MURANG'A UNIVERSITY OF TECHNOLOGY

UNIT: HIV/AIDS

This course will be conducted using lectures, discussions and presentations. It's a requirement for each student to sit for a minimum of two written CATs (20% or 30%), two assignments (10%) and a main exam (70%).

COURSE OUTLINE

I. GENERAL INTRODUCTION

a) Definition of terms
b) Types of HIV
c) Justification of the course
d) Origins, theories and history of HIV/AIDS
e) Sex and sexuality
f) Global distribution and trends of HIV/AIDS- Comparative trends (statistics locally and globally)

II. BIOLOGY OF HIV

a) Nature of HIV
b) Structure of HIV
c) Lifecycle of HIV
d) Human Immune System- an overview
e) The effects of HIV on the immune system

III. TRANSMISSION OF HIV

a) The modes of HIV transmission
b) Pregnancy and HIV/AIDS
c) STIs, STDs, FGM and HIV/AIDS

IV. DISEASE PROGRESSION AND SYMPTOMS.

V. TREATMENT OF HIV/AIDS

a) Diagnosis of HIV
b) Anti retroviral therapy (ART)
c) ARVS and AIDS vaccines

VI. MANAGEMENT OF HIV/AIDS

a) Proper nutrition
b) Living positively
c) Voluntary Counselling and Testing (VCT)
d) Home Based Care (HBC)

VII. PREVENTION AND CONTROL OF HIV/AIDS

a) Safer sex strategies
b) Abstinence
c) Being faithful
d) Condom use
e) Destigmatize

VIII. SOCIAL AND CULTURAL PRACTICES

a) Practices that promote /reduce the spread of HIV/AIDS
b) Religion and HIV/AIDS
c) Gender and HIV/AIDs
d) Poverty and HIV/AIDs
e) Drugs and HIV/AIDs
f) Social stigma on HIV/AIDS
g) Behavioral change

IX. POLICIES AND RIGHTS OF PLWHAs

X. IMPLICATIONS OF HIV/AIDS

a) Impacts on individuals, families, community
b) Demographic impacts- population
c) Multi-sectoral impact (Education, Agriculture, Economy, Health, Industry and Business)

INTRODUCTION

- People have been warned about HIV and AIDS for over twenty years now.
- AIDS has already killed millions of people, millions more continue to become infected with HIV, and there's no cure - so AIDS will be around for a while yet.
- However, some of us still don't know exactly what HIV and AIDS actually are
- HIV is a virus.
- Viruses infect the cells of living organisms and **replicate** (make new copies of themselves) within those cells.
- A virus can damage the cells it replicates in, which is one of the things that can make an infected creature become ill.
- Different viruses attack different parts of the body - some may attack the skin, others the lungs, and so on.
- What makes HIV so dangerous is that it attacks the immune system itself - the very thing that would normally get rid of a virus.
- It particularly attacks a special type of immune system cell known as a CD4 lymphocyte.
- And on top of this, HIV has a number of tricks that help it to evade the body's defences, including very rapid **mutation.** This means that once HIV has taken hold, the immune system can never fully get rid of it.
- People can become infected with HIV from other people who already have it, and when they are infected they can then go on to infect other people. Basically, this is how HIV is spread.
- HIV stands for the **'Human Immunodeficiency Virus'**. Someone who is infected with HIV is said to be **'HIV+'** or **'HIV positive'**.
- A damaged immune system is not only more vulnerable to HIV, but also to the attacks of other infections. It won't always have the strength to fight off things that wouldn't have bothered it before.

- As time goes by, a person who has been infected with HIV is likely to become ill more and more often until, usually several years after infection, they become ill with one of a number of particularly severe illnesses.
- It is at this point that they are said to have **AIDS** - when they first become seriously ill, or when the number of immune system cells left in the body drops below a particular point.
- Different countries have slightly different ways of defining the point at which a person is said to have AIDS rather than HIV.
- AIDS (**Acquired Immune Deficiency Syndrome*)*** is an extremely serious condition, and at this stage the body has very little defence against any sort of infection

DEFINITION OF TERMS

a) HIV

- It's the virus that causes progressive impairment of the body's cellular immune system leading to increased susceptibility to infections, diseases and tumors and a fatal condition called AIDS
- **Human**- means the virus can only survive in the human body because its only human blood that have CD4+ lymphocytes and these are the cells where HIV attaches to.
- **Immunodeficiency-** lack of natural ability of the body to protect itself against diseases and/or infections. Once inside the body, HIV attacks and destroys WBCs thus the body lacks immunity.
- **Virus-** an organism transmittable from one person to another. It can multiply at a very high rate and can only be seen using a very powerful microscope i.e an electron.
- Infected semen has been found to contain about 100million viral copies per ml.

b) AIDS

- It is a collection of signs and symptoms caused by infections and other implications arising from HIV infection. It may occur 3-10 years after HIV infection.
- **Acquired**- to obtain something new
- **Immune**- against infections
- **Deficiency-** lack of
- **Syndrome**- a group of clinical signs and symptoms denoting a disease, in this case the collection of signs and symptoms result from lowered immunity due to HIV

c) HIV prevalence

- The percentage of population infected with HIV

d) Infection

- Invasion of the body by pathogenic organism

- Not all infections lead to diseases because the body's defense mechanism resist the effects of toxins (poisonous substances) and prevents the multiplication and spread of pathogens.

e) Infectiousness/ communicability

- Capacity of an organism to spread

f) Super infection

- Being exposed to different strains of HIV almost at the same time
- The 2nd infection occurs months after the 1st infection
- The body's immune response to the 1st virus is sometimes not enough to prevent infection with the 2nd virus/strain

g) Co-infection

- Being infected with 2 or more strains at once

h) Opportunistic infection

- These are infections that take advantage of impairment of the immune system and sometimes are caused by organisms that don't cause infection or diseases in man
- They take advantage of an immune system which has been weakened by HIV.
- As HIV multiplies and more immune cells are destroyed, many complications and infections occur
- These complications are called Opportunistic Infections (O.I.s) because they take advantage of lowered immunity.

i) Virulence

- It describes the degree of pathogencity of an organism and is dependent on the invasiveness and/or the ability of an organism to produce toxins (poisonous substances)

j) Endemic

- Constant presence of a disease or an agent of a disease in a community/ region
- Endemic diseases can rapidly become epidemics if environmental factors changes in a way which favors transmission

k) Epidemic

- An acute outbreak of a disease in a community/region in excess of normal expectancy and is derived from a common or a propagated source
- A sporadic disease is that which breaks out only occasionally.

l) Pandemic

- Spreads to several countries and affect a large number of population e.g. HIV

m) Epidemiology

- The study of spread distribution, prevalence and control of a disease in a community.

n) Sentinel surveillance

- A system used to determine the prevalence of HIV in Kenya
- It is coordinated by NASCOP (National AIDS and STDs Control Program)

- It involves anonymous HIV testing of blood samples collected for routine testing of pregnant women who visit ante natal clinics

o) Enzymes

- Are biological catalysts that enables cellular processes to go on or quicken their pace e.g. of HIV enzymes are proteases, RT, integrases.

p) Mutation

- A process through which new cells are formed with a genetic material that is different from the original one due to copying errors
- For cells to multiply, they must make new copies of their genetic material, and, this is not usually error free
- Mutation is common with RNA viruses e.g. HIV, because the genetic material is copied in 2 stages, 1st to DNA form then back to RNA form

q) Mutants

- New type of virus produced as a result of mutation i.e. the mutant strain

r) Wild type virus

- The original virus that has not undergone mutation

s) Evidence based approach

- An approach to prevent HIV/AIDS spread which involves using tested, proven and practical evidence rather than as perceived or theoretical

TYPES OF HIV

- There are 2 main types of HIV:- HIV-1 &HIV-2
- Both types are transmitted by sexual contact, through blood & from mother-to-child.
- They both appear to cause clinically indistinguishable AIDS.
- **HIV-2** is less easily transmitted & the period between initial infection & illness is longer. Its uncommon & conc. in W.Africa. E.g. Senegal, Ghana, Mali, Burkina Faso, Ivory Coast.
- Most HIV-2 reported in Brazil, Angola, Mozambique and Portugal can be traced back to W. African contact.
- **HIV-1** is the predominant virus world wide & generally when people refer to HIV without specifying the type they refer to HIV-1.

HIV-1 subtypes

- HIV-1- a) Group M (major)
  b) Group N (new) c) Group O (outlier)

- The 3 groups may rep separate introduction of SIV into humans
- Group O appears to be restricted to West-central Africa
- Group N was discovered in 1998 in Cameroon & is extremely rare.
- More than 90% of HIV-1 infections belong to group M

- There are at least 9 subtypes within group M.
- They include A, B, C, D, F, G, H, J, K.

HIV1A – found across west east axis from Ivory Coast to Djibouti via Kenya
HIV1B – found in Thailand, Europe and S.America
HIV1C – found in East Africa, Botswana and South Africa and is the commonest subtype globally accounting for 50%

HIV1D – found in Congo, Kenya, Rwanda, Burundi, Tanzania and Uganda

HIV1E – found in Thailand, Cameroon, Central African Republic and Congo

HIV1F – found in Cameroon and Congo

HIV1G – found in Congo and Gabon

HIV1H, J, K – are rear but found in African continent.

- In Kenya we have subtypes A, C, and D and this makes our country to be ranked amongst the leading countries with the highest HIV infections.

CRFs-circulating recombinant forms

- Occasionally 2 viruses of diff subtypes can meet in the cell of an infected person & mix together its genetic material to create a new hybrid virus in a process similar to sexual reproduction & sometime called **viral sex.**
- Many of these strains don't survive for long but those that infect more than one person are known as CRFs. E.g. CRF A/B is a mixture of subtype A&B.

JUSTIFICATION OF THE COURSE

- Education is an important component of preventing the spread of HIV.

Aims of HIV/AIDS training,

- To prevent new infections from taking place. i.e.
  - By giving people information about HIV - what HIV and AIDS are, how they are transmitted, and how people can protect themselves from infection.
  - Teaching people how to put this information to use and act on it practically –for e.g. how to get and use condoms, how to suggest and practice safer sex, how to prevent infection in a medical environment or when injecting drugs.
- To improve quality of life for HIV positive people i.e.by
  - Enabling and empowering them to improve their quality of life.
  - To be able to access medical services and drug provision
  - To be able to find appropriate emotional and practical support and help
  - Teaching them about the importance of not passing on the virus
- To reduce stigma and discrimiunation.- Discrimination against positive people can help the AIDS epidemic to spread
- To help people focus upon the person than the disease and be more caring to the person.

- To provide knowledge on modes of transmission especially to those affected and how to cope with the infected.
- To initiate and sustain behavior changes necessary to reduce the rate of developing infections through safer sex practices.

Reasons for AIDS education/ why train in HIV/AIDS

- HIV infection is lifelong and there is no cure
- HIV is infectious, and those infected will remain infectious throughout their lives.
- Fear arises from uncertainty of unpredictable medical conditions and reactions of people especially of those close to them.
- Information and knowledge is incomplete about HIV care and prevention and at times even conflicting.
- The infected and affected are likely to have abroad of physical, psychological and social needs which may need adjustments e.g. finances.
- Good management can contain some of these problems, early identification and intervention.
- It provides knowledge needed to initiate and sustain change in risky behavior.
- It helps the infected find a new or perhaps different approach to using safer sex and responsible social relationships.
- It helps those who are infected to live with the infection.

Why educate HIV positive people

- To help people to cope with the trauma of a HIV positive test result.
- To inform HIV positive people about the nature of HIV and AIDS.
- To help them to confront any discrimination they may face as a result of being infected with HIV.
- To enable them to lead full and healthy lives.
- To enable them, should they wish to, to have an active sexual life without passing the infection on to anyone else
- To ensure that the infection isn't passed on by any other means - the sharing of injecting equipment.

Who should be trained?

- People who have not yet been educated and may be at risk of becoming infected.
- People who have already been educated for whom the education was not effective. If AIDS education were completely effective, there wouldn't be so many new infections.
- Everyone needs to learn how and why not to discriminate against positive people.
- People who are already infected also require education.
- Those who are physically unwell and want to know their HIV status.
- Those who are worried about HIV counseling and testing

- The family, close friends and colleagues of the infected.
- Children with HIV/AIDS.
- Discordant couples

- Those who are currently engaged in risky sexual behavior.
- People who experience difficulty and problems as they seek employment and housing.
- Those who are at all stages of illnesses related to HIV.
- When one is receiving HIV results whether positive or negative.
- When people come for clinical checkups and have HIV related illnesses.

NB: The only people who do not fall into one of these groups are those who have received AIDS education, have taken it in, and have the resources to turn knowledge into action.

ORIGINS, THEORIES AND HISTORY OF HIV/AIDS

- The origin of AIDS and HIV has puzzled scientists ever since the illness first came to light in the early 1980s.
- For over twenty years it has been the subject of debate and the cause of countless arguments, with everything from a promiscuous flight attendant to a suspect vaccine program being blamed.
- The first recognized cases of AIDS occurred in the USA in the early 1980s

In 1981,

- The virus was discovered among homosexuals in the USA.
- A number of gay men in New York and San Francisco suddenly began to develop rare opportunistic infections and cancers that seemed stubbornly resistant to any treatment.
- They presented with a syndrome which included mouth rash, skin problems e.t.c
- At this time, AIDS did not yet have a name, but it quickly became obvious that all the men were suffering from a common syndrome.
- Their bodies' immunity was weakened and completely suppressed.
- Medics wrote their investigations in a journal.

In 1983,

- It was discovered that the symptoms that were earlier observed were caused by a certain virus called **immunodeficiency virus** and it was suppressing the immune system.

