Clinical Tract

Module on

Nutrition and HIV

Learning outcomes

After completion of this module the learner should:

- Understand the basic concepts of nutritional needs in people living with HIV/AIDS.
- Appreciate the special demands of HIV/AIDS on nutritional status and food selection.
- Understand the interaction between nutrition and antiretrovirals.
- Understand the concept and place of supplementary nutrients.
- Understand the issues involved in infant feeding of children born to HIV infected mothers.
- Be able to assess adults, pregnant women and children with HIV/AIDS.
- Be able to give advice on nutrition to people living with HIV/AIDS.

1. NUTRITION IN GENERAL

Food Based Dietary Guidelines

- Enjoy a variety of foods.

  It is important to eat different types of food because one type of food does not contain all the nutrients we need. The best way to ensure that we obtain all of the nutrients we need is to eat three meals a day and to eat a variety of foods at these meals. Young children should have extra food between meals because their stomachs are smaller.

- Be active.

  To be active means we have to do things to keep our body parts moving. Using all our muscles in our bodies regularly will keep us healthy and fit, will increase our muscles and decrease fat.

- Make starchy foods the basis of most meals (they are relatively cheap and supply lots of energy). Starchy foods are also sometimes called staple foods. Starchy foods are for example maize meal, bread, rice, samp, potatoes and porridge. They make us feel full, are widely available, low in fats and cheaper than animal foods.

- Eat plenty of vegetables and fruits everyday.

  Vegetables and fruits have lots of vitamins and minerals that are good for our health. They help our bodies to protect and fight against illnesses. Vegetables and fruits also add colour and variety to our meals.

- Eat dry beans, peas, lentils and soya regularly.

  Dry beans, split peas, lentil and soya are rich sources of protein and can be eaten with other foods such as starchy foods and vegetables. We can eat them instead of meat because they are much cheaper than meat. They also help to prevent heart disease as well as cancer and they make our bowels work properly.

- Chicken, fish, meat, milk or eggs could be eaten daily.

  The above-mentioned foods are good sources of protein and minerals to build our muscles, bones, teeth and blood.

- Eat fats sparingly.

  There are different kinds of fat. Some fats are good and some are not so good. It is also important to know that eating too much of any type of fat is not healthy.

- Use salt sparingly.

  Most of the salt we eat comes from processed food. The rest comes from the salt added at the table and salt added while cooking. Intake of too much salt can lead to high blood pressure, fluid retention and stroke.

- Use food and drinks containing sugar sparingly and not between meals.

  Sugar is high in energy. Too much sugar is bad for our teeth and can make us overweight. It can also make us full and cause us to eat less of foods like milk, fruits and vegetables that are good for us.

- Drink lots of clean, safe water (6-8 glasses a day).

  Every part of our body contains large amounts of water and because the body loses water through the day, you have to drink water daily.

- If you drink alcohol, drink sensibly.

  Alcohol is not an essential food for good health. A sensible limit is no more than two standard drinks per day for a woman and no more than three standard drinks a day for men. One standard drink is one can of beer or one glass of wine.

