the rate at which people without a disease develop the disease during a specified period of time. Incidence rate is longitudinal and is the fundamental tool for studying the aetiological factors for both acute and chronic illness.

IR = $\frac{\text{Number of new cases}}{\text{Population at risk}}$ **X** a given interval of time

Prevalence Rate (PR)

Prevalence rate is defined as the proportion of the population affected by a disease at a particular time. It therefore measures the number of people in a population who have the disease at a given time. It is cross–sectional.

PR = $\frac{\text{Number of existing cases Old + New}}{\text{Total population at risk}}$ **X** a given point in time

It is clearly evident that a relationship exists between prevalence, incidence and the duration of the disease. Prevalence is important in determining the workload and planning for facilities (for example the number of hospital bed required). The relationship changes if the incidence rate is rapidly changing as in acute epidemic if the average duration of illness changes in response to treatment.

Other rates to be noted include:

- **Crude rate –** is a rate expressed in terms of the total population. In other words, the numerator of crude rate is the total population of the area been studied. There are three (3) crude rates commonly used. These are: crude birth rate, crude death rate and rate of natural population increase.

A. Crude Birth Rate (CBR) – This is the number of live births to resident in an area in a calendar year divided by the average population in that population multiplied by 1000

$$= \frac{\text{Total number of births in a year}}{\text{Mid year population}} \times 1000$$

B. The Crude Death Rate (CDR) - The total number of death in a year divided by the mid- year population in the area multiplied by 1000.

$$= \frac{\text{Total number of deaths in a year}}{\text{Mid-year population}} \times 1000$$

C. Rate of Natural Population Increase (RNPI) – This is the difference between Crude Birth Rate and Crude Death Rate.

= CBR - CDR = RNPI

- **Specific Rates –** This is a rate expressed in terms of a sub-group of a population (i.e.) the numerator is not the total population but a selected portion of it. The sub-population may be defined in terms of age or other demographic characteristics like sex, race or as a combination. Examples are that of age, sex and cause specifics, case fatality, and standardised rate.

Age Specific rate = $\frac{\text{Number of deaths in the age group}}{\text{Number of people aged 15-44yrs in a year}} \times 1000$

Sex Specific rate =

$\frac{\text{Number of deaths in women age group 15-44 yrs in a year}}{\text{Number of women aged 15-44yrs in the population in a year}} \times 1000$.

Where MMR = Maternal Mortality Rate

3.5 Statistics

It is a process of collecting, processing, analysing and reporting of data required for planning and operating health services. Data can be collected through primary or secondary source. The main objective is to provide reliable, relevant, adequate, timely and unambiguous information for health planners who will in turn interpret it for health providers to implement.

The health of a community is assessed by data usage which serves as indicators of the health status. The main sets of statistics are: morbidity, mortality and service utilisation statistics.

3.5.1 Types of Statistics

There are three (3) main types of statistics. These are vital, health and morbidity statistics.

- **Vital statistics** are statistics that records vital events as births, death, marriages, annulment and divorce obtained at registration centers at local, state and federal levels. The data are used to generate information for whole groups or entire population.

- **Health statistics** are a combination of vital statistics and other data pertinent to health. In the operation of health services, data can be derived from resources and institutional records. This can be further explained as being derived from:
- notification of diseases which is routinely done.
- institutions which include hospitals, health centers, dispensaries and private hospitals.
- special programmes like school health services, maternal and child health, disease control programme such as tuberculosis and leprosy etc.
- epidemiological survey which includes the whole population or sample in case of an epidemic

- **Morbidity statistics**

This includes data on occurrence and severity of a sickness in a community obtained from medical health service points.

Statistics from other sectors

There are other sectors apart from health where data can be collected to assist in planning for the health of people. These include: education, public works such as housing, water supply and sanitation, agriculture in regards to food production and distribution as well as economic planning and development which provides the poverty and economic indicator.

3.5.2 Uses of statistics

Statistics is used for the following reasons among others:

- to measure the health status of people and quantify their health problems
- for health comparisms at local, national and international levels
- for planning, administration and effective management of health services and programme
- for assessment of health services in relation to the set goals
- for assessing the attitudes and degree of consumers satisfaction to health care
- for heatlh research.

3.6 Data Collection

There is a basic source of data which is of primary importance in epidemiology. It is called CENSUS. It is so because it provides the denominator for the calculation of rate. Census is a periodic count or enumeration of a population. It is usually done every ten (10) years. Census is a procedure undertaking to contact every member of the population in a given time and collect a variety of information. It is used to derive population pyramid. A population pyramid is the age and sex structure of the population displayed in the form of histogram showing the percentage distribution of each sex at 5 yearly intervals.

The primary function of census is to provide information such as total count of population and breakdown into groups and subgroups such as age and sex distribution.

The data to be collected during the exercise will include age, sex, colour, marital status, relationships to head of households, occupation, housing, address, name, educational level, parity, employment status, income, etc.

Methods and Sources of Data Collection

We shall now consider various methods of data collection. These include:

- use of questionnaire in households
- physical examination
- special investigation
- sample registration from a population or group
- sources related to utilisation services
- data collected from routine examination
- notification of disease
- hospital records
- data from environment
- population surveys
- epidemiological surveillance.

SELF-ASSESSMENT EXERCISE

1. Enumeration is a key word in census. What is enumeration?
2. List the two (2) methods of enumeration.

4.0 CONCLUSION

You have been exposed to the relevance of rate in epidemiological studies. It is hoped that you understood it so well to be able to interpret and apply it in your client management at all levels of health care. The place of data in patients' management is of overall importance. In medical practice, lack of reliable data in developing countries is an important barrier to effective management of health and other social services. It is therefore obligatory that a viable and functional method of data collection which will assist health planners and managers be put in place to allow for effective implementation and evaluation of health care services.

5.0 SUMMARY

This unit has considered the various measurements in epidemiology. Rate which is the basic tool for epidemiology studies was examined with particular reference to incidence, prevalence and specific rates. This unit also discussed the place of statistics, its uses, sources, types and methods of data collection. It is hoped that you will find it very useful as you explore other variables for effective health care of your patients and clients.

6.0 TUTOR-MARKED ASSIGNMENT

Highlight the major differences between incidence and prevalence.

7.0 REFERENCES/FURTHER READING

Alakija, W. (2000). *Essentials of Community Health, Primary Health Care and Health Management.* Medisuccess Publication.

Lucas & Gilles (2003). *Short Textbook of Public Health Medicine for the Tropics*. London: Oxford University Press.

Lucas & Gilles (1989). *A Short Textbook of Preventive Medicine for the Tropics*. ELBS.

MODULE 2 EPIDEMIOLOGY OF COMMUNICABLE AND NON-COMMUNICABLE DISEASES

UNIT 1 STRATEGIES OF EPIDEMIOLOGY

CONTENTS

1.0 INTRODUCTION

Your understanding of epidemiology with the **3Ds,** namely disease frequency, distribution of disease and determinants of disease requires some strategies which provide a search for causal association between disease and other biological processes and experiences. This unit will expose you to those strategies.

2.0 OBJECTIVES

At the end of this unit, you should be able to:

- identify the main strategies for epidemiological studies
- interpret its usefulness in disease management
- apply them in the overall health care of the patient/client.

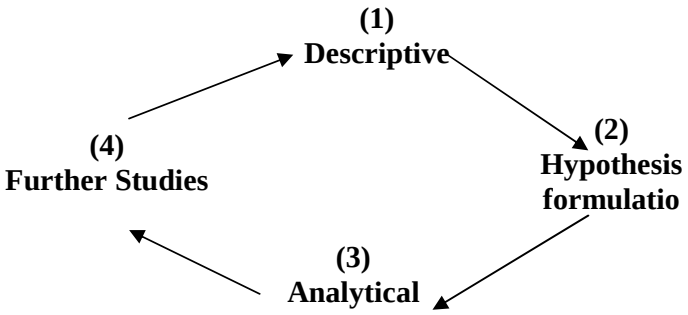
3.0 MAIN CONTENT

3.1 Chain of Epidemiology

The following chains exist in the study of epidemiology: These are:

- Descriptive studies: in which there is data aggregation and analysis
- Hypothesis testing- this is based on the result of your analysis in the descriptive studies, you can build a model and formulate an hypothesis
- Analytical study – the hypothesis generated in phase II is tested and this can be either observational or experimental. Analysis obtained here may suggest further studies or generate new hypothesis.

Chain of Epidemiology



3.2 Disease Causation

In disease causation, ecological factors are important. You may ask, what is ecology? Ecology is the study of relationship of organisms including humans to each other as well as other aspects of the environment. This has given rise to the concept of the multiple causation of disease (that is multi-factual aetiology of disease).

There are other factors necessary for the development of disease namely:

a. level of immunity
b. the environmental conditions
c. the agents-factors which must be present for the particular disease to occur (i.e.) a sinequa-non (without which nothing will happen).

3.3 Factors precipitating Disease Causation

There are factors that precipitate the cause of diseases. These are the Host Factor (HF) and the Environmental Factor (EF).

1. **Host Factors:** these are intrinsic factors, genetic (inborn) in a person. It can be

- **specific** (i.e.) not inborn but acquired by immunisation and natural infection
- **personality –** people working hard, ambitious with strong drive
- **social class membership:** peer grouping, organisation.

2. **Environmental Factors:** these are sub-divided into three namely: biological, physical and social factors.

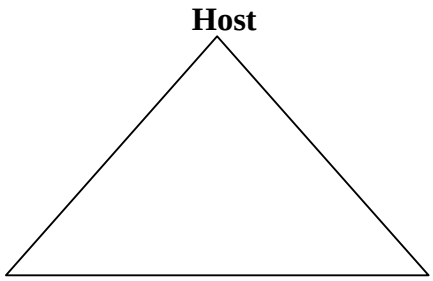
- Biological factors: these includes the infectious agents, reservoirs which may be human, animal or soil, transmitting vectors, plants and animals in their environment which may serve as foods or drugs, antibiotics, antigens and antibodies.
- Physical factors: it includes heat, light, air, water, radiation, chemical agent, atmospheric pressure, etc.
- Social factor: this is defined as the overall economic and political organisation of a society and the institutions by which individual are integrated into the society at various ages of their lives. Social environment is man- made environment which includes what he has created to make life worth living e.g. housing. It also includes the people's customs, levels of integration of the community, levels and systems of medicare, the degree of enforcement of health law and code.

3.4 Interrelated Factors

Our state of health depends on a balance of forces in a dynamic equilibrium. If the equilibrium is precarious, then the disease occurs easily. If the equilibrium is stable then the disease does not occur very easily. See this ecological model showing the state of equilibrium in disease state.

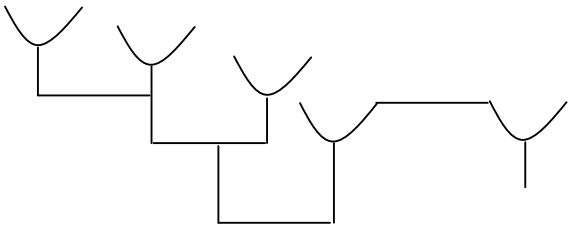
A. Ecological model (Epidemic triangle)

NB: It is the balance in the three that equals HEALTH



B. Web of Causation

Diseases do not just happen rather it develops as a result of a chain of position in which each link is the result of a complex genealogy of antecedence.

