Module 1: ‘Let’s talk about HIV’

A. Questions

1. Which cells does HIV primarily target for replication?
   CD4 cells, which are cells carrying a CD4 receptor on their surface. These are found on a variety of cells but primarily the T4 lymphocytes of the immune system.

2. Why does HIV ‘need’ CD4 cells?
   Like all viruses, HIV cannot replicate on its own. It requires the ‘machinery’ of other cells. HIV must enter CD4 cells and use the cell to replicate, thus producing new HIV viruses.

3. What is the effect of HIV’s attack on CD4 cells?
   CD4 cells are essential in co-ordinating the immune system. When HIV uses CD4 cells for replication, it also destroys those CD4 cells. The immune system is therefore weakened and unable to fight off infections. Without medication to fight HIV, the immune system becomes weaker and weaker, opportunistic infections occur and the patient develops AIDS. The eventual result is death.

4. What does ‘latency’ mean?
   ‘Latency’ refers to the period during which a patient is infected with HIV but is not experiencing signs and symptoms associated with HIV. This period varies greatly from one individual to the next. On average it lasts 8 – 10 years but it may be even longer in some people.

5. Using Handout 2: ‘Life Cycle of HIV’ below, write in the different stages of HIV replication from 1 – 10
   Answers are on Hand Out 1: ‘The Life Cycle of HIV’

6. What are the clinical signs and symptoms associated with early infection (Stage I & II)?
   In Stage I, the patient is asymptomatic although may have swollen glands under the arms, in the neck or in the groin. CD4 count is usually high, between 600 and 1500 cells/mm3 and the patient can fight off infections and live a normal life. By Stage II, the CD4 count has dropped to below 350 and infections are more common e.g., shingles, rash, skin infections, oral thrush and recurrent chest infections. Weight loss commences. It is still possible to continue with normal daily life, with the help of treatment for infections.

7. What are the clinical signs and symptoms associated with the later stages of HIV infection (Stage III & IV)?
   In Stage III, the CD4 count drop even further to below 200 and the patient is said to have AIDS. More serious Opportunistic infections are more common, e.g., pneumonia, TB (although this may be seen at any stage), meningitis, oesophageal candidiasis, chronic diarrhoea and prolonged fever. Weight loss continues and normal activities become more difficult. By Stage IV, the CD4 count is extremely low, even reaching zero. Severe Opportunistic infections occur e.g. PCP pneumonia, extra-pulmonary TB, lymphoma, severe diarrhoea, encephalopathy, Kaposi’s
sarcoma and CMV. The patient suffers extreme weight loss, is very sick and bedridden with death imminent.

B. Group Work

Patients will look to you for explanations about their condition. If patients are to have confidence in their nurse and receive clear, accurate information, it is vital that nurses are able to answer their questions appropriately. These role plays have been designed to help equip you with the skills to answer some common questions patients may have about their condition.

Practice some responses to the following questions.

Typical Patient Questions:

1. **What is the difference between HIV and AIDS?**
   
   HIV is the virus which attacks your immune system. When HIV enters the body you are said to be ‘HIV infected’ or ‘HIV positive’. It does not mean you have AIDS. You may be HIV positive for a long time before you become unwell. However, over time HIV causes great damage to your immune system so that you start to get infections that you could normally fight off. These are called Opportunistic Infections.

   When you start getting many of these Opportunistic Infections, you will have AIDS.

2. **How does HIV make me sick?**
   
   When viruses enter the body, they are normally attacked by your immune system so that you do not become sick. HIV is also a virus, but unlike other viruses, HIV attacks the immune system itself. In other words, it destroys the very system that would usually fight against infection in the body.

   HIV does this by using immune cells (tiny parts or building blocks of the immune system) known as CD4 cells, to replicate itself. HIV makes lots of new virus but destroys the CD4 cells in the process. This means the immune system becomes extremely weak and cannot protect you against infections.