Ways to reduce food costs

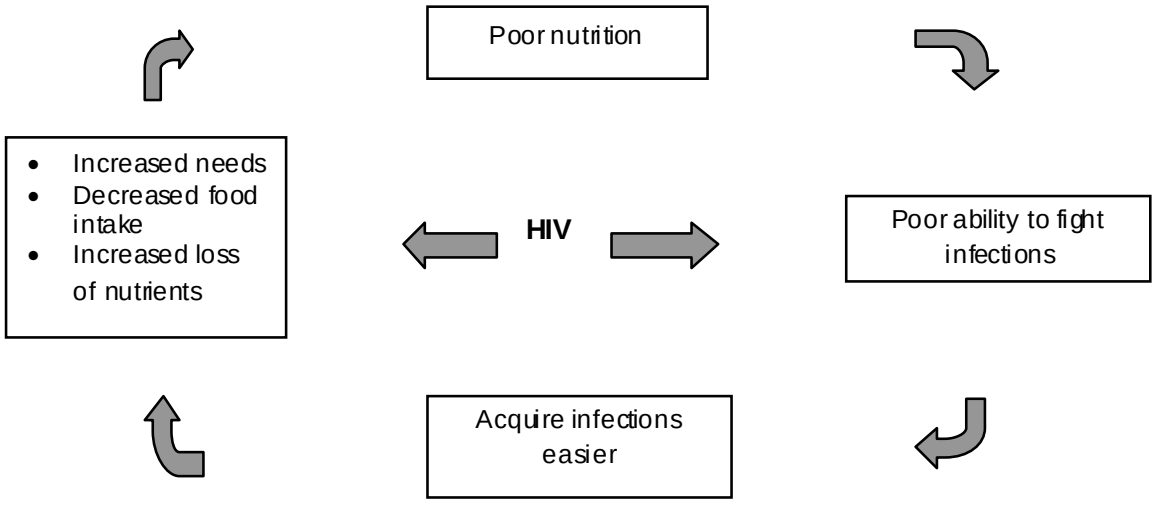
- Have a shopping list and stick to it.
- Don't shop on an empty stomach.
- Buy fruits and vegetables in season.
- Start a vegetable garden at home (see attached instructions).
- Cook vegetables for a short period of time except pumpkin.
- Choose a variety of affordable food items
- Buy in bulk if you have adequate storage facilities.
- Check prices per kilogram, not only the advertised price.
- Use less oil in food preparation.
- Buy cheaper meat cuts e.g. stewing meat.

Food safety guidelines

- Always wash hands with soap and water before preparing and serving food especially
  - after visiting the toilet.
  - after touching body fluids like blood, vomit or urine.
  - after wiping a nose or face or sneezing.
  - before cleaning any injuries or sores to prevent contamination of the injury and after to prevent contaminating the rest of your body.
  - before and after giving or taking medicine.
  - after doing any cleaning.

- Use clean and safe water to wash and prepare any food items. If water is not clean, boil it or use 1 teaspoon of unscented bleach (Jik) in 25 liters of water and let it stand for at least 2 hours before using.
- Cover all wounds to prevent contamination of food during preparation and handling.
- Keep all prepared food covered to prevent contamination.
- Keep the kitchen, all food preparation areas and utensils clean. Wash floors at least once a week.
- Buy meat, poultry and milk only from reputable shops.
- Make sure meat and poultry is well cooked to prevent contamination with Salmonella.
- Store perishable food like milk, raw meat and cooked leftover food in a refrigerator.
- Do not eat raw or cracked eggs and wash eggs before breaking it to prevent contamination with Salmonella.
- Buy foods in amounts that can be eaten before they spoil.
- Check expiry dates on containers and do not buy products that have expired.
- Do not use cans that are dented and wash the tops of cans before opening them.
- Serve and eat food as soon as possible after preparation.
- Keep cold foods cold and hot foods hot.
- Wash all fruits and vegetables (use 1 teaspoon bleach added to 1 liter clean water if there is no access to safe/running water).

2. THE LINK BETWEEN HIV/AIDS AND NUTRITION



Causes of poor nutrition in people living with HIV/AIDS.

- Repeated infections and fever that increase energy needs.
- Loss of appetite.
- Reduced food intake due to eating problems.
- Poor absorption of nutrients.
- Nutrient losses in urine and stools.
- Medication.
- Depression and anxiety.
- Reduced ability to care for oneself.
- Tiredness.
- Limited access to and availability of food.

How can we break the cycle of HIV/AIDS and poor nutrition?

- Awareness of HIV status.
- Good nutrition, hygiene and food safety.
- Learning to cope with problems related to HIV/AIDS.
- Early detection and treatment of infections.
- Increased food intake during illness.
- Learning to cope with stress.
- Increased activity and exercise.
- Getting enough rest and sleep.
- Management of money, family time and food distribution.

3. NUTRITION IN HIV/AIDS

Benefits of good nutrition in HIV/AIDS

- Weight maintenance.
- Prevent muscle loss.
- Increased strength.
- Replace lost nutrients.
- Improve wound healing.
- Quicker recovery from infections.
- Better tolerance of medication and treatment.
- Improved quality of life.

Aim of good nutrition in HIV/AIDS

Improve quality of life for people living with HIV/AIDS.

