

A Study on Knowledge and Awareness about HIV among School and College going Students of Dhaka City

*A Dissertation submitted to the Department of Pharmacy, East West University,
Bangladesh, in partial fulfillment of the requirements for the Degree of Bachelor of
Pharmacy*

Submitted by

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Declaration by the Research Candidate

I, Hafiza Sultana Eity, ID: (2014-1-70-018), hereby declare that the dissertation entitled **“A Study on Knowledge and Awareness about HIV among School and College going Students of Dhaka City”** submitted by me to the Department of Pharmacy, East West University in partial fulfillment of the requirement for the award of the degree Bachelor of Pharmacy is a trustworthy record of original and genuine research work carried out by me.

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Acknowledgement

At first, I would like to thank the almighty “ALLAH” the most gracious and merciful for enabling me to successfully complete my research work soundly and orderly.

I would like to express my deepest gratitude to my research supervisor, **Ms. Nigar Sultana Tithi**, Senior Lecturer, Department of Pharmacy, East West University, who has been always optimistic and full of passion and ideas. Her generous advice, constant supervision, intense support, enthusiastic encouragements and reminders during the research work not only helped shape this study but also helped me into being a better researcher.

I would also like to put forward my most sincere regards and profound gratitude to **Dr. Chowdhury Faiz Hossain**, Professor and Chairperson, Department of Pharmacy, East West University, for giving me the opportunity to conduct such an interesting project and for facilitating a smooth conduction of my study.

I would also like to put forward my most sincere regards and profound gratitude to **Dr. Shamsun Nahar Khan**, Associate Professor, Department of Pharmacy, East West University for her appreciation.

A special thanks to **Ms. Nishat Nasrin**, Assistant Professor, Department of Pharmacy, East West University, for her in-depth thinking, motivation, timely advice and encouragement have made it possible for me to complete this research.

Dedication

**My beloved parents; MD. Hafiz Uddin
and
Hasina Sultana**

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List of Abbreviation

NRTIs- Nucleoside/nucleotide reverse transcriptase inhibitors

NNRTIs- Non-nucleoside reverse transcriptase inhibitors

UNAIDS- United Nations Programme on HIV/AIDS

CDC- Centers for Disease Control and Prevention

ART- Antiretroviral therapy

NAT- Nucleic acid test

WHO- World Health Organization

PEP- Post-exposure prophylaxis

STD- Sexually transmitted disease

HPV- Human papillomavirus

HAART- Highly Active Anti-Retroviral Therapy

MSM- Men who have sex with men

AIDS- Acquired immunodeficiency syndrome

GRID- Gay related immune deficiency

AZT- Azidothymidine

HIV- Human Immunodeficiency Virus

ELISA- Enzyme- linked immunosorbent assay

CD4- Cluster of differentiation 4

Abstract

This study was aimed to evaluate student's knowledge, awareness and attitude about HIV/AIDS. It was a cross sectional study where 291 students studying in class VIII-XII from different areas of Dhaka were interviewed with a structured questionnaire. Majority (95.53%) heard about HIV/AIDS. They have good knowledge about the ways of transmission of viruses such as sharing infected needle or injection (92.78%), blood transfusion (92.10%), mother to fetus (87.97%). But also had some misconceptions like eating or drinking from same glass or plate (43.99%), kissing (37.46%), wearing same dress (30.51%) can be responsible for spreading of HIV. The respondent mentioned that avoiding needle share (84.54%), knowledge and education (82.82%) about HIV/AIDS, avoiding casual sex (81.10%) could be the methods for preventing AIDS. The study participants were quite positive about presence of all infected person in the school or college if he/she is a teacher (61.17%) or a student (60.82%). Students demonstrated a high level of knowledge concerning AIDS and HIV, but had considerable misconceptions and prejudices about people having HIV/AIDS. The study results suggest that a more appropriate education programme in schools and colleges in Bangladesh may be necessary to reduce the discrepancy between general knowledge and desirable attitude regarding HIV/AIDS. However, schools and colleges should come forward to design awareness campaigns for the benefit of the students.

Key Words: HIV, AIDS, Knowledge, Mode of transmission, Attitude, Prevention.

CHAPTER 1

INTRODUCTION

1.1 HIV (Human Immunodeficiency Virus)

HIV is a virus that attacks the immune system, which is our body's natural defense against illness. The virus destroys a type of white blood cell in the immune system called a T-helper cell, and makes copies of itself inside these cells. T-helper cells are also referred to as CD4 cells. As HIV destroys more CD4 cells and makes more copies of itself, it gradually breaks down a person's immune system. This means someone living with HIV, who is not receiving treatment, will find it harder and harder to fight off infections and diseases. If HIV is left untreated, it may take up to 10 or 15 years for the immune system to be so severely damaged it can no longer defend itself at all. However, the speed HIV progresses will vary depending on age, health and background (Avert, 2017a).

1.1.1 Basic facts about HIV

- There is effective antiretroviral treatment available so people with HIV can live a normal, healthy life.
- The earlier HIV is diagnosed, the sooner treatment can start – leading to better long term health.
- HIV is found in semen, blood, vaginal and anal fluids, and breast milk.
- HIV cannot be transmitted through sweat, saliva or urine.
- Using male condoms or female condoms during sex is the best way to prevent HIV and other sexually transmitted infections.

If a person injects drugs, he should always use a clean needle and syringe, and never share equipment (Avert, 2017a).

If a woman is pregnant and living with HIV, the virus in her blood could pass into your baby's body, or after giving birth through breastfeeding. Taking HIV treatment virtually eliminates this risk (Avert, 2017a).

1.1.2 AIDS (Acquired Immune Deficiency Syndrome)

AIDS is not a virus but a set of symptoms caused by the HIV virus. A person is said to have AIDS when their immune system is too weak to fight off infection, and they develop

certain defining symptoms and illnesses. This is the last stage of HIV, when the infection is very advanced, and if left untreated will lead to death (Avert, 2017a).

1.1.3 Basic facts about AIDS

- AIDS is also referred to as advanced HIV infection or late-stage HIV.
- AIDS is a set of symptoms and illnesses that develop as a result of advanced HIV infection which has destroyed the immune system.
- Treatment for HIV means that more people are staying well, with fewer people developing AIDS.

Although there is currently no cure for HIV with the right treatment and support, people with HIV can live long and healthy lives. To do this, it is especially important to take treatment correctly and deal with any possible side-effects (Avert, 2017a).

1.2 History of HIV and AIDS

It is widely believed that HIV originated in Kinshasa, in the Democratic Republic of Congo around 1920 when HIV crossed species from chimpanzees to humans. HIV was unknown and transmission was not accompanied by noticeable signs or symptoms. In 1981, cases of a rare lung infection called *Pneumocystis carinii pneumonia (PCP)* were found in five young, previously healthy gay men in Los Angeles. In June 1982, a group of cases among gay men in Southern California suggested that the cause of the immune deficiency was sexual and the syndrome was initially called gay-related immune deficiency (or GRID). In September, the CDC used the term 'AIDS' for the first time. In January 1983, AIDS was reported among the female partners of men who had the disease suggesting it could be passed on via heterosexual sex. In June, the first reports of AIDS in children hinted that it could be passed via casual contact but this was later ruled out and it was concluded that they had probably directly acquired AIDS from their mothers before, during or shortly after birth. By September, the CDC identified all major routes of transmission and ruled out transmission by casual contact, food, water, air or surfaces. In April 1984, the National Cancer Institute announced they had found the cause of AIDS, the retrovirus HTLV-III. In July, the CDC state that avoiding injecting drug use and sharing needles "should also be effective in preventing transmission of the virus. "In March 1985, the U.S Food and Drug Administration (FDA) licensed the first commercial

blood test, ELISA, to detect antibodies to the virus. In May 1986, the International Committee on the Taxonomy of Viruses said that the virus that causes AIDS will officially be called HIV instead of HTLV-III/LAV. In July, the WHO confirmed that HIV could be passed from mother to child during breast feeding. In August 1994, the USA Public Health Service recommended the use of AZT to prevent the mother-to-child transmission of HIV. In June 1995, the FDA approved the first protease inhibitor beginning a new era of highly active antiretroviral treatment (HAART). In July 2000, UNAIDS negotiated with five pharmaceutical companies to reduce antiretroviral drug prices for developing countries. In July 2002, South Africa's Constitutional Court orders the government to make the HIV drug nevirapine available to all HIV-positive pregnant women and their newborn children. In 2006, male circumcision was found to reduce the risk of female-to-male HIV transmission by 60%. Since then, the WHO and UNAIDS have emphasised that male circumcision should be considered in areas with high HIV and low male circumcision prevalence. In July 2012, the FDA approved PrEP for HIV-negative people to prevent the sexual transmission of HIV. In September, the WHO launched new treatment guidelines recommending that all people living with HIV should receive antiretroviral treatment, regardless of their CD4 count, and as soon as possible after their diagnosis. In 2016, achieving increased ART access means a greater risk of drug resistance and the WHO released a report on dealing with this growing issue (Avert, 2017b).