In 1986,

- It became clear that the virus discovered in 1981 was spreading fast and many people suffered from the same condition.
- In 1986, in West Africa, another virus was discovered & they called it **immunodeficiency virus type2.**
- The discovery of HIV, the Virus that causes AIDS was made soon after.
- **In Kenya,** the 1st case was noted in **1983** in KNH & it was noted that the body of the patient had low immunity.

From **1981** to date the disease has claimed 22m lives & is still spreading.

- There is now clear evidence to prove that HIV does cause AIDS.

- So, in order to find the source of AIDS, it is necessary to look for the origin of HIV, and find out how, when and where HIV first began to cause disease in humans.

Did HIV come from SIV?

- It is now thought that HIV came from a similar virus found in chimpanzees.
- It is now generally accepted that HIV is a descendant of a Simian Immunodeficiency Virus because certain strains of SIVs bear a very close resemblance to HIV-1 and HIV-2, the two types of HIV.
- For e.g.HIV2 corresponds to *SIVsm*, a strain of the Simian Immunodeficiency Virus found in the sooty mangabey (also known as the green monkey), which is indigenous to western Africa.
- HIV-1, was until recently more difficult to place. Until 1999, the closest counterpart that had been identified was *SIVcpz*, found in chimpanzees, but this virus still had certain significant differences from HIV-1.

Theories of how HIV could have originated

- Below are some of the most common theories about how this 'zoonosis' took place, and how SIV became HIV in humans.
- Zoonosis- viral transfer between animals & humans

1. Hunter theory

- The most commonly accepted theory is that of the 'hunter'.
- In this scenario, SIVcpz was transferred to humans as a result of chimps being killed and eaten or their blood getting into cuts or wounds on the hunter.
- Normally the hunter's body would have fought off SIV, but on a few occasions it adapted itself within its new human host and become HIV-1.
- Discoveries such as this have lead to calls for an outright ban on bush meat hunting to prevent simian viruses being passed to humans.

2. Oral Polio Vaccine (OPV) theory

- That HIV was transferred via medical experiments.
- That HIV could be traced to the testing of an oral polio vaccine called Chat, given to about a million people in the Belgian Congo, Ruanda and Urundi in the late 1950s.
- To be reproduced, live polio vaccine needs to be cultivated in living tissue, and
- Hooper's belief is that Chat was grown in kidney cells taken from local chimps infected with SIVcpz.
- This, he claims, would have resulted in the contamination of the vaccine with chimp SIV, and a large number of people subsequently becoming infected with HIV-1.
- However, in February 2000 the Wistar Institute in Philadelphia (one of the original places that developed the Chat vaccine) announced that it had discovered in its stores a phial of polio vaccine that had been used as part of the program.

- The vaccine was subsequently analysed and in April 2001 it was announced[4] that no trace had been found of either HIV or chimpanzee SIV.
- A second analysis[5] confirmed that only macaque monkey kidney cells, which cannot be infected with SIV or HIV, were used to make Chat.
- While this is just one phial of many, most have taken its existence to mean that the OPV vaccine theory is not possible
- The fact that the OPV theory accounts for just one (group M) of several different groups of HIV also suggests that transferral must have happened in other ways too.
- The final element that suggests that the OPV theory is not credible as the sole method of transmission is the argument that HIV existed in humans before the vaccine trials were ever carried out.

3. The contaminated needle vaccine

- This is an extension of the original 'hunter' theory.
- In the 1950s, the use of disposable plastic syringes became commonplace around the world as a cheap, sterile way to administer medicines.
- However, to African healthcare professionals working on inoculation and other medical programmes, the huge quantities of syringes needed would have been very costly.
- It is therefore likely that one single syringe would have been used to inject multiple patients without any sterilisation in between.
- This would rapidly have transferred any viral particles (within a hunter's blood for example) from one person to another, creating huge potential for the virus to multiply in each new individual it entered, even if the SIV within the original person infected had not yet converted to HIV.

4. The colonialism theory

- The colonialism or **'Heart of Darkness' theory** is one of the more recent theories to have entered into the debate.
- It is again based on the basic 'hunter' premise, but more thoroughly explains how this original infection could have lead to an epidemic.
- During the late 19th and early 20 th century, much of Africa was ruled by colonial forces. In areas such as French Equatorial Africa and the Belgian Congo,
- colonial rule was particularly harsh and many Africans were forced into labour camps where sanitation was poor, food was scare and physical demands were extreme.
- These factors alone would have been sufficient to create poor health in anyone, so SIV could easily have infiltrated the labour force and taken advantage of their weakened immune systems to become HIV.
- A stray and perhaps sick chimpanzee with SIV would have made a welcome extra source of food for the workers.
- Moore also believes that many of the labourers would have been inoculated with unsterile needles against diseases such as smallpox (to keep them alive and working),
- and that many of the camps actively employed prostitutes to keep the workers happy, creating numerous possibilities for onward transmission.

5. The conspiracy theory

- Some say that HIV is a 'conspiracy theory' or that it is 'man-made'.
- A recent survey carried out in the US for example, identified a significant number of African Americans who believe HIV was manufactured as part of a biological warfare program, designed to wipe out large numbers of black and homosexual people.
- Many say this was done under the auspices of the US federal 'Special Cancer Virus Program' (SCVP), possibly with the help of the CIA.
- Some even believe that the virus was spread (either deliberately or inadvertently) to thousands of people all over the world through the smallpox inoculation program, or to gay men through Hepatitis B vaccine trials.

6. The calculated theory

- This is the latest theory on the origins of HIV and it emerged in early 19^{th} century.
- It deals with the question of when and not how or why.
- The scientists calculated how far back in time one could need to go for all the HIV-viral subtypes to have a common ancestor/ origin.
- That mutant strains can be used to trace how far back HIV has been in existence.

NB: While none of these theories can be definitively disapproved, the evidence they are based on is tenuous at best, and often ignores the clear link between SIV and HIV, or the fact that the virus has been identified in people as far back as 1959.

- They also fail to take into consideration the lack of genetic-engineering technology available to 'create' the virus at the time that AIDS first appeared.

SEX AND SEXUALITY

What is sex education?

- **Sex education**, is sometimes called **sexuality education** or **sex and relationships education**,
- It's the process of acquiring information and forming attitudes and beliefs about sex, sexual identity, relationships and intimacy.
- It is also about developing young people's skills so that they make informed choices about their behaviour, and feel confident and competent about acting on these choices.
- It is widely accepted that young people have a right to sex education, partly because it is a means by which they are helped to protect themselves against abuse, exploitation, unintended pregnancies, sexually transmitted diseases and HIV/AIDS.

Aims of sex education

- To reduce the risks of potentially negative outcomes from sexual behaviour like unwanted or unplanned pregnancies and infection with STDs
- To enhance the quality of relationships.
- To develop young people's ability to make decisions over their entire lifetime.

  - **Sex-** the state of being male or female i.e gender
  - **Sexuality-** the sexual nature or xtics of somebody i.e. involves all biological, social &spiritual xtics that makes up a person to be either a woman or a man.
  - **Sexual intercourse-** the action of a man inserting the penis into a woman's vagina leading to release of semen from the penis & as a result the woman may become pregnant.
  - **Sex abuse-** Illegal sexual activities esp as practiced on children by adults
  - **Sex offender-** a person found guilty of illegal sexual acts esp on children
  - **Sex object-** a person considered only in terms of his or her sexual attractions.
  - **Sex symbol-** a person generally considered to be ideal in terms of his /her appearance sexual attraction.

Reasons for excessive interest in sexual intercourse

- Peer pressure among the youth.
- Genetic makeup of a person i.e tribe
- Curiosity –the urge to discover
- Availability of sexually explicit material eg pornography
- Breakdown of mechanism of social control
- Existence of unstable families- divorce, separation- child freedom
- Poverty
- Idleness
- Alcoholism & drug addiction
- Attitude towards premarital sex e.g European countries

Nature of sexual relationships

- Heterosexual- both partners are willing
- Homosexual- " " " "
- Lesbianism
- Incest
- Rape- one partner is willing
- Prostitution
- Sugar mummies/daddies
- Multiple partners- differential in age.

Sources of sexual information

- Media-TVs, Radio, magazines etc
- Films –pornographic materials
- Internet
- Observation
- Literature-novels
- Professionals-doctors, teachers

Myths surrounding sexuality

- ❖ Virginity myth- 25 when still a virgin one does not enjoy sex.
- ❖ Vitality myth/ Fertility myth- men become infertile/engagement in sex enhances fertility.
- ❖ Virility myth- the more one is engaged, the powerful they become/ practice makes perfect.
- ❖ Abstaining from sex leads to sickness/ madness
- ❖ Men's sex drive is believed to be boundless
- ❖ Sex with virgins cures AIDS/ raping young girls cure AIDS
- ❖ Women should never say no to sex
- ❖ Sex with condoms is not real sex
- ❖ Have sex early to know if you are functioning well
- ❖ The more one engages in sex the healthier they become
- ❖ A man cannot be satisfied by one woman
- ❖ The cure of backache is sex
- ❖ Femininity & masculinity- the gender identity prove theory- to prove you are a man.
- ❖ To multiply & fill the earth

GLOBAL DISTRIBUTION AND TRENDS OF HIV/AIDS- COMPARATIVE TRENDS (STATISTICS LOCALLY AND GLOBALLY

- **Trends -** Involves looking at the direction HIV/AIDS is taking, the way it is affecting people, and, what measures are put across to curb its transmission

- **Distribution-** Involves looking at how HIV is spread globally i.e. in the continents, regions and countries which are grossly affected.

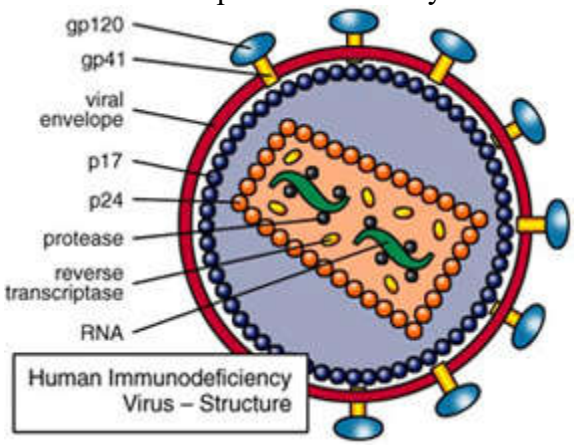
II. BIOLOGY OF HIV

NATURE OF HIV

- HIV can't grow or reproduce on its own
- It requires cell of living organisms to infect & reproduce.
- HIV is specific to CD4+ cells in the human body i.e. cells with surface molecule called **C**luster **D**esignation **4.** Cells carrying this molecule are called CD4+ cells
- Therefore HIV cant survive in the animal blood, because its only human blood that contains CD4+cells
- HIV is a lentivirus
- Like all viruses of this group it attacks the immune system
- **Lentiviruses** are in turn part of a larger group of viruses called **retroviruses**
- The term "retrovirus" stems from the fact that these kinds of viruses are capable of copying RNA into DNA. No other organism so far discovered on earth is capable of this ability.
- The name lentivirus means slow virus
- This is because they take such a longtime to produce any adverse effects in the body.
- They have been found in a no. of diff. animals e.g. cats, sheep, horses &cattle
- The most interesting lentivirus in terms of the investigation into the origins of HIV is the Simian Immunodeficiency Virus (SIV) that affects monkeys.

THE STRUCTURE OF HIV

- Outside of a human cell, HIV exists as roughly spherical particles (sometimes called virions).
- The surface of each particle is studded with lots of little spikes.
- An HIV particle is around 100-150 billionths of a meter in diameter. That's about the same as 0.1 microns or 4 millionths of an inch or one seventieth of the diameter of a human CD4+ white blood cell.
- Unlike most bacteria, HIV particles are much too small to be seen through an ordinary microscope. However they can be seen clearly with an electron microscope.



NB; The proteins gp120 and gp41 together make up the spikes that project from HIV particles, while p17 forms the matrix and p24 forms the core.

- Structurally HIV consist of

1. Viral core/capsid

- The viral core (or capsid) is usually bullet-shaped and is made from the protein **p24**.
- The core contains:

a) 2 copies of identical strands of RNA- HIVs genetic material
  - Almost all organisms, including most viruses, store their genetic material on long strands of DNA.
  - Retroviruses are the exception because their genes are composed of RNA (Ribonucleic Acid).
  - RNA has a very similar structure to DNA. However, small differences between the two molecules mean that HIV's replication process is a bit more complicated than that of most other viruses.

b) 3 viral enzymes: required for HIV replication
  - Reverse transcriptase (RT)- converts viral RNA to ds DNA
  - Integrase- integrates DNA produced by RT into human DNA
  - Protease/proteinase- cuts proteins into segments & facilitates assemblance of new viral copies.

3. Matrix

- Just below the viral envelope is a layer called the matrix, which is made from the protein **p17** which maintains the integrity of the virus structure & transport genetic material.

2. Double layered lipid envelope-

- HIV particles surround themselves with a coat of fatty material known as the **viral envelope (**or membrane).
- Projecting from this are around 72 little spikes, which are formed from the proteins **gp120** which protrudes from the surface & binds CD4+ cells and **gp41**. which is embedded within the envelope & is for entry/fusion

THE LIFE CYCLE OF HIV/ HIV REPLICATION

1. Attachment

- The **gp120** on the surface of the virus particle bind to the **CD4** receptor on the surface of human T cell and
- The viral envelope fuses with the human T cell membrane.

2. Entry

- The contents of the HIV particle are then released into the cell, leaving the envelope behind.

3. Reverse Transcription

- Once inside the cell, the HIV enzyme **reverse transciptase** converts the viral RNA into DNA, which is compatible with human genetic material(DNA)

4. Integration

- This DNA is transported to the cell's nucleus, where it is spliced into the human DNA by the HIV enzyme **integrase.**
- Once integrated, the HIV DNA is known as **provirus.**

5. Transcription

- HIV provirus may lie dormant within a cell for a long time.
- But when the cell becomes activated, it treats HIV genes in the same way as human genes.
- First it converts them into messenger RNA (using human enzymes).