Objectives of nutritional care in HIV/AIDS

- Improve micronutrient intake and maintain bodyweight.
- Improve functioning of immune system.

Dietary goals of nutritional care in HIV/AIDS for :

- **Patients without HIV/AIDS symptoms**
  - Promote a balanced diet according to the Food Based Dietary Guidelines
  - Optimal nutritional status and nutrition stores.
  - Preserve normal growth in children.
  - Prevent nutrient deficiencies.

- **Patients with HIV/AIDS symptoms**
  - Improve quality of life.
  - Prevent malnutrition.
  - Maintain or get optimal nutrition stores.
  - Prevent deficiencies.
  - Decrease nutrient deficiency complications.
  - Decrease drug related complications.

4. NUTRITIONAL ASSESSMENT

Nutritional assessment is essential to determine the patient's nutritional status and necessary to complete the scoring sheet to qualify for nutritional supplementation.

The process of assessment and evaluation for supplementation

Adults

- Take weight and height (no shoes with light clothing), calculate Body Mass Index (BMI).
  BMI = weight (kg)/ [height (m) x height (m)]
  E.g. Patient with weight of 50kg and height of 1.65m
  BMI = $50/(1.65)^2 = 50/2.7225 = 18.36 kg/m^2$

- Do nutrition risk score based on the following questions **(Nutrition Risk Score sheet attached)**
  - Has the patient lost any weight in the past 3 months and if yes indicate how much
    (kg or clothes sizes)?
  - Evaluation of BMI.

BMI	Classification
20+	Normal
18.5-20	Borderline
17-18.5	Mild malnutrition
16-17	Moderate malnutrition
16 or less	Severe malnutrition

NOTE : The table omits the levels of obesity

- o Is the patient's appetite good, poor or is the patient unable to eat?
- o Problems regarding ability to eat (vomit, swallow, diarrhoea) and severity of problem.
- o Current stage of HIV infection.

Pregnant women

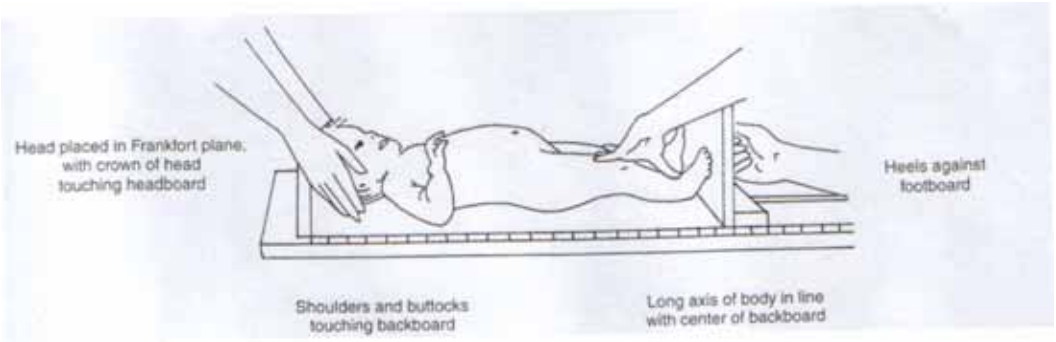
- Use pre-pregnancy weight as indicator of current health.
- Use pre-pregnancy height to determine BMI.
- Use BMI to determine recommendations for total weight gain, weight gain during 1st trimester and weight gain during 2nd & 3rd trimester (see table).
- Use triceps skin fold (only in 1st trimester) and upper arm circumference to determine fat and muscle stores.
- Weight change during pregnancy of less than 1kg in any month with BMI 19.8-29.0 needs further evaluation.

Weight classification	Total gain (kg)	Gain in 1st trimester	Gain in 2nd & 3rd trimester
Underweight (BMI <19.8)	12.5-18.0	2.3kg	490g/week
Normal (BMI 19.8-26.0)	11.5-16.0	1.6kg	440g/week
Overweight (BMI26-29)	6.8-11.0	0.9kg	300g/week
Obese (BMI >29)	6.8		Individualize

Weight recommendations according to Pre-pregnancy BMI

Children

- Take weight, length (children that cannot stand erect)/height, mid-upper arm circumference and triceps skin fold (to determine muscle stores) without clothes or a diaper.