3. **What are these blood tests I have to have?**
   
   There are a variety of blood tests you may receive but there are two main tests which can show what the HIV is doing in your body.

   - **CD4 count** which measures the number of CD4 cells in your blood. This tells you how strong your immune system is. The higher the CD4 count the better.
   - **Viral Load** measures the amount of HIV in your blood. The lower the Viral Load the better.

4. **What will happen to me now that I have HIV?**
   
   Everybody is different. Many people stay well for a very long time while others may become sick with different infections more quickly. What is important is to try and stay healthy for as long as possible. Various things are very important and include good nutrition, exercise, being immunised, having regular checks at the clinic, and having safe sex. You may also be given medication to prevent you from getting certain infections. ARV drugs will be given to you when you need them.
Module 2: How do ARVs work?

A. Questions

1. How do ARV drugs affect HIV disease?
   ARV drugs control HIV disease, turning it from a progressive, terminal diagnosis to a long-term, manageable chronic illness. They do this by reducing the replication of HIV in the CD4 cells so that new viruses cannot be made. In this way, CD4 cells are protected and the immune system remains strong to fight infections.

2. Name the three main classes of ARV drugs
   - NRTIs – nucleoside reverse transcriptase inhibitors
   - NNRTIs – non-nucleoside reverse transcriptase inhibitors
   - PIs – protease inhibitors

3. Where do ARVs work in the HIV Life Cycle?
   Use Hand Out 2: The Life Cycle of HIV, to mark the different places where ARV drugs work.

4. What are the two main enzymes which current ARV drugs inhibit?
   - Reverse Transcriptase, at the beginning of the Life Cycle
   - Protease, at the end of the life cycle

5. What is the main goal of ARV therapy?
   To decrease or reverse immune system damage associated with HIV

6. What are the main advantages of ARV drugs?
   Improved quality of life, reduced sickness and prolonged life

7. When should ARV drugs be started?
   Any patient with Stage IV disease OR any patient with Stage I, II or III and a CD4 count less than 200 cells/mm3.

8. What are the three main challenges of ARV drugs?
   Resistance, Adherence & Side Effects

9. What three main factors are taken in to consideration before starting patients on ARV drugs?
   CD4 count, Clinical Symptoms & Patient Readiness

B. Group Work

1. How do ARV drugs work?
   See Handouts 3 and 4 for the answers to this

2. Why should I take ARVs?
   ARV drugs ‘control’ HIV disease. Without them, HIV gradually destroys your immune system, making it more and more difficult for you to fight infections. Although everyone is different and some people will remain well for a long time, there WILL come a time when your immune system becomes weaker and weaker, you will get increasingly severe infections and eventually not be able to survive these.
However, ARV drugs control HIV by slowing down the damage it does to the immune system. When HIV replicates (reproduces), it damages the immune system. It also produces more and more virus. By preventing the virus from reproducing, ARVs protect the immune system, making you stronger and more able to fight infections.

Although everybody is different and it is not possible to say that ARVs will definitely help you live much longer with a better quality of life, people with HIV all over the world, including South Africa, are now living for years longer than they had expected, with far fewer sicknesses and living normal lives.

The ARV drugs will NOT remove HIV from the body so it is NOT a cure. But they are providing new hope and a new lease of life for many, many people.

3. Case Scenario

How have the ARVs helped Nkosnati?
Prior to commencing ARVs, Nkosnati’s viral load was extremely high and his CD4 count extremely low. This showed that HIV was overwhelming his immune system and had destroyed most of his CD4 cells, leaving him with very little defence against severe Opportunistic Infections like Cryptococcal meningitis.