1.3 Stages of HIV Infection

Without treatment, HIV advances in stages, overwhelming your immune system and getting worse over time. The five stages of HIV infection are: (1) Acute HIV infection, (2) Clinical latency, (3) Early Stage AIDS, (4) Middle-Stage AIDS and (5) Late-Stage AIDS (Diplacido, 2017).

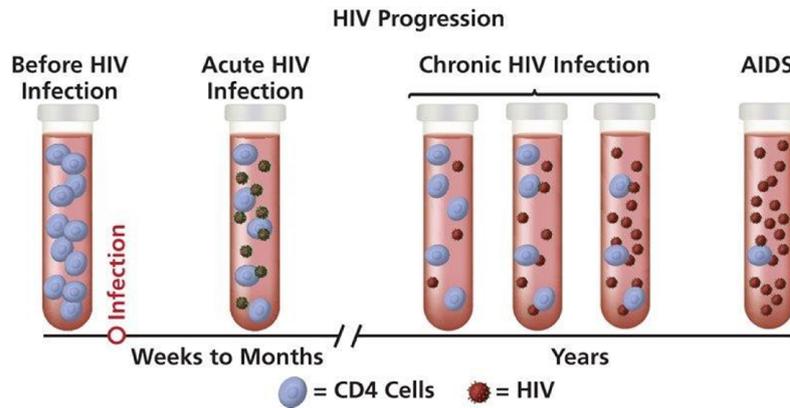


Figure 1.1: Stages of HIV infection (Diplacido, 2017)

Acute HIV Infection Stage

Acute infection occurs within two to four weeks after infection with HIV. The symptoms of the acute infection are similar to a bad flu or "the worst flu ever." During the acute infection phase, that large amount of virus are being produced in the body, attacking CD4 T cells, which are one type of cell that makes up the immune system. Eventually the body brings the virus back down to low levels, and the CD4 T cell count increases (Diplacido, 2017).

Clinical Latency Stage

The next stage of HIV infection is clinical latency, a period that may extend for several years, where the infected person feels no symptoms. Often the only clue that a person is infected with HIV is that he would test positive in an HIV test. Additionally, he may have larger-than-normal lymph nodes. This stage can persist for a period of eight years or longer (Diplacido, 2017).

Early Stage AIDS

Early stage AIDS occurs when the body's immune system is compromised enough to be susceptible to some mild bacterial, viral and fungal infections. In early stages of AIDS, the person may experience mild symptoms such as skin rashes, fatigue, night sweats, slight weight loss and fungal skin and nail infections. The National Institute of Allergy and Infectious Diseases (NIAID) reports that headache and fatigue are also common symptoms of early stage AIDS (Diplacido, 2017).

Middle-Stage AIDS

The middle stage of AIDS is characterized, as an increase in severity of infections. The person may experience troublesome fungal infections of the mouth or vagina called thrush, which manifests as a white or yellow film that may cause irritation. Other symptoms characteristic of middle-stage AIDS include: herpes infection of the mouth and genitals (cold sores), diarrhea, more dramatic weight loss and persistent fevers (Diplacido, 2017).

Late-Stage AIDS

In late-stage AIDS, infections may make the infected person consistently and often severely sick. These infections include *Mycobacterium avium* complex disease (caused by a fungus) *Pneumocystis carinii* pneumonia (caused by a bacteria), and cytomegalovirus (caused by a virus). The NIAID reports that chronic severe diarrhea, intense night sweats, memory loss, depression and other disorders of the brain may occur in late-stage AIDS. Furthermore, the person may develop type of cancer called Kaposi's sarcoma that causes red, brown or purple blotches on the skin of the face (Diplacido, 2017).

1.4 The Life Cycle of HIV

In order for viruses to reproduce, they must infect a cell. Viruses are not technically alive: They are like a brain with no body. In order to make new viruses, they must hijack a cell and use it to make new viruses. The body is constantly making new skin cells or new blood cells each cell often makes new proteins in order to stay alive and to reproduce. Viruses hide their own DNA in the DNA of the cell, and then when the cell tries to make new proteins it accidentally makes new viruses as well. HIV mostly infects cells in the immune system. HIV infects a variety of cells, its main target is the T4-lymphocyte (also called the "T-helper cell"), a kind of white blood cell that has lots of CD4 receptors. Once HIV binds to a cell, it hides HIV DNA inside the cell's DNA: This turns the cell into a sort of HIV factory and replicates itself (AIDSinfo, 2005a).

- **Binding and Fusion:** HIV begins its life cycle when it binds to a CD4 receptor and one of two co-receptors on the surface of a CD4+ T- lymphocyte. The virus

then fuses with the host cell. After fusion, the virus releases RNA, its genetic material, into the host cell.

- **Reverse Transcription:** An HIV enzyme called reverse transcriptase converts the single-stranded HIV RNA to double-stranded HIV DNA.
- **Integration:** The newly formed HIV DNA enters the host cell's nucleus, where an HIV enzyme called integrase "hides" the HIV DNA within the host cell's own DNA. The integrated HIV DNA is called provirus. The provirus may remain inactive for several years, producing few or no new copies of HIV.
- **Transcription:** When the host cell receives a signal to become active, the provirus uses a host enzyme called RNA polymerase to create copies of the HIV genomic material, as well as shorter strands of RNA called messenger RNA (mRNA). The mRNA is used as a blueprint to make long chains of HIV proteins.
- **Assembly:** An HIV enzyme called protease cuts the long chains of HIV proteins into smaller individual proteins. As the smaller HIV proteins come together with copies of HIV's RNA genetic material, a new virus particle is assembled.
- **Budding:** The newly assembled virus pushes out ("buds") from the host cell. During budding, the new virus steals part of the cell's outer envelope. This envelope, which acts as a covering, is studded with protein/sugar combinations called HIV glycoproteins (AIDSinfo, 2005a).

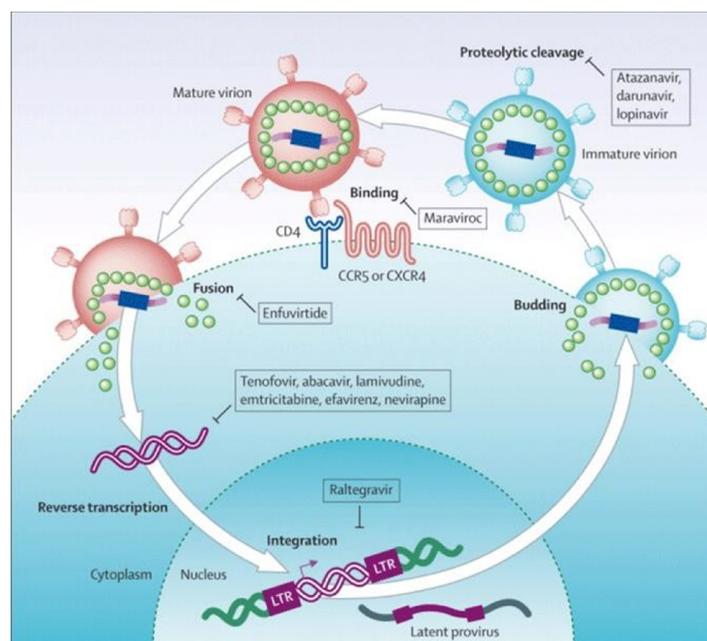


Figure 1.2: HIV life cycle (AIDSinfo, 2005a)

1.5 HIV Transmission and Risks

HIV is transmitted through the following body fluids:

- Blood
- Semen
- Pre-cum
- Rectal fluids
- Vaginal fluids
- Breast milk (POZ, 2017).

