**Continuing Education**

## AETIOLOGY AND NATURAL HISTORY OF HIV/AIDS –*Lyamuya E.*

### HISTORICAL OVERVIEW

First cases of HIV/AIDS in the world were described in California, USA, 1981. Causative agent was isolated in 1983 by Prof. Luc Montagnier and in 1984 by Dr. Robert Gallo. In 1986 the agent was named Human Immunodeficiency Virus type 1 (HIV-1). In 1987 another agent, closely similar to HIV-1 was isolated from West African patients with AIDS and it was named HIV type 2 (HIV-2).

### HIV/AIDS IN TANZANIA

The first case in Tanzania was reported from Kagera region in 1983. By December 1985, 20 regions of Tanzania mainland had reported AIDS cases. Since then, progressive increase in the number of cases has been recorded.

### WHY GIVE HIV/AIDS SO MUCH ATTENTION?

Even though the number of infected people in some countries is low, HIV unchecked, can devastate communities. HIV/AIDS is associated with sexual transmission (in some countries homosexuality and drug use), and has become the focus of fears and prejudices which do not arise with other illnesses.

Up to December 2001 the total number of people living with HIV/AIDS globally were 40 million. Adults were estimated to be 37.2 million, women 17.6 million and children under 15 years 2.7 million. People newly infected with HIV in 2001 were 5 million; adults 4.3 million, women 1.8 million and children under 15 years 800 000. Total AIDS deaths in 2001 was 3 million; adults 2.4 million, women 1.1 million and children under 15 years 580 000. As of end of December 2001 about 14 000 new HIV infections a day were infected. More than 95% were in developing countries, 2000 were children under 15 years of age and about 12 000 were in persons aged 15 to 49 years, of whom: almost 50% were women and about 50% were 15–24 year old.

### MAGNITUDE OF HIV/AIDS IN TANZANIA (Year 2000)

January -December 2000, new AIDS cases were 11,673. People living with HIV/AIDS in year 2000 were 1,810,353. On average HIV infection was reported to be 10% among blood donors, 12-14% among pregnant women and 40% among patients with STD.

### VIROLOGY

The family of the virus is retroviridae, which has three subfamilies, including oncovirinae, spumavirinae, lentivirinae. Members of the subfamily lentivirinae include human immunodeficiency virus type 1 and 2 (HIV-1 and HIV-2), Simian immunodeficiency virus (SIV), Feline immunodeficiency virus (FIV), Bovine immunodeficiency virus (BIV), Visna– Visna maedi virus, Equine infectious anaemia virus (EIAV), Caprine arthritis encephalitis (CAEV) and Murine immunodeficiency virus (MIV).

### Current classification of HIV

Two types are known; HIV-1 and HIV-2. HIV-1 has three groups; Major (M), Outlier (O) and Novel (N). Group M has several subtype; A, B, C, D, F, G, H, I, J, K and several recombinants such as AG, AE etc. HIV-2 has six subtypes, A,B,C,D,E,F

### HIV CHARACTERISTICS

HIV is inactivated by hypochlorite (10,000 ppm available chlorine), equivalent to 1/10 dilution of domestic bleach, heat (autoclaving, hot air oven), glutaraldehyde 2% and alcohols and other disinfectants. HIV may survive at room temperature for up to 15 days and at 37$^0$C for 10-15 days

### TRANSMISSION

HIV is transmitted through sexual contact, heterosexual (commonest mode of transmission in Tanzania) and homosexual. Mother to child, sharing contaminated skin piercing instruments and blood transfusion. Important to note is that HIV is not transmitted by touching, shaking hands, kissing, sharing utensils or linen or mosquitoes

**There is interaction between HIV and Sexually transmitted infections (STIs) in the following manner.**

Other STIs make transmission of HIV more likely. Having another STI makes an HIV infected person more infectious, ulcers and lesions of STI provide openings for HIV to pass from person to person, STI increase more than 100 times the amount of HIV shed into genital secretions and treating STI curbs spread of HIV (Mwanza study).

**RESISTANCE TO INFECTION**

Defect in expression of HIV co-receptor genes: Homozygous defect in CCR-5 gene confers resistance to M-tropic HIV strains. The known Host immune mechanisms are; CTL activity, chemokines: RANTES, MIP-1α, MIP-1β and Neutralizing abs. Other unconfirmed protective mechanisms are genetic factors: MHC association reported and other biological factors. HIV infection affects the immune system through cellular and initial defects. CD4 depletion due to lysis, cytopathic effect, syncytia formation, destruction by cytotoxic T lymphocytes and apoptosis. Also HIV causes impaired macrophage function and impaired Natural killer (NK) cell activity.

Humoral defects are; non-specific B cell activation and impaired B cell responses to newly introduced antigens.

Progression from HIV infection to AIDS varies from one individual to another. Three groups are identified; typical progressions rapid progressions and long term survivors. In typical progressor the median time is 10 years from initial infection. This is seen in about 60% of all HIV-infected individuals. With rapid progressors individuals progress to AIDS within first 2-3 years of infection. About 10% of infected individuals fall under this category. Long term survivors is when HIV infection is documented for at least 8 years, no ARV therapy and CD4 levels >500 cells/μl. This is seen in about 5-10% of all HIV-infected individuals. These data were obtained from the Multicentre AIDS Cohort Study (MACS) in USA.

**Impact of HIV/AIDS**

Increase in the number of diseases associated with HIV infection, increase in HIV-associated mortality and increase in number of widows and orphans. Other impacts are decrease in life expectancy, increase in health costs and decrease in productivity.