

## Risk Factors and Concerns of HIV/AIDS

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### ABSTRACT

**Background:** HIV is one of the worst epidemics ever. The epidemic is extremely heterogenic and dynamic. HIV prevention depends upon a good understanding of population-specific transmission determinants. India has the third largest HIV epidemic in the world, with 2.1 million people living with HIV. India's epidemic is concentrated among key affected populations, including sex workers and men who have sex with men. **Aims and Objective:** This paper aims to understand about the Risk Factors and Concerns of HIV/AIDS. **Results and Conclusions:** This paper suggests most people who get HIV get it through anal or vaginal sex, or sharing needles, syringes, or other drug injection equipment (for example, cookers). But there are powerful tools that can help prevent HIV transmission.

**Keywords:** Risk Factors, HIV/AIDS

The origin of the Human Immunodeficiency Virus (HIV) has been a subject of scientific research and debate since the virus was identified in the 1980s. There is now a wealth of evidence on how, when and where HIV first began to cause illness in humans.

### *The link between HIV and SIV*

HIV is a type of lentivirus, which means it attacks the immune system. In a similar way, the Simian Immunodeficiency Virus (SIV) attacks the immune systems of monkeys and apes (Worobey, M. et al, 2010).

Research found that HIV is related to SIV and there are many similarities between the two viruses. HIV-1 is closely related to a strain of SIV found in chimpanzees, and HIV-2 is closely related to a strain of SIV found in sooty mangabeys (Sharp & Hahn, 2011). In 1999, researchers found a strain of SIV (called SIVcpz) in a chimpanzee that was almost identical to HIV in humans. The researchers who discovered this connection concluded that it proved chimpanzees were the source of HIV-1, and that the virus had at some point crossed species from chimps to humans (Gao, F et al., 1999). The same scientists then conducted more research into how SIV could have developed in the chimps. They discovered that the chimps had hunted and eaten two smaller species of monkeys (red-capped mangabeys and greater spot-nosed monkeys). These smaller monkeys infected the chimps with two different strains

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of SIV. The two different SIV strains then joined together to form a third virus (SIVcpz) that could be passed on to other chimps. This is the strain that can also infect humans (Bailes, E. et al., 2003).

### *How did HIV cross from chimps to humans?*

The most commonly accepted theory is that of the 'hunter'. In this scenario, SIVcpz was transferred to humans as a result of chimps being killed and eaten, or their blood getting into cuts or wounds on people in the course of hunting (Sharp & Hahn, 2011). Normally, the hunter's body would have fought off SIV, but on a few occasions the virus adapted itself within its new human host and became HIV-1. There are four main groups of HIV strains (M, N, O and P), each with a slightly different genetic make-up. This supports the hunter theory because every time SIV passed from a chimpanzee to a human, it would have developed in a slightly different way within the human body, and produced a slightly different strain. This explains why there is more than one strain of HIV-1 (Sharp & Hahn, 2011). HIV-2 comes from SIV in sooty managed monkeys rather than chimpanzees (Chen, Z., et al., 1999). The crossover to humans is believed to have happened in a similar way (through the butchering and consumption of monkey meat). It is far rarer, and less infectious than HIV-1. As a result, it infects far fewer people, and is mainly found in a few countries in West Africa like Mali, Mauritania, Nigeria and Sierra Leone (Sharp & Hahn, 2011).

### *When and where did HIV start in humans?*

Study by Science (1998) reported of some of the earliest known samples of HIV provide clues about when it first appeared in humans and how it evolved. The first verified case of HIV is from a blood sample taken in 1959 from a man living in what is now Kinshasa in the Democratic Republic of Congo. The sample was retrospectively analysed and HIV detected. There are numerous earlier cases where patterns of deaths from common opportunistic infections, now known to be AIDS-defining, suggest that HIV was the cause, but this is the earliest incident where a blood sample can verify infection.

In 1981, a few cases of rare diseases were being reported among gay men in New York and California, such as Kaposi's Sarcoma (a rare cancer) and a lung infection called PCP (Hymes, K.B. et al., 1981; CDC, 1981). No one knew why these cancers and opportunistic infections were spreading, but they concluded that there must be an infectious 'disease' causing them. At first the disease was called all sorts of names relating to the word 'gay' (Brennan & Durack, 1981). It wasn't until mid-1982 that scientists realised the 'disease' was also spreading among other populations such as haemophiliacs and heroin users. The 'disease' was finally named AIDS (CDC, 1982). It was only in 1983 that the HIV virus was isolated and identified by researchers at the Pasteur Institute in France. Originally called Lymphadenopathy-Associated Virus (or LAV) the virus was confirmed as the cause of AIDS, when scientists working at the USA National Cancer Institute isolated the same virus and called it HTLV-III. LAV and HTLV-III were later acknowledged to be the same.

### *The Global HIV/AIDS Epidemic*

HIV, the virus that causes AIDS, is one of the world's most serious public health challenges. But there is a global commitment to stopping new HIV infections and ensuring that everyone with HIV has access to HIV treatment.

