
UNIT 5 VARIOUS MODES OF TRANSMISSION OF HIV

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5.1 INTRODUCTION

There are several ways in which one can get infection with HIV. It is very important to know the routes of HIV transmission. This will help us to avoid the spread of HIV. In other words, understanding how HIV passes from one person to another will enable us to protect ourselves. It will also help us to plan and implement programmes for the prevention and control of HIV/AIDS.

Persons infected with the HIV can pass on the virus to those who are not infected. Most transmission occurs from persons who are infected but without symptoms of AIDS. Therefore, it is essential that everyone is aware about the transmission of HIV. It is also important to know who can get infected and how one can get infected. HIV is present in all body fluids, tissues and organs. HIV has been found in almost all body fluids like blood, genital secretions, (semen, cervical and vaginal) saliva, tears and breast-milk. The HIV and AIDS virus can pass on to an individual through the following three definite routes.

- i) Sexual exposures.
- ii) Contact with HIV/AIDS, contaminated blood and blood products.
- iii) Mother to child through pregnancy, childbirth and breast milk.

In this unit, let us examine how HIV spreads among people through the three routes mentioned above.

5.2 OBJECTIVES

The aim of this lesson is to create awareness about the transmission of HIV through sex, blood and mother to child. This will give us ideas on how to avoid all sorts of risky sexual behaviour associated with HIV transmission.

After studying this unit, you will be able to:

- know how HIV is transmitted through sex, blood and from mother to child;
- analyse the factors responsible for the risk of becoming infected; and
- state the conditions and characteristics of various sections of population who are more vulnerable to HIV infection than others.

5.3 HIV TRANSMISSION THROUGH SEXUAL ACTIVITIES

Sexual activity, whether homosexual or heterosexual, is the major route of transmission of the HIV throughout the world. The virus can be transmitted by any penetrative sexual act in which HIV-infected semen, vaginal or cervical secretions or blood is introduced into the body through a break in the mucosa. The sexual activities where this type of transmission occurs are:

- a) penetrative penile - vaginal intercourse;
- b) penile - anal intercourse; and
- c) oral - genital contact.

Detailed epidemiological studies throughout the world have documented that sexual transmission occurs through exposure to semen and vaginal or cervical secretions. Exposure to any of these fluids may also occur during other sexual activities.

The precise risk of HIV transmission from a single act of sexual activity is not known. Population - based estimates suggest that the extent of risk through penile-vaginal or penile - anal contact is generally less than one infection per hundred exposures. However, such statistics describe the average within a group of people and cannot be applied to an individual case. While some people have had multiple sexual contacts with infected persons without acquiring HIV infection, others have become infected following a single sexual encounter. Repeated sexual activity with an infected person increases the risk of infection. Let us discuss various types of sexual activity and the risks involved in transmitting HIV during those acts.

Penetrative Penile-Vaginal Intercourse

This is the most common form of sexual activity. Transmission of HIV from men to women and from women to men is well documented. However, transmission rate through heterosexual contact is reported to be high among females.

The transmission from men to women is fairly well understood. Semen from an infected man contains HIV that is most likely associated with infected lymphocytes. HIV introduced into the vagina must make its way into the lymphatic to initiate viral reproduction. Small breaks in the linings of vagina are presumed to be portals of entry to the lymphatic. Women are more susceptible to infection than men after a single exposure to HIV. This difference may be because the vaginal mucosa has a larger surface area and the vagina acts as a vessel for the seminal secretions. The seminal fluid has a greater contact time with the vaginal mucosa. Moreover, small cuts or break in the mucosa go unnoticed.

Other factors that increase the transmission during the sexual act are the presence of ulcers on the male and female genitalia. Women who have infections in their pelvic organs are more prone to develop infections. Chemical irritation of the vaginal mucosa that occurs due to use of barrier contraceptives may increase the chance of the women getting infected. Although male to female transmission clearly occurs, the means of transmission of HIV from women to men is less clear.

Penile-Anal Activity

This means penetration of penis into the anus. It appears to be the primary means by which HIV is transmitted among men having sex with men. This is sometimes referred as rectal activity and in turn often leads to breaks in the lining of rectum. The rectal mucosa is delicate. These breaks in the rectum linings make it easier

for HIV to enter into the lymphatic. Laboratory studies suggest that cells that line the rectum may also become directly infected with the virus.