There are several ways this can happen:

- Sexual contact with an infected person.
- Sharing needles, syringes or other injection equipment with someone who is infected.
- Mother-to-child transmission. Babies born to HIV-positive women can be infected with the virus before or during birth or through breast feeding after birth.
- Transmission in health care settings. Health care professionals have been infected with HIV in the workplace, usually after being stuck with needles or sharp objects containing HIV-infected blood (POZ, 2017).

1.5.1 Sexual Transmission of HIV

In the United States, sexual contact is the most common route of HIV transmission. The term MSM is important because many men who have sex with men do not necessarily identify themselves as "gay" or even "bisexual." HIV transmitted through sexual activity among heterosexuals accounted for 31 percent of new infections, with most of these cases among women infected by men. Injection drug users, in total, accounted for 12 percent of new infections, though about a quarter of those were MSM, so it isn't possible to know for sure whether those men were infected by sharing injection equipment or through sex. Heterosexual intercourse is the most common mode of HIV transmission in many resource-poor countries. In Africa, slightly more than 80 percent of infections are acquired heterosexually, while mother-to-child transmission and transfusions of contaminated blood account for the remaining infections. Heterosexual contact and

injection of drugs are the main modes of HIV transmission in South and South East Asia. The reason why sexual activity is a risk for HIV transmission is because it allows for the exchange of body fluids. It is also true that HIV has been detected in saliva, tears, and urine. However, HIV in these fluids is only found in extremely low concentrations. What's more, there hasn't been a single case of HIV transmission through these fluids reported to the CDC (POZ, 2017).

1.5.2 Specific Sexual Practices

Studies have repeatedly demonstrated that certain sexual practices are associated with a higher risk of HIV transmission than others (POZ, 2017).

1.5.3 Vaginal Intercourse

Unprotected vaginal intercourse is the most common mode of HIV infection worldwide. In the United States and many other developed nations, it is the second most common mode of sexual HIV transmission (after anal intercourse among MSM). Studies have demonstrated that male-to-female HIV transmission during vaginal intercourse is significantly more likely than female-to-male HIV transmission. In other words, HIV-positive men are much more likely to transmit the virus to HIV-negative women through vaginal intercourse than HIV-positive women are to HIV-negative men. There are a few reasons for this. First, there are more men than women in the United States infected with HIV, meaning that it's much more likely for a female to have sex with an HIV-positive male than for a male to have sex with an HIV-positive female. Second, women have a much larger surface area of mucosal tissue – the lining of the vagina and cervix that can chafe easily and are rich in immune system cells that can be infected by HIV – than men. For men, HIV must enter through a cut or abrasion on the penis or through the lining of the urethra inside the tip of the penis. There has been some research suggesting that men who are uncircumcised have a higher risk of becoming infected with HIV or transmitting the virus if they are already HIV positive. However, it is important to stress that men who are circumcised can still be infected (or transmit the virus) if condoms are not used for vaginal sex. Men or women who have sexually transmitted infections (STIs), such as genital herpes or syphilis, are more likely to spread the virus if they are HIV positive or to become infected with the virus if they are HIV negative (POZ, 2017).

1.5.4 Anal Intercourse

Anal intercourse is associated with a high risk of HIV infection, if condoms are not used and the insertive partner's HIV status is either positive or not known. Being the receptive partner – the "bottom" – during unprotected anal intercourse puts you at a much higher risk of HIV infection, but it's possible for either partner to get HIV. The reason for this is that HIV-infected semen can come into contact with mucosal tissues in the anus that can be damaged easily during anal intercourse. And the risk of HIV transmission isn't necessarily reduced if the "top" pulls out before ejaculation – studies have demonstrated that pre-ejaculate (pre-cum) can contain high amounts of HIV and can result in transmission during anal intercourse. The insertive ("top") partner is at lower risk, but it is possible for HIV to enter through a cut or abrasion on the penis or through the lining of the urethra inside the tip of the penis. Studies suggest that unprotected insertive anal sex is roughly four to 14 times less risky than unprotected receptive anal sex (POZ, 2017).

1.5.5 Penile-Oral Sex

The risk of penile-oral sex raises the greatest amount of confusion in terms of risk – and raises the greatest number of questions. But most experts agree that fellatio, sometimes referred to as "blow jobs," is not an efficient route of HIV transmission. This does not mean that it cannot happen, but the risk is very low. Because unprotected fellatio allows body fluids from one person to come into contact with the mucosal tissues or open cuts, sores, or breaks in the skin of another person, there is a "theoretical risk" of HIV transmission, meaning that passing an infection from one person to another is considered possible. These instances all involved MSM – men who were the receptive partners (the person doing the "sucking") during unprotected oral sex with another HIV-positive man. There haven't been any instances of HIV infection among female receptive partners during unprotected oral sex. And there hasn't been a single documented case of HIV transmission to an insertive partner (the person being "sucked") during unprotected oral sex, either among MSM or heterosexuals (POZ, 2017).

1.5.6 Oral-Vaginal Sex

Like fellatio, this is also considered a low risk activity. Female-to-female transmission of HIV via cunnilingus and female-to-male transmission of HIV via cunnilingus can happen. Both of these cases involved transmission from receptive partner (the one receiving oral sex) to the insertive partner (the one performing oral sex) (POZ, 2017).

1.5.7 Oral-Anal Sex

Oral-anal sex is often referred to as anilingus. Anilingus, or "rimming," is not considered to be an independent risk factor for HIV. However, it has been shown to be a route of transmission for hepatitis A and B, as well as parasitic infections like giardiasis and amebiasis (POZ, 2017).

1.5.8 Digital-Anal or Digital-Vaginal Sex

Digital-anal or digital-vaginal sex is the clinical term for "fingering" either the anus or the female genitals (including the vagina). While it is theoretically possible that someone who has an open cut or fresh abrasion on his or her finger or hand can be infected with HIV if coming into contact with blood in the anus or vagina or vaginal secretions, there has never been a documented case of HIV transmission via fingering (POZ, 2017).



Figure 1.3: HIV transmission (POZ, 2017)

1.6 Risk behaviors for HIV infection

- Having vaginal or anal sex without using a condom with someone who is HIV-positive or whose HIV status you don't know
- Injecting drugs and sharing needles, syringes, or other drug equipment with others
- Exchanging sex for money or drugs
- Having a sexually transmitted disease (STD), such as syphilis
- Having hepatitis or tuberculosis (TB) (AIDSinfo, 2017b).

1.7 Common myths about how HIV is spread

These are some of the circumstances you don't have to worry about because they will not put you at risk for becoming infected with HIV:

- Being bitten by a mosquito or other bug or being bitten by an animal.
- Eating food handled, prepared or served by somebody who is HIV positive.
- Sharing toilets, telephones or clothing.
- Sharing forks, spoons, knives or drinking glasses.
- Touching, hugging or kissing a person who is HIV positive.
- Attending school, church, restaurants, shopping malls or other public places where there are HIV-positive people.

HIV is not transmitted though saliva, urine, feces, vomit or sweat (POZ, 2017).

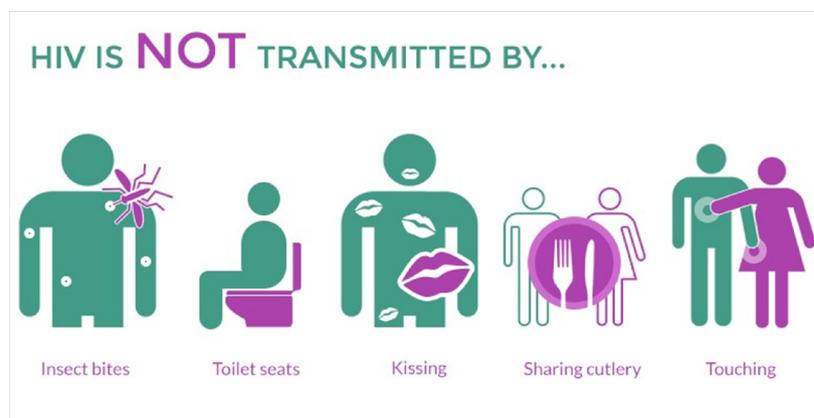


Figure 1.4: Myths about routes of transmission for HIV (POZ, 2017)

1.8 Symptoms of HIV

1.8.1 HIV symptoms in men

The symptoms of HIV can vary greatly from person to person. No two men with HIV will likely experience the exact same symptoms. However, an HIV infection in men will generally follow this pattern:

- **Acute illness**

Approximately 80 percent of people who are infected with HIV experience flu-like symptoms within two to four weeks of becoming infected. This flu-like illness is known as acute HIV infection. It's the primary stage of the infection and lasts until the body has created antibodies against the HIV virus (Story, 2016).