When he started ARVs, HIV replication was slowed down considerably. By taking 2NRTIs (AZT and 3TC) and 1NNRTI (Efavirenz), the replication of HIV was inhibited in the early stages of its life cycle in two different ways. AZT and 3TC inhibited the enzyme Reverse Transcriptase in one way whilst Efavirenz inhibited it another. The result was a strong suppression of HIV replication. In turn, the number of viruses dropped dramatically. So, with fewer viruses around to infect and destroy CD4 cells, CD4 cells were able to build up again, providing an improved immune system for Nkosnati. He is now much stronger as a result.
Module 3: Side Effects

A. Questions

1. Name some of the more common side effects associated with ARVs
   Nausea, diarrhoea, vomiting, headache, abdominal pain, skin rash

2. Why is regular monitoring of Full Blood Count, U&Es and LFTs so important for patients taking ARVs?
   ARVs can be toxic to the liver, kidneys and blood cells. Any damage may be detected by taking regular blood tests to identify changes in blood levels from the normal range as early as possible. There is then plenty of time for the medical team to decide what to do for the patient.

3. What must a patient be told when starting Nevirapine?
   If they experience a rash when starting Nevirapine, they must come to the clinic immediately.

4. How can a nurse best help patients when they first start ARVs?
   Patients need to know that they may experience side effects, how to recognise them and what to do if they occur. This requires that the nurse takes the time to ensure patients have correct, clear information about their drugs and are confident what to do if they experience any side effects.

5. If a patient arrives at clinic with yellow eyes, what may be the cause and what should you do as a nurse?
   ARVs may be toxic to the liver. The patient may have jaundice and must be referred immediately to a doctor for appropriate management.

6. Whilst taking vital signs from a patient taking ARVs, you ask the patient how she is managing with them. The patient becomes very distressed and informs you she is finding it very difficult indeed, due to the diarrhoea she experiences on a daily basis. What should you do for your patient?
   First and foremost, she must be praised highly for doing so well by continuing with her ARVs. She must be reassured that she is not alone and has lots of people in the clinic to support her. Explain to her that although the diarrhoea may be due to the ARVs, it is necessary to take some stool specimens in case she has an infection. Then, ensure she is seen by the Doctor for further investigation. The Doctor may prescribe anti-diarrhoeal medication to help alleviate the symptoms. Encourage her that diarrhoea is a very common side effect of ARVs and often passes. Remind her again of the importance of adherence, offering support at all times.

B Group Work

3. Case Scenario

1) Should Nothando stop taking the ARVs?
   No, she should not stop them herself. If she does, the virus will be able to start replicating again and she may even develop strains of HIV that are resistant to the drugs. However, she should be seen by a Doctor who will decide on appropriate action.

2) What should Nothando have done when she started feeling unwell?
She should have gone to the clinic to tell the clinic staff that she was experiencing side effects. Then she could be supported with explanations that these side effects are quite common and should pass. She could have been given drugs to help reduce the vomiting and given advice about fluid intake and diet. She could be given a great deal of encouragement for taking the drugs so well and the benefits of ARVs stressed again. The side effects would hopefully be alleviated and Nothando could continue to take the ARVs and start feeling a lot better.

3) Why did Nothando not go to the clinic?
Nothando was let down as she had not been made aware of the particular side effects that may occur. So the side effects she experienced were a great shock to her and confirmed all her fears about ARVs. She therefore lost faith in those that should be supporting her. Also, she had not been told what to if she did experience any side effects.

4) What should have happened?
Nothando should have been warned of the possible common side effects associated with her drugs. She should have been told what to expect and then been reassured that these are quite common but do usually pass. She should know that, in the meantime, the clinic staff will always be there to support her in order that she can continue with ARVs and gain from their full benefits.
Module 4: Resistance

A. Questions

1. What is ‘resistance’?
   Resistance is where HIV becomes ‘resistant to’ or ‘unaffected by’ ARV drugs. The ARV drugs being taken are no longer able to suppress replication of HIV.

2. How does resistance occur?
   Resistance begins when Reverse Transcriptase makes mistakes as it copies the viral RNA to make viral DNA. Any viral DNA copied with ‘mistakes’ goes on to make mutant forms of virus which are not affected by the ARVs being taken. If given the opportunity, they will replicate quickly and become plenty in number. The ARVs are unable to control these mutated viruses and are said to be resistant to the ARVs.

