Regional Centre for Quality of Health Care

Nutrition and HIV/AIDS

A Training Manual

SESSION 1

Basics of HIV/AIDS in Africa

SESSION 2

Link between Nutrition and HIV/AIDS

SESSION 3

Nutrition Actions for People Living with HIV/AIDS

SESSION 4

Food Security Components in HIV/AIDS Nutritional Care and Support

SESSION 5

Nutritional Management of HIV/AIDS-Related Symptoms

SESSION 6

Nutritional Care for Pregnant or Lactating Women and Adolescent Girls Infected with HIV/AIDS

SESSION 7

Infant Feeding and Prevention of Mother-to-Child-Transmission of HIV

SESSION 8

Nutritional Care for Children Born to Women Infected with HIV

SESSION 9

Management of Drug-Food Interactions in HIV/AIDS Therapy

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ABBREVIATIONS AND ACRONYMS

ACC	Administrative Committee on Coordination
AIDS	acquired immune deficiency syndrome
ANC	antenatal care
ARV	antiretroviral
ART	antiretroviral therapy
CRHCS-ESA	Commonwealth Regional Health Community Secretariat for East and Southern Africa
ESARO	East and Southern Africa Regional Office
FANTA	Food and Nutrition Technical Assistance Project
FAO	Food and Agriculture Organization
HIV	human immunodeficiency virus
HMIS	health management information system
IEC	information, education, and communication
IMCI	Integrated Management of Childhood Illness
MOH	Ministry of Health
MTCT	mother-to-child transmission of HIV
NGO	nongovernmental organization
PCR	polymerase chain reaction
PLWHA	people living with HIV/AIDS
PMTCT	prevention of mother-to-child transmission of HIV
RCQHC	Regional Centre for Quality of Health Care
RDA	recommended daily allowance
REDSO	USAID Regional Economic Development Support Office for East and Southern Africa
SARA	Support for Analysis and Research in Africa Project
STI	sexually transmitted infection

TBA	traditional birth attendant
UNAIDS	Joint United Nations Program on HIV/AIDS
UNICEF	United Nations Children's Fund
USAID	United States Agency for International Development
WFP	World Food Program
WHO	World Health Organization
VCT	voluntary counseling and testing

INTRODUCTION

The coexistence of high rates of malnutrition and HIV/AIDS in East and Southern Africa creates an additional challenge for nutritionists. Providing adequate nutrition at community and individual levels, even in the absence of HIV/AIDS, remains a problem. The new challenge calls for the acceleration of both short-term and long-term efforts to combat malnutrition and its effect on morbidity and mortality associated with HIV/AIDS. New capacities have to be developed and new resources sought. The Greater Horn of Africa Capacity Development Initiative in Nutrition (GHA-CDIN) has identified nutrition in the context of HIV/AIDS as an area of capacity development that urgently needs attention.

As part of GHA-CDIN, a nutrition/HIV working group (WG) was formed with representatives from CRHCS, FANTA, FAO, LINKAGES, RCQHC, SARA, UNICEF/ESARO, UNU, and USAID/REDSO-ESA. The WG, facilitated by RCQHC, organized a number of regional actions to support countries in East and Southern Africa to develop needed policies and guidelines to provide nutritional care and support for people living with HIV/AIDS. The application of the guidelines may include developing materials for in-service and pre-service training on nutrition and HIV/AIDS. Integrating HIV/AIDS into pre-service nutrition training provides a long-term approach to this problem.

The WG and RCQHC have initiated this activity under the assumption that developing module topics might enable African training institutions to integrate nutrition and HIV/AIDS into their training programs. The strategy is to disseminate teaching materials that can be used with existing curricula rather than to change existing curricula.

Background

In August 2002 the WG and RCQHC facilitated a weeklong workshop with tutors from 10 training institutions in the region to review teaching module sessions. Workshop participants were oriented in various topics related to nutritional care and support of people living with HIV/AIDS. Subsequently, the appropriate content and format for the manual was agreed on. The content of the manual draws on the work of SARA (Piwoz and Preble 2000), FANTA (2001), LINKAGES (2001), FAO/WHO (2002), and literature and material in international journals. Tutors should feel free to use other

reference materials that present information on nutrition and HIV/AIDS to update the information and change the content of lectures as necessary.

Purpose and objectives

This manual is intended to complement materials used by tutors in nutrition and health institutions of higher learning to train people in nutrition and HIV/AIDS.

Purpose

The training manual is designed to help improve the quality of pre-service training in nutrition and HIV/AIDS.

Objectives

- Provide a comprehensive source of information on nutrition and HIV/AIDS
- Provide tutors with technical content, presentations, and handout materials that can be used for planning and facilitating courses and lectures

Audience

The intended users of the manual include tutors of students of

- Medical or health sciences
- Applied human nutrition
- Dietetics or home economics
- Food technology and agriculture

The materials can be adapted for master's or undergraduate level students. Ideally students exposed to these materials will acquire enhanced knowledge and skills in the nutritional management of clients infected with HIV.

Content

The content is arranged in the following sessions:

1. Basics of HIV/AIDS in Africa

2. Link between nutrition and HIV/AIDS

3. Nutrition actions for people living with HIV/AIDS

4. Food security components of HIV/AIDS nutritional care and support

5. Nutritional management of HIV/AIDS-related symptoms

6. Nutritional care and support for pregnant or lactating women and adolescent girls infected with HIV

7. Infant feeding and prevention of mother-to-child-transmission of HIV

8. Nutritional care for children born of women infected with HIV

9. Management of drug and food interactions in HIV/AIDS therapy

Each session presents state-of-the-art knowledge on the topic and relevant strategies for and approaches to providing care and support. The following components are included in each session:

- Purpose, learning objectives, and outline of the session, including suggested methodologies, materials, and time

- Lecture notes, handouts, and PowerPoint presentations

- Suggested reference materials and key articles or books

- Discussion points, small group work, or large group exercises (where applicable)

- Recommendations for field visits that can be adapted to the context (where applicable)

The authors of this manual encourage the incorporation of local guidelines, service provider tools, and materials (e.g., job aids, health education guides, posters, maternal and child cards, health management information services (HMIS) recording charts) into the lectures and exercises.

Use of the manual

The manual is designed primarily for pre-service training, although it can be adapted for in-service settings. *Tutors* are assumed to have basic skills and some experience in nutrition and infectious disease. They should

- Have technical expertise and experience in child and maternal nutrition
- Be familiar with the local nutrition and health care system and service delivery protocols
- Have experience using adult learning and participatory techniques for training

The manual also assumes that *students* have prerequisite knowledge of basic nutrition, particularly the nutrition of women and children, counseling and communication, and household food security.

Structure

The manual is structured thematically to allow flexibility. Tutors can identify sessions that meet the needs of their students or trainees and present them in 2-4 hours in either pre-service or in-service programs. Taken together, the sessions aim to cover the main issues related to nutrition and HIV/AIDS. Tutors may, however, present the sessions independently. Each session is complete in delivering the knowledge and skills for those topics. Tutors can also adjust the content or exercises to the time available for each session.

The sessions can also be taught in a course *module*. The size of the module will depend on curriculum requirements. The outline presented in each topic can be used to develop the curriculum.

The materials provided for each session (lecture notes, PowerPoint presentations, case studies, and exercises) may be adapted and applied to the class context where needed. Tutors should feel free to use other materials as applicable. The reference materials may be useful for students who need additional reading in specific areas.

Case studies

Many of the sessions contain case studies and role-play exercises that allow students to apply the new material in a simulated setting before going to the field and practicing with clients. The case studies may be used in the following ways:

- Given to students to work on in groups, with each group asked to prepare a brief presentation for the rest of the class

- Used as exam questions for assessment of individual student learning

- Used for role-plays in which one student plays the client, and another plays the counselor. The class can then use the handouts as checklists to discuss the assessment and counseling session and the appropriateness of the interventions.

- An answer key to the case studies is provided for guidance, but the answers provided are not necessarily exhaustive.

Note: The names in the case studies were selected arbitrarily and should be modified, along with foods described and other local references, to country and community contexts.

CD-ROM

The CD provided with this manual contains all the materials needed for each session and additional references that may be useful for tutors and students.

SESSION 1 THE BASICS OF HIV/AIDS IN AFRICA

Purpose

The purpose of this session is to provide students with basic information about HIV/AIDS: its causes, transmission, progression, management, and challenges.

Learning objectives

By the end of the session, students will be able to:

- Discuss the scale of HIV/AIDS globally and in their countries
- Outline the cause, transmission, and disease progression of HIV/AIDS
- List factors that affect the risk of transmission of HIV and increase vulnerability to HIV infection
- Outline stages of HIV/AIDS diseases and complications faced at each stage
- Discuss strategies for caring for and supporting people living with HIV/AIDS and challenges in managing HIV/AIDS

Note: This topic will need to be updated regularly with changes in HIV/AIDS and new research findings.

Prerequisite knowledge

- Basic science (biology, physiology)

Estimated time: 60 minutes

Outline

Content	Methodology	Timing
Definitions of HIV and AIDS Magnitude of HIV/AIDS in Africa Prevalence of HIV/AIDS in the country and by region/district (if data is available) Trends by age and sex (if data is available) 1. Modes of transmission of HIV and related factors • Key modes of transmission and risk and proportion of all cases of infection ○ Sexual intercourse ○ Perinatal transmission/mother-to-child transmission (MTCT) ○ Parenteral (blood) transfusion ○ Unsafe injections or sharp materials 2. Factors affecting risk of HIV transmission • Viral • Host • Environmental • Sexual behaviors • Demographic • Economic • Political • Social 3. Stages of HIV • Early (acute or asymptomatic), middle (symptomatic), and late (full-blown AIDS) 4. Testing for the virus	Hold interactive lecture using **PowerPoint 1** Ask students to state what they understand by the terms HIV and AIDS If available, show rates of HIV in the country and by regions or districts Discuss factors that may affect regional or district differences in HIV prevalence	50 minutes

Content	Methodology	Timing
5. Impact of HIV/AIDS in Africa (in the country) on demographic patterns, food security, economic development, health and education, society, culture 6. Comprehensive package of HIV/AIDS programs (at different stages of the disease, prevention of mother-to-child transmission (PMTCT), home-based care, behavior change communication (BCC), voluntary counseling and testing (VCT), nutrition, antiretroviral drugs (ARVs) or antiretroviral therapy (ART), care and support of orphans 7. Challenges of addressing HIV/AIDS in Africa (in the country): technical, infrastructure, social, economic, political, human resources	Brainstorm and discuss programs addressing HIV/AIDS transmission and care and support in the country	
Summary of the presentation through questions	Facilitate large group **Discussion Points 1** Capture discussion points on a flipchart or board	10 minutes

Required materials

- LCD or overhead projector
- Flipchart stand and paper
- Writing pens

Recommended preparation

1. Review **PowerPoint 1** and **Lecture Notes 1.**
2. Be familiar with the epidemiology of HIV/AIDS and its prevalence in the country (if possible, disaggregating the data by geographic area and by sex), HIV/AIDS activities in the country, and issues involved in these interventions.

3. Review **Discussion Points 1** to identify questions that can help students master the concepts and facilitate group discussion if time allows.

Materials provided

PowerPoint presentations

- **PowerPoint 1**: The basics of HIV/AIDS in Africa

Handouts

- **PowerPoint 1** presentation

- **Handout 1**: Royce, RA, A Sena, W Cates, and MS Cohen. 1997. Sexual transmission of HIV. *New Eng J Med 336* (15): 1072-1078.

Suggested reading materials

Family Health International. 2001. HIV/AIDS prevention and care in resource-constrained settings: A hand book for the design and management of programs.

Fan, H, F Ross, RF Conner, and LP Villarreal. 2000. The biology of AIDS. 4th edition. Boston: Jones and Bartlett Publishers International.

Fauci A, D Panteleo, S Stanley, and D Weisman. 1996. Immunopathogenic mechanisms of HIV infection. *Annals of Internal Medicine* 124:653-4.

Joint United Nations Programme on HIV/AIDS. 2000. Report on the Global HIV/AIDS Epidemic. Geneva: UNAIDS.

Royce RA, A Sena, W Cates, and MS Cohen. 1997. Sexual transmission of HIV. *New Eng J Med 336* (15): 1072-1078.

World Health Organization. 1997. *Weekly Epidemiological Record* 72: 81-88. Geneva.

———. 1990. *Weekly Epidemiological Record* 65: 221-228. Geneva.

LECTURE NOTES 1: THE BASICS OF HIV/AIDS IN AFRICA

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Introduction

HIV has affected 40 million people worldwide, 28.5 million of them in sub-Saharan Africa alone. People are infected with the virus through sexual, parenteral, and vertical transmission, and a variety of factors increase vulnerability to infection. HIV is recognized primarily through testing for the presence of the antibodies formed against the virus. Governments are increasingly mounting comprehensive interventions to prevent infection and mitigate its deleterious affects on all sectors. These efforts, however, are hampered by stigma, lack of political commitment, and resource constraints.

Purpose (slide 2)

The purpose of this session is to provide students with basic information about HIV/AIDS: its causes, transmission, progression, management, and challenges. The session:

- Introduces the scale of HIV/AIDS globally and in their countries
- Outlines the cause, transmission, and disease progression of HIV/AIDS
- Lists the factors that affect the risk of transmission of HIV and increase vulnerability to HIV infection
- Outlines the stages of HIV/AIDS diseases and complications faced at each stage
- Discusses strategies for caring for and supporting people living with HIV/AIDS and challenges in managing HIV/AIDS

Definitions and scope (slides 4, 5, 6, 7, 8, 9)

HIV was first identified in 1981. By the end of 2001, the disease was estimated to affect 40 million people worldwide and be responsible for 19 million deaths (UNAIDS 2002). This makes it the second largest epidemic of the twentieth century after influenza, which has caused 20 million deaths globally.

HIV/AIDS in Africa (slide 10)

Africa remains the continent by far the most affected by HIV/AIDS. Of 40 million people living with HIV/AIDS globally, 28.5 million are in sub-Saharan Africa (SSA), which is home to only 11 percent of the world's population. Of the 19 million deaths globally resulting from AIDS, 83 percent (16 million) have occurred in SSA. The estimated number of deaths in 2001 alone in the region was 2.2 million (UNAIDS 2002).

Seventy percent of people living with HIV/AIDS and 80 percent of children orphaned by AIDS are found in SSA. Globally more men than women are infected and dying, but in SSA women make up more than half of people living with HIV/AIDS.

The disease (slide 11)

Significant evidence now demonstrates that HIV (human immunodeficiency virus) causes AIDS. HIV belongs to a class of viruses called retroviruses. It attacks white blood cells, attaching itself to cells with the help of a specific surface protein called CD4. This protein is present on white blood cells known as T helper lymphocytes and macrophages and as a result mainly infects these cells. The T helper cells help stimulate the production of antibodies and multiplication of other white blood cells. The macrophages help destroy infected body cells.

When HIV binds itself to the cell surface, its particles enter the cytoplasm of the attacked cell. Then, with the help of a virus-specific enzyme called reverse transcriptase, the RNA of the HIV is incorporated into the attacked cell's DNA. The attacked cell then makes more copies of viral RNA, which may function as a messenger for producing viral proteins or become material for new virus particles that leave the cell by budding off the cell surface. This impairs the functioning of the attacked cell, and as more and more cells are attacked the body's immunity is

gradually weakened. The infected person becomes vulnerable to a variety of life-threatening illnesses and is said to have AIDS (acquired immune deficiency syndrome), which is characterized by signs and symptoms of severe immune deficiency.

Transmission (slide 12)

HIV is transmitted through three primary routes: sexual, parenteral, and vertical. The risk of transmission varies by mode of transmission and context.

Sexual transmission

Sexual transmission accounts for 70 percent–80 percent of transmissions globally (UNAIDS 1996). Sexual transmission of HIV can occur from male to male, male to female, female to male, and female to female. Despite the fact that it is the dominant mode of transmission, sexual transmission carries a risk of only 0.1 percent–1 percent. The greatest risk of infection per episode seems to come from receptive rectal intercourse (0.1 percent–3 percent) and vaginal intercourse (0.1 percent–0.2 percent) (Royce et al 1997).

Parenteral transmission

Parenteral transmission occurs through transfusion of blood (the estimated risk of infection from a single unit of HIV-infected whole blood is over 90 percent); sharing of needles among intravenous or injecting drug users, which is responsible for 5 percent–10 percent of global HIV infections (the risk of transmission is 0.1 percent); and needle pricks among health workers (Royce et al 1997).

Vertical transmission

Vertical transmission from mother to child can occur in utero, during labor and delivery, and through breastfeeding. In SSA the risk of transmission through this means ranges between 10 percent and 30 percent. More information on perinatal transmission can be found in Session 7 on prevention of mother-to-child transmission of (PMTCT) of HIV.

Factors for transmission and increased vulnerability to HIV/AIDS (slides 13, 14)

Vulnerability to HIV infection and AIDS appears to depend on a number of factors. These include the type of HIV, the health of the host, hereditary resistance, and the stage of infection.

Viral factors

Evidence suggests that the properties of HIV influence transmission. The two known types of HIV are HIV1 and HIV2. Both are transmitted by sexual contact, through blood, and vertically from mother to child and both cause the same clinical AIDS.

HIV1, the predominant type worldwide, is divided into groups M, O, and N. Group M is further divided into sub-types A-K, which have distinct geographical distribution, apparently different tropism for the different target cells, and therefore different efficiency of transmission (Duer et al 2000; Kunanusont et al 1995; Soto Ramirez et al 1996). Sub-types A, C, D, and E are predominant in Africa and Asia, and sub-type B is predominant in the Caribbean, the United States, South America, and Western Europe.

HIV2 is primarily found in West Africa. Evidence suggests that this type is less transmissible, especially through vertical means, and is associated with a lower viral load and a slower rate of clinical disease progression. In addition to the viral properties, there is evidence to suggest that the concentration of HIV in blood is correlated with enhanced transmission by all routes (Busch et al 1996; Gray et al 2001; Quinn et al 1993; St Louis et al 1993).

Host factors

Host susceptibility depends on viral entry into cells through CD4 receptors. Host factors affecting infectivity may operate through several interrelated mechanisms. Susceptibility may be affected by factors linked to inflammation or immune activation that alter either the number of susceptible target cells or the receptivity of those cells to HIV. The presence of sexually transmitted infections (STIs) or reproductive tract infections is strongly associated with susceptibility to HIV. Chlamydia, gonorrhea, and trichomonas infection are associated with a relative

increase in HIV prevalence of 60 percent–340 percent in men and women (Royce et al 1997). Infections such as cytomegalovirus infection, gonorrhea, and seminal urethritis are also associated with increased detection of HIV in semen (Royce et al 1997). Studies have shown that treatment of urethritis diminishes the detection of HIV in the urethra and the excretion of HIV in semen (Cohen et al 1997).

Other factors may induce microscopic erosions that provide the virus direct access to the bloodstream. Ulcerative genital tract diseases are associated with a much higher susceptibility to HIV than non-ulcerative genital tract infections.

Hereditary resistance to HIV

Data from recent studies suggest that some people have innate or acquired resistance to HIV infection. Sex workers in Nairobi were found to remain uninfected despite repeated unprotected sexual intercourse with HIV-infected partners. This resistance has been attributed to the possession of a variant type of cell receptor (the non-functional CCR-5 mutation) and the presence of specific antibodies directed against the HIV envelope (Fowke et al 1996; Hoffman et al 1997; Kaul et al 1999).

Stage of infection

The likelihood of transmission of HIV is very high during the late stage of infection. Studies (Royce et al 1997) show that HIV is more readily detected, and in some cases present in higher concentrations, in the blood and semen of men with low CD4 cell counts or more advanced HIV. Increased infectivity has also been associated with primary infection (the stage between exposure to HIV and appearance of HIV antibodies).

People from all population groups may be exposed to HIV infection, but some groups are more vulnerable than others. Social norms that affect sexual practices, including patterns of sexual partnering, contraceptive choices, and the use of substances that lower sexual inhibitions, can determine a group's vulnerability to infection. As discussed earlier, receptive anal or vaginal intercourse has a greater risk of HIV transmission. In most countries in the SSA region, gender inequalities subject women to limited choices in sexual relationships, sexual violence, or pressure to trade sex for food. Traditional perceptions about sexuality and STIs and the lack or late

presentation of STI symptoms in women decrease the likelihood that women will seek treatment when infected. This further increases women's vulnerability to HIV infection.

Youth are more vulnerable than adults to infection because of unclear perceptions about what constitutes risky behavior and insufficient knowledge and incorrect information about sex, sexuality, and sexual health. This vulnerability is further complicated by traditional beliefs about what should be discussed and practiced during this stage of life. Such beliefs can either limit the availability of correct information or increase susceptibility to infection. Initiation ceremonies may promote early engagement in sex as part of the sexual maturation process.

Some population factors may affect the average rate of sex partner change, which in turn may affect the growth of the HIV/AIDS epidemic. Vulnerable groups include populations on the move in emergency situations whose basic security of life is threatened, occupational groups accustomed to leaving their homes and families for extended periods, and street children.

The length of time HIV/AIDS has been present in a community affects the probability of exposure, and the number of people with AIDS in different geographic areas affects awareness, which influences both individual behavior and the social response. The risk of secondary (new) cases of HIV has been described as **Ro, where Ro = beta x C x delta** (beta represents the efficiency of transmission, C the number of sexual partners, and delta the duration of infectivity of the index case (Anderson and May 1991).

Phases of HIV infection **(slides 15, 16)**

Generally four phases of HIV disease are recognized. These are the acute phase, the asymptomatic phase, the symptomatic phase, and the late symptomatic phase.

1. Acute phase (initial infection)

As soon as HIV enters the body, it replicates rapidly. This rapid replication requires energy from the host's body. The virus relies entirely on the host for survival and will deplete the host of whatever is required for its multiplication and survival. HIV

infection may have a rapid onset, leading to hypermetabolism with catabolism. Although some infected people may not have any symptoms at this stage, the host's energy and nutrient requirements increase significantly, and food intake should increase accordingly. This period varies from 1 to 6 weeks.

After the first 6 (sometimes up to 12) weeks, levels of the virus decrease, but the body produces antibodies to fight it (seroconversion). The body needs additional energy and begins to use its fat stores and muscle. Muscle is used to repair the cellular and tissue damage. If the additional energy and nutrients taken are not replaced, the host loses weight and gradually develops malnutrition that weakens the immune system and make the host vulnerable to opportunistic infections.

2. Asymptomatic phase

The length of the asymptomatic phase varies and may reach several years, depending on the health and nutritional status of the host before the infection. The asymptomatic phase is marked by hypermetabolism and increased energy needs.

3. Symptomatic phase

Initial symptoms start at the onset of opportunistic infections. The HIV-infected person presents symptoms such as fever, night sweats, tuberculosis, fungal infection of the mouth, chronic diarrhea, and weight loss. The onset of opportunistic infections is a sign of a weakened immune system.

Negative nitrogen balance occurs early in acute infections because of decreased food intake and increased urinary protein losses. Immunologic response to infection activates cytokines, which cause fever and anorexia, thereby leading to increased energy expenditure and decreased caloric intake. The opportunistic infections further increase the nutritional needs of the host and continue to weaken the immune system, speeding up the progression of the disease.

Early immune failure occurs when the persistence of symptoms and opportunistic infections lead to increased energy needs, reduced food intake, malabsorption of nutrients, weight loss, and wasting. The persistence of these conditions will lead to full-blown AIDS.

4. Late symptomatic phase (full-blown AIDS)

The late phase is marked by metabolic alteration, weight loss, and wasting. Other characteristics include high viral load, a decreased CD4 count, pneumonia, Kaposi's sarcoma, systemic fungal infection, bacterial infection, and cancer.

Disease recognition

HIV is recognized primarily through testing for the presence of the antibodies formed against the virus. Other tests are available to test for HIV itself, but they are very expensive and less commonly used.

HIV antibody tests (slides 17, 18, 19)

- The test results may be negative during the first 3 months after infection.
- Two tests are recommended. If results are conflicting, a third confirmatory test, which is usually more specific for HIV, is done.
- A test should be repeated 3 months after the initial testing because a person who was just infected at the time of the initial test may not yet have seroconverted.
- Pregnant women normally pass on antibodies to their babies. A baby born to an HIV-infected mother therefore might test positive for HIV antibodies without being infected.

Types of HIV antibody tests include blood tests, urine tests, and oral fluid tests.

Blood tests

- Enzyme immune assay (EIA) and enzyme linked immunosorbent assay (ELISA)
- Western blot
- Radioimmunobinding assay

- Dot-blot immunobinding assay

Urine tests

- EIA

- Western blot

Oral fluid test

- EIA

- Western blot

Tests for HIV itself

Polymerase chain reaction (PCR) looks for HIV genetic information. This test is very useful for detecting infection during the acute stage and among children born to HIV-infected mothers.

Impact of HIV/AIDS

HIV affects the mortality trends, food security situation, and health and education indicators of a society.

Demographic impact (slides 20, 21, 22)

More than 60 million people have been infected with HIV since the epidemic began. HIV/AIDS is now the leading cause of death in SSA and the fourth largest global killer. The average life expectancy in SSA is now 47 years, compared with an estimated 62 years without AIDS. In high-prevalence areas life expectancy has decreased severely (see PowerPoint 1). An additional 55 million deaths are projected in SSA between 2000 and 2020 as a result of AIDS, 39 percent more than would be expected without AIDS (UNAIDS 2002). The impact of HIV/AIDS on mortality among children between the ages of 1 and 5 years has been even stronger. In 7 countries in the region, under-five mortality has increased by 20 percent-40 percent.

Impact on food security (slide 23)

HIV/AIDS is a potentially significant threat to food security and nutrition. Food consumption may drop as a result of the illness and death of productive household members. A study in Tanzania found that per capita food consumption decreased by 15 percent after the death of an adult in the poorest households (FAO 2001).

Reduction in agricultural work or even abandonment of farms is likely. With fewer people, households farm smaller plots of land or resort to less labor-intensive subsistence crops, which often have lower nutritional or market value.

Impact on the health sector (slide 24)

Health expenditure per capita in the SSA region is generally low, and the demands of HIV/AIDS further strain already stretched health budgets and systems. The kind of strain varies depending on the level of services, the number of people who seek the services, the nature of the demands, and the capacity to deliver that care. During early HIV infection, the demand is mostly for primary care and out-patient services. As the infection progresses to AIDS, demand for hospitalization increases. Shortages of beds tend to lead to admission of HIV patients only at the later stage of the disease, limiting their chances of survival.

Aside from the increased demand for hospitalization, the increased patient load and the toll the epidemic takes on health workers leads to staff shortages and staff burnout. The complex nature of some of the opportunistic infections associated with HIV/AIDS demands more time and money spent on diagnosing and investigating cases. The demand for specialized services such as counseling also increases.

Impact on the education sector (slide 25)

A decline in school enrollment is one of the most visible effects of HIV/AIDS. Research from South Africa showed a 20 percent drop in the number of pupils enrolling in the first year of primary school in parts of Kwazulu Natal Province between 1998 and 2001 (UNAIDS 2002). In the Central African Republic and Swaziland, school enrollment is reported to have fallen by 20 percent–36 percent because of AIDS and orphanhood, with girls the most affected (2002). The following factors contribute to the decline in school enrollment:

- Removal of children from school to care for parents and family members
- Inability to afford school fees and other expenses
- AIDS-related infertility and a decline in birth rate
- Infection of more children who do not survive through the years of schooling

The capacity to deliver the basic social mandate is reduced as a result of illness or death of teachers. A study in Manicaland, Zimbabwe (UNAIDS 2002), found that 19 percent of male teachers and almost 29 percent of female teachers were infected with HIV. Education budgets are further strained by the need to train new teachers to replace those lost to AIDS, which affect the funds available for materials and infrastructure needed to provide quality educational services.

Comprehensive HIV/AIDS package (slides 26, 27)

Key elements of a comprehensive package to address HIV/AIDS include involving political and social leaders, mitigating the impact of the disease, reducing vulnerability to infection, preventing infection, providing care and support, and addressing cross-cutting issues.

Leadership

Leadership is required from the national to the community level. Strong personal commitments from political and civil society leaders are vital to promote national and local understanding and cooperation, avoid denial and stigma, and secure the full commitment and accountability of all sectors. The commitment of Uganda's president contributed significantly to the increased openness and some of the strides made in curbing HIV infection in Uganda.

Mitigating the social and economic impact of HIV

HIV/AIDS increases poverty and vulnerability and depletes the capacity of society and individuals to respond to the epidemic. Special attention should be given to the growing number of orphans and children made vulnerable through HIV/AIDS. Such attention should ensure access to basic education, health, and social services and regularly monitoring the care, health, and well-being of such children.

Reducing vulnerability to infection

The epidemic is driven by forces of social and economic vulnerability that inhibit people's capacity to control their risk of infection. A comprehensive package should therefore include strategies to reduce vulnerability, particularly for women and girls, people living with HIV/AIDS, and people in war or conflict and emergency situations. Such strategies include empowering people to combat poverty, hunger, and disease through education, life skills building, microfinance services, and legislative and policy measures to promote and protect basic human rights.

Prevention

A strong focus on prevention is essential to significantly reduce the spread of HIV and its impact. Special attention has to be given to young people, as over 30 percent of people currently living with HIV/AIDS are under the age of 24. Efforts also need to be targeted to other vulnerable populations such as sex workers. Prevention methods should include health and sex education not only to provide information but also to build life skills to reduce vulnerability, access to female and male condoms, expanded services for preventing mother-to-child transmission, expanded demand and harm reduction programs for intravenous drug users, and expanded access to voluntary counseling and testing (VCT).

Care and support

Prevention is inseparable from care and support for people affected by HIV/AIDS and should be closely linked with care and support interventions. This synergy is central to reversing the spread of the epidemic. Care and support strategies should clearly indicate the range of services to be provided and the standards to which they will adhere. Strategies should include voluntary counseling and testing, which acts as a vital point of entry for prevention and care interventions. When carried out

effectively, care and support interventions help to overcome stigma and denial, lead to better management of illnesses and opportunistic infections, and prevent further transmission including from mother to newborn infants. In addition, care and support strategies should include health services and psychosocial support, PMTCT, and counseling and care for children orphaned by HIV/AIDS.

Cross-cutting issues

Key cross-cutting issues include promoting the full participation of people living with HIV/AIDS and affirming and strengthening the capacity of communities to respond to the epidemic.

Challenges in managing HIV/AIDS (slide 28)

The global response to HIV/AIDS has been limited by the following major challenges:

Political commitment is still lacking at all levels of government, even in some of the most severely affected countries.

Resources and funds available globally and nationally cannot provide the full package for managing HIV/AIDS, particularly for accessing antiretroviral drugs (ARVs) for the majority of people affected.

Stigmatization and discrimination limit the impact of prevention and care interventions.

Scaling up interventions to reach all vulnerable groups faces two challenges. Current programs are still small and have been unable to reach large numbers of the population, and scaling up raises issues of resources and the difficulty of ensuring the same level of quality on a larger scale.

Lack of a vaccine is a challenge. There is not yet a cure for HIV. As with most viral infections, building natural immunity would be one of the most effective ways to reduce new infections, but no effective vaccine has been produced.

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DISCUSSION POINTS 1

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1. What factors in the country are likely to influence transmission of HIV?
2. What factors in the country are likely to increase vulnerability to HIV infection and the impact of HIV/ADS?
3. Which HIV tests are known to be available and are currently used in the country?
4. Discuss the main impact of the HIV/AIDS epidemic on the country.
5. Which of the elements of a comprehensive HIV/AIDS package are most likely to affect the nutrition of people affected by or infected with HIV/AIDS?

SESSION 2 LINK BETWEEN NUTRITION AND HIV/AIDS

Purpose

The purpose of this session is to provide students with basic concepts of the relationship among food, nutrition, and HIV/AIDS; general dietary needs; and practices to reduce morbidity, mortality, and the progression of HIV to AIDS.

Learning objectives

By the end of the session, students will be able to:

- Explain the relationship between nutrition and HIV/AIDS
- Outline the synergism between macronutrients and micronutrients and HIV/AIDS from evidence-based studies
- Describe the benefits of adequate nutrition for people living with HIV/AIDS

Prerequisite knowledge

- Basic knowledge of the principles of nutrition throughout the life cycle
- Basic knowledge of HIV/AIDS in Africa (see Session 1)

Estimated time: 60 minutes

Outline

Content	Methodology	Timing
1. Task 1 (in Exercise 2) 2. Cycle of malnutrition and HIV/AIDS (RCQHC/FANTA model) 3. Independent and synergistic effects of malnutrition and HIV on the immune system (including the synergism between malnutrition and HIV and the effects of the synergism on productivity) 4. Mutual contribution of nutrition and HIV/AIDS • Causes of decreased food intake, absorption, and utilization • Changes in metabolism • HIV-associated wasting syndrome • Studies showing the relationship between nutrition and HIV/AIDS	Ask students to carry out the plenary task 1 in **Exercise 2** Facilitate an interactive lecture using **PowerPoint 2** and **Lecture Notes 2**	15 minutes 45 minutes
Summary of students' presentations on Exercise 2	Divide the class into smaller groups and allow them time to carry out Task 2 in **Exercise 2**. Capture discussion points on a flipchart or board	30 minutes

Required materials

- LCD or overhead projector
- Flipchart paper or board
- Writing pens

Recommended preparation

1. Be familiar with **Lecture Notes 2** (The Link Between Nutrition and HIV/AIDS).

2. Review **Discussion Points 2** to identify relevant questions to help students master the concepts. Facilitate a group discussion if time allows.

3. Decide on the timing of each activity, considering the students' backgrounds and the coverage of the content elsewhere.

4. Search for recent studies on the influence of nutritional interventions on reduced mortality and morbidity rates and prolonged life and functional capacity among people living with HIV/AIDS.

5. Review additional reading materials if needed, particularly Piwoz and Preble 2000.

Materials provided

PowerPoint Presentations

- **PowerPoint 2**/overhead presentation: The Link between Nutrition and HIV

Handouts

1. Piwoz, EG, and EA Preble. 2000. HIV/AIDS and nutrition: A review of the literature and recommendations for nutritional care and support in sub-Saharan Africa. Washington: SARA Project, Academy for Educational Development, pp. 8–26 (or give for reference reading)

2. Hellerstein, M, and D Kotler. 1998. HIV-associated wasting syndrome and body-habitus changes. *PRN Notebook* 3(3): 14-21

Suggested reading materials

Lwanga, D, E Piwoz, and BD Giyose. 2001. Nutrition brief: Nutrition and HIV in East, Central and Southern Africa. Kampala, Uganda: Commonwealth Regional Health Community Secretariat and Washington, DC: SARA Project/AED.

Hellerstein, M, and D Kotler. 1998. HIV-associated wasting syndrome and body-habitus changes. *PRN Notebook* 3(3): 14-21.

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LECTURE NOTES 2: LINK BETWEEN NUTRITION AND HIV/AIDS

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Introduction (slide 2)

Much of this session is derived from the work of Piwoz and Preble (2000). Nutritional status may affect the progression of HIV disease in adults and the survival of HIV-infected people. The relationship between malnutrition and AIDS is well recognized, especially in Africa, where the disease was initially known as "slim disease" because of the classic wasting syndrome typically experienced by people with HIV infection.

Purpose (slides 3, 4)

The purpose of this session is to provide students with basic knowledge about the link between HIV/AIDS and nutrition the general dietary needs and practices to reduce morbidity and mortality and the progression of HIV to AIDS. The session:

- Reviews the relationship between HIV and nutrition
- Describes how HIV/AIDS affects nutrition
- Describes how nutrition affects HIV/AIDS
- Discusses the effects of macronutrients, micronutrients, and nutritional status on HIV/AIDS, as established by observational and clinical studies, to serve as guidelines for dietary needs in HIV/AIDS disease

Importance of nutrition in managing HIV/AIDS acknowledged locally

The importance of nutrition in the context of HIV/AIDS is gaining more recognition in various sectors, including the policy level. The November 2002 meeting of the East, Central, and Southern Africa (ECSA) ministers of health in Entebbe, Uganda, called for member states to mobilize communities for proper nutrition in the management of AIDS. A number of countries in the region are developing or implementing national guidelines on nutritional care and support for people living with HIV/AIDS. Tertiary institutions, especially those with nutrition courses, have a key role to play in

disseminating information on the benefits of proper nutrition to people who can pass it on to communities.

The cycle of malnutrition and HIV (slide 5)

As covered in Session 1, HIV infection is characterized by progressive destruction of the immune system, leading to recurrent opportunistic infections and malignancies, progressive debilitation, and death. Malnutrition is one of the major complications of HIV infection and a significant factor in advanced disease. In resource-constrained settings HIV infection combined with pre-existing malnutrition places a tremendous burden on people's ability to remain healthy and economically productive.

Malnutrition and HIV: A vicious cycle (slide 5)

Malnutrition and HIV negatively affect each other. HIV infection may result in poor nutrition as a result of insufficient dietary intake, malabsorption, and altered metabolism. This cycle has the following results:

- Weight loss, the most common and often disturbing symptom of HIV, reported in 95 percent to 100 percent of all patients with advanced disease
- Loss of muscle tissue and body fat
- Vitamin and mineral deficiencies
- Reduced immune function and competence
- Increased susceptibility to secondary infections
- Increased nutritional needs because of reduced food intake and increased loss of nutrients leading to rapid HIV disease progression

Synergistic effects of malnutrition and HIV

Malnutrition and HIV affect the body in similar ways. Both conditions affect the capacity of the immune system to fight infection and keep the body healthy. Before

AIDS, the impairment of immune function caused by malnutrition was called nutritionally acquired immune deficiency syndrome, or NAIDS.

As shown in slide 6, the following changes in the immune function resulting from malnutrition are similar to those caused by HIV and AIDS:

- CD4 T-lymphocyte number
- CD8 T-lymphocyte number
- Delayed cutaneous hypersensitivity
- CD4/CD8 ratio
- Serologic response after immunizations
- Bacteria killing

Effects of HIV/AIDS on nutrition (slide 7)

HIV affects nutrition in three sometimes overlapping ways:

- It is associated with symptoms that cause a reduction in the amount of food consumed
- It interferes with the digestion and absorption of nutrients consumed
- It changes metabolism, or the way the body transports, uses, stores, and excretes many of the nutrients

Decreased food consumption (slide 8)

HIV/AIDS is associated with conditions that result in reduced food intake. Decreased food consumption may result from the following factors:

- Inability to eat or swallow because of painful sores in the mouth and throat

- Loss of appetite as a result of fatigue, depression, and other changes in the mental state

- Side effects of medications, including nausea, loss of appetite, a metallic taste in the mouth, diarrhea, vomiting, and abdominal cramps

- Reduced quantity and quality of food in the household as a result of the inability to work or reduced income because of HIV-related illness

Nutrient and food absorption (slide 9)

HIV infection also interferes with the body's ability to absorb nutrients, an effect that occurs with many infections. Poor absorption of fats and carbohydrates can occur at any stage of HIV infection in both adults and children and results in excess nutrient loss. Poor absorption is caused by the following:

- HIV infection of the intestinal cells, which may damage the gut, even in people with no other symptoms of infection

- Increased incidence of opportunistic infections such as diarrhea, which is a common cause of weight loss in people living with HIV

Poor absorption of fat reduces the absorption and use of fat-soluble vitamins such as vitamins A and E. This can further compromise nutrition and immune status.

Changes in metabolism (slide 10)

Changes in metabolism in HIV-infected people occur as a result of the immune system's response to HIV infection. When the body mounts its acute phase response to infection, it releases pro-oxidant cytokines and other oxygen-reactive species. These cytokines produce several results, including anorexia (causing lower intake of food) and fever (increasing energy requirements).

If the infection is prolonged, muscle wasting occurs because muscle tissue is broken down to provide the amino acids with the immune protein and enzymes they need. These processes increase energy requirements of people living with HIV/AIDS during the asymptomatic phase by 10 percent over the level of energy intake recommended

for healthy, non-HIV-infected people of the same age, sex, and physical activity level. They increase energy requirements during the symptomatic phase by 20 percent-30 percent over the level of energy intake recommended for healthy, non-HIV-infected people of the same age, sex, and physical activity level (Seumo-Fosso and Cogill 2003).

The body also responds to this release of pro-oxidant cytokines by increasing the demand for antioxidant vitamins and minerals, such as vitamins E and C, beta-carotene, zinc, and selenium. These vitamins and minerals are used to form antioxidant enzymes.

Oxidative stress occurs in an imbalance between the pro-oxidants and antioxidants, when there are not enough antioxidants to meet the demands of the pro-oxidant cytokines. This stress is believed to increase HIV replication and transcription, leading to higher viral loads and disease progression. For this reason, many studies have examined the impact of antioxidant vitamin supplementation on HIV transmission and disease progression.

HIV/AIDS-associated wasting syndrome (slides 11, 12)

Wasting syndrome is a multifaceted complication of HIV that is well known to increase morbidity and mortality. Both body weight and body cell mass assays should be used to assess body composition to understand the clinical significance and magnitude of the wasting syndrome in HIV. Body cell mass is the metabolically active tissue compartment in the body.

Body cell mass measures are superior to body weight measures in the presence of HIV because they correlate better with mortality. Studies have found the following relationship between body cell mass changes and the progression of HIV disease:

- A progressive depletion of body cell mass in the late stages of HIV disease (Kotler 1985)

- Significant prolonged survival in patients with body cell mass of > 30 percent of body weight or serum albumin levels exceeding 3.0g/dl (Suttman 1991)

- There may be many causes of AIDS-wasting syndrome. The etiology should define the management of the condition. The following factors may be associated with the syndrome:

- Reduced energy intake

- Gastrointestinal disorders including diarrhea and malabsorption

- Metabolic parameters

Changes in body composition (slide 13)

When a healthy person suffers an acute illness that reduces food intake, inadequate levels of nutrients are ingested and absorbed by the body to meet increased energy needs. As a result, weight (fat mass) may be lost first but is usually regained immediately after normal eating habits return. Fats stored in adipose tissues are catabolized to fuel the body energy needs, thus sparing amino acids needed to build or preserve lean body mass.

With HIV/AIDS, however, the opposite seems to occur. Amino acids are more readily used to fuel energy needs, while fat continues to accrue. The patient may consume adequate nutrient levels but utilizes and stores them inadequately. The patient has excess adipose tissue in proportion to lean tissue as the body converts the digested nutrients into fat instead of lean tissue. With high triglyceride levels in the blood, resting energy expenditure is increased. The underlying causes of an HIV-infected person's inability to preserve or regain lean tissue remain unknown.

Effect of nutrition on HIV/AIDS: Observational studies (slide 14)

Effective and inexpensive ways to deal with the cycle of infection and poor nutrition include good nutrition, hygiene, and food safety. Early studies, which observed associations over time without providing specific nutrition interventions, showed that nutritional status and HIV were interrelated. These studies reported that weight loss was associated with HIV infection, disease progression, and shorter survival time.

Low blood levels of several nutrients, including, selenium, iron, zinc, and vitamins A, B_{12}, and E, were associated with faster HIV disease progression and reduced survival. This was found after taking into account patients' use of antiretroviral drugs, immune status, and diet. However, these data on the impact of nutrition interventions on HIV have various limitations:

- These observations alone do not show whether the nutritional deficiencies caused or resulted from HIV progression.

- Most studies were conducted in the United States or with European populations with access to antiretroviral drugs and multivitamins and without endemic malnutrition.

- Controlled clinical trials are needed to find out whether improving nutrition can affect HIV progression and prolong patient survival.

Effect of nutrition on HIV/AIDS: Clinical trials (1) (slide 15)

Since the 1980s a number of controlled clinical trials have studied the effects of nutrition on HIV. Many of the trials were done with patients with AIDS, but some were done with patients at early stages of HIV infection.

These studies show that nutrition supplementation and counseling interventions may reduce HIV patients' vulnerability to weight loss and muscle wasting. This effect is confirmed particularly when nutrition supplements are given in the early stages, when low dietary intake and poor nutrient absorption are the primary causes of weight loss. Later in the course of infection, when metabolic changes begin to play a leading role in the wasting process, other types of interventions are required.

In one of the studies on HIV/AIDS and nutrition quoted in Piwoz and Preble (2000), HIV-infected adults who were given high energy/protein liquid supplements gained weight and maintained it as long as they did not suffer secondary infections. In another of the studies, AIDS patients were given fish oil supplements containing omega-3 fatty acids, which the body needs to respond to inflammation, and those patients who did not suffer from new secondary infections gained weight. In yet another, patients who had already lost a significant amount of weight and were

given counseling and a supplement containing amino acids and several antioxidant vitamins and minerals gained weight and experienced an increase in muscle mass.

Effect of nutrition on HIV/AIDS: Clinical trials (2) (slide 16)

Studies in which single or multiple micronutrient supplements were given to patients showed that these supplements improved the immune system, reduced oxidative stress, and reduced the risk of morbidity and mortality. Summaries of studies that measured the effects of different supplements are listed below.

- Studies in Tanzania and South Africa showed that vitamin A supplementation reduced diarrhea and mortality and improved several indicators of immune status in HIV-infected children. However, the exact dosage for maximum effectiveness remains unknown.

- Other studies of men from the United States have shown that improving vitamin B_{12} status improves CD4 cell counts.

- One study with Canadian adults concluded that supplementation with vitamins E and C reduced oxidative stress and HIV viral load.

- A study in Zambia found that taking vitamin E supplements in the late stage of the disease may not be effective because the vitamin is fat soluble and poorly absorbed.

Multivitamin supplementation has also been shown to improve pregnancy-related outcomes and immune status.

Nutrition and HIV/AIDS: Clinical trials (3) (slide 17)

- In France, HIV-infected patients were given selenium and beta-carotene supplements, which increased antioxidant enzyme functions in those studied.

- A study of AIDS patients in Italy found that zinc supplements reduced the incidence of opportunistic infections, stabilized weight, and improved CD4 counts. Some studies in the United States however, suggest that additional zinc intake is associated with faster HIV-disease progression.

- Finally, a study of AIDS patients in the United States showed that treating anemia with synthetic erythropoietin slowed HIV-disease progression and increased survival time.

Nutrition and HIV/AIDS: A summary (slide 18)

- HIV affects nutrition by decreasing food consumption, impairing nutrient absorption, and causing changes in metabolism, HIV associated wasting, and body-habitus.

- Nutritional status also affects HIV disease progression and mortality.

- Improving and maintaining good nutrition may prolong health and delay HIV disease progression. The impact begins early in the course of HIV infection, even before other symptoms are observed.

- Counseling and other interventions to prevent or reverse weight loss are likely to have the greatest impact early in the course of HIV infection.

- Nutritional supplements, particularly antioxidant vitamins and minerals, may improve immune function and other HIV-related outcomes, especially in nutritionally vulnerable populations.

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Keithley, JK, B Swanson, M Murphy, and DF Levin. 2000. HIV/AIDS and nutrition. Implications for disease management. *Nurs Case Manag* 5(2): 52-9.

Piwoz, EG, and EA Preble. 2000. HIV/AIDS and nutrition: A review of the literature and recommendations for nutritional care and support in sub-Saharan Africa. Washington: SARA Project, Academy for Educational Development.

Seumo-Fosso, E, and B Cogill. 2003. Meeting nutritional requirements of HIV-infected persons. Washington DC: FANTA Project, Academy for Educational Development. Forthcoming.

Tang, AM, and E Smit. 1998. Selected vitamins in HIV infection: A review. *AIDS Patient Care STDS* 12(4): 263-73.

EXERCISE 2

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TASK 1: Use this exercise at the beginning of the session or when introducing the relationship between nutrition and HIV/AIDS.

Write each of the factors below on separate pieces of paper.

Effects of Nutrition on HIV/AIDS

- Further decrease in Immunity
- Healing process
- Disease progression
- Cost of treatment

Effects of HIV/AIDS on Nutrition

- Increased energy needs
- Malabsorption
- Adverse drug effects
- Frequent diarrhea episodes
- Anorexia and nausea
- Recurrent infections
- Increased nutrient requirements
- Inflammatory response
- Abnormal metabolic response

Write "HIV/AIDS" on a board or post a card on the wall. On the left write "Effects of nutrition on HIV/AIDS," and on the right write "Effects of HIV on nutrition," as illustrated below.

Effects of nutrition on HIV/AIDS	**HIV/AIDS**	Effects of HIV/AIDS on nutrition

Pass out the pieces of paper with the factors written on them, one to each student. Ask students to go to the wall and stick or tape their factors on the appropriate side of the "HIV/AIDS" card. Allow time for discussion. Then ask students to explain their choices (for example, why anorexia was placed under "Effects of HIV on nutrition" rather than under "Effects of nutrition on HIV/AIDS").

TASK 2: Ask students to list on a flipchart or board the factors that are likely to influence the nutritional status of people living with HIV/AIDS in the country. Once the factors are listed, ask students to categorize them according to the following:

- Social factors
- Biological factors
- Programmatic factors

Allow students time for discussion. Then ask them to explain how each factor influences the nutritional outcome. Make sure the explanations are relevant to the local context.

SESSION 3 NUTRITION ACTIONS FOR PEOPLE LIVING WITH HIV/AIDS

Purpose

The purpose of this session is to provide students with general nutrition and dietary guidelines to mitigate the effects of HIV on nutrition and reduce the progression of HIV/AIDS morbidity, mortality, and related discomfort.

Learning objectives

By the end of the session, students will be able to:

- Outline the goals of nutritional care and support for people living with HIV/AIDS
- Describe the essential nutrition actions in the care and support of people living with HIV/AIDS
- Explain factors to consider when planning nutritional care and support interventions for people living with HIV/AIDS

Prerequisite knowledge

- Knowledge of the principles of nutrition throughout the life cycle
- Basics of HIV/AIDS in Africa

Estimated time: 60 minutes

Outline

Content	Methodology	Timing
1. Task 1 in Session 3 2. Goals of nutritional care and support • Maintaining or improving nutritional status • Ensuring optimal body composition for quality life and survival • Preventing diseases and diminished immunity 3. Components of nutritional care and support • Assessing nutritional status • Designing and implementing appropriate nutritional interventions • Ensuring appropriate actions for the stage of illness, economic factors, and cultural setting • Taking essential nutrition actions in HIV/AIDS to a) prevent weight loss, b) improve body composition, and c) improve immunity and prevent infections 4. Follow up and review: Importance of recording, integrated follow-up, and care of opportunistic infections and other infections	• Facilitate group work Facilitate an interactive lecture using **PowerPoint 3** presentation Brainstorm the role of nutritional care and support for people living with HIV/AIDS Brainstorm methods that can be used for nutritional assessment in HIV/AIDS	10 minutes 50 minutes
5. Factors to consider when designing or implementing nutritional care and support interventions • Social factors (stigma, social support) • Economic (household resources) • Clients rights • Quality of support (counseling, infrastructure, consistency)	After the lecture, facilitate group work to carry out Task 2 in **Exercise 3**	30 minutes
Summary of presentation by answering students' questions	Capture discussion points on a flipchart or board	10 minutes

Required materials

- LCD or overhead projector
- Flipchart stand and paper
- Writing pens
- Food composition tables for foods consumed in the country

Recommended preparation

- Be familiar with the following:
    - **Lecture Notes 3:** Key Nutrition Actions for People Living with HIV/AIDS
    - HIV/AIDS activities in the country, for examples from the local context
    - Cut-off points for anthropometry and laboratory assessments of population of interest by age group and sex
    - Other materials used in the country for nutritional care and support (e.g., posters, job aids, recording materials)
- Collect examples of brochures of programs that provide nutritional care and support in the country (including addresses and contacts).
- Allocate time for each activity according to students' backgrounds and coverage of the content elsewhere.
- Prepare to divide students into pairs for **Exercise 3**. In this manual names for the case studies were selected arbitrarily. Adapt names and other aspects of the case studies to country and community contexts.
- Prepare to emphasize the use of practical household measures in meal planning.
- Prepare to emphasize a client-centered approach in decision making.

Materials provided

PowerPoint presentations

- **PowerPoint 3**/overhead presentation: Nutrition Actions for People Living with HIV/AIDS

Handouts

- **Handout 3.2**: Safe Food Handling Practices
- National guidelines for nutrition and HIV/AIDS (if available)
- **Additional resources on CD**
- Hellerstein, M, and D Kotler. 1998. HIV-associated wasting syndrome and body-habitus changes. *PRN Notebook* 3(3): 14-21

Suggested reading materials

FANTA. 2000. HIV/AIDS: A guide for nutritional care and support. Washington DC: FANTA Project, Academy for Educational Development.

Fields-Gardner, C, and JK Keithley. 2001. Management of antiretroviral-related nutritional problems: Challenges and future directions. *J Assoc Nurses AIDS Care* 12 suppl: 79-84.

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Hellerstein, M, and D Kotler. 1998. HIV-associated wasting syndrome and body-habitus changes. *PRN Notebook* 3(3): 14-21.

Kotler, D. 2000. The epidemiology and pathogenesis of lipodystrophy in HIV disease: An update. *PRN Notebook* 5(1): 9-13.

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LECTURE NOTES 3: NUTRITION ACTIONS FOR PEOPLE LIVING WITH HIV/AIDS

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Introduction

Steady advances have been made in understanding the mechanisms underlying nutritional loss in HIV patients. The utility and optimal modes of nutritional support, however, have not been fully established.

Purpose (slides 2, 3)

The purpose of this session is to give students basic information on nutritional care and support practices for people living with HIV/AIDS. This information can be used as a general guideline to mitigate the effects of HIV on nutrition and reduce the progression of HIV/AIDS morbidity, mortality, and discomfort. The session:

- Outlines the goals of nutritional care and support for people living with HIV/AIDS
- Describes the essential components of nutritional care and support for people living with HIV/AIDS
- Identifies appropriate assessments for nutritional care for people living with HIV/AIDS
- Outlines appropriate follow-up and review actions for nutritional care and support for people living with HIV/AIDS
- Describes selected nutritional effects of antiretroviral therapy (ART)
- Explains factors to consider when planning nutritional care and support interventions for people living with HIV/AIDS

Goals of nutritional care and support (slide 4)

Lwanga and Piwoz (2001) identify the following goals of nutritional care and support for people living with HIV/AIDS:

- **Improve nutritional status** by maintaining weight, preventing weight loss, and preventing loss of muscle mass.

- **Ensure adequate nutrient intake** by improving eating habits and building stores of essential nutrients, including carbohydrates, protein, important antioxidant nutrients, and other vitamins and minerals necessary for the functioning of the immune system.

- **Prevent food-borne illnesses** by promoting hygiene and food and water safety.

- **Enhance the quality of life** by promptly treating infections and managing the symptoms that affect food intake to minimize the nutritional impact of secondary infections when they occur.