Determination of length in children

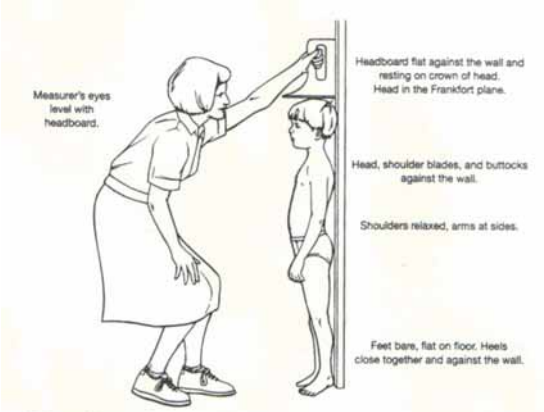
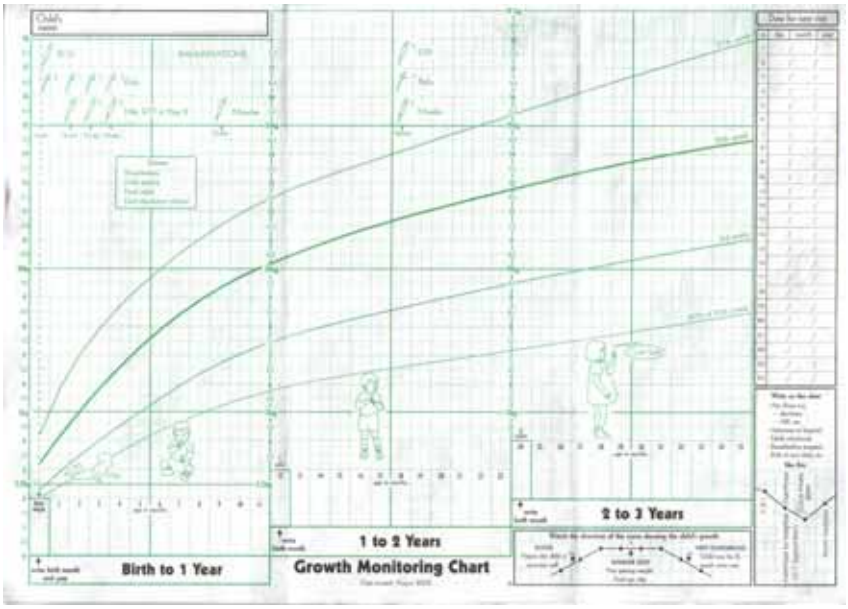


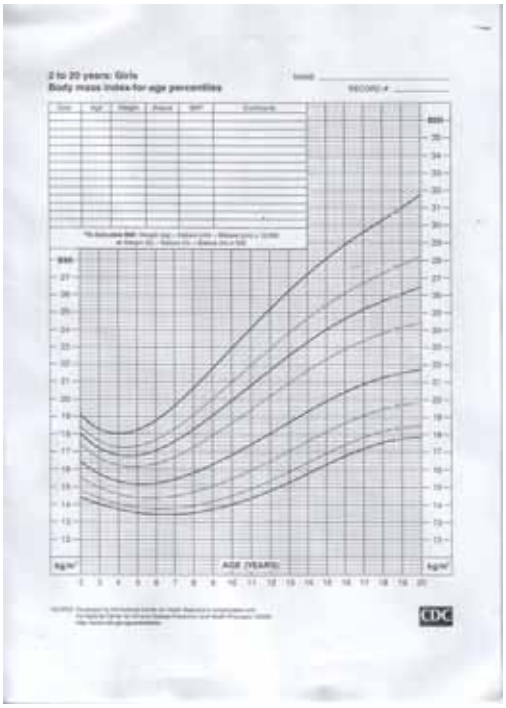
Figure 6.3 Body position when measuring stature.

Determination of height

- Evaluate according to the Road to Health Chart (**RtHC**) for children from **birth to 5** Years or Center for Disease Control (CDC) growth chart for children **2 to 12 years** of age (Examples attached)



RtHC

- 

CDC growth chart

The 4 lines on the RtHC from the top is the

- 97th centile (97% of healthy children have weights which are below this) = TOP RANGE OF HEALTHY WEIGHT.
- 50th centile (50% of healthy children have weights below and above this) = IDEAL/MEDIAN.
- 3rd centile (only 3% of healthy children have weights which are below this) = BOTTOM RANGE OF HEALTHY WEIGHT.
- 60% of the 50th centile.