Male to male transmission through anal intercourse occurs at the rate of one infection per 10 sexual acts. Surveys of the homosexual populations indicate that a partner who inserts his penis in to the anus of another partner (active partner) seems to have a lower chance of becoming infected when compared to the partner into whose anus he has inserted (passive partner). When these activities are performed without any physical barriers, it must be considered as high risk for transmission of the virus.

Usually penile-anal activity is not recommended even between a mutually faithful husband and wife on health grounds. It is against dignity for the man to force his wife to agree for penile-anal sex against her will. Every human act whether in public or private has its implications on the behaviour and character of the individual. One must have regard and respect for every human being including a sex worker.

Oral-Genital contact

This means contact between the mouth and genitals. The role of oral-genital sex as a route of transmission of HIV is poorly studied in populations other than homosexuals. It is because individuals who engage in oral genital sex rarely do so to the exclusion of other forms of sexual contact. It is difficult to attribute transmission of HIV to oral sex and not to other types of sexual exposures.

The possibility of transmitting HIV from the vagina to the mouth seems possible, although it is not documented. Similarly, the feasibility of transmitting of HIV from the mouth to the genitals is unclear. One can speculate about plausible routes of transmission in any type of oral-genital contact. HIV bearing lymphocytes present in semen could contact damaged mucosa in the mouth and allow the entry of HIV into tissue. Likewise, traces of menstrual blood or vaginal discharge containing HIV could serve as a conduit of infection from the genitals to the mouth. The virus is shed in the saliva. Saliva is not infective as the dose of virus needed to transmit the infection is very low. Saliva also contains an enzyme that inhibits the virus. Hence, it does not easily transmit the infection.

Oral sex is very rare amongst most people in the Indian sub-continent for various reasons. Some of these reasons are given below:

- i) Lack of adequate privacy. Over 70 per cent people live in rural areas in small houses along with several family members (children, joint family, etc.) where privacy for intimate sexual activities is limited.
- ii) Almost half the populations in most urban areas live in slums which comprise a small room without any privacy and safety.
- iii) Most men and women from the above mentioned categories return home tired and wanting rest after a day's work.
- iv) Most people in India are not exposed or oriented to various forms of sexual activities described above due to their family, cultural, religious, educational, traditional and social background.
- v) Husband and wife hardly talk to each other on sex and sexuality.

It may be noted that very few studies have been conducted on the sexual behaviour of people in India. Therefore, most of the concerns discussed in this unit may not be relevant for most people. However, adequate information on various aspects with regard to sexual activities which are risky in nature need to be made known

so that the last person in the country is enabled to take necessary precaution to avoid transmission of HIV and AIDS and STDs.

Factors Responsible for Causing Infections

The risk of becoming infected with HIV as a result of sexual activity depends upon the following factors.

- i) Whether the sexual partner is infected.
- ii) The type of sexual contact involved.
- iii) The amount of virus present in the blood or secretions of the infected partner.
- iv) The presence in either partner of other sexually transmitted diseases or genital lesions.

Probability that Sexual Partner is HIV Infected

The prevalence of HIV infection among sexually active people varies in different areas and among population sub-group in those areas. The probability that a person has acquired a sexually transmitted HIV infection is, in general, proportional to the number of sexual partners the person has had in recent years. In areas where the mode of transmission is through heterosexual activity, the higher prevalence of infection has been found among female sex workers.

The probability of a homosexual man encountering an HIV infected sexual partner ranges from a few percent for those with only a few male sexual partners in areas of low AIDS prevalence to more than 70 per cent for men who have many sexual partners in areas of high HIV prevalence. Unlike several permissive societies in the world, the percentage of homosexuals and lesbians in India are very insignificant. However, we do have reported cases of the prevalence of HIV among the minority homosexual population of the country.

Type of Sexual Contact Involved

Sexual intercourse

All forms of sexual activity in which any type of contact with body fluid is involved carries a risk of HIV transmission. While existing data suggests differences in the relative risk of various forms of activity, the precise level of risk associated with each is not yet known. Trauma to the mucous membrane of the rectum or vagina may facilitate transmission of HIV, but is not essential for transmission to occur.

The highest risk for HIV infection occurs amongst men and women who engage in receptive anal activity with an HIV-infected partner. Vaginal intercourse carries a higher risk for heterosexual men and women than oral activity. Oral-genital contact may transmit HIV, but the available data are too limited to permit quantification of the risk from such contact.