- **Provide palliative care during the advanced stages of the disease.**

Components of nutritional care and support (slide 6)

The three components of nutritional care and support are nutritional assessment, intervention selection and design, and follow up and review.

Nutritional assessment: Why measure? (slide 7)

Nutritional assessments of people living with HIV/AIDS are necessary because they experience changes in a) body composition (decreased weight and body cell mass and even fat accumulation), b) morbidity status that may affect eating and food utilization, and c) food intake. Nutritional assessment measurements are conducted to:

- Identify and track body composition changes and trends to determine the effectiveness of nutrition therapy in slowing the progression of disease

- Offer tailored treatment and management based on the assessment results

- Address concerns and fears about physical health status

Body measurements are increasingly used as screening tools in clinical trails.

What to assess or measure? (slide 8)

The following measurements are commonly used in nutritional assessments:

- Measurement of body size or proportions, known as anthropometry (e.g., weight, height)

- Laboratory tests for blood sugar, lipids, cholesterol, protein, and micronutrient status (e.g., serum levels, Hb, B_{12})

- Clinical assessment of symptoms and illnesses associated with HIV/AIDS infection such as oral thrush and diarrhea, often appropriate in the absence of laboratory facilities

- Review of dietary history such as appetite, food habits, and stress or depression that may affect eating

- Lifestyle practices such as smoking, drinking alcohol and caffeine, and using drugs that may affect food intake or utilization

Anthropometric measurements in HIV/AIDS (slide 9)

The following anthropometric measurements should be conducted regularly with HIV/AIDS patients to assess and monitor body weight and composition:

- Percentage change in weight or BMI (body mass index) over time to gauge wasting

- Lean body mass measurement to establish the proportion of body composition that is muscle. Body cell mass is a comparison of weight and volume.

- Circumferences of the waist, hips, mid-upper arm, and mid thigh as indicators of wasting or body composition

- Skin fold measurements can provide an estimate of total body fat

Another body circumference that should be measured is the fat accumulation behind the neck, known as the "buffalo hump." This is caused by fat maldistribution as a result of altered metabolism in ART and is associated with wasting.

Although weight is often used to measure body mass or composition, obvious sources of error in the context of HIV/AIDS include fluid overload (e.g., severe renal or hepatic disease, hypoalbuminemia, or intravenous hydration) or fluid deficits (e.g., dehydration from diarrhea or poor fluid intake). Body weight measures are therefore not the most effective for differentiating between changes in lean tissues or fat.

Measures of body cell mass—the metabolically active tissue compartment in the body—are superior to body weight measures in the presence of HIV infection because they correlate better with mortality.

Nutrition laboratory measurements in HIV/AIDS (slide 10)

Laboratory measurements are commonly used to assess vitamin and mineral profiles, as well as body composition, to gauge adverse events. For example, the fasting blood sugar test aims to determine hyperglycemia, lipid profiles for hyperlipidemia, and fat maldistribution.

Clinical assessments in HIV/AIDS (slide 11)

Clinical assessments aim to identify symptoms and illnesses associated with HIV/AIDS infection that can affect nutritional status (e.g., diarrhea, fever, mouth and throat sores, oral thrush, nausea, vomiting, muscle wasting, tuberculosis, anorexia, fatigue, and lethargy). Nutritional advice for these symptoms is discussed in detail in Session 4. The advice emphasizes mitigating the nutritional consequences of the disease and preserving functional independence when possible. Patients are advised to:

- Preserve lean body mass

- Eat small, frequent meals throughout the day
- Minimize gastrointestinal discomfort
- Maintain fluid intake
- Avoid foods such as hot, spicy foods, sweet foods, alcohol, and caffeine that cause thermal, chemical, and mechanical irritation
- Treat infections immediately to avoid effects on appetite, ability to eat, and nutrient absorption and retention
- Follow food safety and hygiene guidelines

Diet history in HIV/AIDS (slide 12)

Diet histories of people living with HIV/AIDS are taken to assess the following:

- Dietary intake levels, specifically the types and amounts of food eaten (including food access and utilization and food handling) and use of supplements and medications
- Factors that affect food intake, such as food availability, appetite, eating patterns, medication side effects, traditional food taboos, lifestyles (smoking, alcohol, physical activity, caffeine intake, use of social drugs), psychological factors (stress and depression), stigma, and economic factors

Nutritional care and support interventions **(slide 13)**

Nutritional care and support interventions and strategies should be based on the nutritional assessment. However, the stage of HIV infection can affect the effectiveness of nutrition interventions.

Consider the phase of the HIV infection (slides 14, 15)

Recommendations for nutritional care vary depending on the underlying nutritional status of the person and the extent of HIV disease progression. Nutrition recommendations should consider disease stage and body composition. Disease progression can be categorized into three main phases:

- In the **early phase** the person has no symptoms and a stable weight
- In the **middle phase** the person experiences significant, unintentional, or undesirable weight loss as a result of opportunistic infections
- The **late or symptomatic phase** leads to full-blown AIDS

Nutrition priorities vary according to individual symptoms and energy and nutrient needs, which depend on the stage of disease (Lwanga 2001).

During the **early phase** the main objective is to stay healthy by building stores of essential nutrients, maintaining weight, preserving lean body mass, and understanding and following food safety guidelines through proper nutrition education and counseling.

During the **middle phase** a person who has or has had an acute infection accompanied by weight loss should primarily minimize consequences by:

- Maintaining food intake during an infection
- Increasing energy nutrient intake and meeting requirements for proteins, iron, and vitamins A, B, C, and E for recovery (this should be done with care) and weight gain
- Continuing as much physical activity as possible to preserve lean body mass

As the disease progresses to AIDS in the **late phase**, the main objective is to provide comfort or palliative care. This care includes treating opportunistic infections, modifying the diet according to symptoms, and encouraging eating.

Psychological and emotional support are also important priorities at all stages of the disease. The use of ARVs is recommended where necessary and possible.

Needs of HIV-infected people (slide 16)

Nutrition-related actions for HIV patients may be grouped under the following three categories, based on individual symptoms or needs:

- Maintain or prevent weight loss
- Improve body composition (e.g., changes in shape, fat deposits)
- Prevent disease and strengthen immunity

These three categories may in turn be used as a guideline for designing interventions to address nutritional change.

Key actions to **prevent weight loss** include promoting adequate calorie and protein intake (e.g., creating an individualized meal plan based on the patient's food security and needs) and advising on lifestyle changes to avoid practices that negatively influence food intake, nutrient use, disease condition, and recovery.

Actions to **improve body composition** include promoting regular exercise to preserve muscle mass and at times using steroids and other growth stimulants to preserve or increase body cell mass.

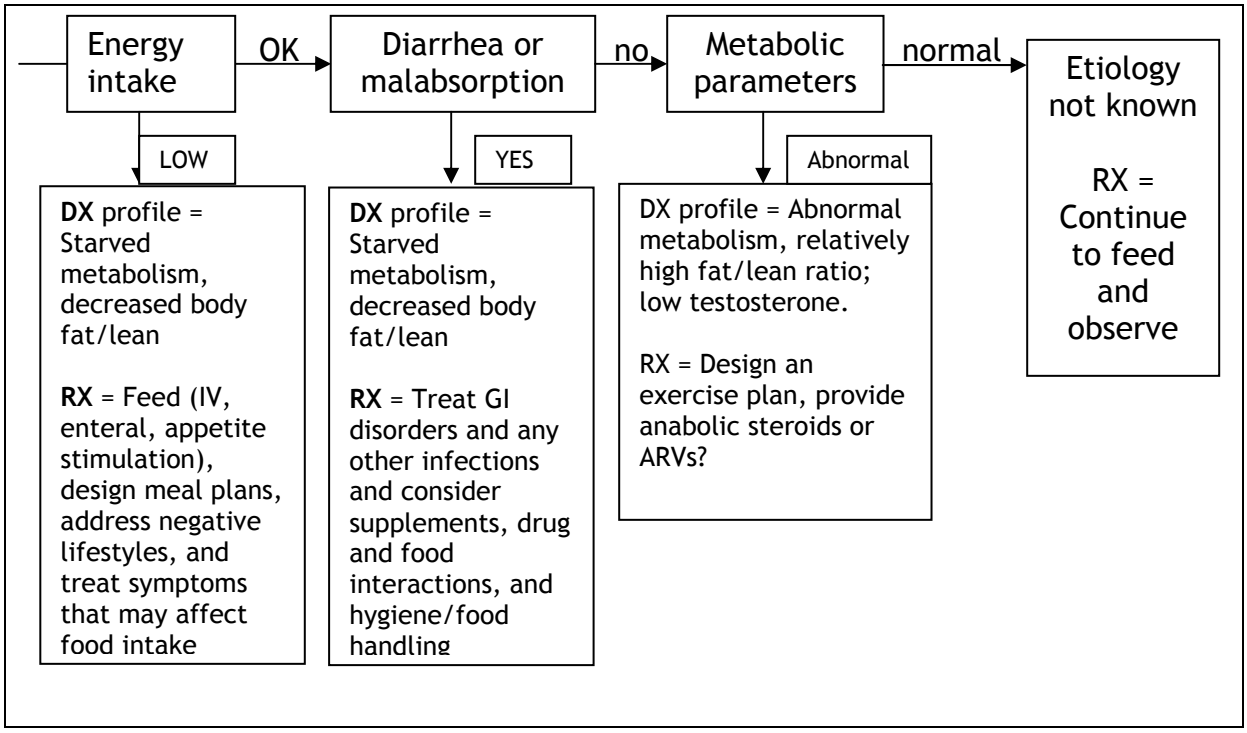
Actions to **improve immunity and prevent infections** include promoting increased micronutrient (vitamin and mineral) intake, encouraging the observation of food safety and handling practices to prevent food bone illnesses, and promoting the use of ARVs to reduce viral load where necessary and possible.

Recommendations should be guided by the condition of the patient's disease state and body composition, other symptoms, and social, economic, physical, and biological ability to comply with the recommendations. The first key action is to assess the patient's nutritional status periodically.

Promote adequate nutrient intake (slides 17, 18)

Most people living with HIV/AIDS report weight loss, but loss of weight among HIV/AIDS patients is not only related to food intake. A number of other factors should be investigated to determine appropriate interventions. Hellerstein and Kotler (1998) have suggested an algorithm for choosing the best option of interventions for patients with HIV/AIDS related weight loss (adapted figure below).

Figure 1 Algorithm for managing weight loss in patients with HIV/AIDS



To prevent weight loss it is important to ensure adequate nutrient intake at all times. The following practices can help achieve this:

- Provide information about a proper diet that is based on a variety of foods that are locally available and acceptable and will help the patient diversify the diet and increase energy and nutrient intake.

- Suggest a diet that provides adequate protein, carbohydrates, and other essential nutrients to meet the increased nutritional requirements during HIV infection.

Low energy intake is just one of the possible causes of weight loss among people living with HIV/AIDS. Other important factors that should be examined are malabsorption (or related diarrhea) and metabolic reasons. However, malabsorption and diarrhea should only be examined if levels of energy and nutrient intake are adequate and the client continues to lose weight. Though there are individual differences, the following recommendations apply to people living with HIV/AIDS:

Energy requirements: HIV-infected *asymptomatic* people should increase energy intake by 10 percent over the level of energy intake recommended for healthy, non-HIV-infected people of the same age, sex, and physical activity level. HIV-infected *symptomatic* people should increase energy intake by 20 percent-30 percent over the level of energy intake recommended for healthy, non-HIV-infected people of the same age, sex, and physical activity level. The recommendation during the symptomatic phase is a range from 20 percent to 30 percent because energy needs increase as the disease progresses and opportunistic infections worsen (Seumo-Fosso and Cogill 2003).

Protein requirements: HIV-infected asymptomatic and symptomatic people do not require additional protein beyond the intake level recommended for healthy non-infected people of the same age, sex, and physical activity level. Although the onset of opportunistic infections leads to nitrogen losses, studies have not demonstrated that increased protein intake by HIV-infected people improves clinical outcomes. It is important, however, to consider pre-existing or concurrent protein deficiencies.

If carbohydrate intake is insufficient, protein is used to provide the body with energy. When this happens, protein is not available to maintain muscle and strengthen the immune system. This can lead to muscle wasting and increased susceptibility to infection of an already weakened immune system. The diet should therefore contain foods that are sufficient in both energy (in the form of carbohydrates) and protein.

Individualized meal plans (slide 19)

Because each patient has unique social and medical characteristics, individualized meal plans need to be developed. Meal planning takes time and requires the inclusion of the following considerations:

Stages of illness and symptoms. Symptoms of HIV/AIDS infection vary according to the stage of the disease. No two patients go through the same symptom experience at the same time, even at the same stage of disease.

Food security. Is food available and accessible? Is the patient able to get sufficient amounts of adequate quality food?

Resources. Does the patient have the money to acquire supplemental food sources and medications and the time and energy to prepare them? Are other caretakers willing to help with preparation?

Food preferences and dislikes. Consider tastes and preferences to recommend foods that the patient will eat.

Knowledge, attitudes, and practices. Does the patient understand the importance of proper nutrition in HIV? What are his or her attitudes toward HIV (stigma and discrimination)? Toward food? Current food practices? How do cultural factors affect the above?

Meal plans should suit medication and nutrition *and* health status (slide 20). They should be flexible and take the following into consideration:

- Food and drug interactions
- Medication regimens
- Opportunistic infections such as diarrhea and mouth sores (see details in Session 3)
- Changes in food accessibility, especially in limited-resource settings where patients have limited access to food and money to buy it, which is further hampered by reduced productivity because of HIV.

Lifestyle changes for nutritional well-being (slide 21)

Good nutrition can help prevent weight loss and strengthen the immune system. Some foods, however, should be avoided because they aggravate the commonly

occurring symptoms discussed previously. These foods may speed up disease progression through infections or have so little nutritional value that they do not help improve nutritional status (Lwanga 2001). The following foods and habits should be avoided:

- Raw eggs, unpasteurized milk, and dairy products from unpasteurized milk may contain bacteria, particularly salmonella, that are harmful to the already weakened immune system of the HIV-infected person.

- Undercooked meats and chicken may contain bacteria that are harmful to the already immune-compromised HIV-infected person.

- "Junk" foods such as chips, biscuits, and sweets have little nutritional value, and sweets and sugar may promote the growth of fungi (thrush).

- Alcohol and coffee decrease appetite and interfere with metabolism. Alcohol may interact with some medications, decreasing their efficacy.

- Smoking increases the amount of free radicals in the body.

- Expired foods, acidic foods, foods with preservatives, and oily foods aggravate symptoms related to diarrhea, nausea or vomiting, loss of appetite, and mouth and throat sores.

Regular exercise (slides 22)

Muscle loss often occurs when disease or trauma places additional nutritional demands on HIV patients who commonly eat less because of a diminished appetite. This causes the body to use protein from muscle stores to fight the disease. Over time the muscles become weaker and smaller and less flexible. Eventually muscle loss makes it difficult to recover from illness, impairs mobility, and affects quality of life. Muscle and lean body mass can be preserved through regular exercise or the use of steroids or hormones (table 1).

Table 1 Comparison of therapeutic regimens for HIV-related weight loss (slide 23)

Therapy	Nitrogen retention [g/day]	Rate of change in body composition	
		LBM [kg/wk]	Weight [kg/wk]
Megestrol acetate	n/a	0.00-0.05	0.45
Parental nutrition	n/a	0	0.30
rGH	4.0	0.25	0.13
Nandrolone (Hypogonadal)	3.7	0.25	0.41
Resistance exercise alone	3.8	0.48	0.53
Resistance exercise and Oxandrolone	5.6	0.86	0.84

Source: Hellerstein and Kotler 1998

The following can be deduced from the table:

- **Megestrol acetate** is an effective appetite stimulant. Its effect on amount of food intake was excellent (20 percent-25 percent increase), but its effect on weight gain was a result of fat mass accumulation.

- All weight gained by study subjects on only **parental nutrition** was fat and not lean body mass.

- rGH is an **anabolic agent** (growth hormone) that increases nitrogen retention (anabolism) and lipid catabolism and thus is expected to increase muscle restoration. However, rGH typically has to be given continuously to preserve normal body cell mass and has serious side effects.

- **Nandrolone and Oxandrolone** are anabolic steroids that increase positive nitrogen balance, lean body mass, and strength.

- **Resistance exercise** or weight lifting by itself and combined with anabolic steroids can have a significant affect on lean body mass. Exercise helps maintain physical activity and improve circulation of blood to the heart, legs, and feet, which improves overall functional capacity in terms of strength and appetite.

Exercises that build muscle mass (slide 24)

Exercises for people with HIV/AIDS do not need to be strenuous but should be of moderate intensity. Exercises should be done 3–5 times a week for approximately 30 minutes of continuous activity, depending on the patient's abilities. Disease stage and body composition should be considered when making exercise recommendations.

Types of exercises recommended to build muscle mass include the following:

- Weight-bearing exercises or progressive resistance training that build lean body mass and hence improve body composition

- Exercises such as aerobics, jogging, stair climbing, hiking, and skipping that generate high force on the bone and also increase bone density and improve circulation

- Relaxation exercises such as yoga and meditation

Increased vitamin and mineral intake (slide 25)

Increased nutrient and mineral intake is essential to replenish body stores as HIV infection increases nutrient needs. Food-based approaches are recommended as a first line of intervention because they are safer, have no undesirable side effects, and in most cases are affordable. Such strategies include recommending vitamin- or mineral-enriched products such as fortified breakfast cereals, beverages, and maize, millet, rice, or wheat flour. This fortification can also be done at home using "micronutrient sprinkles." Issues of food security (discussed in the next session) may be key factors for people relying on food-based approaches.

The other option is the use of nutrient supplements, particularly antioxidant vitamins and minerals. If used well, supplements can improve immune function and other HIV-related outcomes, especially in nutritionally vulnerable populations. Multivitamin and multimineral supplements are better than single vitamin or mineral supplements because they ensure meeting the varied nutrition requirements. HIV causes changes in the cells and intestines, and many minerals and vitamins are not absorbed as well as they used to be .

Nutrient supplements for people living with HIV/AIDS (slide 26)

Deficiencies of total calories, protein, vitamin A, vitamin B_6, vitamin B_{12}, vitamin C, vitamin E, magnesium, iron, selenium, and zinc are associated with HIV. Normalization of these vitamin and mineral deficiencies may be linked to slower disease progression, though the evidence is not conclusive. Though micronutrient needs for people living with HIV/AIDS are largely unknown, the recommendation is not to exceed two times the recommended daily allowance (RDA). The following levels of intake have been recommended. This information needs to be updated regularly as research findings are obtained.

- Vitamin A: 13,000-20,000 IU or 2-4 times the RDA (Vitamin A RDA = 5,000 IU)
- Vitamin E: 400-800 IU
- Vitamin B: High-potency vitamin B complex, e.g., B_{25} or B_{50} with niacin and B_6
- Vitamin C: 1,500-2,000mg
- Selenium: 200mcg
- Zinc: 1 RDA (12-19mg)

People with HIV should be informed that nutrient supplementation is only useful in combination with an adequate and well-balanced diet and can never replace the need for proper food intake. A multi-micronutrient nutritional supplement covering recommended daily allowance will help people with HIV maintain their nutritional status.

Adverse effects of nutrient supplements (slide 27)

Caution must be exercised when prescribing supplements to HIV-infected patients. Often patients take in too much, causing adverse effects such as diarrhea, nausea, and stimulation of viral replication (zinc, iron, and vitamins E and C) that hamper food consumption, absorption, or utilization. Special care must be taken when giving supplements, especially during pregnancy and breastfeeding. Excessive amounts of

certain nutrients (including vitamin A, vitamin E, zinc, and iron) impair rather than improve the immune system and can cause harm to mother and infant.

Food safety to prevent food-borne illness (slide 28)

Improper food handling can cause infection in anyone. For HIV-infected people, these food-borne illnesses can cause even greater damage because of their compromised immune systems.

To prevent food-borne infections, people with HIV/AIDS should practice safe food handling (e.g., washing hands, food, and utensils and cooking food thoroughly). A complete list of food eating and handling practices is provided in **Handout 3.2**.

Once contracted, food-borne illnesses may cause loss of appetite that may result in malnutrition. Food-borne illnesses are difficult to treat and may keep recurring.

Follow up and review (slides 29, 30)

Continuous, integrated follow up is necessary both at the health facility and at home for holistic treatment of the patient. The people doing the follow up should:

- Keep accurate client records
- Monitor nutritional and dietary indicators
- Ask about side effects from the use of drugs or ARVs
- Treat or refer and manage opportunistic infections and other infections
- Counsel to address barriers to good nutrition
- Offer support and encouragement
- Review and record changes in meal plans, exercise and drug regimes, and patients' nutritional and health status

Conclusion (slide 31)

Nutritional care should be part of a comprehensive HIV/AIDS program, which requires considering a broad range of factors to design and implement nutritional care and support interventions. HIV infection can affect patients' self–esteem, leading to depression, feelings of isolation, and lack of appetite. When HIV was first diagnosed, it appeared to be confined to groups who practiced socially unacceptable behaviors. This has led to stigmatization of HIV-infected people, causing them to lose their jobs or be denied medical care, housing, education, and inheritance. Stigma and discrimination have increased the spread of the disease, as people avoid being tested and, if they test positive, often deny their status and continue their high-risk behavior. People with HIV have the same human rights as everyone else, including the rights to privacy, freedom of association, and health care.

HIV/AIDS has had serious implications for household and community economic status. Households affected by HIV/AIDS have suffered loss of productive labor, income, and food reserves, with savings diverted to meet health costs. The rising demands of infected people reduce existing household resources. Emotional, spiritual, and social support is essential at such a time to maintain adequate health. Family and community support should be encouraged through quality support structures at policy and local levels. Quality support should be offered through counseling to promote voluntary testing and provide HIV-infected people with access to nutrition and ARV information.

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EXERCISE 3

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TASK 1: Divide students into pairs to discuss and list two key nutrition actions in the care and support of people living with HIV/AIDS.

TASK 2: Ask students to discuss issues to consider when designing or implementing nutritional care interventions for a given geographic area in the country. They should categorize the issues as social, economic, human rights, and quality of support systems. Ask students to consider these issues to identify interventions to make at the levels of policy, program, and household or individual to improve nutritional status.

TASK 3: Divide students into small groups to address the following case studies as practically as possible.

HANDOUT 3.1 Case studies in HIV and nutrition

Case study 1

You are working as a counselor in a local clinic. José, an HIV-positive business executive, has been having recurrent diarrhea for the past 2 months. He has a poor appetite, smokes a lot, and because of mouth sores prefers to eat cold food. José has heard of antioxidant micronutrients through advertisements by local groups. He wants to start taking antioxidants to help with HIV infection.

1. How do you use this information to assess José's nutritional status?
2. What assessments will you do?
3. What do you need to discuss with José regarding to his nutritional status?
4. What interventions, follow up, and review actions would you propose to José?

Case study 2

You are a manager of a rural local NGO whose mandate is to provide care and support for people living with HIV/AIDS. You meet Adam and his wife Eve, who are both HIV positive and asymptomatic. They have recently migrated from town to live in this rural farming community. While in town they had had regular laboratory tests to monitor their HIV status paid for by their employer, but the nearest HIV/AIDS service center to their present village is 25 kilometers away.

1. What should you discuss with Adam and Eve concerning their nutrition?
2. What issues would you discuss with them concerning their ability to attain their nutritional well-being and objectives in their rural home?
3. What follow-up actions would you discuss with them?

Case study 3

The international NGO you work for in a peri-urban community is interested in starting nutrition activities in its HIV/AIDS program. The program covers a population of 100,000, most of whom are casual laborers in the industrial area and some of whom do petty trading and hawking. Sanitation is poor. People with push-carts sell water to villages, pit latrines are shared among houses, and some homes keep small ruminants or poultry. The prevalence of HIV is estimated at 30 percent among women attending the antenatal clinic (ANC).

One of the two health units in this community is managed by the city council and the other by the Catholic mission. Each is staffed by a clinical officer, a midwife, and three nurses who run the units. Both offer routine out-patient (OPD) care and ANC services. Your NGO has recently introduced voluntary counseling and testing (VCT) in the city council clinic and is helping to provide condoms and TB drugs. The clinic has a referral system for ARV services with the district hospital 20 kilometers away. In addition to the OPD and ANC services, the mission clinic is working with Catholic Relief Services (CRS) to provide food supplements to homes with children below –2.5 standard deviance of weight for age. CRS also offers food to homes with terminally sick people. The mission clinic offers better-quality services than the city council health unit, but you do not want to work with it because it does not want to distribute condoms and insists on charging a “minimal” fee for services.

Your colleagues include the manager of this NGO and the senior staff. You have just agreed that you need a consultant to help make *practical* recommendations on how to integrate nutrition activities into your existing program. As a group, prepare the scope of work for the consultant.

1. What are the objectives of the job and key questions you want answered?

2. What issues does the consultant need to be aware of?

3. What are the expected outputs?

HANDOUT 3.2 Safe Food Handling Practices

Students can use this handout when role-playing to counsel clients on safe food handling practices.

Wash hands thoroughly before preparing, handling, and eating food and after using the toilet or changing diapers or nappies	Keep food covered and stored away from insects, flies, rodents, and other animals
Wash and keep food preparation surfaces, utensils, and dishes clean	Use safe (boiled or bottled) water for drinking, cooking, and cleaning dishes and utensils
Wash all fruit and vegetables with clean water before eating, cooking, or serving	Do not eat moldy, spoiled, or rotten food
Avoid letting raw food come into contact with cooked food	Do not eat raw eggs or foods that contain raw eggs
Ensure all food is cooked thoroughly, especially meats and chicken	Serve all food immediately after preparation, especially if it cannot be kept hot
Avoid storing cooked food unless you have access to a refrigerator	Do not use bottles with teats to feed infants; use a cup instead

SESSION 4 FOOD SECURITY COMPONENTS IN HIV/AIDS NUTRITIONAL CARE AND SUPPORT

Purpose

The purpose of this session is to help students understand how food insecurity constrains nutritional care and support and give them knowledge about approaches to optimize nutritional care and support in the context of food insecurity.

Learning objectives

By the end of the session, students will be able to:

- Explain the three dimensions of food security
- Understand and describe the relationship between HIV/AIDS and food insecurity and the impacts each has on the other
- Identify the effects of food insecurity on nutritional care and support capacity
- Describe interventions and tools that can be used to address and account for food security constraints on nutritional care and support

Prerequisite knowledge

- Basic knowledge of HIV/AIDS in Africa (e.g., Session 1)
- Basic counseling skills

Estimated time: 120 minutes excluding time for field work

Outline

Content	Methodology	Timing
1. Rationale 2. Food security components and nutritional care and support • Availability, access, and utilization. • Nutritional care and support and utilization • Access and availability constraints to nutritional care and support. • Factors affecting food security 3. HIV/AIDS and food security • Scope of the problem • Relationship between HIV/AIDS and food insecurity ○ Special aspects of HIV/AIDS-food security dynamic ○ How HIV/AIDS affects food availability and access ○ How food access and availability affect HIV/AIDS ○ Interventions to address HIV/AIDS and food security	Facilitate interactive lecture using **PowerPoint 4** presentation Facilitate questions and answers (to master concepts) At the appropriate moment distribute **Handout 4**	
4. Food security constraints to nutritional care and support. Constraints relate to: • Infant feeding and PMTCT • Pregnant and lactating women • Management of drug and food interactions • Nutritional management of symptoms		

Content	Methodology	Timing

5. Implementing effective nutritional care and support in the face of food security constraints
• Assessment
  ○ Understanding the sources of food insecurity
  ○ Identifying key foods and nutrients for which access gaps exist
  ○ Identifying capacities and options
• Selection of Options
  ○ Identifying alternate dietary practices and options that are feasible.
  ○ Increasing food security
  - Links/referrals to services
  - Adjusting expenditure allocations
  - Intra-household food allocations and practices
  ○ Involving people living with HIV/AIDS, caregivers, and household members
• Follow-up
 	
6. Conclusions
	At the appropriate time, distribute **Handout 4**
	
	Use **Exercise 4** to conduct some of the role plays/group work given available time
	
	Refer students to some of the suggested reading materials	

Required materials

1. LCD or overhead projector

2. Flipchart stand and paper, writing pens, or board

Recommended preparation

- Be familiar with **Lecture Notes 4:** HIV/AIDS, Household Food Security, and Nutritional Care and Support and **Handouts 4.1** and **4.2**.

- Be prepared to divide participants into pairs for the role-plays and group work in **Exercise 4**. Use foods and situations appropriate for the country context.

Materials provided

PowerPoint Presentations

- **PowerPoint 4**/overhead presentation: Food Security Components in HIV/AIDS Nutritional Care and Support

Handout

- **Handout 4**: Steps for Addressing Food Security in the Nutritional Care and Support Counseling Process

Additional resources on CD

- HIV/AIDS Mitigation: Using What We Already Know

- A Review of Household and Community Responses to the HIV/AIDS Epidemic in Rural sub-Saharan Africa

- Effective Food and Nutrition Policy Responses to HIV/AIDS: What We Know and What We Need to Know

Suggested reading materials

Barnett, T, and G Rugalema. 2001. HIV/AIDS: A critical health and development issue. In The unfinished agenda: Perspectives on overcoming hunger, poverty, and environmental degradation, session 7. Washington: International Food Policy Research Institute (IFPRI).

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LECTURE NOTES 4: FOOD SECURITY COMPONENTS IN HIV/AIDS NUTRITIONAL CARE AND SUPPORT

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Introduction

The food insecurity commonly faced by HIV/AIDS-affected households can make it difficult for people living with HIV/AIDS to practice appropriate nutritional care and support. Service providers who understand a household's specific food security situation, the constraints on care and support options caused by insufficient food availability and access, and the mechanisms to address these constraints can offer feasible and more effective nutritional care and support interventions.

Purpose (slides 2, 3)

The purpose of this session is to give students an introduction to the constraints posed by food insecurity on nutritional care and support for people living with HIV/AIDS and approaches to implementing this care and support in food-insecure contexts. The session:

- Describes the dimensions of food security
- Outlines the relationship between HIV/AIDS and food insecurity
- Describes the effects of food insecurity on nutritional care and support to people living with HIV/AIDS
- Discusses ways to implement nutritional care and support in the face of food insecurity

Food security components and nutritional care and support (slide 4)

Nutritional care and support of people living with HIV/AIDS depends on the availability, accessibility, and utilization of food, which in turn are affected by external, internal, and household social, economic, and cultural factors.

Availability, access, and utilization (slides 5, 6)

USAID (1992) defines food security as a situation in which "…all people at all times have both physical and economic access to sufficient food to meet their dietary needs for a productive and healthy life." Achieving food security requires sufficient physical supplies of food, adequate household access to these food supplies, and appropriate use of food to meet people's specific dietary needs. The USAID definition involves three distinct but interrelated aspects of food security: food availability, food access, and food utilization (slide 7).

Food **availability** is achieved when sufficient quantities of food are consistently available to all people in a country or region. Such food can be supplied through household production, other domestic output, commercial imports, or food assistance.

Food **access** is ensured when households and all people in them have adequate resources to obtain appropriate foods for a nutritious diet. Access depends on income available to the household, the distribution of income within the household, and the price of food.

Food **utilization** is the proper biological use of food, which requires potable water, adequate sanitation, a diet that provides sufficient energy and essential nutrients, and knowledge within the household of food storage and processing techniques, basic principles of nutrition and proper child care, and illness management (USAID 1999; Bonnard et al 2002).

Similar definitions of food security and conceptual frameworks have been developed by other agencies.[1] Information in this session is organized using the USAID definition.

Nutritional care and support and utilization

Nutritional care and support for people living with HIV/AIDS is part of the utilization component of food security. It enables people living with HIV/AIDS to obtain the energy and nutrients to meet their nutritional needs, manage symptoms, prevent weight loss, maintain optimal nutritional status, and support immune function. This requires a combination of appropriate dietary behaviors, hygiene and symptom management, availability of and access to food, and knowledge about nutritional needs.

HIV, ensuing opportunistic infections, and medications can all increase the body's nutritional needs, inhibit nutrient absorption, or reduce food intake. This makes the utilization dimension of food security critical, as biological use of food is impaired by these HIV-related factors. Appropriate dietary and nutritional behaviors can help mitigate these problems, strengthen nutritional status, and manage symptoms (slide 8).

As described in other sessions of this module, nutritional care and support involves interventions such as dietary changes to ensure increased consumption of key nutrients required to address the virus or to complement medications; more frequent feeding to maintain consumption in the face of anorexia, nausea, or other side effects; and special food preparation to address symptoms (e.g., soft foods for thrush or mouth sores). For more information on nutritional management of symptoms, refer to Session 5.

Access and availability constraints to nutritional care and support (slides 9, 10)

The capacity to implement effective nutritional care and support depends on food availability and access. Sufficient quantities of a variety of nutritious foods must be steadily available, and households and people living with HIV/AIDS must have the resources to access an adequate quantity and variety of such foods. Limited availability of and access to nutritious foods constrains the capacity of many HIV/AIDS-affected households to implement nutritional interventions to strengthen the health and nutritional status of infected people. Furthermore, nutritional care and support often requires substantial time commitment from household members and caregivers, and households face competing demands on time for food production and income-generating activities.

In this session “food security constraints” refers to limitations in food availability and access that impede proper nutritional care and support. Utilization is also a fundamental component of food security, but because food utilization is inherent in nutritional care and support (i.e., nutritional care and support itself addresses food utilization), the “external” food security constraints in this session refer only to food access and food availability. Certain aspects of food utilization, such as poor quality water supplies, can also externally constrain nutritional care and support.

Reduced labor availability of both HIV-infected people and caregivers in the household, sale of productive assets such as a goat or a dairy cow to pay for health care or basic necessities, and external non-HIV/AIDS-related factors such as weather or conflict can all decrease household and community food production. This reduced **availability** of food constrains the capacity for nutritional care and support by limiting the quantity and variety of food available for consumption.

Within households, HIV/AIDS often leads to loss of income, sale of assets, and depletion of savings and food reserves to pay for health care, compensate for lost labor, and maintain expenditure levels on basic needs. These responses can all diminish household **access** to food, and nutritional care and support depends on the capacity to access a variety of nutritious foods continuously.

Practitioners who provide nutritional care and support guidance and recommendations should recognize and identify the specific food security constraints that may keep a household or individual from accessing nutritional care and support. Based on this recognition, practitioners can work with clients and caregivers to identify dietary recommendations that are feasible within their constraints, as well as actions and services that can help mitigate the food insecurity.

Factors affecting food security (slide 11)

Factors that negatively affect a household’s or individual’s food availability or food access can be divided into four categories:

- **Individual-level constraints** such as food habits, reduced capacity to eat because of infection symptoms, level of knowledge of the benefits of proper feeding, and psychosocial factors such as depression

- **Household-level constraints** such as lack of production and purchasing power, inequitable intra-household distribution, lack of knowledge about nutritional needs and dietary practices, food taboos, and changes in prioritization among household members as a result of disease

- **Constraints external to the household** such as seasonal variation in production, price fluctuations, social stigma, market availability, legal issues, and social customs

- **External shocks** such as droughts, floods, or conflict

HIV/AIDS and food security (slide 12)

HIV/AIDS can cause and increase food insecurity, and food insecurity can increase vulnerability to HIV infection and the impact of HIV/AIDS. This section examines the reciprocal effects of HIV/AIDS and food security.

Scope of the problem (slide 13)

UNAIDS and WHO (2002) report that at the end of 2002 approximately 42 million people were infected with HIV/AIDS, of which over 29 million were living in sub-Saharan Africa. The adult prevalence rate was greater than 10 percent in 16 sub-Saharan African countries and 20 percent or higher in 7 of these countries (UNAIDS 2002; U.S. Bureau of the Census 2002). Many of the most severely affected communities and households in these countries were already food insecure before HIV/AIDS struck. HIV/AIDS increases the severity and frequency of food insecurity within households and creates food insecurity among previously food secure households and people.

Data from Zimbabwe and Ethiopia illustrate the impact of HIV/AIDS on household food consumption and production. A study in Zimbabwe (Kwaramba 1997) found that after a death in the household from HIV/AIDS, household crop production fell by 37 percent-61 percent (61% for maize, 49% for vegetables, 47% for cotton, and 37% for groundnuts). In Ethiopia a study showed that HIV/AIDS-affected households spent an average of 11.6-16.4 hours a week on agricultural work, compared with 33.6 hours a week spent by non-HIV/AIDS-affected households (UNAIDS 2002).

HIV/AIDS attacks food security not only by reducing food production but also by diminishing income and savings. Data from urban households in Côte d'Ivoire (Alban and Guiness 2000) show that the monthly per capita income in households with a member living with HIV/AIDS is approximately 65 percent less than that of the general population, and that HIV/AIDS-affected households have average *dissavings* of nearly 5,000 francs CFA, compared with average *savings* of approximately 2,000 francs CFA for the general population (slide 14).

By depleting human, financial, and physical capital, HIV/AIDS increases vulnerability to other shocks, such as droughts or conflict. When such shocks occur, the coping capacity of HIV/AIDS-affected households is seriously impaired because food and money reserves have already been depleted, productive assets may have been sold, and alternative earning capacity is limited by illness and care-giving responsibilities. For example, UNAIDS has reported that the impact of the 2002 drought in southern Africa was worsened by reduced household capacity to perform agricultural labor because of HIV/AIDS. The drought's severe consequences are an example of how HIV/AIDS worsens the impact of other shocks. In many cases the food security impact of HIV/AIDS is broader than the direct effects of illness.

Relationship between HIV/AIDS and food insecurity

HIV/AIDS affects all three components of food insecurity-availability, access, and utilization. Nutritional care and support interventions mitigate the disease's impact on food utilization by strengthening the biological use of food to manage symptoms and strengthen immune function. The other sessions in this module describe how HIV/AIDS affects nutritional status and food utilization and how care and support interventions can address these impacts. This section examines the relationship between HIV/AIDS and food availability and access.

Special aspects of the HIV/AIDS-food security dynamic (slides 15, 16)

While in certain respects the HIV/AIDS pandemic has an impact on food security similar to that of droughts, floods, conflict, and other shocks, the dynamic between HIV/AIDS and food security is unique in the following ways:

- Unlike most food security shocks, which may last for a single season or a single year, HIV/AIDS continues to erode food security year after year (Bonnard 2002).

- HIV/AIDS attacks people-both women and men-during their most productive years, weakening and killing the strongest producers of food and income (Haddad and Gillespie 2001).

- Unlike many other food security shocks, HIV/AIDS creates *additional* nutritional needs among infected people, widening the gap between food needs and food access.

- The stigma attached to HIV/AIDS may inhibit people or households from seeking assistance and hinder community efforts to address the impacts or prevent further spread (UNIADS 2002).

- The scale of the pandemic is larger than most food security shocks, affecting entire countries and regions and with high prevalence rates within communities.

- The time between infection and symptoms is often several years, leading to greater spread of HIV/AIDS in the interim. Recognition of the scale and impact of HIV/AIDS may not occur until prevalence is already high, limiting and delaying the establishment of coping strategies to deal with food security impacts (UNAIDS 1997).

Food insecurity itself can lead to adoption of riskier behaviors (e.g., migrant labor, transactional sex) by food-insecure household members, which may increase the prevalence of HIV/AIDS. This sets up a dynamic in which the shock's food security impact itself can worsen the scale of the shock.

Effects of HIV/AIDS on food availability and access (slide 17)

HIV/AIDS significantly impedes the food security of affected people, households, communities, and entire regions by decreasing-often drastically-the labor, income, assets, food reserves, savings, information exchange, institutional support, and community safety nets available to affected households. Gillespie, Haddad, and Jackson (2001) analyze the impact of HIV/AIDS on agriculture and livelihoods by looking at the ways the disease diminishes four types of capital (slide 18).

- **Human capital:** Reduced productivity and lost labor as a result of illness and death of infected people and to increased time demands on caregivers, lost knowledge transfer between generations, and lack of education of children unable to attend school because of caregiving or earning responsibilities

- **Financial capital:** Health and funeral expenses, reduced income from less productive or lost labor, sale of assets, dissavings, and loans to affected households

- **Social capital:** Reduced access to formal and informal networks and support systems because of stigma, overburdened support systems, depleted capacity to respond to begging or borrowing, declines in institution membership because of illness and death, and diminished incentives to cooperate for future benefits because of impending illness or death

- **Physical and natural capital**: Sale of productive equipment or land, sale of household assets (e.g., furniture), and loss of property rights by widow- or child-headed households or other survivors

Barnett and Blaikie (1992), Hunter et al (1993), Rugalema (1999), and Barnett and Halswimmer (1995) have shown that HIV/AIDS significantly damages farming systems. The results are "significant reduction in land use, declining crop yields, changes in cropping patterns, reduction in the range of crops and diminished crop enterprise diversity, which can result in a poorer diet, lower economic returns, loss of soil fertility and a decline in livestock activities" (CGIAR 2001).

In response to food security shocks, **households** often look to the community and to other households to help meet consumption needs. But with an increasing number of households affected and with people infected during their most productive years, community safety nets weaken and community resources diminish. Many **communities** face prevalence rates significantly higher than the already high national rates, and existing coping strategies often fail. Orphans and vulnerable children, who under other circumstances would be supported by communities or extended families, are often left to fend for themselves and are particularly vulnerable to food insecurity.

Faced with other types of food security shocks in the past, communities often have coping strategies to deal with food-insecure periods. While some of these coping strategies can be used in the face of HIV/AIDS, the distinct nature of the disease may render them ineffective. In many communities HIV/AIDS has only recently been recognized as a threat to food security, and specific coping strategies are often not in place to deal with the disease's impact.

Intra-household food distribution may favor healthy members at the expense of HIV-infected people who are no longer productive or are dying. In some cases people living with HIV/AIDS may deliberately reduce their food intake so other household members can consume more. Stigma can also contribute to uneven allocation of food or other resources, either within or among households, which further reduces people living with HIV/AIDS access to food.

As mentioned above, HIV/AIDS can also make communities more vulnerable to external shocks and further aggravate their impact. HIV/AIDS-affected households have diminished food and financial reserves, less effective coping strategies, and less earning capacity than other households to meet food needs in the face of drought, conflict, or other shocks. Table 1 in Bonnard (2002) provides specific examples of how HIV/AIDS can negatively affect the productive factors that underlie food security.

People living with HIV/AIDS require additional nutrients to help mitigate the physical impacts of the disease, but HIV/AIDS reduces their access to food. Efforts and interventions to provide nutritional care and support must account for and, where possible, directly address these access constraints.

How food access and availability affect HIV/AIDS (slide 19)

In some cases food insecurity leads people to adopt behaviors and livelihood strategies that put them at greater risk of HIV infection. Food-insecure populations are often the most vulnerable to the disease and its impacts. For example, household members may resort to commercial or transactional sex to earn money for food and basic necessities, thereby increasing the risk of infection to themselves, their spouses, and any future children. Members of food-insecure households may be more likely to work as migrant laborers to increase income, which may also lead to greater exposure to the virus.

Food-insecure populations may also lack access to education and materials, such as condoms, needed to prevent infection. Conflict, which often worsens food insecurity, can also increase vulnerability to HIV/AIDS infection because of forced migration of populations, sexual assault, disruption of support services and prevention efforts, and high HIV prevalence among and transmission by soldiers. The UN Interagency Standing Committee Task Force for HIV/AIDS in Emergency Settings is developing guidelines on HIV/AIDS in such situations.

The impact of HIV/AIDS is also more severe for food-insecure households. Such households are often less able to access and afford health care services for infected people. Households may be forced to choose between spending money on food or on health care. With less access to formal coping strategies such as insurance, food-insecure households rely more on family, friends, and community (Gillespie et al 2001), which becomes an increasingly weak support system as more and more households are themselves affected by the disease.

Interventions to address HIV/AIDS and food security (slide 20)

The interaction between HIV/AIDS and food security has been recognized relatively recently, and interventions to address this issue continue to emerge. While these interventions are too recent for their results to yield solid lessons, much can be learned from general food security interventions. Table 2 in Bonnard (2002) presents a range of possible interventions to address the impact of HIV/AIDS on productive factors that underlie food security.

Food aid can be an effective instrument to address food insecurity caused by HIV/AIDS. However, food aid needs to be programmed so as not to create disincentives for local production of food and not to create beneficiary dependence on food aid. Planners of food aid interventions should aim to use food resources to build the coping capacities of communities and households, in addition to meeting short-term food needs.

Food assistance can be used to directly increase food insecure households' access to food through safety net programs; to support agricultural activities through food-for-work programs; to support training programs in vocational and income-generating activities; and to encourage school attendance by orphans and vulnerable children, which can strengthen long-term food security.

Food aid programs targeting households affected by HIV/AIDS should consider the particular nutritional needs of people living with HIV/AIDS in designing rations. More information on planning food aid programs and rations for HIV/AIDS-affected populations is available in Potential Uses of Food Aid to Support HIV/AIDS Mitigation Activities in Sub-Saharan Africa (FANTA 2000) and Module 6 of HIV/AIDS: A Guide for Nutrition, Care and Support (FANTA 2001).

Agricultural extension and introduction of new technologies to reduce labor requirements can help maintain or improve agricultural productivity in the face of declining labor. For example, a USAID project has developed a drip irrigation system for HIV/AIDS-affected households in Zimbabwe that reduces the labor needed for irrigation by 50 percent.[2] Microfinance can support the maintenance or purchase of productive assets, help smooth income flow, and enable households to meet key food, health care, and other basic expenditures. While small loans can enable affected households to increase income, savings, and food access, microfinance interventions may need to be designed with special features in the context of HIV/AIDS to deal with challenges such as ill borrowers. For example, a microfinance program in Zimbabwe instituted a mandatory insurance fee to cover the cost of outstanding loans from borrowers who die (Horizons 2002).

Capacity building of networks and community support organizations can help address the erosion of institutions, support linkages with services, and maintain knowledge. Often networks and organizations already exist, although they may be weakened by the spread of HIV/AIDS in communities. Capacity building may involve training, strengthening the support that groups offer to HIV-affected households, developing coordination mechanisms between groups and services, and providing outreach to new community members and population groups.

Nutritional care and support practitioners should be aware of services to help strengthen food access and availability and when possible link and refer clients to them. Session 5 discusses approaches other than formal services, such as household strategies and allocation of food expenditures.

Food security constraints to nutritional care and support (slides 21, 22)

Poor food access and availability at the individual or household level can impede capacity to implement optimal nutritional responses to HIV/AIDS. This section discusses how food insecurity limits capacity to meet the specific nutritional needs of HIV/AIDS-affected people. These needs correspond with specific topics in this module. As each topic is discussed in greater detail in its separate session, it will be helpful to consider the practical food security constraints. The next section discusses how counselors and care providers can address and deal with these constraints when providing nutritional care and support.

Infant feeding and PMTCT

In the context of infant feeding and the prevention of mother-to-child transmission of HIV (PMTCT), food security issues pertain to replacement feeding options and complementary feeding for children over 6 months. For more information on infant feeding and PMTCT, refer to Session 7.

Replacement feeding and food security (slide 23)

A critical factor in determining whether HIV-infected mothers replacement feed or exclusively breastfeed their children from 0-6 months is access to affordable breastmilk substitutes (e.g., animal milk or formula) and facilities for their hygienic preparation (e.g., water and boiling tools).

For HIV-infected mothers of children 0-6 months, WHO recommends exclusive replacement feeding only if it is acceptable, feasible, affordable, sustainable, and safe. Four of these five factors-feasibility, affordability, sustainability, and safety-are related to food security. For many mothers the feeding decision is determined by their access to the necessary foods or facilities. Counseling to support HIV-infected mothers in infant feeding choices should combine information about feeding options and safe practices with consideration of the realities and constraints of each mother's food security situation.

If HIV-infected mothers are breastfeeding their children, WHO recommends that **once children of HIV-infected mothers reach 6 months of age**, or earlier if possible, mothers cease breastfeeding and begin replacement feeding. For this to occur, mothers must have access to the required foods and facilities. A common

reason that many HIV-infected mothers continue to breastfeed their children after 6 months, thereby increasing the risk of mother-to-child transmission, is their inability to afford replacement feeding options.

To facilitate a successful transition from exclusive breastfeeding to replacement feeding and to complementary feeding (see below), service providers must support mothers in addressing the food security constraints impeding their transition. Specifically, priority must be placed on access to breastmilk substitutes for children under 6 months and access to breastmilk substitutes and adequate sources of complementary foods for children over 6 months. This may involve providing linkages to safety net services or food aid or helping to plan reallocation of household expenditures to afford these items.

Complementary feeding and food security (slide 24)

Practicing proper complementary feeding of children between the ages of 6-24 months and obtaining adequate nutritious foods for complementary feeding are challenges to many poor households, even outside the context of HIV/AIDS. The disease exacerbates this challenge by diminishing household resources and may create the need for complementary foods with higher levels of micronutrients (e.g., iron, zinc, vitamin A, vitamin C, and folic acid) than are contained in some breastmilk substitutes. Complementary foods need to be protein-calorie dense and contain sufficient levels of macronutrients. Because it is recommended that HIV-infected mothers not breastfeed their children past 6 months of age and because some breastmilk substitutes such as cow's and goat's milk lack key nutrients contained in breastmilk, accessing complementary foods containing these nutrients is critical.

To support appropriate complementary feeding of children of HIV-infected women, merely providing information to mothers and caregivers about nutritional requirements and food types may be insufficient. In addition to understanding the knowledge and behavior constraints, counselors and service providers need to understand the food security constraints that inhibit proper complementary feeding. Based on this information, they can help mothers identify feasible options within these constraints. Such options may include seeking fortified foods where possible, providing referrals for food assistance or other safety net services, and helping to identify which available foods are optimal for complementary feeding.

Pregnant and lactating women (slide 25)

Pregnant and lactating women have additional protein, energy, and micronutrient needs, and those living with HIV/AIDS need higher levels of energy than those who are not HIV/AIDS affected (for more information on specific requirements and recommendations, refer to Session 6 of this module). However, external and intra-household factors mean that many pregnant and lactating women living with HIV/AIDS lack access to sufficient quantities of foods containing these nutrients. Therefore, knowledge of the need for additional nutrients and even of the best locally available foods to consume will not necessarily lead to improved nutritional practices.

Counselors or service providers need to understand the specific food security constraints that prevent women from following recommendations to be able to identify feasible options to meet their nutritional needs. For pregnant or lactating women, intra-household issues (stigma, women's status and decision-making power, intra-household food distribution, and income access) as well as external factors may contribute to food insecurity. In such cases, counselors may need to facilitate greater understanding in the household about the infected women's nutritional needs and the importance of supporting her dietary habits and other care.

Management of drug and food interactions (slide 26)

Medications to treat HIV and opportunistic infections often require specific complementary food responses to alleviate side effects, improve efficacy, maintain nutritional status, and ensure continued adherence to the drugs. Session 9 offers guidance and specific recommendations about these issues.

Many people living with HIV/AIDS, however, cannot follow optimal food and nutrition recommendations because they cannot access the foods required. For example, vitamin B_6 supplements are recommended for people taking Isonazaid to treat tuberculosis because the drug inhibits the metabolism of vitamin B_6 (FANTA 2001). In limited-resource settings many people living with HIV/AIDS may lack access to such supplements. Service providers can help people living with HIV/AIDS access supplements through health facilities and recommend locally available, affordable, and acceptable foods rich in vitamin B_6, such as sweet potatoes, white beans, maize, oil seeds, green leafy vegetables, meat, and fish.

By impeding effective management of drug and food interactions, food insecurity can lead to poorer nutritional status, aggravated side effects, and in some cases reduced drug efficacy. These outcomes in turn can lead to poor medication adherence, as people living with HIV/AIDS unable to access the foods needed to complement a medication may stop taking the drug mid-course. This has serious implications both for the individual, whose health will likely decline following termination of the medication, and for others in the household and community, as poor adherence can lead to resistant strains of infections or viruses, including tuberculosis and HIV. Rapid deterioration of the individual's health can also lead to more severe declines in household food security because of lost labor and productivity.

Counselors and service providers who offer guidance on management of drug and food interactions should help clients identify factors that might prevent them from following recommendations and help address these constraints by identifying foods and schedules suitable for the specific medications.

Nutritional management of symptoms

Session 5 offers information and recommendations for nutritional management of symptoms common among people living with HIV/AIDS. Food insecurity can impinge on the capacity to follow these recommendations. For example, patients with anemia need foods rich in iron, and patients with thrush need soft, mashed foods. The lack of such foods makes households and people less able to meet these dietary needs, resulting in poorer symptom management. Nutritional care and support efforts need to account for food security constraints by working with clients to identify feasible options for symptom management based on available foods.

Implementing effective nutritional care and support in the face of food security constraints (slides 27, 28)

Given the food security constraints described above, it is important for counselors, service providers, and others who provide nutritional care and support to account for and address food access and availability factors. Unless nutritional counseling is informed by an understanding of the specific food security constraints affecting clients, it may fail to offer practical, feasible options for people living with HIV/AIDS to improve their health and nutritional status.

Implementation of nutritional care and support through counseling can be organized into three stages: **assessment**, **option selection**, and **follow-up**. Food security issues can be addressed and integrated in each of these stages. **Handout 4** outlines steps to integrate food security issues into nutritional care and support counseling sessions.

Assessment

The first stage of nutritional care and support interventions is the assessment. This gives counselors an opportunity to assess food access gaps, sources, and options.

Understanding the sources of food insecurity (slide 29)

A nutritional care and support assessment consists primarily of determining the client's nutritional needs based on nutritional status, progression of the disease, opportunistic infections, symptoms, and medication. At this stage it is also critical to assess the client's current food and nutrition practices and factors that may prevent the client from adopting recommended practices.

Lack of knowledge may be addressed by education and counseling. Other factors may include lack of financial or physical capacity to purchase or produce sufficient quantities of required foods, intra-household food distribution that favors non-HIV-infected people, or food taboos such as those for pregnant women. A number of common constraining factors are listed above.

Identifying these constraints will require discussing general household issues such as overall food provisions from all sources, expected harvest of specific crops, employment and sources of income, and status of other household members. Understanding the approaches a household is using to maintain food security involves asking the following questions:

- What coping strategies are the household and community using and how adequate are they?

- What support networks exist and how adequate are they?

- What strategies used in the past are no longer possible in the context of HIV/AIDS?

- Which coping strategies are having negative effects (e.g., sale of assets, risky lifestyle activities)?

- What components need to be supported and built up and how?

The objective of this process is to better understand the household's food security situation, strategies to maintain or improve the situation, and opportunities that can be supported or enhanced. Counselors need to broach these topics in addition to discussing the clients' health status to understand the sources of food insecurity and help clients identify and address these factors.