The most common symptoms of acute HIV include:

- body rash
- fever
- sore throat
- severe headaches

Less common symptoms may include:

- fatigue
- swollen lymph nodes
- ulcers in the mouth or on the genitals
- muscle aches
- joint pain
- nausea and vomiting
- night sweats

Symptoms typically last 1 to 2 weeks (Story, 2016).

- **Asymptomatic period**

After the initial symptoms disappear, HIV may not cause any other symptoms for months or years. During this time, the virus replicates within the person's body and begins to weaken his immune system. The person won't feel or look sick, but the virus is still active. The person can easily transmit it to others. This is why early testing, even when the person feels fine, is so important (Story, 2016).

- **Advanced infection**

It may take some time, but HIV may eventually break down a person's immune system. Once this happens, HIV will progress to AIDS, which is the last stage of infection. At this point, the person's immune system is severely damaged, making him more susceptible to opportunistic infection (Story, 2016).

1.8.2 HIV symptoms in women

- **Early symptoms**

In the early weeks after becoming infected with HIV, it's not uncommon for people to be without symptoms. Some people may have mild flu-like symptoms, including:

- fever
- headache
- lack of energy

Often, these symptoms go away within a few weeks. In some cases, it may take as many as 10 years for more severe symptoms to appear (Pietrangelo, 2016).

- **Skin rashes and skin sores**

Most people with HIV develop skin problems. Rash is the most common symptom of HIV. In a person with HIV, the skin can become extremely sensitive to irritants and sunlight. A rash may appear as a flat red patch with small bumps, and skin may become flaky. Sores, or lesions, may form on the skin of the mouth, genitals, and anus, and may be difficult to treat. People with HIV are also at increased risk of herpes and shingles. With proper medication, skin problems may become less severe (Pietrangelo, 2016).

- **Swollen glands**

We all have lymph nodes throughout our bodies, including the neck, back of the head, armpits, and groin. As part of the immune system, our lymph nodes fend off infections by storing immune cells and filtering for harmful substances. As the HIV infection begins to spread, the immune system kicks into high gear. The result is enlarged lymph nodes, commonly known as swollen glands. It's often one of the first signs of HIV. In people infected with HIV, swollen glands may last for several months (Pietrangelo, 2016).

- **Infections**

HIV makes it harder for the immune system to fight off germs, so it's easier for opportunistic infections to take hold. Some of these include pneumonia, tuberculosis, and hepatitis C. People with HIV are more prone to infections of the skin, eyes, lungs, kidneys, digestive tract, and brain. It may also be more difficult to treat common ailments like the flu. Taking extra precautions, including frequent hand washing and taking HIV medications, can help prevent some of these illnesses and their complications (Pietrangelo, 2016).

- **Fever and night sweats**

People infected with HIV may experience long periods of low-grade fever. A temperature between 99.8°F and 100.8°F (37.6°C and 38.2°C) is considered to be a low-grade fever. Your body develops a fever when something is wrong, but the cause isn't always obvious. Because it's a low-grade fever, those who are unaware of their HIV-positive status may ignore the symptom. Sometimes, night sweats that can interfere with sleep may accompany fever (Pietrangelo, 2016).

- **Menstrual changes**

Women with HIV can have changes to their menstrual cycle. Your period may be lighter or heavier than normal, or you may not have a period at all. You may also have more severe premenstrual symptoms (Pietrangelo, 2016).

- **Bacterial and yeast infections**

Bacterial and yeast infections may be more common in women who are HIV-positive. They may also be harder to treat (Pietrangelo, 2016).

- **Sexually transmitted infections (STIs)**

HIV also increases your risk of getting STIs, including:

- chlamydia
- trichomoniasis
- gonorrhea
- human papillomavirus (HPV), which can lead to genital warts or even cervical cancer

If someone has genital herpes, his outbreaks may be worse and happen more often. Also, his body may not respond as well to the herpes treatment (Pietrangelo, 2016).

- **Pelvic inflammatory disease (PID)**

PID is an infection of uterus, fallopian tubes, and ovaries. PID in HIV-positive women may be harder to treat. Also, symptoms may last longer than usual or return more often (Pietrangelo, 2016).

- **Advanced symptoms of HIV and AIDS**

As HIV progresses, symptoms can include:

- diarrhea
- nausea and vomiting
- weight loss
- severe headache
- joint pain
- muscle aches
- shortness of breath
- chronic cough
- trouble swallowing

In the later stages, HIV can lead to:

- short-term memory loss
- mental confusion
- coma (Pietrangelo, 2016).

At this stage, the immune system is severely compromised and infections become increasingly hard to fight off. Certain cancers mark the transition from HIV to AIDS. These are called “AIDS-defining cancers” and include Kaposi sarcoma and non-Hodgkin’s lymphoma. They also include cervical cancer, which is specific to women (Pietrangelo, 2016).

1.9 HIV testing

HIV testing can detect HIV infection, but it can’t tell how long a person has been infected with HIV or if the person has AIDS.

1.9.1 Importance of HIV testing

Knowing a person’s HIV status can help keep him and others safe (AIDSinfo, 2017b).

1.9.2 HIV test for pregnant woman

CDC recommends that all pregnant women get tested for HIV as early as possible during each pregnancy. Women who are planning to get pregnant should also get tested. Women with HIV take HIV medicines during pregnancy and childbirth to reduce the risk of mother-to-child transmission of HIV. HIV medicines used as recommended during pregnancy can reduce the risk of mother-to-child transmission of HIV to less than 1% (AIDSinfo, 2017b).

1.10 HIV Diagnosis

Blood tests are the most common way to diagnose HIV. These tests look for antibodies to the virus that the body creates in an attempt to fight the virus. People exposed to the virus should get tested immediately, although it can take the body anywhere from six weeks to a year to develop antibodies to the virus. Follow-up tests may be needed depending on the

initial time of exposure. Early testing is crucial. If someone tests positive for the virus, he and his doctor will discuss and develop a treatment plan that can help fight HIV and ward off complications. Early testing also can alert the person to avoid high-risk behavior that can spread the virus to others. During testing, doctor will ask about his symptoms, medical history and risk factors and perform a physical examination (UCSF Medical Center, 2017).

1.11 Types of HIV tests

There are three main types of HIV tests: antibody tests, combination tests (antibody/antigen tests), and nucleic acid tests (NATs). How soon each test can detect HIV infection differs because each test has a different window period. The window period is the time between when a person gets HIV and when a test can accurately detect HIV infection (AIDSinfo, 2017b).

- **Antibody test:** It checks for HIV antibodies in blood or fluids from the mouth. HIV antibodies are disease-fighting proteins that the body produces in response to HIV infection. It can take 3 to 12 weeks for a person's body to make enough antibodies for an antibody test to detect HIV infection. (In other words, the window period for antibody tests in most people is somewhere between 3 to 12 weeks from the time of infection.) (AIDSinfo, 2017b).
- **Combination test (antibody/antigen test):** It can detect both HIV antibodies and HIV antigens (a part of the virus) in blood. A combination test can detect HIV infection before an HIV antibody test. It can take 2 to 6 weeks for a person's body to make enough antigens and antibodies for a combination test to detect HIV infection (AIDSinfo, 2017b).
- **RNA test:** It looks for the virus itself and can diagnose HIV about 10 days after a person has been exposed. It's expensive, though, so it's usually not the first test. But if a person is at high risk and he has flu-like symptoms, his doctor may want to use it (AIDSinfo, 2017b).
- **NAT:** It looks for HIV in the blood. NATs can detect HIV infection about 7 to 28 days after a person has been infected with HIV. NATs are very expensive and not routinely used for HIV screening unless the person had a high-risk exposure or a possible exposure with early symptoms of HIV infection (AIDSinfo, 2017b).