The CDC growth chart also has centile lines similar to the RtHC and 95th centile and 5th centile is the top and bottom ranges of healthy weight. The 50th centile is again the median.

A child should be growing in a curve similar to the ones on the chart. Attention is needed when the curve is flat or going downwards.

- Do nutrition risk score based on the following questions **(Nutrition Risk Score sheet attached)**
  - Is the child malnourished according to RtHC or CDC chart?
  - Is the appetite good, poor or is the child unable to eat?
  - Problems regarding ability to eat (vomit, swallow, diarrhoea) and severity of problem.
  - Current stage of HIV infection.

5. NUTRITIONAL SUPPLEMENTATION IN THE ART PROGRAM

Vitamins & minerals influencing the immune system as well as HIV/AIDS signs and symptoms

- Low **vitamin A** levels are associated with increased HIV progression, increased deaths, child growth failure, transmission of HIV and increased HIV load in breast milk and the birth canal. Vitamin A is important in keeping the linings of the skin, lungs and gut healthy.
- **Vitamin B_6** supplementation has been linked with improved survival in HIV because vitamin B6 is necessary to maintain a healthy immune and nervous system.
- **Vitamin $B_{1,2,3,6}$** were associated with slower progression to AIDS because of its importance in nutrient metabolism, neural function and anti-oxidation.
- **Selenium** deficiency has been associated with immune impairment and demonstrated to be a significant predictor of HIV-related deaths, independent of the CD4 count and antiretroviral treatment. It is an independent predictor of survival and important to activate the immune system.
- High **Vitamin E** levels were associated with decreased HIV progression because it affects cell proliferation and growth.
- **Iron** is important for all body cells to generate energy.
- Low **Zinc** levels are associated with HIV disease progression because zinc improves the immune system.
- Women who received a **multivitamin supplement** during pregnancy showed a decrease in fetal deaths and low birth weight babies as well as improved maternal health.

Natural sources of vitamins and minerals

Nutrient	Sources
Vitamin A	Milk, cheese, eggs, liver, carrots, mangos, paw paw, pumpkin, green leafy vegetables
Vitamin B1	Meat, chicken, fish, liver, milk, eggs, dried beans (lentils, peas)
Vitamin B2	Milk, eggs, liver, meat, fish, chicken, yogurt, green leaves, dried beans (lentils, peas)
Vitamin B3	Milk, eggs, meat, chicken, fish, peanuts
Vitamin B6	Potatoes, meat, chicken, fish, maize, avocado, green leafy vegetables
Vitamin B12	Meat, fish, chicken, cheese, eggs, milk
Vitamin C	Citrus fruit like oranges & naartjies, cabbage, green leaves, tomatoes, green peppers, potatoes
Vitamin D	Milk, cheese, eggs, liver, exposure to sun
Vitamin E	Green leafy vegetables, vegetable oil, liver, egg yellow, peanuts
Iron	Red meat, chicken, fish, liver (iron the body takes up easily), eggs, dried beans (lentils, peas), dried fruit (iron the body takes up with difficulty, must take with vitamin C source)
Calcium	Milk, yogurt, cheese, green leafy vegetables, dried fish with bones, dried beans (lentils, peas)
Zinc	Meat, fish, chicken, dried beans (lentils, peas) peanuts, milk, cheese, yogurt, vegetables
Selenium	Meat, eggs

Magnesium	Nuts, dried beans (lentils, peas), dark green vegetables
Iodine	Iodized salt

Entry criteria as calculated in section 4 according to Nutritional risk score sheet (attached)

- If less than 3 the primary intervention is nutrition education.
- If more than 4 intervention is nutrition education and supplement.

Nutritional follow-up of patients on ART program

Patients are re-assessed on a monthly basis and the nutrition risk score is repeated at each visit.

Exit criteria for nutritional supplementation

If nutrition risk score is 4/5 with good weight gain for 3 months, supplementation is stopped.