Assessments focus on improving the counselor's knowledge of client feeding practices and of the underlying factors that could constrain or motivate the clients to improve their diet. Understanding the specific nature of these factors is critical to provide appropriate guidance and help clients identify feasible options for nutritional responses.

Identifying gaps in access to key foods and nutrients (slide 30)

An understanding of nutritional needs and food security constraints should make it possible to identify foods and nutrients the client is not consuming in sufficient quantities because of poor access and availability. An effective assessment identifies these gaps and the causes of sub-optimal consumption. When lack of knowledge or difficulty in eating as a result of HIV/AIDS symptoms cause low consumption, education and suggestions of new dietary practices to ease symptoms may be sufficient to enable improved intake. In other situations poor food availability or access is the cause.

Assessments will be client specific. Individual nutritional needs vary to some extent depending on the stage of disease, medications taken, and opportunistic infections and symptoms. Reasons for failing to meet nutritional needs also vary. For example, an HIV-infected person or a caregiver may have access to relatively plentiful quantities of energy- and nutrient-rich food but be unaware of the need to eat more of it. Another person infected with HIV may not be able to afford greater quantities of energy- and nutrient-rich food (which may be more expensive than less nutrient-dense staple foods). Still another may not have the status in the household to

demand these foods. A good assessment allows the counselor to understand a client's specific situation and constraints.

Identifying capacities and options (slide 31)

Knowing which nutrients and foods a client needs more access to and what factors constrain this access enables the counselor to work with the client to identify feasible options for nutritional care and support.

An important part of an assessment is identifying the capacities of the client and household members to address food security constraints and supporting improved nutritional practices within these constraints. For example, an older child may be able to support a sick parent by ensuring they follow a regimen of frequent feeding. It is also important to recognize which capacities carry opportunity costs. For example, playing a care-giving role may prevent a child from attending school or earning income.

There may be potential for refining existing coping strategies to address specific nutritional needs. Households that produce tubers and cereals can allocate some space to grow vegetables rich in micronutrients. Such vegetables can complement foods high in energy to meet the specific micronutrient needs.

Based on clients' needs and capacities, counselors work with clients to identify options to strengthen their capacity to implement nutritional care and support. This process, building on the specific food security situation, identifies options to improve access to required foods; examples of such options are discussed in the next section. It is critical to work with clients, caregivers, and possibly other household members to identify options for improving food security and maximizing nutritional care and support within specific household constraints.

Selection of options

Based on the assessment, counselors work with clients to select appropriate and feasible options from among those identified to improve dietary practices. The counseling process should integrate nutritional recommendations with a) guidance about how to adopt these recommendations within a household's food security constraints and b) support for needed measures to strengthen food security. Informing clients about nutritional needs and recommended dietary practices alone

is not sufficient. Recommendations need to be practical, and support is needed to enable application of recommendations.

Identifying feasible alternate dietary practices and options (slide 32)

A critical aspect of counseling is working with clients to identify feasible ways to follow nutritional care and support recommendations. Poor food availability and access prevent many people living with HIV/AIDS from adopting optimal nutritional responses to HIV, opportunistic infections and symptoms, and medication. In such cases it is essential to find alternate dietary practices that are possible within the specific constraints.

Identifying optimal feasible alternatives requires understanding the client's specific nutritional needs and food security constraints, as well as knowledge of locally available foods. When recommended foods are not available or accessible for economic, seasonal, or other reasons, it is important to find locally available substitutes.

In some cases this process will involve second-best or third-best options such as finding available, affordable foods that do not provide the full levels of nutrients required but still provide more than the existing diet. If the schedule of other household members does not allow optimal frequency of feeding, a second-best option may be to develop a schedule that still enables greater frequency than usual and includes meals with medication as needed.

Increasing food security (slide 33)

Counselors and service providers should seek opportunities to support households in directly improving food availability and access. In addition to strengthening household livelihood and mitigating the impact of HIV/AIDS, improved food security also enables stronger nutritional care and support.

<u>Links and referrals to services</u>

One way to support clients in improving food availability and access is to link them with services that address household livelihoods and food security. Health and nutrition counselors and service providers can refer clients to programs for food aid, safety nets, or other services.

Counselors should be aware of and in touch with relevant programs that cover the geographic areas where they work. It is important to work with program managers operating these services to agree on criteria for participation to ensure that elgible beneficiaries are referred. In some cases it may be necessary to establish a formal link between the nutrition services and livelihood or safety net programs to avail referrals; in other cases informal information exchange may suffice.

Adjusting expenditure allocations

Even without external resources, households can often reduce the food security constraints impeding nutritional care and support to some extent. For example, household food expenditures can be reallocated to increase purchase of foods energy-rich foods needed by people living with HIV/AIDS or foods helpful for managing symptoms (e.g., soft foods for oral thrush). The Minnesota International Health Volunteers community program in Uganda works with people living with HIV/AIDS to help them plan their food budgets. Emphasis is placed on increasing the proportion of energy- and nutrient-dense foods relative to staple foods that are not nutrient dense.

Intra-household food allocation and behaviors

Intra-household allocation of food can limit the capacity of people living with HIV/AIDS to access the quantity and diversity of foods needed for effective nutritional care and support. This is especially the case when poor households choose to allocate lower quantities or poorer quality food to people living with HIV/AIDS as a result of stigma, their poor productivity, or the perception that spending resources on someone who will die soon is wasteful. Counselors and service-providers can help facilitate changes in intra-household food allocation and emphasize the benefits of proper nutrition for people living with HIV/AIDS and their families and communities. Home-based care settings offer a strong opportunity for such interventions.

Simple adjustments to household food practices can also enhance the capacity for nutritional care and support. Such adjustments include changing meal practices and schedules to accommodate more frequent feeding for people living with HIV/AIDS.

Involving people living with HIV/AIDS, caregivers, and household members (slide 34)

People living with HIV/AIDS and to some extent caregivers and other household members have the best knowledge of existing options and relevant constraints. These people ultimately will choose whether to implement and continue dietary recommendations and therefore must believe the nutritional recommendations are credible and feasible. Therefore, it is critical to involve these stakeholders at all stages of the processes described above. For example, to assess the food security situation and identify opportunities to strengthen it, counselors should discuss the questions and issues mentioned above (under "Understanding the sources of food insecurity") with clients, caregivers, and household members. Successful counseling must fully involve these people at all stages-assessing needs, identifying constraints and underlying factors, identifying capacities and options, selecting approaches, and planning implementation of these approaches.

Follow up (slide 35)

Follow up to nutritional counseling focuses on examining how many of the recommended practices are followed, what changes in health and nutritional status are evident, and what further support is needed. Follow-up sessions should also assess whether food security constraints have been addressed, what remaining or new food security issues impede nutritional care and support, and what further measures may be needed to address these issues and strengthen the capacity for nutritional care and support.

Follow up may indicate that new approaches are required. For example, if a client shows strong knowledge of nutritional needs but is unable to follow them because of the household's declining earnings, further nutrition education may be less useful than other approaches focused on food access, such as household budgeting exercises, prioritizing food needs to facilitate optimal food expenditure and diet within the household's budget, or referrals to safety net resources or services to strengthen livelihoods.

Conclusion (slide 36)

The capacity to implement effective nutritional care and support depends heavily on household food security. Information about optimal nutritional practices is often not sufficient to enable people living with HIV/AIDS to improve their health and nutritional status. Providers of nutritional care and support need to assess clients' food security situations and underlying factors, identify feasible dietary options within the food security constraints, and where possible help address the sources of food insecurity through referrals or linkages to programs and through improved household practices and strategies.

The remaining sessions of this module focus on specific dimensions of nutritional care and support. Successful implementation of each of these dimensions is undermined by food insecurity. Each nutritional recommendation and intervention requires consideration of specific food security constraints and options to address these constraints. Considering the food security issues laid out in this session will enable stronger practical application of each topic's information and recommendations, thereby enabling improved nutritional care and support for people living with HIV/AIDS.

Notes

1. The United Nations Subcommittee on Nutrition (UN ACC/SCN 1991) defines food security in the following way: "A household is food secure when it has access to the food needed for a healthy life for all its members (adequate in terms of quality, quantity and culturally acceptable), and when it is not at undue risk of losing such access." The International Fund for Agricultural Development (IFAD) organizes household food security into the concepts of acquirement and utilization ("Food Security – A conceptual framework").

2. This system was developed by Development Alternatives, Inc., and International Development Enterprises through the 5-year, USAID-funded LEAD (Linkages for the Economic Advancement of the Disadvantaged) project (Dratt 2002). Promising practices on multisectoral approaches to HIV/AIDS. Washington, DC: PVO-USAID Steering Committee for Multisectoral Approaches to HIV/AIDS; Kadiyala, S, and S Gillespie. 2003. Rethinking food aid to fight AIDS. Washington, DC: IFPRI).

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EXERCISE 4

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The following tasks will help students

- Critically analyze specific food security situations and identify and assess constraints, enabling factors, and capacities

- Identify practical options to address food security and solve problems

- Practice interacting, counseling, and advising various types of clients about food security issues in different contexts

- Think through ways that food security affects specific nutritional care and support needs and situations

Facilitating a brief class discussion after each exercise can further draw out the lessons learned and ideas generated through the role-plays. This will allow the observers and the participants in the role- plays to comment on what is learned from the activity. Discussion also allows the instructor to emphasize key points from the lecture.

Tutors and instructors may develop additional exercises that reflect the circumstances in their countries or situations commonly faced by members of the students' professions (e.g., specific role-plays for doctors or for nutritionists). Facilitators and participants may want to assign names to characters in the role-plays.

TASK 1: Ask students to brainstorm food security constraints individually, in pairs, or in small groups. Select a specific nutritional care and support topic from this module (e.g., "Management of Drug-Food Interactions" or "Infant Feeding and PMTCT"). Ask the students to respond to the following questions from the point of view of a service provider planning nutritional care and support interventions on this topic:

1. How does poor food availability or access impede people living with HIV/AIDS and caregivers from following the recommendations for this topic? What important foods or food groups do they lack strong access to?

2. Which recommendations from this topic may be especially difficult to follow because of food insecurity?

3. What alternative recommendations for this topic or adjustments to these recommendations can be made for food-insecure households?

4. What common types of food insecurity and underlying factors in your country particularly affect the recommendations offered for this topic? What do practitioners need to look for during assessment, counseling, and follow up?

5. What types of services and interventions can address food security constraints (e.g., less labor, depleted savings, and poorer agricultural output)? What steps are being taken in your country to address these constraints?

TASK 2: This two-person role-play addresses household food security. Ask one student to play the role of the client and another to play the role of a counselor. A 35-year-old widow living with HIV/AIDS has received nutritional care and support counseling through a health center for the past 3 months. She shows knowledge and awareness of her nutritional needs, but her health and nutritional status has shown no improvement during this time; in fact, she has lost 2kg. The woman explains that she has not been able to follow most of the recommendations because of her family situation. She and her three children live with her brother, his wife, and their four children. She has not been well enough to work, and her brother's income barely covers basic necessities for the 10 of them. Her sister-in-law has been suggesting that the woman and her children are a burden and has favored her own family at mealtimes. Ask students to help the woman identify options to improve her nutritional status by discussing the following questions.

1. What options are open to the woman? How can she be supported to pursue them?

2. Do psychosocial factors also affect the woman's dietary habits?

3. What should be recommended for her children's diet and nutrition? If she gives most food available to her to her children, eating very little herself, how should a counselor deal with this?

4. Can the counselor play a role in easing the family constraints?

5. What can the community do in this situation? Are any specific community services feasible?

6. What types of further education may be needed? For whom?

TASK 3: This task involves a case *s*tudy of working with food *s*ecurity *p*rograms and can be conducted as a small group discussion and brainstorming or a two-person role–play, or both. Ask students to brainstorm key issues and then ask one student to role-play the manager of the counseling program and another the food aid manager.

As manager of a health and nutrition counseling program, you hear that a food assistance program will open soon for HIV/AIDS-affected families. Realizing that many of your clients drastically need this kind of support, you make an appointment with the food aid program manager to discuss how to establish linkages so that clients can be referred from your program to receive food assistance. You also want to take the opportunity to discuss the types of food assistance used to encourage provision of foods most needed by HIV-infected people. Discuss the following questions and issues.

1. What key results and points of agreement should you leave the meeting with?

2. What are the criteria for admission to the program? Can nutritional status be incorporated into the criteria? If so, how?

3. Is there an opportunity to improve the foods offered by the food aid program to better address the nutritional needs of people living with HIV/AIDS? How can this be done given available foods? What other factors (e.g., local acceptability, energy needs, food preparation, and dietary behaviors) should be considered in designing the food package?

4. What sort of system can be established for referrals?

5. Will referrals and targeting of people living with HIV/AIDS increase stigma? How can this be addressed?

6. Can nutritional care and support counseling or follow-up be integrated into the program? How?

TASK 4: This three-person role-play addresses food security and managing drug and food interactions. Students take the roles of a doctor, a father, and his daughter. The doctor is checking the status of a man living with HIV/AIDS who has recently begun antiretroviral therapy. The man's 13-year-old daughter, who is his primary caregiver, indicates that he has taken the medicines irregularly because of the side effects, including diarrhea and nausea. The doctor makes a number of dietary recommendations to address the side effects, but the father and daughter indicate they do not have regular access to the foods the doctor recommends the father consume daily. The doctor tries to understand the constraints they face and discusses other dietary and food preparation options to deal with the side effects. Students should discuss the following questions.

1. What specific food constraints does the patient face? Are there alternative dietary recommendations?

2. What information (e.g., hygiene, eating habits, and cooking techniques) would be useful for the doctor?

3. Can some of these constraints be alleviated by meal planning? By adjusting food expenditures? By referrals?

4. What role can the daughter play in this process?

5. What information should the man be given? The daughter?

6. What sort of system would help ensure that the man does not miss any doses?

HANDOUT 4 Steps to Address Food Security in Nutritional Care and Support Counseling

Students can use this handout to help them integrate food security issues into nutritional care and support counseling. For information on nutritional care and support counseling, refer to Session 6.

During ASSESSMENT

1) Understand the sources of food insecurity for the client and household.
    a) What factors prevent the client from adopting recommended dietary practices?
    b) What is the status of food supply, production, income, and employment?
    c) What coping strategies are used?
    d) What strategies or support mechanisms need support?

2) Identify key food and nutrient access gaps.
    a) What foods and nutrients does the client need more of?
    b) What causes these gaps?

3) Identify capacities and options.
    a) What capacities (e.g., support from household members, coping strategies) do households have to reduce food security constraints?
    b) What options are there for strengthening nutritional practices?

During OPTION SELECTION

1) Identify feasible dietary practices and options. Which dietary options can meet client's nutritional requirements and are feasible within the food security constraints?

2) Identify ways to help increase food security.
    a) Can households link or be referred to services supporting food security and livelihoods?
    b) Can households adjust expenditures to increase purchase of foods rich in nutrients required by people living with HIV/AIDS?
    c) How can changes in intra-household food allocation and behaviors be facilitated?

During FOLLOW UP

1) Assess how food security constraints have been addressed and what further food security issues require attention.

2) Determine whether additional approaches are required.

THROUGHOUT THE PROCESS, involve client, caregivers, and household members.

SESSION 5 NUTRITIONAL MANAGEMENT OF HIV/AIDS-RELATED SYMPTOMS

Purpose

The purpose of this session is to give students knowledge and skills for the nutritional management of HIV/AIDS-related symptoms.

Learning objectives

By the end of the session, students will be able to:

- Describe the appearance of HIV/AIDS-related symptoms in the progression of the disease.
- Describe the dietary management of HIV/AIDS related symptoms.

Estimated time: 60 minutes

Prerequisite knowledge

- Knowledge of infant, child, and adult nutrition
- Basic counseling skills

Outline

Content	Methodology	Timing
1. Review of the relationship between nutrition and HIV/AIDS • Use of the RCQHC/FANTA model to show that malnutrition weakens the immune system and HIV exacerbates the situation • Review of the effects of HIV on nutrition and vice versa 2. Evolution of HIV/AIDS and the nutritional repercussions: The importance of nutrition to prevent the repercussions at all stages of the illness 3. HIV/AIDS-related symptoms and their dietary management • Nutritional management for illnesses such as diarrhea, anorexia, nausea or vomiting, fever, anemia, wasting, and constipation: What foods to take and avoid • Assessing a client with different HIV/AIDS dietary related symptoms	Facilitate an interactive lecture using **PowerPoint 5** presentation Facilitate a question and answer session to master dietary management of symptoms Use **Exercise 5** role-play on counseling clients presenting with different symptoms Distribute and explain the use of **Handout 5.1**	50 minutes
Discussion on the presentation	Use **Exercise 5** to help students master key concepts	10 minutes

Required materials

- LCD or overhead projector
- Flipchart stand and paper
- Writing pens

Recommended preparation

- Be familiar with **Lecture Notes 5**: Nutritional Management of HIV/AIDS-Related Symptoms.
- Allocate time for each activity considering students' backgrounds and the coverage of the content elsewhere
- Prepare to divide class into pairs for **Exercise 5** role-plays on counseling people presenting with HIV/AIDS-related symptoms. For this manual, names for the role-plays were selected arbitrarily, the names and any other aspects (e.g., foods, medication, symptoms) of the following case studies should be modified appropriately for country and community contexts.

Materials provided

PowerPoint Presentation

- **PowerPoint 5**/overhead presentation: Nutritional Management of HIV/AIDS-Related Symptoms

Handouts

- **Handout 5.1**: Caring for Symptoms Associated with HIV in Adults

Suggested reading materials

Bijlsma, M. 1996. Living positively: A nutrition guide for people with HIV/AIDS. Mutare, Zimbabwe: Mutare City Health Department.

Health Canada/Santé de Canada. 2002. A comprehensive guide for the care of persons with HIV disease. Canadian Strategy on HIV/AIDS. Ottawa.

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LECTURE NOTES 5: NUTRITIONAL MANAGEMENT OF HIV/AIDS-RELATED SYMPTOMS

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Introduction

Malnutrition remains a public health challenge in resource-limited settings. There are various forms of malnutrition with complex and subtle causes. Malnutrition affects all age groups in sub-Saharan Africa.

Purpose (slide 2)

The purpose of this session is to give students knowledge and skills for the nutritional management of HIV/AIDS-related symptoms. The session:

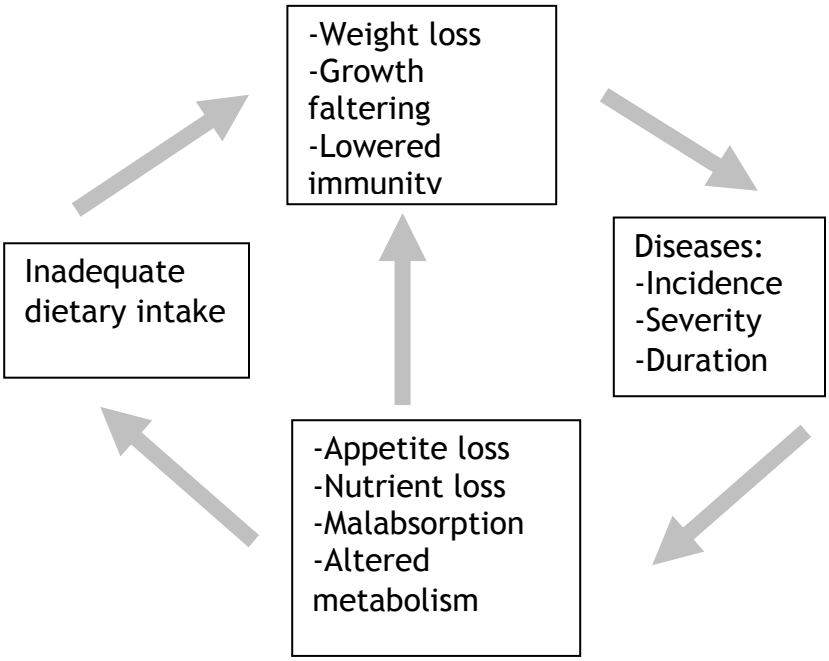
- Discusses the appearance of HIV/AIDS-related symptoms in the progression of the disease

- Describes the dietary management of HIV/AIDS related symptoms

Malnutrition and infection

As illustrated in figure 1, malnutrition increases vulnerability to and severity of infections, and infections aggravate malnutrition. Inadequate dietary intake leads to malnutrition and lowered immune system function. Malnutrition reduces the body's ability to fight infections and therefore contributes to increased incidence, severity, and length of infections. Symptoms that accompany infections, such as loss of appetite, diarrhea, and fever, lead to reduced food intake, malabsorption, nutrient losses, and altered metabolism, which lead to weight loss, growth faltering, and further weakening of the immune system.

Figure 1 Vicious cycle of malnutrition and infection



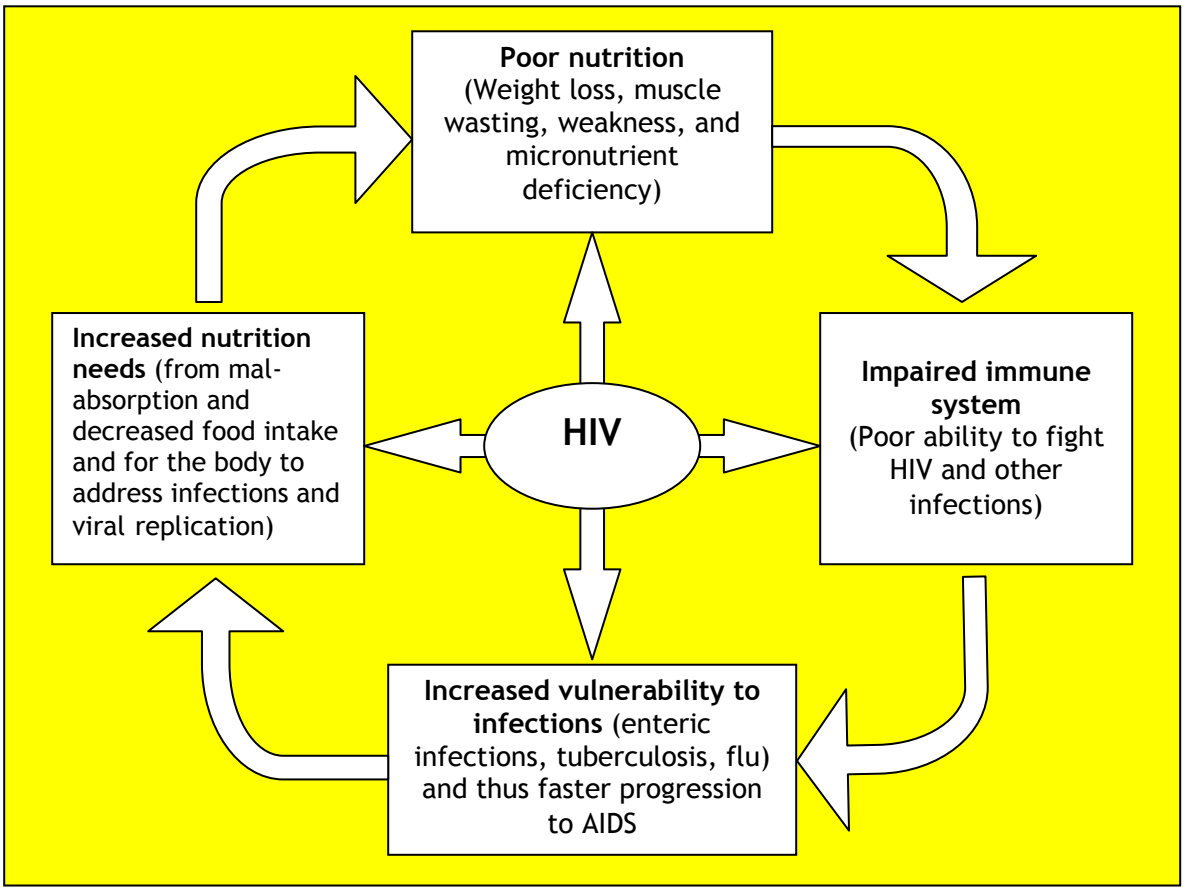
Source: Tomkins and Watson 1989

In resource-limited settings, HIV infection is often contracted by people who may already be malnourished. Their lowered immune systems increase their vulnerability to infections.

Relationship between nutrition and HIV/AIDS **(slide 4)**

HIV infection has long been recognized to have a possible negative impact on the nutritional status of people living with HIV/AIDS and lead to malnutrition. The relationship between HIV/AIDS and malnutrition is a classic example of the vicious cycle of immune dysfunction, infectious diseases, and malnutrition. As illustrated in figure 2, malnutrition can weaken the immune system and increase vulnerability to infections, and may speed up the progression of the disease.

Figure 2 Cycle of malnutrition and infection in the context of HIV/AIDS (slide 5)



The nutritional needs of HIV-infected people and the effects of HIV infection on their nutritional status may vary according to the stage in the disease.

I. Acute phase

Initial infection. As soon as HIV enters the body, it replicates rapidly. This rapid replication requires energy and nutrients taken from the host's body. The virus relies entirely on the host for survival and will deplete the host of whatever is required for its multiplication and survival. The HIV infection may have a rapid onset leading to hypermetabolism with catabolism. Although some infected people may not have any symptoms at this stage, the host's energy and nutrient needs increase, and food intake should increase accordingly. If the host's food does not increase, there will be a nutrient negative balance. The period during which this occurs varies from 1 to 6 weeks, depending on the person.

Seroconversion. During the seroconversion phase, the body produces antibodies to fight the virus. The body needs additional energy and nutrients to mount this immune response. If these are not provided by the diet, the host will use fat and muscle to provide the necessary nutrients. The host will lose weight and will gradually develop malnutrition that will weaken the immune system and make the host vulnerable to opportunistic infections. The seroconversion phase occurs after 6–12 weeks.

II. Asymptomatic phase

The length of the asymptomatic phase varies and may last several years, depending on the host's health and nutritional status before the infection. The asymptomatic phase is marked by hypermetabolism and increased energy needs.

III. Symptomatic phase (slide 6)

Initial symptoms are marked by the onset of opportunistic infections. Common symptoms include fever, night sweats, tuberculosis, fungal infection of the mouth, chronic diarrhea, and weight loss. The onset of opportunistic infections is a sign of a weakened immune system. Negative nitrogen balance occurs early in acute infections because of the decrease in food intake and increased urinary protein losses. Immunologic response to infection activates cytokines, which causes fever and anorexia, thereby leading to increased energy expenditure and decreased caloric intake. The opportunistic infections further increase the nutritional needs of the host and continue to weaken the immune system and hasten the progression of the disease.

The persistence of symptoms and opportunistic infections lead to increased energy, and nutrient needs, reduced food intake, malabsorption of nutrients, weight loss, and wasting. Wasting is defined as a profound involuntary weight loss > 10 percent of baseline body weight plus either chronic diarrhea (> 30 days) or chronic weakness and documented fever (> 30 days) in the absence of a concurrence illness or condition other than HIV infection (Macallan 1999). Wasting is often accompanied by changes in lean body mass and body cell mass (Babameto and Kotler 1997). The persistence of reduced food intake, malabsorption of nutrients, weight loss, and wasting will lead to full-blown AIDS.

IV. Late symptomatic phase (full-blown AIDS)

The late phase is marked by metabolic alteration, weight loss, and wasting. Other characteristics include high viral load, decreased CD4 count, pneumonia, Kaposi's sarcoma, systemic fungal infection, bacterial infection, and certain types of cancer.

Table 1 briefly describes the symptoms that occur at each stage of the disease and the nutritional repercussions. The stages and the symptoms described are indicative and may vary from one individual to another or overlap.

Table 1 Progression of symptoms in HIV infection and nutritional impact

Stage	Symptoms	Nutritional impact
I. Acute infection Initial infection	Transient early acute symptoms: fever, body ache High concentration of virus in the blood (1–6 weeks)	Hypermetabolism Increased energy, and nutrient needs. Nutrient depletion
Seroconversion	Body starts producing antibodies (6–12 weeks) or after 15 months for HIV-infected baby	
II. Asymptomatic (includes also initial infection and seroconversion)	No symptoms Declined number of CD4 Varied length (can last several years)	
III. Symptomatic phase Initial symptoms (onset of opportunistic infections)	First symptoms, illustrating a weakened immune system: lymphadenopathy, fever, night sweats, tuberculosis, and chronic fatigue	Increased energy and nutrient needs, nutrient malabsorption and depletion, and weight loss
Early immune failure	Shingles, thrush, chronic diarrhea, chronic fatigue	Hypermetabolism Increased energy and nutrient needs Nutrient malabsorption Weight loss and wasting
IV. Late symptomatic, full-blown AIDS	High viral load, marked decreased in CD4, pneumonia, Kaposi's sarcoma, systemic fungal infection, bacterial infection (tuberculosis), cancer	Hypermetabolism Increased energy and nutrient needs Nutrient malabsorption and depletion Metabolic alteration Weight loss and wasting

Source: Adapted from Piwoz 2000

Importance of good nutrition at all times (slide 10)

Good nutrition is critical for people living with HIV/AIDS (box 1). Good nutrition has the greatest impact at the early stages of the disease because it strengthens the immune system to fight opportunistic infections and delays the progression of the disease. Good nutritional status before contracting the virus is also important. A person with good nutritional status is resistant to many infections. Even at the onset of symptoms, good nutrition helps reduce the severity of infections and the likelihood of weakening the immune system. Good nutrition also contributes to weight gain, stops wasting, and enables the host's body to fight opportunistic infections.

Box 1 Positive impact of adequate nutrition for people living with HIV/AIDS (slide 11)

- Prevents malnutrition and wasting
- Achieves and maintains optimal body weight and strength
- Enhances the body's ability to fight opportunistic infections
- May help delay the progression of the disease
- Improves the effectiveness of drug treatments
- Improves the quality of life

HIV/AIDS symptoms and nutritional implications (slide 12)

Symptoms appear in an HIV-infected person at a critical time when the virus has already caused some damage to the body, such as the reduction of the CD4 cells, and is gradually hindering the capacity of the body to fight opportunistic infections. CD4 cells, also known as T4 cells, which are a sub-category of T-lymphocyte cells, are the primary cells to which HIV binds during HIV infection, resulting in cell death. The progression of HIV disease is marked by a progressive depletion of CD4 cells or T-lymphocyte cells. Monitoring the number of CD4 cells helps to monitor the progression of the disease (Fan et al 2000). Symptoms such as skin rash and headache may require medical treatment.

The following symptoms may also negatively affect nutritional status:

1. **Reduced food intake** during loss of appetite or anorexia, nausea, oral thrush, constipation, and bloating or heartburn

2. **Poor nutrient absorption** during diarrhea and vomiting

3. **Increased nutrient needs** during fever and anemia

Medical treatment is critical to treat symptoms and opportunistic infections, and good nutrition complements medical treatment. Good nutrition enhances the capacity of the body to fight opportunistic infections and therefore maximizes the effectiveness of medical treatment. Nutrition can help people without access to medical treatment manage symptoms and strengthen immune function.

Reduced food intake will result in insufficient energy and nutrient intake at a time of increased nutritional needs. A person living with HIV/AIDS who was in good nutritional status at the beginning of the infection might have to use fat storage to meet energy needs and will gradually lose weight. If the reduced food intake persists, the body will use muscle to produce energy. If the person was not in good nutritional standing at the onset of infection, the effect of HIV/AIDS-related symptoms on food intake would be compounded by opportunistic infections and very quickly lead to weight loss and wasting.

People living with HIV/AIDS tend to present various oral conditions that may affect food intake. They may suffer from bacterial infections such as gingivitis or periodontal disease, viral infections such as herpes, and fungal infections such as thrush. Other oral diseases such as cavities that are not HIV/AIDS-related but that can also affect food intake should be treated promptly. This will help avoid the drastic reduction in food intake that increases the negative impact on nutritional status.

Poor nutrient absorption prevents the body from using the nutrients provided by foods and contributes to energy and nutrient losses, which will increasingly hamper the capacity of people living with HIV/AIDS to meet their increased nutritional needs. If malabsorption of nutrients is not properly addressed, the deficit in energy and nutrients will increase and further weaken the person and their immune system and speed up the progression of the disease.

Increased nutrient needs result from the additional needs the body requires to replicate the virus and compensate for nutrient losses during the many disease processes, such as fever and anemia that are often present in people living with HIV/AIDS. During fever the resting energy expenditure increases, and consequently the total energy expenditure increases, increasing the likelihood of weight loss. Often people living with HIV/AIDS gradually decrease their level of physical activity to maintain their energy balance, further limiting their capacity to carry out regular daily activities. Additionally, the nutrients from food intake are poorly used, increasing the energy and nutrient gaps and helping to increase the severity of opportunistic infections and speed up the progression of the disease.

Anemia is common in people living with HIV/AIDS and may result from cytokinine-induced suppression of red blood cell production, chronic inflammation, reduction in food intake, the effect of antiretroviral therapy such as Zidovudine, or nutritional deficiencies of iron, folate, riboflavin, vitamin A, and vitamin B_{12}.

Reduced food intake, poor nutrient absorption, and increased nutrient needs occur simultaneously to further debilitate the immune systems of people living with HIV/AIDS, prevent them from meeting their nutritional needs, and worsen their health and nutritional status. Health workers and counselors should advise using available foods and nutrients to address HIV/AIDS-related symptoms, either to maintain food intake or to compensate for nutrient losses.

Dietary management of HIV/AIDS-related symptoms (slides 13, 14, 15)

Dietary management of HIV/AIDS-related symptoms refers to the strategy of using food and nutritional practices to manage the effects of HIV/AIDS-related symptoms on food intake and nutrient absorption. The goal of dietary management of HIV/AIDS-related symptoms is to prevent malnutrition and improve the health and nutritional status of people living with HIV/AIDS, thereby slowing the progression of the disease. The specific objectives are to reduce discomfort, alleviate symptoms, and ensure adequate food intake using locally available foods. Dietary management of HIV/AIDS-related symptoms has the following advantages:

- Enables greater food intake by adding more flavor, encouraging consumption of small but frequent quantities of food, or presenting foods in a texture that can be easily eaten

- Increases comfort and reduces pain while eating

- Provides more nutrients to compensate for nutrient losses

- Prevents dehydration during diarrhea and fever

- Complements and strengthens medical treatment

- Reduces the severity of symptoms by providing specific nutrient needs and strengthening the immune system

Handout 5.1 provides information on coping with HIV/AIDS symptoms. This dietary advice has been used successfully in some countries but should be adapted to specific food habits and regional constraints and availability (slide 16). Each country should compile and capitalize on these experiences by making them available to people living with HIV/AIDS, caregivers, and affected households and communities. Health workers and counselors should refer to national guidelines on nutritional responses to HIV/AIDS-related symptoms when they are available.

The dietary management of HIV/AIDS-related symptoms should be integrated in all services at health centers and in outreach activities where health workers and counselors meet people living with HIV/AIDS (e.g., counseling, testing, and antenatal visits). During counseling sessions, health workers and counselors should always assess how clients are managing diet-related HIV/AIDS symptoms and, when needed, help identify alternative options. See Session 6 for additional information on how to counsel people living with HIV/AIDS.

Conclusion

The dietary management of HIV/AIDS-related symptoms helps improve nutritional status by maintaining food intake and compensating for nutrient losses. Dietary management complements medical treatment and enhances the capacity of the body to fight opportunistic infections. Health workers and counselors should carefully monitor the client's symptoms and food and drug regimen to ensure that nutritional status is maintained.

EXERCISE 5

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Management of HIV/AIDS-related symptoms

Use **Lecture Notes 5** to discuss the PowerPoint slides. After the PowerPoint presentation, depending on the time available for the class, use one or more of the following tasks.

TASK 1: Divide students into two groups of equal number for a question and answer session. Distribute **Handout 5.1** to students for reference. Give group 1 a list of the following dietary symptoms: Fever, anorexia, nausea, and vomiting. Give group 2 a list of the following dietary symptoms: Diarrhea, thrush, and constipation. Give each group 10 minutes to master the dietary management of its list of symptoms. In plenary have each group present the dietary management of its symptoms and correct any misinformation. If scores are recorded, the group with the most correct answers will be the winner.

If time allows, ask each group to master the dietary management of a different set of symptoms and present it in plenary.

When the students have mastered the dietary management of all the symptoms, quiz them on the dietary management of all symptoms and ask them to give the reasons for the recommended food and nutrition and care practices.

TASK 2: Using the case study below, divide students into pairs for a role-pay on nutritional assessment to help them master this task. Ask two students to role-play a counseling session between an HIV-infected client who has HIV/AIDS-related symptoms including nausea, thrush, and fever and a counselor who will assess the dietary management of the symptoms. The first volunteer will be the client with fever, nausea, and thrush. The second volunteer, the counselor, will focus on the assessment during the counseling.

John, 35, was tested for HIV 2 years earlier when he donated blood to his brother, who just had an accident. John was informed the day after the blood donation that he was HIV positive. He had attended several counseling sessions to help him cope

with the infection and remembered that the counselor insisted that he seek prompt treatment for any symptom. John has not been feeling well for the past 2 days. He is suffering from nausea, thrush, and fever, and has decided to go to the counselor.

After the counseling session, the counselor will explain how to use the information that was collected.

Distribute the observation checklist to the students to record their observations and provide feedback to the volunteers. Ask the students to write their comments in the appropriate column. After the role-play, ask the counselor to share what was easy or difficult during the assessment. Ask other students to provide feedback following the order of the checklist. They should start by saying what the counselor did well, then add what the counselor should improve, and finally suggest how the counselor can improve.

Summarize the session, highlighting the importance of considering food security issues in the dietary management of the symptoms. Remind students to use the related resource materials.

HANDOUT 5.1 Caring for symptoms associated with HIV in adults

Illness	Diet	Care and nutrition practices
Anorexia (appetite loss)	• Try to stimulate appetite by eating favorite foods. • Eat small amounts of food more often. • Select foods that are more energy dense. • Avoid strong-smelling foods.	• If appetite loss is a result of illness, seek medical attention for treatment.
Diarrhea	• Drink a lot of fluids (soups, diluted fruit juices, boiled water, and light herbal teas) to avoid dehydration. • Avoid strong citrus fruits (orange, lemon) because they may irritate the stomach. • Consume foods rich in soluble fiber (millet, banana, peas, and lentils) to help retain fluids. • Consume fermented foods such as porridges, and yogurt. • Consume easily digestible foods such as rice, bread, millet, maize porridge, potato, sweet potato, and crackers. • Eat small amounts of food frequently and continue to eat after illness to recover weight and nutrient loss. • Eat soft fruits and vegetables such as bananas, squash, cooked and mashed green bananas, mashed sweet potato, and mashed carrots. • Eat eggs, chicken, or fish for protein. • Drink nonfat milk if there is no problem with lactose. • Boil or steam foods. **Avoid or reduce intake of these foods:** • Some dairy products such as milk • Caffeine (coffee and teas) and alcohol • Fatty foods • Fried foods and extra oil, lard, or butter • Gas-forming food such as cabbage, onions, carbonated soft drinks (sodas)	<u>Prevention</u> • Drink plenty of clean boiled water. • Wash hands with soap and water before handling, preparing, serving, or storing foods. • Wash hands with soap and water after using a toilet or latrine or cleaning a child after defecation. <u>Treatment</u> • Drink more fluids to prevent dehydration. Prepare rehydration solutions using oral rehydration salt packets or a home-made solution of 1 liter of boiled water, 4 teaspoons of sugar, and 1/2 teaspoon of iodized salt. • Go to a health center if symptoms such as severe dehydration (low or no urine output), fainting, dizziness, shortness of breath, bloody stools, high fever, vomiting, severe abdominal pain, or diarrhea) persist for more than 3 days.

Illness	Diet	Care and nutrition practices
Fever	• Eat soups rich in foods that give energy and nutrients, such as maize, potatoes, and carrots. • Drink plenty of liquids. • Drink teas from lemon, guava, and gum tree. • Drink more than usual, beyond thirst. • Continue to eat small, frequent meals as tolerated.	• Drink fluids to prevent dehydration, particularly clean boiled water. • Bathe in cool water. • Rest. • Take two aspirin or Panadol, if available, with a meal three times a day (morning, afternoon, and evening). • Go to the health center in case of: ➢ Fever that last several days and is not relieved with aspirin ➢ Loss of consciousness ➢ Severe body pain ➢ Yellow eyes ➢ Severe diarrhea ➢ Convulsion seizure ➢ Convulsion seizure
Nausea and vomiting	• Eat small and frequent meals. • Eat foods such as soups, unsweetened porridge, and fruits such as bananas. • Eat lightly salty and dry foods such as crackers to calm the stomach. • Drink herbal teas and lemon juice in hot water. • Avoid spicy and fatty foods. • Avoid caffeine (coffee and tea) and alcohol. • Drink liquids such as clean boiled water.	• Avoid an empty stomach; nausea is worse if nothing is in the stomach. • Avoid lying down immediately after eating; wait at least 20 minutes to avoid vomiting. • Rest between meals.
Thrush	• Eat soft, mashed foods such as carrots, scrambled eggs, mashed potatoes, bananas, soups, and porridge. • Eat cold or room-temperature foods. • Avoid spicy, salty, or sticky foods; these may irritate mouth sores. • Avoid sugary foods; these cause yeast to grow. • Avoid strong citrus fruits and juices that may irritate mouth sores. • Avoid alcohol. • Drink plenty of liquids.	• Seek medical attention for treatment. • If a spoon or cup is available, use it to eat small amounts of foods. • Tilt head back when eating to help with swallowing. • Rinse mouth with boiled warm salt water after eating to reduce irritation and keep infected areas clean so yeast cannot grow.
Anemia	• Eat more iron-rich foods such as animal products (eggs, fish, meat, and liver) green leafy vegetables (collard greens, spinach), legumes (beans, lentils, groundnuts), nuts, oil seeds and fortified cereals. • Take iron supplements.	• If available, take one iron tablet once a day with some food. Take with a source of vitamin C such as tomatoes or orange juice to help with absorption. • Drink fluids to avoid constipation. • Treat malaria and hookworm.

Illness	Diet	Care and nutrition practices
Muscle wasting	• Increase food intake by increasing quantity of food and frequency of consumption. • Improve quality and quantity of foods by providing a variety of foods. • Increase protein in diet. • Increase intake of starchy foods in cereals and other staples. • Eat small, frequent meals.	• Do regular weight-bearing exercise to build muscles.
Constipation	• Eat more foods that are high in fiber, such as maize, whole-wheat bread, green vegetables, and washed fruits with the peel. • Drink plenty of liquids. • Avoid processed or refined foods.	• Avoid using cleansing practices such as enemas and medications. • Drink plenty of fluids, including boiled water.
Bloating or heartburn	• Eat small, frequent meals. • Avoid gas-forming foods (cabbage, soda). • Drink plenty of fluids.	• Eat long enough before sleeping so food can digest.
Tuberculosis	• Consume foods high in protein, energy, iron, and vitamins.	• Seek medical attention immediately. • Consult medical personnel about taking food with medications. • If taking Isoniazid for treatment, take a vitamin B_6 supplement to avoid deficiency of this micronutrient.
Loss of taste or abnormal taste	• Use flavor enhancers such as salt, spices, herbs, and lemon. • Chew food well and move it around in mouth to stimulate receptors.	

HANDOUT 5.2 Observation checklist for nutritional assessment

	Yes	*No*	*Comments*
1. Did the counselor ask the client about:			
Feeding practices			
Foods frequently eaten?			
Number of meals per day?			
Period(s) of food shortage?			
Foods affected by food shortage?			
Coping strategy during food shortage?			
Most available and affordable foods?			
Symptoms			
Different symptoms and their frequency?			
Coping strategy?			
2. Did the counselor find out from his knowledge and from the information collected about:			
Food to use to address each symptom?			
Alternative options?			
Care and nutritional practice for each symptom?			

SESSION 6 NUTRITIONAL CARE AND SUPPORT OF PREGNANT OR LACTATING WOMEN AND ADOLESCENT GIRLS INFECTED WITH HIV/AIDS

Purpose

The purpose of this session is to give students a general understanding of special considerations for nutritional care and support of HIV-infected pregnant or lactating women or adolescent girls.

Learning objectives

By the end of the session, students will be able to:

- Explain how HIV infection increases the risk of malnutrition in HIV-infected pregnant and lactating women and adolescents in resource-limited settings.
- Describe the essential components for nutrition care of HIV-infected pregnant or lactating women and adolescents.
- Describe the general dietary recommendations for HIV-infected pregnant or lactating women and adolescents.
- Make appropriate recommendations for nutritional care and support of HIV-infected pregnant or lactating women and adolescents.
- List factors to consider when planning nutritional care and support for HIV-infected pregnant or lactating adolescents.
- Explain the challenges HIV-infected pregnant and lactating women face that increase their risk for malnutrition.

Prerequisite knowledge

- Understanding of nutrition through the life cycle, maternal nutrition, including nutrition during normal and healthy pregnancy and lactation, and adolescent nutrition

- Basic counseling skills

Estimated time: **120 minutes**

Outline

Content	Methodology	Timing
1. Why focus on women, nutrition and HIV? • High proportion of women affected and infected by HIV in sub-Saharan Africa • Likelihood of poorer quality care • Social, economic, and biological factors associated with the health of the woman, reproductive performance, and nutritional stress	Facilitate an interactive lecture using **PowerPoint 6** presentation Use questions and answers to help students master concepts	110 minutes
2. Nutritional requirements for the HIV-infected pregnant or lactating woman • Increased nutrient and energy needs with HIV infection • Gaps in knowledge and programming needs 3. General nutritional recommendations of WHO and the role of nutritional care and support for the HIV-infected pregnant or lactating woman and adolescent • Meeting increased nutrient demands and preventing negative implications for the health of the mother or the baby • Practical considerations and limitations in optimizing women's nutrition 4. Goals of nutritional care and support for the HIV-infected pregnant or lactating woman and adolescent • Attaining and maintaining good nutrition and preventing malnutrition • Preventing risks of illness and decreased food intake	Discuss the practical considerations within each subheading Distribute **Handouts 6.1 and 6.2**. Use **Exercise 6** to role-play and assess some key actions discussed Distribute **Handouts 6.3-6.7** and review	

Content	Methodology	Timing
5. Components of nutritional care and support for the HIV-infected pregnant or lactating woman • Nutritional assessment • Nutritional education and counseling • Promotion of food safety and hygiene • Physical activity • Safer sex • Psychosocial support • Symptom-based management • Access to ARV therapy 6. Issues and challenges in nutritional care and support of HIV-infected pregnant and lactating women and adolescent girls • Challenges in providing optimum nutrition to these groups • Access to and use of VCT • Social stigma and discrimination • Access to food in terms of quantity and quality • Gender issues • Quality of health and nutrition care (including counseling)		
7. Discussion of presentation	Use **Discussions Points 6** to raise issues in the class or in small groups. Organize a **field visit** if time permits	10 minutes

Required materials

- LCD or overhead projector
- Flipchart stand and paper
- Writing pens

Recommended preparation

- Be familiar with **Lecture Notes 6**: Nutritional Care and Support of Pregnant or Lactating Women and Adolescent Girls Infected with HIV/AIDS.

- Allocate time for each activity considering students' background and the coverage of the content elsewhere.

- Look through **Discussion Points 6** to identify relevant questions to help students master the concepts. Consider facilitating a group discussion if time permits.

- Prepare to divide class into pairs for **Exercise 6**, which includes a field visit and role-plays on counseling pregnant and lactating women in areas of high HIV prevalence.

- For the purpose of this manual, names for the role-plays were selected arbitrarily. Modify the names and any other aspects (e.g., foods described) in the following case-studies as appropriate for country and community contexts.

Materials provided

PowerPoint Presentations

- **PowerPoint 6**/overhead presentation: Nutritional Care and Support of Pregnant or Lactating Women and Adolescent Girls Infected with HIV/AIDS

Handouts

- **Handout 6.1**: Essential Nutrition Health Sector Actions to Improve Maternal Nutrition in Africa

- **Handout 6.2**: A Guide for Nutritional Assessment for People Living with HIV/AIDS

- **Handout 6.3**: Checklist for Nutritional Assessment of Women Infected with HIV

- **Handout 6.4**: Practical Considerations for Counseling

- **Handout 6.5**: Checklist for Assessing Counseling of Pregnant or Lactating Women with HIV/AIDS

- **Handout 6.6**: Safe Food Handling Practices

- **Handout 6.7**: Nutritional Management of Common Problems in HIV/AIDS

- **Discussion Points**: Class questions for reflection and discussion

- **Class Exercises**: Role-plays and field visit

Suggested reading materials

American Dietetic Association and Dietitians of Canada. 2000. Manual of clinical dietetics. Sixth edition. Chicago, Illinois: American Dietetic Association.

Coutsoudis A, K Pillay, et al. 1999. Randomized trial testing the effect of vitamin A supplementation on pregnancy outcomes and early mother-to-child HIV-1 transmission in Durban, South Africa. South African Vitamin A Study Group. *AIDS* 13: 1517-24.

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Dreyfuss, ML, and WW Fawzi. 2002. Micronutrients and vertical transmission of HIV-1. *Am J Clin Nutr* 75: 959-70.

Fawzi, WW, et al. 2002. Randomized trial of vitamin A supplements in relation to transmission of HIV-1 through breastfeeding and early child mortality. *AIDS* 16(14): 1935-44.

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Fields-Gardner, C, et al. 1997. A clinician's guide to nutrition in HIV and AIDS. Chicago, Illinois: American Dietetic Association.

Gorduek, V, et al. 2001. Iron status and the outcome of HIV infection: An overview. *J Clinical Virology* 20: 111-15.

Huffman, S, et al. 2001. Essential health sector actions to improve maternal nutrition in Africa. Washington, DC: LINKAGES Project, Academy for Educational Development.

Institute of Medicine, National Academy of Sciences. 1990. Nutrition during pregnancy. Washington, DC: National Academy Press.

Levine, A, et al. 2001. Prevalence and correlates of anemia in a large cohort of HIV-infected women: Women's interagency HIV study. *J Acquir Immune Defic Syndr* 26: 28-35.

Lwanga, D. 2001. Clinical care of HIV-infected women in resource poor settings: Nutritional care and support. Baltimore, MD: Johns Hopkins Program on International Education for Obstetrics and Gynecology (JHEPIGO). CD-ROM tutorial.

Lwanga, D, and E Piwoz. 2001. Nutrition care and support for women living with HIV/AIDS in West Africa. Technical update: Women and adolescent nutrition, West Africa Nutrition Focal Point Meeting, 2001.

Nduati R, et al. 2001. Effect of breastfeeding on mortality among HIV-1 infected women: A randomised trial. *Lancet* 357: 1651-55.

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Piwoz, E, and E Preble. HIV/AIDS and nutrition: A review of the literature and recommendations for nutritional care and support in sub-Saharan Africa, Washington, DC: SARA Project, Academy for Educational Development.

Samba-Ndure, K. 2001. Women's nutrition during pregnancy and lactation. Technical update: Women and adolescent nutrition. West Africa Nutrition Focal Point Meeting, 2001.

Semba, RD, and G Gary. 2001. Pathogenesis of anemia during human immunodeficiency virus infection. *J Investigative Medicine* 49(3): 225-39.

Semba, RD, et al. 1994. Maternal vitamin A deficiency and mother-to-child transmission of HIV-1. *Lancet* 343: 1593-97.

Singer, P, et al. 1992. Nutritional aspects of the acquired immunodeficiency syndrome. *Am J Gastroenterology* 87(3): 265-73.

WHO. 1985. Energy and protein requirements: Report of a joint FAO/WHO/UNU consultation. Geneva.

WHO/BASICS/UNICEF. 1999. Nutrition essentials. A guide for health managers. Geneva.

LECTURE NOTES 6: NUTRITIONAL CARE AND SUPPORT OF PREGNANT OR LACTATING WOMEN AND ADOLESCENT GIRLS INFECTED WITH HIV/AIDS

Introduction

Good maternal nutrition during both pregnancy and lactation is vital for the survival and well-being of the developing infant. Well-nourished mothers have healthier babies and a lower risk of maternal mortality and morbidity. In contrast, malnourished women have higher reproductive risks and subsequently poorer pregnancy outcomes than their well-nourished counterparts. In sub-Saharan Africa, where malnutrition is endemic, many women are malnourished even before pregnancy, and over 50 percent of women are HIV infected. Malnutrition and HIV work in tandem, with malnutrition weakening the immune system and increasing vulnerability to infection and HIV compromising nutritional status and increasing vulnerability to infection. Consequently, the nutritional status of an HIV-infected woman or adolescent girl before, during, and after pregnancy may influence her own health as well as the risk of transmitting HIV to her infant. Improving nutritional status and food security for all, including HIV-infected pregnant and lactating women or adolescent girls, so that they remain productive is a challenge for policymakers.

Purpose (slides 2, 3)

The purpose of this session is to give students a general understanding of special considerations for nutritional care and support of HIV-infected pregnant or lactating women or adolescent girls. The session:

- Explains how HIV infection increases the risk of malnutrition in pregnant and lactating women living with HIV/AIDS in resource-limited settings

- Describes the essential components for nutrition care of HIV-infected pregnant or lactating women and adolescents

- Describes the general dietary recommendations for HIV-infected pregnant or lactating women and adolescents

- Makes recommendations for nutritional care and support of HIV-infected pregnant or lactating women and adolescents

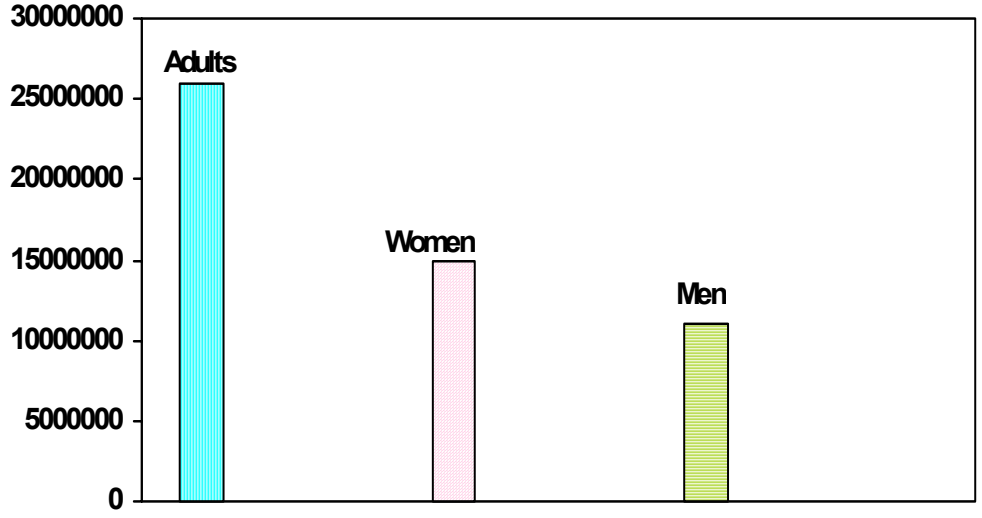
- Lists factors to consider when planning nutritional care and support for HIV-infected pregnant or lactating adolescents

- Explains the challenges HIV-infected pregnant and lactating women face that increase their risk for malnutrition

Why focus on women, nutrition, and HIV? (slides 4, 5, 6, 7)

HIV is said to have the face of a woman. The vulnerability of women and girls to HIV is increased by biological, economical, social, and cultural factors. In addition, in some countries the legal and political status of women makes them more vulnerable to HIV/AIDS. HIV spreads rapidly, particularly among young women. According to WHO/UNAIDS figures, 12-13 African women are infected for every 10 African men (UNAIDS 2001). Over 50 percent of adults (15-49 years of age) living with HIV/AIDS in sub-Saharan Africa are women (figure 1). These women are in their most productive and reproductive years.