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### According to UNAIDS

**Number of People with HIV-** There were approximately 37.7 million people across the globe with HIV in 2020. Of these, 36 million were adults and 1.7 million were children aged 0-14 years. More than half (53%) were women and girls.

**New HIV Infections-**An estimated 1.5 million individuals worldwide acquired HIV in 2020, marking a 31% decline in new HIV infections since 2010. (New HIV infections or “HIV incidence,” refers to the estimated number of people who newly acquired HIV during given period such as a year, which is different from the number of people diagnosed with HIV during a year. (Some people may have HIV but not know it.) Of these new HIV infections:

- 1.3 million were individuals ages 15+
- 160,000 were among children aged 0-14 years

### HIV Aids in India-

India has the third largest HIV epidemic in the world, with 2.1 million people living with HIV. India’s epidemic is concentrated among key affected populations, including sex workers and men who have sex with men. The National AIDS Control Programme has made particular efforts to reach these two high-risk groups with HIV interventions. Compared to neighbouring countries, India has made good progress in reducing new HIV infections by half since 2001. Despite free antiretroviral treatment being available, uptake remains low as many people face difficulty in accessing clinics. India has the third largest HIV epidemic in the world. In 2017, HIV prevalence among adults (aged 15-49) was an estimated 0.2%. This figure is small compared to most other middle-income countries but because of India's huge population (1.3 billion people) this equates to 2.1 million people living with HIV.<sup>1 2</sup> Overall, India’s HIV epidemic is slowing down. Between 2010 and 2017 new infections declined by 27% and AIDS related deaths more than halved falling by 56% (UNAIDS, 2019). In 2017, 79% of people living with HIV were aware of their status of whom 71% were on antiretroviral treatment (ART). The proportion of people on ART who are virally suppressed is not reported.<sup>4</sup> India’s HIV epidemic is driven by sexual transmission, which accounted for 86% of new infections in 2017/2018. The three states with the highest HIV prevalence, Manipur, Mizoram and Nagaland, are in the east of the country (Ministry of Health and Family Welfare, 2019).

HIV prevalence is higher among men than women, with 0.25% of men and 0.19% of women living with HIV as of 2017. This is due to high prevalence among key populations including men who have sex with men (sometimes referred to as MSM), migrant workers and men who use drugs.<sup>8</sup> Key population groups have been prioritised in the national AIDS response since its inception in 1992. Both the sex worker and men who have sex with men population groups have experienced a recent decline in HIV prevalence (NACO, 2015). However, a number of issues including HIV-related stigma, relatively low levels of status awareness among people living with HIV and weak links between diagnosis and treatment mean progress is not moving as quickly as hoped. A lack of data on key populations and on certain key indicators such as viral suppression rates also makes it difficult for HIV programmes to be designed in ways that effectively meet the needs of those most affected by the country’s HIV epidemic.

### Symptoms of HIV and AIDS:

The symptoms of HIV and AIDS vary, depending on the phase of infection.

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### **Primary infection (Acute HIV)**

Some people infected by HIV develop a flu-like illness within two to four weeks after the virus enters the body. This illness, known as primary (acute) HIV infection, may last for a few weeks. Possible signs and symptoms include:

- Fever
- Headache
- Muscle aches and joint pain
- Rash
- Sore throat and painful mouth sores
- Swollen lymph glands, mainly on the neck
- Diarrhoea
- Weight loss
- Cough
- Night sweats

These symptoms can be so mild that you might not even notice them. However, the amount of virus in your bloodstream (viral load) is quite high at this time. As a result, the infection spreads more easily during primary infection than during the next stage.

**Clinical latent infection (Chronic HIV)** In this stage of infection, HIV is still present in the body and in white blood cells. However, many people may not have any symptoms or infections during this time.

This stage can last for many years if you're not receiving antiretroviral therapy (ART). Some people develop more severe disease much sooner.

### ***Symptomatic HIV infection***

As the virus continues to multiply and destroy your immune cells — the cells in your body that help fight off germs — you may develop mild infections or chronic signs and symptoms such as:

- Fever
- Fatigue
- Swollen lymph nodes — often one of the first signs of HIV infection
- Diarrhoea
- Weight loss
- Oral yeast infection (thrush)
- Shingles (herpes zoster)
- Pneumonia

### **Progression to AIDS**

Thanks to better antiviral treatments, most people with HIV in the U.S. today don't develop AIDS. Untreated, HIV typically turns into AIDS in about 8 to 10 years. When AIDS occurs, your immune system has been severely damaged. You'll be more likely to develop opportunistic infections or opportunistic cancers - diseases that wouldn't usually cause illness in a person with a healthy immune system.

The signs and symptoms of some of these infections may include:

- Sweats
- Chills

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- Recurring fever
- Chronic diarrhoea
- Swollen lymph glands
- Persistent white spots or unusual lesions on your tongue or in your mouth
- Persistent, unexplained fatigue
- Weakness
- Weight loss
- Skin rashes or bumps

### **HIV Transmission:**

Most people who get HIV get it through anal or vaginal sex, or sharing needles, syringes, or other drug injection equipment (for example, cookers). But there are powerful tools that can help prevent HIV transmission.