Supplements available

- **Adults and children 6 years+**
  Adult fortified maize supplement.

- **Children 6 months to 6 years of age**
  Infant fortified maize supplement.

Recommended supplementation or feeding

- **Adults and children 6 years+**
  100g fortified supplement/day (300ml prepared).

- **Children (6 months to 6 years)**
  100g fortified supplement/day (300ml prepared).

More about the products used

- Instant, energy dense porridge.
- Use indicated for immune compromised patients e.g. TB & HIV, as supplement when intake is inadequate, for prevention and treatment of malnutrition.
- Made from soya protein and maize meal & -oil.
- Cow's milk and wheat free.
- Fortified with vitamins, A, $B_{1,2,3,6,12}$, C, D, and E.
- Fortified with calcium, iron, magnesium, chromium, selenium and other minerals.
- Provide 80% of recommended daily protein intake.
- Provide between 50-100% of recommended daily vitamin and mineral intake.

Important points to remember when giving supplements

- Supplements do not replace meals but supplement meals.
- Other infections complicate recovery.
- Give advice on hygiene and food safety.
- Give advice on treating gastrointestinal disturbances.

6. NUTRITIONAL CARE FOR PREGNANT HIV INFECTED WOMEN

Pregnancy is a vulnerable time because

- nutritional needs for energy, vitamins and minerals are increased by 30%.
- malnutrition during pregnancy can cause an even poorer immune system and make HIV positive individuals more vulnerable for disease progression.
- during breastfeeding exclusive breastfeeding requires an additional 2100 kJ energy per day as well as extra iron, zinc, copper, folic acid, calcium and vitamin D.

Nutrient needs during pregnancy

- If mother's nutrient supply is inadequate, the fetus will have nutrient deficiencies.
- Vitamin D deficiency in the mother can cause delayed fetal growth.
- Vitamin B6 required for central nervous system development.
- Low vitamin C levels associated with premature membrane rupture.
- Folic acid deficiency causes neural tube defects.
- Iron deficiency can cause impairment in the mother's immune system.
- Calcium is needed for fetal bone growth.
- A multivitamin supplement given to HIV infected women during pregnancy improved weight gain
- The nutrients most often lacking is:
    - calcium
    - iron
    - zinc
    - vitamins A,D,B6,riboflavin,folic acid
    - total energy.
- Extra intake needed per day (1430-1890kJ) is equal to 1 glass low fat / skimmed milk, 1 slice of bread, an apple and30 g meat/chicken or 1 egg.
- Many of these deficiencies are a result of poor eating habits.

Evaluation of the pregnant mother

Infant birth weight is related to lean body weight of the mother NOT fat gain.Gaining too little weight during pregnancy can

- retard the baby's growth (brain and placenta).
- cause a low birth weight baby.
- cause baby health problems or death soon after birth.

If weight gain is too slow determine if
- your measurement is correct.
- overall pattern is acceptable.
- the patient has nausea and vomiting.
- she has money for and access to food.
- she has medical problems.

The following guidelines suggest pregnant women being nutritionally at risk

- women weighing less than 50kg or are over/underweight at the time of conception.
- women whose height is less than 1.5m at the time of conception.
- pregnant adolescents (younger than 18 years).
- inadequate weight gain (see nutritional assessment).
- women with short birth-intervals (less than 1 year).
- women with previous pregnancies
    - 3 or more for mothers younger than 20 years.
    - 4 or more for mothers older than 20 years.
- women with history of low birth weight babies (less than 2.5kg).

7. INFANT FEEDING AND PREVENTION OF MOTHER TO CHILD TRANSMISSION (MTCT) OF HIV

HIV infected cells are present in the breast milk of HIV positive mothers and these cells are present throughout the breast feeding period.