Figure 1 Estimated number of men and women 15-49 years of age living with HIV/AIDS in sub-Saharan Africa, end of 2001 (slide 8)



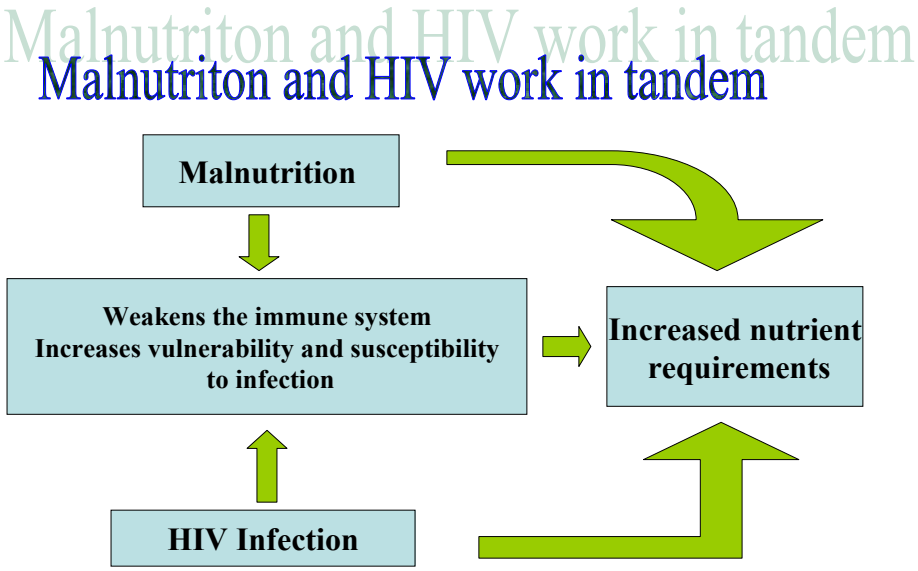
Source: UNAIDS 2002

The stigma associated with HIV can cause isolation and depression, particularly if governments, religious leaders, and community leaders do not discuss the disease (UNAIDS 2001). Silence also contributes to the general impact of HIV/AIDS on food security and nutrition, because infected people may be discriminated against in the workplace or be unable to work because of illness, personal isolation, and difficulty coping with their status. In addition, the burden on women who must care for HIV-infected children or other family members is especially great and increases the family's vulnerability to food insecurity and malnutrition.

Good maternal nutrition is important for the health and reproductive performance of women, as well as the survival and development of their children (slide 8). However, these reproductive years are periods of nutritional stress for many African women. Pregnancy-related health and nutrition problems have an effect on the quality of their lives and the lives of their newborn infants well beyond delivery. Malnourished women have high reproductive risks and subsequently poorer pregnancy outcomes than women who are well nourished (Institute of Medicine 1990). Well-nourished women have healthier babies and a lower risk of maternal morbidity and mortality. The physiological changes that occur during pregnancy require extra nutrients and energy to meet the demand of an expanding blood supply, the growth of maternal tissue, the developing fetus, loss of maternal tissue at birth, and preparation for lactation.

In Africa malnutrition is an endemic problem that has been complicated by HIV/AIDS. Furthermore, malnutrition and HIV work in tandem. Malnutrition weakens the immune system and therefore increases vulnerability to infections and may hasten the progression of HIV to AIDS. In the other direction, HIV compromises the nutritional status of infected people and increases their susceptibility to other infections (Piwoz and Preble 2000). Figure 2 shows the relationship between HIV and malnutrition. The endemic problem of malnutrition makes many women enter pregnancy are already malnourished and makes them malnourished prior to infection. For women who are HIV infected, the effects of malnutrition and HIV increase poor clinical outcomes and poor birth outcomes. The nutritional status of an HIV-infected woman or adolescent girl prior to, during, and after pregnancy may influence her own health as well as risk transmitting HIV to her infant.

Figure 2 Malnutrition and HIV (slide 9)



Source: Adapted from Piwoz and Preble 2000

Improving nutritional status and food security issues for all, including HIV-infected pregnant or lactating women or adolescent girls so mothers can remain productive, is a challenge for policymakers. The following sections look at special considerations for nutritional care and support of HIV-infected pregnant or lactating women or adolescent girls to promote adequate gestational weight gain, improve or maintain good nutritional status, prevent weight loss during lactation, reduce maternal mortality, and delay disease progression.

Nutritional implications for the HIV-infected pregnant or lactating woman or adolescent girl (slide 10)

The negative relationship between malnutrition and HIV discussed in earlier sessions has particular implications for women of reproductive age.

The HIV-infected pregnant or lactating woman (slides 11, 12, 13, 14)

In all women, malnutrition **during pregnancy** increases maternal morbidity and mortality and affects birth outcomes. For the HIV-infected pregnant woman, HIV infection causes nutrient losses that increase nutritional requirements and the risk

of malnutrition, which increases the risk of mother-to-child transmission (MTCT) of HIV.

Semba et al (1994) and Nduati (1995) have shown that vitamin A deficiency, even in mild and moderate forms, is independently associated with HIV viral load in blood, genital secretions, and breastmilk, increasing the risk of MTCT. Vitamin A deficiency is common among African populations, including women.

Randomized placebo-controlled studies have been carried out in Africa by Coutsoudis et al (1999) and Fawzi et al (1998) on the impact of vitamin A supplementation and other vitamin supplements on vertical HIV transmission. None of these studies has shown a benefit of vitamin A supplementation in reducing vertical HIV transmission during pregnancy or the intrapartum period. However, the studies found a marked decrease in prenatal mortality and an increase in birth weight that was associated with vitamin A supplementation in pregnancy.

Caution must be exercised with regard to vitamin A supplementation. A 2002 study in Tanzania by Fawzi et al found that vitamin A supplementation of HIV-infected pregnant women from 20 weeks gestation and throughout lactation actually increased the risk of vertical transmission of HIV through breastfeeding. On the other hand, though the results were not statistically significant, providing HIV-infected, immunologically and nutritionally compromised breastfeeding mothers with a multivitamin that did not contain vitamin A was associated with a decrease in HIV-1 transmission through breastfeeding and in child mortality. Given these research findings, Fawzi suggests that providing multivitamins to HIV-infected lactating women may improve their child's health. WHO does not recommend daily vitamin A supplementation during breastfeeding, and such supplementation is not advised for HIV-infected women. A multivitamin should contain less than 800 micrograms or 2500 IU of vitamin A per day.

Providing multivitamin supplementation to HIV-infected women during pregnancy has shown decreased adverse pregnancy outcomes and increased T-cell counts (Fawzi et al 1998). In yet another study giving multivitamin supplements daily during pregnancy to HIV-infected women improved weight gain among these women (Villamor et al 2002). These studies suggest that providing a daily multivitamin to HIV-infected women as part of their care is beneficial.

Anemia already affects half of all pregnant women in Africa and is common in HIV-infected women. Anemia is a risk factor for pre-term delivery and low birth weight, and both of these conditions increase the risk of MTCT. However, it is important to recognize that there are many causes of anemia in HIV infection. A study of multivitamins plus iron and folic acid given during pregnancy to HIV-infected mothers (Fawzi et al 2000) resulted in increased weight gain during pregnancy, lower risk of low birth weight, and pre-term delivery, and other positive related outcomes.

Increased energy demands **during lactation** may also increase weight loss, a risk factor for reduced survival in HIV infection. The HIV-infected lactating woman is at an increased risk for malnutrition and may be at an increased risk for mortality, although results are not substantiated.

There has been very little study of the impact of breastfeeding on maternal HIV disease progression. Two published studies that contain such evidence were not originally designed to address this issue. One study, in Kenya (Nduati 2001), found that HIV-infected mothers who breastfed were more likely to die in the 2 years following delivery compared with mothers who did not breastfeed. A study in South Africa (Coutsoudis et al 2001) found no increased morbidity or mortality in women who breastfed. According to WHO, there is no conclusive evidence to suggest that HIV-1-infected women who breastfeed are at an increased risk of mortality. More research is required before changes in policy can be made against breastfeeding by HIV-infected mothers for maternal survival can be made.

It is also not known whether maternal nutritional supplementation can improve the health and prolong the survival of HIV-infected mothers who breastfeed. This issue is currently under study in Zambia and Malawi

The pregnant or lactating adolescent (slide 15)

A young maternal age (11-18 years) increases nutrient needs above the ordinary demands of pregnancy. This is a result of the combined needs for adolescent growth and fetal growth and development (American Dietetic Association and Dietitians of Canada 2000). For the HIV-infected pregnant or lactating adolescent, nutrient requirements increase as a result of HIV infection. Thus the requirement for energy, protein, and other nutrients increases overall to ensure continued growth of the

adolescent mother, growth and development of the fetus, and fulfillment of the increased demands on the body by HIV infection.

The HIV-infected pregnant or lactating adolescent is at high risk of malnutrition and should be closely monitored. Improving nutrition prior to pregnancy should be the main goal to minimize the impact of HIV on nutrition. This is a challenge because many women and adolescent girls do not know they are HIV infected until the disease is advanced or until they choose to be tested for HIV at the antenatal clinic. Early nutrition interventions can minimize the impact of HIV on the mothers' nutritional status and health.

Nutritional requirements of HIV-infected pregnant or lactating woman (slide 16)

Much is known about the increased nutritional requirements of HIV-positive women who are pregnant or lactating, but the exact amounts of nutrients needed in case of secondary infections is still to be determined.

What is known (slide 17)

During pregnancy and lactation the requirements for energy, protein, and various micronutrients increase to meet the demands for adequate gestational weight gain, growth and development of the fetus, and milk production. HIV infection causes excess nutrient loss and malabsorption, further increasing the nutritional requirements of HIV-infected pregnant or lactating women. The requirements may be higher if the HIV-infected pregnant woman is suffering from secondary infections. These requirements are in addition to those needed to support a normal and healthy pregnancy and lactation. As a result, the HIV-infected pregnant or lactating woman is at greater nutritional risk than the non-HIV-infected woman (table 1). The HIV-infected pregnant or lactating woman or adolescent girl requires additional food as a result of the combined needs to meet the extra demands for nutrients during pregnancy and lactation and the demands HIV infection imposes on the body.

What is not known (slide 18)

Because studies have not demonstrated that increased protein intake by PLWHA leads to positive clinical outcomes, there is no current recommendation for HIV-

infected pregnant or lactating women to increase protein intake as a result of HIV infection. However, further research is needed on this subject. Tables 2 and 3 list the energy and protein requirements for a healthy, non-HIV-infected woman during pregnancy and lactation.

Table 1 Comparison of nutritional risks of HIV-infected and non-HIV-infected pregnant and lactating women (slide 19)

HIV-infected	Non-HIV-infected
• Increased need for energy, protein, and other nutrients secondary to the demands of pregnancy or lactation • Increased need for energy, protein, and other nutrients secondary to HIV infection • Increased risk of opportunistic infections and malnutrition • Increased risk of weight loss and delivery of a low-birth weight baby as a result of HIV infection • Increased risk of inadequate dietary intake and hence malnutrition as a result of depression, isolation, or stigmatization • Increased risk of MTCT with poor nutritional status • Increased risk of transmitting the virus to the baby through breastfeeding	• Increased need for energy, protein, and other nutrients secondary to the demands of pregnancy or lactation

Recommended nutritional requirements for the HIV infected pregnant or lactating woman (slide 20)

Similar to HIV, common secondary infections such as fever and diarrhea increase energy and nutrient requirements. Fever, a common symptom in HIV-infected people, increases energy requirements by about 10 percent for every degree rise above normal body temperature. The energy and nutrient requirements imposed by a co-infection such as fever may need to be taken into account when assessing the nutritional requirements of someone infected with HIV, just as they would be for someone who is not HIV infected.

HIV infection increases the energy requirements of a pregnant or lactating HIV-infected woman, and fever increases them further. The current recommended increase in energy intake for HIV-infected pregnant and lactating women is the same as for non-pregnant, non-lactating HIV-infected women (10 percent during the asymptomatic phase and 20 percent-30 percent during the symptomatic phase). The additional energy (10 percent) is added to the basic energy requirements for a non-pregnant, non-lactating woman of the same age and physical activity level (Seumo-Fosso and Cogill 2003).

For example, if a 25-year-old moderately active 55 kg woman requires 2,140 kcal daily, an asymptomatic HIV-infected moderately active pregnant woman of the same age and weight will require approximately 2,140 kcal + 214 kcal (10 percent increase due to HIV) + 285 kcal (due to pregnancy) = 2,639 kcal daily. If she is symptomatic (e.g., has fever), then she will require 20 percent-30 percent additional energy (428 kcal-642 kcal).

Table 2 Recommended energy and protein requirements for healthy women during pregnancy (slide 21)

Source	Energy requirements	Protein requirements
FAO/ WHO 1985	285 kcal/day above non-pregnant level if physical activity is maintained 200 kcal/day above non-pregnant level if physical activity is reduced	Average 6 g/day of protein above non-pregnant levels throughout pregnancy
Institute of Medicine, U.S. National Academy of Sciences 1990	300 kcal/day above non-pregnant levels (Based on theoretical calculations that assume a maternal weight gain of 12.5 kg and median infant birth weight of 3.3 kg).	**60 g/day of protein** (10 g/day above the recommended dietary allowance for protein) throughout pregnancy

The Institute of Medicine of the National Academy of Sciences in the United States gives the most recent (1990) recommendations for energy intake during pregnancy.

These recommendations are universally accepted. The FAO/WHO recommendations published in 1985 are the most commonly used in developing countries.

The healthy non-HIV-infected woman needs about an additional 200 kcal per day and more if her pre-pregnancy weight is low. For the healthy lactating woman, separate allowances have been set for the first and second 6 months of lactation, reflecting the differences in the amount of milk produced. Table 3 shows FAO/WHO-recommended energy and protein requirements. Most breastfeeding women in developing countries need an extra 500 kcal per day to meet the energy demands of lactation.

Table 3 Recommended energy and protein requirements for healthy women during lactation (slide 22)

Energy **(FAO/WHO, 1985)**	Extra **500 kcal/day** above non-lactating levels (increase if the mother is breastfeeding more than one child)
Protein **(FAO/WHO, 1985)**	Extra **16g/day** for the first 6 months of lactation, **12g/day** for the second 6 months, and 11g/day thereafter

Micronutrient supplementation for pregnant and lactating women and adolescent girls

Pregnant women and infants are the most vulnerable to iron deficiency. Anemia during pregnancy is a risk factor for infant and probably maternal morbidity and mortality. Iron deficiency anemia of up to 80 percent is found in some countries of sub-Saharan Africa. Because anemia is so prevalent, iron and folic acid supplementation is recommended during pregnancy and lactation for 6 months in pregnancy. If started late, this supplementation should extend into the post-natal period for 6 months where the prevalence of anemia is < 40 percent. Where the prevalence is > 40 percent, supplementation is recommended for 6 months in pregnancy and 3 months post-partum for a total of 9 months (WHO/BASICS/UNICEF 1999). Iron and folic acid supplements should be provided to HIV-infected pregnant women as per existing national standards for antenatal care for all pregnant women.

Anemia is common during HIV infection (Levine et al 2001), and in the HIV-infected mother anemia increases the risk of mortality. The causes of anemia in HIV infection are complex. In developing countries anemia in pregnant or lactating women may be a result of poor dietary intake, poor absorption of iron or other vitamins such as folate and vitamin B_{12}, and co-infections such as malaria and hookworm. For the HIV-infected pregnant woman, prolonged use of some antiretroviral drugs (ARVs), such as AZT (Zidovudine), can cause anemia that presents as megaloblastic anemia like that seen with folate or vitamin B_{12} deficiency.

In many developing countries iron supplementation during pregnancy and lactation is recommended. Excessive amounts of iron may contribute to HIV disease progression (Clark and Semba 2001; Gorduek et al 2001; Semba et al 2001). However, Clark and Semba (2001) concluded that the available data did not contraindicate the current practice of iron supplementation in developing countries with a high prevalence of both iron deficiency anemia and HIV. Therefore, pregnant women should receive iron supplementation to prevent anemia as per the standard of care for pregnant women in the country, pending further review of the issue. Table 4 gives WHO/UNICEF guidelines for iron and folic acid supplementation for all pregnant women.

Table 4 Recommended iron and folic acid supplements for pregnant women to prevent anemia (slide 23)

Prevalence of anemia in pregnant women in the area	Dose	Duration
< 40%	60 mg iron + 400 mcg folic acid daily *(where iron supplements containing 400mcg folic acid are not available, an iron supplement with a lower level of folic acid may be used)*	6 months in pregnancy *(or if started late, extend to post-natal period for a total of 6 months. If this is not possible, increase the dose to 120 mg iron in pregnancy)*
>40 %	60 mg iron + 400 mcg folic acid daily *(where iron supplements containing 400 mcg folic acid are not available, an iron supplement with a lower level of folic acid may be used)*	6 months in pregnancy plus 3 months post-partum (for a total of 9 months)

Source: WHO/BASICS/UNICEF 1999

Data on other micronutrient intake for HIV-infected pregnant and lactating women are limited. Only Fawzi et al (1998) have studied this issue, among pregnant and lactating HIV-infected women in Tanzania. In this randomly assigned placebo-controlled trial, HIV-infected pregnant women at 12-27 weeks gestation received either a daily prenatal supplement of vitamin A (1,667 mcg RE, or 5,000 IU, preformed vitamin A plus 30 mg or 5,000 mcg RE of beta-carotene], a multivitamin containing folic acid, thiamin, riboflavin, niacin, and vitamins C, B_6, B_{12} and E, both the vitamin A and multivitamin, or neither (placebo group). The study showed no significant effect on the risk of HIV transmission from either vitamin A or multivitamin supplementation. However, the multivitamin supplements, not the vitamin A, decreased the risk of fetal mortality. The researchers concluded that multivitamin supplementation is a low-cost way to reduce adverse pregnancy outcomes in HIV-1-infected women.

The pregnant adolescent girl has an increased need for iron, folic acid, and zinc. A multivitamin supplement, where available, can help meet these increased needs.

The use of high levels of supplements (usually **greater than 10 times** the recommended daily allowance) is not recommended because it can lead to nutrient toxicity that can be harmful to the body. Nutrients that may become toxic if taken in large amounts include iron, zinc, selenium, and vitamins A, B, C and D. For the HIV-infected pregnant or lactating woman, a high intake of these nutrients could do more harm. For example, studies have shown that high intakes of iron may contribute to HIV-disease progression (Semba and Gary 2001), and that for the lactating HIV-infected mother, vitamin A supplementation may increase the risk of HIV-1 transmission (Fawzi et al 2002).

Note: Almost all the studies mentioned have shown that multivitamin supplementation is associated with health benefits for both HIV-infected mothers and their infants and should therefore be provided where available.

Nutritional recommendations for healthy adolescents during pregnancy and lactation

The nutritional requirements of healthy pregnant and lactating adolescents are known, but energy, protein, and other nutrient requirements to compensate for HIV infection in pregnant and lactating adolescents have not been determined.

What is known (slides 24, 25)

The risk of malnutrition increases in teenage pregnancies because of the combined needs of the growing adolescent and the growing fetus, especially if the pregnancy occurs less than 2 years after the start of menses. Nutrition requirements should consider energy needs for normal growth of the adolescent and weight gain needed for the pregnancy. Pregnant adolescents need an **extra 300 kcal/day** in the second and third trimesters.

The American Dietetic Association and Dietitians of Canada (2000) recommend that pregnant adolescents eat at least 2,000 kcal/day. In many developing countries adolescent girls who are not pregnant or HIV infected may not get adequate energy for growth and development. Therefore, chances are that many pregnant adolescent girls are already undernourished. Getting more than the recommended 2,000 kcal/day to meet the demands of adolescent pregnancy may be difficult, especially where food security is a significant concern. See Session 4 for what can be done to

help young adolescent pregnant girls who may be HIV infected, at high nutritional risk, and at high risk for morbidity and mortality.

What is not known (slide 26)

As noted above, the increased energy needed during pregnancy and lactation for HIV-infected women is the same as for other infected adults (i.e. 10 percent during asymptomatic infection and 20 percent-30 percent during symptomatic HIV infection). It is still unclear whether the same applies to an HIV-infected pregnant or lactating adolescent girl. There are no current recommendations to increase protein requirements for the HIV-infected pregnant or lactating adolescent girl.

Practical considerations

Pregnancy and HIV have a negative synergetic effect on the immune function.

- Both impose physiological stress on the body.
- Both affect immune response in women, which increases their vulnerability to viral, bacterial, and fungal infections.
- Both increase metabolism, which increases the requirements for energy, protein, and micronutrients.

These demands superimposed on the HIV-infected pregnant or lactating woman or adolescent girl require regular nutritional assessments (described later) and early nutrition interventions to individualize nutritional care and support.

Research is needed to assess which nutrients are needed and in what amounts for the HIV-positive pregnant or lactating woman or adolescent. Until there is clear guidance, the established nutrition requirements for a normal pregnancy and lactation and the recommended increases in energy intake as a result of HIV infection should be followed. Additional individualized requirements could be recommended based on the nutritional assessment. Country guidelines for vitamin and mineral supplementation for pregnant and lactating women and recommendations for the HIV-positive pregnant or lactating woman should be consulted.

Nutritional care and support for the HIV-infected pregnant or lactating woman or adolescent girl (slides 27, 28, 29)

It is well established that the nutritional well-being of a healthy mother is critical for an uncomplicated pregnancy and positive outcome. Nutritional status has even greater implications for the HIV-infected woman or adolescent, who is at higher risk of delivering premature or low-birth weight infants and being malnourished than the uninfected woman. Poor nutritional status of the HIV-infected mother during pregnancy may also increase the risk of vertical transmission during pregnancy.

For all women, improving nutritional status before and during pregnancy and during lactation can help ensure adequate gestational weight gain and decrease the risk of premature delivery and low birth weight. For the HIV-infected woman in particular, improving nutrition can help strengthen the immune system, prevent weight loss during lactation, prevent maternal malnutrition, and delay disease progression, allowing the woman to remain productive and prolong her quality of life. Nutritional care and support plays an important role in the overall care of the pregnant or lactating woman or adolescent girl living with HIV/AIDS.

Purpose of nutritional care (slide 30)

During **pregnancy** nutritional care is needed to meet the demands of expanded blood volume, growth of maternal tissues, a developing fetus, and loss of maternal tissues at birth, as well as to prepare for lactation.

During **lactation** nutritional care is needed to meet specific nutrient needs to optimize maternal post-natal nutritional status, the quality and quantity of breastmilk production, and infant growth and development.

Nutritional care during pregnancy and lactation is needed for all pregnant and lactating women or adolescents, regardless of their HIV status. However, the challenge is to ensure that HIV-infected pregnant or lactating women or adolescents are able to maintain good nutritional status throughout pregnancy to carry their pregnancies to term. HIV infection increases not only the pregnant woman's nutrition requirements but also her susceptibility to infection, which in turn puts her at high risk for malnutrition and pre-term delivery. This vicious cycle can be controlled to some extent through good nutritional care and support. This should be

done as early in the pregnancy as possible to minimize the impact of HIV on the woman's nutritional status and delay disease progression. The woman can then remain productive and able to take care of her infant, herself, and her family. Psychological support for the HIV-infected pregnant or lactating woman or adolescent girl is integral to this care.

Practical considerations

1. Antenatal contacts with mothers can be used for voluntary counseling and testing (VCT) to determine as early in the pregnancy as possible whether the mother is HIV infected. Antenatal contacts can also be used for nutritional assessments to determine whether eating patterns provide adequate nutrient intake and to allow for early nutrition interventions, monitor weight gain during pregnancy, and support successful infant feeding post-partum.

2. Actions have been identified for the health sector can carry out to improve the nutrition of pregnant and lactating women, including those who are HIV infected. These Essential Health Sector Actions aim to ensure the following outcomes (Huffman et al 2001):

   - Adequate food intake during pregnancy and lactation
   - Adequate micronutrient intake during pregnancy and lactation
   - Reduction in malaria infection in pregnant women in endemic areas
   - Reduction of hookworm infection in pregnant women in endemic areas
   - Birth spacing of 3 years or longer

See **Handout 6.1**: Health Sector and Maternal Actions to Improve Maternal Nutrition in Africa.

The Essential Health Sector actions can be achieved through contacts with women during antenatal care, delivery and post-partum care, child health visits, and family planning services. Each contact point can be used to provide nutritional care and support to improve the nutrition of the pregnant and lactating women and adolescent girls.

Management of secondary infections is important to minimize their impact on the mother's nutritional status. This management includes promoting the treatment of opportunistic infections and management of common HIV symptoms that are diet related, such as nausea, vomiting, diarrhea, fever, anorexia (loss of appetite), taste changes, sores in the mouth or throat (thrush), constipation, heartburn, and bloating. Some of these common HIV symptoms (i.e., nausea, vomiting, constipation, heartburn, and bloating) are also common in pregnancy.

Anorexia, nausea, vomiting, oral thrush, constipation, heartburn, and bloating can have a serious impact on the HIV-infected pregnant woman's nutritional status because they reduce food intake. Diarrhea and vomiting increase nutrient losses, and fever increases nutrient requirements. Management of these symptoms should be prompt to minimize their impact on the nutritional status and health of the mother.

Nutritional care should be part of a comprehensive program that provides health care as well as emotional, psychological, and spiritual support for the HIV-infected mother and her family.

Goals of nutritional care and support for the HIV-infected pregnant or lactating woman or adolescent girl (slide 31)

Lwanga (2001) lists the following goals of nutritional care and support for HIV-infected pregnant women (slide 32):

- Improve nutritional status. Maintain weight, prevent weight loss, and preserve lean body mass.

- Ensure adequate weight gain during pregnancy. A pregnant woman should gain at least 1 kg per month during the second and third trimesters.

- Ensure adequate nutrient intake by improving eating habits and building stores of essential nutrients (both macronutrients and micronutrients). These nutrients include carbohydrates, protein, important antioxidant nutrients, and other vitamins and minerals necessary for the functioning of the immune system.

- Prevent food-borne illnesses by promoting hygiene and food and water safety.

- Enhance the quality of life by promptly treating infections and managing the symptoms that affect food intake to minimize the impact of secondary infections on nutritional status.

- Provide palliative care as necessary during advanced stages of the disease.

Components of nutritional care and support for the HIV-infected pregnant or lactating woman or adolescent girl (slide 33)

The HIV-infected pregnant or lactating woman or adolescent girl needs regular nutritional assessments and early nutrition interventions. Programs that provide nutritional care and support for HIV-infected pregnant and lactating women should include the following components:

Nutrition screening and assessment

The nutritional assessment is important to gather information on the nutritional status and adequacy of the diet and to identify risk factors for developing nutritional complications. The earlier in the pregnancy this assessment can be done the better. The information gathered should be interpreted to identify problems that put the woman at high nutrition risk or contribute to the malnutrition. The nutritional assessment should help counsel the mother on her diet to ensure adequate gestational weight gain, improve eating habits, and identify and address food insecurity issues. The goal of the nutritional assessment and interventions are to improve nutritional status, enhance quality of life, and prolong survival of the mother (American Dietetic Association and Dietitians of Canada 2000).

Refer to **Handout 6.2**: Guide to Nutritional Assessment of HIV-Infected Pregnant and Lactating Women

Components of a nutritional assessment (slide 34)

Nutritional assessments include the following:

A. Nutrition history

- Dietary intake and adequacy
- Eating habits
- Food intolerance and aversions to related symptoms
- Dietary problems (e.g., poor appetite, difficulty chewing and swallowing, gastrointestinal problems, and pain in the mouth and gums)
- Hygiene and food preparation and handling practices
- Psychosocial factors contributing to inadequacy of intake, such as social isolation, depression, stigma, and inability to prepare food
- Fatigue
- Physical activity
- Knowledge of food and nutrition issues
- Use of vitamin and mineral supplements and alternative practices

B. Physical assessment

- Anthropometric measurements
    - **Pregnant woman**: Height, pre-pregnancy weight, weight gain during pregnancy (at least 1 kg per month in the second and third trimesters)
    - **Lactating woman**: height, current weight, pre-pregnancy weight, weight during pregnancy and 6 weeks post-partum; **body mass index (BMI) of less than 18.5 indicates nutrition risk**
- Measurement of mid-upper-arm circumference (MUAC) for evidence of loss of muscle mass; **less than 23 cm indicates nutrition risk**

- Screening for oral or pharyngeal inflammation or pain
- Screening for pallor (inner eyelids and palms)

C. Medical history

- Gastrointestinal problems (e.g., diarrhea, abdominal pain, nausea, vomiting)
- Pattern of bowel movements (constipation or diarrhea)
- Presence of opportunistic infection
- Concurrent medical problems (e.g., diabetes, hypertension, malaria)

D. Medication profile

- Drug use (ARVs, alternative therapies, and other medications)
- Side effects of medications with nutritional implications
- Nutrition-medication interactions
- Traditional herbs or medicine interactions

E. Biochemical data (laboratory data where available and feasible)

- Serum albumin
- CD4 and viral load counts
- Evaluation of anemia: Iron (Hb), vitamin $B_{12,}$ and folate status

F. Psychosocial profile

- Living environment and functional status

- Income, housing, amenities for cooking, access to food, attitude towards nutrition and food preparation, age, family or support system, and educational level

G. Profile of lactating woman

- Family and other support for breastfeeding

- Breastfeeding pattern: Exclusive breastfeeding, mixed feeding (breastmilk and formula), breastfeeding during pregnancy

Practical considerations for nutrition interventions

1. Encourage women to eat a varied diet with extra food and get additional rest, particularly in the third trimester of pregnancy. The HIV-infected pregnant or lactating adolescent may require even more food than the HIV-infected pregnant or lactating woman. However, all interventions should be based on the individual nutritional assessment.

2. Conduct nutritional assessments for women with weight gain below the recommended range. This may indicate a possible medical problem (e.g., an opportunistic infection), inappropriate energy intake, or food insecurity. Identify and implement appropriate interventions.

3. Monitor weight gain during pregnancy. Pregnancy weight gain of less than 1.5 kg per month in the second and early third trimesters, or less than 10.5 kg during the entire pregnancy, is of serious concern, and the mother should be referred for further care. **Note:** This applies to <u>all</u> pregnant women. The gestational weight of HIV-infected pregnant women or adolescents should be monitored more regularly because of the impact of the infection on the body. In this way any faltering can be addressed early and good nutritional status maintained.

4. Be aware of community services and programs (e.g., food distribution programs, women's groups for psychosocial support) that may benefit nutritionally vulnerable women. Establish links and refer women who need these services.

5. Assess the HIV-infected pregnant woman for other risk factors that can affect nutritional status and pregnancy outcome. These factors include adolescence,

previously existing malnutrition, underweight status at the start of pregnancy, anemia, gestational diabetes, and opportunistic infection.

6. Discuss with the mother dietary management and appropriate interventions of diarrhea, nausea, vomiting, malabsorption, loss of appetite, oral thrush, and opportunistic infections. These conditions may prevent weight gain in the HIV-infected pregnant woman or adolescent and have a profound impact on nutritional status and disease progression in an HIV-infected pregnant woman.

7. Be aware of cultural foods, traditional therapies, and practices that are harmful during pregnancy and lactation and counsel the mother about them.

8. Counsel the mother on foods to avoid, especially foods that expose her to bacterial or enteric infection, which can hasten disease progression. These foods include raw eggs or foods with little nutritional value or that do not improve nutritional status. For example, coffee and alcohol decrease appetite, interfere with metabolism, and in the case of alcohol, may interact with some medications to decrease their efficacy.

9. Note the medications, including ARVs, that the HIV-infected pregnant or lactating woman is taking and be aware of the food and drug interactions that can have a negative impact on the woman's nutritional status by reducing food intake. Provide appropriate interventions as required.

10. Improving micronutrient status is an important step to decrease maternal malnutrition, although the additional amounts required by the HIV-infected pregnant or lactating woman have not been determined. Provide multivitamins and other vitamin or mineral supplements as per the country guidelines or WHO/UNICEF guidelines for all pregnant women. Stress the use of iodized salt to prevent iodine deficiency.

11. If multivitamins are recommended to improve the adequacy of the diet or the mothers' nutritional status, carefully analyze their composition. High doses of many nutrients (more than **10 times** the usual recommended dietary allowance) may harm the immune system rather than benefit the mother. For example, vitamin C in excess of 1,000 mg may cause or exacerbate diarrhea.

In summary, it is important to improve the diet and eating habits of HIV-infected pregnant or lactating women and adolescent girls. If the diet is not varied, a

multiple nutrient supplement, where available, may be needed. Managing barriers to weight gain is important. Ensure that the woman eats sufficient food daily and that the types of food used to prepare meals and snacks provide her with enough critical nutrients to meet her daily needs for pregnancy and lactation. Provide information and counseling on managing feeding and appetite problems during pregnancy and, if necessary, during lactation.

Refer to **Handout 6.3**: Checklist for the Nutritional Assessment of the Pregnant or Lactating HIV-infected Pregnant Woman or Adolescent Girl.

Nutrition education and counseling (slide 34)

Nutrition education and counseling should be an integral part of nutritional care and support of the HIV-infected pregnant or lactating woman or adolescent. Nutrition education and counseling are important to help the mother understand the need to maintain an adequate diet and how to manage common gastrointestinal problems related to HIV and pregnancy that may have a negative impact on nutritional intake.

Counseling on the dietary management of common symptoms that affect intake is essential to ensure continued adequate energy and nutrients to maintain lean body mass, ensure optimal gestational weight gain during pregnancy, and delay disease progression. In addition, counseling and education should address vitamin and mineral supplementation (particularly iron and folate supplementation) during pregnancy, malaria and hookworm treatment as required, and adequate diet to support lactation and prevent weight loss.

Group educational talks can address topics of concern to most women, leaving time in individual sessions for evaluation and counseling. Topics for group talks may include food safety, importance of fluids and hydration during lactation, and locally available nutrient-dense food choices. Antenatal clinics and women's support groups are settings where group educational talks could be beneficial.

Nutrition counseling in the context of HIV/AIDS

Many people think counseling is giving information and advice. But counseling an HIV-infected pregnant woman or adolescent girl may involve more than imparting information and advice on diet, nutrition, and healthy eating. The counselor may

also help the mother address her feelings about and reactions to being HIV infected. A counselor who understands how clients react to HIV infection can provide nutrition counseling to help them examine their options and make the best choices. In this way the clients are more likely to comply with the nutrition information and advice (ADA and DOC 2000; Field-Gardner et al 1997). An effective counselor must:

- Build a trusting relationship with the client
- Maintain professionalism and confidentiality at all times
- Treat the client with respect and acceptance (avoid being judgmental)
- Respect the client even if the counselor does not agree with the client's attitudes, beliefs, and life choices

Nutrition counseling and education to prevent malnutrition during pregnancy and lactation and improve reproductive health and birth outcomes can benefit all pregnant and lactating women, regardless of their HIV status. A list of practical considerations for nutrition counseling is provided in **Handout 6.4** and a checklist for nutrition counseling in **Handout 6.5**. This checklist can be used during field visits and classroom role-plays.

Food safety and hygiene (slide 35)

Improper food handling can cause infection in anyone, but for people infected with HIV, food-borne illnesses can cause even more damage because their weakened immune systems increase their susceptibility to other infections (Lwanga 2001). Therefore, a main goal of nutritional care and support for HIV-infected pregnant or lactating women or adolescents is to avoid food-borne illnesses by educating and counseling on hygiene. This can help prevent infections that cause diarrhea, a common cause of HIV disease progression. Hygiene includes water and sanitation and proper food handling and safety.

During the counseling and education session, based on the analysis of the nutritional assessment, the counselor should stress safe food handling practices (see **Handout 6.6**) to avoid food-borne illnesses.

Management of diet-related HIV problems (slide 36)

Common diet-related HIV problems include anorexia, nausea, vomiting, diarrhea, constipation, bloating, mouth or throat sores, fever, malabsorption, fatigue, and taste alterations. These can all be barriers to gaining weight during an HIV-complicated pregnancy. Dietary modifications to manage the conditions that affect food intake can minimize the impact on the woman's nutritional status, maximize nutritional intake, ensure adequate gestational weight gain, maintain weight and muscle mass during lactation, and improve quality of life for the infected woman.

Appropriate locally available and affordable dietary interventions should be explored and used as much as possible. Use of medications together with dietary interventions to manage common dietary problems should be an integral part of nutritional care and support for HIV-infected pregnant or lactating women or adolescent girls. Safe traditional therapies that help relieve symptoms should also be considered and encouraged. **Handout 6.7** provides a guide on the dietary management of some common HIV symptoms.

Physical activity (slide 37)

Maintaining physical activity has been shown to improve body composition and quality of life in people living with HIV/AIDS. Exercise can also help stimulate the appetite and increase energy. The pregnant or lactating woman should be encouraged to maintain physical activity as much as possible. Exercise as simple as a daily walk should be encouraged. However, as pregnancy advances the pregnant woman or adolescent girl should be encouraged to get more rest and, if possible, avoid strenuous physical activity or work.

Safer sex and reproductive health practices (slide 37)

Education and counseling on HIV prevention is important. Safer sex practices such as condom use should be promoted and VCT services provided. These are especially important for the HIV-infected pregnant or lactating woman or adolescent girl because acute infections, including sexually transmitted infections (STIs), may increase maternal viral replication, causing a higher maternal viral load. There is strong evidence that a high viral load increases the risk of vertical transmission of HIV during pregnancy and lactation and further weakens the immune system, making

women even more susceptible to opportunistic infections. Condom use may help HIV-positive women avoid infecting their uninfected partners or prevent repeated exposure to infection from HIV-infected partners. Repeated exposure to HIV can increase maternal viral load and increase the risk of MTCT.

Psychosocial support (slide 37)

Psychosocial support is an important part of nutritional care and support for the HIV-infected pregnant or lactating woman or adolescent. Malnutrition with wasting has an impact on self-esteem, which can lead to depression, isolation, lack of appetite, and an aversion to food. For the HIV-infected pregnant or lactating woman or adolescent, this can increase the risk of malnutrition.

It is important to explore feelings such as guilt, fear, and denial when providing psychosocial support. The woman should receive emotional, spiritual, and social support in a supportive environment. Encourage access to peer support where available. Counsel and support the woman on coping with possible stigmatization and discrimination, especially if she has not disclosed her HIV status to her partner, family, and friends.

Antenatal and post-natal care (slide 38)

Good antenatal and post-natal care are integral components of nutritional care and support for women infected with HIV. The antenatal clinic is a good place to start early nutrition interventions to minimize the impact of HIV on a woman's nutritional status. Monitoring weight and diet at all antenatal contacts can help ensure adequate weight gain and food intake during pregnancy (see **Handout 6.1**: Health Sector and Maternal Actions to Improve Maternal Nutrition in Africa). Early nutrition interventions for HIV-infected pregnant women may help improve their overall pregnancy outcomes.

Where available, ARVs should be provided to reduce mother-to-child transmission of HIV. Antimalarial prophylaxis and deworming medications should be provided as per national protocols to reduce the risk of anemia and low birth weight. Where possible forge links with traditional birth attendants and include them in discussions on reproductive health practices. Inclusion of the traditional birth attendants can help reduce the risk of MTCT.

Infant feeding options and risks (slide 39)

All pregnant women and adolescents should be counseled on infant feeding options and risks. HIV-infected women and adolescents should be informed about ways to reduce risk of HIV transmission to the infant and counseled on related infant feeding options and risks. HIV-infected mothers who choose to breastfeed should be counseled on how to make breastfeeding safer, and mothers who decide not to breastfeed should know the options and risks of replacement feeding.

For breastfeeding women who are at risk of malnutrition, programs should consider providing nutritional support to prevent nutritional depletion, weight loss, and disease progression, as well as to enhance the success of exclusive breastfeeding (the efficacy of this is now being studied). Refer to Session 7 for further information on infant feeding and prevention of mother-to-child transmission of HIV.

Medications and ARV therapy (slide 40)

Medications used to treat HIV-opportunistic infections may result in negative drug-nutrient interactions or cause side effects. As access to ARVs increases, more women will be treated with ARVs to delay disease progression and reduce the risk of transmission of the virus to their infants. Many ARVs and medications prescribed to treat opportunistic infections have side effects that may affect dietary intake. These side effects include nausea, vomiting, diarrhea, constipation, anorexia, and changes in taste.

The side effects of medications should be managed to ensure continued food intake and adherence to the medications (see **Handout 5.1**: Caring for Symptoms Associated with HIV in Adults for details on managing common problems in HIV infection). In addition, some food and drug-nutrient interactions have to be taken into consideration, and proper counseling should be provided on the use of these medications by the pregnant or lactating HIV-infected woman or adolescent. For example, supplements containing iron and zinc should not be taken with the antibiotic Ciprofloxacin. Refer to Session 9 on the dietary management of food and drug interactions for further details.

Issues and challenges for nutritional care and support of HIV-infected pregnant or lactating women or adolescent girls (slide 41)

Lwanga and Piwoz (2001) have identified a number of issues and challenges involved in nutritional care and support of pregnant or lactation women and adolescents that policymakers and health workers should address. First, although nutrition improvement is likely to have its greatest impact early in HIV disease, most people, including women, do not know they are HIV-infected until they have advanced disease (slide 42). This means a need for more accessible counseling and testing services so that women can know their HIV status and deal with it earlier. Improving access to treatment for HIV or opportunistic infections may increase willingness to be tested for HIV.

Stigma and discrimination continue to be problematic, especially for women, who for social and cultural reasons may have less access to care and support services than men (slide 43). Families are more likely to buy medication and care for ill males than females. Stigma, gender issues, and cultural constraints must be addressed to improve care for women and their children.

Access to food is one of the main challenges facing people living with HIV/AIDS in Africa (slide 44). Food insecurity increases the vulnerability of women and young girls to HIV infection as social status is diminished, thus compromising their ability to choose safer and healthier life strategies. Lack of adequate food and nutrition significantly complicate the management of HIV/AIDS.

The gender challenges of HIV, including women's vulnerable social status and legal rights, must be faced (slide 45). In several countries studies have shown that rural women whose husbands died of AIDS were forced into commercial sex to survive because they had no legal rights to their husbands' property. This increases food insecurity and risk of malnutrition. Reversing the spread of HIV will require changes in women's rights and empowerment.

In most cases planting food crops is the responsibility of women (slide 46). AIDS-affected households may plant less food or replace labor-intensive but nutritious crops with root crops that mature quickly but are less nutritious and profitable. The move away from profitable or nutritious crops contributes to household food

insecurity and may increase malnutrition, particularly in nutritionally vulnerable pregnant and lactating women and children.

HIV/AIDS adds to the already heavy burden women face as workers, caregivers, educators, and mothers (slide 47). Women are responsible for caring for the sick when they themselves may be infected. At the same time, in many countries their legal, social, and political status makes them more vulnerable to HIV/AIDS.

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DISCUSSION POINTS 6

1. What are the most important considerations for nutritional care and support for HIV-infected women pre-pregnancy, in the antenatal period, and during the post-partum period?

2. What are the important nutrition considerations and interventions for the HIV-infected pregnant or lactating adolescent girl?

3. What are the most important practices for a health worker to consider when providing nutritional care and support to an HIV-infected pregnant or lactating woman?

4. Discuss how the issues and challenges mentioned affect the nutritional care and support of HIV-infected pregnant and lactating women in your country.

5. What steps, if any, have been taken in your country to address these challenges?

6. What components of nutritional care and support mentioned are provided in any of the programs you have visited in your field trips? What recommendations would you make to help the programs include missing components?

7. What is being done locally and nationally to address gender issues that exacerbate the impact of HIV/AIDS on women?

8. What ideas do you have to address these issues?

HANDOUT 6.1 Health Sector and Maternal Actions to Improve Maternal Nutrition in Africa

This handout can supplement the Nutrition Job Aid for antenatal care in regions with high HIV prevalence to improve nutrition for the HIV-infected mother.

Outcomes	Essential Health Sector Actions	Maternal actions
1. Adequate food intake during pregnancy and lactation	▪ Encourage increased food intake during pregnancy and lactation ▪ Monitor weight gain in pregnancy ▪ Counsel on reduced energy expenditure	▪ Eat at least one extra serving of staple food per day during pregnancy and the equivalent of an extra meal per day during lactation ▪ Gain at least 1kg per month in the second and third trimesters of pregnancy ▪ Rest more during pregnancy and lactation
2. Adequate micronutrient intake during pregnancy and lactation	▪ Counsel on diet diversification ▪ Prescribe and make accessible iron and folic acid supplements ▪ Assess and treat severe anemia in women ▪ Distribute vitamin A to post-partum women	▪ Increase daily consumption of fruits and vegetables, animal products, and fortified foods, especially during pregnancy and lactation ▪ Consume daily supplements (iron/folic acid – 60 mg iron + 400 mg folic acid- or multiple vitamin/mineral supplements) during pregnancy and the first 3 months post-partum ▪ **IF** anemic, consume a daily dose of 120 mg iron + at least 400 mg folic acid for 3 months ▪ Consume a high dose (200,000 IU) of vitamin A immediately after delivery or within the first 8 weeks after delivery if breastfeeding and within 6 weeks after delivery if not breastfeeding

3. Reduction of malaria infection in pregnant women in endemic areas	▪ Prescribe and make accessible antimalaria curative or prophylactic drugs to pregnant women according to local recommendations ▪ Treat clinical infections ▪ Promote use of insecticide-treated materials	▪ In the second and third trimesters, take antimalarial drugs as a curative treatment regardless of symptoms OR take weekly antimalarial prophylaxis starting at the first antenatal visit ▪ Seek treatment for fever during pregnancy; take drugs to treat malaria and reduce fever; take iron/folic acid supplements to treat anemia ▪ Use insecticide-treated materials
4. Reduction of hookworm infection in pregnant women in endemic areas	▪ Counsel on preventative measures (sanitation and footwear) ▪ Prescribe and make accessible antihelminthics after first trimester of pregnancy	▪ Wear shoes and dispose of feces carefully to prevent infection ▪ Take a single dose of Albendazole (400 mg) or a single dose of Mebendazole (500 mg) in the second trimester of pregnancy to treat hookworm if endemic (> 50% prevalence)
5. Birth spacing of three years or longer	▪ Promote optimal breastfeeding practices ▪ Promote family planning as a health and nutrition intervention; counsel on the need for a recuperative period to build energy and micronutrient stores ▪ Consider breastfeeding status when prescribing contraception ▪ Promote safer sex.	▪ Initiate breastfeeding in the first hour after birth, breastfeed exclusively for 6 months, and continue breastfeeding for 2 years or more ▪ Practice family planning to space births for at least 3 years; delay pregnancy so that there are at least 6 months between the period of breastfeeding and the subsequent pregnancy ▪ Use contraceptives that protect breastfeeding ▪ Use condoms before deciding to become pregnant and during pregnancy and lactation

Source: Adapted from Essential Health Sector Actions to Improve Maternal Nutrition in Africa, May 2001

HANDOUT 6.2 A Guide to Nutritional Assessment for Pregnant and Lactating Women with HIV Infection

This handout can be used to supplement the Nutrition Job Aid for antenatal care in regions with high HIV prevalence for a more detailed nutritional assessment of the HIV-infected mother.

Nutrition history	• Dietary intake and adequacy, eating habits • Food intolerance and aversions to related symptoms • Dietary problems (e.g., poor appetite, difficulty chewing and swallowing, gastrointestinal problems, pain in mouth and gums) • Sanitation and hygiene practices in food preparation and handling • Psychosocial factors contributing to inadequacy of intake (e.g., social isolation, depression, stigma, inability to prepare food) • Fatigue and physical activity • Use of vitamin and mineral supplements and alternative practices • Knowledge about food and nutrition issues
Physical assessment	• Anthropometric measurements **For pregnant woman**: Height, pre-pregnancy weight, weight gain during pregnancy (mother's weight gain should be at least 1kg per month in the second and third trimesters of pregnancy) **For lactating woman:** Height, current weight, pre-pregnancy weight, weight during pregnancy and 6 weeks post-partum weight, BMI

	• Evidence of loss of muscle mass (wasting) • Oral or pharyngeal inflammation or pain • Pallor (inner eyelids and palms)
Medical history	• GI problems (e.g., diarrhea, abdominal pain, nausea, vomiting) • Pattern of bowel movements (constipation, diarrhea) • Presence of opportunistic infections • Concurrent medical problems (e.g., diabetes, hypertension, malaria)
Medication profile	• Drug use (ARVs, alternative therapies and other medications) • Medication side effects with nutrition implications • Nutrition-medication interactions and traditional herbs or medicine interactions
Biochemical data (where available)	• Serum albumin • CD4 and viral load counts • Evaluation of anemia (iron, B_{12} and folate status)
Psychosocial profile	• Living environment and functional status (income, housing, amenities to cook, access to food, attitude regarding nutrition and food preparation) • Age • Family or support system

	• Educational level **Lactating mother:** • Family or other supports for breastfeeding • Breastfeeding pattern: Exclusive breastfeeding, mixed feeding (breastmilk and formula), breastfeeding during pregnancy

Source: Adapted from the American Dietetic Association and Dietitians of Canada 2000

HANDOUT 6.3 Checklist for the Nutritional Assessment of the Pregnant or Lactating HIV-Infected Woman or Adolescent Girl

This checklist offers suggestions for conducting an effective assessment to provide appropriate interventions for the client. Students can use this checklist during the antenatal clinic field visit while observing a nutritional assessment and when role-playing any of the case studies at the end of this topic. Students should be able to carry out a thorough nutritional assessment and analysis and make appropriate recommendations at the end of the field visit or role-play.

Did the counselor ask about:	**YES**	**NO**
Nutrition history • Dietary intake and adequacy, eating habits? • Food intolerance and aversions to related symptoms? • Dietary problems (e.g., poor appetite, difficulty chewing and swallowing, gastrointestinal problems, pain in mouth and gums)? • Sanitation and hygiene practices in food preparation and handling? • Psychosocial factors contributing to inadequacy of intake, such as social isolation, depression, stigma, inability to prepare food? • Fatigue and physical activity? • Use of vitamin and mineral supplements and alternative practices? • Knowledge about food and nutrition issues?		
Physical assessment • Anthropometric measurements ***For pregnant woman:*** Height, pre-pregnancy weight, weight gain during pregnancy (mother's weight gain should be at least 1kg per		

Did the counselor ask about:	YES	NO
month in the second and third trimesters of pregnancy) ***For lactating woman:*** Height, current weight, pre-pregnancy weight, weight during pregnancy and 6 weeks post-partum weight, BMI • Evidence of loss of muscle mass (wasting) • Oral or pharyngeal inflammation or pain • Pallor (inner eyelids and palms)		
Medical history • GI problems (e.g., diarrhea, abdominal pain, nausea, vomiting)? • Pattern of bowel movements (constipation)? • Presence of opportunistic infection? • Concurrent medical problems (e.g., diabetes, hypertension, malaria)?		
Medication profile • Drug use (ARVs, alternative therapies, and other medications)? • Medication side effects with nutrition implications? • Nutrition-medication interactions and traditional herbs or medicine interactions?		
Biochemical profile (where available) • Serum albumin • CD4 and viral load counts		

Did the counselor ask about:	YES	NO
• Evaluation of anemia (iron, B_{12}, and folate status)		
Psychosocial • Living environment and functional status (income, housing, amenities to cook, access to food, attitude regarding nutrition and food preparation) • Age • Family or support system • Educational level ***Lactating mother:*** • Family or other support for breastfeeding. • Breastfeeding pattern: Exclusive breastfeeding, mixed feeding (breastmilk and formula), breastfeeding during pregnancy		

HANDOUT 6.4 Practical Considerations for Nutrition Counseling

1. Be aware and sensitive when counseling people living with HIV/AIDS. Remember that it is common for them to feel that HIV infection is controlling their life. The HIV-infected mother may be shocked, depressed, or frightened by this chronic disease. If the mother is an adolescent, pay close attention to other fears she may have. Make the mother feel comfortable by first determining her needs and wants during counseling and then working together to make a feasible plan.

2. Listen carefully, empathize, and respond to the mother's needs and concerns. This can make the difference between effective and ineffective nutritional care and support.

3. Be an active listener, avoid judgment, and be aware of body language (both yours and your client's).

4. Conduct assessments and interviews in a nonjudgmental manner to elicit more accurate responses from the mother and build rapport with her.

5. Maintain confidentiality and professional conduct throughout the counseling period and after the counseling session.

6. Change is difficult, and living with HIV is stressful. Suggest one change at a time and ensure that your recommendations are realistic. Remember that each woman has individual needs and a unique situation.

7. Communicate nutrition information based on the woman's own cultural values and beliefs. For example, be familiar with food taboos and help identify appropriate alternatives.

8. Provide practical suggestions, including a) a list of local, affordable, and accessible foods to show what kinds of foods the mother should eat or how much extra food she needs and b) ways to manage symptoms such as anorexia, diarrhea, nausea, vomiting, and weight loss.

9. Ask open-ended questions (what, why, and how) when counseling women about their diet.

10. Be aware of harmful traditional practices and practices that are not harmful and can be encouraged. Counsel and educate accordingly.

11. Praise and reaffirm what the mother is doing right to build self-confidence, self-esteem, and motivation.

Source: Adapted from Field-Gardner et al 1997

HANDOUT 6.5 Checklist for Nutrition Counseling

This checklist can be used for field visits and role-playing with the case studies.