6. Translation

- Then the messenger RNA is transported outside the nucleus, and is used as a blueprint for producing new HIV proteins and enzymes.

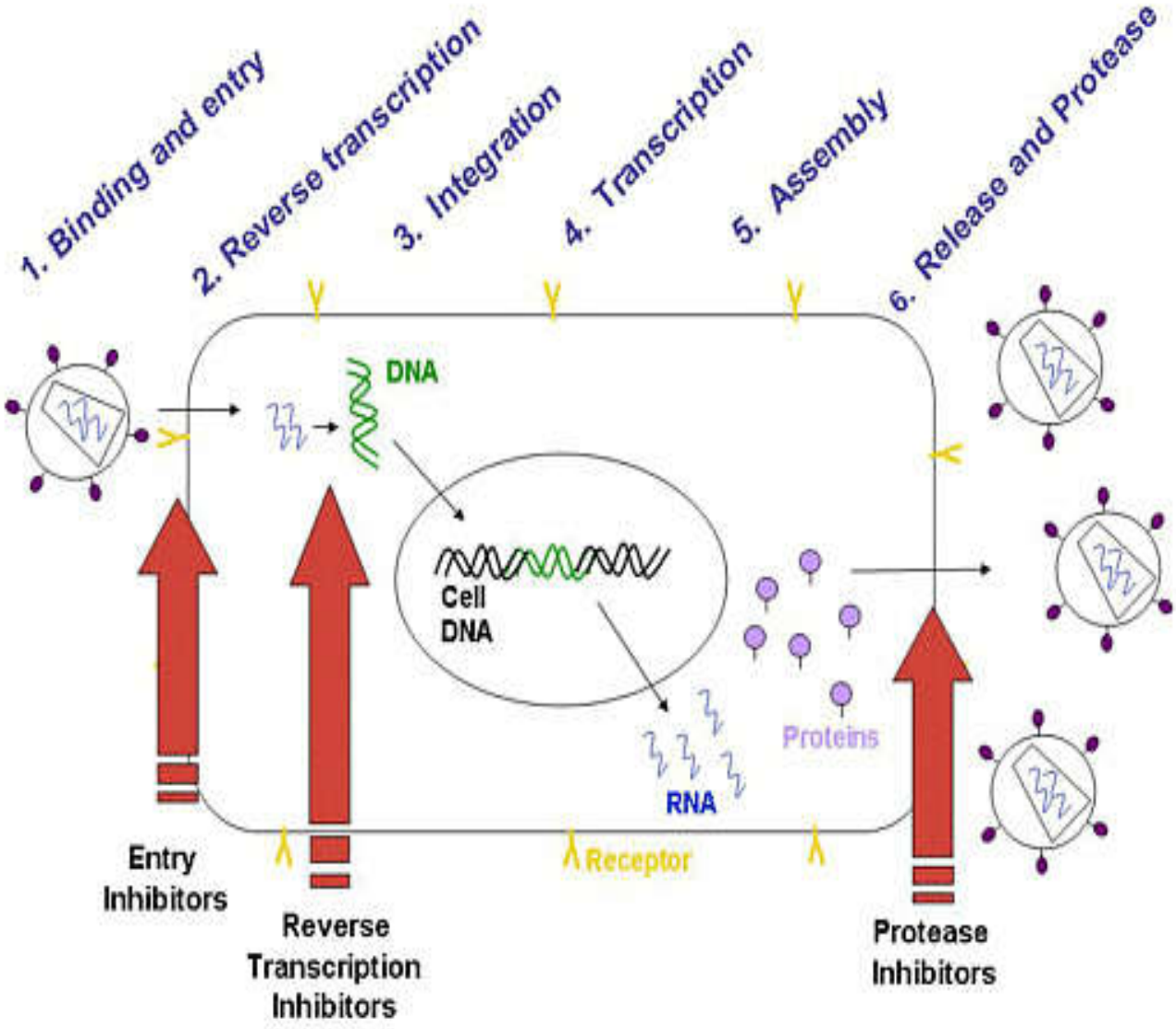
7. Assembly & budding

- Among the strands of messenger RNA produced by the cell are complete copies of HIV genetic material.
- These gather together with newly made HIV proteins and enzymes to form new viral particles, which are then released from the cell.
- The enzyme **protease** plays a vital role at this stage of HIV's life cycle by chopping up long strands of protein into smaller pieces, which are used to construct mature viral cores.

8. Maturation & release

- The newly matured HIV particles are ready to infect another cell and begin the replication process all over again.
- In this way the virus quickly spreads through the human body. And once a person is infected, they can pass HIV on to others in their bodily fluids.

Life cycle of HIV/ replication



HUMAN IMMUNE SYSTEM- AN OVERVIEW

- **Immunity-** the ability of the body to resist invading microorganism/ antigen/ pathogen/ foreign body/ disease agents
- **Immunology-** the scientific study of the mxn that defend the body against invading microorganism

The blood- is the fluid tissue that circulates thro the cardiovascular system.

Functions of blood

- Transport nutrients from digestive system to all cells of the body
- Transport oxygen from lungs to all cells & CO2 from cells to lungs
- Transport metabolic waste from cells to kidney
- Transport hormones from endocrine glands to target cell
- Protect body against diseases by recognizing& attacking foreign substances
- Help regulate body temp
- Help regulate fluid salt balance

Components of the blood

- Blood consist of formed elements & plasma
- Formed elements are RBCs, WBCs & platelets

The immune system

- It's composed of many interdependent cell types that collectively protect the body from bacterial, parasitic, fungal, viral infections and from the growth of tumor cells.
- Many of these cell types have specialized functions.
- The cells of the immune system can engulf bacteria, kill parasites or tumor cells, or kill viral-infected cells.
- These cells depend on the T helper subset for activation signals in the form of secretions formally known as cytokines, lymphokines, or more specifically interleukins.

Organs of the Immune System

1. Bone Marrow –

- All the cells of the immune system are initially derived from the bone marrow.
- They form through a process called hematopoiesis.
- During hematopoiesis, bone marrow-derived stem cells differentiate into either mature cells of the immune system or into precursors of cells that migrate out of the bone marrow to continue their maturation elsewhere.
- The bone marrow produces B cells, natural killer cells, granulocytes and immature thymocytes, in addition to red blood cells and platelets.

2. Thymus –

- The function of the thymus is to produce mature T cells.
- Immature thymocytes, also known as prothymocytes, leave the bone marrow and migrate into the thymus.
- thymic education,- T cells that are beneficial to the immune system are spared, while those T cells that might evoke a detrimental autoimmune response are eliminated.
- The mature T cells are then released into the bloodstream.

3. Spleen –

- The spleen is an immunologic filter of the blood.
- It is made up of B cells, T cells, macrophages, dendritic cells, natural killer cells and red blood cells.
- In addition to capturing foreign materials (antigens) from the blood that passes through the spleen, migratory macrophages and dendritic cells bring antigens to the spleen via the bloodstream.
- In the spleen, B cells become activated and produce large amounts of antibody.
- Also, old, red blood cells are destroyed in the spleen.

4. Lymph Nodes –

- The lymph nodes function as an immunologic filter for the bodily fluid known as lymph.
- Lymph nodes are found throughout the body.
- Composed of T cells, B cells, dendritic cells and macrophages, the nodes drain fluid from most of our tissues.
- Antigens are filtered out of the lymph in the lymph node before returning the lymph to the circulation

Cells of the Immune System

1. T-Cells –

- T lymphocytes are divided into two major subsets that differ in functions and identity (functionally and phenotypically (identifiably) different).

a) The T helper subset, (CD4+ T cell),

- The main function is to augment or potentiate immune responses by the secretion of specialized factors that activate other WBCs to fight off infection.
- They interact with B cells or T killer cells & help them respond to foreign agents.
  - **i) T helper1-**controls intracellular pathogens (CMI)
  - **ii) T helper2**- controls extra cellular pathogens (AMI)

b)T killer/suppressor subset (CD8+ T cell).

- These cells are important in directly killing certain tumor cells, viral-infected cells and sometimes parasites.
- They directly bind to foreign agents, attack & kill those cells thus eliminating them from the body.
- The CD8+ T cells are also important in down-regulation of immune responses.

NB:

- Both types of T cells can be found throughout the body.
- They often depend on the secondary lymphoid organs (the lymph nodes and spleen) as sites where activation occurs, but they are also found in other tissues of the body, most conspicuously the liver, lung, blood, and intestinal and reproductive tracts.

2. Natural Killer Cells (NK)–

- Are similar to the killer T cell subset (CD8+ T cells).
- They directly kill certain tumors such as melanomas, lymphomas and viral-infected cells, most notably herpes and cytomegalovirus-infected cells.
- NK cells, unlike the CD8+ (killer) T cells, kill their targets without a prior sensitization.
- But kill more effectively when activated by T h cell.

3. B Cells –

- The major function of B lymphocytes is the production of antibodies in response to foreign proteins of bacteria, viruses, and tumor cells.
- **Antibodies** are specialized proteins that specifically recognize and bind to one particular protein that specifically recognize and bind to one particular protein.
- Antibody production and binding to a foreign substance or antigen, is critical as a means of signaling other cells to engulf, kill or remove that substance from the body.

4. Granulocytes or Polymorphonuclear (PMN) Leukocytes --

- A group of WBCs.
- Granulocytes are composed of three cell types identified as neutrophils, eosinophils and basophils, based on their staining characteristics with certain dyes.
- These cells are important in the removal of bacteria and parasites from the body. They engulf these foreign bodies and degrade them using their powerful enzymes.

a) Neutrophils -a/c60%

- complete dvpt in the BM

-enter blood & remain incirculation for 10hours

- leave thro capillary wall & enter connective tissue

- after a day or 2 they enter the digestive tract or urinary tract & are swept out of the body by waters.

b) Eosinophils –a/c 3% of circulating WBCs

- help control allergic reactions & helminth infections

c) Basophils- a/c less than 1%

- controls allergic reactions, inflammatory reactions, clotting process & fat metabolism

5. Macrophages –

- They are often referred to as scavengers or antigen-presenting cells (APC)
- This is because they pick up and ingest foreign materials and present these antigens to other cells of the immune system such as T cells and B cells.
- This is one of the important first steps in the initiation of an immune response.
- Stimulated macrophages exhibit increased levels of phagocytosis and are also secretory.
- **Monocytes-**they cross capillary wall, enter tissue & differentiate to macrophages,
  - destroy bacteria, dead cells and other matters
  - Are CD4+

6. Dendritic Cells –

- Dendritic cells function as APCs.
- In fact, they are more efficient apcs than macrophages.
- These cells are usually found in the structural compartment of the lymphoid organs such as the thymus, lymph nodes and spleen.
- They are also found in the bloodstream and other tissues of the body.
- It is believed that they capture antigen or bring it to the lymphoid organs where an immune response is initiated.
- They are extremely hard to isolate.
- recent finding is that dendritic cells bind high amount of HIV, and may be a reservoir of virus that is transmitted to CD4+ T cells during an activation event.

Cells that possess CD4 markers include:

- T helper cells
- Macrophages
- Monocytes
- Colon cells
- Dendritic cells
- Retinal cells

NB: HIV attaches to any CD4+ cell.

Immune Response

- An immune response to foreign antigen requires the presence of an APC, (either a macrophage or dendritic cell) in combination with a B cell or T cell.

When an APC presents an antigen on its cell surface to a B cell,

- The B cell is signaled to proliferate and produce antibodies that specifically bind to that antigen.
- If the antibodies bind to antigens
  a) It acts as a signal for PMNLs or macrophages to engulf (phagocytose) and kill bacteria or parasites.
  b) antibodies also initiate the "complement destruction cascade." i.e. When antibodies bind to cells of bacteria, serum proteins called **complement** bind to the immobilized antibodies and destroy the bacteria by creating holes in them.
  c) Antibodies can also signal Natural Killer (NK) cells and macrophages to kill viral or bacterial-infected cells.

When APC presents the antigen to T cells,

- The T cells become activated.
- Activated CD4+ T cells proliferate and become secretory, or,
- Activated CD8+ T cells kill target cells that specifically express the antigen presented by the APC.

- **NB:** The production of antibodies and the activity of CD8+ killer T cells are highly regulated by the CD4+ helper T cell subset.
- The CD4+ T cells provide growth factors or signals to these cells that signal them to proliferate and function more efficiently**.**

TYPES OF IMMUNITY

1. Innate/ Inborn/Natural/Non-specific immunity;

- Present at birth
- Provide non-specific immunity to any foreign invador regardless of invadors' composition.
- Operates under certain mxn or factors

a) Physical/mechanical barrier

- Skin –protects from entry of pathogens to our body
- Respiratory tracts- the hairs /cilia along the tract leads to coughing & sneezing in presence of microorganism hence act as filters to clear the pathogens from upper respiratory tract.

b) Biochemical factors

- Acidic gastric juices e.g. Hcl in stomach
- Enzymes present in sweat, saliva, breast milk respond by destroying invading microorganisms.
- Blood protein factors e.g. interferons, compliments, acute phase proteins destroy by puncturing holes in the body.

c) Genetic control

- People may become carriers but not sick

d) Cellular factors

- WBCs participate both in natural & acquired immune responses
- The cells fight invading foreign bodies by releasing cell mediators
- Other cells (non-granular) e.g. monocytes & macrophages are phagocytic i.e. engulf, digest &kill microorganisms

2. Acquired/ Adaptive / Specific Immunity

- Immunologic responses are acquired during life
- Are not present at birth
- They develop as a result of immunization/vaccination
- Also developed after contracting a disease i.e. weeks or months after exposure to the disease, the body produces an IR sufficient to defend against re-infection
- Its divided into 2 forms

a) Humoral immunity (AMI)

- Involves antibodies produced by B cells
- The antibodies recognize & bind specifically to foreign antigens & may cause one of the following: -Break/ splitdown the membrane of Ag (lysis)

-Coat the Ag making it easier for phagocytosis (opsonization)

-Neutralize activities of toxins/ virus/ bacteria (neutralization)

-Direct killing of foreign Ag (cytotoxicity / cell killing)

-Clump parasites together (agglutination)

b) Cell mediated immunity (CMI)

- Two most important T cell subtypes are involved in CMI
- T helper and T killer cells

Disorders of the immune system

- Hemolytic anaemia- affects RBCs
- Leukemia- WBCs destroying RBCs
- Addison's disease- affects adrenal glands
- Graves disease- affects thyroid glands
- Systemic lupus erythematosus –affects the connective tissue
- Rheumatoid arthritis- affects joints

Natural immunity to HIV/AIDS

- An immunologic study of the sera of the prostitutes showed that the women were generating highly specific cytotoxic T lymphocytes (CTL)/ CD8+T cells responses to both HIV-1 and HIV-2
- In HIV+ individuals, HIV specific CTLs can be detected by using the patient's own virus to stimulate CTLs
- The most probable explanation for the finding of HIV specific CTLs able to kill virus infected cells, in apparently uninfected individuals but repeatedly HIV exposed women is that they have been immunized by exposure to HIV.
- The findings suggest that the CTL cell generation may be the most important element in creating protective immunity against HIV
- The observation of a naturally occurring protective immunity to HIV provides a new rationale for vaccine development
- The study requires the importance of utilizing CTL induction in design of AIDS vaccine.