A person's initial HIV test will be either an antibody test or a combination test (AIDSinfo, 2017b).



Figure 1.5: HIV Tests (AIDSinfo, 2017b)

1.12 HIV test for home use

There are two HIV tests approved by the U.S. Food and Drug Administration (FDA) for home use. Both are HIV antibody tests. The Home Access HIV-1 Test System is a home collection kit, which involves pricking the finger for a blood sample, sending the sample to a lab for testing, and then calling the lab for results as early as the next business day. If the result is positive for HIV, the lab will do a follow-up test on the same blood sample to confirm the initial HIV-positive test result. The Ora Quick In-Home HIV Test comes with a test stick and a tube with a testing solution. The test stick is used to swab the gums to get a sample of oral fluids. To get results, the test stick is inserted into the test tube. Test results are ready in 20 minutes. A positive result on this home HIV test must always be confirmed by additional HIV testing performed in a health care setting (AIDSinfo, 2017b).

1.13 Interpretation of HIV test

If a person is HIV-negative

Testing shows that the person doesn't have HIV. Continue taking steps to avoid getting HIV, such as using condoms during sex and taking medicines to prevent HIV if the person is at high risk of becoming infected with HIV (pre-exposure prophylaxis or PrEP).

If the initial test result is negative and the test was done during the window period, re-testing should be done 3 months after the possible exposure to HIV. It usually takes a few days to a few weeks to get results of an HIV test. Some rapid HIV tests can produce results within 30 minutes (AIDSinfo, 2017b).

If a person is HIV-positive

Testing shows that the person is infected with HIV, but he can still take steps to protect his health. Begin by talking to his health care provider about antiretroviral therapy (ART). ART is the use of HIV medicines to treat HIV infection. People on ART take a combination of HIV medicines every day. ART helps people with HIV live longer, healthier lives. ART also reduces the risk of transmission of HIV. People infected with HIV should start ART as soon as possible. Health care provider will help the person decide what HIV medicines to take. The Centers for Disease Control and Prevention (CDC) recommends that everyone 13 to 64 years old get tested for HIV at least once. As a general rule, people at high risk for HIV infection should get tested each year. Sexually active gay and bisexual men may benefit from getting tested more often, such as every 3 to 6 months (AIDSinfo, 2017b).

1.14 Complications

HIV infection weakens your immune system, making you highly susceptible to numerous infections and certain types of cancers.

1.14.1 Infections common to HIV/AIDS

- **Tuberculosis (TB):** TB is the most common opportunistic infection associated with HIV and a leading cause of death among people with AIDS (Mayo Clinic, 2015).
- **Cytomegalovirus:** This common herpes virus is transmitted in body fluids such as saliva, blood, urine, semen and breast milk. A healthy immune system inactivates the virus, and it remains dormant in your body. If a person's immune system weakens, the virus resurfaces — causing damage to your eyes, digestive tract, lungs or other organs.

- **Candidiasis:** Candidiasis is a common HIV-related infection. It causes inflammation and a thick, white coating on the mucous membranes of your mouth, tongue, esophagus or vagina (Mayo Clinic, 2015).
- **Cryptococcal meningitis:** Meningitis is an inflammation of the membranes and fluid surrounding the brain and spinal cord (meninges). Cryptococcal meningitis is a common central nervous system infection associated with HIV, caused by a fungus found in soil.
- **Toxoplasmosis:** This potentially deadly infection is caused by *Toxoplasma gondii*, a parasite spread primarily by cats. Infected cats pass the parasites in their stools, and the parasites may then spread to other animals and humans.
- **Cryptosporidiosis:** This infection is caused by an intestinal parasite that's commonly found in animals. The parasite grows in the intestines and bile ducts, leading to severe, chronic diarrhea in people with AIDS (Mayo Clinic, 2015).

1.14.2 Cancers common to HIV/AIDS

- **Kaposi's sarcoma:** A tumor of the blood vessel walls, this cancer is rare in people not infected with HIV, but common in HIV-positive people. Kaposi's sarcoma usually appears as pink, red or purple lesions on the skin and mouth. In people with darker skin, the lesions may look dark brown or black. Kaposi's sarcoma can also affect the internal organs, including the digestive tract and lungs (Mayo Clinic, 2015).
- **Lymphomas:** This type of cancer originates in white blood cells and usually first appears in lymph nodes. The most common early sign is painless swelling of the lymph nodes in neck, armpit or groin (Mayo Clinic, 2015).

1.14.3 Other complications

- **Wasting syndrome:** Aggressive treatment regimens have reduced the number of cases of wasting syndrome, but it still affects many people with AIDS. It's defined as a loss of at least 10 percent of body weight, often accompanied by diarrhea, chronic weakness and fever (Mayo Clinic, 2015).
- **Neurological complications:** Although AIDS doesn't appear to infect the nerve cells, it can cause neurological symptoms such as confusion, forgetfulness, depression, anxiety and difficulty walking. One of the most common neurological

complications is AIDS dementia complex, which leads to behavioral changes and diminished mental functioning (Mayo Clinic, 2015).

- **Kidney disease:** HIV-associated nephropathy (HIVAN) is an inflammation of the tiny filters in kidney that remove excess fluid and wastes from bloodstream and pass them to urine. Because of a genetic predisposition, the risk of developing HIVAN is much higher in blacks. Regardless of CD4 count, antiretroviral therapy should be started in those diagnosed with HIVAN (Mayo Clinic, 2015).

1.15 High rates of heart disease in people with HIV

The rate of heart diseases are high in people living with HIV.

The researchers estimated the risk of heart attacks, strokes and other forms of heart disease in three populations:

- The general population of the United States.
- HIV-negative people who are at high risk of acquiring HIV and who have similar rates of smoking and alcohol use as HIV-positive people.
- HIV-positive people in the United States.

In all the three groups of men are more prone to heart disease with increase to age. Even it is more higher who have HIV. In general by comparing the groups we find that heart rate increase with increasing age (aidsmap, 2017).

1.16 Preventive measure for HIV

- **Condoms**

A condom is the most effective form of protection against HIV and other STIs. It can be used for vaginal and anal sex, and for oral sex performed on men. HIV can be passed on before ejaculation, through pre-come and vaginal secretions, and from the anus. It is very important that condoms are put on before any sexual contact occurs between the penis, vagina, mouth or anus (Avert, 2017c).

- **Lubricant**

Lubricant can make sex safer by reducing the risk of vaginal or anal tears caused by dryness or friction, and it can also prevent a condom from tearing. Only water-based

lubricant (such as K-Y Jelly) rather than an oil-based lubricant (such as Vaseline or massage and baby oil) should be used with condoms. (Avert, 2017c).

- **Dental dams**

A dental dam is a small sheet of latex that works as a barrier between the mouth and the vagina or anus to reduce the risk of STIs during oral sex (Avert, 2017c).

- **Sharing needles and injecting equipment**

If a person injects drugs, he should not share needles or syringes, or other injecting equipment such as spoons and swabs, as this could be exposed to HIV and other viruses found in the blood, such as hepatitis C. A GP or drug counsellor should be able to advise the person about both needle exchange programmes and methadone programmes. If a person is having a tattoo or piercing, it's important that a clean, sterilised needle is always used (NHS choices, 2017).

- **Monogamy**

The idea of monogamy as a preventive for HIV infection originated in the gay male community in the earliest months of the AIDS epidemic. At that time, all that was known about the cause of AIDS was that it seemed correlated with having had large numbers of sexual partners. As the medical community learned more about how HIV can be transmitted and as tests for HIV infection became widely available, safer-sex interventions began to stress barrier methods like condoms over partner-selection methods like monogamy. Many social conservatives also encourage monogamy, although they are concerned more often with morality than with public health (Fox, 1998).