Did the counselor	YES	NO
• Greet the client?		
• Introduce himself or herself to the client?		
• Treat the client with respect and acceptance?		
• Listen carefully and actively and show empathy to the client's needs and concerns?		
• Make eye contact when talking with the client?		
• Take note of the verbal and non-verbal cues from the client?		
• Ask open-ended questions?		
• Praise and reaffirm the things the client is doing right?		
• Suggest interventions that were acceptable, affordable, and feasible for the client?		
• Communicate the nutrition information based on the client's level of knowledge and cultural values and beliefs?		
• Provide practical and realistic suggestions and recommendations?		
• Maintain professional conduct during the counseling session?		
• Discuss appropriate follow up with the client?		

HANDOUT 6.6 Safe Food Handling Practices

This handout can be used by students when role-playing to counsel on safe food handling practices.

- Wash hands thoroughly before preparing, handling, and eating food and after using the toilet or changing diapers or nappies
- Wash and keep food preparation surfaces, utensils, and dishes clean
- Wash all fruit and vegetables with clean water before eating, cooking, or serving
- Avoid allowing raw food to come into contact with cooked food
- Ensure all food is cooked thoroughly, especially meats and chicken
- Avoid storing cooked food unless one has access to a refrigerator
- Keep food covered and stored away from insects, flies, rodents, and other animals
- Use safe water (boiled or bottled) for drinking, cooking, and cleaning dishes and utensils.
- Do not eat moldy, spoiled, or rotten foods
- Do not eat raw eggs or foods that contain raw eggs
- Serve all food immediately after preparation, especially if it cannot be kept hot
- Do not use bottles with teats to feed infants, use a cup instead

Source: Lwanga 2001

HANDOUT 6.7 Dietary Management of Common Problems in HIV Infection

This handout can be used during role-plays to help counsel on managing common HIV-related dietary problems.

Dietary problem	Nutritional intervention
Anorexia or loss of appetite	✓ Eat small frequent meals spaced throughout the day (5-6 meals/day). ✓ Schedule regular eating times. ✓ Include a food-based protein from either animal or plant sources, with snacks and meals whenever possible. ✓ Drink plenty of liquids, preferably between meals. ✓ Take walks before meals to stimulate appetite.
Sores in the mouth or throat	✓ Avoid citrus fruits, tomatoes, and spicy, salty, sweet, or sticky foods. ✓ Drink liquids with a straw to ease swallowing. ✓ Eat foods at room temperature or cold. ✓ Eat soft, pureed, or moist foods such as porridge, mashed bananas, potatoes, carrots, or other non-acidic vegetables and fruits. ✓ Avoid smoking, caffeine, and alcohol. ✓ Rinse mouth daily to prevent thrush with 1 teaspoon baking soda mixed in a glass (250 ml) of warm boiled water. **Do not** swallow the mixture.
Nausea and vomiting	✓ Avoid having an empty stomach, which makes the nausea worse. ✓ Eat small, frequent meals. ✓ Try dry, salty, and bland foods, such as dry bread or toast, or other plain dry foods and boiled foods. ✓ Drink plenty of liquids between meals rather than with meals. ✓ Avoid foods with strong or unpleasant odors, greasy or fried foods, alcohol, and coffee. ✓ Do not lie down immediately after eating; wait 1-2 hours. ✓ If **vomiting**, drink plenty of fluids to replace fluids and prevent dehydration.

Dietary problem	Nutritional intervention
Diarrhea	✓ Eat small, frequent meals. ✓ Eat bananas, mashed fruit, soft, boiled white rice, and porridge, which help slow transit time and stimulate the bowel. ✓ Avoid intake of high fat or fried foods and foods with insoluble fiber; remove the skin from fruits and vegetables. ✓ Drink plenty of fluids (8-10 cups a day) at room temperature, especially those that contain some calories, such as diluted fruit juices. ✓ Avoid coffee and alcohol. ✓ Eat food at room temperature; very hot or very cold foods stimulate the bowels and diarrhea worsens. ✓ Limit or eliminate milk and milk products to see whether symptoms improve; for some people lactose intolerance may occur. but only for a short period during episodes of diarrhea. **If diarrhea is severe**: ✓ Give oral rehydration solution to prevent dehydration. ✓ Withhold food for 24 hours or restrict food to clear fluids (e.g., soups, soft foods, white rice, porridge, and mashed fruit and potatoes).
Constipation	✓ Drink plenty of fluids, especially water. ✓ Increase intake of fiber by eating vegetables and fruits. ✓ Do not use laxatives or enemas.
Bloating	✓ Avoid foods associated with cramping and bloating (cabbage, beans, onions, green peppers, eggplant). ✓ Eat slowly and try not to talk while chewing.
Altered taste	✓ Use a variety of flavor enhancers such as salt, spices, and herbs to increase taste acuity and mask unpleasant taste sensations. ✓ Try different textures of food. ✓ Chew food well and move around mouth to stimulate taste receptors.

Dietary problem	Nutritional intervention
Fever	✓ Drink plenty of fluids throughout the day. ✓ Eat smaller, more frequent meals at regularly scheduled intervals. ✓ Add high-protein snacks between meals.
Fat malabsorption	✓ Eliminate oils, butter, ghee, margarine, and foods that contain or are prepared with these. ✓ Trim all visible fat from meat and remove the skin from chicken. ✓ Avoid deep fried, greasy, or high fat foods. ✓ Eat smaller, more frequent meals spaced out evenly throughout the day. ✓ Take a daily multivitamin, if available.
Lack of energy or fatigue	✓ If possible have someone pre-cook foods (ensure proper food safety of pre-cooked food). ✓ Eat smaller, more frequent meals and snacks throughout the day. ✓ Try to eat at the same time each day and exercise as much as possible to increase energy.

Source: Lwanga 2001

EXERCISE 6

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The following case studies will help students integrate aspects of nutritional care and support for HIV-infected pregnant and lactating women or adolescents in order to provide appropriate interventions. The following activities support the role-play:

- Field visits to antenatal clinics
- Field visits to VCT clinics
- Field visits to PMTCT clinics
- Mother support groups
- Open class discussion with a counselor or counselors working with pregnant or lactating HIV-infected women
- Other activities appropriate for the topic area

TASK 1: Ask students to role-play the following case study illustrating nutritional care and support of an HIV-positive pregnant woman. One student should take the role of the pregnant women and another, the role of the nutritional counselor.

Rachael is a 30-year-old school teacher in the second trimester of her pregnancy with her first child. During her antenatal visit, she tested positive for HIV. She lives with her husband, who has not been tested. She has not disclosed her status to him or anyone else. Her husband was recently laid off work, and Rachael tells you that her income is just enough to cover their basic needs. She usually eats one main meal a day and may have one to two snacks throughout the day. At present Rachael is asymptomatic.

Students should discuss the following questions about counseling Rachael. Answers are provided.

1. How could HIV infection affect Rachael's nutritional status?

HIV infection superimposes additional energy requirements on top of the extra energy and protein requirements caused by pregnancy. HIV also affects the immune system, making the infected person susceptible to infection and at high risk for morbidity and mortality.

2. What are the nutritional goals for Rachael?

- *Maintain or improve nutritional status*
- *Ensure adequate weight gain during pregnancy*
- *Ensure adequate nutrient intake*
- *Prevent food-borne illness*
- *Enhance quality of life*

3. What information and advice would you give Rachel about her nutrition?

- *Eat a variety of locally available and affordable foods, including fruits and vegetables, regularly and take a multivitamin, if possible.*
- *Eat more food than normal.*
- *Increase the amount of food you eat in relation to your pregnancy and HIV status.*
- *Pay particular attention to food safety and hygiene.*
- *Consult a PMTCT clinic for counseling on infant feeding choices.*

3. What additional information would you need to help Rachael with appropriate interventions?

- *Her pre-pregnancy weight, if available*
- *Adequacy of the gestational weight she has gained*
- *Her dietary intake and food habits*
- *Medications or dietary or herbal supplements she is taking*
- *Problems affecting her food intake*
- *Support systems at home or at work*
- *Any other concurrent medical problems, e.g., diabetes, hypertension, fever, or malaria*
- *Her feelings on the interventions and which ones she thinks that she can and cannot do*

TASK 2: Ask students to role-play the following case study illustrating nutritional care and support of an HIV-positive adolescent. One student should take the role of the pregnant adolescent and another the role of the nutritional counselor.

Jennifer is a 15-year-old girl who just learned that she is HIV positive during her visit to the antenatal clinic. Her parents are aware of her pregnancy, but she has not told them that she is HIV positive. Jennifer was attending school but recently had to drop out because she was not feeling well. Her parents have three younger children, and their combined income is just enough to cover the families' needs. Jennifer does not know how much support her parents will give her to take care of the baby. She is in her first trimester of pregnancy when she comes to see you and admits to feeling frightened, alone, and depressed. She tells you that she smokes, has little appetite, and feels nauseated.

Students should discuss the following questions about the appropriate counseling for Jennifer. Answers are provided.

1. What nutritional care and support issues should you focus on for Jennifer?

- *Nutritional status, dietary intake, and food habits*
- *Communication with her partner about her HIV status and pregnancy*
- *Support from her parents, other family members, or partner*
- *Pre-pregnancy weight and height*
- *Lack of appetite and nausea*
- *Food security*
- *Knowledge of food and nutrition and HIV*
- *Referral systems to compliment the nutritional care and support*

2. What factors put Jennifer at high nutritional risk and why?

- *Young adolescent age increases nutritional requirements needed for adolescent growth and fetal growth*
- *HIV-infected status increases nutrient requirements*
- *Depression and fear can lead to decreased appetite and premature delivery*
- *Lack of appetite can result in inadequate gestational weight gain*
- *Nausea can decrease food intake, leading to inadequate nutrient intake*
- *Lack of income causes food security issues*
- *Smoking contributes to low birth weight, premature delivery, decreased appetite, and inadequate pregnancy weight gain*

3. What goals would you consider while counseling Jennifer and how would you achieve these goals?

- ***Adequate gestational weight gain***

  Assess and monitor weight gain

- ***Adequate nutrient intake***

  Counsel on dietary management of nausea and ways to increase appetite to help improve intake

  Carry out a detailed nutrition assessment

  Counsel on healthy eating habits and intake of essential nutrients to promote growth and development of the fetus

  Counsel on avoiding cigarette smoking, which can reduce appetite and contribute to poor health outcomes for the baby

  Prevent food-borne illnesses

  Counsel on safe food handling, hygiene, and water safety

TASK 3: Ask students to role-play the following case study illustrating nutritional care and support of an HIV-positive pregnant woman. One student should take the role of the pregnant woman and another, the role of the nutritional counselor.

A young couple, Jacob and Rita, come to the clinic. Rita is HIV positive and 5 months pregnant with her second child. Jacob's test results indicate that he is HIV negative. Rita is aware of her status but has not told Jacob. Both Rita and Jacob are employed. Rita has gained adequate gestational weight but tells you that she has diarrhea and nausea and finds it difficult to eat because she has sores in her mouth. In an earlier session, Rita revealed to you that she is afraid to tell Jacob her status because of her fear of being stigmatized by Jacob and her family and losing her job. She is not taking ARVs.

1. What factors should you address when counseling Rita and Jacob and how?

- *Rita's dietary intake and eating habits, by reinforcing what she is doing right*

- *Her plans to disclose her status to her partner, by addressing her fears about stigma, discrimination, and possible abuse*

- *Her nausea, diarrhea, and mouth sores, which affect her food intake, by counseling on how to manage these HIV problems*

- *Her plans for feeding her baby, by counseling on infant feeding options*

- *Her overall well-being and delivery of a term baby, by counseling on the Importance of good nutrition in the context of HIV*

- *Her need for support, by discussing sources of support other than her partner*

- *The effect of ARVs on preventing mother-to-child transmission of HIV, by asking whether she discussed prenatal and post-natal prophylaxis with her doctor*

- *Fear of being stigmatized, by counseling on community support systems*

- *Maintenance of adequate gestational weight gain*

2. What are the main nutritional goals for Rita?

- *Adequate gestational weight gain (especially with nausea, diarrhea, mouth sores, and anxiety about disclosing her status, which can affect nutritional intake)*

- *Dietary management of her common HIV problems*

2. What are the main nutrition interventions for Rita?

- *Counseling on how to manage nausea, diarrhea, and mouth sores to maximize nutritional intake and promote adequate gestational weight gain (see* ***Handout 6.7****: Dietary Management of Common Problems in HIV)*

- *Providing information on referral systems or refer her to psychosocial support to help her deal with disclosing her status and obtain general support during pregnancy and after delivery.*

TASK 4: Ask students to role-play the following case study illustrating nutritional care and support of an HIV-positive lactating woman. One student should take the role of the lactating woman and another, the role of the nutritional counselor.

Brenda, 25, comes to see you for the first time for counseling. She has a 2-month-old baby and tells you that she is breastfeeding. She has not had the courage to test for HIV, but her partner died 3 months earlier, and rumors suggest he died of AIDS. Brenda is living alone with her baby while on maternity leave. She tells you she is worried about how she will support herself and her baby on her small salary. She confides that she is worried about her health and has not been able to eat well. She feels she has lost weight because her clothes fit loosely. She does not have any nausea or vomiting, but does have diarrhea and fever. She also complains about being tired. She is very concerned about her weight loss and her inability to eat.

1. Identify and discuss nutritional care and support issues for Brenda.

- *Food security because of her low income*
- *Support systems she has in place*
- *Her pre-pregnancy weight, current weight and height, and calculation of her body mass index (BMI)*
- *Her knowledge of HIV and infant feeding, including her own nutrition*
- *Her eating habits and dietary intake*
- *Opportunistic infections that are causing fever*
- *Medications or dietary supplements*

2. What interventions would you suggest to help Brenda?

- *Eating smaller, more frequent energy- and protein-dense meals to help promote weight gain and improve appetite*

- *Managing diarrhea, fever, and fatigue through diet*

- *Drinking plenty of fluids to prevent dehydration*

- *Maintaining as much physical activity as possible, because exercise helps stimulate appetite, decrease fatigue, and build lean body mass*

3. What other support or referrals would you suggest?

- *VCT clinic to test her HIV status*

- *PMTCT clinic for infant feeding counseling*

- *A doctor if the fever and diarrhea persist*

- *Food assistance, if available*

- *Help from her family or community to take care of her baby so she can get some rest every day*

TASK 5: Organize field visits for students to enable them to:

- Conduct a nutritional assessment and nutrition counseling and education in various environments when working with HIV-infected pregnant and lactating women

- Describe at least three challenges in working with HIV-positive pregnant or lactating women or adolescents in limited-resource settings

- State at least two interventions to address the issues and challenges identified above

Divide the students into groups and assign each group to visit a different site that provides care for HIV-infected pregnant or lactating women or adolescents. Sites can include antenatal clinics, PMTCT clinics, health centers, or other appropriate settings. Establish a relationship with the different sites the students will visit. Arrange times for field visits and identify contact people for the students to see when they arrive. Inform the facilities of the objectives of this exercise.

Review the objectives of the field visits with the students and direct them to the sites. Arrange for them to observe a health worker conducting a nutritional assessment and nutrition counseling and education session. Allow each student to conduct at least one supervised nutritional assessment and nutrition counseling and education session with an HIV-infected pregnant or lactating woman or adolescent.

The number of students in a group may not allow each student to conduct a nutritional assessment and nutrition counseling session. Classroom role-plays can be used, or different appointments can be set up for individuals or smaller, more manageable, groups of students. Students who are unable to practice conducting a nutritional assessment during the field visit should act as observers, using the nutritional assessment checklist to provide feedback to fellow students.

Follow up the field visits by asking each group to present its experience to the rest of the class by answering the following questions:

- What type of nutritional care and support was provided to the HIV-infected mothers in the places they visited?

- How was the nutritional assessment or counseling session observed in the field different from what he students learned in class?

- What should be done differently and why?

- What challenges and issues did they observe in providing nutritional care and support, and how should they be addressed?

- What alternative approaches for nutritional assessment and counseling should be implemented at the sites visited?

- What issues and challenges did they face when they conducted the nutritional assessment and counseling sessions? What would they do differently next time?

SESSION 7 INFANT FEEDING AND PREVENTION OF MOTHER-TO-CHILD-TRANSMISSION OF HIV

Purpose

The purpose of this session is to equip students with knowledge and materials necessary to understand the concepts and latest research findings related to PMTCT, as well as programmatic experience and lessons learned for future application.

Learning objectives

At the end of this session students will be able to:

- Provide a comprehensive definition of MTCT, the scope and magnitude of the problem, and associated issues
- Present a risk analysis for vertical transmission of HIV, including the LINKAGES risk model
- Summarize the key research studies on MTCT and their policy and programming implications
- Describe interventions to prevent MTCT and their relative efficacy, including the Ndola case study

Prerequisite knowledge

- Technical knowledge and background on breastfeeding and young child and maternal nutrition
- Basic understanding of lactation management
- Basic counseling skills

Estimated time: 120 minutes excluding time for field work

Outline

Content	Methodology	Timing
1. Definition of terms and scope of the problem • Meaning and scale of mother-to-child transmission of HIV (MTCT), especially resulting from infant feeding • Infant feeding practices (country-specific examples)	Facilitate an interactive lecture using **PowerPoint 7** presentation	100 minutes
2. Risk analysis and factors for MTCT, with emphasis on the breastfeeding period • Size of risk and risk factors for transmission of HIV during pregnancy, labor and delivery, and breastfeeding • Possible mechanisms of HIV transmission during breastfeeding (enabling factors, inhibitory factors, and colostrum) • Risk factors for breastfeeding and MTCT: viral load, maternal immune system, breast health, pattern and mode of breastfeeding, duration of breastfeeding, maternal nutritional status, and child factors such as age and oral and intestinal health	Distribute **Handout 7.1**: WHO Recommendations on Replacement Feeding to Reduce the Risk of MTCT and **Handout 7.2**: PMTCT-Infant Feeding Decision-Making Algorithm	
3. Interventions to prevent MTCT • Essential nutrition actions in ANC and VCT • Support for safer infant feeding practices (modified exclusive breastfeeding, exclusive replacement feeding, other breastmilk options) • Short course antiretroviral (ARV) prophylaxis, optional obstetric care, and family planning	Facilitate **Exercise 7:** Role play in pairs a health worker counseling a mother or father on safer infant feeding in HIV-prevalent communities (case studies included) Distribute case study from Ndola, Zambia	

Required materials

1. LCD or overhead projector
2. Flipchart stand and paper or board
3. Writing pens or chalk

Recommended preparation

1. Be familiar with **Lecture Notes 7**: Infant Feeding and PMTCT.
2. Allocate time for each activity considering students' backgrounds and coverage of the activity elsewhere.
3. Prepare to divide the class into pairs for the role plays in **Exercise 7**: Counseling Pregnant and Lactating Women in Areas of High HIV Prevalence.
4. Change names for the role play as appropriate for the context. Modify the names and any other aspects of the following case studies (e.g., foods described) as appropriate for country or community contexts.

Materials provided

PowerPoint Presentations

- **PowerPoint 7**/overhead presentation: Infant Feeding and Prevention of Mother-to-Child Transmission (PMTCT) of HIV

Handouts

- **PowerPoint 7** presentation
- **Handout 7.1**: WHO Recommendations on Replacement Feeding to Reduce the Risk of MTCT
- **Handout 7.2**: PMTCT-Infant Feeding Decision-Making Algorithm (including an example from Uganda's national PMTCT guidelines)

Suggested reading materials

Coutsoudis, A, et al. 2001. Method of feeding and transmission of HIV-1 from mothers to children by 15 months of age: prospective cohort study from Durban, South Africa. *AIDS* 15: 379-387.

Dabis, F, V Leroy, K Castelbon, et al. 2000. Preventing MTCT of HIV-1 in Africa in the year 2000. *AIDS* 14: 1017-26. Abstract available at http://archive.mail-list.com/pkids/msg00127.html.

Guay, L, P Musoke, T Fleming, et al. 1999. Intrapartum and neonatal single dose Nevirapine compared with Zidovudine for prevention of MTCT of HIV-1 in Kampala, Uganda: HIVNET 012 randomised trial. *Lancet* 354: 795-09. http://pdf.thelancet.com/pdfdownload?uid=llan.354.9181.original_research.3219.1&x=x.pdf

Piwoz, E, J Ross, and J Humphrey. 2003. HIV transmission during breastfeeding: Knowledge, gaps, and challenges for the future. In *Advances in experimental medicine and biology, protecting infants through human milk: Advancing the scientific evidence base*. Kluwer Publishing (in press).

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LECTURE NOTES 7: INFANT FEEDING AND PREVENTION OF MOTHER-TO-CHILD-TRANSMISSION OF HIV

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Introduction (slide 2)

By 2000 an estimated 5 million children had been infected by HIV. Increases in child deaths of more than 100 percent are projected by 2010 in the most-affected regions of the world (UNAIDS 2002). The Joint UN Programme on HIV/AIDS estimates that about 600,000 children under 15 years of age were newly infected in the 2000 alone. Ninety percent were infected through mother-to-child transmission (MTCT), and 90 percent of the infections occurred in sub-Saharan Africa. In some sub-populations, more than 30 percent of pregnant women are HIV infected.

Purpose (slides 3, 4)

The purpose of this session is to provide students with knowledge and materials necessary to understand the concepts and latest research findings related to PMTCT, as well as programmatic experience and lessons learned for future application. The session:

- Provides a comprehensive definition of MTCT, the scope and magnitude of the problem, and associated issues

- Presents a risk analysis for vertical transmission of HIV, including the LINKAGES risk model

- Summarizes the key research studies on MTCT and their policy and programming implications

- Describes interventions to prevent MTCT and their relative efficacy, including the Ndola case study

Mother-to-child transmission (slide 5)

HIV can be passed from a mother to her infant during pregnancy, during labor and delivery, and through breastfeeding. This module focuses primarily on transmission through breastmilk because breastfeeding is the basis of most infant nutrition in sub-Saharan Africa, regardless of the mothers' HIV status. Prevention of mother-to-child transmission (PMTCT) programming is the subject of the second portion of this session.

In the absence of PMTCT interventions, 24 percent-45 percent of HIV-infected mothers will transmit HIV to their infants by all modes of transmission (Dabis et al 2000). In the United States the risk is only 2 percent, in large part because of HIV counseling, antiretrovirals (ARVs), elective Caesarian sections, and safe use of infant formula.

Median duration of breastfeeding by region (slide 6)

This section first analyzes the risks associated with MTCT, with an introduction to key studies that provide the basis for recommended interventions. Next is an overview of these recommended interventions, focusing on safe infant feeding guidelines in areas of high HIV prevalence. Finally, a case study of the Ndola Demonstration Project in Zambia illustrates some of the realities of PMTCT.

Risks analysis and factors: Key research findings

This section covers the risk of HIV transmission during pregnancy, labor and delivery, and breastfeeding.

HIV transmission during pregnancy (slides 7, 8)

There is a 5 percent-10 percent risk of transmission of HIV during pregnancy. A child is considered to have been infected in utero if the HIV-1 genome is detected within 48 hours of delivery by a polymerase chain reaction test (DNA-PCR) or viral culture. (UNICEF/UNAIDS/WHO 1998a). Transmission during pregnancy occurs when the placental protection of the fetus is compromised, allowing for viral transmission. The following factors are associated with transmission during pregnancy:

- A viral, bacterial, or parasitic placental infection in the mother during pregnancy

- HIV infection of the mother during pregnancy

- Severe immune deficiency associated with advanced AIDS in the mother (WHO 1999)

- Malnutrition (Semba 1997)

HIV transmission during labor and delivery (slides 9, 10)

There is a 10 percent-20 percent risk of transmission of HIV during labor and delivery. WHO/UNAIDS/UNICEF (1998) consider transmission to have occurred intrapartum if the results of the diagnostic tests were negative during the first 48 hours after delivery but became positive in subsequent samples taken within 7-90 days of delivery. During labor and delivery transmission most often occurs when babies suck, imbibe, or aspirate maternal blood or cervical secretions containing HIV. Higher risks of HIV transmission during labor and delivery are associated with duration of membrane rupture, acute chorioamnionitis resulting from untreated sexually transmitted infections (STIs) or other infections, and invasive delivery techniques that increase the baby's contact with the mother's blood (WHO 1999).

HIV transmission during breastfeeding (slides 11, 12)

There is a 10 percent-20 percent risk of transmission of HIV through breastfeeding. The time that HIV transmission occurs following birth is difficult to determine precisely. The presence of maternal antibodies, combined with a period of time during which the infection is undetectable, makes it difficult to determine whether infection occurred during delivery or through breastfeeding. Late post-natal transmission (after 3-6 months) can be estimated with the PCR test. A meta-analysis of five studies concluded that the best available estimate of the risk of breastmilk transmission is 14 percent (Dunn et al 1992). The risk of HIV transmission through breastfeeding can be calculated for a particular population with the following formula: percentage of HIV-infected mothers at time of delivery multiplied by 14 percent.

Up to 70 percent of breastmilk samples from HIV-infected mothers have been shown to contain cell-associated and cell-free HIV. Transmission is not necessarily a result of the presence of HIV in breastmilk, however, but of a complex interaction between the anti-infective agents—macrophages, lymphocytes, and immunoglobulin— in breastmilk and HIV.

Possible mechanisms of transmission through breastmilk (slide 13)

One theory to explain the transmission of HIV through breastmilk is that M-cells—specialized epithelial cells that comprise only one percent of all epithelial mucosal cells found in the Peyer's patches of intestinal mucosa—engulf the virus and allow it to pass through to the macrophages on the other side. The M-cells could facilitate passage through the single layer of cells in the gut that are connected with mostly impermeable junctions (Featherstone 1997). Another study showed the HIV-infected cells in the intestinal lumen stimulated enterocytes to engulf HIV particles (Bomsel 1997). More research is needed in this area.

Research conducted in Rwanda with 215 HIV-1-infected women examined how three factors (HIV-1-infected cells, deficiencies in anti-infective substances in breastmilk, or both) influenced transmission at 15 days, 6 months, and 18 months post-partum (Van de Perre et al 1993). Immunoglobulin (Ig) G was the most frequently identified HIV-specific antibody in breastmilk, followed by immunoglobulin (Ig) M. The strongest predictor of transmission was HIV-1 infected cells in breastmilk and combined with a defective IgM response.

Anti-HIV activity in breastmilk (slide 14)

Human lactoferrin, with demonstrated inhibitory effects on E. coli and other pathogens, has been shown to ward off HIV (Harmsen et al 1995). Lipid-dependent antiviral activity against HIV and other enveloped viruses and bacteria has also been identified (Isaacs and Thormar 1990; Orloff et al 1993). A sulphated protein, glycoprotein mucin or glycosaminoglycan, also appears to inhibit the binding of HIV to CD4 receptors (Newburg et al 1992).

Studies vary greatly on the presence of cell-free and cell-associated virus in colostrum. Some research (Ruff et al 1994; Van de Perre et al 1993) shows more HIV

DNA (cell-associated virus) in colostrum than in breastmilk. Other studies (Nduati et al 1995) indicate higher proportions of infected cells in breastmilk than in colostrum.

Breastfeeding saves lives (slide 15)

Replacement feeding prevents breastmilk transmission of HIV, but in resource-limited settings, the risk of death from artificial feeding must be weighed against the risk of HIV infection. Several studies have reached the same conclusion about these competing risks: with high levels of infectious disease mortality, breastfeeding is safer than artificial feeding for infants up to a certain age when the mothers are HIV infected.

If infant mortality is < 80/1,000 live births and the risk of death from artificial feeding is < 2.5 times the risk of death of exclusively breastfed infants, infants of HIV-infected mothers are safer when fed artificially. The LINKAGES risk model for HIV and infant feeding assumes that if HIV prevalence among child-bearing women is 20 percent, the relative risk from not breastfeeding is 3 times that, and 17 percent of infants uninfected at delivery who are breastfed by an infected mother will become infected. Even in situations where a greater percentage of children die from HIV-related illness, the overall risk of mortality is still greater for children who fall into the categories of no breastfeeding at all or the spillover category of mixed feeding (Ross 1999).

HIV and infant feeding risk analysis (slide 16)

Additional risk factors for breastfeeding and MTCT are described below, along with an indication of the strength of evidence for each risk factor.

Maternal viral load

Maternal viral load is higher in mothers with recent HIV infection or advanced disease. The risk of MTCT during breastfeeding nearly doubles if the mother becomes infected while breastfeeding. An analysis of four studies in which mothers became infected post-natally found a 29 percent risk of transmission through breastfeeding (Dunn et al 1992). As discussed under the Intervention section below,

the increased risk provides a strong argument for voluntary counseling and testing (VCT) and prevention measures during pregnancy and delivery. **Strong evidence*

Maternal immune status

Maternal immune status also appears to increase the risk of transmission. Immune deficiencies in the mother, including a low CD4 or high CD8 cell count, increase the risk. A study in Kenya (Nduati et al 1995) found a strong correlation between low CD4 counts and detection of HIV DNA in breastmilk. **Strong evidence*

Breast health (slide 17)

Breast health related to mastitis, cracked and bloody nipples, and other indications of breast inflammation may affect transmission of HIV. The risk is also higher in an infant with oral lesions such as thrush (Ekpini et al 1997; Semba et al 1999). **Strong evidence*

Mastitis may be caused by infectious agents, poor positioning and attachment, or weak suckling. Deficiencies in the antioxidants vitamin E and selenium also may increase the risk of mastitis. Mastitis causes junctions in the mammary epithelium to become "leaky," allowing blood plasma constituents (HIV) to enter breastmilk. Cytokines and other immune reactions resulting from mastitis can damage the intestines of young babies.

Pattern or mode of breastfeeding

The pattern or mode of breastfeeding also affects transmission**.** Babies who are exclusively breastfed may have a lower risk of becoming infected than those who consume other liquids, milks, or solid foods in addition to breastmilk during the first months of life (Coutsoudis et al 1999, 2001; Smith and Kuhn 2000). The research conducted in South Africa (Coutsoudis et al 1999, 2001) showed that mothers who exclusively breastfed their infants for 3 months were less likely to transmit the virus than mothers who introduced other foods or fluids before 3 months. At 3 months, infants who were exclusively breastfed had significantly lower transmission rates (19.4 percent) than mixed-fed infants (26.1 percent) and the same transmission rate as formula-fed infants (19.4 percent). **Limited evidene*

Mucosal integrity (slide 18)

Studies show that the disruption of the epithelial integrity of the mucous membranes of the intestine or mouth of the infant increases the risk of transmission (Ekpini et al 1997). Mixed feeding, allergic reactions to complementary foods, and infectious illness can damage the intestine and increase risk of transmission (Bobat et al 1997; Ryder et al 1991; Tess et al. 1998b). Oral thrush in an infant may also be associated with MTCT.

Breastfeeding duration (slides 19, 20)

The first positive PCR cannot differentiate whether transmission occurred during late pregnancy, labor and delivery, or the early post-natal period. Studies suggest that the risk of transmission declines with the age of the infant. It is difficult, however, to ascribe increased risk only to breastfeeding duration and the age factor, as feeding patterns change over time. Breastmilk intake is gradually decreased, which reduces exposure to the virus but also causes the infant to become increasingly vulnerable to other infections. ***Strong evidence*

Maternal nutritional status (slides 21, 22)

Malnutrition during pregnancy *may* increase the risk of MTCT (Semba 1997). Vitamin A deficiency may impair T and B cell function, resulting in an increased maternal viral load and reduced antibody concentrations. Vitamin A deficiency could also result from advanced HIV disease. Both malnutrition and vitamin A deficiency contribute to MTCT.

A study of 1,075 HIV-infected pregnant women in Tanzania showed that taking multivitamins, not vitamin A supplements, improved birth outcomes (reduced risk of low birth weight, severe pre-term birth, and small size for gestational age) (Fawzi et al 1998). Taking multivitamins, not vitamin A, significantly increased CD4, CD8, and CD3 counts. No conclusions were drawn from the findings on vertical transmission. * *Limited evidence*.

A study in Kenya (Nduati et al 2000a) showed that HIV-infected mothers who breastfed lost more weight and were more likely to die in the 2 years following delivery than HIV-infected mothers who did not breastfeed. Another study in South

Africa, however, showed no increase in morbidity or mortality among breastfeeding women (Coutsoudis et al 2001). WHO issued a statement on June 7, 2001, that there is insufficient evidence on the issue and additional research is needed.

Interventions to prevent MTCT

Case studies from relevant countries should be included as examples when facilitating this section. For this module, the Ndola Demonstration Project in Zambia is used to illustrate various aspects of community PMTCT programming. Include box 1 as a handout, or develop another example.

Box 1 Ndola Demonstration Project, Zambia (slide 23)

In 1997 the LINKAGES Project began a demonstration project with the Ndola District Health Management Team and the National Food and Nutrition Commission in Zambia to introduce voluntary counseling and testing (VCT) and improved infant feeding counseling into antenatal care and community services. Other partners included Hope Humana and the Horizons project. This pilot project included the following interventions:

- Formative research
- Policy and advocacy (for the Baby-Friendly Hospital Initiative, International Code of Marketing of Breast-milk Substitutes, and national policies and guidelines)
- Training of health workers
- VCT for pregnant women and their partners, including prevention
- Infant feeding counseling and support
- Improved care and nutrition during pregnancy and delivery
- Community support
- Antiretroviral prophylaxis (Nevirapine)

LINKAGES offered three training courses to strengthen the knowledge and skills of health workers. All health professionals attended a 12-day basic course on HIV, PMTCT, and infant feeding. Some participants then participated in an 8-week counseling course developed at national level with significant input from the Ndola program on the infant feeding and HIV component. Health staff who completed both courses were trained in a 2-week training of trainers course so they could facilitate training of other health workers in the 12-day course. Both the 12-day and 8-week courses were adapted and offered to community health volunteers and traditional birth attendants. In 2002 the program expanded to other sites in Ndola District and to the districts of Kabwe, Kapriri-Mposhi, Livingstone, and Lusaka.

PMTCT interventions are most effective when carried out in the context of comprehensive maternal and child health (MCH) services. These include antenatal care, post-natal care, and child health services (slides 24, 25, 26).

Essential Nutrition Actions (slides 27, 28)

Nutrition and HIV/AIDS programs, including PMTCT, should be based on a number of key elements, depending on the country context. The Essential Nutrition Actions (ENA) package promotes the seven following key nutrition behaviors that are do-able and scientifically proven to improve the nutrition of women and children:

1. Promotion of optimal breastfeeding during the first 6 months
2. Promotion of appropriate complementary feeding beginning at 6 months with continued breastfeeding to 2 years and beyond
3. Promotion of appropriate feeding of the child during and after illness
4. Prevention of vitamin A deficiency (breastfeeding, consumption of fortified and vitamin A-rich foods, maternal and child supplementation 6-59 months)
5. Prevention of anemia (maternal and child iron supplementation, deworming, malaria control, and consumption of fortified and iron-rich foods)
6. Promotion of iodized salt consumption by all families
7. Promotion of improved women's nutrition (increased food intake during pregnancy and lactation, iron and folic acid supplementation, treatment and prevention of malaria, deworming during pregnancy, post-partum vitamin A supplementation)

The ENA approach is implemented through health worker counseling and behavior change communication at six contact points in the life cycle: antenatal, delivery and immediate post-partum, post-natal and family planning, immunization, growth monitoring or well child, and sick child consultations. The ENA package may be implemented within MCH or other ongoing programs. For PMTCT programs, emphasis may be placed on infant feeding and promotion of exclusive breastfeeding

depending on the context. The promotion of improved women's nutrition may also be important for PMTCT.

Consistent with the ENA approach, experience has shown that a full antenatal service package for PMTCT should include VCT, maternal tetanus toxoid immunization, screening and treatment for sexually transmitted infections, iron and folic acid supplementation, malaria preventive intermittent treatment, tuberculosis treatment where appropriate, basic obstetric care, and information on HIV prevention, infant feeding counseling, and family planning (Dabis et al 2000a).

Ensuring good nutrition during pregnancy and lactation

Vitamin A deficiency has been associated with a significant increase of HIV in breastmilk and increased mortality of HIV-infected adults (Nduati et al 1995). Vitamin A supplementation, however, has not resulted in reduced MTCT (Coutsoudis et al 1999). Iron deficiency is associated with low birth weight and prematurity. Both are risk factors of infant HIV infection. One study (Fawzi et al 1998) found that multivitamin supplements resulted in a 44 percent reduction in low birth weight, 39 percent reduction in prematurity, and improved maternal hemoglobin and CD4 counts after delivery.

The risks to the HIV-infected breastfeeding mother have been a subject of some debate. One study in Nairobi (Nduati et al 2001) included 425 HIV-infected pregnant women who were randomly assigned to breastfeed or formula feed. The study was designed to examine modes of infant feeding and associated rate of MTCT. A secondary analysis, however, revealed that the relative risk of death for breastfeeding mothers compared with formula feeding was 3.2. There was also an association with maternal death and subsequent infant death. A WHO statement (2001) advised that the results of this study pertaining to mortality should be interpreted with caution. However, the study highlights the importance of care and support to the HIV-infected mother.

Although MCH clinics are an excellent entry point for PMTCT interventions, they do not necessarily reach men. Outreach to men and communities should be integral to MCH interventions, so the burden is not only on mother.

Breastfeeding techniques

It is especially important for PMTCT programming that staff members are trained in lactation management skills. The risk of cracked nipples may be reduced by improving positioning and attachment (i.e., latching onto the areola rather than nipple). The use of abrasive creams and soaps, which may result in cracked nipples, should be discouraged by counselors and health workers. The pain of cracked nipples may cause the mother to avoid emptying her breasts, resulting in engorgement and eventually leading to mastitis. Gentle expression techniques may be required to assist the mother with emptying her breasts.

Role-plays and practical sessions on lactation management are recommended for instructing or reviewing good breastfeeding techniques with students. Refer to Session 3 on nutrition actions for people living with HIV/AIDS for more information.

Voluntary and confidential counseling and testing (slide 29)

Voluntary counseling and testing (VCT) has been shown to be a cost-effective approach to reducing HIV-related risk behaviors. Stigma is an important issue to consider for this intervention. Sensitivity counseling, community education, and involvement of partners in the VCT process may help alleviate the stresses caused by the stigma of HIV. Work is ongoing in Kenya and other countries to examine the effectiveness of VCT on PMTCT. The following lessons have been learned from these and other VCT programs:

- Systems should be in place to ensure confidentiality of VCT services.
- Men and communities need to be sensitized about MTCT.
- Health workers must be properly trained in MTCT.
- Counseling programs should be offered to support HIV-infected women and men. Peer counselors, service providers, and social workers must be properly trained.

- Prevention messages should be included with VCT, especially in the context of MTCT, because newly infected women are twice as likely to transmit the virus to their infants.

Box 2 describes VCT services promoted in Ndola Demonstration Project.

Box 2 Ndola Demonstration Project VCT services

Individual VCT pretest and post-test sessions were offered by the Ndola Project. When women came to receive antenatal services, they first participated in a general health education session. Women who were interested in learning more about VCT participated in a smaller group education session. During the pretest VCT, health workers carried out knowledge assessments and encouraged women to involve their partners. At the post-test VCT, counseling on HIV prevention and infant feeding began. Experience in Ndola showed that mothers requested the same health workers at each meeting for reasons of confidentiality and a relationship that often developed. In addition to counseling, other health education sessions and group meetings offered information on VCT.

Support for safer infant feeding (slides 30, 31)

Formative research is an important first step for PMTCT programs for supporting safer infant feeding practices. Efforts must be made to understand the attitudes and practices related to breastfeeding to assess locally appropriate and feasible replacement feeding options. Counselors and health programmers should also be aware of stigma concerns associated with HIV in the program area. Box 3 describes the formative research conducted in the Ndola Demonstration Project.

Box 3 Ndola formative research

In 2000 the Ndola Demonstration Project carried out 2 months of formative research, costing only $3,000, using focus group discussions, key informant interviews, market surveys, household observations, cooking demonstrations, and trials of improved practices (TIPS). Feedback was received from caregivers, health providers, and community members. The most feasible and effective approaches were determined to encourage cup feeding, boiling water, preparing infant formula or diluted and sweetened cow's milk, expressing breastmilk, and enriching local recipes for young children.

Counseling is an important skill for service providers working with mothers in the context of HIV. See Session 8 on the nutritional needs of pregnant and lactating

women with HIV/AIDS for additional information about counseling. Counseling on infant feeding may be conducted during the VCT post-test session or in conjunction with MCH services. Peer counseling has been a successful approach in some PMTCT programs.

Program experience has shown that infant feeding options beyond breastfeeding are often not feasible, sustainable, or socially acceptable. The following factors must be considered when discussing and counseling on infant feeding options with an HIV-infected mother:

- Nutritional requirements to avoid micronutrient deficiencies
- Bacterial infections as a result of unclean water, unhygienic preparation and storage, and the risk of diarrhea
- Costs of formula, fuel, water, and health care
- Family planning, including the lactational amenorrhea method (LAM) and other methods. (LAM is a modern, temporary family planning method that supports breastfeeding and family planning use, which is based on the natural infertility resulting from certain patterns of breastfeeding.)
- Psychosocial stimulation through mother-infant bonding

Many PMTCT programs, including the Ndola project, support informed choice by HIV-infected mothers about their infant feeding decision. See **Handout 6.1**: WHO Recommendations and **Handout 6.2**: PMTCT Decision-Making Algorithm.

Safer infant feeding options **(slides 30, 31)**

Note: Depending on students' backgrounds, this complete description of safer infant feeding options may be discussed before formative research and counseling.

Once a thorough assessment has been made of the mother, household, and community, the infant feeding options below may be discussed and evaluated for their feasibility and practicality. Food security issues must be considered for each of

the options. It should be emphasized that none of the following options are easy for the mother to practice without support, especially is she is HIV infected.

Modified exclusive breastfeeding

Exclusive breastfeeding of infants up to 6 months should be promoted for women who are HIV negative or of unknown HIV status. Exclusive breastfeeding should also be supported as long as replacement feeding is not a viable option for an HIV-infected mother. UN guidelines state that breastfeeding should be promoted, protected, and supported for all women who do not know their HIV status and for women who are not infected. **Note**: Address the policies that support exclusive breastfeeding or breastfeeding in general in your country, for example, the Baby-Friendly Hospital Initiative and International Code of Marketing of Breastmilk Substitutes.

Early cessation of breastfeeding is recommended after a certain period of time (an optimal time has not been determined) for HIV-infected mothers when adequate and hygienic replacement feeds are available. Cessation is especially important if a mother develops AIDS symptoms. Research is being carried out in Lusaka, Zambia, to examine the effectiveness of early breastfeeding cessation at 4 months for HIV-infected women. One study (Victora et al 2000) carried out to facilitate infant feeding risk assessments in regions of high HIV prevalence did a pooled analysis of research examining the effect of not breastfeeding and death from infectious disease. This study showed the declining protection afforded by breastmilk with age of infant (pooled odds ratio 5.8 for < 2 months; 4.1 for 2-3 months; 2.6 for 4-5 months; 1.8 for 6-8 months; and 1.4 for 9-11 months).

A number of factors should be considered to support a mother in the early cessation of breastfeeding. As discussed below, acceptable, feasible, sustainable, and safe breastmilk substitutes must be available. Appropriate complementary foods and feeding practices must also be encouraged, and food security considerations taken into account. Piwoz et al (2001) recommend a transition period between exclusive breastfeeding and exclusive replacement feeding with the following actions to accustom the infant to the new feeding patterns.

- Accustoming the infant to cup feeding

- Providing skin-to-skin contact and use of massage and other means to comfort the baby in place of offering the breast

- Teaching the infant to sleep through the night

- Monitoring the infant's urine output to detect and prevent dehydration

- Switching from breastmilk to replacement foods

- Supporting and caring for the mother

- For additional information, refer to Piwoz et al. (2001) Issues, Risks, and Challenges of Early Breastfeeding Cessation to Reduce Postnatal Transmission of HIV in Africa. Washington, DC: SARA Project, Academy for Educational Development.

Methods for treating expressed breastmilk are currently being tested. Such methods include pasteurizing the milk (heating to 62.5 degrees Celsius for 30 minutes) or boiling it briefly and cooling it immediately in the refrigerator or by placing the container in cool water. Although these methods destroy HIV, they may be difficult to sustain. Heat-treated milk retains nutritional benefits but loses some anti-infective factors. Ideally, an infant should be given the treated breastmilk from a cup. This option is most likely feasible in a hospital setting for sick and low birth weight infants. Several studies have shown that expressing breastmilk and letting it stand for a half-hour inactivates HIV (Orloff et al 1993; Isaacs and Thormar 1990; Newburg et al 1992). During this time the naturally occurring anti-HIV factors in breastmilk are allowed to take effect.

Again, the feasibility and sustainability of this option must be considered. Does the mother have time (or well-being) to express and heat treat her milk, and then feed her child? With an electric pump in the optimal setting, expressing and storing takes on average 20-30 minutes, and the infant is fed this expressed breastmilk 8-10 times a day. Can the mother afford the fuel to heat the breastmilk?

Exclusive replacement feeding (slide 32)

Replacement feeding refers to feeding a child who is not receiving any breastmilk from birth to about 2 years of age with a diet that provides all the nutrients the child needs. The following conditions must be in place for safe replacement feeding:

- Access to clean water
- Availability of sterilized utensils
- A steady supply of commercial or home-prepared formula for meeting the infant's nutritional needs

Replacement feeding options for children 0-6 months

- ***Commercial infant formula*** is made from modified cow's milk or soy protein but lacks the long-chain essential fatty acids that are present in breastmilk. Giving formula requires water, fuel, utensils, skills, and time to prepare it accurately and hygienically. The average quantity needed to feed an infant for 6 months is 20 kg of powdered formula (44 tins containing 450g each). Cup feeding rather than bottle feeding is recommended for hygienic purposes.

- ***Home-prepared formulas*** can be made from animal milks, powdered milk, and evaporated milk.

<u>Animal milks</u> (e.g., cow, goat, buffalo, or sheep). For modified cow's milk use 100 ml cow's milk; 50 ml of boiled water; and 10g of sugar (2 teaspoons). Home-prepared formulas are usually deficient in micronutrients such as iron, zinc, folate, and vitamins A and C. Unmodified cow's milk increases the risk of dehydration because of greater concentration of sodium, phosphorous, and other salts. Again, cup feeding is recommended for hygienic purposes.

<u>Powdered full-cream milk and evaporated milk</u>. Full-cream milk requires the addition of boiled water as described on the package. Increase water by 50 percent and add 10g of sugar for each 150ml of feed. Micronutrients are also required. Skimmed milk, sweetened condensed milk, cereal feeds, juices, and teas are not

suitable for replacement feeds before 6 months. Again, cup feeding is recommended for hygienic purposes.

Recommendations for replacement feeding of children 6-24 months

Children of this age should be given a suitable breastmilk substitute and complementary foods (nutrient enriched and appropriately prepared family foods). Between 6 and 12 months breastmilk generally provides up to half or more of an infant's nutritional requirements, and between 12 and 24 months, up to one-third of requirements. If suitable breastmilk substitutes are not available, other dairy products should be given, such as animal milk, dried skimmed milk, yogurt, meat, liver, fish as a source of iron and zinc, and fruits and vegetables to provide vitamins (especially A and C).

The guidelines for complementary feeding of children ages 6-24 months should be carefully adhered to for children given replacement feeds. Food quantity, consistency, and variety should increase as the child ages, while maintaining frequent replacement feeds. Feeding frequency should also increase as the child ages, using a combination of meals and snacks. Children 6-8 months old should receive complementary foods 2-3 times a day, children 9-11 months old should receive complementary foods 3-4 times a day, and children 12-24 months old should receive complementary foods 4-5 times a day. It is also important to diversify the diet to improve quality and micronutrient intake. The mother or caregiver should practice responsive feeding, frequent and responsive feeding during and after illness, and good hygiene and proper food handling (LINKAGES 2001). See Session 8 on nutritional care and support for children with HIV/AIDS, including care of severely malnourished children, for additional information.

Other breastmilk options

- Breastmilk from breastmilk banks is generally available over a short time for sick or low birth weight babies, but not in limited-resource settings.

- Wet nurses should be HIV negative. HIV transmission may occur from the infant to the wet nurse, especially if she has cracked nipples.

The Code of Marketing of Breastmilk Substitutes and HIV

The International Code of Marketing of Breastmilk Substitutes is especially important in the context of HIV and infant feeding. The Code protects optimal breastfeeding for most infants but also protects artificially fed infants by ensuring that all products are clearly labeled for proper preparation and that the choice of replacement feeding is based on non-commercial information. Countries may purchase infant formula and provide it free or at subsidized cost. Care must be taken to ensure this formula is used exclusively. Labeling is important in local languages on safe preparation and use. **Note**: Address whether and how the Code is implemented in your country.

A study in Zvitambo, Zimbabwe, is measuring the effect of infant feeding counseling on feeding decisions (box 4).

Box 4 ZVITAMBO study

Since 2001 the ZVITAMBO study in Zimbabwe has followed 14,000 mother-baby pairs (approximately 30 percent of them HIV positive and 70 percent HIV negative) for 12–24 months to measure the impact of infant feeding counseling on several outcomes, including mother-to-child transmission (MTCT). ZVITAMBO has provided high-dose vitamin A supplements to mothers (400,000 IU) or babies (50,000 IU) within 96 hours of delivery. The study has investigated infant morbidity and mortality, rate and timing of MTCT during breastfeeding, and the incidence of HIV infection among post-partum women. Results from this and other studies will help to inform PMTCT recommendations.

Short-course perinatal ARV prophylaxis (slide 33)

Short-course perinatal ARV prophylaxis is to be distinguished from long-term ARV therapy for treating HIV-infected people. The former regimens are prescribed to prevent mother-to-transmission of HIV and not to treat the HIV-infected mother. The three most common courses are listed below.

- Administration of Zidovudine (ZDV) to women from 36 weeks gestation through labor and delivery, with additional prophylactic ZDV to the mother after birth in some regimens. ZVD is a nucleoside analogue. Retrovir is the commercial name.

- Administration of ZVD and Lamivudine (3TC) to mother and baby during the antenatal, intrapartum, and post-partum periods. 3TC is also a nucleoside analogue. Epivir is the commercial name.

- Administration of Nevirapine (NVP) during labor and to infant within 72 hours of birth. This course is preferred because of the low cost ($4 for mother and child pair) and ease of administration (single dose for mother and newborn). NVP is a non-nucleoside reverse transcriptase inhibitor. Viramune is the commercial name.

Five perinatal antiretroviral therapy (ART) regimens have been tested for breastfed infants. Efficacy is reduced over time, likely because trials provided ART only during the perinatal period (Farley et al 2000). There are ongoing trials to examine whether ARVs prevent MTCT during breastfeeding. A clinical trial in Uganda (Guay et al 1999) showed that giving a single dose of Nevirapine to mothers during labor and another to her infant after delivery reduced transmission in breastfed infants by 42 percent through 6 weeks and by 35 percent through 12 months.

For additional information on ARVs, refer to Session 6 on nutritional care and support for pregnant and lactating women infected with HIV, Session 8 on nutritional care for children infected with HIV or born to HIV-infected mothers, and Session 9 on management of drug and food interactions in HIV/AIDS therapy.

Optimal obstetric care

Safe motherhood and reproductive health programs are advised for PMTCT programs. It is important to support safer labor and delivery practices in the context of HIV/AIDS. Women should be encouraged to walk during labor, to stay well nourished and hydrated, and to have a safe delivery plan and a contingency plan for referral. Partographs are recommend to record labor progress and mother-baby vital signs. Artificial rupture of membranes to hasten labor should be avoided, as well as routine episiotomy for all primagravidas.

Following delivery, the baby should be thoroughly dried, and any remaining maternal blood and amniotic fluid should be removed. Vigorous suctioning of the infant's mouth and pharynx right after delivery should be avoided, and cutting and care of

umbilical cord should be carefully handled. Elective Caesarian sections are used for prevention of MTCT but may be risky in certain environments.

Family planning

The contraceptive prevalence rate in sub-Saharan Africa remains low at 17 percent (UNICEF 2000). Available safe and effective contraception as well as quality reproductive health counseling for PMTCT programs are important. See Nutrition Job Aids for Regions with High HIV Prevalence for additional information.

Conclusion (slides 34, 35, 36)

The future of PMTCT depends on programmers, policymakers, and researchers. While successful programs are now being implemented, an even greater investment is needed to address this problem with particular emphasis on infant feeding.

At the policy level, many governments have developed national guidelines on PMTCT. There is a need to share experiences among countries and ensure that guidelines are based on current research findings and programmatic experience. Finally, further research is needed on PMTCT. **Note**: Explore students' ideas about the future of research, as well as programming and policy needs in PMTCT, and infant feeding.

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EXERCISE 7

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Use the case studies in this exercise for students to practice counseling on infant feeding and PMTCT. Although this module focuses on the Ndola Demonstration Project, country-specific case studies can be developed to use in its place. For this module, names for the role-play were selected arbitrarily. Modify the names and any other aspects (i.e. foods described) of the following case studies as appropriate for country and community contexts.

Refer to slide 31: Counseling on Infant Feeding, slide 32: Informed Choice, **Handout 6.2** PMTCT Decision-Making Algorithm, and LINKAGES infant feeding guidelines.

TASK 1: Case study for counseling pregnant and lactating women in areas of high HIV prevalence (including PMTCT)

In the following exercise, students will have the opportunity to practice assessment and counseling skills for the care and support of pregnant and lactating women who are either HIV-infected or of unknown status but live in areas of high HIV prevalence. Specifically, students will practice helping women make an informed choice of infant feeding options and counsel them on PMTCT.

Divide the students into pairs and give each pair one of the following case studies. One student plays the part of health worker or counselor, and the other student plays the part of father or mother. The questions provided are intended for guidance. Students should be encouraged to formulate additional questions to enhance the counseling session. Once the session is complete, the entire class may discuss each case study from the points of view of the health worker and client.

All case studies should be prefaced with the following information. One out of every five people in Zambia between the ages of 15 and 49 is infected with HIV, and approximately 25,000 Zambian infants will become infected with HIV each year either in utero, during labor and delivery, or through breastfeeding. The seroprevalence rate of the three districts where counselors are working are 25.6 percent in Kabwe, 41 percent in Livingston, and 28 percent in Ndola.

Case study 1

A school teacher, Regina, comes into the clinic to discuss infant feeding options. She tested HIV positive earlier in her pregnancy. She is now 8 months pregnant. Regina has read about and heard that giving infant formula instead of breastmilk will eliminate the risk of passing on the virus to her infant during breastfeeding. Regina also tells you that she has just enough income to cover her basic needs.

- What additional information is needed to help Regina make an informed choice and also manage her nutritional needs?
- Can she afford to replacement feed?
- Is there community or household support for her infant feeding decision?
- What are her feelings on the issue?
- What is her partner's HIV status?
- Has she gained adequate gestational weight?