- 25 – 30% of HIV infected mothers in SA will transmit the virus to their child and the risk of transmission through breastfeeding ranges from 8 – 14% (South African Breast feeding Guidelines for health workers). However 60-75% of infants will NOT contract HIV from their mothers.
  Transmission is decreased by about 50% if the mother is on antiretroviral treatment.
- Transmission through breastfeeding can take place at any time and the longer the breast feeding period the bigger the chance for MTCT.
- There are many immune factors in human breast milk that may protect against HIV infection in infants.
- Many of these properties and the nutritional quality of the milk are affected by the mother's nutritional status.
- Therefore micronutrient supplementation to improve maternal nutritional status may improve breast milk quality and give nutritional and immune benefits to breast-fed infants.
- Feeding and HIV transmission statistics
    - MTCT risk before delivery = 7%
    - MTCT risk increase with preventative measures during labour and delivery = 6.5%
    - MTCT risk increase with **no** preventative measures during labour and delivery = 17%

- MTCT risk increase after delivery with breastfeeding is dependant on :
  - The duration of breastfeeding (the longer the period, the higher the risk of transmission).
  - Mixed feeding (non-exclusive breastfeeding increases transmission rate because the lining of the gut is not mature and transmission occurs more easily).
  - Presence and frequency of breast pathology (cracked or bleeding nipples and mastitis).
  - Maternal viral load (level of circulating HIV virus).
- MTCT risk increase after 6 months breastfeeding with preventative measures = 7.8%
- MTCT risk increase after 6 months breastfeeding with **no** preventative measures = 8.0%
- MTCT risk increase after 12 months breastfeeding with preventative measures = 2.8%
- MTCT risk increase after 12 months breastfeeding with **no** preventative measures = 2.5%
- Total MTCT risk with preventative measures and formula feeding at 12 months = 13%
- Total MTCT risk with preventative measures and breastfeeding at 12 months = 22%
- Total MTCT risk with **no** preventative measures and breastfeeding at 12 months = 31%

- Therefore micronutrient supplementation to improve maternal nutritional status may improve breast milk quality and give nutritional and immune benefits to breast-fed infants.
- A new acute HIV infection during the breastfeeding period is considered to be a very high risk for MTCT and therefore mothers need to avoid any new HIV infections during the breastfeeding period.
- Vitamin supplementation for the infant should also be started at the first antenatal visit. A multivitamin, vitamin A, Ferrous sulphate (iron) and folic acid are recommended to improve immunity.
- The mother and her partner should be provided with sufficient information and counseling on the risk of MTCT and on the risks of alternative methods of feeding in order for her to make an informed choice.

Options for feeding infants of HIV positive mothers

- Exclusive breastfeeding
- Exclusive breast-milk substitute feeding

Mixed feeding (breast milk or breast milk substitute with added solids or breast milk as well as breast milk substitutes with added solids) is strongly discouraged since it increases the risk for infection and contamination. Breast milk's immune effects are diluted if mixed with anything else and solids added to formula feeding introduce foreign contaminants to the body, thereby increasing the risk for infection and allergies.

Exclusive breastfeeding

Exclusive breastfeeding means the infant receives breast milk from the mother, directly from the breast or expressed and no water, other liquids or solids with the exception of drops/syrups consisting of vitamin-mineral supplements or medicines. Increased frequency of feeding results in the formation of more milk and if breastfeeding is substituted with bottle feeding or other complementary foods, milk production is reduced. Other feeds can also interfere with the successful establishment and maintenance of lactation. The use of artificial teats is not suggested because it may lead to disturbed suckling patterns and it is a source of contamination.

Exclusive breastfeeding is favourable when

- the environment for formula feeding is risky (no running water, no electricity, illiterate mother, formula is not affordable, rates of malnutrition will increase due to improper use of artificial feeding). 25% of children in SA are vulnerable to malnutrition and this directly relates to access to safe, clean water, sanitation and adequate nutrition.
- it is stopped at 4 months of age to avoid late transmission.
- a good technique (correct positioning and latching) is used to reduce risk of mastitis and nipple damage that could increase the risk for transmission.

Breastfeeding should be protected, supported and promoted to all mothers who are not aware of their HIV status and those who are not infected.

Advantages of breastfeeding

- Improves baby's immune system and therefore protects against infections.
- Colostrum increases the gut's maturation and thereby decreases the rate of HIV transmission.
- Always the correct temperature.
- Always clean. (Minimize infections)
- Contains exactly the nutrients babies need for good growth and brain development.
- Promotes bonding between mother and child.
- Inexpensive.

Disadvantages of breastfeeding

- Increased HIV transmission rate.