AIDS, HIV and The Immune System

- Whenever any foreign organism enters the body, the Immune System is activated
- Both T & B responds to the threat which eventually results in the elimination of the antigen
- If the foreign antigen is the one which is extra cellular, the best response is the production of antibody by B cells which will bind the foreign agent
- If it is an intracellular organism the best response is the activation of T killer cells which eliminate by killing of the cell that contain the antigen
- Both of these responses require T helper cell.

THE EFFECTS OF HIV ON THE HUMAN IMMUNE SYSTEM

- Gp 120"recognizes" a protein on helper T-cells named CD4, and physically associates with it.
- The CD4 [Cluster of Differentiation Antigen No. 4] protein is a normal part of a helper (both Th1 and Th2) T-cell's membrane.
- CD4 is at the same time a specific receptor for HIV.
- HIV therefore specifically infects the very cells necessary to activate both B-cell *and* cytotoxic T-cell immune responses.
- Without helper T-cells, the body cannot make antibodies properly,
- Infected cells containing HIV (an intracellular pathogen) can't be properly eliminated without T helper cells.
- On the other hand HIV can multiply, kill the helper T-cell in which it lives, infect adjacent helper T-cells, repeat the cycle, and on and on, until eventually there is a substantial loss of helper T-cells.
- The fight between the virus and the immune system for supremacy is continuous.
- Our body responds to this through production of more T-cells, some of which mature to become helper T-cells.
- The virus eventually infects these targets and eliminates them, too.
- More T-cells are produced; these too become infected, and are killed by the virus.
- This fight may continue for up to ten years before the body eventually succumbs, apparently because of the inability to any-longer produce T-cells.
- This loss of helper T-cells finally results in the complete inability of our body to fight-off even the weakest of organisms (all kinds of bacteria and viruses other than HIV) which are normally not even a problem to us.
- This acquired condition of immunodeficiency is called, **AIDS.**

III.TRANSMISSION OF HIV

- HIV is present in semen, vaginal/ cervical secretions & body fluids
- It may be present in tears, urine, breast milk & infected discharges, saliva.
- HIV is spread when an infected individual come into contact with infected body fluids or cells.

How HIV is NOT transmitted

- There is no evidence to show that HIV can be transmitted by:

a) casual social contact e.g. shaking hands, hugging
b) sneezing or coughing
c) shared facilities & equipment e.g. toilets, swimming pools
d) non wet kissing
e) sharing food & utensils
f) insect bites e.g. mosquitoes -HIV only lives for a short time and does not reproduce in an insect
g) Injecting with sterile needles
h) Protected sex -If an unbroken latex condom is used, there is no risk of HIV transmission. There are myths saying that 'some very small viruses can pass through latex' - this is **not** true.

MODES OF HIV TRANSMISSION

1. **Sexual contact**
   - Any unprotected (no condom) penetrative sex whether vaginal, anal or oral can transmit HIV from infected individual to uninfected sexual partner.
   - Heterosexual contact (man &woman) a/c 70%-80% of all HIV transmission.
   - Homosexual contact a/c 5-10%
   - Oral sex is low risk but oral ulcers, bleeding gums, genital sores & presence of STIs (gonorrhea, syphilis & genital ulcers) do increase the risk of HIV transmission
   - **Rape, & sodomy** victims could get infected if the attacker is HIV+
   - The victims should seek prompt medical attention because early treatment with ARVs can greatly reduce chances of HIV infection.
   - They will also require specialized counseling & psychological /psychiatric care

Factors that influence transmission through sexual contact

- The risk of HIV transmission through sexual contact is influenced by a number of factors:

a) level of virus in the body
b) number of sexual partners
c) sex – male/female
d) age
e) STDs/STIs
f) Condom use

2. **Intravenous Drug Use/ Contaminated Piercing Instruments**
   - I.V. drug use- is the administration of drugs of addiction e.g. heroin into the blood stream by injecting into the veins

- Most drug users tend to shoot in groups & often share needles
- It there4 becomes very easy for transmission /infection to occur from one infected group member to another
- It's a significant modes in the developed countries a/c 5-10% of HIV infections
- Procedures such as ear piercing & circumcisions when done with poorly cleaned & unsterile instruments can lead to HIV transmission.

3. Occupational exposure/ Infection in the health-care setting

- Occupational exposure is the accidental exposure of healthcare workers (e.g. doctors & nurses) to body fluids from an infected patient in their care
- This is most frequently due to needle pricks or cuts with surgical instruments
- Infection can also occur due to contact with infected blood, lab samples especially through broken skin.

4. Mother -to -child transmission/ MTCT

- Also called **Vertical / perinatal transmission** & a/c 13-40%
- It's possible for HIV to be transmitted from HIV+ mothers to unborn child.
- This occurs in 3 ways:

a) During pregnancy-
   - The virus crosses from mother's blood to child through the placenta.
   - Although there's no exchange of blood between mother & child, researchers believe that the foetus can get HIV through diffusion
   - A/c about 35%

b) During birth –
   - Thro exposure to mother's blood & other secretions. A/c 65%

c) After birth- through breast feeding.
   - Breast milk contains minimal quantities of HIV
   - A/c 15%

Factors that increase chances of MTCT/ Determinants

a) high level of HIV in mother's blood & other body fluids (maternal viral load)
b) duration of exposure to maternal secretions during delivery
c) inadequate nutrition
d) pre-term delivery- premature babies are more prone to infection bcoz immune mechanism is still very weak/ immature
e) Maternal immune response- maternal CD4 cell count
f) prolonged membrane rupture-increased risk if more than 4hours
g) obstetrical procedures- e.g. vacuum assisted delivery
h) unprotected sexual intercourse
i) presence & amount of virus in the genital tract
j) Placenta barrier- breaches in barrier leads to mixing of maternal and foetal cells
k) Presence and amount of HIV in genital tracts

Prevention of MTCT (PMTCT)

- Prevent HIV infection in women
- Reduce the number of HIV exposed pregnancies
- ART- to infected pregnant women
- Preventing malaria in the pregnant woman
- Reducing trauma and shortening exposure of the baby to the virus during labour and delivery
- Appropriate choice of feeding infants i.e. breastfeeding exclusively without any supplements followed by abrupt but timely weaning or replacement feeding from birth without any breast milk.
- Follow up and care (PMCT – Plus)

NB PMCT-Plus provides a package of services that include prophylaxis against opportunistic infections, treatment of HIV complications, counseling of mothers and ART for eligible mothers, children and family.

STIs, STDs, FGM and HIV/AIDS

- STDs are diseases that are transmittable from an infected person to another through sexual intercourse
- STIs is a term applied to infections that are transmitted primarily through sexual contact be it vaginal, oral, or anal intercourse
- They don't necessarily involve sexual activity but
- The organisms that cause STIs enters mostly thro the soft & thin skin that cover the inner surfaces i.e. mucus membrane of the vagina, urethra, anus & mouth.
- However in some instances exposure to sores or other types of skin to skin contact may be insufficient to transmit the infection.

Common examples of STIs/ STDs

- Syphilis.
- Gonorrhea.
- Candidacies.
- Hepatitis B & C.
- Chancroids (genital sores)
- Genital herpes (Herpes Simplex V).
- Genital warts(Human Papilloma V)
- Bacterial vaginosis.
- Trichomoniasis

Relationship between HIV & STDs/STIs

- STIs/STDs increase the risk of HIV infection by mobilizing a high population of T cells to fight the STI/STD hence providing the breeding ground for HIV
- STDs/STIs also increase the risk of acquiring or transmitting the virus
- Both are transmitted through sexual contact & from infected mother to child

Dangers/ risks of STDs/STIs

- Increased risks of getting infected with HIV or the risk of infecting others

- High incidences of infertility e.g. pelvic inflammatory disease if untreated result in infertility or tubal pregnancies.
- Future problems with pregnancies & child birth
- Mental disorders & deaths esp in syphilis

Treatment of STDs/STIs

- STDs/STIs require medical examination & medical treatment
- Any person who has contracted STD/STI & is receiving treatment should also:

a) Receive counseling from a qualified health worker on how to avoid future infections
b) Take all medicines prescribed exactly according to all the instructions
c) Inform all sexual partners of the need to get examined & treated
d) Abstain from further risky sexual behaviors
e) Use condoms for protection

FGM (FEMALE GENITAL MUTILATION)

- It's a destructive invasive procedure usually performed on girls before puberty.
- Involves surgically removal of part or the whole clitoris using razor blades, knives, and scissors
- Since the victims are young they are unable to give their informed consent.
- FGM is forced on approx 6000girls/day world wide
- Because of poverty & lack of medical facilities the procedure is frequently done under less hygienic conditions & often without anaesthesia
- A person who is not medically trained usually circumcises about 20 girls of same age group

Effects of FGM leads to conditions that favours HIV survival, they include;

a) An abnormal anatomy with anatomical distortion
b) Partial closure of the vagina
c) Incomplete healing brought about by infections i.e. acids & organisms from urine
d) Scar formation which may be excessive
e) Urinary tract infection
f) Inflammation of the genital area
g) Chronic urinary retention- urine is broken down to urea & uric acid accumulates in joints & causes gout

IV DISEASE PROGRESSION AND SYMPTOMS.

- HIV infects cells of the immune system and the central nervous system mainly T helper cell thus weakening the immune system.

Exposure vs. Infection

- When HIV+ individual encounters an uninfected person, this does not always result in transmission of HIV to the uninfected person
- Only a fraction of the exposed people will be infected
- Different kinds of exposure between infected & uninfected individuals have different probabilities of leading to infection
- Those who are exposed & become infected do not show sign of illnesses right away.

Infection vs. Disease

- Among individuals who become infected with HIV, not everybody will develop physical symptoms
- Most viral infections don't show physical symptoms
- But most people infected with HIV ultimately develop some disease symptoms caused by damage or destruction of cells & tissues in the infected person
- In some cases the damage may result from direct killing of cells by virus
- In the case of AIDS, most of physical symptoms are the indirect result of damage to the I.S. by HIV
- Factors such as age, sex, genetic make-up, nutrition, environmental factors, & encounters with other infectious agents can influence the exact nature of the symptoms in a particular individual.

HIV infection can be broken down into 4 stages:

a) Primary HIV infection, window period & sero conversion

b) Clinically asymptomatic stage,

c) Symptomatic HIV infection,

d) Progression from HIV to AIDS.

i). Primary HIV infection

- This is the initial stage where one obtains the virus thro the various modes of transmission.
- It can be divided into:

a) Window period

- This stage of infection lasts for a few weeks to about 3 months and is often accompanied by a short flu-like illness or no signs.
- HIV cannot be detected in blood screening although HIV is present in blood & the blood is not 100% free of HIV

- The virus cannot be seen in the first 21 days.
- During this time a person can still transmit the virus to another person.
- It's the most crucial stage

b) Sero conversion

- This is the development of the anti-bodies.
- Immune system begins to respond to HIV by producing HIV antibodies and cytotoxic lymphocytes.
- If an **HIV antibody test** is done before seroconversion is complete then it may not be positive.
- In this stage a person may have flu like illnesses, fever, fatigue, sore throat, joint pains & lymphadenopathy
- Some will not experience any illnesses at this stage.

ii). Clinical asymptomatic HIV infection/ Latent phase

- The presence of HIV without major symptoms
- Although there may be swollen glands.
- The level of HIV in the peripheral blood drops to very low levels but people remain infectious and
- HIV antibodies are detectable in the blood, so antibody tests will show a positive result.
- HIV is not dormant during this stage, but is very active in the lymph nodes.
- Large amounts of T helper cells are infected and die and a large amount of virus is produced.
- This period can last for many years (5 – 15 years)

Initial Infection Symptoms

- Mononucleosis-like illness (sore throat, swollen glands, fever) & skin rash
- Encephalopathy i.e. Brain infections - brain swelling & inflammation of the brain lining or meninges
- This causes headache, fever, brain functions impairment, difficulty in conc., remembering or solving problems
- Personality changes may also occur

NB: Asymptomatic period – some type of balance exist between HIV infection & the I.S. in the infected person

iii). Symptomatic HIV infection/AIDS Related Complex (ARC) phase

- Over time the immune system loses the struggle to contain HIV due to the following main reasons:

a) The lymph nodes and tissues become damaged or 'burnt out' because of the years of activity;

b) HIV mutates and becomes more pathogenic, i.e. stronger and more varied, leading to more T helper cell destruction;

c) The body fails to keep up with replacing the T helper cells that are lost.