Kissing

Kissing has been shown to pose a risk of transmission. Nevertheless, while not substantiated, there is a theoretical risk of HIV transmission during 'wet kissing' in which saliva is exchanged and if there are cuts and pores in the mouth.

Masturbation

Self-masturbation obviously poses no risk of HIV transmission. However, mutual masturbation, which may involve exposure to semen, or cervical and vaginal

secretions, may pose a theoretical risk of HIV transmission if there are cuts, wounds etc. in parts of the body, which may be exposed to such body fluids.

Amount of virus present in the blood or secretion of the infected partner

HIV infected individuals are thought to become more infectious as they progress to overt disease i.e., AIDS. Similarly during the window period the concentration of HIV is the highest and the person is highly infectious. Therefore, exposure during window period can be highly risky.

Presence of other sexually transmitted disease (STDs)

There is increasing evidence that the presence of another sexually transmitted disease in one or both partners may increase the risk of HIV transmission. Genital ulceration may occur with chancroid, syphilis or herpes virus infection. Ulcerative disease appears to increase the susceptibility to infection of uninfected individuals and to enhance the infectivity of those who are already infected.

Commercial sex workers

It is always risky to have sex with Commercial Sex Workers (CSWs) in India. Reports indicate that most of the sex workers suffer from STDs and a large number of CSWs are also found to be HIV infected across the country. The only sure way to avoid HIV is for a couple to remain mutually faithful to each other or the practice of abstinence. Sex education is the need of the hour.

Check Your Progress

Notes: a) Use the space provided for your answer.

b) Check your answer with those provided at the end of this unit.

1. Describe how HIV transmission occurs through sexual activities.

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5.4 TRANSMISSION OF HIV THROUGH BLOOD

In the previous section we have already studied transmission of HIV through sex. In this unit we shall study transmission of HIV through blood. The magnitude of transmission through blood is very less when compared to transmission through sex. The important aspect about transmission through blood is that this can be completely reduced if certain precautions are followed. Various Means of Transmission through Blood will be discussed in this section.

A) Blood Transmission

HIV reproduces itself in the CD4 lymphocytes, which circulate in the blood and other body fluids. Blood collected for transfusion contains these lymphocytes. HIV is not only present within these cells but it is also present in serum (blood unassociated with cells). Thus, introduction of blood from infected person to uninfected persons will transfer the virus that is present both in the cells as well as the serum. Of all the forms of exposure to HIV, **blood transfusion** is the most

effective means of transmitting the virus from person to person. No barrier of any kind exists between the infected person and the individual who receives contaminated blood directly into the blood stream. However, if the blood banks take adequate precautions, this risk can be reduced to a considerable extent.

Instruments like scalpels or suture needles, if contaminated with infected blood can transmit the infection. Similarly, needles that have blood stains on them can transmit the infection. Sometimes injuries that occur with broken glass vials containing infected blood or serum can transmit the infection. The risk of infection through small cuts and abrasions that occur with contact sports e.g., wrestling, football etc., is very low.

B) Transmission of HIV Through Blood Products

Blood that is collected from a donor can be separated into different components using a cell separator. One unit of blood will be separated into red blood cells, platelet concentrates and plasma. These components can be used as and when required.

Apart from these conventional uses, substances present in the blood i.e. antibodies are removed to produce **immunoglobulin**. These immunoglobulins are used in treatment of many medical conditions. HIV can be transmitted through these products also. Treating these products can prevent transmission.

C) Transmission Through Organ Transplantation

HIV can be transmitted through infected organs. HIV is found in the blood as well as the tissue of an infected organ. Before any organ is transplanted the donor has to be screened for HIV. In cadaver (removal of organs from brain dead patients) transplantation, the donor has to be checked. This route of transmission is very rare in practice. Since an infected person's body fluids contain HIV it is essential that screening for HIV is carried in cases of organ transplantation of any kind such as kidney, bone marrow, eyes, skin, semen etc.

D) HIV Transmission Through Intravenous Drug Use (IVDU)

Intravenous drug use acts as a source of transmission of HIV because drug users frequently share syringes and needles to inject drugs. These instruments are not sterilised before use. Small volumes of contaminated blood remains inside previously used needles and syringes thereby providing opportunities to transmit the virus via their blood contents. In the early years of the epidemic, studies found links between HIV drug users and male homosexuals who were already infected with HIV. The overlap of these two groups facilitated in the introduction of HIV into drug using population and then to the sex partners of the drug users.

