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## **Relationship between Human Immunodeficiency virus infection and cancer**

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## **Abstract**

The acquired immune deficiency syndrome (AIDS) defined as HIV infection associated with an absolute CD4 count below 200/uL and it cause by chronic infection with the human immunodeficiency virus type 1 (HIV-1) leads to severe immunosuppression and death from immunologic and neurologic dysfunction . AIDS-defining opportunistic infection or AIDS-defined cancer, including Kaposi sarcoma (KS), non-Hodgkin lymphoma, and cervical cancer. About 40% of HIV-associated malignancies are associated with oncogenic viruses, including human papillomavirus (HPV), Epstein-Barr virus (EBV), human herpesvirus 8(HHV-8), and hepatitis B and C viruses. Human immunodeficiency virus (HIV) infection is correlated with an augmented incidence of specific types of cancer, namely Kaposi sarcoma, non-Hodgkin´s lymphoma and cervical cancer, all associated with r chronic infection by oncogenic virus.

## Introduction

Viruses are very tiny germs they are made of genetic material inside of a protein coating. Numerous viruses introduce DNA damage and genetic instability in host cells during their lifecycles and some species also manipulate components of the DNA damage response. Human immunodeficiency virus (HIV) infection is a viral infection that progressively destroys certain white blood cells and can cause acquired immunodeficiency syndrome (AIDS). Both HIV -1 and HIV -2 cause AIDS. HIV is one of the two important human T-cell lymphotropic retroviruses. It preferentially infects and kills helper (CD4) T lymphocytes, and other cells that have CD4 protein on their surface, resulting in loss of cell-mediated immunity and probability that the host will develop opportunistic infection. This virus is classified into lentivirus, which causes slow infection with long incubation periods. HIV has a cone-shaped (type D) core surrounded by an envelope containing virus-specific glycoproteins (gp120 and gp41). The genome of HIV consists of two identical molecules of single-stranded, positive-polarity RNA and is said to be diploid. The HIV genome is the most complex of the known retroviruses. HIV is transmitted through close contact with a body fluid that contains the virus or cells infected with the virus (such as blood, semen, or vaginal fluids). The human immunodeficiency virus (HIV) is a retrovirus, which, like many other viruses, stores its genetic information as RNA rather than as DNA (most other living things use DNA). Persons with HIV are at increased risk for AIDS-defining cancer (ADC) and several types of non-AIDS-defining cancer (NADC), some of which are caused by oncogenic viruses (1). We aimed to discuss the correlation between the relationship between viral infection and cancer of this virus and its transmissions, prevention.

## Materials and Methods

A literature search was performed to discover studies reviewing the correlation between human immunodeficiency virus (HIV) infection and cancer. Online sites and databases included in this report are PubMed database , google scholar , clinical medicine Oxford and Levinson, Warren. Review of medical microbiology and immunology for relevant reports. Search terms included “cancer”, “infection”, “human immunodeficiency virus HIV” cancer in hiv patient . Titles and abstracts were observed for significance.

## Results

all studies researched showing high relation between Human Immunodeficiency Virus and cancer so People infected with HIV have a substantially higher risk of some types of cancer compared with uninfected people of the same age (2)

Three of these cancers are known as "acquired immunodeficiency syndrome (AIDs)-defining cancers" or "AIDS-defining malignancies": Kaposi sarcoma, aggressive B-cell non-Hodgkin lymphoma, and cervical cancer Compared with the general population, people infected with HIV are currently about 500 times more likely to be diagnosed with Kaposi sarcoma, 12 times more likely to be diagnosed with non-Hodgkin lymphoma, and, among women, 3 times more likely to be diagnosed with cervical cancer (3)

Table : Characteristics of Patients with Cancer According to HIV Status (4)

characteristic	HIV infected (n= 6,459)		HIV uninfected (n = 1,810,002)	
		%		%
Sex				
Female	1,464	22,7	851,720	47,1
Male	4,995	77,3	958,282	52,9