- As the immune system fails, so symptoms develop.

- Initially many of the symptoms are mild, but as the immune system deteriorates the symptoms worsen.
- When the viral load reaches a critical amounts, the I.S. is suppressed to such a degree that other infections which under normal circumstances will not be difficult to resist gain entrance i.e. **opportunistic infections**
- **Opportunistic infections** – they take advantage of the impairment of the I.S. & sometimes are caused by organisms that don't cause infections/ diseases in man.

Symptoms of HIV infection in this stage

- Two or more of the following signs / symptoms may occur

-Chronic fever -Lethargy (fatigue/ tiredness)

-Continuous diarrhea - Eczema (allergy of the face)

-More than 10% wt loss - Psoriasis (itchy pimples)

-Lymphadenopathy - Dermatitis (itchy skin)

-Night sweats - Oral candidiasis (sores in mouth)

-Dementia (short term memory loss)

- **Incubation period-** is the length in time between initial infection & becoming symptomatic.
- It varies between people & depends on a length of factors

iv). Progression of HIV to AIDS

- As the immune system becomes more and more damaged the illnesses that present become more and more severe leading eventually to an AIDS diagnosis.
- It's the most advanced stage of HIV infection
- At this time when CD4 cell count has gone down below 200 CD4 cells/ml, HIV develops to one or more severe opportunistic infections or cancer
- The infection / cancer may be life threatening due to the weakened I.S.

Common symptoms in this stage/ Initial Disease Symptoms

- An infected individual may have symptoms from more than one of these classes;

a) HIV wasting syndrome: -

- Sudden unexplained loss in body weight (>10% of total body weight),
- Unexplained chronic diarrhea (>1 month)
- Chronic weakness
- Unexplained prolonged fever usually at night that causes night sweats (>1 month).
- Brain damage due to high temp that causes fevers

b) Lymphadenopathy syndrome (LAS)/ persistent generalized lymphadenopathy (PGL):

- Lymph glands enlargement is persistent
- They swell in groin, armpits, head & neck but are not painful

- Some infected people may experience both LAS & Wasting Syndrome

c) Neurologic disease-

- direct damage of the brain by HIV or by other agent
- Damage of parts of the nervous system can also cause different neurologic symptoms. For e.g.

i) **Dementias**

- Impaired mental functions, forgetfulness, loss of mental functions
- Difficulty reasoning & performing mental tasks
- Depression, social withdrawals & personality changes
- Unable to care for themselves eventually
- Coma & death may follow

ii) Spinal cord damage/ swelling (myelopathy)

- Spinal cord transmits nerve impulses to the muscles of the body
- Bcoz of this, damage may result in weaknesses or paralysis of voluntary muscles/ limbs

iii) Peripheral nerve swelling/ damage (neuropathy)

- these nerves sense pain
- when damaged can cause burning or stinging sensations in the hands or feet or occurrence of numbness

NB: individual patients may experience a mixture of any of these illnesses

Others include:

- Coughs & gasping of breath
- Seizure- lack of coordination
- Difficulty or pain during swallowing
- Psychotic symptoms- mental confusion & forgetfulness
- Loss of vision
- Severe head ache
- Nausea
- Abdominal crump & vomiting
- Extreme fatigue
- Cancers-m of blood, BM etc
- Coma
- Death

HIV+ patient can die any moment at this stage

Common infant symptoms of HIV/AIDS

- Growth failure
- Persistent diarrhea
- Chronic cough
- Chronic fever

- Pulmonary/ chest infections
- Lymphadenopathy

OTHER COMPLICATIONS IN HIV PATIENTS- manifest when I.S is weak

a) Common brain infections

- Tumors, Swelling of the brain, Nerve damage

- They can cause

- Headache & confusion, Poor coordination of feet, Blindness
- Enlarged lymph nodes
- Fever, sore throat, weaknesses

b) Common skin infections

- When I.S. is damaged in HIV patients the skin conditions tend to persist more & they become difficult to treat
- In most cases these conditions are caused by bacteria, viruses or fungi

E.g. of Bacterial infections

- frequent boils that reoccur
- cellute- stays in one place in lower part of the leg or under the feet/ finger nails.

E.g. of fungal infections

- ring worms & fungal infections of hair &nails
- *Tinea pedes*(nails), *Tinea capolis* (hair), *Tinea capidis*(ringworms)

E.g. of viral infections

- HSV 1&2 (burnt face or genitals)
- Herpes zoster (rushes around waistline –shingles)
- skin cancers
- genital warts (rough sores in skin that affects a small area initially but rapidly spread

Factors that lead to faster development of hiv infection to full- blown aids

1. Age

- Persons who get infected after the age of 35years move faster from HIV infection to full blown AIDS than those who get infected in their mid 20s.

- Children who get infected at birth die faster simply because their immune system is not well developed at their tender age.

2. Type of HIV contracted

- There are two well known types: HIV1 and HIV2.
- HIV1 is harsher on people hence kills faster than HIV2.

3. Mode of transmission

- HIV got through blood transfusion kills faster than one got through sexual contact.
- This is because the amount of virus channeled into the bloodstream is in large quantity.

4. Ill- health & other types of infections

- People who are already sick & then get infected move faster than those infected when healthy
- Tropical diseases such as malaria, typhoid & intestinal worms makes patients to develop AIDS faster

5. Nutritional status

- Those infected & are not eating enough of wll balanced foods are more likely to develop AIDS faster

6. Lifestyle

- People who expose themselves to re-infection with other strains of HIV or STIs/STDs and other illnesses move faster from HIV to AIDS

7. Opportunistic infections

- If they are not competently treated , then the HIV+ person develops AIDS faster.

OPPORTUNISTIC INFECTIONS

E.g. of fungal infections

a) PCP

- Inflammation of the lungs caused by infection with fungus called *Pneumocystis carinii.*
- Inflamed areas of lungs appear as white spots in x-rays
- It's the leading cause of death in AIDS patients i.e. about 50% of AIDS patients will eventually develop PCP

b) Candida

- Fungus similar to baker's yeast
- Found on skin & mucosal surfaces (mouth, vagina)
- In mouth they appear like white plaques that feel furry
- Antifungal e.g. mycostatin can be used
- They are difficult to completely eliminate
- They can spread to oesophagus & cause painful burning sensation when eating i.e. oesophagitis.
- 50% of AIDS patients will experience candidacies.

c) Systemic mycosis

- Soil fungus that can cause generalized infections in AIDS patients
- Exist in either mold like or yeast like form & are called **dimorphic**
- Are of 3 types- Histoplasmosis, Coccidiomycosis, & Cryptococcus
- They cause lung infections in healthy patients
- But in AIDS patients, the brain, skin, bone, liver & lymphatic tissue may also be highly infected.

E.g. of Bacterial infections

- Components of I.S. responsible for controlling the common bacteria are less affected by HIV infection, thus adult AIDS patients do not generally suffer infections with common bacteria

a) Mycobacterium

- Infection with *Mycobacterium avium intracellular* is most common in AIDS patients
- It does not cause disease in healthy people but it causes TB-like disease in the lungs of AIDS patients
- Also causes infection of BM & presence of bacteria in blood at high levels
- Patients will have fevers & low no. of WBCs
- *Mycobacterium tuberculosis* that causes TB is also common in AIDS patients

E.g. of Viral infections

a) Cytomegalovirus (CMV)

- Common virus that infect people inn childhood with no symptoms but may cause mononucleosis-like illness (sore throat, swollen glands, fevers) in adults
- Congenital infections(fetus) can also lead to permanent brain damage
- In AIDS patients CMV infect retinas of the eyes causing blindness & also adrenal glands leading to hormonal imbalance
- CMV can cause pneumonia, fevers, rash & gastroenteritis in AIDS patients
- CMV pneumonia in patients with PCP is fatal

b) Varicella (shingles)

- Painful rash condition that occurs on human trunk
- Latent varicella zoster (that causes chicken pox in childhood) is reactivated when the I.S. is compromised
- Antiviral drugs e.g. acyclovir is sometimes used to control shingles

E.g. of Protozoan infections

a) Cryptosporidium gastroenteritis

- Caused by protozoan called *cryptosporidium*
- It infect lining of the intestinal tract & causes diarrhea (gastroenteritis)
- In normal/ healthy people diarrhea lasts a few days but in AIDS patients it is prolonged & severe
- That is about 20-50 watery stools per day accompanied by abdominal cramps & weight loss

b) Toxoplasmosis

- Caused by *Toxoplasma gondii* that causes asymptomatic infections in healthy adults
- In AIDS patients it causes brain infections with symptoms similar to brain tumors (e.g. convulsions, dementias).

E.g. of Cancers

a) Kaposi's sarcoma (KS)

- Are tumors of blood vessels
- In non- AIDS patients KS is seen in older men of Jewish ancestry
- Initially few tumors appear as pink, purple or brown skin lesions located on arms or legs
- Eventually they spread & bcom widely distributed in most linings of the body
- They are difficult to control if they spread to the lungs
- Chemotherapy can eradicate them

b) Lymphomas

- Cancers derived from B cells of I.S. are the common type of lymphomas in AIDS patients
- Epstein-Barr virus causes mononucleosis but it can also transform normal B cell into cancer cell
- Unusual lymphoma that spread to the brain also occur in AIDS patients

c) Cervical cancers

- Its common in female AIDS patients

- Infections with certain strains of Human Papilloma Virus (HPV) that cause warts in the genital tract is an underlying cause of cervical cancer
- Cancer caused or induced by HPV develops faster when I.S. is compromised in AIDS patients.

Hairy leukoplakia

- Abnormal condition of the mouth in which white plaques appear on the surface of the tongue
- This is due to abnormal growth of papillae cells of the tongue
- They can't be scrapped off
- They resemble cancer cells

V. DIAGNOSIS AND TREATMENT OF HIV/AIDS

DIAGNOSIS OF HIV

- An HIV test is done to detect presence of HIV in a sample (usually blood) drawn from an individual
- It's also possible to determine the actual amount /level/ quantity of HIV in the blood i.e. Viral load test
- The term **viral load** is used to describe the level of virus in the blood

Requirements
- Individual should give consent before testing is done
- The individual should be well counseled before & after the test
- Test results should not be revealed to others unless consent is sought & given
- Adequate care by health care workers should be taken to protect individual's rights to privacy.

Laboratory methods to test for HIV
- Several methods are used to either detect or quantify HIV

1). HIV Antibody Test
- Tests for antibodies produced against HIV
- When HIV enters our bodies we respond by producing antibodies 'specific' to HIV
- These antibodies for HIV can be detected using certain lab techniques
- Presence of HIV antibodies indicate that one has been infected with HIV bcoz that's the only way the body can produce HIV antibodies
- But, HIV antibody test could be inappropriate in infants born to HIV+ mothers
- This is becoz for nearly 18 months the infants may have antibodies against HIV from mother that may lead to erroneous results
- As the child grows older, maternal HIV antibodies are cleared from the body as their immune system continues to develop

E.g. of HIV antibody tests
- Currently there are 3 antibody based HIV tests in routine use

a) ELISA (Enzyme Linked Immuno Sorbent Assay).
- Detects the presence of HIV antibodies in serum, fluid or whole blood
- The presence of HIV antibody is shown by a colour change(red) & the test is said to be positive i.e. HIV+
- If the test solution remains clear, this indicates that there are no detectable HIV antibodies & the test is said to be negative i.e. HIV-
- Thus the terms HIV+ & HIV-
- Modern ELISA tests are quite accurate (98-99%)
- They are associated with false+ (1%)
- They are very sensitive and requires laboratory testing by a qualified personnel

b) Rapid HIV tests -Unigolds and determines
- Produces very quick results in about 10-20 minutes

- These are rapid tests recommended for VCT's in Kenya
- They are simple, free and require no laboratory

c) Western blot

- This reacts to the presence of specific elements of HIV.
- It relies on detection of antibodies to multiple different parts of HIV to confirm a HIV+ result
- It requires an HIV antibody test which is + to different but specific parts of gp of HIV in order to confirm an HIV+ status
- Its there4 the standard for determining the + HIV antibody test which is a confirmatory test
- Its more reliable & less prone to giving false results i.e. accurate
- It takes about 7 days & is very expensive.(at least Ksh.5000 per test)

2). HIV Antigen tests

- This tests directly for HIV itself and not for HIV antibodies
- Are extremely sensitive & can detect even small fragments of HIV
- Can detect HIV within days or weeks of infection, unlike HIV antibody test which can take up to 6 wks
- Are especially used in babies

E.g. of HIV antigen test

a) Polymerase chain reaction (PCR) assay

- It detect presence of HIV genetic material & can be used to detect both HIV-1 & HIV2

b) Branch chain DNA (bDNA) assay

- Also detect both HIV-1 & HIV-2
- It's not widely used bcoz it has not been approved by Food & Drug Administration (FDA) in America.

NB. -HIV antigen tests are expensive.

-They can be used to detect & quantify HIV

3). Viral cultures

- It's based on growing HIV in the lab
- A specimen is taken from a sample (e.g. blood) & cultured in lab grown cells (culture/media)
- If HIV grows then that is proof that one has been infected with HIV
- This is because the cell media is HIV specific making it incapable of supporting growth of other viruses
- It's expensive & tedious
- It's used only for research purposes.

OTHER TESTS – to quantify HIV

I. CD4 cell count

- The test is able to det. & count the amt of CD4 cells remaining in the blood as an indicator of the strength of the immune system.