As a strategy for HIV prevention, however, monogamy can be highly problematic. Because the epidemiological value of monogamy is so intertwined with its emotional and interpersonal meanings, prevention educators believe that in some cases it can actually be a barrier to prevention rather than an aid. A partner in a monogamous relationship who slips and has a sexual contact outside the relationship, which may put him or her at risk for HIV infection, may be afraid to tell the primary partner about the contact for fear of the partner's response to this dual betrayal. In such situations, the offending partner may feel forced to conceal the marital breach from the other partner and may even deny to him- or herself that the event occurred, thereby increasing the likelihood of infecting the

partner. This may be the case even when partners have adopted the strategy of "negotiated risk" -- in which partners agree to predetermine the level of sexual risk they feel comfortable with -- and have established a standing agreement acknowledging the reality that unsafe extramarital sexual encounters may occur and that the viability of the couple depends upon their ability to openly discuss such encounters (Fox, 1998).

1.17 Education banishes myths and stigmas

When HIV first emerged, being HIV positive was a death sentence with a huge stigma attached to it. Researchers have studied transmission extensively and developed treatments that allow many people who are infected to live long, productive lives. Today, the stigma isn't as great because more people understand the way HIV is spread. But let's not stop there. Continued education is the key to banishing the myths and the spread of HIV (Roth, 2016).

1.18 Treatment

To protect health, it is important to get on and stay on HIV treatment. HIV treatment is important because it helps the body to fight HIV. Most people living with HIV who don't get treatment eventually develop AIDS. If left untreated, HIV attacks the immune system and can allow different types of life-threatening infections and cancers to develop. If a person's CD4 cell count falls below a certain level, he is at risk of getting an opportunistic infection. These are infections that don't normally affect people with healthy immune systems but that can infect people with immune systems weakened by HIV infection. HIV treatment is most likely to be successful when a person knows what to expect and are committed to taking his medicines exactly as prescribed. Working with the health care provider to develop a treatment plan will help a person to learn more about HIV, manage it effectively, and make decisions that help the person to live a longer, healthier life (HIV.gov, 2017).

1.18.1 Approved HIV Drugs

Different classes or groups of HIV drugs block different steps of HIV's lifecycle. There are currently six classes of HIV drugs approved by the US Food and Drug Administration (FDA):

- **Entry Inhibitors:** These drugs stop (inhibit) HIV from entering a CD4 cell. There are different types of entry inhibitors - fusion inhibitors and receptor blockers (CCR5 antagonists). One of each type is approved:
 - Fusion inhibitor: enfuvirtide or T-20
 - CCR5 antagonist: maraviroc
- **Integrase Inhibitors:** These drugs interfere with HIV's integrase enzyme. There are three approved integrase inhibitors:
 - raltegravir
 - dolutegravir
 - elvitegravir (thewellproject, 2017).
- **Nucleoside and Nucleotide Reverse Transcriptase Inhibitors (NRTIs or "nukes"):** These drugs interfere with HIV's reverse transcriptase enzyme. There are many approved NRTIs:
 - emtricitabine or FTC
 - lamivudine or 3TC
 - zidovudine or AZT
 - TAF; in Descovy and Genvoya below
 - didanosine or ddI
 - Tenofovir disoproxil fumarate or TDF
 - stavudine or d4T
 - abacavir (thewellproject, 2017).
- **Non-Nucleoside Reverse Transcriptase Inhibitors (NNRTIs or "non-nukes"):** Like NRTIs, these drugs interfere with HIV's reverse transcriptase enzyme. There are a number of approved NNRTIs:
 - rilpivirine or RPV
 - etravirine or ETR
 - delavirdine
 - efavirenz
 - nevirapine
- **Protease Inhibitors (PIs):** These drugs interfere with HIV's protease enzyme. There are many approved PIs:
 - tipranavir
 - indinavir
 - saquinavir

- lopinavir plus ritonavir
 - fosamprenavir
 - ritonavir
 - darunavir
 - atazanavir
 - nelfinavir (thewellproject, 2017).
- **Fixed-Dose Combinations:** Although not a separate class, there are fixed-dose drugs that combine two or more HIV drugs from one or more classes in just one pill. This can make dosing easier. There are seven combination pills approved:
- Sustiva plus Emtriva plus Viread
 - Retrovir plus Epivir
 - Emtriva plus Viread plus Edurant
 - Emtriva plus tenofovirafenamide (TAF)
 - Epivir plus Ziagen
 - Reyataz plus Tybost
 - Vitekta plus Tybost plus Emtriva plus tenofovirafenamide fumarate (TAF)
 - Emtriva plus tenofovirafenamide (TAF) plus Edurant
 - Prezista plus Tybost
 - Emtriva plus Viread plus Vitekta plus Tybost
 - Ziagen plus Tivicay plus Epivir
 - Retrovir plus Epivir plus Ziagen
 - Emtriva plus Viread (thewellproject, 2017).
- **Boosting Agents:** These drugs do not affect HIV's lifecycle; rather, they improve, or 'boost' the level of other drugs in the blood stream so that the other HIV drugs can be taken at a lower dose.
- ritonavir
 - Cobicistat (thewellproject, 2017).

1.18.2 Combining HIV Drugs

Health care providers often combine drugs from different classes in order to attack HIV at more than one step in its lifecycle. This is because HIV can make changes, called

mutations, when it reproduces. Some mutations stop HIV drugs from working. When this happens, we say that HIV has become resistant to that HIV drug. If someone takes only one drug (monotherapy) or take a few drugs that all belong to one class, it is easy for HIV to develop mutations that make it resistant to that drug or drug class. However, if someone takes a combination of drugs from different classes, HIV has a much harder time changing enough to develop drug mutations and resistance. It means that combination therapy with drugs that block HIV at different steps of its lifecycle can prevent most of the production of new HIV. Most importantly, it means slower disease progression and longer life for people living with HIV (thewellproject, 2017).

1.18.3 The Bottom Line

Currently six classes of HIV drugs target four steps of HIV's lifecycle. Attacking HIV on multiple fronts by combining drugs from different classes is the best way to slow or stop HIV reproduction. It is also the best way to prevent the development of drug resistance. The approval of new classes of HIV drugs—and new drugs in the classes already available—will continue to provide more treatment options for people living with HIV in the future (thewellproject, 2017).

1.18.4 Emergency HIV drugs

If someone think she has been exposed to the virus within the last 72 hours (three days), anti-HIV medication may stop him becoming infected. For it to be effective, the medication, called post-exposure prophylaxis or PEP, must be started within 72 hours of coming into contact with the virus. It is only recommended following higher risk exposure, particularly where the sexual partner is known to be positive. The quicker PEP is started the better, ideally within hours of coming into contact with HIV. The longer the wait, the less chance of it being effective. PEP has been misleadingly popularised as a “morning-after pill” for HIV – a reference to the emergency pill women can take to prevent getting pregnant after having unprotected sex. But the description is not accurate. PEP is a month-long treatment, which may have serious side effects and is not guaranteed to work. The treatment involves taking the same drugs prescribed to people who have tested positive for HIV (test.hiv, 2015).

1.18.5 Antiretroviral drugs

HIV is treated with antiretrovirals (ARVs), these work by stopping the virus replicating in the body, allowing the immune system to repair itself and preventing further damage. A combination of ARVs is used because HIV can quickly adapt and become resistant to one single ARV. Patients tend to take three or more types of ARV medication. This is known as combination therapy or antiretroviral therapy (ART). Some antiretroviral drugs have been combined into one pill, known as a "fixed dose combination". This means that the most common treatments for people just diagnosed with HIV involve taking just one or two pills a day. Different combinations of ARVs work for different people so the medicine someone takes will be individual to him. Once HIV treatment is started, the person will probably need to take the medication for the rest of life. For the treatment to be continuously effective, it will need to be taken regularly every day. Not taking ARVs regularly may cause the treatment to fail. Many of the medicines used to treat HIV can interact with other medications prescribed by GP or bought over-the-counter. These include herbal remedies such as St John's Wort, as well as recreational drugs (test.hiv, 2015).

1.19 HIV patients with another condition

If a patient has also been diagnosed with hepatitis B or hepatitis C, it is recommended that they start treatment when their CD4 count falls below 500. Treatment is recommended to begin at any CD4 count if they are on radiotherapy or chemotherapy that will suppress the immune system, or if they have been diagnosed with certain other illnesses, including:

- Tuberculosis
- HIV-related nephropathy (kidney disease)
- HIV-related neurocognitive (brain) illnesses (test.hiv, 2015).