Case study 2

A young couple, John and Jane, come to the clinic. You have already been meeting with Jane, who is HIV positive. She is 6 months pregnant with her first child. John's test results indicate that he is HIV negative. Jane is aware of her HIV status, but has not told John. Both John and Jane are unemployed. Jane has not gained adequate gestational weight and is complaining of diarrhea and nausea. She is not taking any ARVs.

- How does this information help you assess Jane's nutritional status? What additional questions might be appropriate? (e.g., What have you eaten today, yesterday? What variety of food have you taken the last week?)
- What interventions would you propose to Jane?

- What issues must be explored in this session for guidance on infant feeding once the child is born? What open-ended questions might be asked to ascertain the infant feeding options available?

- What other help would John and Jane need with regards to their HIV status? What advice and support is needed from their community and from you as counselor?

Case study 3

Gertrude is about to give birth. She has visited the clinic for other antenatal services but declined to be tested for HIV. Her husband has recently died, and rumors are that he has died of AIDS. She has four children at home already, two of whom are of school age. She has recently moved back home with her mother. Gertrude tells you she has many anxieties about how she is going to support her household. She does not have a formal job but is able to grow some vegetables to sell in the market. Gertrude has managed to gain adequate gestational weight. She states that she has breastfed all of other children, although not exclusively, introducing foods within the first or second months.

- What are the nutritional care and support issues for the mother, unborn child, and household?

- What other preventative messages would you convey?

Case study 4

Hilary is 3 months pregnant and has tested HIV positive. She is a fairly successful entrepreneur who has built a small business selling beer in the city. Hilary has two other children who have been healthy. Her partner has not been tested, and she has not yet told him she is HIV infected. She seems to have enough resources to afford some form of replacement feeding. She has breastfed her other children. Hilary has heard that some herbal products (garlic supplements) and micronutrient supplements (i.e., vitamins A and C) could help with HIV infection. She wonders whether you would recommend these products. She has also asked about taking ARVs.

- How would you respond to Hilary's question about the supplements? What information should you give her?

- What other supplements would you recommend to her by identifying pros and cons for each supplement?

- What other information do you need from Hilary to assess her replacement feeding options effectively?

- What advice would you give about ARVs?

HANDOUT 7.1 WHO Recommendations

"When replacement feeding is acceptable, feasible, affordable, sustainable, and safe, avoidance of all breastfeeding by HIV-infected mothers is recommended. Otherwise, exclusive breastfeeding is recommended during the first months of life.

To minimize HIV transmission risk, breastfeeding should be discontinued as soon as feasible, taking into account local circumstances, the individual woman's situation and the risks of replacement feeding (including infections other than HIV and malnutrition)."

Source: WHO. 2001. New data on the prevention of mother-to-child transmission of HIV and their policy implications: Conclusions and recommendations. Geneva.

HANDOUT 7.2 PMTCT Decision-Making Algorithm

IF a mother knows she is HIV infected, and

IF safer feeding options other than exclusive breastfeeding are appropriate,

IF breastmilk substitutes are affordable and can be fed safely with clean water,

IF adequate health care is available and affordable,

THEN the infant's chances of survival are greater if fed with breastmilk substitutes

OR if a mother chooses to breastfeed, she should do so exclusively until the infant is about six months old, when she/he is ready to take complementary foods.

HOWEVER,

IF infant mortality is high as a result of infectious diseases, or

IF hygiene, sanitation, and access to clean water are poor, or

IF safer feeding options other than exclusive breastfeeding are inappropriate,

IF the cost of breastmilk substitutes is prohibitively high, or

IF access to adequate health care is limited,

THEN breastfeeding may be the safest feeding option, even when the mother is HIV positive.

Adapted from LINKAGES. 2001 Frequently Asked Questions on Breastfeeding and HIV. Washington, DC: Academy for Educational Development.

SESSION 8 NUTRITIONAL CARE FOR YOUNG CHILDREN INFECTED WITH HIV OR BORN TO HIV-INFECTED MOTHERS

Purpose

The purpose of this session is to equip students with knowledge and materials on nutritional care and support for children infected with HIV or born to mothers infected with HIV and the care of severely malnourished children with HIV/AIDS.

Learning objectives

By the end of the session students will be able to:

- Explain the relationship between nutrition and HIV/AIDS in children and the etiology of growth failure among HIV-infected children and children born of mothers infected with HIV.
- List the nutrition actions to prevent or reduce wasting and specific nutrition deficiencies.
- Present the key issues in the management of severely malnourished children with HIV/AIDS.

Prerequisite knowledge

- Technical background in infant and young child nutrition.
- Session 2: The Link between Nutrition and HIV/AIDS

Estimated time: 120 minutes, excluding time for field work

Outline

Content	Methodology	Time
1. Etiology of malnutrition in children infected with HIV or born to HIV-infected mothers • Number of children infected with HIV/AIDS in the region • Sources of malnutrition among HIV-infected children and children born to HIV-infected mothers ○ Malnutrition before and after birth and progressive post-natal malnutrition in HIV-infected children ○ Reasons for growth retardation in HIV-infected children • Consequences of growth failure among children with HIV/AIDS 2. Nutritional care and support for children infected with HIV or born to HIV-infected mothers • Goals of nutritional care and support • Components of nutritional care and support for children infected with HIV or born to HIV-infected mothers • Provider guidelines for nutritional care and support of children infected with HIV or born to HIV-infected mothers	Facilitate an interactive lecture using **PowerPoint 8** presentation Brainstorm reasons for growth failure in HIV-infected children Use **Discussion Points 8** to help participants master the concepts during discussion Brainstorm key nutrition actions for children with HIV	100 minutes
3. Special considerations for care and support of severely malnourished children who are HIV positive 4. Considerations in and approaches to care and support 5. Case study: Why Did Norman Die? 6. Nutritional considerations for a terminally ill child	<u>After the lecture</u> Divide class into groups of 4 and give **Exercise 8** cards on "Why Did Norman Die?" (cards and case studies attached) Distribute Arpadi 2000a and **Handout 8.1**: Growth Failure in Children with HIV Infection	20 minutes

Required materials

- LCD or overhead projector
- Flipchart stand and paper or board and chalk
- Writing pens

Recommended preparation

- Be familiar with **Lecture Notes 8**: Nutrition and HIV/AIDS among Young Children.
- Look through **Discussion Points 8** to identify relevant questions to help students master the concepts. Facilitate group discussions of these issues if time allows.
- Allocate time for each activity considering students' backgrounds and coverage of the activity elsewhere.
- If necessary, refer to some reading materials, particularly Arpadi 2000a.
- Prepare cards for **Exercise 8:** Why Did Norman Die?

Materials provided

PowerPoint Presentations

- **PowerPoint 8**/overhead presentation: Nutrition and HIV/AIDS among Young Children

Additional Resources Available on CD

- Arpadi S. 2000a. Growth failure in children with HIV infection. *JAIDS* 25: S37-S42.

Suggested reading materials

Agostoni C, GV Zuccotti , M Giovannini , et al. 1998. Growth in the first two years of uninfected children born to HIV-1 seropositive mothers. *Arch Dis Child* 79: 175-78. http://adc.bmjjournals.com/cgi/content/full/archdischild%3b79/2/175

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LECTURE NOTES 8: NUTRITION AND HIV/AIDS AMONG YOUNG CHILDREN

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Introduction

The Centers for Disease Control and Prevention (CDC) and World Health Organization (WHO) recognize malnutrition or growth faltering as an important sign of AIDS infection in children (CDC 1987). Malnutrition is a problem not only for children infected with HIV but also for HIV-negative children born to infected mothers. Numerous factors known to clinically indicate HIV infection in children have been used to define the essential actions for care of HIV-affected children, though many other factors are still unknown.

Purpose (slides 2, 3)

The purpose of this session is to equip students with knowledge and materials on nutritional care and support for children infected with HIV or born to mothers infected with HIV and the care of severely malnourished children with HIV/AIDS. The session:

- Explains the relation between nutrition and HIV/AIDS in children and the etiology of growth failure among HIV-infected children and children born of mothers infected with HIV.

- Lists the nutrition actions to prevent or reduce wasting and specific nutrition deficiencies.

- Presents the key issues in the management of severely malnourished children with HIV/AIDS.

How children become infected with HIV (slides 4, 5, 6)

Infants can acquire HIV from their infected mothers during pregnancy, at the time of labor and delivery, or after birth through breastfeeding. They can also become

infected with HIV-contaminated blood or from medical equipment or sometimes through child abuse. In some populations in sub-Saharan Africa, 30 percent or more of pregnant women are infected with HIV. As presented in Session 7, in the absence of prevention of mother-to-child transmission (PMTCT) interventions, 24 percent–45 percent of HIV-infected mothers will pass on the virus to their infants.

By 2000 an estimated 5 million children were infected with HIV. As shown in table 1, over 150,000 children in Ethiopia, 95,000 in South Africa, and 78,000 in Kenya were living with HIV/AIDS in 2000. The number of orphans from HIV/AIDS in some countries is 5 percent–8 percent of the total population. All these children have to be given special care.

Table 1 HIV infection rates by African country, 2000

Country	HIV rate in adult population (percentage)	Children 0–14 infected	Children orphaned
Angola	2.8	7,900	98,000
Burundi	11.3	19,000	230,000
Botswana	35.8	10,000	66,000
DR Congo	5.1	53,000	680,000
Ethiopia	10.6	150,000	1,200,000
Kenya	13.9	78,000	730,000
Lesotho	23.5	8,200	35,000
Madagascar	0.2	450	2,600
Malawi	15.9	40,000	390,000
Mozambique	13.2	52,000	310,000
Namibia	19.5	6,600	67,000
South Africa	19.9	95,000	420,000
Rwanda	11.2	22,000	270,000
Swaziland	25.2	3,800	12,000
Tanzania	8.1	59,000	1,100,000
Uganda	8.3	53,000	1,700,000
Zambia	19.9	40,000	650,000
Zimbabwe	25.1	56,000	900,000

Source: UNAIDS 2002

Despite these statistics, it is difficult to assess whether and when a child is infected with HIV. Conventional methods such as HIV antibody tests (ELISA and Western blot assays) cannot reliably differentiate infants' own HIV antibodies from trans-placenta-acquired maternal antibodies. Expensive virologic assays such as HIV DNA polymerase chain reaction (PCR) are more useful in defining HIV among young children. Because of these challenges in assessing the HIV status of infants, this session discusses only how to care for children born to the one-third of mothers assumed to be infected with HIV. The session also presents current knowledge on the etiology of malnutrition in HIV-infected children.

Risk of malnutrition among children born to HIV-infected women and HIV-infected children

Low birth weight and stunting are common among children born to HIV-infected mothers.

HIV-infected women are likely to give birth to low birth weight children (slides 7, 8)

Studies differ on the effect of maternal HIV status on birth weight. Generally, infants born to HIV-infected women have a higher risk of lower birth weight, regardless of their HIV status, compared with infants of uninfected women. A study in Kigali, Rwanda, reported a mean birth weight of 2,047g among children born to HIV-infected women, compared with 3,104g among children born to HIV-negative women of the same social and economic conditions (Casterborn et al 1999). Some studies report lower birth weight but not shorter mean length among children born to HIV-infected women at full term (Agostoni et al 1998; Bailey et al 1999). Reduced birth weight and length are not necessarily more severe among HIV-infected children than among uninfected children born to HIV-positive women (Bailey et al 1999; LePage et al 1998).

Four factors seem to be associated with reduced birth weight among children born to HIV-infected women:

- Shorter gestational age among HIV-infected women
- Severity of maternal HIV disease, a factor of viral load

- Intrauterine growth retardation and micronutrient deficiency, most likely occurring late in the pregnancy. Infection with HIV increases demand for energy and nutrients. If food intake is not adequate to compensate for the increased needs, a negative energy and micronutrient balance may result.

    - In one study in areas prone to vitamin A deficiency in Malawi (Semba et al 1997), 1-year-old children of vitamin A-deficient mothers weighed approximately 8 percent less and were 2 percent shorter than infants born to vitamin A-replete mothers, regardless of the infants' HIV status.

    - In another study in Tanzania (Fawzi et al 1998), supplementation of HIV-infected women with multivitamins during pregnancy improved the pattern of weight gain and improved birth weight and birth outcome.

- Prenatal drug or alcohol use during pregnancy (Arpadi 2000a).

Progressive post-natal stunting is common among HIV-infected children (slides 9, 10, 11)

Although uninfected infants born to HIV-infected women start with lower birth weights, they show rapid weight gain and "catch-up" growth immediately after birth. Mainly this is facilitated by fat mass deposition. By the third month most uninfected children born of HIV-infected women have caught up in height and weight with children born to HIV-negative women (Agostoni et al 1998).

Poor growth, however, is common among children infected with HIV. As many as 50 percent of children with HIV fail to thrive (Arpadi 2000a). In fact, since 1994 the CDC has used failure to thrive as an AIDS definition condition in children. By the third month, linear growth (height) is proportionately decreased among HIV-infected children. The difference in linear height is significant and evident by the second year of life. By that time, HIV-infected children have a growth velocity of less than the fifth percentile, an indication of severe growth failure. Along with stunting, symptomatic HIV-infected children commonly show HIV-related wasting, mainly marasmus.

Etiology of growth failure among HIV infected children (slides 12, 13, 14)

What explains the slow linear growth among HIV-infected children? The etiology is not well understood and may involve many factors. Some documented factors are listed below.

- The rate of HIV replication has a reciprocal relation to the rate of growth.
    - HIV-infected children with poor growth also have higher viral loads than infected children with normal growth curves (Pollack et al 1997).
    - Suppression of viral load with antiretroviral drugs (ARVs) appears to have a favorable effect on growth, especially weight gain (Arpadi 2000a).
- Underlying disease activity seems to be a major factor in children's growth (Bailey et al 1999). Gastrointestinal dysfunction (including persistent diarrhea) and malabsorption are key factors in the nutrition of children in resource-constrained areas.
- Inadequate energy and micronutrient intake (simple starvation) affect growth. For most HIV-infected children, daily intake may not be sufficient to meet increased metabolic demands. In addition, during this period of rapid growth there is normally increased demand on available nutrient pools. HIV-infected children or children born to HIV-infected parents may not be able to consume adequate foods to meet all their needs, for various reasons:
    - High social risk of being born to poor households and having mothers with HIV/AIDS who are unable to access enough food for themselves and their babies or to provide quality care
    - Gastrointestinal dysfunction, including infections and malabsorption
    - Infections and use of medicine affecting child food intake
    - Micronutrient deficiency associated with growth failure
    - Additional nutrient and energy needs for growth and development, even in the absence of abnormal eating habits

- Children infected with HIV also show preferential decreases of fat-free mass (lean body mass) compared to uninfected children . This is also seen among children (especially boys) depicting normal rates of growth. This may be associated with:
    - High viral load, also associated with decreased proportion of free fat mass
    - Host immune response to the replication of the virus, which may increase the basal metabolic demands (and thus increased energy expenditures) in HIV-infected children. Unlike in adults, hypermetabolism is rarely reported in HIV-infected children. However, the lack of hypermetabolism may partly result from a lower amount of FFM, which is preferentially decreased in children infected with HIV, especially those with growth failure.
- Maternal vitamin A deficiency influences infant linear growth during the first year of life. Increased mortality is associated with vitamin A deficiency during human immunodeficiency virus infection (Semba, Miotti, Chiphangwi, et al 1997).
- The following additional factors may be associated with the etiology of growth failure and altered body composition:
    - Metabolic and endocrine alterations or disorders associated with stress
    - Growth hormone deficiency
    - Hypothyroidism

Consequences of growth failure among HIV-infected children (slides 15, 16, 17, 18)

Poor growth is associated with poor survival. HIV-infected Ugandan infants with weight-for-age below –1.5 Z-scores have five times the risk of dying before the age of 25 months compared with non-infected children (Berhane et al 1997). Growth failure among HIV-infected children is associated with retarded cognitive development and functional deficits such as delayed sexual development among

boys. Micronutrient deficiencies will result in functional consequences similar to those reported in uninfected children.

Nutritional care and support of children infected with HIV or born to mothers with HIV (slide 19)

Nutritional care and support of children born to HIV-infected women is similar to that of HIV-infected adults.

Goals of nutritional care and support of children born to HIV-infected women (slides 20, 21)

- Improving nutritional status—maintaining weight, preventing weight loss, and preserving lean body mass
- Building stores of essential nutrients (macronutrients and micronutrients) necessary to boost immunity for resistance to infections and speedy recovery in case of infections
- Preventing food-borne illnesses by promoting hygiene and food and water safety
- Enhancing the quality of life by promptly treating infections and managing the symptoms that affect food intake to minimize the impact of secondary infections on nutritional status

Components of nutritional care and support for HIV-infected children and children born to HIV-infected women (slide 22)

The risk of malnutrition among children born to HIV-infected women or children infected with HIV requires regular nutritional assessments and early nutrition interventions. Programs that provide nutritional care and support for affected children should include the following components:

- Prevention of mother-to-child transmission of HIV (including maintaining appropriate weight gain in pregnancy and avoiding behaviors that increase risk of low birth weight and length)

- Periodic nutritional assessment of infants and young children
- Nutrition support and behavior change communication to improve nutrition for the mother and the child
- Proper food hygiene and handling (plus periodic deworming)
- Diversification of the child's food (or the use of micronutrient supplements and fortified foods) to increase energy density and micronutrient availability
- Prompt treatment of infections and opportunistic infections that affect food intake and nutrition
- Use of ARVs where available or affordable

Good obstetric care and maternal nutrition (slide 23)

Good obstetric care and prevention of mother-to-child transmission of HIV are vital to prevent transmission of HIV to children and maintain good nutrition. Actions include supporting women to maintain appropriate weight gain in pregnancy, take multivitamin supplementation, and avoid behaviors that increase the risk of low birth weight and length.

Periodic nutritional assessment (growth monitoring) (slides 24, 25)

The goal of nutritional assessment and intervention is to improve nutrition status, prevent further complications, and enhance the child's quality of life and survival.

The nutritional assessment is important to gather information on the current nutrition status and adequacy of the diet and to identify risk factors for developing nutritional complications. The earlier and more consistently this can be done the better. The information gathered should be interpreted to identify problems that put the children at increased nutrition risk and to design the best intervention with caregivers. The assessment should help capture the following information:

- Changes in nutritional status (weight for height and height for age)

- Changes in eating behaviors associated, for example, with food availability issues, feeding pattern changes, and appetite changes

- Morbidity that may result in nutritional changes

Components of the nutritional assessment

The nutritional assessment should cover the child's physical and biochemical (laboratory) data, nutrition history, medical history, and medication profile.

1. Physical assessment

- Anthropometric measurements

    - Growth monitoring measures normally include weight and age but should also include height.

    - Weight changes are assessed monthly basis (a child should grow parallel to the growth curves).

- Measurements to assess changes in muscle mass

- Screening for pallor (inner eyelids and palms) to assess anemia

2. Biochemical data (where available and feasible)

- Serum albumin

- CD4 and viral load counts

- Evaluation of anemia: iron (Hb), $B_{12,}$ and folate status

3. Nutrition history

- Dietary intake, frequency and adequacy of food consumed (including breastmilk for infants who are breastfed), exclusiveness of breastfeeding among infants

who are breastfed, exclusiveness of replacement feeding among infants who are not breastfed, adequacy of breastmilk substitutes for infants who receive replacement feeding, foods given, and hygiene practices

- Dietary problems such as poor appetite, difficulty chewing and swallowing, gastrointestinal problems, oral thrush, and sores
- Food intolerance and aversions, especially related to dietary symptoms
- Hygiene and practices in preparing and handling baby foods
- Use of vitamin and mineral supplements (e.g., vitamin A, iron supplementation), deworming, and alternative practices
- Medical history
- Recent gastrointestinal problems (e.g., diarrhea, abdominal pain, nausea, and vomiting)
- Pattern of bowel movements (e.g., incidence of constipation)
- Opportunistic infections
- Concurrent medical problems (e.g., malaria, worm infestation, oral thrush and sores)

5. Medication profile

- Drug use (e.g., ARVs, alternative therapies, and other medications)
- Side effects of medications and their nutrition implications

Nutritional support, education, and counseling of caregivers

Caregivers need not only nutrition education but also a sense of empowerment and confidence to apply the knowledge in their contexts. Nutritional support and counseling of caregivers should:

- Address issues relevant and of concern to most caregivers and their children
- Allocate time for individual evaluation and counseling
- Provide practical suggestions
- Use a list of local, affordable, and accessible foods to show mothers how much extra food they need to eat or to feed their children
- Provide advice on how to manage symptoms such as loss of appetite, diarrhea, vomiting, and weight loss
- Address harmful traditional feeding practices and practices that do no harm that should be encouraged
- Be respectful and confidential at all times

Proper food hygiene and handling practices (slide 26)

Session 3 on nutrition actions for the care and support of people living with HIV/AIDS addresses food hygiene, including water and sanitation and proper handling and safety of children's food and drinks. The aim of proper food hygiene and handling is to avoid food- or water-borne infections such as diarrhea, dysentery, cholera, and typhoid that can further weaken the immune system and thus foster HIV disease progression.

Food diversification (slide 27)

Children's food can be diversified by increasing energy density and providing micronutrient supplementation or fortification. This meets the energy requirements of children infected with HIV or born to HIV-infected mothers and optimizes their nutrient intake.

<u>Energy</u>

There is no documented energy recommendation for children with HIV/AIDS, but asymptomatic HIV-infected adults require 10 percent more energy than non-infected adults of the same age, sex, and activity level, and symptomatic HIV-infected adults

require 20 percent-30 percent more energy. Children with HIV/AIDS also have increased energy needs, but there is no current recommendation specific to children. Most of the energy for a young child may come from breastmilk if the mother chooses to breastfeed. The breastfeeding mother needs adequate food intake and nutrition to benefit both herself and her child (see Session 7 for details).

Optimizing intake

For a child infected with HIV to consume enough calories, proteins, and nutrients, intake needs to be optimized by:

- Increasing the frequency of feeding (probably to 5—8 small servings per day)
- Providing higher energy- and nutrient-dense foods (germinated or fermented foods, fortified foods)
- Modifying the diet to enable the child to increase consumption (e.g., by pureeing or slightly spicing the food)

Prompt treatment of infections and opportunistic infections (slide 28)

Prompt treatment of diseases such as malaria, diarrhea, acute respiratory infections, sore mouth, and ulcers minimizes the impact of the infection on the child's nutritional status. The possible effect of infections on food intake and absorption is also important. The following common opportunistic infections may affect food intake among children infected with HIV:

- Sore throat and wounds in the gastrointestinal tract
- Thrush
- Fever

Children need medications to treat opportunistic infections and other diseases. The medicines themselves may affect food intake through side effects, discomfort, changes in taste.

Enhanced ARV therapy (slide 29)

Children need antiretroviral therapy to reduce viral load and delay disease progression. However, ARVs may have side effects (nausea, vomiting, diarrhea, constipation, and changes in taste) that may affect the dietary intake of the infected children. The side effects may be caused by the interaction between food or nutrients and the drugs (see Session 9). Side effects should be managed to ensure continued food intake and adherence to medication regimens.

Nutrition actions that service providers can take in care and support (slide 30)

As noted above, HIV-infected children are more likely than non-HIV-infected children to experience growth failure and face an increased risk of death. These risks require early intervention and continual follow up.

For all children

- Regularly and accurately monitor growth (weight and height) to recognize growth failure, malnutrition, and its possible causes.

- Provide or refer caregivers for routine essential infant and child services (e.g., immunization, vitamin A supplementation, and deworming), according to national guidelines.

- Counsel caregivers to identify any opportunistic infection (e.g., oral thrush or sores, fever, gastrointestinal problems) or other infection (e.g., malaria, acute respiratory infections, diarrhea) and seek early support from a health worker.

- Counsel caregivers to identify support services and programs in their communities (e.g., home-based care, food distribution, psychosocial support) that may improve their or their children's nutrition.

- Review the child's diet at every clinic visit to ensure appropriate feeding.

- Counsel caregivers on cultural feeding habits, traditional therapies, and other practices that may be harmful to young children.

- Promote good food hygiene and food handling practices to make food safe and prevent food-born infections.

- Refer caregivers to programs that may have available medications, including ARVs for young children.

For infants 0—5 months

- If the mother is breastfeeding, promote ONLY exclusive and frequent breastfeeding (> 8 times/day).

- If the mother is not breastfeeding, ensure infants receive ONLY replacement feeding (see Session 7) and that proper hygiene is maintained. Provide the child with multivitamins or counsel on giving foods fortified with micronutrients (e.g., "sprinkle sachets" for home fortification where available).

For children 6—35 months

- If the infant is HIV negative or of unknown status, educate and support the mother on early weaning at or before 6 months of age.

- Promote adequate and proper feeding to 24 months or beyond. Review the child's diet at every well- and sick-baby clinic visit to ensure appropriate feeding (crucial if the mother is formula feeding).

- Promote good hygiene and proper food safety and handling.

- Counsel the caregiver to increase the amount and variety of foods given to the child, emphasizing the use of locally available, energy-dense foods (e.g., germinated or fermented flours to make porridge), fortified foods (e.g., fortification sachets), and increased use of fruits and vegetables.

For severely malnourished children (slides 31, 32, 33, 34, 35, 36, 37, 38, 39)

Severely malnourished HIV-infected children rarely respond to conventional rehabilitation or take much longer to rehabilitate.

- Refer children with severe malnutrition to an appropriate nutritional rehabilitation institution.

- Treat severe malnutrition according to **new** WHO guidelines, following the following steps:

    - Categorize the extent of malnutrition by both anthropometric (e.g., body weight, skinfold measures, height) and clinical and biochemical methods. Also try to determine current intake patterns to assess adequacy and determine optimal intervention.

    - Treat any infections, especially those that affect food intake and absorption.

        - Prevent and control hypoglycemia (also a common complication of ARVs).

        - Use oral rehydration therapy to replace lost fluids.

        - Regulate body temperature to prevent hypothermia.

        - Use antibiotics as necessary to treat any infections.

    - Give adequate nutritional therapy.

        - Provide locally available and culturally acceptable high-energy and nutrient-dense diets.

        - Promote breastfeeding where appropriate during rehabilitation.

        - Provide vitamin A supplements according to national protocols (e.g., 200,000 IU on admission, a second dose the next day, and a follow-up dose 14 days later).

        - Use gastrotomy tube supplementation for HIV-infected children if other oral methods fail.

    - Provide nutrition counseling to the caretakers.

- Provide follow up after discharge while monitoring weight and other infections (slide 40).

DISCUSSION POINTS 8

Questions for class reflection and discussion

- Ask students to list the factors in the country that are likely to influence the nutrition of children born to HIV-infected mothers and the actions they propose to address those factors at a) policy, b) programmatic, and c) household levels.

- Which of the components of nutritional care and support discussed above do students think are more likely to improve the nutrition and survival of children affected by HIV/AIDS in the communities where they come from? Ask them to explain their choices.

- Ask students to identify several key programs (government, NGO, and private sector) in which nutritional care and support of children can be integrated and to indicate how this can be done.

- Show the students some of the country's policies and guidelines on HIV/AIDS and nutritional care and support, if available. Also bring job aids, protocols, posters, and recording sheets (e.g., Integrated Management of Childhood Illnesses guidelines and chart books, supervision checklists) that may be used by people handling children.

    - Ask students how the tools could be improved or modified to address the key issues and areas identified above.

    - Discuss the adequacy of available materials (e.g., job aids, protocols, posters, and recording sheets) in improving the quality of services offered in the care and support of children infected with or born to mothers infected with HIV.

EXERCISE 8

TASK 1: Why did Norman die? The actions and activities in the table below show a sequence of events in the short life of an HIV-infected infant named Norman. Prepare sets of cards marked with the actions and activities. Divide the students into small groups, giving each group one set of the cards. Shuffle the cards to make sure the groups cannot easily find the sequence of events. As them to reconstruct this sequence and determine why Norman died (the underlying reason was discontinuation of the follow up).

Action/activity	Information
Helen, a 17-year-old student	
Helen married	
Helen pregnant	
Helen attending antenatal clinic	
Helen receiving VCT	
Helen found HIV positive	EIA test
Helen giving birth to a baby boy (Norman)	
Norman born weighing 2.7kg	
Norman testing HIV positive	
Norman exclusively breastfed for 5 months	PCR at 1.5 months
Norman abruptly weaned on cow's milk	
Norman fully immunized for age	
Norman admitted suffering from severe diarrhea	
Norman admitted with pneumonia	
Norman at 13 months and 3.2kg	

Action/activity	Information
Norman admitted to nutrition rehabilitation	OBSERVED: Severe wasting (W/A=44%); absence of pedal edema; moderate dehydration; marked irritability; clinical signs of anemia; indrawn chest and bilateral crepitations) **Management** • Rehydration • Temperature control • High-energy milk (HEM) (150kcal/kg body weight per day) fed every 2 hours • Vitamin A (400,000 IU given on admission and on day 2) • Multivitamins given (1 tablet daily) • Folic acid given (5mg/day) • Antihelminthics given • Antimalarials given • Antibiotics given • Antituberculosis given empirically
Norman discharged after 51 days Norman weighing 4.8kg at discharge	Helen taught essential nutrition behaviors: • Family planning (registered) • Diet planning and food preparation • Child feeding practices (with active feeding) • Food and personal hygiene
Norman receiving monthly follow up from Nutrition Rehabilitation Unit Helen getting sick and being cared for at home Norman suffering from diarrhea Helen dying Caretaker (aunt) given education on hygiene and diet planning Norman registered in an antiretroviral program at 33 months Monthly follow up from NRU stopped Follow up by NRU 24 months finding that Norman died 8 months earlier	

SESSION 9 MANAGEMENT OF DRUG AND FOOD INTERACTIONS IN HIV/AIDS THERAPY

Purpose

The purpose of the session is to equip students with knowledge and skills for the nutritional management of drug and food interactions in HIV/AIDS therapy.

Learning objectives

By the end of the session, students will be able to:

- State why nutritional management of drug and food interactions is important in HIV/AIDS therapy.
- List the common types of drugs taken by people living with HIV/AIDS, different types of food-drug interactions, their nutritional implications, and the appropriate dietary responses.
- Assess and analyze information collected during client assessment and work with the HIV-infected person to select the most appropriate actions or approach.

Prerequisite knowledge

- Technical background in infant, child, maternal, and adult nutrition and HIV/AIDS-related symptoms
- Basic counseling skills

Estimated time: 120 minutes, excluding time for field work

Outline

Content	Methodology	Timing
1. Rationale for the proper nutritional management of drug and food interactions in HIV/AIDS therapy • Increased need for management of HIV/AIDS and treatment of opportunistic infections and other diseases • Effects of food and nutrients on drug efficacy • Medications side effects on food intake, nutrient absorption, and compliance 2. Main types of drugs (common modern and traditional therapies) taken by people living with HIV/AIDS to treat and manage HIV/AIDS 3. Food and drug interactions and the nutritional management of the interactions • Effects of food and nutrients on drug efficacy • Effects of drugs on nutrient absorption and metabolism • Potential side effects of drugs on food intake, absorption and metabolism • Unhealthy effects of the interaction	Facilitate an interactive lecture using **PowerPoint 9** presentation Use the questions and answers in **Discussion Points 9** to help students master concepts Go through some of the examples in **Handout 9.1**: Drugs Commonly Taken by People Living with HIV/AIDS, Likely Side Effects, and Recommended Dietary Practices to Increase Drug Efficacy	100 minutes
Discussion of recommendations for service providers to address issues related to food-drug interactions (e.g., food-drug timetables and considerations for women and children)	Distribute **Handout 9.1**: Drugs Commonly Taken by People Living with HIV/AIDS, Likely Side Effects, and Recommended Dietary Practices to Increase Drug Efficacy	

Content	Methodology	Timing
4. Assessment and analysis of the client's information and selection of the most appropriate actions or approaches during the counseling session on drug and food interactions	Use **Exercise 9** to conduct role-plays (a health worker counseling an HIV/AIDS client on potential food-drug interaction with Combivir (AZT/3TC). Use **Handout 9.2**: Observation Checklist for Assessment during a Counseling Session on the Management of Drug and Food Interactions in HIV/AIDS Therapy to observe the role-play	20 minutes

Required materials

- LCD or overhead projector
- Flipchart stand and paper or board
- Writing pens or chalk

Recommended preparation

- Be familiar with **Lecture Notes 9**: Management of Drug and Food Interaction in HIV/AIDS Therapy, **Handouts 9.1**: Drugs Commonly Taken by People Living with HIV/AIDS, Likely Side Effects, and Recommended Dietary Practices to Increase Drug Efficacy and Prevent Malnutrition and **9.2**: Observation Checklist for Assessment during a Counseling Session on the Management of Drug and Food Interactions in HIV/AIDS Therapy, and the **Discussion Points** for interactive discussions.

- Prepare to use **Exercise 9** at the appropriate moment in the session. Divide students for the role-play on counseling HIV-infected people on the management of drug-food interactions. Make sure the foods and drugs used in the role-plays are available in the country.

- Allocate time for each activity considering the time available for the session, the students' backgrounds, the coverage of the activity elsewhere.

Materials provided

PowerPoint Presentations

- **PowerPoint 9**/overhead presentation: Management of Drug and Food Interactions in HIV/AIDS Therapy

Handouts

- **Lecture Notes 9**: Management of Drug and Food Interactions in HIV/AIDS Therapy

- **Handout 9.1**: Drugs Commonly Taken by People Living with HIV/AIDS, Likely Side Effects, and Recommended Dietary Practices to Increase Drug Efficacy

- **Handout 9.2**: Observation Checklist for Assessment during a Counseling Session on the Management of Drug and Food Interactions in HIV/AIDS Therapy

Exercise

- Exercise 9

Suggested reading materials

Dobkin, JF. 2002. Tenefovir, the first nucleotide for HIV Infection. *Infect Med* 19 (1): 11, 38.

Food and Nutrition Technical Assistance (FANTA) Project. 2001. HIV/AIDS: A guide for nutrition, care and support. Washington, DC: FANTA Project, Academy For Educational Development.

Health Canada/Santé de Canada: 2002. Canadian Strategy on HIV/AIDS. A comprehensive guide for the care of persons with HIV disease. Ottawa.

Mondy, K, et al. 2002. Longitudinal evolution of bone mineral density (BMD) and bone markets in HIV-infected people. 9th Conference of Retroviruses and Opportunistic Infections, Seattle, Washington.

Moyle, G. 2002. The once-a-day era is upon us. *AIDS Read* 12(2): 56–58.

National Institutes of Health. 2002. Garlic supplements can impede HIV medication. *AIDS Read* 12(2): 60.

———. 2002. Structured intermittent therapy may prove feasible. *AIDS Read* 12(2): 60.

Pronsky, Z, SA Meyer, and C Fields-Gardern. 2001. HIV medication–food interactions handbook. Second edition. Birchrunville, PA: Food Medication Interactions.

Schambelan, M, CA Benson, A Carr, JS Currier, et al. 2002. Management of metabolic complications associated with antiretroviral therapy for HIV-1 infection: Recommendations of an International AIDS Society–USA Panel. *J Acquir Immune Defic Syndr* 31: 257-275.

WHO/UNAIDS. 2000. Safe and effective use of antiretroviral treatments in adults with particular references to resources limited settings. Geneva. PDF available

Web sites with information about ARV and food and nutrition interactions

AIDS Nutrition Services Alliance (ANSA)
www.aidsnutrition.org

AIDS Info
www.aidsinfo.nih.gov

American Medical Association
www.ama-assn.org

Clinical Infectious Diseases
www.journals.uchicago.edu/CID/journal/contents/v36nS2.html

Food and Drug Administration
www.fda.gov

Food Medication Interactions
www.foodmedinteractions.com

Immunodeficiency Clinic University Health Network, Toronto, Canada.
www.tthhivclinic.com

Johns Hopkins AIDS Service
www.hopkins-aids.edu

Medline Plus (U.S. National Library of Medicine and National Institutes of Health)
www.nlm.nih.gov/medlineplus

Medscape
www.medscape.com

World Health Organization
www.who.org

For information about herbs: jkinabo@suanet.ac.tz

LECTURE NOTES 9: MANAGEMENT OF DRUG AND FOOD INTERACTIONS IN HIV/AIDS THERAPY

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Introduction

As described in previous sessions, people living with HIV/AIDS risk malnutrition because of malabsorption, reduced food intake, and increased loss of nutrients as a result of infections and viral replication. People living with HIV/AIDS use medications to treat HIV/AIDS, opportunistic infections caused by HIV/AIDS, and the common diseases encountered in resource-constrained settings, such as waterborne diseases, malaria, tuberculosis, and intestinal parasites.

Effective medical treatment can slow the progress of HIV, reduce opportunistic infections, and ease symptoms, but food can interact with drugs and affect the drugs' efficacy. Drugs can also interact with foods and nutrients and negatively affect nutritional status. The side effects of both traditional and modern medications can affect both food intake and nutrient absorption and thereby the client's adherence to medications. Additionally, drugs and food can interact to cause unhealthy side effects. Ultimately, if not addressed, drug and food interactions can result in poorer health and nutritional status.

Purpose (slides 2, 3)

The purpose of this session is to equip students with knowledge and skills for the nutritional management of drug and food interactions in HIV/AIDS therapy. The session:

- Explains why nutritional management of drug and food interactions is important in HIV/AIDS therapy

- Lists common types of drugs taken by people living with HIV/AIDS, types of food-drug interactions, nutritional implications, and appropriate dietary responses

- Describes information collected during client assessment and working with the HIV-infected person to select the most appropriate actions or approach

Rationale for the proper nutritional management of drug and food interactions in HIV/AIDS therapy (slides 4, 5)

The food and nutritional implications of modern and traditional therapies need to be properly addressed to prevent weight loss, wasting, and malnutrition. Proper management of drug and food interactions will also ensure the efficacy of the therapies.

Side effects that interfere with food consumption or interactions that limit food intake or reduce nutrient absorption may also lead to poor medication adherence. This may result in clients discontinuing medications before completing the necessary course, which for antiretroviral drugs (ARVs) may last many years. Proper nutritional management of the side effects will help minimize them and improve the client's adherence to the treatment.

Types of drugs taken by people living with HIV/AIDS in resource-constrained settings (slide 6)

People living with HIV/AIDS often use both modern and traditional therapies to treat HIV/AIDS-related symptoms and opportunistic infections.

Modern medications

ARVs significantly reduce the replication of HIV in the body and slow the progression of the disease. The main types of ARVs are listed below. Table 1 lists the main classes of ARVs with examples for each class.

1. Non-nucleoside reverse transcriptase inhibitors (NNRTIs): Efavirenz and Nevirapine

2. Nucleoside reverse transcriptase inhibitors (NRTIs) or nucleoside analogues: Abacavir, Didanosine, Lamivudine, Stavudine, Zalcitabine, and Zidovudine

3. Protease inhibitors (PIs): Amprenavir, Indinavir, Nelfinavir, Ritonavir, and Saquinavir

Table 1 Major classes of ARVs and examples

Non-nucleoside reverse transcriptase inhibitors		**Nucleoside reverse transcriptase inhibitors or nucleoside analogue**		**Protease inhibitors**	
Generic	*Brand name*	*Generic*	*Brand name*	*Generic*	*Brand name*
Nevirapine (NVP)	Viramune	Didanosine (ddl)	Videx	Ritonavir (RVT)	Norvir
Efavirenz (EFV)	Sustiva/ Dupont	Zidovudine (AZT, ZDV)	Retrovir	Saqinavir (SQV)	Invirase

Fusion inhibitors are a new type of ARV that prevent HIV from binding to the surface of the T cell and infecting the T cell. HIV-positive people who have become resistant to PIs, NRTIs, and NNRTIs are likely to benefit from the fusion inhibitors because they are a different type of ARV. However, because fusion inhibitors are not included in the list of ARVs published by WHO for resource limited settings, they are not discussed in this session.

Each type of ARV is active at different stages of the virus' replication. Two, three, or more ARVs are generally combined to enhance their efficacy in suppressing this replication. This is referred to as combination therapy or highly active antiretroviral therapy (HAART). During combination therapy, one medication acts in combination with another to treat the HIV infection. For example, the action of the antiretroviral Zidovudine is enhanced if used in combination with Didanosine or Lamivudine. Thus a person living with HIV/AIDS will most likely take a combination of ARVs rather than just one.

Like ARVs, anti-fungal drugs, antibiotics, anti-malaria drugs, antihelminthics, and dietary supplements may interact with food. Appropriate dietary responses will be required during the treatment.

- *Antifungal drugs* such as Nystatin and Nizoral are used to treat thrush.
- *Antibiotics* such as Rifampin and Cotrimoxazole are used to treat bacterial infections.

- *Antimalaria drugs* such as quinine and pyrimethamine are used to treat malaria in endemic regions.
- *Antihelminthics* such as Ivermectin and Provamicina are used for the treatment of intestinal parasites and worms
- *Dietary supplements* such as iron and vitamins A, B, and E may be taken to treat nutritional deficiencies.

Traditional therapies

The use of traditional therapies such as herbs, teas, and infusions to treat several symptoms or diseases is a common practice. People living with HIV/AIDS often use traditional therapies to relieve symptoms and increase their sense of hope, empowerment, and control over their health problems. These traditional therapies vary from one place to another. The efficacy of traditional therapies has not been documented.

Because traditional medications may have side effects and interact with certain foods or other drugs, it is important to address their side effects as well as their negative effects on nutrient absorption, metabolism, distribution and excretion. For example, the concurrent use of garlic supplements and Saquinavir is not recommended. This combination has been reported to decrease plasma levels of Saquinavir by 50 percent, which will decrease the effectiveness of Saquinavir as an antiretroviral drug.

Very little information on the interaction between antiretroviral medication and traditional medication and herbs is available. It seems prudent to recommend that patients on HAART should not add traditional medication and herbs if the effects of these are not known. Timely management of traditional therapy and food interactions will help prevent weight lost, wasting, and malnutrition.

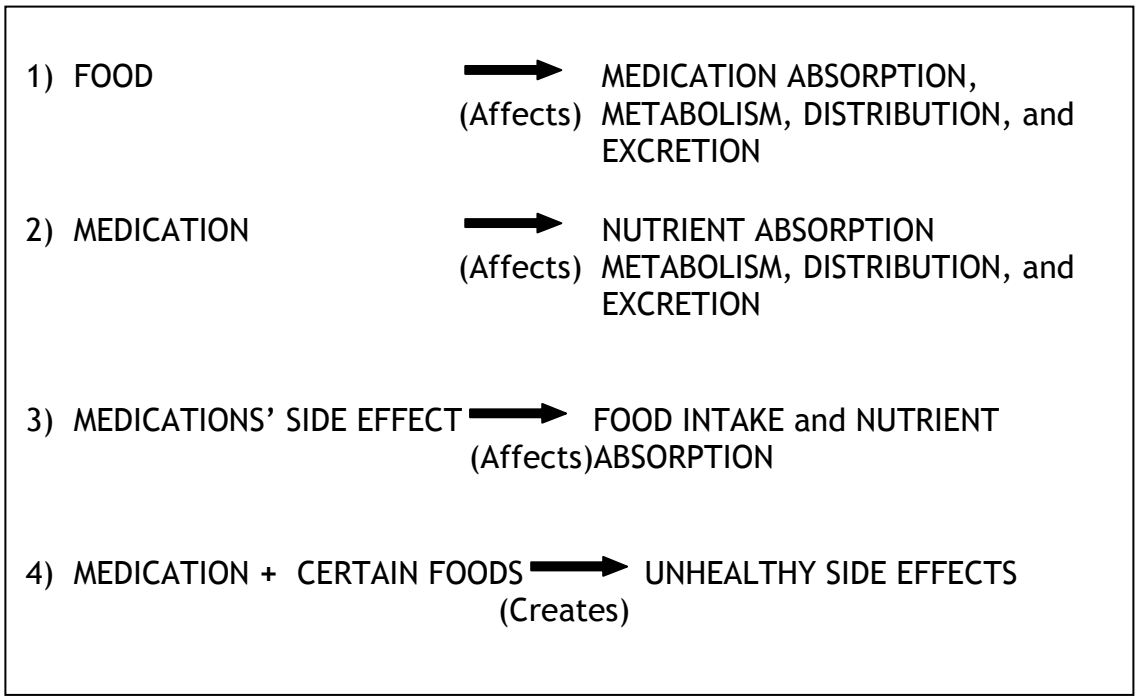
Food and drug interactions and their dietary management (slide 7)

The main food and drug (modern and traditional medications) interactions are listed below and in figure 1.

- Food effects on drug efficacy

- Drug effects on nutrient absorption, metabolism, distribution, and excretion
- Side effects of medications that affect food intake and nutrient absorption
- Drug and food interactions that cause unhealthy side effects

Figure 1 Types of interactions between medications and food



Source: Castleman et al forthcoming

The side effects of drugs on food intake and the effects of drugs on nutrient absorption, metabolism, distribution and excretion may have the most negative impact on the nutritional status of people living with HIV/AIDS. The side effects of drugs and the effects of the disease are often difficult to distinguish. For example, headaches, malaise, fever, and gastrointestinal symptoms may be side effects of drugs but can also be associated with HIV and AIDS. Appropriate dietary responses may help address these.

Moreover, the effects of food on drugs' efficacy and the unhealthy side effects caused by the interaction of food and drugs also require appropriate dietary responses to maintain nutritional status and ensure the client's adherence and the effectiveness of the treatment.

Food effects on drug efficacy (slides 8, 9)

Food intake or meals can enhance or inhibit the absorption, metabolism, distribution, and excretion of medications. This type of interaction varies from one drug to another and requires appropriate dietary responses to improve the client's adherence and optimize the medication's efficacy. Dietary management to improve the efficacy of a medication includes taking the medication with food, on an empty stomach, or with or without certain types of foods. Examples of the ways food intake affects drug efficacy are listed below.

- Food reduces the rate of absorption of aspirin (acetylsalicylic acid), commonly used to treat the fever and pain that are common in people living with HIV/AIDS. Aspirin is best taken 2 hours after meals with a full glass of water.

- Food reduces the absorption of Isoniazid, a medication commonly used to treat tuberculosis. Therefore, Isoniazid has to be taken 1 hour before or 2 hours after meals.

- Rifampin is also used to treat tuberculosis. As with Isoniazid, food reduces the absorption of Rifampin. Rifampin should be taken 1 or 2 hours after meals to increase the medication's absorption.

- Food enhances the absorption or metabolism of some ARVs and inhibits the absorption or metabolism of others. For example, a high-fat meal increases the bioavailability of the nucleoside analogue Tenofovir (Pronsky, Meyer, and Fields-Gardner 2001). A high-calorie, high-fat, high-protein meal decreases absorption of the protease inhibitor Indinavir and reduces the absorption of the nucleoside reverse transcriptase inhibitor Zidovudine. It is therefore recommended not to take Zidovudine with high-fat meals (>40g of fat).

As the effect of food on the efficacy of a drug is food and drug specific, the counselor should help the client draw up a food and drug timetable. This timetable should take into account both the food and drug interactions of each drug to be taken and the client's eating habits to ensure the greatest efficacy of the treatment.

Drug effects on nutrient absorption, metabolism, distribution, and excretion (slides 10, 11)

Certain modern medications affect nutrient absorption, metabolism, and excretion. Modern medications that inhibit or enhance nutrient absorption and metabolism may have negative effects on nutritional status. Dietary management may require either increasing food intake, taking a nutrient supplement to compensate for the nutrient affected, or reducing the nutrient intake if the metabolite produced can negatively affect health.

Drugs that may require increased food or nutrient intake

The medication Isoniazid, commonly taken to treat tuberculosis, inhibits the metabolism of vitamin B_6. Supplementation of this vitamin is therefore recommended. The antibiotic and antituberculosis medication Rifampin may increase vitamin D metabolism. Supplementation of this vitamin D may be required.

Drugs that may require reduced food or nutrient intake

Studies have reported lipid abnormalities, including increased level of triglycerides, cholesterol, and fat maldistribution, in people who have taken protease inhibitors or non-nucleoside reverse transcriptase inhibitors. The protease inhibitors Saquinavir and Ritonavir may cause an elevation in cholesterol and triglycerides levels, which may increase the risk of cardiovascular diseases (Pronsky, Meyer, and Fields-Gardner 2001). Most of the protease inhibitors may cause changes in lipid levels that require both dietary and medical responses.

Lipid abnormalities include hypertriglyceridemia, hypercholesterolemia, and lipodystrophy syndrome. For hypertriglyceridemia, it is important to maintain a healthy weight, eat a variety of foods, reduce the intake of refined sugar and excessive carbohydrates, increase intake of fiber, avoid alcoholic beverages, exercise daily, and take medication to lower triglycerides. For hypercholesterolemia, it is important to maintain a healthy weight, eat a diet low in fat and limited saturated fat, increase intake of fruits and vegetables, avoid food rich in cholesterol, avoid alcohol and smoking, exercise daily, and take medication to lower the cholesterol (Pronsky, Meyer, and Fields-Gardner 2001).

The effective management of fat maldistribution or lipodystrophy syndrome has not yet been established. Diet and exercise, use of medications, and change in the ARV regimen can help.

Some antiretroviral drugs may affect glucose metabolism and cause insulin resistance. Insulin resistance is associated with increased risk of diabetes (Gelato 2003). For diabetes, specific carbohydrate controlled diet, reduced intake of refined sugar and saturated fat, exercise, and antidiabetic medications are recommended.

Progressive lactic acidosis is a complication of NRTI therapy (Carr 2003). The signs of severe lactic acidemia include fatigue, weight loss, abdominal pain, dyspnea, liver dysfunction, and cardiac dysrhythmias. In case of any of these symptoms, stopping the NRTI may help.

Table 2 lists the purposes, recommended consumption, and potential side effects some of the better-known and more widely taken medications in resource-limited settings. This list is not comprehensive, and health workers and programs are encouraged to add or update the list as medications become available or their use is discontinued.

Table 2 Modern medications and recommended food intakes and side effects

Medication	Purpose	Recommended To be taken	Potential side effects
Abacavir (ABC)	Antiretroviral	Can be taken without regard to food.	Nausea, vomiting, fever, allergic reaction, anorexia, abdominal pain, diarrhea, anemia, rash, hypotension, pancreatitis, dyspnea, weakness and insomnia, cough, and headache
Chloroquine	Treatment of malaria	With food	Stomach pain, loss of appetite, nausea, vomiting Not recommended for women breastfeeding
Didanosine (ddl)	Antiretroviral	With water only, 1hour before or 2 hours after eating. Avoid alcohol. Do not take with juice. Do not take with antacid containing aluminum or magnesium	Anorexia, diarrhea, nausea, vomiting, pain, headache, weakness, insomnia, rash, dry mouth, lost of taste, constipation, stomatitis, anemia, fever, dizziness, and pancreatitis.

Medication	Purpose	Recommended To be taken	Potential side effects
Efavirenz	Antiretroviral	Can be taken without regard to food. Avoid alcohol.	Elevated blood cholesterol levels, elevated triglycerides levels, rash, dizziness, anorexia, nausea, vomiting, diarrhea, dyspepsia, abdominal pain, flatulence
Fluconazole	Treatment of candida (thrush)	With food	Nausea, vomiting, diarrhea. Can be used during breastfeeding.
Indinavir (IDV)	Antiretroviral	1 hour before or 2 hours after meal. Drink at least 1,500ml of fluid daily. Do not drink grapefruit juice as it may lower the level of medicine in the blood. Avoid St. John's wort.	Nausea, abdominal pain, headache, kidney stones, taste changes, vomiting, regurgitation, diarrhea, insomnia, ascites, weakness, and dizziness. May increase the risk of lipodystrophy.
Isoniazid	Treatment of tuberculosis	1hour before or 2 hours after meals. May cause possible reactions with foods such as bananas, beer, avocados, liver, smoked pickled fish, yeast and yogurt. May interfere with vitamin B_6 metabolism and require vitamin B_6 supplementation. Avoid alcohol.	Anorexia and diarrhea.
Lamivudine (3TC)	Antiretroviral	Can be taken without regard to food. Avoid alcohol.	Nausea, vomiting, headache, dizziness, diarrhea, abdominal pain, nasal symptoms, cough, fatigue, pancreatitis, anemia, insomnia, muscle pain, and rash.
Lopinavir	Antiretroviral	Can be taken without regard to	Abdominal pain, diarrhea, headaches, headache,

Medication	Purpose	Recommended To be taken	Potential side effects
		food. Avoid St John's wort.	weakness, nausea. May increase the risk of lipodystrophy and or diabetes.
Nelfinavir	Antiretroviral	With meal or light snack. Avoid St John's wort.	Diarrhea, flatulence, nausea, abdominal pain, and rash. May increase the risk of lipodystrophy.
Nevirapine (NVP)	Antiretroviral	Can be taken without regard to food. Avoid St John's wort.	Nausea, vomiting rash, fever, headache, skin reactions, fatigue, stomatitis, abdominal pain, drowsiness, paresthesia. High hepatoxicity.
Nystatin	Treatment of thrush	With food	Infrequent occurrence of diarrhea, vomiting, nausea
Quinine	Treatment of malaria	With food	Abdominal or stomach pain, diarrhea, nausea, vomiting, lower blood sugar
Rifampin	Treatment of tuberculosis	On an empty stomach 1hour before or 2 hours after meals. Avoid alcohol.	Nausea, vomiting, diarrhea and loss of appetite.
Ritonavir	Antiretroviral	With meal if possible. Avoid St John's wort.	Nausea, vomiting, diarrhea, hepatitis, jaundice, weakness, anorexia, abdominal pain, fever, diabetes, headache, dizziness. May increase the risk of lipodystrophy.
Saquinavir	Antiretroviral	With meal or light snack within 2 hours of a high-fat meal and high-calcium meal. Avoid garlic supplements and St John's wort.	Mouth ulceration, taste changes, nausea, vomiting, abdominal pain, diarrhea, constipation, flatulence, weakness rash, and headache. May increase the risk of lipodystrophy.
Stavudine (d4T)	Antiretroviral	Can be taken without regard to food	Nausea, vomiting, diarrhea, peripheral neuropathy, chills and fever, anorexia, stomatitis, diarrhea, anemia, headaches, rash, bone marrow, and pancreatitis. May increase the risk

Medication	Purpose	Recommended To be taken	Potential side effects
			lipodystrophy. Limit the consumption of alcohol.
Sulfadoxine and Pyrimethamine (Fansidar ®)	Treatment of malaria	With food and continuous drinking of clean boiled water	Nausea, vomiting, taste loss, and diarrhea. Not recommended if folate deficient. Not recommended for women breastfeeding.
Sulfonamides: Sulfamethox-azole, Cotrimoxazole (Bactrim ®, Septra ®)	Antibiotic for treatment of pneumonia and toxoplasmosis	With food	Nausea, vomiting, and abdominal pain
Tenefovir (TDF)	Antiretroviral	With food	Abdominal pain, headache, fatigue, and dizziness
Zidovudine/lamivudine/Abacavir (AZT/3TC/ABC)	Antiretroviral combination	On empty stomach if possible; if not, with low-fat meals	Nausea, vomiting, abdominal pain, diarrhea, anorexia, fever, bone marrow suppression, anemia, and hyperlactacemia
Zidovudine (AZT)	Antiretroviral	With low fat meal food. Avoid alcohol.	Anorexia, anemia, nausea, vomiting, bone marrow suppression, headache, fatigue, constipation, fever dizziness, dyspnea, insomnia, muscle pain, and rash

Source: Adapted from FANTA 2001

Effects of drug side effects on food intake and nutrient absorption (slide 12)

Modern and traditional medications may cause side effects that affect food intake and nutrient absorption. Side effects may include changes in taste, loss of appetite (anorexia), nausea, bloating and heartburn, constipation, vomiting and diarrhea that affect food intake and nutrient absorption. Changes in taste, loss of appetite, nausea, bloating and heartburn, and constipation may lead to reduced food intake, whereas vomiting and diarrhea can cause poor nutrient absorption. Reduced food

intake and poor nutrient absorption can lead to the weight loss and wasting associated with faster progression of HIV to AIDS.