- After testing & finding the HIV status to be +ve, its impt to know how much the immune system has deteriorated
- If conc. of CD4 cell is high, then that of HIV will be low & vice versa
- This is bcoz HIV destroy CD4 cells
- Normal CD4 cell count is 1000-1500 CD4 cells / ml
- If its below 200 CD4 cells / ml, then one becomes highly accessible to OIs
- If CD4 cell is 1000 & viral load is low then such a person need not to go on treatment
- This is becoz the body is capable of adequately protecting itself
- Those who fall in this category are called **long term survivors**
- If CD4 cell count is below 1000 & viral load is high then treatment should be administered

II. Viral load test

- This also tests for the virus itself.
- It's a test to quantify the level of HIV in the body i.e. to det the amt of HIV in the body
- High viral load is an indicator of an advanced HIV infection
- CDC has set guidelines that treatment for HIV+ people should start when viral load shows values of above 10000 viral copies / ml of blood

NB:

- Many labs in Kenya offer ELISA & western blot
- Facilities are also available for PCR & bDNA assays
- HIV testing methods which use saliva or urine other than blood have also been developed & are easier to undertake bcoz no drawing of blood is involved / required
- However, they are not reliable & are not used routinely
- Handling of blood & blood products remains the work of a qualified medical or lab staff as it carries a great risk of HIV transmission if adequate precautions are not undertaken

HIV/AIDS TREATMENT (ART)

HAART

- Highly Active Antiretroviral Therapy
- In the early days of HIV management single drugs (monotherapy) was used to manage the disease.
- It had very poor outcome as the HIV quickly developed resistance to the drug.
- It was then found that an increase in the number of drugs increased the potency/ effectiveness of the drug and also reduced the emmergence of the resistant strains.
- This combination is known as HAART.

Anti-Retroviral drugs (ARVs)

- Are drugs that stop HIV from multiplying inside the human cell.
- They are not the cure.
- These drugs have led to:

a) Reduction of the virus circulating in the blood
b) Significant reduction of death due to HIV.
c) Have improved the quality of life for those infected with HIV
d) Have improved immunological responses of those infected
e) Have led to a reversal of symptoms of the opportunistic infections/ diseases.

Classes of ARVS

- There are three classes of ARVs which have been found effective in inhibiting & suppressing multiplication of HIV

a) Non-Nucleoside Analogue Reverse Transcriptase Inhibitors (NNRTI)

- Binds RT & prevents the conversion of viral RNA to viral DNA
- **Side effects**- Nausea, vomiting, skin rash

b) Nucleoside Analogue Reverse Transcriptase Inhibitors (NRTI)

- Incorporate into the viral DNA thus stopping the building process
- The resulting DNA is incomplete

Side effects

- Anaemia, Nausea, vomiting, skin rash,
- Peripheral neuropathy- xtised by sensations similar to needle pricks on fingertips & other extreme parts of the body

c) Protease Inhibitor

- Prevent the virus from being successfully assembled & released out of the human cell

Side effects

- Dietary restrictions (lots of water -1.5L/day)**,** High fat diets
- Unpleasant tastes (16 pills / day)
- Interfere with elimination of other drugs from the body e.g. antifungal, anti TB drugs
- Interfere with body sugar levels & as a result may cause or complicate diabetes
- Alter fat distribution (women appear pregnant bcoz fat is deposited in abdomen & men at the shoulders creating hump)

Advantages of ARVs

- Restores immune functions and slows down the decline of the immune function
- Prolong life and improves the quality of life
- decreases risk of illnesses and hospitalization
- Improves symptoms of the HIV opportunistic infections.
- Improves health and strength.

Disadvantages of ARVs

- ARVs are not the cure and may raise false hope.

- They may have to be taken for the remainder of the patient's life.
- At least three drugs have to be taken have to be taken together to be effective.
- Most of the regimens have a complicated schedule.
- Most of the drugs have side effects which might make the patient discontinue taking the drugs.
- If resistance develops the drug no longer works effectively.
- Most of the drugs are expensive.

Factors to consider when initiating HAART

a) Clinical symptoms

- HAART should be given to all individuals exhibiting clinical AIDS symptoms.

b) CD4 cell count

- When CD4 cells have shown to drop significantly, HAART should be administered.
- CDC has set guidelines below 500CD4 cells/mm3 should be given.
- Bcoz of regional & individual variations in CD4 cell count, there is no consensus on CD4 cell count at which treatment should begin

c) Viral count

- High viral load is an indicator of advanced HIV infection.
- CDC has set value of above 10,000 viral copies per mm3 of blood.
- There is no consensus on viral load level at which treatment should begin

Limitations of HAART

- When HAART was 1st dvpd, researchers believed that they had the ability to completely eradicate HIV within a few years
- However more studies & further experiences with HAART dampened their expectations

Factors that limits effectiveness of HAART

a) High cost limit long term use
b) Toxicity could limit long term use
c) Complexity of drug instructions & high amt of pills may result in patient not adhering to treatment
d) Dvpt of resistance to one /more drug combination- doctors may identify the drug in the combination & replace it with a new drug.
    - -New drug combination is called **salvage therapy**

e) **Sanctuary sites**- drugs are not able to penetrate into certain sites in sufficient levels e.g. testis, brain, macrophages
f) **Latent viruses** – ARVs work on a replicating virus & not on non-dividing viruses
    - -If HAART is withdrawn, HIV in sanctuary sites are released into blood & latent viruses may start multiplying

AREAS OF RESEARCH

- More potent drugs -that will try to eliminate HIV
- Drugs with lower pill burden instead of many pills- one drug is now available in some countries
- Structured treatment interruptions (STIs)- to allow patients to go on drug holidays i.e. to go off medication for some periods
- Fusion/ entry inhibitors- to prevent HIV from attaching (fusion) & entering (entry) the cell
- Integrase inhibitors – to interfere with incorporation of viral DNA into human DNA
- Introducing artificial CD4 cells for HIV to attach to
- Immune modulators- strengthen I.S. e.g growth hormones & interleukins2
- Microbicides- anti HIV creams to be applied by women
- Vaccines-preventive & therapeutic vaccines

VI.MANAGEMENT OF HIV/AIDS

- The approaches to managing HIV/AIDS include:
  a) Destigmatization
  b) Behavior change
  c) Proper nutrition
  d) Living positively
  e) Voluntary Counseling and Testing(VCT)
  f) Anti-Retroviral Therapy(ART)
  g) Home Based Care(HBC)

A) DESTIGMATIZATION

- **Stigmatization-** is an act of identifying, labeling undesirable qualities targeted towards those perceived as being shamefully different from social ideal
- It's an attribute that discredits affected and infected people from the normalized social ideal
- **To destigmatize-** is to remove stigma such that the infected are not neglected and seen as bad people, but as responsible people i.e. freely talk about HIV to create awareness.

B) BEHAVIOR CHANGE

- Avoiding high risk behavior and situations that can increase the spread of HIV
- **E.g. of high risk behaviors**
  - Drug use and abuse
  - Pre and extra marital sex
  - Early and forced marriages
  - Early sexual encounters
  - Homosexuality and lesbianism
  - Emulating negative role models
  - Rape
  - Prostitution
  - Incest
  - Group sex
  - Peer pressure
  - Sugar daddies /mummies
- **E.g. of risk free behaviors**
  - Chastity
  - Proper use of leisure time
  - Proper courtship and marriage
  - Setting and emulating positive role model
  - Encouraging peer counseling and education

C) PROPER NUTRITION FOR PLWHAS

- Nutrition is the science of food value i.e. it's the use of a balanced diet
- Eating well is an important part of keeping well balanced diet that can help if you are HIV positive.
- There is no better intervention to infection than good nutrition.
- Good nutrition is the key to good health and it is more important than medicine.
- Everyone needs to eat food from the three basic food groups everyday i.e. proteins, vitamins & carbohydrates. This is called a **balanced diet**. Other food groups include fats, minerals and water.
- A balanced diet is a part of the food that the body uses:

a) To build and repair worn out body cells/ tissues i.e. proteins
b) To provide energy to the body i.e. carbohydrates
c) To protect the body against infections i.e. vitamins
d) To store energy to be used sparingly when there is danger i.e. fats
e) To stimulate the appetite e.g. water
f) Improve well being of the body and the spirit

- PLWHAs need to be careful about their nutrition.
- As the disease progresses it may cause them to loose appetite so that they eat less and no longer get the nutrients they need.
- HIV may also affect the way the body uses the nutrients it gets
- BUT the body has greater need for good nutrition as a result of HIV and opportunistic infections.
- Eating a well balanced diet will help the PLWHAs to stay healthy longer by providing the nutrients the body needs to maintain strength and fight diseases.

Advantages of proper nutrition

- Provides the body with all the essential nutrients required for good health
- Helps to prevent illnesses esp. vitamins
- Enables the immune system to work at its best capacity
- Maintains weight esp. proteins
- Improves health and energy esp. carbohydrates
- Prevents dehydration
- Proper nutrition can be enjoyable

Key indicators of health problems

- Lack of appetite
- Low or high body temperature
- Lack of sleep (insomnia)
- Poor digestion
- Toxic colon i.e. unhealthy stool

Signs of healthy and unhealthy stool

	healthy	**unhealthy**
size	Large in diameter (1-2 inches)	Narrow(¼- ½ inch), indicating an inflamed colon
colour	Medium brown	Green, dark brown indicating high fat in stool
Form	Soft but firm, floats in toilet bowel	Mud-like, very hard or very soft, smells ammonia

Ways of increasing appetite

- Chilies
- Digestive herbs e.g. ginger, garlic
- Drinking purified water
- Body exercise

Treating of insomnia

- Chilies
- Herbal tea
- Sun bathing
- Body exercise
- Drink lemon olive oil

Hints of a health life

- Eat more fresh foods, fruits and vegetables
- Eat less cooking fats and less fried foods
- If your eyes are yellow it's better to eat boiled foods
- Avoid alcohol and street drugs
- Flush your system by drinking 8 glasses of water per day
- Drink lemon olive oil

D) LIVING POSITIVELY

- It involves accepting one's HIV status and possible ways of delaying the onset of AIDS

Ways of living positively

- Accepting one's HIV status- it can't be changed
- Refusing to be a victim- focusing on what one can do best but not on dying of AIDS
- Seeking support and not pity- living one day at a time
- Exercising more regularly- it's good for the body and reduces stress
- Seeking prompt treatment for any illness.
- Seeking advice when planning to have a baby.
- Paying attention to nutritional needs- eating locally available food stuffs(veges & fruits), and consulting a doctor on the best diet
- Managing stress effectively through continued support counseling and freely socializing with colleagues at work, friends and family members
- Keeping busy- no self pity, but concentrating on development
- Taking enough rest to regain energy- do not overstrain
- Thinking and acting positively- seeking out for people who are honest, trustworthy and supportive and avoiding people who judge you
- Embracing your own spirituality- joining Faith Based Organization
- Accepting responsibility- using condoms to prevent infection and re-infection- do not deliberately infect others.

What to avoid when living with HIV/AIDS

- Avoid lifestyle that can expose one to further infections with HIV and other illnesses
- Avoid unsafe sex- exposure to other infections
- Avoid the use of unprescribed drugs for effective control of diseases
- Avoid living in isolation- participate in social activities

- Avoid pregnancy
- Avoid consumption of alcohol and cigarettes due to opportunistic infections

How to help PLWHAs to live positively

- Prevent disruption of normal life and promote solution for domestic violence
- Keep confidentiality between care giver and patient
- The patient is to feel loved – e.g. by feeding, bathing- it gives hope to the patient
- Material support- donation of clothes, drugs- makes them feel supported
- Expression of views-give them time to express views- it makes it easier to advice them
- Enlightening on nutritional foodstuff- encourage a balanced diet
- Delivering of health services

E) VOLUNTARY COUNSELING & TESTING (VCT)

- **Voluntary** - means no person can be tested without his or her informed consent.
- **Counseling** - It's a confidential dialogue between a counselor and a client aimed at enabling the client to cope with stress and take personal decision related to HIV/ AIDS
- **Testing -** Is the diagnosis of HIV by detecting the presence of antibodies against HIV in a client's blood.

Government policy on HIV testing

- There are THREE principles that frame the govt. policy on HIV testing
  a) Every person who requests for the test or is advised to take one must be **counseled** and educated about the meaning of the test and its implications
  b) No one will be tested without his or her **informed consent**
  c) Test results are **confidential**
- **Informed consent-** a person is made aware ,in a language he or she can understand, of the possible consequences of the test and agrees to be tested without coercion
- **Confidentiality-** is a protection of personal information (including test results)

Pre-test counseling- This is done because of the following;

- **Aim:** To help the client to make informed decisions whether or not to take the test.
- To assist the client to consider the implications
- To provide the person/ client with accurate information about HIV
- To access the client's ability to cope with positive results
- To help the client manage fear and anxiety while waiting for the results

Pre-test counseling should include

- Information about the test
- Information about HIV infection and AIDS
- Why the person is being tested
- What it will mean to test positive or negative
- Discussion about confidentiality
- Education about HIV prevention and how to reduce risk
- Discussion about whether or not to have the test done

- Meanings of HIV tests including the window period
- Reasons why the client is requesting VCT

Post-test counseling-

- **Aim:** to explain the HIV test results, provide appropriate information, support and referral

It can help a person to

- Clarify information
- Understand the test
- Help in the development of successful coping mechanism
- Change behavior that may place them to other risk i.e. Encourages risk reduction behavior
- Express their feelings and reactions i.e. The client is helped to understand the test result and is reassured and given hope
- It helps a person feel that they are not neglected or rejected once a diagnosis is made

Counseling after positive results

a) It reveals what the positive results mean and how the client
b) It lets the client express his feelings and thoughts
c) Asses the psychological thought of revenge or suicide. Such expression should never be ignored even if said jokingly
d) Explain ways of positive living
e) Offer empathy and find out how the client will behave in the next hour and days
f) Encourage the client to discuss any other concerns e.g. Marriage or pregnancy
g) You may refer the client to a supportive group

Counseling after negative results

a) The client may shout with happiness and joy or even become angry.
b) Ask open ended questions to establish the understanding of the clients' negative results.
c) Remind the client of the window period and recommend a repeat of the test after 3 months and meanwhile reduce risks.
d) Discuss with the client how to prevent and protect themselves from infection.