Rapid increase in prevalence of HIV in drug users in major urban areas from around the world were recorded in the late 1980s and early nineties.

E) Cultural Invasive Practices

There are certain practices in which the HIV can be transmitted through infected blood on the instruments. Example of such practices in India are the following:

1) Tattooing, ear or nose piercing

Tattooing, ear or nose piercing is an age-old custom in India. Nose and ear piercing is very common in India. Tattooing is more common among the tribal communities. It can be seen in cities also. These procedures should be done with clean instruments.

2) Circumcision or genital mutilation

Practices of circumcision are found among several groups in India. A circumcision needs to be done with extra care. Using clean instruments and if a trained person does the operation the chances of the infection can be reduced.

Vulnerable Groups to HIV Transmission Through Blood

A) Patients Suffering from Blood Disorders

Patients who suffer from various blood disorders like various types of anemia, especially Thalassemia or Leukemia require multiple transfusions. They are at risk to contract the infection if untested blood is used. Measures that can reduce the need for transfusion in these patients can prevent the infection from spreading.

Hemophiliacs are born with an inherited bleeding disorder and are exclusively males. This disorder is determined genetically. It results in poor clotting of blood. There is an absence of a single protein that is involved in coagulation. Various forms of hemophilia exist. Hemophilia is due to deficiency of Factor VIII. It is the most common form of Hemophilia. Hemophilia B is due to deficiency of factor IX. Before the onset of universal screening of blood products, HIV infection was common among hemophiliac patients. After the onset of screening, new infections among hemophiliacs has decreased.

B) Intravenous Drug Users

Injecting drug users are potential channel for transmission of HIV. We have already discussed this mode of transmission. In India, injecting drug users have a high incidence of the infection. It is more common in the North Eastern parts of India. The drug addicts often sell their blood to purchase drugs. Several of them are found to be professional blood donors.

C) Professional Blood Donors

Professional blood donors are persons who repeatedly donate blood to the blood banks for money. They are usually poor and unhealthy people. Many of them are found to be HIV carriers. The Supreme Court of India has banned professional blood donation in the country. However, these professionals continue their profession, as there is dearth of blood donation in the country.

D) Health Care Workers

Health care workers often get injuries due to needle pricks and cuts with other equipments. There are several documented cases of health care workers being infected through this route. However, this route remains a very small fraction of a percentage of all the infected persons. The health care providers must be aware of the routine universal precautions and put them into practice.

Check Your Progress

Notes: a) Use the space provided for your answer.

b) Check your answer with those provided at the end of this unit.

2. How is HIV transmitted through blood and blood products?

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5.5 MOTHER TO CHILD TRANSMISSION OF HIV

Women, because of their social and sexual subordination are disproportionately affected by the epidemic. The inabilities of women to control the factors at risk, place them at risk of HIV infection and are compounded by the fact that many societies define the social and cultural identity of a woman primarily through her role as child-bearer and child-rearer.

So, whenever, we discuss mother-to-child-transmission, we have to look at the problem in a broader perspective and not in a compartmentalized way. Broader perspective includes role of husband, societal pressure, norms, and values and above all her own rights over the sexual act as well as rights over her body and family pressures.

Extent of HIV Infection Among Women of Child Bearing Age and Children

Currently, there are almost 14 million women of childbearing age through out the world who are HIV positive. Among these women who are pregnant, the highest rates of infection have been reported from Sub-Saharan Africa. In urban centers in Southern Africa, HIV rates among pregnant women tested anonymously at antenatal clinics is between 20-30 per cent. Rates above 40 per cent to 59 per cent and even 70 per cent have been recorded in Botswana and parts of Zimbabwe. According to data from the UNAIDS, there are very few places outside Sub-Saharan Africa in which the prevalence of HIV infection among pregnant women has reached 10 per cent.

Figures from UNAIDS also show that the risk of infection is increasing among women everywhere both in developed and developing countries alike. In a period of ten years from 1985 to 1995 the incidence increased among women in varying degrees. For example, in France, it increased from 12 per cent to 20 per cent. In Spain, it rose from 7 per cent to 19 per cent. In Brazil the proportion rose from just 1 per cent in 1984 to 25 per cent ten years later.