3. What is the advantage of triple ARV therapy over monotherapy?
   Monotherapy, one ARV drug alone, is unable to suppress HIV enough and resistant virus emerges. However, if three drugs are used (i.e. triple therapy), when the virus becomes resistant to one drug, there are two other drugs in the system to destroy it. Triple therapy therefore has a much greater effect on inhibiting HIV replication. This is particularly so when different classes of drugs are used. Resistance is much less likely to emerge.

4. Why may a patient who has developed resistance to D4T also be said to be resistant to AZT when he has never taken AZT before?
   This is known as ‘cross resistance’. When HIV becomes resistant to an ARV drug being taken, HIV may also be resistant to other drugs within that same class, even if they have never been taken. D4T and AZT are both NRTIs.

5. What is the best way to prevent resistance?
   Strict adherence is the best way to prevent resistance occurring. If drugs are taken exactly as prescribed, this limits the possibility of viral replication and that resistant virus may emerge.

6. What is the effect of resistance at an individual level?
   If a patient becomes resistant to the ARVs being taken, HIV will start replicating again as the ARVs are unable to control it. Viral Load will increase again and CD4 count will decline as CD4 cells are destroyed by rapidly replicating virus. That particular regimen will no longer be effective for that patient. Future treatment options are limited as there are finite drug options available, particularly where cross resistance occurs.

7. What is the effect of resistance at a public health level?
   Millions of people around the world could benefit from ARV drugs. However, ARV resistant HIV may be transmitted. In other words, if an individual is resistant to ARVs, he may infect someone else with this resistant virus. They will also be resistant to those ARVs and unable to take them when they need them. Like Multi drug resistant TB, the potential for widespread ARV-resistant HIV is a great concern as it could render ARVs useless.
Module 5: Adherence

A. Questions

1. What do we mean by adherence?
Adherence means taking ARVs exactly as prescribed, that is, the right drugs, at the right time, in the right way. Any difference is non-adherence.

2. For how long must patients remain adherent to ARVs?
Strict adherence must be maintained for as long as they are taking them.

3. How many doses of ARVs is it safe for a patient to miss in a month?
None! 100% adherence is the ideal for maximum benefit.

4. What happens if a patient is non-adherent to ARVs?
HIV will no longer be fully suppressed so will be able to start replicating again. Resistant viruses may also emerge.

5. What signs may indicate that a patient is non-adherent?
- Viral Load starts increasing again
- CD4 count starts dropping again
- The patient’s health starts deteriorating and Opportunistic Infections occur.
- The patient is unsure about the names, doses or timings of his drugs when asked
- The patient has not brought pill boxes for re-filling for a long time

(It must be stressed that these signs do not always mean someone is non-adherent)

6. List 5 factors which make adherence difficult
Possible answers:
- Pills must be taken every day for life
- Medicine must be taken in spite of unpleasant side effects
- Tablets may be difficult to swallow
- Tablets sometimes taste bad
- Patients may get confused about which drugs to take, when and how to take them
- Patients often have to take many tablets, several times a day
- Patients must fit them in to their lives (daily activities, visiting friends, work)
- Patients may be concealing the drugs from friends and family
- Some ARVs have dietary restrictions, complicating daily routine
- Patients may be too unwell to take them correctly
- Patients must make sure that they have their drugs with them if they travel

B. Group Work

1. Barriers to Adherence
In your groups, discuss Divide the group into small groups of 2-4 people and ask them to discuss issues that prevent good patient adherence.

2. Nurses Role in Promoting Adherence
Now ask the group to discuss ways of overcoming these issues.
3. Case Scenario

1) Why may Bongani’s blood results have changed in this way?