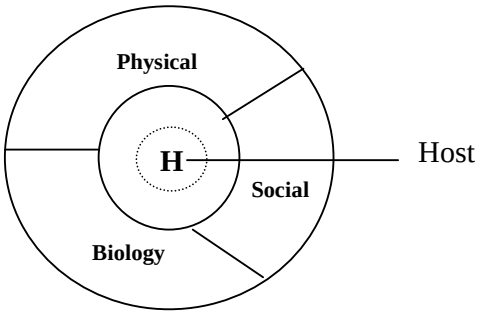


- **Webs**

If the link in the chain is broken anywhere, the disease may not occur. For example if a man changes his job and stop been a long time driver.

C. The Wheel Model

Wheel model tends to emphasise that the contribution of the different components is not equal in any specific disease.



It is worthy to note that the host has the genetic core and this determines prognosis/severity. You may not know the agent of a disease before its

modification. Killing of mosquitoes may reduce the malaria episodes. Counseling is used in Sickle Cell Disease SCD to reduce genetic core. This is a way of manipulation. Manipulations sometimes leads to their own problem e.g. use of insecticide in killing mosquito leading to inhalation of the insecticide causing breathing problem. Manipulation can therefore cause another problem. An impact assessment is therefore necessary in carrying out a manipulation.

SELF-ASSESSMENT EXERCISE 1

Highlight the disease precipitating factors.

3.5 Levels of Prevention

Control is presumed to be the ultimate aim of epidemiology but now prevention seems to be taking the lead. In a narrow common usage, prevention means the inhibition of the development of a disease before it occurs. But in the broader sense, prevention also includes all measures which interrupt or slow the progression of disease and the resulting disability. Prevention in epidemiology is divided into three main stages.

Stage 1: Primary Prevention

Primary prevention has two components: general health promotion (GHP) and specific measure (SM). GHP includes health education, environmental sanitation and good housing while SM includes chemoprophylaxis, immunisation and good nutrition. This is the prevention stage which reduces exposure of an individual or alters the susceptibility of either being affected by the disease or not.

Stage 2: Secondary Prevention

The second stage is the stage of early diagnosis and treatment. This is any measure that will interfere with the progression of the disease. The measures that constitute early detection are: screening, case finding, mass x-ray to determine lung diseases and smear to detect cancer of cervix in a woman.

Stage 3: Tertiary Prevention

The third stage of prevention is rehabilitation. This is the alleviation of disabilities from the disease and attempt to restore effective functioning. Rehabilitation can be divided into three (3) forms:

a. **Medical rehabilitation:** this is the process of medical care aimed at developing functional and psychological abilities of the

individual. Compensatory mechanism is put in place so as to enable the victim to attain self dependence and live a full life.

b. **Social rehabilitation:** a part of rehabilitation that aims at the integration of a disabled person into society by helping him to adjust to the demand of the family, community and occupation while reducing any economic and social burden that may impede the social rehabilitation process. It is important in diseases with stigma such as leprosy, pulmonary tuberculosis and mental illness. Counseling, social evaluation, individual and community counseling, provision of services including psychiatric services, recreation facilities are components of social rehabilitation.

c. **Vocational rehabilitation:** this includes provision of those vocational services, vocational guidance, training, selective placements which are designed to enable a disabled person to retain a suitable employment. He may require counseling, vocational training, vocational evaluation, proper placement or being looked after by others.

Stage 4: Surveillance

This is the exercise of continuous scrutiny of and watchfulness over the distribution and spread of infection and the related factors with sufficient accuracy and completeness to provide the basis for effective control**.** This idea has three main features namely:

- systematic collection of all related data
- orderly collation and evaluation of each data
- prompt dissemination of results for action to relevant authority.

The following are examples of sources of epidemiological data in the surveillance of disease: registration of deaths, notification of disease and reporting of epidemics, laboratory investigations, data from routine screening e.g. blood donors, investigation of individual cases and epidemics, epidemiological surveys, data from clinics, distribution of the animal reservoir and the vector production and distribution and care of vaccines, serum and drugs, demographic and environmental data and non-medical statistics.

Objectives of Surveillance

There are five main objectives of surveillance. These are:

- to define the problem
- to define priorities
- to determine strategy

- to evaluate control and preventive measure
- to suggest further research.

4.0 CONCLUSION

You have been enlightened on the strategies that provide a search for causal association between disease and other biological /specific biological experiences. Host and environmental factors play a key role in disease causation with an unparalleled interrelation of the factors. The levels of prevention are well laid out to assist you in providing the needed support to facilitate recovery.

5.0 SUMMARY

This unit discussed the following: chain of epidemiology, disease causation, factors precipitating disease causation, interrelated factors and levels of prevention.

6.0 TUTOR-MARKED ASSIGNMENT

Describe the 4 levels of prevention of illness.

7.0 REFERENCES/FURTHER READING

Alakija, W. (2000). *Essentials of Community Health, Primary Health Care and Health Management.* Medisuccess Publication.

Lucas & Gilles (2003). *Short Textbook of Public Health Medicine for the Tropics*. London: Oxford University Press.

Lucas & Gilles (1989). *A Short Textbook of Preventive Medicine for the Tropics*. ELBS.

UNIT 2 EPIDEMIOLOGY OF COMMUNICABLE DISEASES

CONTENTS

1.0 INTRODUCTION

The epidemiology of communicable disease is an important aspect of this course. You will remember by hindsight the place of who, what, where, and when in the understanding of epidemiology. To this end, therefore, the relationship of epidemiology, communicable and non-communicable disease will form the basis of our discussion in this unit.

2.0 OBJECTIVES

At the end of this unit, you should be able to:

- define communicable and non-communicable diseases
- identify various agent-causing diseases
- describe infectious agents
- enumerate the concepts that apply to communicable and non–communicable disease
- discuss the general methods of control of communicable and non-communicable diseases.
- enumerate problems of investigating non-communicable disease
- discuss the significant changes in the health and disease pattern.

3.0 MAIN CONTENT

3.1 Definition

A communicable disease is an illness that occurs due to a specific causative agent or its toxic products which arises through transmission of that agent or its products from a reservoir to a susceptible host. It could be directly as from an infected person or animal or indirectly through an intermediate plant or animal host, vector or the inanimate environment.

3.2 Disease-Causing Agents

We shall now consider some of the key points in the definition above:

Agents and Diseases Caused

Agents	Disease caused
Viruses	Measles, small pox,
Ricketsiae	Typhus organism and tapeworm
Bacteria	Spirochetes – Syphilis
Fungi	Candidiasis, Tinea Capitis, Histoplasmosis
Protozoa	Malaria, Trypanosomiasis, Amoebiasis
Helminthes	Nematodes: roundworms, guineaworms, onchocerchiais: Trematodes and Cestodes: Schizomiasis, Paragomiasis, Flat worms, Tapeworms, Tinea Sadinasa
Anthropods	Gigar

3.3 Infectious Agents

An infectious agent is any organism or agent that is capable of producing infection or infectious diseases. Infection is the successful invasion of the body by micro organisms. Please note that infection is not the same as infectious disease.

Reservoir

A reservoir is any human being/animal/anthropod/plants/soil or inanimate matter in which an infectious agent normally lives and multiply and on which it depends primarily for survival. It reproduces itself in such manner that it can be transmitted to successive host. Man is the only reservoir of infection from many diseases (man to man). Occasionally, an animal may serve as the reservoir.

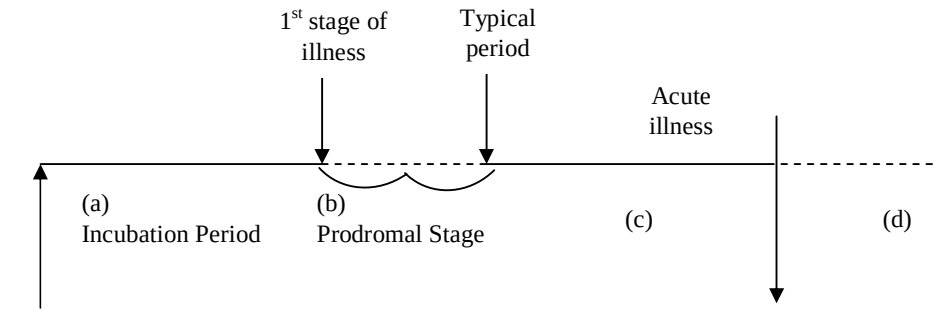
A zoonosis is an infectious disease transmissible under natural conditions from vertebrae animal to man. For example, rabies, sleeping

sickness, yellow fever (jungle type), anthrax, lassa fever (from rat and tape worm).

3.4 Concepts in Communicable Disease

The following concepts are very important in understanding communicable disease.

- **Incubation Period:** this is the period between the exposure to an infectious agent and the appearance of the first signs and symptoms of disease.



It is worthy of note here that the (d) point is the variable which is the outcome and could be the patient going into convalescence, chronic illness or death can occur.

Characteristics of organisms that influence diseases/illness formation

There are characteristics that influence disease/illness formation in the body. These are:

- infectivity
- pathogenicity
- virulence
- antigenic power.

SELF-ASSESSMENT EXERCISE

1. What is the meaning of the following words?

i. Infectivity
ii. Pathogenicity
iii. Virulence
iv. Antigenic power.

Resistance

This is the sum total of body mechanism that provides a barrier to the progress of invasion or multiplication of infectious agents and damage their toxic products. This is made possible through immunity.

Carrier

A carrier is someone who though has disease causing organism in his body but does not show any sign of infection. The carrier has the ability to harbour and disseminate the parasite without showing any clinical evidence of infection. There are times when even carriers of a disease are more than those showing the signs of the disease. They often become chronic carriers but this does not last long. Some of the disease known to have carriers include: cholera, salmonella typhi, poliomyelitis and diphtheria.

Types of Carrier

1. Incubatory carrier is one that is transferred during incubation period
2. Convalescent carrier is one that is transferred during recovery period
3. Intermittent carrier is one that is on and off
4. Chronic carrier is one in which the individual keeps carrying the disease on for a long time
5. Healthy carrier is someone who does not show the manifestation at any time but keeps on transmitting it to people.

Immunity

This is the resistance usually associated with possession of antibodies having specific actions on the micro-organism concerned with a particular infectious disease or its toxin. An individual is considered immune when he possesses specific protective antibodies or cellular immunity as a result of previous infection or immunisation or by previous experience. Immunity can be natural or acquired. Natural is inherent in the individual or specie and it is independent of previous infection. Acquired immunity can be active and passive. Active acquired immunity can be natural or induced, while passive acquired may be natural/trans-placental or passive induced.

Active Immunity: this is the immunity an individual develops as a result of infection or specific immunisation and usually associated with antibodies or cells having a specific action on the disease or toxin. This can be acquired through any of the following:

- After infection e.g. measles
- After in-apparent infection e.g. poliomyelitis
- After immunisation

Passive Immunity: this is the transference of antibodies produced in one body to another to induce protection against disease. This is useful for individual who cannot form antibodies or for the normal host who takes time to develop antibodies after active immunisation. Here, the body depends solely on ready-made antibodies. This can be derived from any of the following:

- when an antibody is administered
- transfer of maternal antibodies across the placenta
- transfer of lymphocytes to induce passive cellular immunity.

Herd Immunity: this is the level of resistance of a community or group of people to a particular disease. It provides an immunological barrier to the spread of disease in the human herd.

Vaccine: this is an immuno-biological substance designed to produce specific protection against a given disease. It stimulates the production of protective antibody and other immune mechanisms. It may be prepared from live modified mechanism or inactivated or killed organisms.