Advantages of knowing one's status

- Removes anxiety
- Protect one's partner
- To prevents mother to child transmission
- To plan for the future
- To receive preventive therapy
- To seek early medical treatment
- To avoid taking risk

Disadvantages of knowing one's status

- Denial of one's HIV status
- Problems in relationships or families

- Risk of stigmatization
- Possibility of someone else knowing your status
- Coping with HIV infection and other illnesses
- Coping with effects of HIV such as unemployment and family problems

Who should visit a VCT

- Anyone 18 years and above
- Anyone who is serious to change his/her sexual behavior
- Couples before marriage
- Anyone who has exposed himself or herself
- Discordant couples
- Pregnant mothers
- Those who have signs & symptoms of HIV/AIDS

Barriers to VCT	**Removing the barriers**
• Fear of testing positive • Concerns about confidentiality • Concerns about stigma • Lack of perceived risk • Lack of perceived benefits of knowing ones status • Inaccessibility – lack of VCT centre • Unfriendly personnel	• Most clients who visit VCT test negative • Maintain high degree of confidentiality at VCTs and outside, this can be done by ensuring that all personnel at VCTs are trained • By maintaining a positive attitude about people who HIV positive to prevent stigma and discrimination • Explain risks of HIV and benefits of knowing ones HIV status • making the VCT not just accessible but also available for full utilization by the communities

Other kinds of testing include:

- **VCT -**Voluntary Counseling and Testing – where the consent of the client is obtained
- **DCT -** Diagnostic counseling and testing – where the client is referred for the testing because they have a condition that is suspicious
- **RTC -** Routine counseling and testing
- **Surveillance testing** - where blood samples that has been taken for other tests is tested for HIV for purposes of knowing prevalence levels.

Role of VCT in HIV management

- Enlighten and give guidance about HIV/AIDS
- Contributes in control of HIV/AIDS
- Conducting the HIV tests- tests and avail results in a few minutes
- Disseminate information on HIV/AIDS
  - avail info. to the uninfected
  - avail info. on prevention and control
  - avail info. that 'its god to assume every1 is infected'
- Give hope to the infected through continued counseling
- Ensure positive living
- Help reduce revenge attitude for the 'innocently infected'
- Help reduce suicidal thoughts/deaths
- Enables the public to stop stigmatizing
- Integration of ARVs programs
- Enables the govt. to keep statistics on prevalence, hence help in policy development and strategic planning

Benefits of VCT

- Improves health status through good nutritional advice
- Earlier access to care and treatment
- Emotional support
- Prevention of HIV related illness
- Better ability to cope with HIV related anxiety
- Awareness of safer options for reproduction and infant feeding
- Motivation to initiate and sustain safer sexual practices
- Motivation for drug related behavior
- Safer blood donations

F) ANTI- RETROVIRAL THERAPY (ART)

- Involves the use of ARVS which are important in stopping the multiplication/ replication of HIV inside the infected individual
- It's important in HIV management because, ARVs slows down the decline of immune functions and help reverse the symptoms of opportunistic infections

G) HOME BASED CARE

- This is the care of the patients infected and affected by HIV/ AIDS that is extended from the hospital or health facility to the patient's home through family participation and community involvement within available resources and in collaboration with health care workers.

Components of home based care

a) Clinical care

- It includes early diagnosis, treatment and follow up care of HIV related illnesses.
- It requires trained clinical personnel, drugs for opportunistic infections, ARV's and dressing materials e.g. cotton wool, bandages and scissors.

b) Nursing care

- It includes care to promote and maintain good health, hygiene and nutrition and ultimately to assist the terminally ill patients to peaceful and dignified death.
- It requires nurses and health care workers trained in home based care, trained community health workers and family members and time.

c) Counseling and psycho-spiritual care

- This includes reducing stress and anxiety, promoting positive living, helping individual make informed decisions and planning for the future and behavioral change and involving sexual partners in such decisions.
- It requires respect for confidentiality, training and monitoring and VCT's

d) Social support

- It includes information about referral to support groups, welfare services legal advice for individuals and families and provision for material assistance.
- It requires confidentiality, acceptance, protection from loss of job and changing the society's concept of the epidemic.

Who provides HBC

- The patient i.e. providing own care if not very sick
- Family members, friends and community members. They need education and counseling especially nursing skills, psycho-social material support, patient care, interaction and positive communication
- Health workers such as community health workers, traditional healers and staff of NGO and CBO

Where HBC are conducted

- At home and within the community
- In clinics for medical problems
- In-patient for very sick people

Difficulties and challenges in HBC

- Insecurity
- Hostility
- Transport problems
- Religion differences
- Traditional beliefs and customs e.t.c.

Advantages of HBC- it's Cheap

- A patient who is nursed in a familiar environment usually suffer less stress and anxiety than one nursed far from home in a strange hospital.
- The home environment also allows the PLWHA continue participating in family matters. This would not be the case if the person was hospitalized away from home
- PLWHA nursed at home is in close contact with family members, friends and community and this promotes a sense of belonging
- Good basic care can be given to the families to care for the PLWA at home rather than in the hospital where there is hospital bills and expensive transport to and from the hospital.
- Nursing a PLWHA at home helps hold the family members together and makes it easier to coordinate family activities
- Information and education on HIV/AIDS will help family members to understand the PLWHA's condition.

- Training in HBC helps community members to become more aware of HIV and encourage people to take steps to prevent it.
- Nursing a PLWHA at home reduces the cost of reaching the PLWA and encourages community participation in the care of the PLWA

Qualities of a HBC giver

- Good communication
- Patient -
- Friendly
- Courageous
- Caring
- Humble
- Observant

NB: One of the most important skills for any care giver is to be **observant.**

- The care giver can prevent a lot of problems by observing the patient's body reactions and feelings.
- The care giver should observe the following
    - Mood of the patient – Is the patient alert, sleepy, withdrawn etc
    - Color of the skin – Norma, yellowish bluish etc
    - The skin – Does it have rushes, blisters, swells etc
    - Body temperature – Cold, hot, normal
    - Breathing – Fast, sow, noisy etc

How to address your client

- Introduce yourself if you are new to the client
- Presentation and punctuality
- Treat the client with respect, dignity, sensitivity and kindness
- Do not blame or discriminate the client
- Patient's privacy must be respected always.
- Strict and absolute confidentiality
- Be acceptable and dependable
- Be knowledgeable to the patient's problems
- Do not judge the moral value of the patient.

VII) PREVENTION AND CONTROL OF HIV/AIDS

How to prevent the spread of HIV

- Awareness campaigns
- Dealing with practices that can increase the spread of HIV/ AIDS
- Responsible/ legitimate sexual behaviors i.e.
    - Abstinence from sex altogether
    - Reduce or limit the number of sexual partners
    - Stay with one un-infected partner 'Being faithful'
- Correct use of a new un-used condom every time you have sexual intercourse
- Going for HIV test or blood screening
- Avoid casual or extramarital sex i.e. chastity
- Avoid sharing un-sterilized needles, toothbrushes razor blades etc.
- Avoid high risk behavior
- Dress and treat open wound
- Communicating correct information

Common safer sex strategies

- Safer sex is any sexual practices that reduce the risk of transmitting HIV from one person to another.

A) Total abstinence.

- It works well with
    - Young people who can manage to delay starting sexual relationships until they get married
    - People who have chosen to remain single
    - People who are separated from their regular partners

    NB: Saying NO to sex is the most effective safer sex strategies

B) **Being faithful to one un-infected partner.**

- This works well with
    - Neither partner has HIV
    - Both partners are faithful to one another all the time
    - People wishing to use this strategy should visit the VCT and remain faithful to one another
- It does not work well with
    - Those whose partners are not faithful to one another all the time
    - Those who already have HIV before their relationship

    NB: Those wishing to use this strategy should visit the VCT and remain faithful to one another all the time

Factors that contribute to unfaithfulness

a) Unmotivated partner
b) Financial irresponsibility
c) When the partner has not yet recovered from a past relationship
d) Emotional damage from childhood
e) When the partner is emotionally unavailable

f) Sexual dysfunction- can be explained in 3 ways

i) Sexual addiction and obsession i.e.

- Demanding for sex all the times even if the partner is not in the mood
- Insisting to engage in humiliating sexual acts e.g. oral sex, anal sex and unrealistic sexual styles
- Involves addiction to pornography, addiction to masturbation, visiting topless/ strip bars frequently, rapists etc

ii) Lack of sexual integrity

- When partners don't honour the sanity of a monogamous relationship hence leaking their sexual energies to someone else
- E.g. flirting, or cheating with other people
- Constant staring of other people's bodies
- Making sexual comments to your partner's friend and to strangers
- Inappropriate touching of other people's bodies

iii) Sexual performance problems

- Impotence
- Premature ejaculation
- Difficulty in experiencing orgasm
- Lack of grip during sexual intercourse (wide vagina or small penis)
- Lack of interest in sex

C) Condoms

- Come in two types- Male condoms and female condoms
- Male condoms are more effective than the female ones
- **Male condom** is a thin sheath latex rubber that is rolled onto the penis.
- It stops the semen from entering the vagina and also the vaginal fluids from entering the penis.
- Its 98% effective BUT the 2% is due to mishandling
- Condom use started during the Medieval Roman empire (100BC)
- 1st condom was made from lamb gut- high portions of gull bladder were reportedly used for fertility regulations

Advantages of using a condom

- Condoms are effective ways of reducing unwanted pregnancies
- Condoms also help protect one from STDs and HIV
- Man can be able to maintain a longer erection when using a condom
- Condon use is less messy especially to the woman who dislikes the wetness, sipping or oozing of semen after sex.
- Condoms also reduce the bad vaginal odor that follows after sex.

Disadvantages of using a condom

- It can burst, slip or tear during the sexual intercourse
- It can also tear when using sharp objects while tearing the packet.
- The latex rubber is easily damage or exposure to heat
- If not correctly used it serves no purpose.

How to apply a male condom

1. Decide to use a condom with your partner.

2. Check the expiry date
3. Make sure the penis is Hard and Erect
4. Remove the condom from the package using finger tips but not finger nails, teeth or sharp objects.
5. Make sure the condom is not bristled or discolored
6. Check the side that unrolls easily.
7. Hold the tip of the condom to remove the air.
8. Place the condom on the tip of the erect penis and squeeze the air out.
9. Unroll it carefully to the base of the penis
10. Smoothen out the air spaces/ bubbles out of the condom with the help of your partner
11. Insert the penis into the rightful place ready for intercourse.
12. During the act make sure that you are not violent.
13. After ejaculation hold the condom at the base of the penis and withdraw while still erect.
14. Remove the condom by unrolling it out of the penis
15. Tie the condom to prevent leakage or spillage.
16. If planning to have a new act, use a new unused condom.

VII) SOCIAL AND CULTURAL PRACTICES

Social practices

- Extramarital sex
- Trial marriages (cohabitation)
- Sex for ritual purposes- barrenness
- Sex expediency- expecting gain
- Sex for livelihood- prostitution
- Resistance to CD use
- Drug use and abuse
- Lack of recreation
- Social stigma- HIV+ people hide status & behave normally
- Internet & pornography
- Patriarchy- dominance of men in society i.e. men decides the circumstances of sex e.g. when, how, where, who, why. And women succumb to pressure because they are economically disadvantaged.
- homosexuality

Factors that contribute to the spread of HIV

1. Deep rooted traditions e.g.
    - Polygamy
    - Wife inheritance
    - Circumcision
    - Tattooing
    - Sharing wives
2. Belief systems e.g.
    - AIDS is a disease like any other
    - AIDS is a curse or witch-crafty
    - Belief that young people do not have AIDS
    - Only poor people can have AIDS
    - Death is certain
3. Peer pressure e.g.
    - You will become sterile if you do not have sex
    - A woman will get problems when giving birth later in their lives if they don't start having sex early
    - Everyone else is doing it why not me
4. Poverty/ riches
    - The rich buy sexual services from the poor
    - The rich have care free attitudes
    - Keeping concubines
    - Marrying an re-marrying
    - The poor take desperate measures
5. Poor parental skills
    - Lack of advice to the children
    - Lack of communication to the children by the parents
    - Parents are not bold /open to their children

- Lack of role models
- Lack of religious morals

6. **Other factors include**
   - International travel
   - Lack of early recognition
   - Lack of counseling for those tested positive.
   - Infection have continued o take place overtime
   - Inaccessible health facilities/services – early treatment to STDs is not given.
   - Lack of sex education -opposed by churches that it promotes immorality
   - Youth engage in sex without adequate information about dangers and consequences
   - Most people who have the virus do not know, they continue spreading unknowingly
   - The stigma associated with AIDS- fear of getting tested or revealing one's serostatus
   - Alcohol abuse and Intravenous Drug Use (IDU)– they have clouded jugdement, they have no time to reason
   - The churches and the parents condemn the use of condoms that its an immoral license to the youth
   - Urbanization –the processes that take place in urban areas allow behaviors that cannot take place in rural areas- this leads to high rate of prostitution
   - Enforced idleness among the unemployed youths- no proper guidance, no explanation to the adolescents about their life experiences
   - Conflict between population control programs & education programs- on the use of condoms which help prevent unwanted pregnancies &STIs but not 100% effective on HIV
   - High risk taking activities –men get involve in more than 1 sexual relationship- they tend to take more risk than women & this exposes them to the dangers of contracting HIV/AIDS
     - 2% of married men & 16% of men are involved in extramarital affairs in any given year (KDHS, 1998) i.e.
     - 7% of men had 2 or more extramarital partners
     - 9% of men had 4 or more different partners over 1yr
     - 30% of unmarried men had 2 or more partners over 1y

RELIGION AND HIV/AIDS

- Religion is a belief in supernatural power
- 2 main religion in Africa- i.e. Christianity and Islamic
- Christianity is divided into- Catholics and protestants
- Catholics beliefs:
  - fornication leads to HIV/AIDS
  - abstinence before marriage
  - condemn the use of condoms
- protestant beliefs:
  - abstinence before marriage
  - some support gay marriages
- Seventh Day Adventist (SDA):
  - Abstinence before marriage
  - Unguided youth functions
- Islam- believe in abstinence before marriage, and, allows polygamy
- Traditional cults- believe that HIV/AIDS is a curse due to fornication

Religious beliefs that promote the spread of HIV/AIDS

- Exorcism- process during which evil spirits are made to leave by saying special words. HIV/AIDS is believed to be one of those evil spirits.
- AIDS is a curse- belief that HIV positive people are cursed and need prayers.