Appropriate dietary responses (slides 13, 14)

Appropriate dietary responses may help maintain food intake and compensate for nutrient losses. Diet-related side effects need to be managed immediately to help continue proper eating habits and to maintain weight.

Examples of appropriate dietary responses is the addition of flavor enhancers such as salt, sugar, spices, vinegar, or lemon to help stimulate the taste buds, increase taste acuity, and mask unpleasant flavors as a result of taste changes from medication.

Eating energy- and nutrient-dense foods such as maize, groundnuts, and carrots and drinking plenty of fluids may help replace nutrient losses and prevent dehydration during fever or diarrhea.

Because drug side effects such as changes in taste, loss of appetite, nausea, bloating and heartburn, constipation, vomiting, and diarrhea are similar to HIV/AIDS-related symptoms, the dietary management is the same. Refer to Lecture Notes 5 on the dietary management of HIV/AIDS-related symptoms.

Some ARVs have been associated with increased risk of bone disorders such as osteoporosis, osteopenia, and osteomalacia (Tebas et al 2000) and may require medical and dietary responses. A balanced diet with high calcium foods such as milk yogurt, cheese, or calcium and vitamin D supplements may be required, along with a medical response. This is especially important for populations already at risk of calcium deficiencies and for pregnant and lactating women whose calcium need is increased.

Proper nutritional management of the side effects of medications will help improve the client's adherence to the treatment. If not properly managed, diet-related side effects of medications often lead to interruption of treatment or poor adherence to treatment. The health worker or counselor should provide the client with the most appropriate dietary guidance in his/her specific context.

Unhealthy side effects of some food and drug combinations (slide 15)

Combinations of specific medications and food can cause unhealthy side effects. Such food should not be taken at the same time as these medications. The consumption of alcohol can cause inflammation of the pancreas while taking the ARV Didanosine and should be avoided. Alcohol should also be avoided while taking the antituberculosis medication Isoniazid, as this combination may increase the risk of inflammation of the liver.

Table 3 lists some of the known contraindications for some of the better-known medications consumed by people living with HIV/AIDS. The list is not comprehensive, and health workers and programs are encouraged to add or update the list as medications become available or their use is discontinued.

Table 3 Foods contraindicated with modern medications

Medication	Purpose	Contraindications
Indinavir (IDV)	Antiretroviral	Do not drink grapefruit, which may lower the level of medicine in the blood
Isoniazid	Treatment of tuberculosis	May cause possible reactions with foods such as bananas, beer, avocados, liver, smoked pickled fish, yeast and yogurt Avoid alcohol
Rifampin	Treatment of tuberculosis	Avoid alcohol
Zidovudine (AZT)	Antiretroviral	Avoid alcohol
Zidovudine/ lamivudine (AZT/3TC)	Antiretroviral combination	Avoid alcohol

Drug–drug interactions (slide 16)

People living with HIV/AIDS often take several modern and traditional therapies simultaneously. This combination may affect the drugs' efficacy and nutritional status. Such interactions need to be managed appropriately to ensure that side effects do not affect food intake, nutrient absorption, and metabolism and to facilitate the optimal efficacy of all medications.

Anti-acid medications containing magnesium and aluminum interacts and leads to increased side effects. Didanosine should therefore not be taken at the same time with an antacid containing magnesium and aluminum.

Studies have shown that the blood concentration of the protease inhibitor Saquinavir decreases by 50 percent if taken together with a garlic supplement. Garlic usually is taken as a traditional therapy to strengthen the immune system. Saquinavir should therefore not be taken with a garlic supplement (Piscitelli et al 2002). The antifungal agents Fluconazole (Diflucan®) and Ketoconazole (Nizoral®) may inhibit the metabolism of protease inhibitors and contribute to increase the toxicity of these drugs.

Recommendations for the proper management of food and drug interactions (slides 17, 18)

Antiretroviral therapy is becoming simpler, with fewer doses and fewer pills. Given the rapid evolution in antiretroviral therapy and the effects of food and drug interactions on drug efficacy and nutritional status, health providers and counselors should know about and keep up to date on possible interactions and their management.

The following recommendations to guide the health worker or counselor in addressing food and drug interactions for the people living with HIV/AIDS should be supplemented by national guidelines if available.

- Because different drugs have different food interactions, recommendations should be drug specific. Understand the specific interactions of each drug used and counsel accordingly.

- If several drugs are taken, refer to the food and drug interactions of each.

- Pay close attention to the client's diet and drug regimen and manage interactions that will affect nutritional status. The nutrition implications of some drug combinations differ from the implications of an individual drug. For example, food reduces the absorption of the protease inhibitor Indinavir, but when Inidinavir is taken in combination with Ritonavir or Delavirdine, studies

have shown that food has no effect on its absorption, and it can be taken with or without food.

- Involve the client in finding solutions for side effects and food-drug interactions.

- Give special consideration to traditional medicines. While some side effects of traditional medicines may be known, many of their food and drug interactions are not known. Help the client who is taking traditional medicines alone or with other drugs to identify the side effects and food and drug interactions and use the foods available to mitigate their impact on nutritional status.

- Be attentive to the side effects and nutritional implications of ARVs for malnourished communities in resource-limited settings. These effects have been studied primarily on well-nourished populations and are not well documented among malnourished people. Act promptly to alleviate their negative impact on the health and nutrition status.

- Food insecurity may constrain people living with HIV/AIDS from meeting optimal food and nutrition responses. Seek alternative responses that are feasible given the circumstances.

Special considerations for pregnant and lactating women (slide 19)

Some pregnant women living with HIV/AIDS are treated with ARVs such as Nevirapine or Zidovudine or both during pregnancy or at the onset of labor to reduce mother-to-child transmission of HIV. ARVs can interact with other drugs and foods and have adverse effects on women's health and nutritional status.

When an ARV is taken just one time at the onset of labor, the food and drug interaction and possible impact on nutritional status are limited. However, the counselor has to counsel the mother on the appropriate timing for taking the drug to ensure the best efficacy of the treatment.

Some pregnant women take Zidovudine from 36 weeks of pregnancy to prevent mother-to-child transmission of the virus, and others take ARVs to treat HIV/AIDS after delivery. For medium- and long-term treatment with ARVs and other drugs, ARVs can interact with other drugs and with food and have negative effects on the

women's nutritional status. It is critical to ensure that food and drug interactions during pregnancy do not result in reduced food intake and limited weight gain for the pregnant mother. These may further weaken the mother and also contribute to low birth weight for the baby. The health worker or counselor should be aware of the possible negative effects of the drugs and drug interactions on the fetus and counsel accordingly.

Because pregnant and lactating women living with HIV/AIDS have increased nutritional needs, food and drug interactions should be managed in a timely manner to alleviate the side effects of the drugs, optimize the absorption and metabolism of nutrients, and optimize the drug efficacy. The nutritional management of drug side effects and drug and food interactions are similar to those for other people living with HIV/AIDS.

The goal of nutritional management of food and drug interactions during pregnancy and lactation aims to ensure good health and nutrition for the mother by maintaining or improving food intake through the consumption of a variety of foods. This will help ensure adequate weight gain. Indicators of good nutrition include type of foods consumed, frequency of meals and quantity of food, weight gain, and the absence of micronutrient deficiencies.

For more information refer to Session 6 on nutritional care and support of pregnant and lactating women and adolescent girls infected with HIV/AIDS and Session 7 on infant feeding and PMTCT.

Special considerations for infants and children (slide 19)

Children living with HIV are at a greater risk of malnutrition. The causes of malnutrition include:

- Inadequate nutrient intake as a result of anorexia, nausea, oral or esophageal lesions, or generalized malaise and weakness

- Increased nutrient and energy requirements during hypermetabolic or hypermetabolic periods induced by fever and secondary infections

- Increased energy cost of breathing related to respiratory infections

- Protein, calorie, fluid, and micronutrient losses with vomiting, diarrhea, and malabsorption

Given the high risk of malnutrition for infants, children, and young people living with HIV/AIDS, those taking ARVs and other drugs need to be monitored closely to manage the side effects of the drugs and the food and drug interactions. Side effects of medications and food and drug interactions are similar to those experienced by adults living with HIV/AIDS. The health worker or counselor should work closely with parents or caregivers to ensure that children do not reduce their food intake and that they eat a variety of foods, gain weight, and continue to grow.

For more information, refer to Session 7 on infant feeding and PMTCT and Session 8 on nutritional care for children born of women infected with HIV/AIDS.

Programmatic implications for the management of drug and food interactions in HIV therapy

Because of the possible negative impacts of poorly managed drug and food interactions on the overall health and nutritional status of people living with HIV/AIDS, program managers and policymakers should provide the enabling environment and strengthen the capacity of health providers to properly manage drug and food interactions in HIV/AIDS therapy.

Enabling environment

Program managers should integrate the management of drug and food interactions in all services where the provider may come in contact with people living with HIV/AIDS. They should also make guidelines available with information on the ARVs and other modern and traditional therapies used in the area, the drug and food interactions, and the proper management of these interactions using foods available. The guidelines should be available in all health services.

The management of drug and food interactions should be included in the support supervision checklist. The information compiled from the support supervision report will highlight the areas where greater support for health providers is needed, such as information gap and lack of skills. Program managers should give health providers appropriate space to provide every client with confidential counseling on the management of drug and food interactions.

Health provider capacity

Health providers should be trained to manage drug and food interactions in their contexts and have access to updated information on the management of drug and food interactions. Supervisors of health providers should provide health providers with support supervision in the management of drug and food interactions and help them address gaps in knowledge or skills. Adequate knowledge and appropriate skills to carry out good nutritional assessment are critical for the successful management of food and interactions.

Nutritional assessment during counseling on the nutritional management of drug and food interactions (slide 20)

The nutritional assessment at the beginning of the counseling session will help the health worker or counselor understand the client's feeding practices, medication, ability to access different foods, and constraints. This information will help the client address his/her food and drug interactions. For more information on counseling, refer to Session 6.

Questions to include in the assessment

- What are the client's feeding practices?
- What foods are frequently eaten?
- How many meals are eaten per day?
- What is the period of food shortages?
- What foods are affected?
- How does the client cope during food shortages?
- What foods are the most available and affordable for the client?
- What drugs will the client be taking?

- What are the client-specific food and drug interactions (for each drug and for all the drugs combined)?
- What are the side effects of each drug?
- What are the side effects of the combined drugs?
- What diets are recommended to alleviate the side effects?
- What are the constraints in addressing the side effects?
- What are the alternative solutions to address the constraints?
- What is the recommended timing for each drug?
- What are the constraints to following the medication timetable?
- What are the alternative options to the medication time table?

It is very important for the health worker or counselor to analyze this information properly to identify different solutions to help the client use available foods to manage the side effects of the drugs and the food and drug interactions. The following questions will help identify possible solutions for the client.

Questions to help identify foods to manage drug side effects

- Which foods are available and affordable to manage the side effects of the drugs the client will be taking?
- In case of shortage of foods that can be used to manage side effects, what alternatives (purchased or donated foods) can the client use, and what can the client do to address food constraints.

Questions to help identify foods that enhance or inhibit drug efficacy

- Which of the foods that the client often eats may inhibit or enhance the efficacy of drugs taken? Which ones are contraindicated for each drug?

- What foods should not be taken with each drug or all of the drugs?

Questions to help identify the best time to take drugs and foods to ensure drug efficacy

- What drugs should the client be taking with foods?
- What drugs should be taken while fasting?
- What drugs should be taken after meals?
- If the client is not eating the number of meals recommended as per the drugs' requirements, what are the alternative solutions?
- How can the client adjust or increase the number of meals to fulfill the medication requirements?
- Which specific foods should not be eaten while taking the drugs?
- What are the alternatives if the specific food not to be eaten is the staple food?

Questions to address the effects of drugs on nutrient absorption and metabolism

- What nutrients are affected by each drug taken by the client?
- What are the possible solutions (diet supplement or micronutrient supplements) to address the problem in the client's context?

Counseling and implementation

The counselor will work with the client to help identify options to address drug and food interactions and enable effective use of drugs with minimal nutritional side effects. This process should involve awareness of food security or other constraints, feasible food-drug options within the constraints, and options to address or reduce the constraints. The option selected will depend on the drugs used, their specific food and nutrition implications, and the client's circumstances. The counselor

should give clients detailed information on the chosen options and alert them to pay close attention to any dietary changes resulting from side effects.

The counselor should meet the client regularly to follow up on implementation of the chosen option. The follow-up sessions will not assess the impact of nutritional management but rather the client's success in implementing the choice and determining the main constraints to help identify other feasible options. If clients are having trouble accessing the required food, the counselor may refer them to other available services to improve food access.

Conclusion

Careful consideration and management of drug and food interactions is required in HIV/AIDS therapy to ensure drug efficacy and client adherence and avoid negative effects on nutritional status. The dietary management of drug and food interactions in HIV/AIDS therapy will help minimize the side effects of medications and maintain food intake, minimize the effect of medications on nutrient absorption and metabolism, ensure efficacious treatment, and improve client adherence.

Successful management of the client's drug and food interactions requires that the counselor understand the specific context of food access and eating habits. The counselor should motivate the client to use available foods to address side effects and interactions of the medications.

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EXERCISE 9

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Use the Lecture Notes to discuss the PowerPoint slides. After the PowerPoint presentation, depending on the time available, do any of the following tasks to help students begin to master the nutritional management of food and drug interactions in HIV/AIDS therapy.

TASK 1: Facilitate a question and answer session on the nutritional implications of Isoniazid or another drug to help students to master the nutritional implications of drug and food interactions in HIV/AIDS therapy. Read the following complaint: "John, who is HIV infected and has been taking Isoniazid for 3 months, complained of nausea and fatigue. His doctor referred him to nutritional counseling." Ask students to discuss the nutritional implications of Isoniazid for this patient and the appropriate dietary management.

Encourages students to use the reference materials provided in this module while counseling by asking, "Which materials or references are you going to check in this case?" Refer students to **Handout 9.1**: Drugs Commonly Taken by People Living with HIV/AIDS, Likely Side Effects, and Recommended Dietary Practices to Increase Drug Efficacy. Ask students to identify the appropriate dietary management from references by asking, "What dietary management would you consider providing?" Ask a student to read the answer.

Isoniazid in the example may be replaced with other drugs, such as Indinavir or Nystatin.

TASK 3: Ask students to role-play an assessment of drug and food interactions in HIV/AIDS therapy during a counseling session using the case study below.

Case study: John is 38 and HIV infected. His health condition has declined seriously in the past months. After measuring John's CD4 and viral load, the doctor informed him that he was eligible to enroll in the antiretroviral therapy program. He explained the program in detail, and John agreed to enroll. After prescribing Trizivir (combination of Abacavir/Zidovudine/Lamivudine (ABC/AZT/3TC), the doctor explained how many tablets John should take per day and how often. The doctor

referred him to the counselor for the counseling session on how to manage Trizivir and food interactions.

Ask students to stage a counseling session with John, who has just been prescribed Trizivir. Carry out the assessment bearing in mind potential food and Trizivir interactions and dietary management to alleviate the side effects of the drug. This session will help John maintain food intake and adhere to treatment as well as ensure drug efficacy.

Ask for two volunteers for the role-play. The first volunteer will be the client who has just been prescribed Trizivir (ABC/AZT/3TC). The second volunteer, the counselor, will focus on the assessment during the counseling. The role-play should focus on the assessment. After the assessment, the counselor should explain how the information collected will be used. Distribute **Handout 9.2**: Observation Checklist during a Counseling Session on the Management of Drug and Food Interactions in HIV/AIDS Therapy to the students to use for observation and feedback. Ask the students to write their comments in the "comments" column.

After the role-play, ask the counselor to explain what he or she found easy or difficult during the assessment. Ask the other students to provide feedback using the checklist and following the order of the checklist. Recommend that the students start with what the counselor did well and then add what needs to be improved and suggest how to improve.

Summarize the session, highlighting the importance of taking into account food security issues for the dietary management of food and drugs interactions. Again remind the students to use the reference materials they have been given.

HANDOUT 9.1 Drugs Commonly Taken by People Living with HIV/AIDS, Likely Side Effects, and Recommended Dietary Practices to Increase Drug Efficacy

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Medication	Purpose	Recommended To be taken	Potential side effects
Abacavir (ABC)	Antiretroviral	Can be taken without regard to food.	Nausea, vomiting, fever, allergic reaction, anorexia, abdominal pain, diarrhea, anemia, rash, hypotension, pancreatitis, dyspnea, weakness and insomnia, cough, and headache
Chloroquine	Treatment of malaria	With food	Stomach pain, loss of appetite, nausea, vomiting Not recommended for women breastfeeding
Didanosine (ddl)	Antiretroviral	With water only, 1hour before or 2 hours after eating. Avoid alcohol. Do not take with juice. Do not take with antacid containing aluminum or magnesium	Anorexia, diarrhea, nausea, vomiting, pain, headache, weakness, insomnia, rash, dry mouth, lost of taste, constipation, stomatitis, anemia, fever, dizziness, and pancreatitis.
Efavirenz	Antiretroviral	Can be taken without regard to food. Avoid alcohol.	Elevated blood cholesterol levels, elevated triglycerides levels, rash, dizziness, anorexia, nausea, vomiting, diarrhea, dyspepsia, abdominal pain, flatulence
Fluconazole	Treatment of candida (thrush)	With food	Nausea, vomiting, diarrhea. Can be used during breastfeeding.

Medication	Purpose	Recommended To be taken	Potential side effects
Indinavir (IDV)	Antiretroviral	1 hour before or 2 hours after meal. Drink at least 1,500ml of fluid daily. Do not drink grapefruit juice as it may lower the level of medicine in the blood. Avoid St. John's wort.	Nausea, abdominal pain, headache, kidney stones, taste changes, vomiting, regurgitation, diarrhea, insomnia, ascites, weakness, and dizziness. May increase the risk of lipodystrophy.
Isoniazid	Treatment of tuberculosis	1hour before or 2 hours after meals. May cause possible reactions with foods such as bananas, beer, avocados, liver, smoked pickled fish, yeast and yogurt. May interfere with vitamin B_6 metabolism and require vitamin B_6 supplementation. Avoid alcohol.	Anorexia and diarrhea.
Lamivudine (3TC)	Antiretroviral	Can be taken without regard to food. Avoid alcohol.	Nausea, vomiting, headache, dizziness, diarrhea, abdominal pain, nasal symptoms, cough, fatigue, pancreatitis, anemia, insomnia, muscle pain, and rash.
Lopinavir	Antiretroviral	Can be taken without regard to food. Avoid St John's wort.	Abdominal pain, diarrhea, headaches, headache, weakness, nausea. May increase the risk of lipodystrophy and or diabetes.
Nelfinavir	Antiretroviral	With meal or light snack. Avoid St John's wort.	Diarrhea, flatulence, nausea, abdominal pain, and rash. May increase the risk of lipodystrophy.

Medication	Purpose	Recommended To be taken	Potential side effects
Nevirapine (NVP)	Antiretroviral	Can be taken without regard to food. Avoid St John's wort.	Nausea, vomiting rash, fever, headache, skin reactions, fatigue, stomatitis, abdominal pain, drowsiness, paresthesia. High hepatoxicity.
Nystatin	Treatment of thrush	With food	Infrequent occurrence of diarrhea, vomiting, nausea
Quinine	Treatment of malaria	With food	Abdominal or stomach pain, diarrhea, nausea, vomiting, lower blood sugar
Rifampin	Treatment of tuberculosis	On an empty stomach 1hour before or 2 hours after meals. Avoid alcohol.	Nausea, vomiting, diarrhea and loss of appetite.
Ritonavir	Antiretroviral	With meal if possible. Avoid St John's wort.	Nausea, vomiting, diarrhea, hepatitis, jaundice, weakness, anorexia, abdominal pain, fever, diabetes, headache, dizziness. May increase the risk of lipodystrophy.
Saquinavir	Antiretroviral	With meal or light snack within 2 hours of a high-fat meal and high-calcium meal. Avoid garlic supplements and St John's wort.	Mouth ulceration, taste changes, nausea, vomiting, abdominal pain, diarrhea, constipation, flatulence, weakness rash, and headache. May increase the risk of lipodystrophy.
Stavudine (d4T)	Antiretroviral	Can be taken without regard to food	Nausea, vomiting, diarrhea, peripheral neuropathy, chills and fever, anorexia, stomatitis, diarrhea, anemia, headaches, rash, bone marrow, and pancreatitis. May increase the risk lipodystrophy. Limit the consumption of alcohol.

Medication	Purpose	Recommended To be taken	Potential side effects
Sulfadoxine and Pyrimethamine (Fansidar ®)	Treatment of malaria	With food and continuous drinking of clean boiled water	Nausea, vomiting, taste loss, and diarrhea. Not recommended if folate deficient. Not recommended for women breastfeeding.
Sulfonamides: Sulfamethox-azole, Cotrimoxazole (Bactrim ®, Septra ®)	Antibiotic for treatment of pneumonia and toxoplasmo-sis	With food	Nausea, vomiting, and abdominal pain
Tenefovir (TDF)	Antiretroviral	With food	Adominal pain, headache, fatigue, and dizziness
Zidovudine/lamivudine/Abacavir (AZT/3TC/ABC)	Antiretroviral combination	On empty stomach if possible; if not, with low-fat meals	Nausea, vomiting, abdominal pain, diarrhea, anorexia, fever, bone marrow suppression, anemia, and hyperlactacemia
Zidovudine (AZT)	Antiretroviral	With low fat meal food. Avoid alcohol.	Anorexia, anemia, nausea, vomiting, bone marrow suppression, headache, fatigue, constipation, fever dizziness, dyspnea, insomnia, muscle pain, and rash

Source: Adapted from FANTA 2001.
Note: The list is not comprehensive and health workers and programs are encouraged to add to or update it as medications become available or their use is discontinued.

HANDOUT 9.2: Observation Checklist during a Counseling Session on the Management of Drug and Food Interactions in HIV/AIDS Therapy

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Problem: The client is experiencing side effects from the drugs and food and drug interactions.

Purpose: The purpose of the assessment is to improve the counselor's understanding of the client's feeding practices and access to different foods. This will enable the counselor to help the client choose the most suitable food response to address the drugs' side effects and the food and drug interactions. Without a good assessment, the counselor cannot know and appreciate the client's context and motivation to address the problem. The client will implement a solution only if it is acceptable, affordable, and feasible.

	Yes	No	Comments
1-Did the counselor ask the client about:			
Feeding practices			
Foods frequently eaten?			
Number of meals per day?			
Period of food shortage?			
Foods affected by food shortage?			
Client's coping strategy during food shortage?			
Most available and affordable foods?			
Drugs			
Drugs the client will be taking?			
Types and frequency of problem experienced with these drugs?			
2- **Did the counselor find out from his or her own knowledge and the information collected about:**			

Side effects of each drug?			
Side effects of the drugs if combined?			
Foods to alleviate the side effects and the alternatives?			
Constraints to addressing the side effects?			
Alternative options?			
Client's food and drug interactions (for each drug and for all the drugs combined)?			
Recommended timing for each drug?			
Constraints of the drug-taking timetable?			
Ways to adjust feeding practice to follow the drug-taking timetable?			

Session 1 Introduction to HIV/AIDS: PowerPoint Presentation Handouts

Introduction to HIV/AIDS

Nutrition and HIV/AIDS: A Training Manual
Session 1

Purpose

To provide basic information about HIV/AIDS: Causes, transmission, progression, knowledge, and challenges

Session Outline

- Basic facts about HIV/AIDS (cause, transmission, progression)
- Factors affecting risk of transmission and vulnerability to infection
- Strategies to manage HIV/AIDS
- Challenges in managing HIV/AIDS

What Is HIV?

- **H**uman immunodeficiency virus
- Responsible for causing AIDS

What is AIDS?

- Acquired immune deficiency syndrome
- Characterized by signs and symptoms of severe immune deficiency
  - Weight loss of more than 10% bodyweight
  - Diarrhea lasting over 1 month
  - Fever lasting over 1 month

Source: WHO

Public Health Importance

- First recognized in 1981
- Second-largest epidemic of the 20th century
- Led to 19 million deaths by the end of 2001
- Affected 40 million people by end of 2001

Table I. Global Summary of the HIV/AIDS Epidemic, as of End 2001 [From UNAIDS, *Report on the Global HIV/AIDS Epidemic*; XIV International Conference on AIDS, Barcelona, 7/02; http://www.unaids.org]

Number of people living with HIV/AIDS	**Total**	**40 million**
	Adults	37.1 million
	Women	18.5 million
	Children under 15 years	3.0 million
People newly infected with HIV in 2001	**Total**	**5 million**
	Adults	4.2 million
	Women	2.0 million
	Children under 15 years	800,000
AIDS deaths in 2001	**Total**	**3 million**
	Adults	2.4 million
	Women	1.1 million
	Children under 15 years	580,000

Figure 1. Adults and Children Estimated to be Living with HIV/AIDS as of End 2001 [From UNAIDS, *Report on the Global HIV/AIDS Epidemic*; XIV International Conference on AIDS, Barcelona, 7/02; http://www.unaids.org]

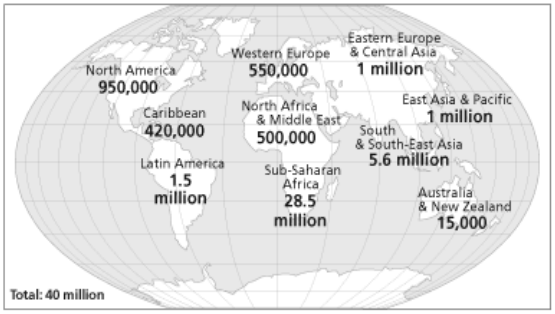
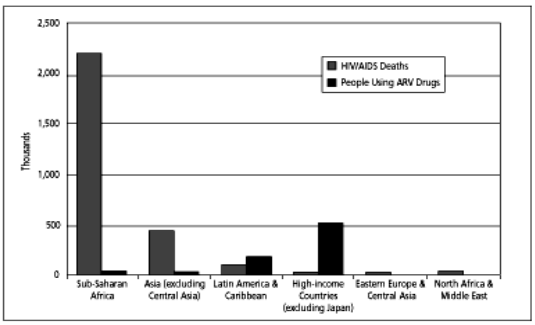


Figure 2. HIV/AIDS Deaths in 2001 and Number of People Using Antiretroviral Drugs by End 2001: By Region [From UNAIDS, *Report on the Global HIV/AIDS Epidemic*; XIV International Conference on AIDS, Barcelona, 7/02; http://www.unaids.org]



HIV/AIDS in Sub-Saharan Africa

- 28.5 million of the world's 40 million people living with HIV/AIDS globally but only 11% of the world's population
- 16 million of the 19 million global deaths from HIV/AIDS (83%)
- 2.2 million deaths estimated in 2001
- 70% of the world's PLWHA
- 80% of children orphaned by AIDS
- 54% of PLWHA are women under 25

Effects of the Virus

- Attacks white blood cells (T helper lymphocytes and macrophages) that are crucial in the immune system
- Destroys cells and takes over their functions
- Weakens immune system
- Increases vulnerability to life-threatening illnesses

Primary Routes of Transmission

Sexual
- 0.1%-1% risk
- 70%-80% of all global HIV infection

Vertical
- 10%-30% risk
- In utero, during labor and delivery, and through breastfeeding

Parenteral
- Blood transfusions (estimated risk from a single unit of HIV-infected whole blood is over 90%)
- Needle sharing among drug users (risk of 0.1%, responsible for 5%-10% of global HIV infection) and needle pricks among health workers

Factors in Transmission and Vulnerability

Viral
- HIV strain
- Viral load

Host
- Presence of sexually transmitted infections
- Circumcision
- Use of vaginal products

Sexual behavior
- Number and rate of exchange of partners
- Sexual mixing patterns
- Type of intercourse
- Condom use

Factors in Transmission and Vulnerability, Cont.

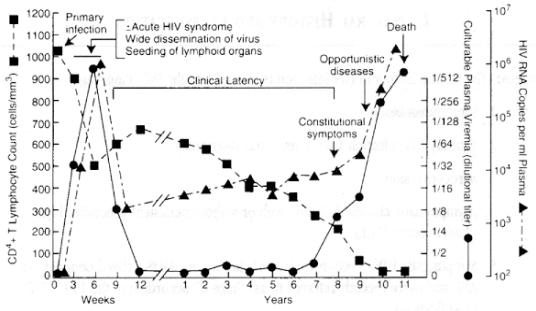
Demographic
- Percentage of sexually active groups
- Male-to-female ratio
- Urban-to-rural ratio
- Migration patterns

Economic and political
- Level of poverty
- War and social conflicts
- Coverage and quality of health care system

Stages of HIV Disease

- Acute infection (2-8 weeks)
- Asymptomatic (2-10 years)
- Symptomatic
- Late

Infection in Average Patient without ARVs from Transmission to Death



Source: Bartlett 2000)

Disease Recognition through HIV Testing

- Negative during first 3 months after infection (window period)
- Two tests required plus a third to confirm if results conflict
- Repeated test recommended 3 months after initial test
- False positives very possible in children under 18 months old

Types of HIV Test

Blood tests for antibodies against HIV
- Enzyme immune assay/enzyme-linked immunosorbent assay (ELISA) is most common
- Western blot is more specific than ELISA and used as a confirmatory test
- Radioimmunoprecipitation assay (RIPA) is expensive and used as a confirmatory test when antibodies low
- Dot-blot immunobinding assay is a rapid screening blood test that is cost effective
- Polymerase chain reaction (PCR)looks for HIV genetic information

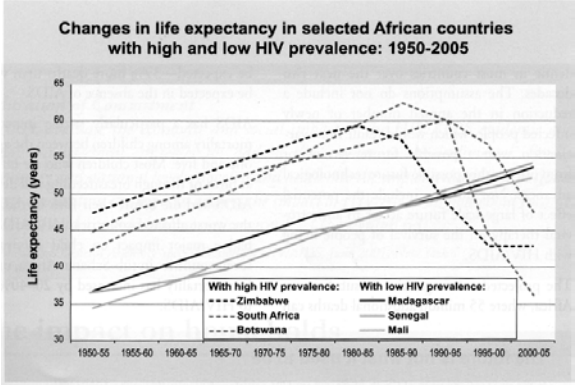
Types of HIV Test, Cont.

Urine tests
- Tests for antibodies in urine
- Not as sensitive as blood tests
- Enzyme immune assay
- Western blot

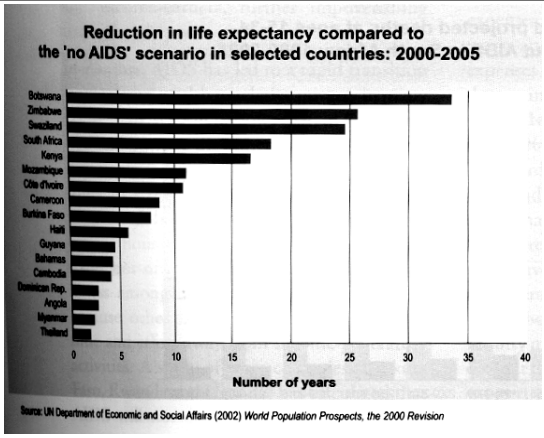
Oral fluid tests
- Tests for antibodies in oral fluids
- Enzyme Immune Assay
- Western blot

Demographic Impact of HIV/AIDS

- Falling life expectancy
- Increasing mortality, especially among children 1-5 years old (most children infected at birth or through breastfeeding will die before their fifth birthdays)



Source: UN Department of Economic and Social Affairs (2001) *World Population Prospects, the 2000 Revision*



Source: UN Department of Economic and Social Affairs (2002) *World Population Prospects, the 2000 Revision*

Impact on Food Security

- Diminished food availability
  - Falling production
  - Loss of family labor, land, livestock and other assets)
- Reduced access to food because of low income

Impact on the Health Sector

- Straining of already meager health budgets and stretched health systems
  - Annual direct medical costs minus ARVs about US$30/person in sub-Saharan Africa
  - Overall public health spending less than US$10/person (UNAIDS)
- Heavy toll on labor force

Impact on the Education Sector

- Declining school enrolment
- Reduced capacity to deliver basic social mandate because of illness or death of teachers
- Lack of intergenerational learning

Comprehensive Package of HIV/AIDS Programs

Leadership
- Promote understanding and cooperation
- Avoid denial and stigma
- Secure commitment and accountability of different sectors

Mitigating social and economic impact
- Care for growing number of vulnerable orphans and children
- Give access to basic needs, rights, and general well-being

Reducing vulnerability
- Target women, girls, PLWHA, people in war and conflict
- Facilitate economic empowerment and life skills

Comprehensive Package of HIV/AIDS Programs, Cont.

Prevention
- Health and sex education
- Expansion of PMTCT
- Expansion of demand and harm reduction for drug users
- Increased access to VCT

Care and support
- Synergy with prevention interventions
- Health services and psychosocial support
- PMTCT
- VCT
- Counseling and care for orphans and children with HIV/AIDS

Challenges

- Political commitment
- Funding
- Stigmatization affecting impact of prevention and care interventions
- Culturally engrained gender inequities
- Increasing scale and quality of interventions
- Vaccine

Session 2 Link Between Nutrition and HIV/AIDS: PowerPoint Presentation Handouts

Link between Nutrition and HIV/AIDS

Nutrition and HIV/AIDS: A Training Manual
Session 2

Acknowledgment

Most of the slides in this presentation are the work of Ellen Piwoz (and Elizabeth Preble) of the SARA Project, Academy for Education Development

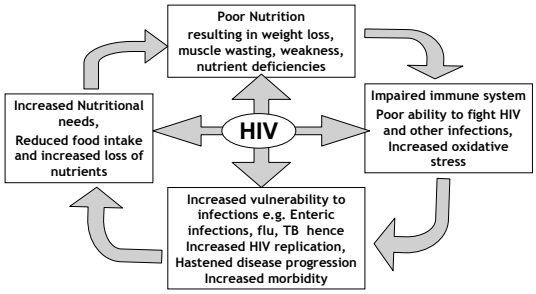
Purpose

To provide basic concepts of the relationship among food, nutrition, and HIV/AIDS; general dietary needs; and practices to reduce morbidity, mortality, and the progression of HIV to AIDS

Session Outline

- Link between HIV/AIDS and nutrition
- Effects of HIV/AIDS on nutrition
- Effects of nutrition (macronutrients, micronutrients and existing nutritional status) on HIV/AIDS

Vicious Cycle of Malnutrition and HIV



Source: Adapted from RCQHC and FANTA 2003

Effects of Malnutrition and HIV on the Immune System

Malnutrition	HIV
CD4 T-lymphocyte number	
CD8 T-lymphocyte number	
Delayed cutaneous hypersensitivity	
CD4/CD8 ratio	
Serologic response after immunizations	
Bacteria killing	

Affects of HIV/AIDS on Nutrition

- Decrease in the amount of food consumed
- Impaired nutrient absorption
- Changes in metabolism

Causes of Decreased Food Consumption

- Mouth and throat sores
- Loss of appetite leading to fatigue, depression, and changes in mental state
- Side effects from medication
- Abdominal pain
- Household food insecurity and poverty

Poor Nutrient Absorption

- Nutrient absorption impaired during many infections
- Poor absorption of fats and carbohydrates at all stages of HIV infection because of
  - HIV infection of intestinal cells
  - Frequent diarrhea and vomiting
  - Opportunistic infections
- Poor absorption of fats that affects use of fat-soluble vitamins such as A and E

Changes in Metabolism

- Infection increases energy (10%-15%) and protein (50% or more) requirements
- Infection increases demand for and utilization of antioxidant vitamins (E, C, beta-carotene) and minerals (zinc, selenium, iron)
- Insufficient antioxidants from increased utilization causes oxidative stress
  - Increases HIV replication
  - Leads to higher viral loads

HIV-Associated Wasting Syndrome

Body weight is the most common body composition measurement but is inaccurate because of:

- Fluid overload (e.g., severe renal disease, IV rehydration)
- Fluid deficits (e.g., dehydration from diarrhea, poor fluid intake)
- Inability to differentiate between changes in lean tissues or fat

HIV-Associated Wasting Syndrome, Cont.

Body cell mass is superior to body weight

- Measures the metabolically active tissue compartment in the body
- Includes the muscles, organs, and circulating cells and so can differentiate between lean tissues and fat

Studies show

- Progressive depletion of body cell mass in the late stages of HIV disease (Kotler 1985)
- Significant prolonged survival in patients with body cell mass >30% of body weight or serum albumin levels exceeding 3.0g/dl (Suttman 1991)

Body Habitus Changes

Metabolic changes in HIV infection result in

- Increased resting energy expenditure
- Prompter use of amino acids to fuel energy needs
- Continued fat accumulation
- More adipose tissue compared to lean tissue
- Lack of preservation and restoration of lean tissue
- Weight loss (HIV-associated wasting syndrome)
- High triglyceride levels in blood

Effects of Nutrition on HIV/AIDS: Observational Studies

Findings

- Weight loss associated with HIV infection, disease progression, and mortality
- Some nutrient deficiencies (vitamins A, B_{12}, and E, selenium and zinc) associated with HIV transmission, disease progression, and mortality

Observational studies do not tell us whether these conditions caused or resulted from more rapid progression. Clinical trials are needed to show that improving nutrition can slow HIV disease progression and increase survival.

Effects of Nutrition on HIV/AIDS: Clinical Trials (1)

Interventions to increase energy and protein intake in HIV+ people may reduce vulnerability to weight loss and muscle wasting

- High-energy, high-protein drink + counseling (Stack et al 1996)led to weight gain and maintenance in HIV+ with no symptoms
- Omega-3 fatty acids common in fish oils and seeds (Hellerstein et al 1999) led to weight gain in some AIDS patients
- Glutamine+antioxidants+counseling (Shabert et al 1999) led to weight gain and improved body cell mass in HIV+ who had begun to lose weight

Effects of Nutrition on HIV/AIDS: Clinical Trials (2)

Improvements in micronutrient intake and status may help strengthen the immune system, reduce consequences of oxidative stress, and lengthen survival

- Vitamin A (Tanzania, South Africa) improved immune status, reduced diarrhea and mortality in HIV+ children.
- Vitamin B_{12} (USA-men) improved CD4 cell counts in HIV+ men
- Vitamins E and C (Canada,Zambia) reduced oxidative stress and HIV viral load
- Multivitamins (A,B,C,E, folic acid) improved pregnancy related outcomes and immune status

Effects of Nutrition on HIV/AIDS: Clinical Trials (3)

- Selenium and beta-carotene (France) increased antioxidant enzyme functions
- Zinc (Italy)reduced incidence of opportunistic infections, stabilized weight, improved CD4 counts in adults with AIDS
- Iron-reversing anemia (USA) slowed HIV progression and improved survival

Conclusions

- HIV affects nutrition in three overlapping ways
- Nutritional status affects HIV disease progression and mortality
- Improving nutritional status may improve some HIV-related outcomes
- Counseling and other interventions to prevent weight loss probably have their greatest impact early in the course of HIV infection
- Nutritional supplements, particularly antioxidant vitamins and minerals, may improve HIV-related outcomes, particularly in nutritionally vulnerable populations

Session 3 Key Nutrition Actions for People Living with HIV/AIDS: PowerPoint Presentation Handouts

Key Nutrition Actions for People Living with HIV/AIDS

Nutrition and HIV/AIDS: A Training Manual
Session 3

Purpose

To provide general nutrition and dietary guidelines to mitigate the effects of HIV on nutrition and reduce the progression of HIV/AIDS morbidity, mortality, and related discomfort

Session Outline

- Goals of nutrition care and support in HIV/AIDS
- Essential components of nutrition care and support in HIV/AIDS
- Key actions for HIV-infected people
- Appropriate assessments, interventions, follow-up and review for nutritional care in HIV/AIDS

Goals of Nutrition Care and Support

- Improve nutritional status
  - Maintain weight and prevent weight loss
  - Preserve muscle mass
- Ensure adequate nutrient intake
  - Improve eating habits and diet
  - Replenish stores of essential nutrients
- Prevent food-borne illnesses
- Enhance quality of life
  - Treat opportunistic infections
  - Manage symptoms affecting food intake
- Provide palliative care

Components of Nutritional Care and Support

1. Nutritional assessment
2. Intervention
3. Follow up and review

Nutritional Assessment

Why Measure?

- To identify and track body composition changes over time and trends
  - Changes in weight
  - Changes in body cell mass and fat-free mass
  - Serum nutrient levels, cholesterol, etc.
- To use results to design appropriate interventions
- To address client concerns about their health
- To meet increasing emphasis on physical nutrition assessment as part of clinical trials

What to Measure?

- Anthropometry
- Laboratory tests
- Clinical assessments
- Diet history and lifestyle

Anthropometric Measurements in HIV/AIDS

To assess and monitor weight

- Weight and height
- Percentage of weight and/or body mass index changes over time

To assess and monitor body composition

- Lean body mass
- Body cell mass
- Skinfold (triceps, biceps, mid-thigh)
- Circumferences (waist, mid-upper arm, hips [buttocks], mid-thigh, breast size for women, neck circumferencve (buffalo hump])

Laboratory Measurements in HIV/AIDS

To assess and monitor nutrient levels

- Serum micronutrients (e.g. retinol, zinc)
- Haemoglobin (and ferritin)

To assess and monitor body composition

- Fasting blood sugar,
- Lipid profiles (e.g., cholesterol and triglycerides)
- Serum insulin

Clinical Assessments in HIV/AIDS

Symptoms and illnesses associated with HIV/AIDS

- Diarrhea and vomiting
- Fever (temperature)
- Mouth and throat sores
- Oral thrush
- Muscle wasting
- Fatigue and lethargy
- Skin rashes
- Edema
- Palm pallor

Diet History in HIV/AIDS

24-hour food consumption or food frequency recalls can be used (in the absence of acute food stress) to assess

- Types and amounts of food eaten (including food access and utilization and food handling)
- Use of supplements and medications
- Factors affecting food intake (appetite, eating patterns, medication side effects, lifestyle, taboos, hygiene, psychological factors, stigma, economic factors)

Interventions

Stages of HIV Disease and Nutrition

Specific nutrition recommendations vary according to underlying nutritional status and HIV disease progression

- **Early stage:** No symptoms, stable weight
- **Middle stage:** Weight loss, opportunistic infections associated effects
- **Late stage:** Symptomatic AIDS

Nutrition Care and Support Priorities by Stage of Disease

Asymptomatic: Counsel to stay healthy

- Encourage building stores of essential nutrients and maintaining weight and lean body mass
- Ensure understanding of food and water safety
- Encourage physical activity

Middle stage – Counsel to minimize consequences

- Counsel to maintain dietary intake during acute illness
- Advise increased nutrient intake to recover and gain weight
- Encourage continued physical activity

Late stage: Provide comfort

- Advise on treating opportunistic infections
- Counsel to modify diet according to symptoms
- Encourage eating and physical activity

Nutrition Actions for HIV-Infected People

To prevent weight loss

- Promote adequate energy and protein intake
- Individualize meal plan and modify to match medication regime or health changes
- Advise changing lifestyles that negatively affect energy and nutrient intake

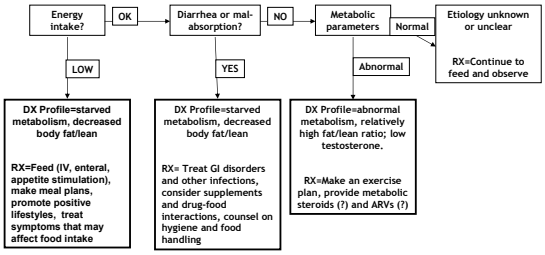
To improve body composition

- Promote regular exercise to preserve muscle mass
- Promote steroids

To improve immunity and prevent infections

- Promote increased vitamin and mineral intake
- Promote food safety
- Promote use of ARVs to reduce viral load

Algorithm for Managing Weight Loss in Patients with HIV/AIDS



Source: Adapted from Hellerstein and Kotler 1998

Promote Adequate Nutrient Intake

- Identify locally available and acceptable foods
- Promote a diet adequate in energy, protein and other essential nutrients
  - Increase energy intake by 10%-15%
  - Increase protein intake
  - Increase eating a variety of foods (especially more fruits and vegetables) and/or promote multiple micronutrient supplements for improved immune function

Support Individualized Meal Plans

Consider

- Stage of illness and symptoms
- Food security (availability and accessibility of basic foods)
- Resources (money, time, other caretakers)
- Food likes and dislikes
- Knowledge, attitudes, and practices (especially traditional dietary taboos)

Modify Meal Plans to Suit Medication and Health Status

Consider

- Flexibility to change depending on client context
- Possible food and drug interactions
- Changes in medication regimens
- Absence of opportunistic infections and other infections that may affect food intake or utilization
- Changes in food accessibility in terms of quality and quantity (especially in resource-poor settings)

Promote Lifestyle Changes for Nutritional Well-being

- **Eliminate foods and practices that aggravate infection**
  - Raw eggs and unpasteurized dairy products
  - Foods not thoroughly cooked, especially meats
  - Unboiled water or juices made from unboiled water
- **Avoid foods that may affect food intake**
  - Alcohol and coffee
  - "Junk" foods with little nutritional value
  - Foods that aggravate symptoms related to diarrhea, nausea and vomiting, bloating, loss of appetite, and mouth sores (e.g., expired foods, fatty foods)

Recommend Regular Exercise

Muscle loss can be restored by reducing viral load or maintaining physical activity

Physical activity improves

- Lean body mass
- Body composition
- Bone density
- Strength
- Functional capacity
- Quality of life
- Appetite

Therapeutic Regimens for HIV-Related Weight Loss

Therapy	Nitrogen retention (g/day)	Rate of change in body composition	
		LBM (kg/wk)	Weight (kg/wk)
Megestrol acetate	NA	0.00-0.05	0.45
Parental nutrition	NA	0.00	0.30
rGH	4.0	0.25	0.13
Nandrolone (hypogonadal)	3.7	0.25	0.41
Resistance exercise alone	3.8	0.48	0.53
Resistance exercise and oxandrolone	5.6	0.86	0.84

***Source*: Adapted from Hellerstein and Kotler 1998**

Exercises That Build Muscle Mass

- Weight bearing exercises
  - Resistance training
  - Weight training
- Exercises generating high force on bone
  - Aerobics
  - Jogging
  - Stair climbing
  - Hiking
  - Skipping
- Relaxation exercises
  - Yoga

Increase Vitamin and Mineral Intake

Strategies to increase vitamin and mineral intake to replenish or build body stores and optimize immune function

- **Food-based approaches**
  - Include local vegetables, vitamin-enriched or fortified local products (maize meal, wheat or soy flour, margarine, cereals)
  - Have no undesirable side effects
  - Are affordable
- **Nutrient supplements**
  - Are more absorbable by sick person
  - Multivitamin and multiple-micronutrient supplements are better than than single vitamins and minerals

Suggested Nutrient Supplement Intake in HIV/AIDS

Vitamin A RDA=5,000 IU)	2-4 RDA (13,000-20,000IU)
Vitamin E	400-800 IU
Vitamin B	High-potency B complex (e.g., B-25 or B-50 with niacin and B6)
Vitamin C	1,500-2,000mg
Selenium	200mcg
Zinc	1 RDA (12-19mg)

Source: Serono 1999; Tang et al 1996. Excerpts from *Eat up*

Adverse Effects of Too Much Intake of Nutrient Supplements

Vitamin E: Malabsorption of vitamins A and K and gastrointestinal upsets

Vitamin C: Gastrointestinal upsets, iron overabsorption and abdominal bloating

Iron: Gastrointestinal bleeding (manifested by vomiting and bloody diarrhea) and possible stimulation of viral replication

Zinc: Gastric distress, nausea, reduced immune function that favors viral replication (HDL reported in supplements of > 300mg/day)

Vitamin B: Gastrointestinal upsets

Selenium: Skin lesions, nausea, and vomiting

Source: Afacan et al 2002, Tang et al 1996; Ziegler and Filler 1996

Promote Food Safety to Prevent Food-Borne Illness

Educate clients to avoid products that

- Contain raw or undercooked meat
- Have expired
- Are in damaged or bulging packing
- Are displayed unsafely (e.g., mixing raw and cooked foods or meats with fruits and vegetables)
- Are sold in unsanitary conditions or by workers with poor personal hygiene or food handling practices

Follow up and Review

Monitor the Client's Well-being

Follow up

- Integrate with other care and support activities where available
- Do continuously in facility and home
- Include monitoring of health, nutrition, and dietary indicators
- Include counseling to address barriers to good nutrition
- Offer support and encouragement

Review

- Meal plans
- Exercise regimens
- Use of medicines
- Compliance with meal requirements

Factors to Consider in Care and Support of People Living with HIV/AIDS

Factors in Design and Implementation

- Social: Support, stigma, gender roles, education, information, traditions, beliefs
- Economic: Household resources, food security, financial access to health and nutrition
- Client rights: Privacy, nondiscrimination in public services
- Quality of support and care: Counseling, infrastructure, consistency, access to VCT and ARVs, information on ARVs

Nutritional and Antiretroviral Therapy

Common Antiretroviral Drugs

Reverse transcriptase inhibitors (RTIs)

- Nucleoside reverse transcriptase inhibitors, or NRTIs: Zidovudine (AZT,ZDV), Lamivudine (3TC), Abacavir (ABC)
- Non-nucleoside reverse transcriptase inhibitors, or NNRTIs: Nevirapine (NVP), Efavirenz (EFV), Delavirdine (DLV)

Protease inhibitors (PIs)

- Saquinavir (SQV)
- Ritonavir (RTV)
- Indinavir (IDV)

Often taken in combination to increase effectiveness and reduce resistance

Promote Use of ARVs

- Reduces viral load, associated opportunistic infections, and immunity to other infections
- Reduces HIV-related wasting and the negative effects on body composition
- Reduces deficiencies of micronutrients such as zinc and selenium (Rousseau et al 2000)

Educate on Nutrition-Related Side Effects of ARVs

- Lipodystrophy (fat maldistribution)
- Hyperglycemia/insulin resistance
- Hyperlipidemia

Lipodystrophy

- Means fat maldistribution
- Is observed in 6%-80% of patients on ARVs
- Is caused by metabolic changes associated with immune reconstitution and ARV mitochondrial toxicity
- Results in
  - Hyperlipidemia
  - Hyperglycemia, insulin resistance, and glucose intolerance
  - Peripheral wasting (extremities, face)
  - Visceral and subcutaneous central adiposity (buffalo hump, breast enlargement)
- Managed by exercise training

Hyperglycemia and Insulin Resistance

- Hyperglycemia: Increased blood sugar levels from pancreatic problems or insulin resistance
- Insulin resistance (impaired message system) reported in 28%-35% of adult patients on ARVs
- Few cases of diabetes (3%-9%)
- Management with
  - Antidiabetic agents
  - Antioxidants (e.g., vitamin C and selenium) to support glutathione, which is crucial in insulin action

Hyperlipidemia

- Changes triglycerides or cholesterol with or without fat maldistribution
- Is caused by ARV interference with normal cellular proteins involved with lipid metabolism
- Increases levels of triglycerides or cholesterol and risk of cardiovascular problems and pancreatitis
- Is managed by
  - Lipid-lowering drugs
  - Decreased fat intake
  - Exercise
  - Lifestyle changes (e.g., quitting smoking)

Nutritional Care and Support Strategies with ARV Therapy

- Promote a nutritionally adequate diet (quality, diversity, and quantity)
- Promote safe water, food, and hygiene practices
- Discourage excessive fat intake (promote modest fats, starches, and sugars and high-protein food but fewer fried eggs and yolks), fatty meats, and animal fats
- Prevent muscle wasting with regular exercise to burn fat and build muscle mass (anabolic agents?)
- Encourage increased fluid intake
- Address nutritional consequences of drug-nutrient interactions and side effects of medications

Conclusions

- Good nutrition and healthy lifestyle can preserve health, improve quality of life, prolong independence, and delay disease progression
- Appropriate physical activity, increases energy, stimulates appetite, and preserves and builds lean body mass
- Preventing food- and water-borne infections reduces the risk of diarrhea (a common cause of weight loss), malnutrition, and HIV disease progression
- Antiretroviral therapy can help improve quality of life, but patients should be educated on adverse nutrition-related effects

Session 4 Food Security Components in HIV/AIDS Nutritional Care and Support: PowerPoint Presentation Handouts

Food Security Components in HIV/AIDS Nutritional Care and Support

Nutrition and HIV/AIDS: A Training Manual
Session 4

Purpose

To introduce the constraints posed by food insecurity on nutritional care and support for people living with HIV/AIDS and approaches to implementing this care and support in food-insecure contexts

Session Outline

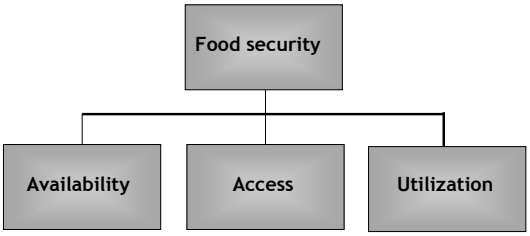
- Food security components and nutritional care and support
- HIV/AIDS and food insecurity
- Food security constraints on nutritional care and support
- Implementing nutritional care and support in food-insecure contexts

Food Security Components and Nutritional Care and Support

USAID Definition of Food Security

All people at all times have both physical and economic access to sufficient food to meet their dietary needs for a productive and healthy life.