3.5 General Methods for the Control of Communicable Disease

Preventive measures	**Control of patient, contact and environment**	**Epidemic measures**	**International measures**
(a) Vaccination against epidemic (b) Chlorination of water supplies © Pasteurisation of milk (d) Control of rodent arthropod, animal (e) Immunisation (f) Public health education (g) Improvement of environmental sanitation and personal; hygiene (h) Chemoprophylaxis e.g. malaria, filariasis, meningococcal meningitis, bacillary	(a) Measures designed to prevent spread of infection matters to person and to the environment (b) Keeping contacts under surveillance during incubation periods © Keeping records under control until found to be free of infectious agents (d) reporting to local authority (e) Isolation (f) Concurrent disinfection (g) Quarantine i.e.	Measures to limit spread of communicable disease which has developed widely in a group or community within an area, state or nation: (a) Notification of occurrence to the appropriate health authority (b) Mass immunisation © Health education (d) Source and contact investigation	(a) Control of international travelers, immigrant, goods, animal products and the means of transport of the above (b) Intergovernmental arrangement, national laws © Monitoring immunisation posts especially at the boarders and ports.

dysentery.	limitation of improvement of person exposed to infection (h) Immunisation of contact (i) Investigation of contact (j) Specific treatment		

(Adapted from "Essentials of Community Health, PHC and Health Management)

3.6 Overview of the Non-communicable Diseases

Non-communicable disease is an illness that occurs due to a specific causative agent or its toxic products but not transferable from persons to persons. It may be acute or chronic. Our discussion here will cover the chronic diseases. This will include all ailments or deviation from normal which have one or the following characteristics:

- permanent disability
- leaves residual disability
- caused by non-reversible pathological change
- it requires the special training of the patient for rehabilitation
- it may be expected to require a long period of supervision, observation and care.

With the control of communicable disease in some part of the world, a change occurs in the demographic picture leading to an older population. This is why chronic disease has become the commonest cause of morbidity and mortality. An estimated 43% of all DALYs globally were attributable to non-communicable diseases. However in low and middle income countries the figure was 39%, while in high income countries was 81%. Non-communicable diseases include cardiovascular, renal, nervous and mental diseases, musculo-skeletal conditions such as arthritis and allied diseases, chronic non-specific respiratory diseases (e.g. chronic bronchitis, emphysema, and asthma), permanent results of accidents, senility, blindness, cancer, diabetes, and obesity and various other metabolic and degenerative diseases and chronic results of communicable diseases. Disorders of unknown cause and progressive cause and often labeled "degenerative".

3.7 The Risk Factors of Non-communicable Disease

There are six (6) major key sets of risk factors that are responsible for major distribution of non-communicable disease in relation to its morbidity and premature mortality. These are:

- use of cigarette and other forms of smoking
- alcohol abuse
- failure or inability to obtain preventive health services e.g. hypertension control, cancer detection and management of diabetes
- life-style changes e.g. dietary patterns, physical activity
- environmental risk factors e.g. occupational hazards, air and water pollution and possession of destructive weapons
- stress factors.

3.8 Problems of Investigating Non-communicable Disease

There are some problems in the understanding of the natural history of chronic/non-communicable disease. They include:

- absence of a known agent. In some chronic diseases, such as silica in silicosis, the absence of a known agent makes both diagnosis and prevention difficult. An example of this is cancer
- the multifactoral nature of the aetiology because most chronic diseases are caused by multiple factors. There is rarely a simple one-to-one cause-effect relationship and in the absence of a known agent, the term "risk factor/s" is used to describe certain factors in relation to a person's background or lifestyle. Occasionally, it can result from cumulative effects of multiple factors and may be addictive or synergistic
- long latent period (incubation period) between the first exposure to suspected cause and the eventual development of disease which is often difficult to determine. It is assumed that what is happening now to someone may result from the effect of past happenings
- indefinite onset so that the incidence rate is difficult to calculate. Most chronic disease is slow in onset and development and the distinction between diseased and non-diseased states may be difficult to establish. An example of this is cancer which by the time the patient seeks medical attention, the damage would have been irreversible or difficult to treat
- the differential effect of the factors on the incidence and the cause of the disease.

4.0 CONCLUSION

The prevalence of chronic disease reveals an upward trend all over the world and for obvious reasons. This trend is likely going to increase. Some of the adduced reasons are: that life expectancy is increasing with a greater number of people living to older ages and are at risk of chronic

diseases of various kinds relative to ageing; changing life-style and behavioural patterns which are favourable to onset of chronic diseases and modern medical care has enabled chronic disease sufferers to survive. However, the impact of the disease on the lives of the people is serious when measured in terms of loss of life, disability, family stress, poverty and its resultant effect on the nation's economy.

5.0 SUMMARY

In this unit, we have discussed the definition of infection and disease-causing agents. Infectious agents and reservoir are concepts worthy of note in the discussion of communicable disease and the general methods of control. We also examined the chronic non-communicable diseases which are assuming higher increase among the young and adult population in both developed and developing countries with its attendant changes in the patterns of health and disease.

6.0 TUTOR-MARKED ASSIGNMENT

1. Differentiate between infection and contamination.
2. What are the risk factors for hypertension?

7.0 REFERENCES/FURTHER READING

Alakija, W. (2000). *Essentials of Community Health, Primary Health Care and Health Management.* Medisuccess Publication.

Lucas, & Gilles (2003). *Short Textbook of Public Health Medicine for the Tropics*. London: Oxford University Press.

Lucas, & Gilles (1989). *A Short Textbook of Preventive Medicine for the Tropics*. ELBS.

UNIT 3 EPIDEMICS

CONTENTS

1.0 INTRODUCTION

In this unit, we shall be discussing epidemic outbreak and its related concepts. While an epidemic expresses the occurrence of a particular group of illness far beyond as expected in nature, surveillance entails the continuous scrutiny of and watchfulness over the distribution and spread of infection to provide the basis for effective control. It is hoped that you will find it very enriching.

2.0 OBJECTIVES

At the end of this unit, you should be able to:

- define epidemics
- explain various terms related to epidemics
- understand the sequence of events associated with epidemics
- investigate epidemic cases.

3.0 MAIN CONTENT

3.1 Definition and Terms in Epidemics

Epidemics can be defined as the occurrence in a community or region or a member of a defined population or a group having illness of a similar nature in excess of a normal expectancy in that population.

In epidemics, any kind of disease or injury may be involved and there are no universally applicable number of cases and no clear geographical extent e.g. food poisoning.

However, it can affect a large population which cuts across boundaries not really world-wide (pandemic) and not specific to time.

A disease can be said to be endemic in contrast to epidemics. This is a constant spread of a disease or an infective agent within a given geographical area. It is the usual prevalence of a given disease within an area.

Hyperendemic is a term that expresses a persistent intense transmission of the disease e.g. malaria

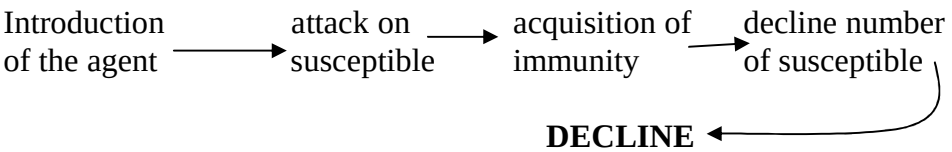
Epizootic and Enzootic are expressions that are equivalent of epidemic and endemic as they apply to animals e.g. epizootic of yellow fever in monkey which precedes that of yellow fever in man.

Herd Immunity: this is a condition in which community immunity is low. It is the measure of the proportion of the immune to the susceptible. When the herd is low, the infection can start and progress because the greater numbers of people are not immuned.

3.2 Propagation of Epidemics

Epidemics only affect a susceptible number of the population. There is an incubation period before manifestation of symptoms. However, susceptible may develop in apparent infection. The infectious agent may leave the host during the communicable period which varies in timing, and duration with each disease. The following are the sequence of events:

- introduction of the agent
- attack on susceptible
- acquisition of immunity
- reduction in the number of susceptible
- decline of the epidemic.



*** The Epidemic Cycle**

However, it is worth noting that the cycle can be influenced by any of these factors: immunity decline, migration and birth/death.

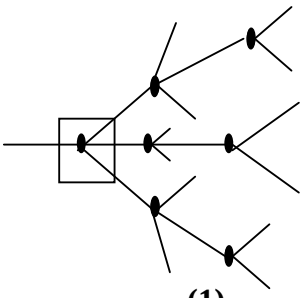
3.3 Types of Spread

There are two major types of spread in any epidemic. These are common vehicle epidemic and latent case. We shall consider each of the spread in turns.

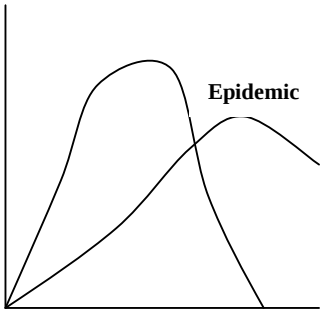
- **The Common Vehicle Epidemic:** this is also called the point source. Transmission here may be through water, food, air or by inoculation. When the epidemic results from a single exposure of the population it is called a point source epidemic. Sometimes, there may be repeated multiple exposure or a continued exposure over a period of time e.g. a contaminated well (point source). It is a point source at the closing up and if from the closing up there is continuous drinking from the source (contaminated well), then it becomes a multiple source.

Characteristics of common vehicle epidemics

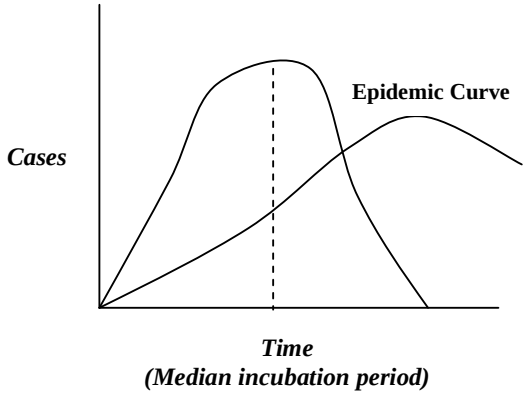
- explosive in onset
- limited in time, place and person (i.e.) there is geographical limitation
- serial transfer or propagation: this usually involves a transfer from host to host. The spread can be by contact, direct or indirect between the infected and susceptible.
- Route is respiratory, oral-fecal or genital-ingestion



(1)



Time



Typically, a common vehicle epidemic shows a rapid rise and a fall within one incubation period whereas in propagated epidemic, new cases continue to develop beyond one incubation period.

Please note the followings:

- that a typical point source epidemic may be affected by the development of secondary source. For example, water that is infected gives diarrhea.
- by the continuous contamination of the source, it ceases to give the picture of point source but multiple sources
- a disease that has a long incubation period will give the type of a long epidemic curve with serial transfer
- on the other hand, a propagated epidemic may look highly infectious with short incubation period
- geographical marking can be done to determine the geographical location of the victims and a spread can occur from centre to sub-boundary regions. The geographical marking and epidemic curve can help determine the type of epidemic and the source.

SELF-ASSESSMENT EXERCISE

List the characteristics of common vehicle epidemics.

3.4 Investigation of Epidemic

Having being exposed to some details about epidemics, it must be stated clearly that there are due process for investigation and this must be done systematically. It includes the following:

1. verification of the diagnosis: this includes what type of disease is been viewed, full history, laboratory investigation, post mortem examination may be required but often a clinical is all that is needed. People confuse infective hepatitis with yellow fever, hence investigation is necessary to confirm and rule out
2. confirmation of the existence of an epidemic. This is done by:

- looking at the previous clinical records and data, questioning the local people in order to obtain approximate estimate of the previous incidence of the disease in the area
- do a mapping to see how scattered/clustering a map to show that cases are spreading.