#### ➤ **HIV from anal sex:**

- Anal sex is the riskiest type of sex for getting or transmitting HIV.
- Being the receptive partner (bottom) is riskier for getting HIV than being the insertive partner (top).
- The bottom's risk of getting HIV is very high because the rectum's lining is thin and may allow HIV to enter the body during anal sex.
- The top is also at risk because HIV can enter the body through the opening at the tip of the penis (or urethra), the foreskin if the penis isn't circumcised, or small cuts, scratches, or open sores anywhere on the penis.

#### ➤ **HIV from vaginal sex?**

- Vaginal sex is less risky for getting HIV than receptive anal sex.
- Either partner can get HIV during vaginal sex.
- Most women who get HIV get it from vaginal sex. HIV can enter a woman's body during vaginal sex through the mucous membranes that line the vagina and cervix.
- Men can also get HIV during vaginal sex. This is because vaginal fluid and blood can carry HIV. Men get HIV through the opening at the tip of the penis (or urethra), the foreskin if the penis isn't circumcised, or small cuts, scratches, or open sores anywhere on the penis.

#### ➤ **HIV be transmitted from a mother to her baby:** HIV can be transmitted from a mother to her baby during pregnancy, birth, or breastfeeding. However, it is less common because of advances in HIV prevention and treatment.

- This is called *prenatal transmission* or *mother-to-child transmission*.
- Mother-to-child transmission is the most common way that children get HIV.
- Recommendations to test all pregnant women for HIV and start HIV treatment immediately have lowered the number of babies who are born with HIV.
- If a mother with HIV takes HIV medicine daily as prescribed throughout pregnancy and childbirth, and gives HIV medicine to her baby for 4 to 6 weeks after giving birth, the risk of transmitting HIV to the baby can be less than 1%.

#### ➤ **HIV from sharing needles, syringes, or other drug injection equipment:**

- Used needles, syringes, and other injection equipment may have someone else's blood on them, and blood can carry HIV.
- People who inject drugs are also at risk for getting HIV (and other sexually transmitted diseases) because they may engage in risky sexual behaviours like having sex without protection (such as condoms or medicine to prevent or treat HIV).

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- You're also at risk for getting hepatitis B and C, and other infections if you share needles, syringes, or other injection equipment.

### ➤ **Some rare ways that HIV has been transmitted:**

#### **Oral Sex:**

- Oral sex involves putting the mouth on the penis (fellatio), vagina (cunnilingus), or anus (rimming).
- Factors that may affect this risk include ejaculation in the mouth with oral ulcers, bleeding gums, or genital sores, and the presence of other sexually transmitted diseases (STDs).
- You can get other STDs from oral sex. And if you get faeces in your mouth during anplings, you can get hepatitis A and B, parasites like *Guardia*, and bacteria like *Shebelle*, *Salmonella*, *Campylobacter*, and *E. coli*.

#### **Deep, Open-Mouth Kissing:**

- Although very rare, transmission can occur if both partners have sores or bleeding gums and blood from the partner with HIV gets into the bloodstream of the HIV-negative partner.
- HIV is not transmitted through closed-mouth or “social” kissing with someone who has HIV.
- HIV is not transmitted through saliva.

#### **Female-to-Female:**

- Case reports of female-to-female transmission of HIV are rare.
- Vaginal fluids and menstrual blood may carry the virus and exposure to these fluids through mucous membranes (in the vagina or mouth) could potentially lead to HIV infection.

#### **Tattoos and Body Piercings:**

- There are no known cases in the United States of anyone getting HIV this way.
- However, it is possible to get HIV from tattooing or body piercing if the equipment used for these procedures has someone else's blood in it or if the ink is shared. This is more likely to happen when the person doing the procedure is unlicensed because of the potential for unsanitary practices such as sharing needles or ink.
- If you get a tattoo or a body piercing, be sure that the person doing the procedure is properly licensed and that they use only new or sterilized needles, ink, and other supplies.

## **HIV/AIDS Treatment Modalities**

Treatment Reduces the Amount of HIV in the Blood. The amount of HIV in the blood is called viral load. Taking your HIV medicine as prescribed will help keep your viral load low and your CD4 cell count high. HIV medicine can make the viral load very low (called viral suppression). Viral suppression is defined as having less than 200 copies of HIV per millilitre of blood. HIV medicine can make the viral load so low that a test can't detect it (called an undetectable viral load). If your viral load goes down after starting HIV treatment, that means treatment is working. Continue to take your medicine as prescribed. If you skip your medications, even now and then, you are giving HIV the chance to multiply rapidly. This could weaken your immune system, and you could become sick. Getting and keeping an undetectable viral load (or staying virally suppressed) is the best way to stay healthy and protect others.

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### **Conflict of Interest**

The author(s) declared no conflict of interest.

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