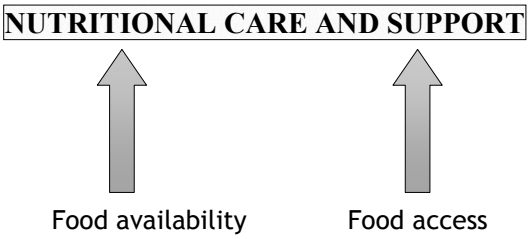
Elements of Food Security



Utilization and Nutritional Care and Support

Nutritional care and support strengthens biological utilization of food, supporting the utilization component of food security

Food Access and Availability Constraints



Food Access and Availability Constraints, Cont.

- Limited quantity and quality of food available and accessible to the household
- Competing time demands on food production and income that limit time for care-giving

Factors Affecting Food Security

- Individual constraints (symptoms and knowledge)
- Household constraints (production and purchasing power)
- External constraints (stigma and market fluctuations)
- External shocks (droughts and conflict)

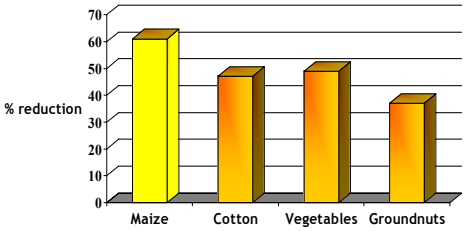
HIV/AIDS and Food Insecurity

Scope of the Problem

- Over 29 million people living with HIV/AIDS (PLWHA) in sub-Saharan Africa in 2002
- HIV prevalence of >10% in 16 countries
- Many of the worst-affected countries already food insecure

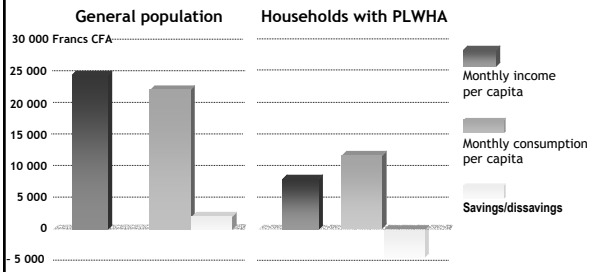
Effect of AIDS on Crop Production

Crop reduction in households after AIDS deaths, Kwaramba, Zimbabwe, 1997



Source: UNAIDS 2000

Impact of HIV/AIDS on Income, Côte d'Ivoire

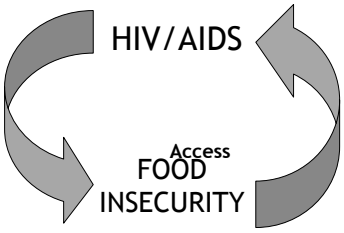


Source: UNAIDS, Alban and Guiness, ADF 2000: Simulation based on data from Bechu, Delcroix, and Guillame 1997

Special Dynamic between HIV/AIDS and Food Security

- HIV/AIDS is a long-term phenomenon
- HIV primarily infects people in their most productive years
- HIV/AIDS creates additional nutritional needs
- Stigma is associated with HIV infection
- HIV/AIDS occurs on a larger scale (national, regional, continental) than other shocks
- There is a time lag between HIV infection and symptoms
- Food insecurity may increase risky behaviors

HIV/AIDS-Food Insecurity Dynamic



Effects of HIV/AIDS of Food Availability and Access

- Reduces labor availability
- Decreases income
- Depletes savings
- Leads to sale or loss of productive assets
- Depletes food reserves
- Interrupts knowledge transfers
- Weakens safety nets and support systems

Types of Capital Diminished by HIV/AIDS

- Human (labor, knowledge transfer, productivity, education)
- Financial (income, assets, savings)
- Social (support systems, networks, cooperation)
- Physical and natural (sale of land, sale of productive equipment, property rights)

Effects of Food Insecurity on HIV/AIDS

- May lead to livelihood strategies that increase risk of infection
- Reduces access to preventive education and commodities
- Increases severity of HIV/AIDS impact

Interventions to Address HIV/AIDS and Food Insecurity

- Agricultural extension
- Food aid
- Microfinance
- Training and grants for income activities
- Capacity building of networks
- Labor-sharing practice

See table 2, Bonnard 2002

Food Insecurity Constraints on Nutritional Care and Support

Infant Feeding and PMTCT: Replacement Feeding

- Access to affordable breastmilk substitutes
- Access to facilities for hygienic preparation
- Counselors: Identify food security constraints and support options to address them

Infant Feeding and PMTCT: Complementary Feeding

- Access to nutritious complementary foods
- Higher levels of nutrients for children not receiving breastmilk
- Counselors: Identify constraints, options, possible foods, and services

Pregnant and Lactating Women

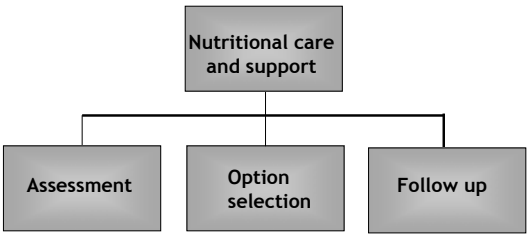
- Poor access to sufficient quantities of nutritious foods because of external or household factors
- Counselors: Understand constraints and identify and facilitate options

Food and Drug Interactions

- Poor access to foods needed to alleviate side effects, improve drug efficacy, and maintain nutritional status
- Side effects leading to poor adherence to medications
- Counselors: Identify drugs' food requirements and limitations and food options and help plan drug-meal schedules

Implementing Nutritional Care and Support in Food-Insecure Contexts

Care and Support Implementation



During Assessment: Understand Sources of Food Insecurity

- Assess nutritional status and practices
- Assess factors that prevent adoption of improved practices, including food access and availability and knowledge
- Assess the status of food supply, income, and employment
- Identify coping strategies used
- Assess the negative effects of these strategies
- Identify components that need external support

During Assessment: Identify Food and Nutrient Access Gaps

- Identify foods and nutrients the client needs more of
- Identify the causes of these gaps

During Assessment: Identify Capacities and Options

- Identify capacities in the household (refining coping strategies, support from other members)
- Identify options to strengthen nutritional practices

During Option Selection: Identify Alternate Practices

- Substitute alternate dietary options that are feasible within the food security constraints
- This may mean using foods and practices that are not optimal but better than existing practices

During Option Selection: Increase Food Security

- Link and refer to services supporting food security and livelihood
- Adjust household expenditures
- Adjust household food allocations and practices

During Option Selection: Involve PLWHA and Households

- PLWHA, care-givers, and household members have the best knowledge of the situation

During Follow up

- Describe how food insecurity has been addressed
- Find out whether further measures are needed to enable nutritional care and support
- Identify new approaches that are needed

Conclusions

- Information and knowledge are not enough for effective nutritional care and support without household food security.
- Nutritional care and support providers need to assess client food security, identify feasible options, and help address food insecurity
- Food insecurity affects recommendations and options for all other topics in this manual

Session 5 Nutritional Management of HIV/AIDS-Related Symptoms: PowerPoint Presentation Handouts

Nutritional Management of HIV/AIDS-Related Symptoms

Nutrition and HIV/AIDS: A Training Manual
Session 5

Purpose

To provide knowledge of and skills for the nutritional management of HIV/AIDS-related symptoms

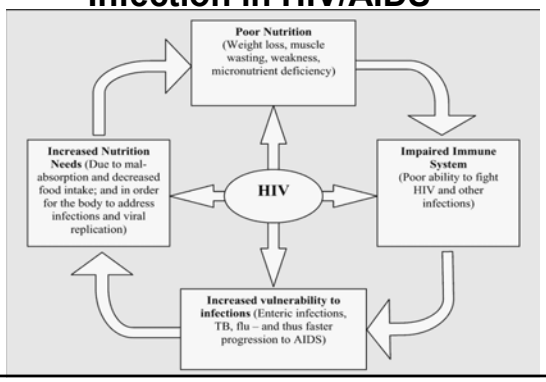
Session Outline

- Relationship between nutrition and HIV infection
- Importance of good nutrition at all times
- HIV/AIDS-related symptoms and nutritional implications
- Dietary management of HIV/AIDS-related symptoms

Rationale

- HIV/AIDS has a negative impact on nutritional status and may lead to malnutrition.
- Malnutrition weakens the immune system and increases vulnerability to opportunistic infections.

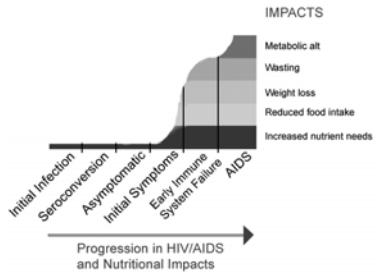
Cycle of Malnutrition and Infection in HIV/AIDS



Rationale, Cont.

- Opportunistic infections cause symptoms such as anorexia and fever that reduce food intake and nutrient utilization and increase nutrient requirements.
- Reduced food intake and poor nutrient absorption weaken the immune system and hasten disease progression.

Rationale, Cont.



Importance of Managing Symptoms at All Times

- Rapid multiplication of the virus depletes the host of nutrients and increases vulnerability to infections.
- Acting promptly and efficiently at the onset of symptoms is critical to strengthen the immune system and reduce the severity of infections.
- Nutritional repercussions and responses vary as the disease progresses.

Goals

- Prevent malnutrition
- Improve health and nutritional status
- Slow the progression of the disease

Importance of Good Nutrition

- Before contracting HIV, reduces the likelihood of the virus rapidly weakening the immune system
- Has the greatest impact at the beginning stages of HIV infection because it strengthens the immune system and reduces vulnerability to opportunistic infections
- Reduces the severity of infections, contributes to weight gain, and prevents wasting.

Adequate Nutrition for PLWHA

- Prevents malnutrition and wasting
- Achieves and maintains optimal body weight and strength
- Enhances the body's ability to fight opportunistic infections
- May help delay progression of the disease
- Improves the effectiveness of drug treatments
- Improves quality of life

Symptoms and Nutritional Status

Symptoms such as loss of appetite, taste changes,fever, diarrhea, nausea, vomiting, oral hrush, anemia, bloating, and heartburn may negatively affect nutritional status because of

- Reduced food intake
- Poor nutrient absorption
- Increased nutrient needs

Dietary Management of Symptoms

- Enables greater food intake
- Contributes to increased comfort
- Compensates for nutrient losses
- Prevents dehydration
- Complements and strengthens medical treatment
- Reduces severity of symptoms

Dietary Management of Symptoms, Cont.

Anorexia: Eat small amounts of food frequently and eat energy-dense foods

Thrush: Eat soft mashed foods cold or at room temperature and avoid spices and sugar

Constipation: Eat more high-fiber foods and drink plenty of fluids

Bloating and heartburn: Eat small and frequent meals, avoid gas-forming foods, and eat long enough before sleeping

Dietary Management of Symptoms, Cont.

Diarrhea: Drink lots of fluids and eat energy-and nutrient-dense foods

Nausea: Eat small frequent meals, avoid lying down immediately after eating, rest between meals

Fever: Drink plenty of fluids and eat soups that are rich in energy and nutrient foods

Anemia: Eat iron-rich foods, such as animal products, green leafy vegetables. Take iron supplement.

Context-Specific Dietary Management

Always adapt recommendations to the specific food habits and food security constraints of the context and the client

Conclusions

- Dietary management of HIV/AIDS-related symptoms helps maintain food intake and compensate for nutrient losses
- Dietary management complements medical treatment and enhances the client's capacity to fight opportunistic infections
- Health workers and counselors should monitor symptoms and food and drug regimen to ensure nutritional status is maintained

Session 6 Nutritional Care and Support of Pregnant or Lactating Women and Adolescent Girls Infected with HIV/AIDS: PowerPoint Presentation Handouts

Nutritional Care and Support of Pregnant and Lactating Women or Adolescent Girls with HIV/AIDS

Nutrition and HIV/AIDS: A Training Manual
Session 6

Purpose

To provide a general understanding of special considerations for nutritional care and support of HIV-infected pregnant or lactating women or adolescent girls.

Session Outline

- Why focus on women, nutrition, and HIV?
- Nutritional implications for the HIV-positive pregnant and lactating woman or adolescent girl
- Nutritional requirements of the HIV-positive pregnant and lactating woman or adolescent girl
- Nutrition care and support for the HIV-positive pregnant and lactating woman or adolescent girl
- Role of nutrition care and support
- Goals of nutrition care and support
- Components of nutrition care and support
- Issues and challenges in nutrition care and support

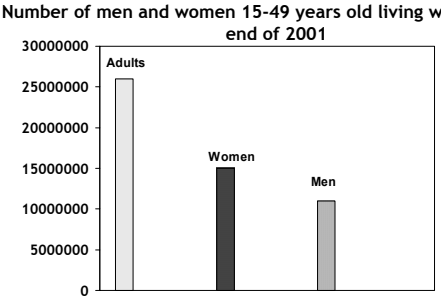
Why Focus on Women, Nutrition, and HIV?

"HIV has the face of a woman"

- 12-13 African women are infected for every 10 African men (WHO/UNAIDS)
- Over 50% of adults living with HIV/AIDS in sub-Saharan Africa are women 15-49 years old
- 15 million women in Sub-Saharan Africa are living with HIV

HIV Prevalence in sub-Saharan Africa

Number of men and women 15-49 years old living with HIV/AIDS, end of 2001



Source: UNAIDS 2002

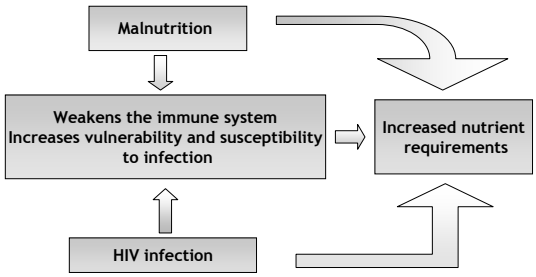
Vulnerability of Women and Young Girls

- Antenatal HIV-positive rates are up to 50%
- Women and young girls face greater risk of infection than men
  - **Biological factors**
  - **Limited access to economic opportunities**
  - **Limited access to health care increases risk factors**
  - **Diminished social status compromising ability to chose healthier life strategies**
- Women are responsible for caring for the sick when they themselves may also be infected

Women, Nutrition, and HIV

- Good maternal nutrition is important for women's health and reproduction and infant survival and development
- Malnourished women are at higher reproductive risk and have poorer pregnancy outcomes than well-nourished women
- In Africa endemic malnutrition is complicated by the AIDS epidemic

Malnutrition and HIV Work in Tandem



Nutritional Implications for the HIV-Positive Pregnant or Lactating Woman or Adolescent Girl

During Pregnancy

Malnutrition increases maternal morbidity and mortality

- Zinc and vitamin A deficiencies increase the risk of reproductive tract infections
- Low calcium intake increases the risk of pre-eclampsia and high blood pressure
- Iron deficiency reduces resistance to disease, causes fatigue, and reduces productivity
- Anemia increases risks of prolonged labor and death from hemorrhage

During Pregnancy, Cont.

Malnutrition affects birth outcome

- Leads to intra-uterine growth retardation and low birth weight
- Decreases nutrient stores for later development
- Increases neonatal mortality and morbidity

Malnutrition may increase the risk of MTCT

- Vitamin A deficiency associated with increased viral load in blood, genital secretions, and breastmilk
- Low hemoglobin associated with increased risk of pre-term delivery and low birth weight—risk factors for MTCT

During Pregnancy, Cont.

Micronutrient supplementation for HIV+ women has **NOT** reduced MTCT, but **HAS** produced other benefits

- Vitamin A supplementation studies have shown reduced pre-term delivery (South Africa) and improved birthweight, neonatal growth, and reduced anemia (Malawi)
- Multivitamin supplements increased weight gain in pregnancy and reduced risk of fetal death, low birth weight, and pre-term delivery <34 weeks (Tanzania)

During Lactation

Increased nutritional demands of lactation may increase weight loss, a risk factor for reduced survival in HIV infection

- Breastfeeding HIV+ mothers more likely to die within 2 years post-delivery (Kenya)
- No increased risk of mortality (South Africa)
- Further research needed on impact of breastfeeding on maternal HIV disease progression

WHO does not recommend daily maternal vitamin A supplementation during lactation, which may increase the risk of MTCT through breastfeeding

For HIV-Positive Pregnant or Lactating Adolescents

- Young maternal age (11-18) increases needs for nutrient
  - Needs for adolescent growth
  - Needs for fetal growth and development
- HIV infection further increases nutrient needs
  - Needs for adolescent growth
  - Needs for fetal growth and development
  - Increased requirements from HIV infection

Nutritional Requirements of the HIV-Positive Pregnant or Lactating Woman or Adolescent Girl

What Is Known

Physiological changes during pregnancy and lactation require extra nutrients

- For adequate gestational weight gain
- For growth of the developing fetus
- For milk production

HIV causes malabsorption and excess nutrient loss that further increase nutritional requirements

- Nutrition requirements for pregnancy superimposed on requirements for HIV

Women's nutritional status influences their health and may affect risk of MTCT

- HIV-positive women are at greater nutrition risk

What Is Known, Cont.

Nutritional requirements for HIV-positive pregnant and lactating women

- Vulnerability to iron deficiency (80% of pregnant women in sub-Saharan Africa are anemic)
- Research studies have shown multivitamin supplements are associated with health

What Is Not Known

Increased requirements for energy, protein, and other nutrients for the HIV positive pregnant and lactating woman

- 2003 WHO technical consultation on HIV and nutrition found no data to suggest increased energy requirements for HIV-infected pregnant or lactating women compared with non-infected pregnant and lactating women; stated that increased energy needs in pregnancy and lactation were the same as for other infected adults

Comparison of Nutritional Risks

HIV+ mother	HIV- mother
• Increased energy, protein and other nutrients secondary to demands of pregnancy or lactation • Increased energy and micronutrient needs secondary to HIV infection • Increased risk of opportunistic infections and therefore of malnutrition • Increased risk of weight loss and delivery of a low-birth weight baby because of HIV infection • Increased risk of inadequate dietary intake and therefore of malnutrition because of depression, isolation, or stigmatization • Increased risk of MTCT with poor nutritional status and through breastfeeding	• Increased energy, protein and other nutrients secondary to demands of pregnancy or lactation

Recommended Energy and Protein Requirements in Pregnancy

Recommended Energy and Protein Requirements during Lactation

Source: FAO/WHO/UNU. 1985. Energy and protein requirements. Report of a Joint FAO/WHO/UNU Expert Consultation. Geneva.

Recommended Micronutrient Supplementation

WHO/UNICEF recommend iron and folate during pregnancy and lactation

Where anemia prevalence is < 40 %

- 60mg iron + 400mcg folic acid daily for 6 months in pregnancy
- If started late, extended 6 months post-natally
- If impossible, dose increased to 120mg iron in pregnancy

Where anemia prevalence is > 40%

- 60 mg iron + 400 mcg folic acid daily for 6 months in pregnancy
- Continued 3 months post-partum
- Daily multivitamin supplement where available

Nutritional Requirements for HIV+ Pregnant and Lactating Women

Increased energy requirements for HIV-infected pregnant and lactating women are the same as for other HIV-infected adults

- 10% increase in energy requirements during asymptomatic HIV infection
- 20%30% increase during symptomatic HIV infection

The additional increment in energy is added to the basic energy requirement for age/activity/weight, not to the additional calories for pregnancy or lactation

Nutritional Requirements for Healthy Adolescent Pregnancy

What is known

- Nutritional risk increases because of combined need of growing adolescent and growing fetus
- Energy needs should be considered for normal growth of the teenager and weight gain needs for pregnancy
- An extra 300 kcal/day are needed in the 2nd and 3rd trimesters
- Younger adolescent girls (13-16 years old) may need even higher energy intakes

Nutritional Requirements for Healthy Adolescent Pregnancy

What is known, cont.

- Pregnant adolescent girls should not eat less than 2,000 kcal/day (as per individual energy requirements)
- Protein requirements increase for the normal growth and development of the teenager and of the fetus
- Needs for iron, folic acid, and zinc increase (a multivitamin supplement may help meet these increased needs)

Nutritional Requirements for HIV+ Pregnant and Lactating Adolescent

What is not known

- Increased energy needs (as with the adult HIV-positive pregnant and lactating woman)
- NO current recommendations for increase in protein requirements

Role of Nutrition Care and Support for the HIV-Positive Pregnant or Lactating Woman or Adolescent Girl

Importance of Nutritional Well-being for Pregnancy and Birth

- Critical for an uncomplicated pregnancy, positive birth outcome, and adequate quality and quantity of breastmilk production
- Increased nutritional risk and hence increased risk of morbidity and mortality in pregnancy and poor pregnancy outcome in HIV-infected women
- Increased risk of vertical transmission of HIC if HIV-positive mother has poor nutritional status during pregnancy

Role of Nutrition Care and Support

- Studies have shown that clinical outcome of HIV is poorer in people with compromised nutrition
- Improving nutrition can help prevent weight loss, strengthen the immune system, and delay HIV disease progression, allowing the mother to remain productive
- Nutrition care should be part of a comprehensive program that helps the HIV-infected person and affected family members

Purpose of Nutrition Care and Support

During pregnancy

- To meet the demands of expanded blood volume, growth of maternal tissues, developing fetus, and loss of maternal tissue at birth
- To prepare for lactation

During lactation

- To meet specific nutrient needs to optimize maternal post-natal nutritional status, quality and quantity of breastmilk production, and infant growth and development

Goals of Nutrition Care and Support for the HIV-Positive Pregnant or Lactating Woman or Adolescent Girl

Goals of Nutrition Care and Support

Improve nutritional status

- Maintain weight and prevent weight loss
- Preserve lean body mass

Ensure adequate gestational weight gain

Ensure adequate nutrient intake

- Improve diet and eating habits
- Replenish stores of essential nutrients

Prevent food-borne illness

- Encourage good hygiene and water and food safety

Enhance quality of life

- Treat opportunistic infections
- Manage symptoms affecting food intake

Components of Nutrition Care and Support for the HIV-Positive Pregnant or Lactating Woman or Adolescent Girl

Nutrition Assessment and Counseling

Nutrition screening and assessment

- Nutrition history
- Physical assessment
- Medical history
- Medication profile
- Biochemical data
- Psychosocial issues

Nutrition education and counseling

- Adequate diet and eating habits
- Management of common dietary problems in HIV

Food Safety and Hygiene

- Wash hands before food handling, after using the toilet, after changing baby's nappy
- Wash fruit and vegetables before cooking and serving
- Drink and use only boiled water
- Do not eat raw eggs or foods containing them
- Do not eat moldy, spoiled, or rotten foods
- Cover all food items when not in use
- Store food away from insects and animals
- Keep food preparation surfaces and utensils clean
- Ensure all food is cooked thoroughly
- Serve food immediately after preparation and do not store cooked food
- Avoid contact between raw and cooked food
- Use a cup rather than bottles with teats to feed infants

Management of Diet-Related HIV Problems

- Use diet and medication strategies to control anorexia, nausea, vomiting, diarrhea, constipation, bloating, mouth or throat sores, fever, malabsorption, fatique, and taste alterations
- Encourage and use safe traditional therapies to manage symptoms and improve intake
- Ensure adequate energy and protein to prevent malnutrition through small, frequent meals and high-protein energy foods with and between meals
- Counsel on food and drug interactions
- Modify food to manage symptoms and increase intake through pureed, minced texture, boiled instead of fried food, and flavor enhancers such as herbs and spices

Physical Activity, Safer Sex, and Psychosocial Support

Promote and encourage physical activity to improve body composition, stimulate appetite, and increase energy

Promote safer sex and reproductive health practices such as use of condoms

Provide psychosocial support

- Encourage peer support where available
- Counsel and support to cope with stigma, especially if not breastfeeding, and disclosure of HIV status to partner, family, and friends

Optimal Antenatal and Post-natal Care

Ensure adequate weight gain during pregnancy

- Start early nutrition intervention to minimize impact of HIV on nutritional status

Reduce risk of anemia and low birthweight

- Provide iron, folic acid, and multivitamin supplements
- Provide antimalarial prophylaxis and deworming

Promptly treat and manage conditions that affect food intake and risk of PMTCT

Promote safer sex practices

Offer VCT and provide ARVs if available

Infant Feeding Counseling

- Counsel on infant feeding options and risks
- Support mothers' feeding decisions
- Provide nutrition support for breastfeeding women

Medication and ARV Therapy

Manage side effects

- Maintain good food intake
- Ensure adherence to medications and ARV therapy

Consider food-drug and drug-nutrient interaction

- Properly counsel pregnant and lactating HIV+ woman or adolescent girl on use of medications

Issues and Challenges for Nutrition Care and Support of the HIV-Positive Pregnant or Lactating Woman or Adolescent Girl

Greatest Impact of Nutrition Improvement Early in HIV Disease

- Most people do not know they are HIV positive until they have advanced disease
- Greater availability of and access to counseling and testing will let women know their status and deal with it more effectively
- Improving access to treatment for HIV or opportunistic infections may increase willingness to be tested for HIV

Stigma and Discrimination

- Women may for social and cultural reasons have more limited access to care and support services
- Family resources are more likely to be used to buy medication and care for ill males than females

Access to Food

- Food access is a major challenge for people living with HIV.AIDS in Africa
- Food insecurity increases the vulnerability of women and young girls to HIV infection by diminishing social status and compromising ability to choose safer and healthier life strategies
- Lack of adequate food and nutrition complicate the management of HIV/AIDS

Gender Challenges of HIV

- Vulnerable social status and lack of legal rights (in several countries, rural women whose husbands had died of AIDS forced to engage in commercial sex to survive because no legal rights to their husband's property, increasing their food insecurity and risk of malnutrition)
- Changes in women's rights and empowerment needed to reverse the spread of HIV

Responsibility for Food Crops

- In most cases planting of food crops falls to women
- AIDS-affected households may plant less food or replace labor-intensive but nutritious crops with less nutritious but more profitable crops, contributing to food insecurity and malnutrition, especially in nutritionally vulnerable pregnant and lactating women and children

HIV/AIDS Adds to an Already Heavy Burden

- Women are workers, caregivers, educators, and mothers
- Women are also usually responsible caring for the sick, even when they are sick themselves
- Women's legal, social, and political status makes them more vulnerable to HIV/AIDS

Session 7 Prevention of Mother-to-Child-Transmission of HIV and Infant Feeding: PowerPoint Presentation Handouts

Prevention of Mother-to-Child Transmission of HIV and Infant Feeding

Nutrition and HIV/AIDS: A Training Manual
Session 7

Size of the Problem in Africa

- >30% of pregnant women are HIV positive in some sub-populations
- About one-third of infants with HIV-positive mothers become infected
- In 2000 an estimated 5 million children were infected with HIV
- More than a 100% increase in child deaths is projected by 2010 in the most-affected regions

Purpose

To provide knowledge necessary to understand the concepts and latest research findings related to PMTCT, programmatic experience, and lessons learned for future application

Session Outline

- PMTCT definitions and concepts
- Risk analysis and factors: Key research findings
- PMTCT interventions
- The Ndola Demonstration Project

Phases of Mother-to-Child Transmission

Infection rates among children born to HIV-positive mothers

- During pregnancy } 10%-25%
- During delivery } 10%-25%
- During breastfeeding: 14% (7%-22%)

Median Duration of Breastfeeding

Photo: Lora Iannotti

Sub-Saharan Africa: 21 months

Near East/North Africa: 14.8 months

Asia: 21.3 months

Latin America/Caribbean: 13.9 months

Source: DHS 1990–1996

Risk Factors in Pregnancy

Evidence for Risk Factors

Strong
- High viral load
- Viral characteristics
- Advanced disease
- Immune deficiency

Limited
- Vitamin A deficiency
- Anemia
- Placental malaria parasitemia
- Ascending infections
- Chorioamnionitis
- Other conditions affecting placental integrity

Source: WHO 1998

Risk Factors in Labor and Delivery

Evidence for Risk Factors

Strong
- High viral load
- Viral characteristics
- Advanced disease
- Immune deficiency
- Exposure to maternal fluids
- Vaginal delivery (versus C-section)
- Prolonged membrane rupture (>4 hrs)

Limited
- Vitamin A deficiency
- Untreated sexually transmitted infections
- Chorioamnionitis
- Invasive or instrumental delivery procedures
- Episiotomy

Source: WHO 1998

Risk Factors in Breastfeeding

Photo: Mary Kroeger

Evidence for Risk Factors

Strong
- High viral load
- Viral characteristics
- Advanced disease
- Immune deficiency
- Breastfeeding duration
- Breast infection (mastitis, abscess, bleeding nipples)
- New HIV infection

Limited
- Age (< 6 mo)
- Non-exclusive breastfeeding
- Elevated breastmilk sodium
- Lesions in infant mouth and intestine
- Vitamin A deficiency

Source: WHO 1998

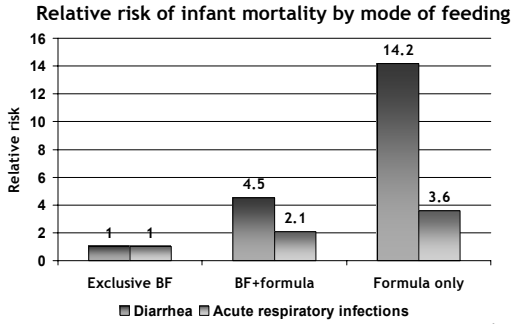
Possible Mechanisms of Transmission

- M-cells serving as a gateway for the virus through epithelial lining
- Enterocytes engulfing and transporting the virus
- Infected cells plus defective IgM

Anti-HIV Activity in Breastmilk

- Lactoferrin
- Sulfated protein that inhibits binding of CD4 to HIV envelope
- Other factors

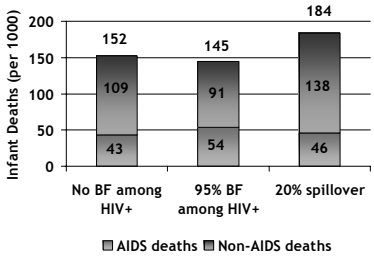
Breastfeeding Saves Lives



Source: Victora et al 1987

HIV and Infant Feeding Risk Analysis

Infant mortality under different breastfeeding scenarios



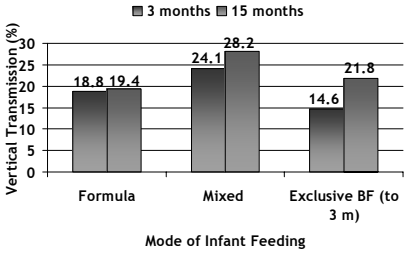
Source: LINKAGES risk model 2001

Breast Health in Malawi

Variable	Limited evidence
Mastitis (breastmilk Na>12 mmol/L)	2.31 (1.25-4.26)
Maternal plasma log HIV load	1.71 (1.16-2.54)
Maternal CD4/CD8 ration	0.19 (0.06-0.54)

Source: WHO 1998

MTCT of HIV-1 by Mode of Infant Feeding



Source: Coutsoudis et al 1999 (S.Africa); Ross 2002 (slide)

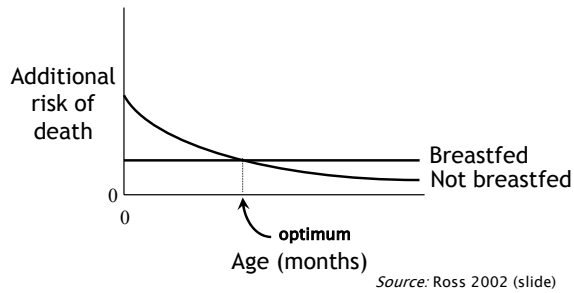
Estimated Risk of Post-natal HIV Transmission

By infant age (Blantyre, Malawi)

Age (months)	%/month	Total
0-0.9	???	???
1-5.9	0.7	3.5%
6-11.9	0.6	3.6%
12-17.9	0.3	1.8%
18-23.9	0.2	1.2%
1-23.9		10.1%

Source: Miotti et al 1999; Piwoz 2001 (slide)

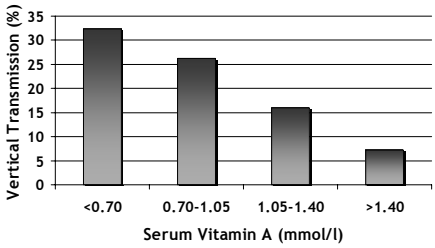
Timing the Introduction of Replacement Feeding



Source: Ross 2002 (slide)

Effect of Vitamin A

Maternal vitamin A levels and MTCT of HIV 1



Source: Semba 1994 (Malawi); Ross 2002 (slide)

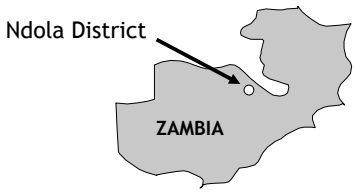
Effect of Maternal Vitamin A Levels on MTCT

Supplementation studies

- Vitamin A had no effect on MTCT
  - South Africa (Coutsoudis et al 1999)
  - Tanzania (Fawzi)
  - Malawi (Semba)
- But vitamin A reduced low birth weight in Malawi
- Multiple micronutrients (but not vitamin A) reduced pre-term delivery in Tanzania

Source: Ross 2002 (slide)

Ndola Demonstration Project



Integrated PMTCT Approach

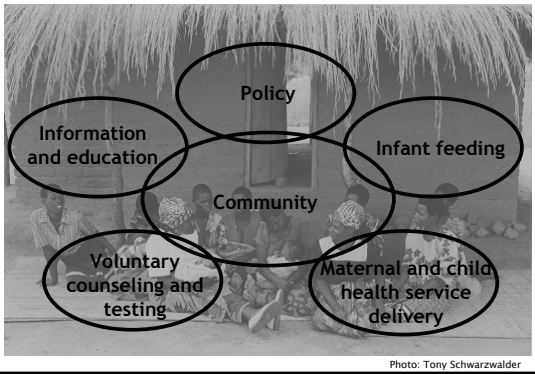
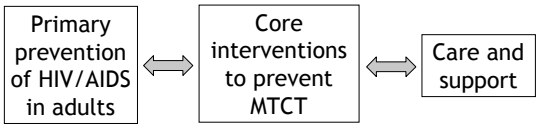


Photo: Tony Schwarzwalder

Prevention-to-Care Continuum



Interventions to Reduce MTCT

Pregnancy

- Provide VCT
- Provide primary prevention
- Prevent, monitor, treat STIs, malaria, other infections
- Provide essential ANC, including nutrition support
- Provide ARVs
- Counsel on safer sex, partner involvement, infant feeding options, family planning, self-care, preparing for the future

Labor and delivery

- ARVs
- Keep normal
- Minimize invasive procedures:
  - AROM
  - Episiotomy
  - Suctioning
- *Elective C-Section*
- *Vaginal cleansing*
- Minimize infant exposure to maternal fluids

Post-natal period

- Implement BFHI
- Initiate early BF
- Support exclusive BF
- Prevent and treat breastfeeding problems

Or If choice:

- *Support replacement feeding*
- Provide care for thrush and oral lesions
- Counsel on complementary feeding/early weaning
- *Provide ARVs*

Source: Piwoz 2001 (slide)

Nutrition Essentials

1. Promotion of optimal breastfeeding during the first 6 months
2. Promotion of appropriate complementary feeding beginning at 6 months, with continued breastfeeding to 2 years and beyond
3. Promotion of feeding of the child during and after illness
4. Prevention of vitamin A deficiency (breastfeeding, consumption of fortified and vitamin A-rich foods, maternal and child supplementation 6-59 months)

Nutrition Essentials, Cont.

5. Prevention of anemia (maternal and child iron supplementation, deworming, malaria control, consumption of fortified and iron-rich foods)
6. Promotion of iodized salt consumption by all families
7. Promotion of improved women's nutrition (increased food intake during pregnancy and lactation, iron and folic acid supplementation, treatment and prevention of malaria, deworming during pregnancy, post-partum vitamin A supplementation)

VCT and MTCT

- Confidentiality assured
- Community sensitization and support
- Health workers trained in MTCT
- Counseling programs (peer counselors, health and social workers)
- Prevention messages included

Informed Choice

"HIV and breastfeeding policy supports breastfeeding for infants of women without HIV infection or of unknown status and the right of a woman infected with HIV who is informed of her sero-status to choose an infant feeding strategy based on full information about the risks and benefits of each alternative."

UNAIDS/WHO/UNICEF

Infant Feeding Counseling

HIV status unknown
- Prevention
- EBF
- VCT counseling
- Complementary feeding

HIV –
- Prevention
- EBF
- VCT counseling
- Complementary feeding

HIV +
- Prevention
- Feeding options: EBF, early cessation, replacement feeding
- Complementary feeding
- BF problems treatment
- Antiretrovirals

Conditions for Safe Replacement Feeding

- Clean water
- Sterilized utensils
- Steady supply of commercial or home-prepared formula to meet all the infant's nutritional needs

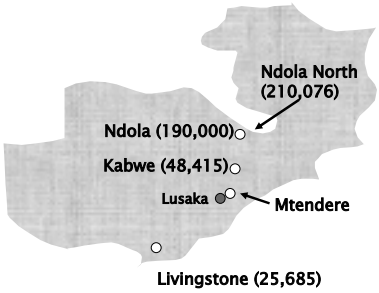
ARV Courses for PMTCT

Zidovudine (ZVD) to mother from 36 months gestation through labor and delivery, with additional prophylaxis to mother after birth in some regimens

ZVD and lamivudine (3TC) to mother and baby during antenatal, intrapartum, and postpartum periods

Nevirapine (NVP) during labor and to infant within 72 hours of birth.

PMTCT Expansion in Zambia



NDP Indicators and Results

1. **Exclusive breastfeeding rate (EBR) of infants 0-<6 months among women of *known* HIV status**
   Baseline: 60% (110)
   Mid-term: 70% (206)
2. **Exclusive breastfeeding rate (EBR) of infants 0-<6 months among women of *unknown* status**
   Baseline: 55.8% (110)
   Midterm: 76% (206)
3. **Exclusive replacement feeding rate (ERF) of infants 0-<6 months, women of *unknown* status**
   Baseline: 0.3%
   Mid–term: 0.0%
4. **Rate of VCT acceptance**
   Baseline: 5.3% (209)
   Mid–term: 15% (319)

Photo: Carolyn Kruger

Source: Horizons 2001

Research Needs

Clinical and biological
- Risks and effects of mixed feeding, infant age, ARVs, etc. on those risks
- Cost-effective risk reduction strategies (exclusive breastfeeding, home-prepared formula, early weaning, ARVs)

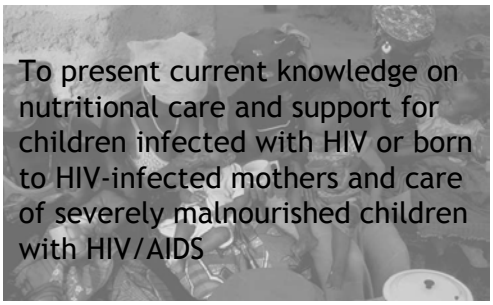
Programmatic
- Implementation of policies
- Effects of policies on breastfeeding, transmission, spillover, and child survival
- Cost-effective testing and counseling (operations research)
- Feasible infant feeding options (community formative research)

Session 8 Nutritional Care for Young Children Infected with HIV or Born to HIV-Infected Mothers: PowerPoint Presentation Handouts

Nutrition and HIV among Young Children

Nutrition and HIV/AIDS: A Training Manual
Session 8

Purpose



To present current knowledge on nutritional care and support for children infected with HIV or born to HIV-infected mothers and care of severely malnourished children with HIV/AIDS

Session Outline

- Etiology of growth failure among children infected with HIV or born to HIV-infected mothers
- Nutrition actions to prevent or reduce wasting and specific nutrition deficiencies
- Issues in managing severely malnourished children with HIV/AIDS

Sources of HIV Infection in Children

HIV Infection in Children

- Most HIV+ children are born to HIV+ mothers. About **one third** are infected during pregnancy, at delivery, or through breastfeeding
- Some are infected through HIV-contaminated blood or medical equipment
- Some are infected through child sexual abuse
- By 2000 more than 5 million children were estimated to be living with HIV/AIDS, more than 80% of them in Africa

HIV Infection in Children, Cont.

- Assessing the HIV status of children is expensive
- Conventional methods such as HIV antibody tests (ELISA and Western Blot assays) cannot reliably differentiate infants' own antibodies from maternal antibodies acquired through the placenta
- More expensive virologic assays such as DNA polymerase chain reaction (PCR) are more useful for defining HIV in young children

Risk of Malnutrition among HIV-Infected Children and Children Born to HIV-Infected Mothers

Children Born to HIV-Positive Mothers

- **Start with a compromised nutritional status**
- **Are more likely to have low birth weights**
  - A study in Kigali, Rwanda, reported mean weight of 2,947g in infants of HIV+ women compared with 3,104g in those born to HIV- mothers (Casterbon et al 1999)
  - Even full-term and uninfected infants of HIV+ mothers have lower length-for-age Z-scores at birth (Agostoni et al 1998)

Main Factors Associated with Reduced Birth Weight

- Shorter gestational age among HIV+ women
- Viral load among HIV+ women (severity of HIV disease)
- Intrauterine growth retardation from HIV+ women's
  - Lower energy intake compared to increased needs from HIV
  - Lower vitamin A (multivitamin) status
  - Drug or alcohol use during pregnancy

Sources of Growth Failure in HIV-Infected Children

Growth Faltering and Wasting

- Growth faltering and weight for age below the 3rd percentile are recognized as important signs of HIV infection (WHO)
- Wasting is a sign of HIV/AIDS in children as well as in adults (CDC)

Compromised Nutritional Status of HIV-Positive Infants

- More severe reductions in birth weight and length

  A study in the United States (Move et al 1996) showed HIV-positive newborns weighing 0.28kg less and measuring 1.64cm less than HIV-negative children born to HIV-positive mothers

Progressive Stunting in HIV-Positive Children

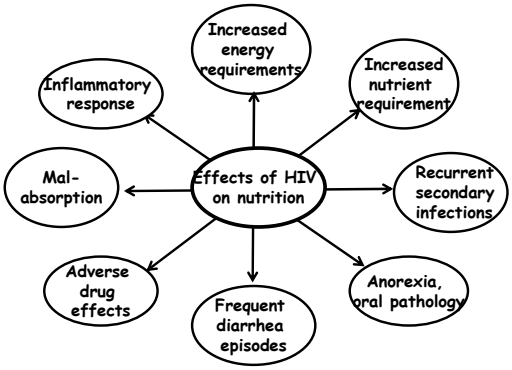
- Perinatal HIV infection associated with early and progressive growth failure
- More devastating nutrition implications of HIV for children because of added growth and development demands
- Significant weight and length differences by 2nd year, even excluding early mortality (Move et al 1996; Berhane et al 1997)
- Preferential reduction in fat-free body mass (Arpadi et al)

Etiology of Growth Failure in HIV-Infected Children

Growth Failure Is Complex and Multifactorial

- Reciprocal relation between HIV viral load and growth
  - Favorable effect of suppression of viral load on growth (especially weight)
  - Positive effect of protease inhibitors on growth and lean body mass
- Underlying morbidity (disease activity)
- Simple starvation (inability to consume adequate energy and nutrients), including malabsorption and gastrointestinal disease
- Negative effect on fat-free mass of metabolic and endocrine alterations associated with stress and trauma
- Micronutrient deficiencies (vitamin A, zinc, selenium)

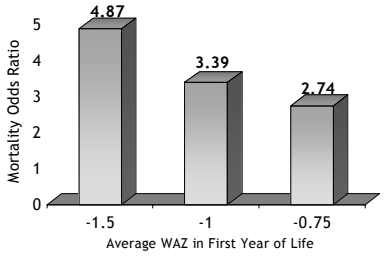
Effects of HIV/AIDS on Nutrition



Consequences of Growth Failure in HIV-Infected Children

The severity of growth failure among HIV-positive children is associated with reduced survival.

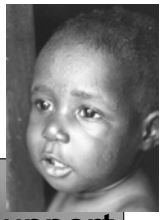
Growth Failure Associated with Increased Risk of Death



HIV-infected infants with weight-for-age below –1.5 Z-scores have five times higher risk of dying before 25 months than non-infected children (Berhane et al 1997)

Other Factors Associated with HIV Infection in Children

- Retarded cognitive development and functional deficits (e.g., delayed sexual development among boys)
- Body composition alterations, with preferential decreases of the lean body mass (or fat-free mass)



Nutritional Care and Support of Young Children Infected with HIV

Goals of Nutritional Care and Support

- Provide essential co-therapy to maximize medical management of HIV
- Prevent wasting and specific nutrient deficiencies
- Build stores of essential nutrients to boost immunity to resist infections and speed recovery
- Prevent food-borne illnesses and their impact
- Support HIV therapy by improving the effectiveness of drug treatment and reducing cost to family and care-giving institution

Factors to Consider in Planning Nutritional Support

- Nutritional status
- Nutrient requirements
- Food-intake-related problems
- Food preferences and dislikes
- Food allergies and intolerance

- Stage of HIV infection
- Weight loss and changes
- Medical problems and treatment, including medications
- Socioeconomic status
- Family support
- Nutrition knowledge of caretaker

Essential Components of Nutritional Support

1. Good obstetric care and maternal nutrition to prevent low birth weight and prematurity
2. Frequent nutritional monitoring to recognize early growth faltering and other nutritional problems and inform interventions
3. Increased food intake and diversification, including periodic supplementation (especially with vitamin A)
4. Promotion of proper food hygiene and handling and periodic deworming
5. Prompt treatment of infections that cause weight loss
6. Use of antiretrovirals where available and affordable

Good Obstetric Care and Maternal Nutrition

- Identification of HIV+ women through VCT
- Support to ensure increased intake of energy and protein and food diversification to increase micronutrient intake (possible supplementation with multiple micronutrient)
- Support to avoid drugs and alcohol during pregnancy
- Monitoring of side effects of ARVs and other drugs and possible interaction with food and nutrition
- Support for safe infant feeding option

Frequent Nutritional Monitoring

Signs and type of malnutrition

- Anthropometry: weight and height for age
  - Skinfold thickness >1 yr a good measure of fat stores
  - MUAC >14 yrs a good measure of lean body mass
  - Head circumference for <3 yrs
- Biochemistry: Hb, serum albumin, urinalysis
- Clinical examination: Signs of nutrient deficiencies, dehydration, and edema

Frequent Nutritional Monitoring, Cont.

Assessment of feeding history

- Adequacy of feeding (enough food?)
  - Food eaten (including breastmilk)
  - Frequency of feeding
  - Methods of feeding
- Feeding problems
  - Appetite and swallowing problems, oral thrush, sores
  - Allergies
  - Hygiene practices in feeding and food handling

Proper Food Hygiene and Handling

- Safe water and sanitation to maintain child health and prevent infections such as diarrhea and specific opportunistic infections that can cause weight loss
- Proper food handling of baby food and feeds and frequent deworming, especially to prevent anemia

Increased Food Diversification and Intake

- Increased diversification to increase micronutrient intake
- Increased frequency of intake
- Use of high-energy and nutrient-dense foods (e.g., germinated, fermented, and fortified foods)
- Dietary modification to enable increased intake (e.g., pureeing, mashing, or slightly spicing food)

Prompt Treatment of Infections

- Mouth pathology (sores and thrush)
- Gastroenteritis symptoms
- Inter-current infections (diarrhea, acute respiratory infections)
- Constipation

Enhanced ARV Therapy

- To reduce viral load
- To reduce incidence of opportunistic infections
- To monitor side effects that may have affect dietary intake (e.g., Hb for children taking AZT)

Nutrition Actions to Prevent Wasting and Specific Nutrient Deficits

Nutritional Management of Severe Malnutrition

- Treat and prevent hypoglycemia
- Treat and prevent hypothermia
- Correct electrolyte imbalance
- Treat and prevent infections
- Correct dehydration
- Update immunization status
- Investigate infection
- Follow up

Nutritional Care of Severely Malnourished HIV+ Children

1. Nutritional diagnosis
2. Dietary prescription
3. Implementation
   - In hospital or health facility
   - At home
4. Follow up and monitoring of progress

Eating Difficulties Associated with HIV

Practical Management of Eating Difficulties

Associated with mouth sores and thrush

- Treat sores and thrush
- Counsel to reduce the amount of sugar in food
- Counsel to avoid spicy and irritating (acidic) foods

Practical Management of Eating Difficulties, Cont.

Associated with appetite

- Support responsive and active feeding
- Feed child's favorite foods in small amounts and more often
- Provide micronutrient supplements (multivitamins)
- Provide appetite stimulants

Practical Management of Eating Difficulties, Cont.

Associated with swallowing

- Encourage oral intake if possible
- Options
  - Special diet (change consistency of food and drink, improve flavor, encourage sipping of foods)
  - Supplementation and fortification to improve energy and nutrient density and availability

Practical Management of Eating Difficulties, Cont.

Associated with swallowing, cont.

- If oral route is impossible but gastrointestinal tract is functional, tube feed with a suitable enteral product
- If gastrointestinal tract is not functional (complete bowel obstruction, severe malabsorption, severe enteritis) and enteral route is not possible, consider tube parenteral nutrition (TPN)

Practical Management of Eating Difficulties, Cont.

Associated with diarrhea and malabsorption

- Give more fluids and fruits
- Give yogurt instead of fresh milk (continue breastfeeding)
- Reduce oil in food
- Avoid food with insoluble fiber
- Give micronutrient supplements

Practical Management of Eating Difficulties, Cont.

At convalescence, enhance weight gain

- Introduce one new food item at a time
- Increase protein content of food (e.g., add peanut butter, split beans, eggs, or fish powder to vegetable soups or porridge)
- Slowly increase the fat content of food

Follow up and Monitoring of Progress

Monitor at regular intervals (e.g., through clinic attendance)

- Changes in nutritional status (improvement vs. deterioration)
- Reasons for poor progress
  - Inadequate intake (address food-related problems and make adjustments)
  - Increased requirements
  - Losses or malabsorption
  - Health-related problems

Care of the Terminally Ill Child

Why?

- To maximize quality of life
- To determine appropriate nutritional support

What to consider?

- Oral intake vs tube feeding vs. TPN and simple hydration
- Role of hospices and support groups
- Wishes of caregivers and need for information

Session 9 Management of Drug and Food Interactions in HIV/AIDS Therapy: PowerPoint Presentation Handouts

Management of Food and Drug Interactions in HIV/AIDS Therapy

Nutrition and HIV/AIDS: A Training Manual
Session 9

Purpose

To provide knowledge and skills for the nutritional management of drug and food interactions in HIV/AIDS therapy

Session Outline

- Common types of drugs taken
- Drug and food interactions
- Nutritional implications
- Appropriate dietary responses
- Assessment questions and analysis

Rationale

- PLWHA are at high risk of malnutrition because of virus progression
- PLWHA take several medications
- Drugs can interact with each other and with food and may reduce food intake or affect nutrient absorption and metabolism

Goal of Management of Drug-Food Interactions

Drug and food interactions should be immediately addressed to:

- Prevent weight loss and malnutrition
- Improve medication efficacy
- Improve client adherence to treatment

Types of Drugs Taken

- Antiretrovirals (ARVs)
- Antifungals
- Antibiotics
- Antimalarials
- Anti-helminthics
- Dietary supplements
- Traditional therapies

Main Food and Drug Interactions

1. Food effects on drug efficacy
2. Medication effects on nutrient absorption, metabolism, distribution, and excretion
3. Side effects of medication on food intake and nutrient absorption
4. Medication and food interactions causing unhealthy side effects

FOOD INTAKE

enhances or inhibits

DRUG EFFICACY

Food reduces absorption of

- Aspirin (analgesic)
- Isoniazid (antituberculosis)
- Rifampin (antituberculosis)
- Indinavir (ARV)

FOOD INTAKE

enhances or Inhibits

DRUG EFFICACY

A high-fat diet enhances the bioavailability of some ARVs, such as Tenovir, but reduces absorption of others, such as Indinavir and Zidovidune.

DRUGS

enhance or inhibit

NUTRIENT ABSORPTION AND METABOLISM

Increased nutrient intake is needed for

- Isoniazid + vitamin B_6
- Rifampin + vitamin D

DRUGS

enhance or inhibit

NUTRIENT ABSORPTION AND METABOLISM

Many protease inhibitors may cause changes in lipid levels and insulin resistance.

- Reduce intake of saturated fats and sugar.

SIDE EFFECTS OF DRUGS

affect

FOOD INTAKE AND NUTRIENT ABSORPTION

Side effects requiring dietary responses

- Changes in taste, nausea, and anorexia
- Bloating, heartburn, and constipation
- Vomiting and diarrhea

SIDE EFFECTS OF DRUGS

affect

FOOD INTAKE AND NUTRIENT ABSORPTION

Appropriate dietary responses

- Use flavor enhancers such as salt, sugar, spices, vinegar, and lemon
- Eat nutrient-dense foods such as maize, potatoes, and carrots
- Drink plenty of fluids during fever and diarhhea

SIDE EFFECTS OF DRUGS

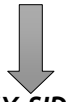
affect

NUTRIENT METABOLISM

PLWHA who have been taking protease inhibitors may develop osteoporosis or bone disorders.

- Increase consumption of food sources of calcium.

FOOD AND DRUG COMBINATIONS



cause

UNHEALTHY SIDE EFFECTS

- Consumption of the ARV Didanosine with alcohol can cause inflammation of the pancreas
- Consumption of alcohol while taking Isoniazid may increase the risk of inflammation of the liver

Effect of Drug-Drug Interactions on Drug Efficacy

Example: Garlic + the protease inhibitor Saquinavir

Management of Food and Drug Interactions

1. Offer drug-specific recommendations.
2. If several drugs are taken, refer to the food-drug interactions of each.
3. Remember that nutrition implications for some drug combinations differ from the implications for an individual drug.
4. Involve the client in finding solutions that address side effects and food-drug interactions.

Management of Food and Drug Interactions, Cont.

5. Give special consideration to traditional medicines.
6. Pay close attention to side effects and nutritional implications of ARVs, whose affects on malnourished people are not well documented.
7. Consider food security constraints.

Special Considerations

Pregnant and lactating women and adolescent girls infected with HIV

- Refer to nutritional care and support of PLWHA

Infants and children

- Refer to PMTCT and infant feeding

Nutritional Assessment

Health workers should understand the client-specific context, both access and eating habits

- Feeding practices
  - Foods frequently eaten
  - Meal frequency
  - Food shortages and coping strategies
- Medications
  - Types
  - Side effects
  - Food drug interactions and their dietary management

Conclusions

Management of drugs and food interactions in HIV/AIDS therapy will help:

- Minimize the side effects of of the medications and maintain food intake
- Minimize the effects of medications on nutrient absorption and metabolism
- Ensure the efficacy of the treatment
- Improve client adherence