3. the identification of the affected persons and their characteristics: who is affected? In terms of age, sex, name, occupation, etc. Obtain their recent movement, time of onset of their symptoms, find out whether they were previously immunised, and find out their contacts within the incubation period of the disease so that you will be able to follow the contact. Here also, you will endeavour to look for additional cases that may be concealed and not typical in nature. Identify a common experience shared by all of those affected e.g. do they all go to the same venue when they ate the food (ceremonies)? Was the water contaminated from source or a sick person visited the family of recent. All of these provide for epidemiological description of those affected.
4. conduct further laboratory and immunological investigation of the population. Carriers are deduced e.g. cholera, cerebro-spinal meningitis to identify the type of organism and therapy sensitivity
5. study the environmental conditions at the time of the outbreak and compare with the previous condition. Find out if there is any change in water source, weather, food, housing conditions, population of human beings and any environmental change for epidemic invasion
6. Formulate a hypothesis. Here you will want to find out how it started, its source, method of transmission, reservoir etc.
7. management of the cases affected. This is involves any of the following:

- treatment of cases by health personnel
- rehabilitation facilities: measures are taken to prevent spread and control of epidemics. These will include chemotherapies, immunisation, isolation of infected individuals, and imposition of quarantine so as to reduce movement from one point to the other as well as education of the community to obtain cooperation.

Permanent control measures are also put in place which includes any of the following: personal hygiene, health education, water supply, vector control, food hygiene legislation, continuous vaccination programme.

- Report writing. This is usually from a layman, health planners and a scientific report.
- Continued surveillance of the population for early detection to reduce the spread.

All the steps mentioned above could be done concurrently.

4.0 CONCLUSION

An epidemic is an unusual occurrence in a community. It is a disease or specific health related behavior that is in excess of expected occurrence. The technique and methods of surveillance can be applied not only to communicable diseases but also non-communicable disease such as environmental hazards, cancer and other degenerative diseases as well as social problems such as drug addiction.

5.0 SUMMARY

This unit has examined epidemics and surveillance. You have examined the various components of epidemics, propagation, spread, characteristics and methods of investigating epidemics. The importance of surveillance for effective control and prevention which includes the collection, analysis, interpretation and distribution of relevant data for action was also discussed.

6.0 TUTOR-MARKED ASSIGNMENT

Clearly differentiate between index case and common vehicle onset.

7.0 REFERENCES/FURTHER READING

Park, K. (2000). *Park's Textbook of Preventive and Social Medicine.* India: M/s Banarsidas Bhanot Publishers.

WHO (2000). *Communicable Diseases.* Geneva: WHO/CDS/2000.1.WHO.

MODULE 3 SEXUALLY TRANSMITTED INFECTIONS AND HIV/AIDS

UNIT 1 SEXUALLY TRANSMITTED INFECTIONS

CONTENTS

1.0 INTRODUCTION

Communicable diseases are sometimes classified by means of transmission. The same applies in cases of sexually transmitted infections. Even when sexually transmitted infections are predominantly transmitted through sex, you should note that there are situations where sex is not directly involved. For example, the new born baby can be infected with gonorrhea during delivery. The issue of HIV is another example. Aside from sex, you must have learnt that HIV can be transmitted through other means like the exchange of blood and other bodily fluids (through the sharing of infected body-piercing instruments; transfusion with infected blood and blood products e.t.c) and also from mother to child. This can occur during pregnancy, during birth or through breast-feeding if the mother is infected with HIV. In this unit, you will learn more about sexually transmitted infections.

2.0 OBJECTIVES

At the end of this unit, you should be able to:

- define sexually transmitted infections
- give examples of some common sexually transmitted infections
- list the characteristics of at least two sexually transmitted infections.

3.0 MAIN CONTENT

3.1 What are Sexually Transmitted Infections (STD)?

Sexually transmitted infections are bacterial, viral, and parasitic infections, transmitted through sexual contacts. They usually affect the genital areas. They may also cause serious disease complications to the whole body. Sexually transmitted infections were, over the years, known by some other names. They used to be called venereal diseases (VD). This name was purportedly derived from the Roman goddess of love. Later, the name changed to sexually transmitted diseases.

In recent times, the name sexually transmitted infections is used. This is because it has been found that not all infections will get to the stage of disease. An example is the HIV infection. The fact that someone is infected with HIV does not mean he would eventually contract AIDS. That is, if he/she manages the condition very well through adequate diets, rest and medication.

3.2 Types of Sexually Transmitted Infections

There are many organisms transmitted through sex which can lead to diseases. You will learn about three of them in this unit.

i. Gonorrhoea
ii. Syphilis
iii. Genital Herpes

Gonorrhoea

This is caused by a bacterium called *Neisseria gonorrhoea*. It is transmitted by intercourse and by oral-genital and anal-genital contact. There is need for warmth and moisture provided by the mucus membranes of the vagina, mouth, or anus for the *Neisseria gonorrhoea* to survive. Because of this, it is not too likely for you to contract gonorrhoea by sharing someone else's towel or from sitting on a public

toilet seat, unless the bacterium had just been deposited there. Even then, the place should be warm and moist.

Syphilis

The organism that causes syphilis is called *Treponema Pallidum*. It is a corkscrew-like organism, which resembles bacteria. Like the gonorrhea bacterium, the organism causing syphilis can survive only in the warmth and moisture by the mucous membranes of the human body. The organism dies quickly outside the body. For this reason, syphilis may not be contracted from a toilet seat. Syphilis can be detected through a simple blood test. The treatment of syphilis is handled medically.

Genital Herpes

There are two types of herpes simplex viruses. Type one results in cold sores in the mouth, while type two causes genital herpes. In about two to 10 days after the virus has entered the body, some symptoms may begin to appear. The symptoms include sores and swollen glands (around the groin). The person will also experience flu-like symptoms (fever, muscle aches and a sick feeling). Also, pain in the genital area during urination or intercourse may occur. There may also be fatigue, swelling of the legs and watery eyes.

3.3 Sexually Transmitted Infections and Consequences

Case Study: Awaiting Result

Miss X, a young school leaver, contracted gonorrhea while awaiting her school certificate examination result. Instead of going to the hospital, she discussed the problem with her friends, who gave her some drugs to use. Because her condition was not improving, she borrowed some money and decided to go to a hospital far away from her home. In the hospital, treatment was commenced. On her third appointment in the hospital, she met a nurse who was from the same town with her. This made her to abandon her treatment.

SELF-ASSESSMENT EXERCISE

1. What made Miss X to abandon her treatment?
2. Explain the possible effect of the lady's half-treated gonorrhea?
3. What do you think should be done to prevent this type of action among young girls?

3.3 Consequences of Sexually Transmitted Infections

Sexually transmitted infections can have a lot of implications on the reproductive health of an individual. Especially in women, the consequences can be very serious. This is why STIs should be properly treated.

In women, pelvic inflammatory disease (PID) can come with the following associated complications:

- Infertility, ectopic pregnancy leading to maternal mortality; chronic pelvic pain, and increased possibility of subsequent pelvic infections.
- Adverse pregnancy and neonatal outcomes have also been identified as a consequence of STIs. In pregnant women, the organism responsible for syphilis, *Treponema Palludum* can cross the placenta barrier and infect the foetus. The same is possible with gonorrhoea and *Chlamydia trachomatis*.

Another problem is cervical cancer. In most cases, there may not be prompt detection and treatment. What happens often, however, is that most women are at an advanced stage of the disease, usually leading to high rates of morbidity and mortality.

Social Consequences

In a country or an area where much value is attached to children, the social consequences of STI can be serious for a woman. Imagine a situation where improperly managed STI leads to infertility. A lot of sad things can happen to the woman:

- she will be stigmatised
- she can be abandoned or rejected by her husband.

Even when there is no problem of infertility, when there is STI, there may be conflicts arising between the couples. The friends and family members who provide support may start accusing the woman. There is mistrust. This may lead to both psychological and emotional problems for the couple.

Economic Consequences

STIs are not without some economic consequences. Handling the disease involves both direct and indirect costs. The direct costs are costs incurred in the process of treatment. Diagnosis, screening and treatment can be very expensive. Because of the expensive screening cost, some

communities have resorted to the use of syndrome management or presumptive therapy without laboratory screening. Some costs cannot be measured in currency, but that does not mean that they do not exist. Some of the indirect costs associated with STIs include: loss of productive life, the cost in infant morbidity, debility and mortality, increase in the economic burden placed on a society.

4.0 CONCLUSION

Sexually transmitted infections can be prevented and can also be treated. If they are not treated properly, they can have serious implications for the sexual health of an individual. There is the need to acknowledge that other STIs such as gonorrhea, syphilis, pelvic inflammatory disease, etc should be given attention like HIV. When these infections are not properly treated, they can cause a lot of harm.

5.0 SUMMARY

In this unit, you have learnt that sexually transmitted infections are infections one can get through sexual intercourse. But you also know that one can get sexually transmitted infections through other means apart from sex. In the past, venereal diseases (VD) and sexually transmitted diseases (STDs) were used to describe this class of infections. Examples of sexually transmitted infections are gonorrhea, syphilis and genital herpes. You have learnt in this unit the various consequences of sexually transmitted infections. You are already aware that the consequences of STIs go beyond physical pain or discomfort. They also have social and economic consequences, all of which can have adverse effects on the well being of the individual.

6.0 TUTOR-MARKED ASSIGNMENT

1. Explain sexually transmitted infections with two examples.
2. Explain the health implications of STIs.
3. Differentiate between direct and indirect cost of STIs

7.0 REFERENCE/FURTHER READING

Greenberg, *et al* (1997). *Wellness*: *Creating a Life of Health and Fitness.* London: Allyn & Bacon.

UNIT 2 HUMAN IMMUNO-VIRUS/ACQUIRED IMMUNE DEFICIENCY SYNDROME

CONTENTS

1.0 INTRODUCTION

HIV means 'Human Immuno-deficiency Virus' and AIDS means 'Acquired Immune Deficiency Syndrome'. As a syndrome, AIDS is a group of signs and symptoms resulting from the attack of the HIV on the body's immune system. It is the worst epidemic so far and it affects every part of the globe. Its effect is estimated to that of the four World Wars put together and it still defies cure. Available drugs do not cure but prevent multiplication of the virus.

2.0 OBJECTIVES

At the end of this unit, you should be able to:

- define HIV/AIDS
- describe the symptoms of HIV/AIDS
- explain the different types of HIV
- differentiate the different types of HIV on the basis of cytopathy and virulence
- describe the structure of HIV
- explain the different genes and their functions in the HIV genome
- explain all the processes involved in the replication of HIV.

3.0 MAIN CONTENT

3.1 HIV/AIDS

The Human Immuno-Deficiency Virus (HIV) is a retro virus so called because this single stranded RNA (ssRNA) virus contains a pol gene that codes for a reverse transcriptase. The HIV is causative agent of the Acquired Immune Deficiency Syndrome (AIDS) which is a pandemic that have spread around the whole world. In 1981, the Communicable Diseases Centre, Atlanta USA noted an increase in requests to use pentamidine for pneumocystis carinii infection in previously healthy individuals who also suffered severe infections by other normally harmless microorganisms. These include candida albicans oesophagittis, mucocutaneous herpes simplex, toxoplasma CNS infection or pneumonia and cryptosporidial enteritis; and Kaposi's sarcoma was often present. Such patients had evidence of impaired immune function as shown by skin test allergies and depletion of CD4 positive T-helper lymphocytes. This immunodeficiency syndrome appearing in an individual without a known cause, such as treatment with immunosuppressive drugs was referred to as "Acquired Immune Deficiency Syndrome" (AIDS).