Furthermore, in the worst affected countries, the virus is spreading fast among young people below the age 24 years. Studies sponsored by UNAIDS among the youth show that the incidence of HIV infection among girls is higher than among boys. In Kenya one in four girls was infected with HIV when compared to one in twenty five among boys. Similarly among the youth in Zambia the ratio is 16:1 (girls: boys) and in Uganda it is 6:1.

Various Stages Transmission

HIV can be transmitted from mother to child in three ways. It can occur in the womb, at the time of delivery and also when the child is breast-fed.

Womb

The foetus receives nutrition from the mother through the placenta. When the mother has a high viral concentration in the blood, some of the virus can pass from the mother to the foetus through the placenta. It is possible throughout the period of pregnancy. A small number of babies acquire the infection through this route.

At the Time of Birth

The lining of the birth canal (vagina) contains a high concentration of HIV. The baby may sustain minor cuts in the mucous membrane and in the skin during the process of birth. Hence, the baby can get infected. It has also been known that the

maximum chance of infection of the foetus occurs during the time of delivery. About 20 percent of children born to HIV mothers become infected at the time of delivery.

Breast milk

About 14 per cent of children who are breast-fed by the HIV infected mothers will contract the infection. Hence, practices which change breast-feeding reduce HIV transmission.

The Risk of Mother-to-Child Transmission (MTCT)

The rates of mother-to-child transmission of HIV under different circumstances are as follows:

- 1) Where no drugs are administered and the baby is breast fed by its HIV- positive mother, the risk of infection generally is around 30-35 percent.
- 2) Where no drugs are administered and the baby is not breast fed by its HIV- positive mother, the risk of infection is around 20 per cent.
- 3) Where a one- month course of AZT is administered and the baby is not breast fed, the risk of infection is around 10 per cent.
- 4) Where a one- month short course of AZT is administered and the baby is breast fed by its HIV- positive mother, for up to six months, the risk of infection is about 18 per cent at that age.

Issues Related to Mother-to-Child Transmission

There are various issues related to mother-to-child transmission, which are still debatable. Some of the debatable issues are:

1) Should HIV-positive women be encouraged to have children or not?

It is every women's fundamental right to decide for herself, without coercion, whether she should have children or not. This is enshrined in the International Human Rights Conventions. It is the responsibility of the Government and health services to provide HIV- positive women and their partners with comprehensive information and education about the risks associated with child bearing as part of routine public information about HIV/AIDS. The health services should ensure that they have real choices of action and respect and support the decisions that they reach.

The NACO policy states that HIV positive women should have complete choice in making decisions regarding pregnancy and child birth. There should be no forcible abortion or even sterilisations on the grounds of HIV status of the women. Proper counselling should be given to the pregnant women for enabling them to take an appropriate decision either to go ahead with or to terminate the pregnancy.

2) Whether HIV-positive mother be told to breast-feed her baby?

Breast feeding has been the corner stone of child health and survival strategies for the past two decades and has played a pivotal role in reducing infant mortality rate in many countries. Even in the era of AIDS, breast-feeding remains the best possible nutrition for the great majority of babies. As against this, there is another view. You may recall that the transmission of HIV through breast milk is about 14 percent. If the mother has received prophylaxis to prevent mother to child transmission, then it is illogical to recommend breast-feeding.

There are many reasons why such advice may not necessarily be appropriate and might indeed be dangerous. The cost of infant formula supplements is often beyond the means of poor families in developing countries, even when it is widely available. Besides, many people lack easy access to the knowledge, safe clean water and fuel needed to prepare replacement feeds safely or simply have no time to prepare them. If it is used incorrectly i.e. mixed with dirty, unsafe water, a breast milk substitute may lead to infection, malnutrition and even death. Breast-feeding suppresses ovulation and delays the return of a woman's fertility. A mother who does not breastfeed her baby loses the natural contraceptive effect and has the increased risk of getting pregnant again very soon.

In August 1997, WHO, UNICEF and UNAIDS issued a joint policy statement on HIV and infant feeding. They subsequently prepared guidelines to help national authorities, to implement the policy. These documents emphasize that it is the individual mothers right to decide how she will feed her child. Any attempt to influence her decision, no matter what the circumstances or motives, is an abuse of her human rights and freedom of choice. The responsibility of people who counsel HIV- positive women about infant feeding is to give them all the available information on the risks associated with breast - feeding. They should be educated about substitutes to breast feeding. They also have to discuss the feasibility, pros and cons of alternative feeding methods in the light of personal circumstances. They also have to give them appropriate support for the course of action they choose.