## Discussion

So they have strong relation to cancer the risk of AIDS patients developing Kaposi's sarcoma (KS), non-Hodgkin's lymphoma (NHL) and cervical cancer was enhanced by several fold. These three cancers have been referred to as AIDS-defining cancers (ADCs) Kaposi's sarcoma; Most common tumour in HIV and AIDS defining. Caused by Kaposi's sarcoma herpes virus (human herpesvirus 8, p405). Presentation: cutaneous or mucosal lesions: patch, plaque, or nodular. Kaposi's Sarcoma have four types but Epidemic/AIDS-associated. This is the most common kind in the U.S. It affects people who have HIV. It's known as an AIDS-defining illness because it's on the CDC's list of conditions that mean someone's HIV infection has become AIDS. is caused by the herpes virus HHV-8, also called Kaposi's sarcoma-related herpesvirus (KSHV). It spreads mainly through saliva, such as during sexual contact or in interactions between a mother and child. People with healthy immune systems can carry the virus without any problems. But it triggers cancers in people with weakened immune systems. It affects eight times more men than women. Among people who have HIV, men who have sex with men are more likely to have the virus and to get Kaposi's sarcoma. Before the onset of the AIDS pandemic, KS was a very rare cancer. In the United States, the incidence of KS between 1973 and 1978 within the white male population was 0.3 per 100,000 person-years. This trend dramatically increased with the onset of the AIDS epidemic, peaking by 1985–1986. It has been estimated that by 1989–1991, the occurrence of KS was 8.9 per 100,000 person-years. Between 1990 and 1995, KS was the most prevalent AIDS-defining cancer in the United States. During this time, HIV-1-infected individuals were at a 53,000 fold-increased risk of developing KS compared to the general population (5)

AIDS-related lymphoma is a disease in which malignant (cancer) cells form in the lymph system of patients who have acquired immunodeficiency syndrome (AIDS). AIDS is caused by the human immunodeficiency virus (HIV), which attacks and weakens the body's immune system. A weakened immune system is unable to fight infection and disease. People with HIV disease have an increased risk of infection and lymphoma or other types of cancer. A person with HIV and certain types of infection or cancer, such as lymphoma, is diagnosed as having AIDS. Sometimes, people are diagnosed with AIDS and AIDS-related lymphoma at the same time. Both non-Hodgkin lymphoma and Hodgkin lymphoma may occur in patients with AIDS, but non-Hodgkin lymphoma is more common. When a person with AIDS has non-Hodgkin lymphoma, it is called AIDS-related lymphoma. When AIDS-related lymphoma occurs in the central nervous system (CNS), it is called AIDS-related primary CNS lymphoma. non-Hodgkin lymphomas are grouped by the way their cells look under a microscope. They may be indolent (slow-growing) or aggressive (fast-growing). AIDS-related lymphomas are aggressive. There are two main types of AIDS-related non-Hodgkin lymphoma: Diffuse large B-cell lymphoma (including B-cell immunoblastic lymphoma). Burkitt or Burkitt-

like lymphoma. NHL originates from malignant transformation of the precursor and mature forms of B, T and natural killer (NK) cells that mainly migrate to the lymphoid organs and the hematopoietic tissues.

but also to other organs Cervical cancer is a neoplastic condition that originates in the cervix. In 1993, invasive cervical cancer began to be included as an AIDS-defining diagnosis. Epidemiological evidence suggests that the precursor lesions, cervical intraepithelial neoplasia, or squamous intraepithelial lesion occur more frequently in women with HIV(6)infected females, infected females, co-infection with the HPV is associated with invasive cervical cancer. infection with the HPV is associated with invasive cervical cancer. (7)

Transmission Is occurs primarily sexual content, and by blood (transfer ) also can perinatal transmitted from mother to neonate by cross placenta at birth or via breast feeding milk. More than 50% neonatal infections occur at the time of delivery and that the remainder is split roughly equally between transplacental transmission and transmission via breast feeding. People with sexually transmitted diseases, especially those with ulcerative lesions such as syphilis, chancroid, and herpes genitalis, have a significantly higher risk of acquiring HIV. Uncircumcised males have a higher risk of acquiring HIV than do circumcised males. Transmission of HIV via blood transfusion has been greatly reduced by screening donated blood for the presence of antibody to HIV.

However, there is a “window” period early in infection when the blood of an infected person can contain HIV antibodies are not detectable. Blood banks now test for the presence of p24 antigen in an effort to detect blood that contains HIV. Study of transportation so important the Centers for Disease Control and Prevention (CDC) estimates that at the end of 2011, there were approximately 1.1 million people infected with HIV living in the United States. The transmission rate has declined markedly, primarily due to increased prevention efforts and improved treatments for HIV; the latter reduces the number of people with high titers of HIV. CDC estimates that approximately 50,000 people new infections occur each year. CDC also estimates that 15% of those who are infected with HIV do not know it because they have not been tested. AIDS is the fourth leading cause of death worldwide.(Ischemic heart disease, cerebrovascular disease, and acute lower respiratory disease are ranked first, second, and third, respectively (8).

## **Conclusion**

many studies had shown that the relationship between HIV patient and cancer is very strong because HIV gives the possibility of pathogens that may damage our genetic material and cause cancer so People living with HIV, including adolescents and young adults are at increased risk of malignancy, due to immune dysregulation and the persistence of oncogenic viruses.

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