Signs and symptoms of acute HIV infection usually occur within days to weeks after initial exposure and last from a few days to more than 10 weeks (usually less than 14 days). Unfortunately, the syndrome is often undiagnosed or misdiagnosed because HIV antibodies are not usually detected during this early phase of infection.

AIDS is a severe, life threatening syndrome which represents the late clinical state of infection with HIV. Invasion and destruction of helper T-cells lead to suppression of the patient's immune system. The immune system of the HIV infected person is unable to produce antibodies in response to T–cell dependent antigens. Secondary infections caused by viruses, protozoa, bacteria and or fungi become systemic and cause death of the patients. AIDS patients die as a result of overwhelming infections caused by a variety of opportunistic pathogens. Previously considered to be a universally fatal disease, certain combinations of drugs referred to as cocktail are used in extending life of AIDS patients.

3.2 Different Types of Human Retroviruses

HIV is classified as a retrovirus because it contains' reverse transcriptase. It is a D type virus in the Lentivirus family. Retroviruses are ribonucleic acid (RNA) viruses and in order to replicate they must make a deoxyribonucleic acid (DNA) copy of their RNA. It is the DNA genes that allow the virus to replicate.

Like all viruses, HIV can replicate only inside cells, commandeering the cell machinery to replicate (reproduce). However, only HIV and other retroviruses, once inside the cell, use the enzyme called reverse transcriptase to convert their RNA into DNA which can be incorporated into the host cells' gene.

Infections of cultured T – cells with HIV usually result in cell death. The major antigenic types (HIV-1 and HIV – 2) have been identified and are readily distinguished by differences in antibody reactivity to the envelope glycoproteins. The two HIV types share approximately 40% genetic identity. There is some disagreement about whether or not they are pathogens. Both apparently cause AIDS, but some researchers think that HIV-2 is less virulent in causing diseases.

Different isolates of HIV-1 and HIV-2 exhibit considerable genomic variation and antigenic heterogeneity. The most variable regions are in the envgene. This type of variation is observed in HIV isolates obtained from individuals over the course of their infection. HIV strains often display differences in replicative capacity and cytopathic effect /cytopathicity.

In 1983, the causative virus of AIDS, HIV was isolated from blood lymphocytes and recognised as belonging to the Lentivirus (slow viruses) group of retroviruses related to similar agents in monkey and to similar virus in sheep and goats.

Table 2 Human Retroviruses

Virus	Characteristics
HTLVI	Endemic in W. Indies and SW Japan. Transmission via blood human milk and can cause adult t–cell leukaemia and HTLV 1 associated myelopathy and tropical spastic apararesis
HTLV2	Uncommon and sporadicoccurrence. Transmission via blood. It can cause hairy T. Cell leukaemia
HIV 1, HIV2	Transmission via blood and sexual intercourse. Responsible for ARC, AIDS, AIDS dementia etc. HIV 2 is West African in origin, closely related but antigenically distinct
Human foamy virus	Causes foamy vacuolation in infected cells. Little is known of its occurrence or pathogenic potential
Human placental virus(es)	Detected in placental tissues by electron microscopy and by the presence of reverse transcriptase
Human genome viruses	Nucleic acid sequence representing endogenous retroviruses are common in the vertebrate genome, often in well defined genetic loci, acquired during evolutionary history, not expressed as infections virus.

The human placental and genome viruses are not known to be infectious agents. An increasing number of different straits of both HIV-1 and HIV-2 are being identified by molecular virology and by phenotyping in cell culture. Highly cytopathic and infectious strains of HIV-1 have been identified in parts of Central Africa. Increases in virulence, appear to be due to minor differences in the molecular structure of the virus. Some strains of HIV-2 appear to cause few symptoms in those known to have been infected for many years.

The molecular biological evidence through nucleic acid sequencing indicates that both HIV-1 and the closely related HIV – 2, seen in West Africa probably arose from closely related primate viruses. HIV–1 may have been present in humans in Central Africa for many years but in the late 1970s, it began to spread rapidly possibly with change of properties, as a result of increased transmission following major socio-economic upheavals and migration of people from Central to East Africa, especially female prostitutes and mobile male soldiers.

3.3 The Structure of HIV

The general structure of HIV is similar to that of Human T – cell Leukemia viruses (HTLV). The virus consists of an external lipid bilayer glycoprotein envelope (including envelopes proteins gp 120 and gp 41), an internal protein core (proteins p15, p17 and p24), a viral RNA complexed with reverse transcriptase. The HIV genome is approximately 10 kilobases which is larger than the HTLV. In addition to the structural gag, pol and env genes, it has regulatory lat (analogous to HTLV rex) genes (nef, rif, vpu and vpr). HIV -2 does not have sequences for vpu but does encode a novel gene, vpx, which is also found in the simian immunodeffiency virus.

A complete HIV particle consists of an envelope, a coat or capsid shell and core. The envelope is the membrane that surrounds the virus. It is a lipid (fat bilavyer), which is derived from the host proteins. Embedded in the envelope is the viral encoded glycoprotein (gp), gp41. Bound to this is the outer glycoprotein knob gp120 molecules bound to specific molecules on the surface of the host cell called cluster designation 4 (CD4) receptors. The capsid is the protein coat that surrounds the core (viral genome) of the virus. It is made up of protein (P) p17 and p18 which is the icosahedral symmetry. The viral core is the elongated inner mass of the virus which contains two identical single strands of viral RNA, structural protein, the enzyme reverse transcriptase and other enzymes. The main core protein is P25. Serological diagnosis of HIV is based on P24, P26 specific detection of antibiotic to HIV and envelope proteins.

SELF-ASSESSMENT EXERCISE

1. List the different types of HIV.
2. What are Lentiviruses?
3. The enzyme used in classifying HIV is called what?

3.4 Replication in HIV

Viral replications are regulated by the products of the genes. The replication cycle is often halted after integration of the provirus, so that the infection remains latent in the cell. The lat and ref genes, for instance, function as transactivating factors and can increase production of viral RNAs and proteins when latently infected cells are stimulated to differentiate (e.g. T-helper cell by antigen) or stimulated by infection with certain other viruses (e.g. HSV, cytomegalovirus).The life cycle of HIV involves 8 steps namely:

- attachment/entry
- reverse transcription and DNA synthesis
- transport to the nucleus
- integration
- viral transcription
- viral protein synthesis
- assembly of virus
- release of virus.

1. Entry of HIV into Cells

Infection typically begins when an HIV particle, which contains two copies of the HIV RNA, encounters a cell with a surface molecule called cluster designation 4(CD4). Cells carrying this molecule are known as CD4 positive cells.

One of the virus gp120 molecules binds tightly to CD4 molecule(s) on the cells surface. The binding of gp 120 to CD4 results in conformational chance in the gp 120 molecule, allowing it to bind to a second molecule on the cell surface known as co-receptor. The envelope of the virus and the cell membrane then fuse, leading to the entry of the virus into the cell. The gp41 of the envelope is critical to the fusion process. Drugs that block either the binding or the fusion process are being developed and tested in clinical trials.

Studies have identified multiple co-receptors for different types of HIV strains. These co-receptors are promising targets for new anti –HIV drugs, some of which are now being tested in pre-clinical and clinical studies. In the early stage of HIV diseases, most people harbour viruses

that use, in addition to CD4, a receptor called CCR5 to enter their target cells. With disease progression, the spectrum of co-receptor usage expands in approximately 50 percent of patients to include other receptors, notably a molecule called CXCR4. Virus that utilises CCR5 is called R5 HIV and virus that utilises CXCR4 is called X4 HIV.

Although CD4+ T – cells appear to be the main target of HIV, other immune system cells with and without CD4 molecules on their surfaces are infected as well. Among these are long-lived cells called monocytes and macrophages, which apparently can harbour large quantities of the virus without being killed, thus acting as reservoirs of HIV. CD 4 T-cells also serve as important reservoir of HIV. A small proportion of these cells harbour HIV in a stable, inactive form. Normal immune processes may activate these cells resulting in the production of new HIV virions. Cell to cell spread of HIV also can occur through the CD 4-mediated fusion of an infected cell with an uninfected cell.

2. Reverse transcriptions

In the cytoplasm of the cell, HIV reverse transcriptase converts viral RNA into DNA, the nucleic acid form in which the cell carries the genes. Nine of the 15 antiviral drugs approved in the United States of America for treatment of people with HIV infection, AZT, ddC, ddI, d4T, 3TC nevirapine, delavirdine abacavir, and efavireng- work by interfering with this stage of the viral cycle.

3. Integration

The newly made HIV DNA moves to the cells nucleus, where it is spliced into the list's DNA with the help of HIV intergase. HIV DNA that enters the DNA of the cell is called a "provirus". Intergase is an important stage for the development of new drugs.

4. Viral transcription: for a provirus to produce new viruses, RNA copies must be made that can be read by the host cell's protein making machinery. These copies are called messenger RNA (mRNA) and production of mRNA is called transcription, a process that involves the host cell's own enzymes. Viral genes in contact with the cellular machinery control this process. The lat gene for example encodes a protein that accelerates transcription. Genomic RNA is also transcribed for later incorporation in the budding virion. Cytokines proteins involved in the normal regulation of the immune response may also regulate transcription. Molecules such as tumour necrosis factor (TNF)-alpha and interleuckin6 (IL-6), secreted in elevated levels by the cells of HIV-infected people may help to activate HIV proviruses. Other

infections by organisms such as mycobacterium tuberculosis may also enhance transcription by inducing the secretion of cytokines.

5. Translation

After HIV mRNA is processed in the cell's nucleus, it is transported to the cytoplasm. HIV proteins are critical to this process. For example, a protein encoded by the rev gene allows mRNA encoding HIV structural proteins to be transferred from the nucleus to the cytoplasm. Without the rev protein, structural proteins are not made. In the cytoplasm, the virus co-opts the cell's protein making machinery including structures called ribosome-to make long chains of viral proteins and enzymes using HIV mRNA as a template. This process is called translation.

6. Assembly and Budding

Newly made HIV co-reproteins, enzymes and genomic RNA gather just inside the cell's membrane while the viral envelope proteins aggregate within the membrane. An immature viral particle forms and buds off from the cells, acquiring an envelope that includes both cellular and HIV proteins from the cells membrane. During this part of the viral life cycle, the core of the virus is immature and the virus is not yet infectious. The long chains of proteins and enzymes that make up the immature viral core are now cleaved into smaller pieces by a viral enzyme called protease. This step results in infectious viral particles. Drugs called inhibitors interfere with this step of the viral life cycle. Six of such drugs are saquinavir, ritonavir, indinavir, amprenavir, nelfinavir and lopinavir-have been approved for marketing in the United States of America.

4.0 CONCLUSION

In this unit, we presented a definition of HIV/AIDS. Specificaly, we saw that HIV means 'Human Immuno-Deficiency Virus' (HIV) and AIDS means 'Acquired immune Deficiency Syndrome'. As a syndrome, AIDS is a group of signs and symptoms resulting from the attack of the HIV on the body's immune system.

5.0 SUMMARY

You have seen that HIV, the aetiology of AIDS which is pandemic is retrovirus of the lentivirus family. HIV/AIDS is associated with opportunistic infections such as pneumocystic carinii infections, candida albicans oesophagitis, toxoplasma CNS infection etc. HIV infected patients had evidence of impaired immunity as shown by skin test anergies and depletion of CD4 positive T-helper lymphocytes. There are two types of HIV i.e. HIV 1 and HIV 2 on the basis of antibody

reactivity to the envelope glycoproteins. Both share 70% genetic identify. The general structure of HIV I is similar to that of HTLV. The viral replication is regulated by the product of genes. Eight steps are involved in HIV replication which includes attachment/entry, reverse transportation and synthesis, transportation to the nucleus, integration, viral transcription, protein synthesis assembly and release of viruses. Careful and in depth examination of patients are required so as not to miss out something vital in clinically diagnosis of HIV.