3) Should every person undergo HIV counselling and testing routinely?

Whether or not each and every person, or at least the reproductive population, should undergo confidential HIV counselling and testing is an ethical consideration.

For pregnant women to take advantage of measures to protect their off springs from HIV infection they need to know whether or not they are infected. Hence, voluntary counselling and testing services are an essential part of any programme for the prevention of mother-to-child transmission of HIV. Ideally, however, every one should have access to such services since there are clear advantages to know one's sero- status. People who know they are HIV infected are likely to be motivated to look after their health, perhaps with behaviour and life-style changes and to seek early medical attention for problems. They can take wise decisions about sexual practices, child bearing and infant feeding and steps to protect partners who may still be infected. And those whose test results are negative can be counselled about how to protect themselves, their partners and their children from infection.

Furthermore, voluntary counselling and testing has an important role to play in unmasking the silent epidemic and reducing the hysteria of and fear surrounding AIDS. At present UNAIDS estimates that around 90 percent of people with HIV are unaware of their status. Efficient, widely accessible and user friendly testing services can help societies recognize and come to terms with the fact that there are many people living with HIV who show no outward signs. This in turn encourages commitment to prevention.

4) Whether HIV-positive men and women can marry among themselves or not is another debatable question?

As far as right of a human being is concerned, HIV-positive men and women may marry among themselves. There are organisation in India which help HIV positive people to choose life partners and arrange for their marriage.

Check Your Progress

Notes: a) Use the space provided for your answer.

b) Check your answer with those provided at the end of this unit.

3. What are the three ways of HIV transmission from mother to child?

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5.6 LET US SUM UP

In this unit various means of transmission of HIV through sex, blood and mother to child have been discussed. Sex is one of the known routes of HIV transmission. This is also the largest mode of transmission. This mode of transmission generally occurs in three ways. These three ways are: Penetrative penile-vaginal, penile-anal and oral-genital contact.

Of all forms of transmission of HIV, blood transfusion is the most efficient one. HIV transmission occurs through blood generally when the blood is transfused, through intravenous drug abuse, dialysis and organ transplant. There are various issues involved in the transmission of HIV through blood. These issues are also discussed in this unit.

Mother-to-Child transmission occurs at three stages. These stages are in the womb, at the time of birth and through breast-feeding. We also discussed how these transmissions occur at various stages. In this unit we also analyzed the rates of mother-to-child transmission of HIV under the different circumstances.

5.7 UNIT-END EXERCISES

1. List how is the knowledge of transmission of HIV helps in the prevention of HIV and AIDS?
2. Identify the situation in your neighbourhood that could lead to transmission of HIV.

5.8 SUGGESTED READINGS

Frumkin, Lyn and Leonard, John (1994): *Questions and Answers on AIDS*, PMIC: Los Angeles.

Thomas, Gracious (1997): *Prevention of AIDS: In Search of Answers*, Shipra Publications: New Delhi.

NACO (1999): *Country Scenario 1997-98*, NACO: New Delhi.

Thomas, Gracious (2006): *Life Skill Education and Curriculum*, Shipra Publications: New Delhi.

(This unit on Various Modes of Transmission of HIV is adapted from block 5 of BSWE-005, IGNOU: New Delhi, 2006).

5.9 ANSWERS TO CHECK YOUR PROGRESS

1. There are three ways of transmission of HIV through sex. The ways are penetrative penile-vaginal, penile-anal, and oral-genital. The most common type of transmission is penetrative penile-vaginal.
2. HIV is mainly transmitted through blood and blood products in the following ways:
3.
 - a) **During Pregnancy:** Throughout the period of pregnancy, a mother is capable of infecting the foetus.
 - b) **At the time of birth:** The lining of the birth canal (vagina) contains a high concentration of HIV. The baby may sustain minor cuts in the mucous membrane and in the skin during the process of birth. Hence, the baby can get infected. It has been shown that the maximum chance of infection of the foetus occurs during the time of delivery.
 - c) **Breast milk:** About 14 per cent of children who are breast-fed by HIV infected mothers will contract the infection. Hence, practices which change breast-feeding reduce HIV transmission.