1.19.1 Pregnancy

ARV treatment is available to prevent a pregnant woman from passing HIV to her child. Without treatment, there is a one in four chance that the baby will become infected with HIV. With treatment, the risk is less than one in 100. Advances in treatment mean there is no increased risk of passing the virus to the baby with a normal delivery. However, for some women, a caesarean section may still be recommended (test.hiv, 2015).

1.20 Missing a dose

HIV treatment only works if a person takes pills regularly every day. Missing even a few doses will increase the risk of treatment not working (test.hiv, 2015).

1.21 Side effects of antiretroviral therapy (ART)

Like most medicines, antiretroviral therapy (ART) can cause side effects. However, not everyone experiences side effects from ART. The HIV medications used today have fewer side effects, fewer people experience them, and they are less severe than in the past. Side effects can differ for each type of ART medicine and from person to person. Some side effects can occur once someone starts a medicine and may only last a few days or weeks. Other side effects can start later and last longer. If the person experiences side effects he should stop taking HIV medication. Skipping doses or starting and stopping medication can lead to drug resistance, which can harm the health and limit future treatment options

Some side effects of ART that are most commonly reported include:

- Nausea and vomiting,
- Diarrhea,
- Difficulty sleeping,
- Dry mouth,
- Headache,
- Rash,
- Dizziness,
- Fatigue, and
- Pain (HIV.gov, 2017).

1.22 Drug interactions

HIV medicines can interact with other HIV medicines in an HIV regimen. They can also interact with other medicines, vitamins, nutritional supplements, and herbal products. A drug interaction can reduce or increase a medicine's effect on the body. Drug interactions can also cause unwanted side effects (AIDSinfo, 2017c).

1.23 Drug Resistance

Drug resistance can be a cause of treatment failure for people living with HIV. As HIV multiplies in the body, the virus sometimes mutates (changes form) and produces variations of itself. Variations of HIV that develop while a person is taking HIV medicines can lead to drug-resistant strains of HIV. With drug resistance, HIV medicines that previously controlled a person's HIV are not effective against new, drug-resistant HIV. In other words, the HIV medicines can't prevent the drug-resistant HIV from multiplying. Drug resistance can cause HIV treatment to fail. A person can initially be infected with drug-resistant HIV or develop drug-resistant HIV after starting HIV medicines. Drug-resistance testing identifies which, if any, HIV medicines won't be effective against a person's HIV. Drug-resistance testing results help determine which HIV medicines to include in an HIV treatment regimen. Medication adherence—taking HIV medicines every day and exactly as prescribed—reduces the risk of drug resistance (HIV.gov, 2017).

1.24 Future approaches for HIV management

1.24.1 Functional cures

A functional cure would suppress the amount of HIV virus in the body to such low levels it can't be detected or make someone ill – but it would still be present. Some scientists argue that antiretroviral treatment is now effectively a functional cure, but most scientists still see a functional cure suppressing the virus without the need for ongoing antiretroviral treatment. There are a few examples of people considered to have been functionally cured, such as the Mississippi Baby, but sadly all have subsequently seen the virus re-emerge. Most of these people received antiretroviral treatment very quickly after infection or birth (Avert, 2017d).

1.24.2 Sterilising cures

A sterilising cure is one where all HIV virus is eradicated from the body, even from hidden reservoirs. In 2007-8, Brown had chemotherapy and a bone marrow transplant to treat leukaemia. His transplant also came from someone with natural genetic resistance to HIV. This seems to have cured his HIV but it's still not fully understood why. Because

bone marrow transplants are also very dangerous, this type of transplant is not practical as a cure for others (Avert, 2017d).

1.24.3 Researching for a cure

There are four main research approaches being looked at for a cure:

- ‘Shock and kill’ approaches aim to flush the virus out of its reservoirs and then kill the infected cells.
- Gene editing aims to change immune cells so they can’t be infected by HIV.
- ‘Immune modulation’ is looking for ways to permanently change the immune system to better fight HIV.
- Stem cell transplants, as used in the case of the Berlin patient, aim to completely eliminate a person’s infected immune system and replace with a donor system. This is the most complex and risky approach.
- There has also been lots of research into an HIV vaccine, with a number of trials showing some encouraging results. However, a vaccine would only offer partial protection and would need to be used in combination with other treatments (Avert, 2017d).

1.25 Global HIV and AIDS statistics

HIV continues to be a major global public health issue. In 2016, an estimated 36.7 million people were living with HIV (including 1.8 million children) – with a global HIV prevalence of 0.8% among adults. Around 30% of these same people do not know that they have the virus. Since the start of the epidemic, an estimated 78 million people have become infected with HIV and 35 million people have died of AIDS-related illnesses. In 2016, 1 million people died of AIDS-related illnesses. The vast majority of people living with HIV are located in low- and middle- income countries, with an estimated 25.5 million living in sub-Saharan Africa. Among this group 19.4 million are living in East and Southern Africa which saw 44% of new HIV infections globally in 2016.

In 2016, there were roughly 1.8 million new HIV infections - a decline from 2.1 million new infections in 2015. There has previously been concern that the annual number of new

infections among adults would remain static, as incidence rates failed to shift between 2010 and 2015. However, a slightly more positive trend is emerging as new infections among adults are now estimated to have declined by 11% - and 16% for the general population - between 2010 and 2016, whereas there was only an 8% decline between 2010 and 2015. While new HIV infections among children globally have halved, from 300,000 in 2010 to 160,000 in 2016 (47%), reports indicate that there is much more that needs to be done to improve knowledge of HIV and HIV testing among adolescents and young adults. Young women are especially at risk, with 59% of new infections among young people aged 15-24 occurring among this group. Moreover, despite the progress made across the 69 countries which witnessed a decline in new infections, UNAIDS warned that progress in combating viral transmission is still not happening fast enough to meet global targets. A closer comparison of country data shows huge discrepancies in efforts to slow the spread of new infections. Some countries have achieved a decline of 50% or more in new HIV infections among adults over the last 10 years, while many have made no measurable progress. Yet some countries are still experiencing worrying increases in new HIV infections.¹¹ Since 2010, the annual number of new infection in the Eastern Europe and Central Asia region, for example, has climbed by an alarming 60% since 2010 (Avert, 2017e).

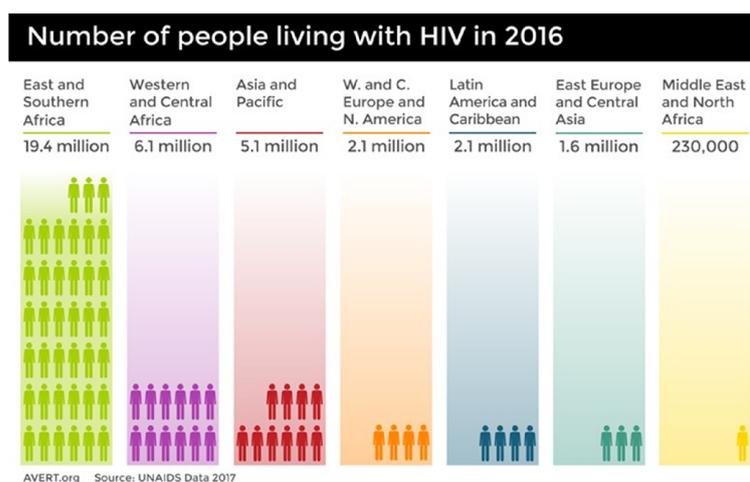


Figure 1.6: Global HIV statistics (Avert, 2017e)

1.25.1 HIV and AIDS estimates in Bangladesh (2016)

Adults and children living with HIV: 12 000 [10 000 - 14 000]

Adult aged 15 to 49 HIV prevalence rate: <0.1 [<0.1 - <0.1]

HIV incidence per 1000 population (adults 15-49): 0.02 [0.01 - 0.02]

Adult and child deaths due to AIDS: 1000 [<1000 - 1100]

Orphans due to AIDS aged 0 to 17: 7900 [6400 - 9400] (UNAIDS, 2017).