6.0 TUTOR-MARKED ASSIGNMENT

1. What do you understand by HIV and AIDS?
2. List six infectious agents associated with AIDS.
3. What effect has HIV on the T-cell?

7.0 REFERENCES/FURTHER READING

Baron, S. (1996). *Medical Microbiology*. Galveston: University of Texas Medical Branch.

Burton, R.W & Engelkirk P. G (2000). *Microbiology for the Health Sciences*, Lippincott Williams & Wilkins.

Moro, D. D, Opere, B. O & Famurewa, O (2004). *HIV Infection among Pregnant Women in Osogbo, Osun State, Nigeria.*

UNIT 3 DEMOGRAPHIC INCIDENCE AND PREVALENCE OF HIV/AID

CONTENTS

1.0 INTRODUCTION

This unit of your study deals with demography which is the statistical study of human population. This unit essentially will relate HIV/AIDS prevalence and incidence to the epidemiology of the disease. That is, the study of HIV/AIDS in terms of its distribution pattern or spread and the number of new cases around.

2.0 OBJECTIVES

At the end of this unit, you should be able to:

- explain the factors that encourage the spread of AIDS in Africa
- appreciate the spread of HIV/AIDS globally and locally
- discuss HIV surveillance epidemiology in terms of modes or routes of transmission
- identify some high risk culture – related practices/ factors that increase HIV/AIDS spread.

3.0 MAIN CONTENT

3.1 HIV/AIDS Global Demographic View

The disease spreads through infected blood production and drug abuse, but overwhelmingly by sexual contact, predominantly between men and women. Women are more vulnerable to infection due to physiological and social reasons, and sex workers are far more likely than the

population at large to be infected. But the sexual behaviour of men is largely responsible for spreading the disease. The study of HIV/AIDS' general distribution pattern or spread as well as the total number of new cases is shown in the alarming figures enumerated below according to a report by the World Health Organisation (WHO):

1.	North America	-	1.2 million
2.	Caribbean	-	300, 000
3.	Western Europe	-	220, 000
4.	Eastern Europe & Central Asia	-	1.6 million
5.	East Asia	-	870, 000
6.	South & South East Asia	-	74, million
7.	Oceania	-	74, 000
8.	Sub-Sahara Africa	-	25.8 million
9.	North Africa & Middle East	-	510, 000
10.	Latin America	-	1.8 million
		-	39.774 million

SELF-ASSESSMENT EXERCISE

Highlight the possible reasons for the difference in the total population of HIV positive people in North America and Sub-Saharan Africa.

3.2 The UN View of HIV/AIDS Pandemic

The United Nations has called AIDS the most devastating disease mankind has ever faced. AIDS is a worldwide catastrophe and the biggest plague in human history. The latest statistics tell us that about 40 million people worldwide are HIV-positive. In sub-Saharan Africa, we have 70% of that 40 million people. Experts estimate that 600,000 people, especially babies become infected each year.

All the wars in the twentieth century resulted in 33 million deaths. But in just about 25 years of AIDS, already about 25 million people or more have died.. 8,000 people die every day from HIV/AIDS in sub-Saharan Africa. From Nigeria to Cape Town, 6,000 people die daily from AIDS. The continent of America and the world were shocked when on September 11 of the year 2001, the world trade centre collapsed through terrorist's attacks, but in Africa, the world trade centre collapses twice a day, in terms of the number of victims that die from AIDS in Africa.

3.3 Epidemic of HIV in Nigeria

The spread of this virus in Nigeria is believed to have started in the 1980s with the first AIDS case reported in 1986. Nigeria is currently experiencing a general HIV prevalence persistently above 1% in

pregnant women attending antenatal clinic since 1999. In 2003, it was estimated that over 3.2-3.8 million persons were living with HIV/AIDS in Nigeria.

It is believed that statistics on HIV/AIDS in Nigeria is not a true picture of what is on ground but it is estimated that there could be 1 to 2 million people in Lagos alone who are HIV positive. The city of Lagos is also estimated to have the largest number of HIV positive victims than many cities in the world. It is said that in Lagos, commercial hawking of one's body is a big factor in HIV/AIDS spread. According to the Federal Ministry of Health, the official HIV/AIDS prevalence rate in Nigeria between the years 2000 to 2005 is around 5.8%, and more recently, the 2007 health statistics indicates 4.4%, hopefully a steady and promising decline.

3.4 HIV Sentinel Surveillance

The virus, sentinel surveillance, was established to monitor trend in the HIV epidemic and assess the impact of the response. The survey was conducted from August 29 to November 26, 2005 to determine HIV prevalence among pregnant women attending antenatal clinics and also acquire data for estimating and projecting HIV figures and trends in the general population.

The 2005 sentinel survey involved 36,931 pregnant women attending antenatal clinics in 160 sites (86 urban and 74 rural) in 36 states and the management team was set up by the Federal Ministry of Health under the chairmanship of the Director of Public Health. The National Action Committee on AIDS (NACA), UN agencies, bilateral agencies and other stakeholders participated as members of the committee.

3.5 Epidemiology of HIV/AIDS in Nigeria

The prevalence of HIV among antenatal clinic clients after the 2005 sentinel survey was found to be 4.4%. It was 1.9% in 1991, 4.5% in 1996, and 5.8% in 2001. HIV epidemic in Nigeria has since extended beyond the high risk groups to the general population. Some parts of the country are worst affected than others but no state is unaffected. All the states of Nigeria have a generalised epidemic (>1% among pregnant women) The epidemic in the country can be described as heterogeneous with various communities in different stages, some declining while others are still rising.

From the result of the 2003 survey, it was estimated that 3.5 million people were living with HIV/AIDS in the country. The report also showed that HIV was more prevalent in the 20-29 years age group in the

urban areas and amongst persons with only primary and secondary school education. AIDS cases are becoming more visible in communities. Although AIDS case reporting has been characterised by under-recognition, under-reporting and delayed reporting. The number of reported cases has been on the increase especially since 1996.

HIV prevalent rate among commercial sex workers in Nigeria has remained high and on the increase from 17.5% in 1991, through 22.5% in 1993, to 35.6% in 1995. This group constitutes an important reservoir of HIV infection for transmission to the general population through sexual networking. Also, the growth in prevalence among tuberculosis patents has remained relatively high- 2.8% in 1991, 7.9% in 1993, 13% in 1995 and 17% in 2000 (refer to Figures 1 to 3 and Tables 1 to 4).

HIV Prevalence by State

States in the North West and South West present lower HIV prevalence. High HIV prevalence is concentrated in Benue and adjoining States as indicated in Figures 3.1 and 3.2 respectively.

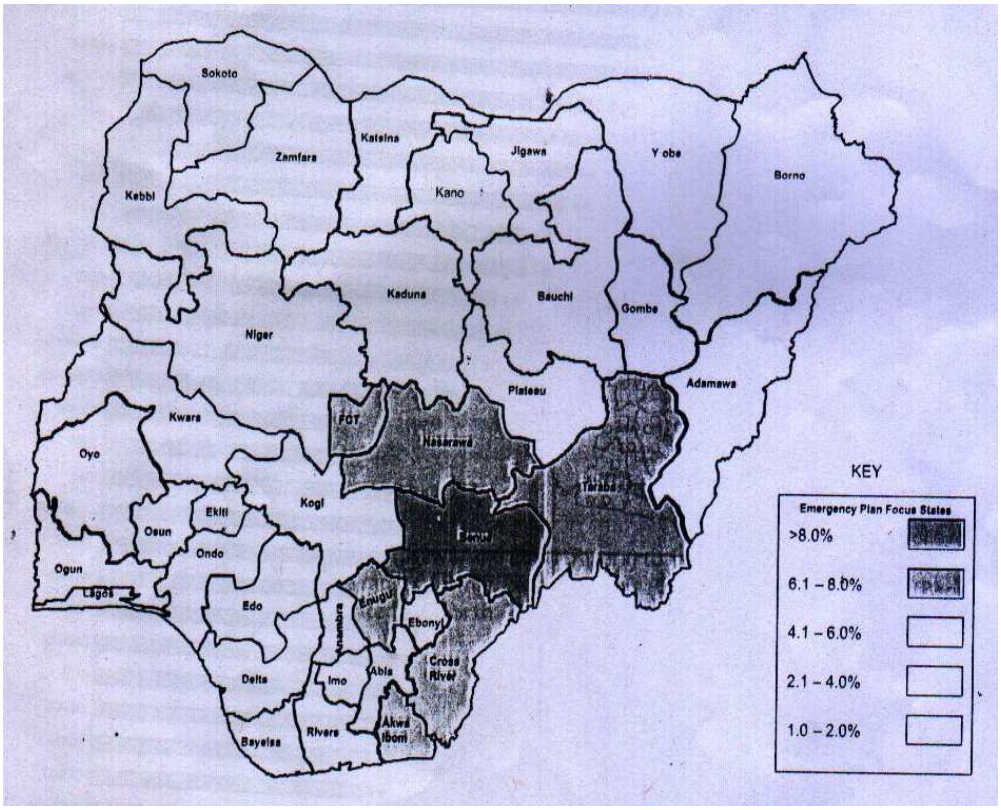


Fig. 3.0: The State HIV Prevalence Range from 1.6% (Ekiti) to 10.0% (Benue) and the Median Prevalence was 4.0% (Abia)