Steps religion have taken/ should take to combat HIV/AIDS spread:

- Hold campaigns against HIV/AIDS
- Engage youth in creative activity to avoid idle youth
- Encourage Christians to support the infected & the affected i.e we are equal
- Set up children homes catering for orphaned HIV/AIDS kids
- Encourage people to visit VCT and know their status
- Help in counseling
- Visit and encourage the infected and affected
- Help start up programs with Govt. e.g. HIV/AIDS at early stages in schools
- They don't allow certain cultural practices e.g. wife inheritance, FGM

Reasons why the church involve in the fight against HIV/AIDS

- Its biblical to help
- Many Christians are infected and affected

POVERTY AND HIV/AIDS

- Poverty- is the ability of an individual to meet only a small portion of their basic needs
- It leads to:
  - rural to urban migration
  - Prostitution
  - Drug dealing jobs
  - Poor resourceful preventive measures
  - Unemployment
  - High percentage of low skilled people
- The above factors contribute to the spread of HIV/AIDS

WOMEN AND HIV/AIDS

- Women are the most infected and affected gender
- Below are some of the reasons / factors that contributes to increased vulnerability of women to HIV infection

Factors include:

a) Social factor

- The societal custom of selecting significantly younger women as wives- this exposes them to sexual activities at an early age

b) Cultural factors

- Cultural practices e.g. early marriages, polygamy, FGM, wife inheritance makes women vulnerable to HIV infection

c) Biological factors

- Women are exposed to sexual activities at an early age

- Before the age of 21, the vagina is lined with a single layer which can easily be ruptured during sexual activity. There is also less mucous production which offers less protection to infections

d) Sexual relationship

- The ratio of male to women transmission is 2:17 times higher
- The amount of sexual fluid (semen) is high in quantity in males and usually goes directly into the woman's body

e) Blood factor

- Women suffer blood loss due to complications of pregnancies and unsafe abortions which can cause anaemia and make them emergency transfusions

f) Economic factors

- Most women are economically dependent on men hence find it difficult to insist on safe sexual practices like use of condoms
- The chances of women reaching a health facility is also minimal

g) Rape – statistically more women are raped than men

h) The notion in women that having dry sex is better, hence they opt to take herbs- this causes sores and bruising during sexual intercourse

Preventing vulnerability of women to HIV/AIDS

- Empower women:
  - educate girls on STIs
  - Girls to have information about their body
  - Engage girls on karate tactics
- Improve medical access for women:
  - counseling facilities
  - supply of condoms
  - cheap medicine
  - friendly VCT
- Build safer norms in society:
  - support organizations advocating against certain practices e.g. FGM, rape, cultural practices
- reinforce women economic independence:
  - providing training opportunities
  - credit programs e.g. Women Finance Trust, savings skills, women cooperatives etc
- policy change:
  - improve legal and human rights from community to national levels
  - revise rape sentencing
  - banning of FGM
  - early marriages should be abolished

VIII) POLICIES AND RIGHTS OF PLWHAs

Global work place policy

- HIV has affected virtually every segment of the population in every country around the world
- A global work place policy has been put in place which guarantees
  - Non discrimination and confidentiality protection
  - VCT services
  - Care support & treatment of HIV+ employees and their dependent with HIV
  - Prevention, education & awareness programs for all employees

Global youth policies

- The youth should be prepared to direct the future of HIV/AIDS policy
- Young people should join the global health & social justice movement to advocate for policy change
- The Student Global AIDS Campaign (SGAC) has mobilized together many students in educational sector & political activism.
- SGAC has organized the students around the core advocacy goals, e.g:
  - increasing funding to the global funds
  - Access to treatment
  - Elimination of developing world debts
- SGAC has built an advocacy framework that has led to both change in risky behavior among participants as well as political successes

Legal rights of HIV/AIDS patients

- Right to education
- Right to employment regardless of their health status
- Right to join any organization & companies whenever they feel like
- Right to move from one place to another within the country as long as one is a Kenyan
- Right to belong to any religious group- most religions associate HIV/AIDS with immorality

Intellectual property rights

- Right to own a house-as long as the house is legally his/hers
- Right to own a business-as long as the business premises is acquired legally
- Right to run a school
- Right to inherit and bequeath property- property should not be taken away just because one is HIV infected
-

IX) IMPLICATIONS OF HIV/AID

To the individual

- Feeling of hopelessness
- Self pity
- Depression
- Suicidal thoughts
- Shame
- Anger
- Denial
- Revenge
- Fear of death
- Social withdrawal- segregation of infected
- Opportunistic infections
- Inability to work
- Reduced life expectancy
- Loss of job
- Lack of faith in God or religion
- Poverty due to medical expenses
- Disruption of persons future plans
- Discrimination at work place and social stigmatization
- Change of sexual behavior
- Poor relationship with spouse, children and relatives

To the family

- Marital instability and breakup- lack of peace in couples
- Children are deprived of parental care and support
- Sense of anticipating grief
- Shame to the family
- Loss of bread winner
- Lack of emotional support/direction
- Strained finances
- Burden of children to the relatives and family friends
- Orphans & vulnerable children have their growth affected, reduced access to basic education & increased risk of acquiring HIV due to lack of parental guidance

To the community

- Reduction of productivity
- Development retardation
- Expensive funerals
- High hospital occupancy
- Financial burden for insurance companies
- Increase in number of street children
- Increased infant mortality rate
- Dependency ratio goes up
- Increased widows, widowers & orphans

- Loss of many lives (human potential)
- Increased diseases which were at one time in control e.g. TB

How to solve negative effects

- Creation of homes for orphans
- Provision of free education to orphans
- Introduction of VCT
- Adoption of orphans in the community
- Destigmatisation
- Acceptance by Govt.

MULTI-SECTORAL IMPACTS OF HIV/AIDS

Impact on Industry and business sector

- Industry and business sector forms the basis for production and supply.
- Labour is required for this production to occur
- HIV/AIDS has effect on labour due to:- increased absenteeism, decreased productivity, reduced number of employees through death, loss of accumulated skills and declining morale.
- Increased medical costs for business with medical schemes
- Declining productivity and increased medical costs results in declining profits
- HIV/AIDS indeed reduces the productivity of the labour force.

Impact on agriculture

- Agriculture is the mainstay of Kenya's economy, followed by tourism sector
- Lower productivity in farming areas due to illness, absenteeism, death and loss of farming skills
- Less land is cultivated
- Less labour-intensive crop production
- Loss of household and farm assets- this is due to diverted time of family members to taking care of the sick and attending funerals.
- Less crop production
- Less livestock production
- Decline in agricultural income and food production and increased food insecurity
- Labour productivity is reduced in commercial farming as well as subsistence farming.

Impact on education

- Increased morbidity
- Absenteeism and attrition of teachers
- Reduced number of school-aged children attending school
- Poor performance in classroom
- These result in decline in quality of education and impose higher cost on education system.
- Pupils are afraid of being taught by infected teachers
- Teachers reported as dying of AIDS are not replaced
- Loss of trained and experienced teachers
- Interruption of teaching programmes due to illnesses

- Resources available to support education are diverted to meet HIV/AIDS related needs
- Children from affected families absent themselves because they take care of the sick
- Poor attendance and increased number of school drop outs because of affected families and death of parents.

Impact on health sector

- Increased demand for health services due to the number of infected persons
- More health resources and workforce are diverted to HIV/AIDS treatment
- Shortage for other health care needs
- Half or more beds in public hospitals are occupied by HIV patients
- Reduced morale of health workers because HIV patients respond poorly to treatment or die
- HIV infected health workers may have low productivity and morale
- ART is costly
- Lab tests to monitor patients are also costly
- Costs of treating opportunistic infections and prophylaxis costs.

Impact on economic growth

- Economic growth is dependent on sustained increase in productive capacity and real output resulting in growing national income
- Labour, capital and technical progress determine economic growth
- HIV/AIDS affect labour and capital investments
- It affects mostly the most productive members of population thus reverses growth in labour supply
- Reduces productivity of infected and affected workers
- Skilled persons die of AIDS reducing economic growth
- Reduced level of domestic savings and investment (crucial for capital formation) due to medical expenses.
- Reduced income and increased poverty imply decreased purchasing power of households thus decreased demand for goods and services

DRUG ABUSE AND MISUSE

- This is also known as substance or chemical abuse.
- It is an intentional use of drugs for reasons other than their intended purpose.
- Drug abuse interferes with physical, social and mental well being.
- Drugs can be used to prevent and treat diseases.
- Not misusing or abusing drugs promote well being

Drug

- is a substance that a person takes that affect the normal functioning of a body positively or negatively

Drug abuse

- Its defined in 3 ways
  - Use of chemicals in excess of normally prescribed dosage & frequency
  - The misuse of drugs
  - Continuous irresistible desire to use drugs that can be harmful to health

Drug dependence

- is a state of dependence or neediness resulting from the continued use of a drug by an individual
- Once an individual is in this state, he or she experiences a compulsion & urge to take the drug in order to experience the desired effects of the drug

Drug addiction

- is a state of periodic or chronic intoxication produced by the repeated consumption of a drug (natural or synthetic**)**

Characteristics of a drug addict

- A tendency to increase the dose – (you feel like you want more & more)
- A psychological dependence on the effects of the drug –(you are helpless without the drug)
- A detrimental effect on the individual & society (the individual is wasted)

Common drugs in Kenya

- **Tobacco** – It is a legal cash crop in some parts of Kenya. It is smoked in the form of cigarettes, chewed or sniffed in some cultures
- **Bhang /Marijuana** – It is illegally grown and exported by some Kenyans. It is smoked.
- **Miraa/ Khat** – A legal and widely chewed drug. It is an important cash crop in some parts of Kenya.
- **Alcohol** – It is legal although there are many illegal alcoholic products being sold in Kenya and it is sold in many different brands.
- **Glue** – It is a legal substance used for shoe repair. It is sniffed especially by street children.
- **Petrol** – A liquid sniffed by young people especially street children.
- **Cocaine** – A stimulant of the central nervous system. It is smoked, sniffed or injected.
- **Heroine –** A fine white or brown substance found in the form of tablet, liquid or capsule. It can be sniffed, smoked or injected and rarely drank.
- **Mandrax** – It is found in tablet form. It is used for its relaxing effects. It is ingested in form of pills or capsule.

Why do people use drugs?

- **Curiosity** – They want to explore and find out what drugs do. This happens due to lack of relevant information about the harmful effects of the drug.
- **Peer pressures** – Peers influence and put pressure on each other to try out drugs. Some people try out drugs just to 'fit in' their group of friends.
- **Sensation** – The drugs are perceived as thrilling to people who want to feel good.
- **Escape** – To escape from the problems and pressures of everyday life.
- **Image** – To acquire new or different images for themselves. Some people want to feel 'tough', 'bolder' 'stronger' or 'cooler'.
- **Fear –** To acquire courage to do certain things they want to do but fear.
- **Addiction** – Drug addicts abuse drugs because they are physically or biologically dependent on the drug. They cannot function without the drug.

Drug reaction

- Drugs make one feel more sociable, smarter, cooler, braver & generally more excited
- They can also make one feel less worried or stressed- these are temporary

How drugs are taken

Most drugs are taken in more than one way:

- **Smoking -**e.g. tobacco, bhang
- **Orally (drinking/swallowing/chewing)** – Drugs can be taken orally and dissolve into the stomach and are absorbed directly into the blood stream e.g. alcohol, miraa, mandrax.
- **Snorting-**
- **Injection** - Drugs can be injected into a vein, muscle tissue or below the skin surface and absorbed directly into the blood stream e.g. cocaine, heroine
- **Inhalation/sniffing** – Drugs can be inhaled and absorbed into blood stream by passing through the lungs. Some of these drugs are gaseous state while some can be sniffed and absorbed into the blood through the mucous membrane of the nasal. e.g. glue, petrol, cocaine

Risk factors to look out for

Young drug abusers tend to have a number of characteristic in common. These include:

- Isolation & alienation from family & friends
- Little or no value for personal achievements
- Little or no personal & social responsibility
- Poor grade & little commitment to doing well in school
- Difficulty getting along with others- (communicating their thoughts & feelings, resolving differences)
- Inability to deal positively with stress, make rational decision, approach problem logically
- Families that have history of criminality, alcoholism or other anti social behaviors
- Parents who are either too lenient or too strict, or who do not clearly define & consistently enforce rules

When drugs are taken

- At night (to induce sleep, relieve pain, relieve boredom)
- In time of trouble (economic problems, exam failure etc)
- After a quarrel (spouses, parents & children etc)
- When idle or bored- to have fun
- Under peer pressure
- When stressed (academic stress)
- During times of insecurity when police & law enforcers are not there

Environments where drugs are commonly taken

- It depends on the social environment & the legality of the drug in question
- In **schools** (esp. with tobacco, bhang & khat)- cases of drugs in schools ar on the increase in Kenya today & are associated with indiscipline
- At **home** or **drug taking den** (alcohol, cocaine & heroine)- home offers most privacy & protection than anywhere else
- On **street-**street children smoking & sniffing petrol and glue
- In **parks** & **bus stops**
- In **tunnels**
- In the **bush**