There are two main possibilities:

a) Bongani may be very unlucky in that he has been taking his ARVs exactly as prescribed BUT the virus has managed to fight around them. In turn, HIV has started replicating again (increasing viral load) and started to infect and destroy CD4 cells once more (decreasing CD4 count).

b) Bongani may be non-adherent to his ARVs. This could mean a number of things, such as:
   - He may be missing just a few doses every now and then
   - He may be taking them at different times each day
   - He may have stopped taking them completely
   - He may be taking it with fatty meals (Ideally, Efavirenz should not be taken with fatty foods if maximum absorption is to occur)
   - He may be taking the wrong number of tablets for one or all three drugs

2) How can you help Bongani?

Above all, Bongani needs a great deal of support and encouragement. He will only feel able to discuss any problems he may be having with adherence if he feels he can trust and confide in a supportive and non-judgmental nurse. Always remember, adherence is an immense challenge and you are there to identify any problems he may be having with adherence and to help him overcome them. Only then, can he hope for achieving undetectable viral load and improved CD4 count again.

Firstly, you must try to identify whether Bongani is adherent to his ARVs. This does not just mean asking him whether he is taking his drugs. You must be sure he knows what adherence means – that he must take the right drugs, at the right time, in the right way, every single time. You may quickly realize that Bongani has started taking doses late or even missing some. For example, may be he has started a new job and this has made it difficult to take drugs exactly on time as he gets home late? Or maybe he has become confused about which drugs to take when?

All this can be identified through gentle, sensitive questions about when Bongani takes his medicines, what he takes and when.

Alternatively, Bongani may have started experiencing unpleasant side effects associated with his ARVs which may be putting him off taking them. Again, a sensitive, open-approach can facilitate conversation about these difficulties.

Once problems have been identified, Bongani may be helped and supported with appropriate intervention. This may involve reinforcement about the need for strict timing, practical ideas about how to take the drugs on time or further investigation of side effects and drugs to alleviate symptoms.

A combination of approaches may be required but the overall effect is the same – you will be able to help Bongani to adhere to the ARVs in order that he can hopefully achieve an undetectable viral load once more.
Module 6: ARVs in Children

A. Group Work

1. Case Scenario

a) What concerns are there over Gracie stating ARV treatment?
Gracie is a two year old child and therefore dependent on her mother for everything. This includes ARV drugs. If Faith forgets to take her own drugs, it is likely that she will forget to give Gracie her drugs.

Faith has an enormous amount to cope with in her life including her own diagnosis and sicknesses, grief for her husband, her daughter’s diagnosis and how she was infected and worry for her daughter’s future in the event of Faith’s death.

The need for Gracie to commence ARV drugs is an overwhelming challenge for a mother already struggling to cope. If Faith cannot remember Gracie’s drugs, Gracie will become increasingly unwell. Even if Faith is able to remember Gracie’s drugs, 2 year old children can be extremely reluctant to take medicines. Faith would need to be giving Gracie syrups at least twice a day, every day. This could be an exhausting struggle and strain on both Faith and Gracie at a period when quality time together is of enormous importance. In addition, Gracie may experience side effects to the ARVs and she will require additional support and care from her mother. This will also contribute further to Faith’s concerns.

b) What measures are required to ensure that Gracie receives the drugs she requires?
Both Faith and Gracie have significant needs. Gracie needs ARVs and she must receive them. Every effort must therefore be made to ensure that this is achieved. Her mother requires a great deal of support in her own right. However, her needs are exacerbated by Gracie’s need for ARVs.

A multi disciplinary approach is required with particular emphasis on the social workers and counsellors. Faith requires a great deal of psychosocial support in order to help her cope with her own circumstances before she can start to think about coping with Gracie. Support groups can have a profound effect on individuals’ ability to cope. Meeting with other people in her situation may help Faith greatly, if she is willing to attend the group. With appropriate intervention, she may be helped to cope more which will, in turn, help Gracie. A treatment supporter may be of great benefit as he/she could supervise and ensure that both Faith and Gracie receive their medication.

Faith and Gracie will require close follow up and a continuing supportive, non-judgmental approach if they are to receive the care and support they desperately need. Only then can they both receive optimal ARV treatment and achieve increased quality of life and prolonged life.