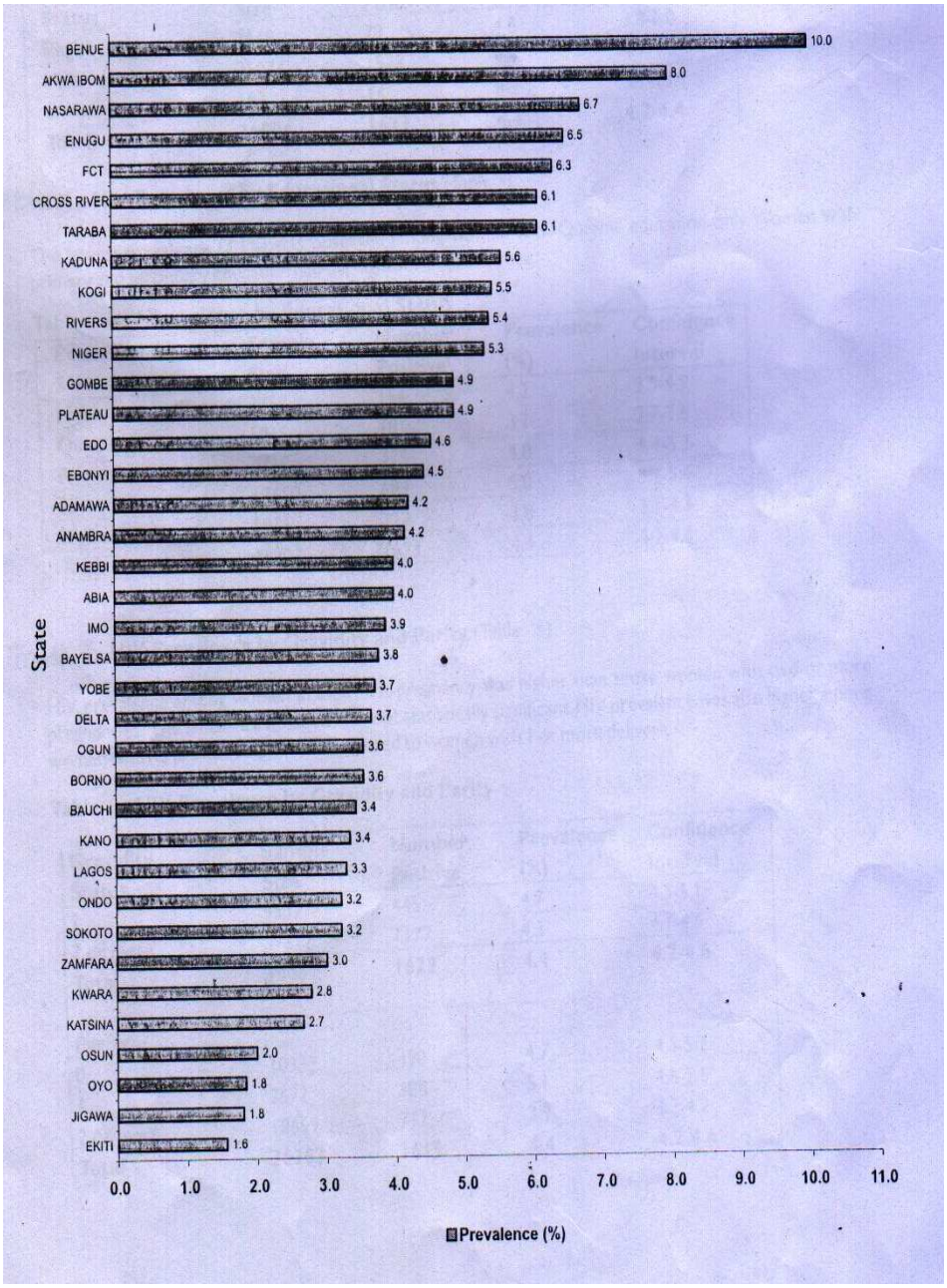


Fig. 3.1: HIV Prevalence by State (HSS 2005)
2005 HIV Sentinel Survey.

Table 3.2: HIV Prevalence by Marital Status (HSS 2005)

Marital Status	**Sample Size**	**Number Positive**	**Prevalence (%)**	**Confidence Interval**
Single	1648	78	4.8	3.8-6.0
Married	35074	1528	4.4	4.1-4.6
Other	182	16	8.8	5.1-13.9
Total	**36904**	**1623**	**4.4**	**4.2-4.4**

HIV prevalence was lowest among married women

Table 3.3: HIV Prevalence by Educational Status

Educational Status	**Sample Size**	**Number Positive**	**Prevalence (%)**	**Confidence Interval**
None	3757	156	4.2	3.5-4.9
Quranic Only	5816	181	3.1	2.7-3.6
Primary	7768	375	4.8	4.4-5.3
Secondary	13650	689	5.0	4.7-5.4
Higher	5911	222	3.8	3.3-4.3
Total	**36902**	**1623**	**4.4**	**4.2-4.6**

HIV prevalence among those in their first pregnancy was higher than those women with two or more pregnancies. The difference however was not statistically significant. HIV prevalence was also higher among women with no previous deliveries compared to women with one or more deliveries.

Table 3.4: HIV Prevalence by Gravidity and Parity

Marital Status	**Sample Size**	**Number Positive**	**Prevalence (%)**	**Confidence Interval**
1	9532	445	4.7	4.3-5.1
2 or more	27317	1177	4.3	4.1-4.6
Total	**36851**	**1622**	**4.4**	**4.2-4.6**
Parity				
0	10332	490	4.7	43.-5.2
1	7672	388	5.1	4.6-5.6
2 or more	18699	737	3.9	3.7-4.2
Total	**36703**	**1615**	**4.4**	**4.2-4.6**

Trend Analysis

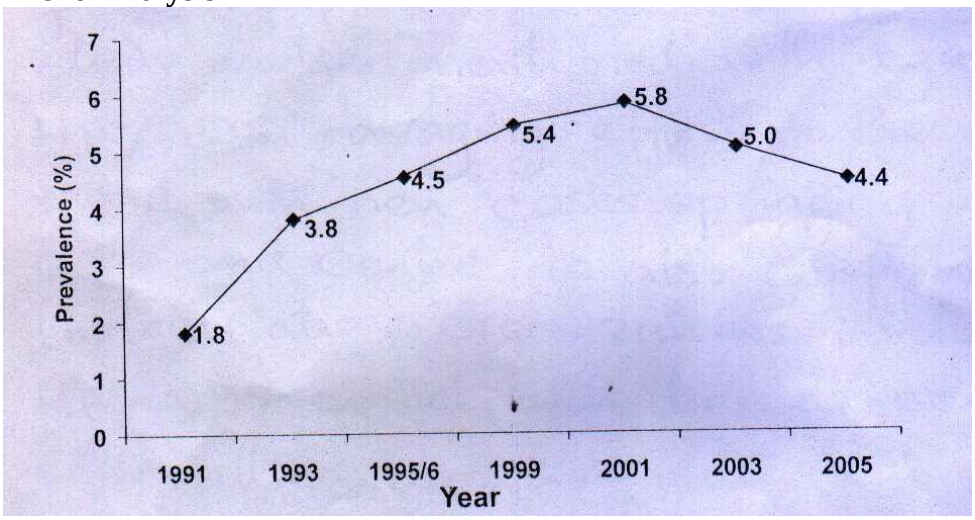


Fig. 3.4: National HIV Prevalence Trend, 1991 – 2005 (HSS 2005)

Table 3.4: HIV Prevalence Trends by State, 1991 – 2005 (HSS 2005)

State	1991/92	1993/94	1995/96	1999	2001	2003	2005
Adamawa	0.3	1.3	5.3	5.0	4.5	7.6	4.2
Anambra	0.4	2.4	5.3	6.0	6.5	3.8	4.2
Benue	1.6	4.7	2.3	16.8	13.5	9.3	10.0
Borno	4.4	6.4	1.0	4.5	4.5	3.2	3.6
Cross River	0.0	4.1	1.4	5.8	8.0	12.0	6.1
Delta*	0.8	5.1	2.3	4.2	5.8	5.0	3.7
Edo	0.0	1.8	3.0	5.9	5.7	4.3	4.6
Enugu	1.3	3.7	10.2	4.7	5.2	4.9	6.5
Kaduna	0.9	4.6	7.5	11.6	5.6	6.0	5.6
Kano	0.0	0.4	2.5	4.3	3.8	4.1	3.4
Kwara	0.4	2.4	1.7	3.2	4.3	2.7	2.8
Lagos	1.9	6.8	-	6.7	3.5	4.7	3.3
Osun*	0.0	1.4	1.6	3.7	4.3	1.2	2.0
Oyo*	0.1	0.2	0.4	3.5	4.2	3.9	1.8
Plateau*	6.2	8.2	11.0	6.1	8.5	6.3	4.9
Sokoto	1.8	1.6	-	2.7	2.8	4.5	3.2
Abia	ND	ND	ND	3.0	3.3	3.7	4.0
Akwa Ibom	ND	ND	ND	12.5	10.7	7.2	8.0
Bauchi	NN	ND	ND	3.0	6.8	4.8	3.4
Bayelsa	ND	ND	ND	4.3	7.2	4.0	3.8

4.0 CONCLUSION

It is clear from the WHO report of demographic incidence and prevalence study earlier mentioned that new cases of HIV/AIDS are springing up. All hands must be on deck in the fight to control the scourge that has been on the increase ever since its emergence.

5.0 SUMMARY

In this unit, we have seen that the latest statistics tell us that there are about 40 million HIV positive people globally. 70% of the 40 million sero-positive people are said to be in sub-Saharan Africa alone. 600,000 people, mainly babies become infected with HIV every year. In just about 25 years of AIDS, 25 million people or more have died of it in the world. 8000 people die every day of AIDS in sub-Saharan Africa alone and the 2003 sentinel survey estimated that about 5.0 million people are living with HIV/AIDS in Nigeria.

6.0 TUTOR-MARKED ASSIGNMENT

Describe the global demographic view of HIV/AIDS and the nursing intervention.

7.0 REFERENCES/FURTHER READING

Adeyi, O., Kanki, P. I., Odutolu, O. & Idoko, J. A. (2006). *AIDS in Nigeria: A Nation on the Threshold*. U.S.A: Harvard University Press.

Federal Ministry of Health (1992). *Care of a Person with AIDS in the Community*. Lagos: Federal Ministry of Health and Social Services.

Technical Report (2005). *National HIV/Syphilis Sero-prevalence Sentinel Survey among Women*.

UNIT 4 TESTINGS FOR HIV AND RESULTS

CONTENTS

1.0 INTRODUCTION

In this unit, we will look at the various ways of examining HIV, testing infants for HIV, possible HIV test results, and the window period.

2.0 OBJECTIVES

At the end of this unit, you should be able to:

- describe HIV testing
- describe testing infants for HIV
- identify possible HIV test results.

3.0 MAIN CONTENT

3.1 The HIV Test

The HIV test is a test that tells if a person is HIV positive or negative by using a simple blood test or at times making use of saliva or urine. Several methods have been developed to detect the infection. Most HIV test that are readily available and affordable do not actually test for the HIV virus but rather for the antibodies produced by the body in reaction to the HIV infection. It is important to note that even though HIV antibodies can be detected in the mouth and in urine, the virus cannot be transmitted from one person to another through saliva or urine. This is because there is not enough of the virus in saliva or urine to infect people this way. HIV needs to be present in very large quantities in order for a person to be infected. The only body fluids that contain enough HIV to be infectious are blood, semen, pre-cum, vaginal fluids and breast milk. There are test which can detect the virus but they are very expensive and require rigorous procedure to carry out.

It is important to remember that the HIV test can only detect if a person has contracted the virus and not:

- if a person has AIDS (only a doctor can make this diagnosis)
- how the person became infected with HIV
- how long the person has been living with HIV
- who infected the person.

HIV test can be carried out in any reputable medical institution/facility and various approved and regulated Non-governmental organisations and laboratories across the country. When the HIV test is carried out typically, it is followed by another HIV test which is called a confirmatory test, done to confirm the result of the first test. A confirmatory test is carried out only for HIV positive results and it is carried out shortly after the first test so as to make sure that the positive result is truly positive.

3.2 Testing Infants for HIV

Children born to HIV positive mothers can be prevented from contacting the virus from their mothers with proper medical attention, care and treatment. Unfortunately, it is difficult to ascertain if a child is positive or not soon after he/she is born. This is because children carry their mother's antibodies for several months after birth as a form of protection against infection. Since most available HIV test seeks to detect HIV antibodies, then the children would test positive because they are carrying their mothers HIV antibodies. Babies born to HIV positive mothers can test positive for antibodies acquired from their mothers for as long as 15 months after birth. For this reason, identifying infected and uninfected infants can only be possible after 18 months. HIV-antibody test results will only show us infants who have been exposed to the virus via their mothers. As mentioned previously, in environments where the HIV test which can detect the virus itself as opposed to the HIV antibody produced by the mothers body is available, the children can accurately be tested HIV negative or positive.

SELF-ASSESSMENT EXERCISE

When the HIV test is carried out typically it is followed by another HIV test. What is it called?

3.3 Possible HIV Test Results

A. Negative Result

An HIV negative result can mean one of the followings:

- the person has not been infected with the HIV virus and the HIV antibodies have not being found in the individual's blood.
- that person has been infected with HIV in the last 3-6 months, and the body has not yet developed antibodies for the HIV test to detect the infection.