UNAIDS, WHO, UNICEF statements on breastfeeding

" When children born to women living with HIV can be ensured uninterrupted access to nutritionally adequate breast milk substitutes that are safely prepared and fed to them, they are at less risk of illness and death if not breastfed. However, when these conditions are not fulfilled, in particular in an environment where infectious diseases and malnutrition are the primary causes of death during infancy, artificial feeding substantially increases children's risk of death (UN Policy statement 1997 and 1998 Guidelines 10)"

…" in all populations, irrespective of HIV infection rates, breastfeeding should continue to be protected, promoted and supported and counseling for women who are aware of their HIV status should include the best available information on the benefits of breastfeeding and the risk of HIV transmission through breastfeeding and on the risks and possible advantages associated with other methods of infant feeding" (UNAIDS, WHO and UNICEF)

Feeding of expressed and heat-treated milk

Mothers express and heat-treat their milk to inactivate the virus and make the breast milk safe for infant feeding while still maintaining the nutritional value and protective properties of the milk. This is called Pretoria Pasteurization. It works on the principle of passive heat transfer from boiled hot water, contained in an aluminium pot to the expressed breast milk, which is contained in a glass jar.

Equipment needed
- a 1 liter aluminium pot.
- a 410g size "Black Cat" peanut butter jar.
- the metal lid of the jar.
- an electric kettle or some other means of boiling water.
- water, dishwashing liquid and a cloth or brush for sterilizing lids and jars.
- bucket and sodium hypo-chloride (Jik) solution for sterilizing lids and jars.
- pen and labels for labeling stored milk with time of expressing.

Milk should be put into a sterilized or very clean container and be stored in a cool place before and after heat treatment. In preterm babies heat-treated milk can be fed with a cup.

Cup feeding of expressed breast milk

If the mother must be separated from the baby for any reason, cup feeding of expressed breast milk can be done. The advantages of this is :

- a cup is easier to clean than a bottle.
- the same facial muscles and tongue movement are used as with breastfeeding.
- no nipple confusion takes place when alternating this with breastfeeding (this happens with bottle feeding).
- the baby can smell the milk, this stimulates secretion of saliva.
- little energy is used to feed.
- the chances for aspiration are less.

How to feed a baby with a cup :

- Hold the baby sitting upright on your lap.
- Hold the small cup of milk to the baby's mouth. Tip the cup so that the milk just reaches the baby's lips. The cup rests lightly on the baby's lower lips and the edges of the cup touch the outer part of the baby's upper lip. The baby will become alert.
- Do not pour milk into the baby's mouth: A low birth weight baby starts to take milk with the tongue, a bigger/older baby sucks the milk, spilling some of it.
- When finished, the baby closes the mouth and will not take any more. If the baby has not had the required amount, wait and then offer the cup again or offer more frequent feeds.

Breast-milk substitutes / Commercial infant formulas

Advantages of formula feeding

- Decreased HIV transmission rate.

Disadvantages of formula feeding

- Expensive.
- Needs clean safe water for mixing.
- Needs facilities for cleaning and sterilizing of bottles and teats.
- Mother must have the understanding of the method and process of formula mixing and feeding.
- Proper mixing of formula necessary.
- Additional risks like upper respiratory tract infections, allergies and GI disorders compared to breastfeeding.
- Baby may develop allergies.

For those mothers choosing to feed commercial infant formula a monthly supply of Nan Pelargon is issued to babies on the Prevention of MTCT program up to 6 months of age according to weight. (A minimum of 3 tins and maximum of 11 tins are issued).

Breast-milk substitutes can also be fed to a baby with a cup (see breastfeeding section)

Bottles should be prepared in a hygienic way (use clean water, bottles and teats) and the following points should be remembered :

- unboiled water, bottles that have not been sterilized in boiled water and incorrect mixing of milk can make an infant sick.
- only prepare one feed at a time.
- follow the exact instructions on the tin (1 level scoop powder for every 25ml water).
- if milk has just been made, check the temperature by squirting milk on the inside of your forearm. It should be at body temperature.
- the bottle should be tipped so that the teat is full of milk, no air.
- small air bubbles in the bottle show the milk is flowing properly.
- never leave a baby alone while feeding because of the danger of aspiration as well as increased middle ear infection.