It is recommended that everybody who is HIV negative should be asked to carry out another HIV test within 3-6 months of the first test during which time they should avoid putting themselves and others at risk contracting the HIV infection. This period is called the window period.

In cases where an individual has developed AIDS and is very ill, the person's HIV test may read HIV negative. This usually happens close to death of the person.

The Window Period

This refers to the period between when a person is first infected with HIV and the development of HIV antibodies in the person's body. If an individual gets tested for HIV during this period it will read negative. This is what is called a false negative test because the individual is actually positive but the test cannot detect it yet because the body has not produced enough antibodies for the test to detect. During this period, though the person has tested negative, the person is actually HIV positive and can infect other people. In other words, a person is actually infected with HIV but the test will show up negative.

Depending on the test used, it can take anywhere from 3 weeks to 6 months for the antibodies to show up in the blood. Almost all people (99%) develop antibodies within 3 months, however. Some testing sites now have more sophisticated tests that are able to "shorten" the window period. In other words, they can detect antibodies within a much shorter period of time- approximately 25 days after infection

If this new test is not available, a person who has received a negative test result and has recently engaged in risky behaviour should be tested again 3-6 months after the last time he/she participated in a risky activity (for example, if he/she had unprotected sex one month ago, he/she should be tested again in 2-5 months).

B. Indeterminate Result

This means that it is not possible to tell if the person has been infected with HIV based on the test results. In other words, the test results are inconclusive, meaning it does not indicate either a negative or a positive. This does not occur very often, but it can happen to people with any of the following conditions:

- multiple pregnancies or miscarriages
- multiple blood transfusions
- received an organ transplant
- suffer from other autoimmune diseases, such as lupus or Grave's Disease
- kidney disease or are receiving dialysis treatment
- liver disorders
- some types of cancer
- in the process of sero-conversion from negative to positive (window period)
- cross reactivity due to prior innoculation, e.g. anti viral vaccine
- prior medical conditions, e.g. auto immune disorders and severe kidney diseases
- people who receive indeterminate results should also be re-tested again in six months if they have engaged in HIV risk behaviours.

C. Positive Result

A positive result means that the HIV antibodies have been detected in the person's blood and that the person has been infected with HIV and can infect others through exposing them to infectious body fluids (blood, semen, pre-cum, vaginal fluids or breast milk). All positive results are confirmed with another test called a confirmatory test. Therefore, it is unlikely that a positive result will be false.

D. False Positive Result

Sometimes, a positive result will be obtained when there are no HIV antibodies in the blood. These can be due to a number of reasons such as:

- technical errors: technical errors which may be made by the laboratory scientist
- serological cross-reactivity
- repeated freezing and thawing of the HIV test reagent
- stickiness of stored sera in malaria.

E. False Negative Result

This situation occurs when the blood tested gives a negative result for HIV antibodies while it should have tested positive as the person is infected. The reason for this is the *window period,* that is the person must have been newly infected or the test maybe defective

4.0 CONCLUSION

In this unit, you learnt that HIV test is a test that tells if a person is HIV positive or negative by using a simple blood test or at times making use of saliva or urine. We illustrated that children born to HIV positive mothers can be prevented from contacting the virus from their mothers with proper medical attention, care and treatment. A review of possible HIV test also includes: negative result, indeterminate result, positive result, false positive result and false negative result.

5.0 SUMMARY

This unit provided a broad view of HIV testing and possible HIV results. You can now attempt the question below.

6.0 TUTOR-MARKED ASSIGNMENT

Describe the Indeterminate and False HIV test results.

7.0 REFERENCES/FURTHER READING

Allot, M & Robb, M. (1997). *Understanding Health and Social Care*. SAGE.

Anne-Marie, Barry& Chris Yuill (2002). *Understanding Health*. SAGE.

D'Cruz, Premilla (2004). *Family Care in HIV*. SAGE.

Neill, McKee, Jane Bertrand & Antje Becker-Benton (2004). *Strategic Communications in the HIV/AIDS Epidemic*. SAGE.

UNIT 5 PREVENTION, TREATMENT AND CONTROL OF HIV/AIDS

CONTENTS

1.0 INTRODUCTION

This unit is the second part and complementary to the first one on HIV/AIDS treatment, leading to the advent of combination therapy. Combination therapy as the name implies, comes as a follow up to anti-retroviral therapy because of certain problems arising from the use of antiretroviral drugs. Among them are toxicity and resistance. The virus is also capable of constant mutation, thus the need for combination therapy.

2.0 OBJECTIVES

At the end of this unit, you should be able to:

- explain what combination therapy is all about in HIV/AIDS treatment
- discuss the rationale for combination therapy
- familiarise yourself with other pharmaceutical care services
- appreciate the different preventive measures for target groups.

3.0 MAIN CONTENT

3.1 Rationale for Combination Therapy

- Combination therapy is useful in increasing efficacy through addition and/or synergistic antiviral activity.
- It reduces the toxic effects associated with each drug used at higher doses.
- It delays the emergence of drug resistance and/or broaden coverage against pre-existing drug resistant virus
- It targets virus in different cellular reservoirs and/or different tissue reservoirs and direct treatment towards cells at different stages of activation.

3.2 Combination Therapy

i. Retrovir (AZT)/Epivir (3TC) combination gives pronounced and prolonged fall in HIV RNA Load. It also gives marked and sustained increase in CD4 cell counts.

Dosage:
Retrovir 200mg t.i.d
Epivir 150mg b.i.d

ii. AZT/3TC/indinavir combination

iii. The issue of treatment of HIV opportunistic infection has been dealt with thoroughly earlier in this course.

SELF-ASSESSMENT EXERCISE 1

Review the rationale for combination therapy.

3.3 Other Pharmaceutical Care Services

1. Drug information for AIDS patients
2. Information on new drugs and therapies
3. Medical literature, newsletters, computer bulletin etc must be available to all concerned
4. Protection of patients: it is the ethical and legal responsibility of the pharmacist and others involved in AIDS patients' care, to protect their confidentiality
5. Counseling of HIV patients: counsel patients from time to time on the use of medical devices and appliances**, for instance:**

i. use of condoms made of latex is more effective barrier to virus than lambkin or natural membrane that is porous
ii. adding the use of spermicide to a condom may provide additional protection
iii. it is safer to use condom with lubricant
iv. community services.

All health providers involved in the care of HIV/AIDS patients should provide needed information to the patients and others in the community, including those who do not have AIDS. Lastly, due to many problems of treatment, especially toxicity, there is therefore need to emphasise prevention which is often said to be safer and cheaper than cure.

3.4 Preventive Measures for Target Group

There are measures that essentially apply to risk groups, such as long distance truck drivers, prostitutes, youths, intravenous drug users, market women and medical personnel.

- Maintain regular and faithful sex partners. Do not share partners or engage in group sex
- Avoid patronising commercial sex workers. The highest percentage of HIV/AIDS cases has been reported with this group
- Always use condom if you must have casual sex but do not rely on it. The tensile strength of some of these condoms is inadequate because of our tropical environmental condition. A sizeable number of them tear during use. Moreover, the pore sizes are much larger than the largest viral particle, hence do not offer absolute protection against HIV infection
- Do not share injection needles or other surgical appliances. Insist on fresh ones
- Do not patronise unqualified medical personnel for injection, tattooing, circumcision and scarification. If you must do any of the above, provide your own blades or surgical equipment
- Request and insist that your traditional medical practitioners use fresh blades or other incision instruments when any cut, or incision or scarification is to be done
- Insist that your barber disinfect his barbing instruments before he applies them on you
- Do not donate blood if you have engaged in risky behaviours.

3.5 Preventive Measures for Medical Personnel

- Assume that all blood, blood products and other body products and other body fluids are infectious and adopt measures to prevent direct contact with them.
- Sterilise all re-useable needles and syringes, surgical and skin piercing instruments after use.
- Screen all blood for HIV before transfusion. It is worthwhile to maintain this standard in all situations so as to ensure safety.
- Wash your hands with soap and disinfectant after any accidental exposure to blood, semen, vaginal secretions and body fluids.
- Wear hand gloves during vaginal examinations, blood, dental procedures etc.
- Decontaminate all re-usable instruments immediately after use, then disinfect or sterilise them.
- In case of accidental cuts, or needle stabs, wash the area thoroughly with soap and disinfect with suitable and effective agents.
- Spills of body fluids and blood should be well cleaned using suitable disinfectants such as preparations containing chorine.
- Wash your hands with soap and water after working with a patient and before you start with another patient.
- Avoid blood transfusion to patients except in critical cases and where there are no alternatives/options.

3.6 Preventive Measures for the General Public

General preventive and control measures are needed for the general public and the main interest here are to:

- prevent HIV infection
- prevent and control cross-infection
- reduce the personal and social impact of HIV and care for those already infected
- preventive measures for the general populace are designed to prevent the spread due to ignorance

3.7 Care for Those Already Infected with HIV/AIDS

1) Information, Education and Awareness Creation

The above three are the key to aids prevention. It is only through enlightenment and information that people can voluntarily and individually decide to change some of their risk behaviours. It should be remembered that such behaviours are private and often known to the

individual alone. The media must be fully involved in the dissemination of information to the general public and not AIDS victims alone.

SELF-ASSESSMENT EXERCISE 2

Review HIV/AIDS preventive measures for the general public.

2) Health and Social Services for Patients

Information and education programmes alone do not sustain prevention. A supportive social environment and health services must be put in place especially for those already inflected.

The HIV infected individual needs counseling, so also their sexual partner and family. A supportive social environment such as tolerance, avoidance of discrimination towards the infected individual at the workplace and at home, helps to protect and give assurance to the victim. There is no health rationale for the isolation of HIV/AIDS patients. What the HIV patients need is empathy, understanding and not pity. Actually, existing prejudices serve to scare people from volunteering for HIV screening. Certain health and social services such as counseling of I.V drug users, provision of free sterile needles and syringes to I.V drug users during the period of counseling and drug withdrawal, supply of drugs free at subsidised rates to strengthen people's capacity to make long term behaviour changes are helpful.

Treatment with drugs is a very crucial and integral part of HIV/AIDS control and in line with the National Drug Policy launched in 1990. It is absolutely necessary to make available at all times, drugs which are very effective, affordable, safe, and of good quality in all sectors of health care through the rational use of drugs.

4.0 CONCLUSION

There is a need for behavioural change as high rates of sexual contact with multiple partners is also incriminated in AIDS spread. There is therefore greater need for awareness creation and effective mobilisation of human, material, medical and financial resources towards effective control of the AIDS scourge.

5.0 SUMMARY

Due to the adverse effects of the ART drugs, particularly toxicity, combination therapy is preferable and in vogue. There are other care services for treatment of HIV/AIDS victims and these include counseling, drug information and community services. There are also preventive measures in place which include those targeted at specific groups such as the commercial sex workers (CSW), medical personnel, HIV/AIDS patients and the general public.

6.0 TUTOR-MARKED ASSIGNMENT

Highlight the adverse effects of antiretroviral drugs.

7.0 REFERENCES/FURTHER READING

Federal Ministry of Health (1992). *Care of a Persons with AIDS in the Community.* Federal Ministry of Health and Social Services, Lagos, Nigeria.

TDR News (2007*). Enhancing Drug Discovery for Neglected Tropical Diseases.* Geneva: World Health Organisation.

UNAIDS (2001). *Sources and Prices of Selected Drugs and Diagnostics for People Living with HIV/AIDS.* Geneva: World Health Organisation.