The first case of HIV/AIDS in Bangladesh was detected in 1989. Since then 1495 cases of HIV/AIDS have been reported (as of December 2008). However UNAIDS estimates that the number of people living with HIV in the country may be as high as 12,000, which is within the range of the low estimate by UNICEF's State of the World's Children Report 2009. The overall prevalence of HIV in Bangladesh is less than 1%, however, high levels of HIV infection have been found among injecting drug users (7% in one part of the capital city, Dhaka¹). Due to the limited access to voluntary counseling and testing services, very few Bangladeshi's are aware of their HIV status (unicef, 2009).

CHAPTER 2
LITERATURE REVIEW

The study was conducted to determine the knowledge among secondary school students regarding HIV/AIDS and provide suggestions for HIV/AIDS education in schools. A cross-sectional study was conducted among students of tenth to twelfth standard in the intermediate schools of Lucknow, India, from July to October 2011. A total of 215 students, both boys and girls, were enrolled in the study. In this study, for majority of the students (85%), the source of information about HIV/AIDS was the television. Regarding knowledge about modes of transmission of HIV/AIDS among girl students, 95.1% of them told that it is through unprotected sex. A total of 75.8% students said that it was transmitted from mother to child. It was observed that the knowledge of the school students was quite satisfactory for most of the variables like modes of transmission, including mother-to-child transmission of the disease. However, schools should come forward to design awareness campaigns for the benefit of the students (Gupta *et al.*, 2013).

This study assesses knowledge and attitudes concerning HIV infection and individuals with AIDS among 383 female students attending colleges in Nagasaki, Japan. A structured questionnaire containing questions concerning knowledge about AIDS, sources of information, beliefs and attitudes toward people with HIV/AIDS was administered during sessions set up for that purpose. The mean age of participants was 18.8 ± 0.8 years (\pm SD). The main source of information for AIDS awareness as reported by the students was the mass media. Good knowledge about AIDS was positively associated with ease of acceptance of living in the same house with a person diagnosed with AIDS [odds ratio (OR): 1.90; 95% confidence interval (CI): 1.07–3.38]. However, residing at home (OR: 0.64; 95% CI: 0.42–0.98) and involvement in nurse education programmes (OR: 0.59; 95% CI: 0.37–0.95) showed a negative association. Students demonstrated a high level of knowledge concerning AIDS and HIV, but had considerable misconceptions and prejudices about people having HIV/AIDS. Our results suggest that a more appropriate education programme in colleges in Japan may be necessary to reduce the discrepancy between general knowledge and desirable attitude regarding HIV/AIDS (Maswanya *et al.*, 2000)

The study was a school-based intervention conducted in three middle schools and two high schools in Wuhan, China, which included 702 boys and 766 girls, with ages from 11 to 18 years old. The intervention was a one-class education program about HIV/AIDS for

participants. HIV/AIDS knowledge, attitude, and high-risk behaviors were investigated using an anonymous self-administered questionnaire before and after the education intervention. Chi-square test was used to compare differences before and after the intervention. Non-conditional logistic regression analysis was used to identify the factors that affect HIV/AIDS knowledge. Misconceptions about basic medical knowledge and non-transmission modes of HIV/AIDS among all the students prevail. Approximately 10% to 40% of students had negative attitudes about HIV/AIDS before the intervention. After the intervention, all of the students had significant improvements in knowledge and attitude about HIV/AIDS ($P < .05$), indicating that educational intervention increased the students' knowledge significantly and changed their attitudes positively. Logistic regression analyses indicated that before the intervention the students' level of knowledge about HIV/AIDS was significantly associated with grade, economic status of the family, and attitudes toward participation in HIV/AIDS health information campaigns. HIV/AIDS education programs were welcomed by secondary students and positively influenced HIV/AIDS-related knowledge and attitudes. A systematic and long-term intervention among secondary school students must be conducted for the prevention of HIV (Gao *et al.*, 2012).

To assess the awareness regarding HIV/AIDS among college students in Chennai. We approached the Arts and Science College for conducting HIV awareness program for the students. We requested all the students to take a sheet of paper and write whatever questions they have in their mind about HIV/AIDS. There were about 400 students, 200 Arts group students and 200 Science group students, out of 400 students 275 were males and 125 were females. All the students were heard about HIV/AIDS, Condom and Sexual contact, but most of them are not aware of mode of transmission and preventive measures. The findings of the study show that Even though all the college students have heard about HIV/AIDS. Most of them are not aware about the mode of transmission and preventive measures. Young people are more vulnerable and are less covered by HIV/AIDS prevention programmes. These study results can be useful in directing future efforts at creating awareness about HIV/AIDS (Chandramohan & Raj, 2014).

This study assessed levels of knowledge, attitudes, and perceived susceptibility to AIDS among freshman college students attending a university in the southeastern United States. Two hundred and twenty-six students completed a modified version of the Di Clemente

AIDS knowledge, Attitudes, and Perceived Susceptibility to AIDS Instrument. A comparison of the findings with data collected earlier in two similar studies shows that adolescents today are generally more knowledgeable about AIDS than they were in the past. There were no differences in AIDS knowledge between those students who had received AIDS education in high school (38%) and those who had not (62%). In spite of increases in knowledge, however, over half (54.7%) of the subjects believed that they were less likely than most people to get AIDS (Adame *et al.*, 2015).

HIV testing was positively associated with HIV-related risk behaviors among sexually active high school students. However, HIV testing remained relatively low (22%) between 2005 and 2011, even for those engaging in risk behaviors. Results differed among the only 7 states that monitored HIV testing through YRBS, most commonly with respect to HIV testing and condom use. Routine HIV testing is critical for early identification of HIV, which was set as a priority in a recent Executive Order. Our data suggest further efforts are needed to achieve widespread uptake of HIV testing among high school students. Furthermore, differences observed across states likely reflect different needs and should be followed up closely by states. Finally, having accurate data that reflects the reality of youths' lives is crucial for efficient prevention planning. Thus, more states should consider collecting HIV testing data to evaluate uptake of HIV testing among youth (Coeytaux *et al.*, 2014).

African American young adults are disproportionately affected by the HIV/AIDS epidemic and often unaware of their personal risk for HIV. Historically black colleges and universities (HBCUs) enroll 25% of college-educated African American young adults and can play an important role in HIV prevention. We examined HIV/AIDS knowledge of students at HBCUs to inform and strengthen our HIV prevention efforts at HBCUs. African American undergraduate HBCU students completed online surveys assessing HIV/AIDS knowledge and behaviors, and we analyzed data to assess their knowledge and behaviors. A total of 1,051 of 1,230 surveys completed (85.4%) were analyzable. Eighty-two percent of students had average/high HIV knowledge scores. Seventy-nine percent of students surveyed perceived themselves to be at low risk for HIV infection; 64% of those who had at least two or more sex partners had not used a condom at last sex encounter. In the final model, significant independent effects were identified for average/high knowledge of HIV risk, including agreeing with assessing a potential partner's HIV risk

by all of the five actions listed (adjusted odds ratio [AOR]=2.7, 95% confidence interval [CI] 1.7, 4.3) and never using a needle to inject drugs (AOR=55.6, 95% CI 3.2, 9.7). Educating students about effectively assessing sex partner risk will improve HIV knowledge and prevention efforts at HBCUs (Sutton *et al.*, 2011).

This descriptive cross-sectional study was carried out in three high schools in Erbil city from February to April 2014. A sample of 437 students was included in the study from fourth, fifth and sixth stages. A multistage cluster sampling method was used to select the students. Data analysis included descriptive statistics and chi-square association test for categorical variables. The age range of the students was between 14 and 21 years with mean \pm standard deviation of 16.0 ± 0.927 years. All the students had heard about AIDS where around two thirds of students had heard from mass media like TV/Radio. Around 45% of students had good knowledge scores about HIV/AIDS, and 43.7% had acceptable knowledge scores, while only 11.2% had poor knowledge scores. There was a statistically significant association between high knowledge score about HIV/AIDS with older age, male gender, and typical school type ($P < 0.001$). High socio-economic status of students was significantly associated with high score of knowledge about HIV/AIDS ($P = 0.005$). The overall rate of knowledge (acceptable and good) about HIV/AIDS among high school students was high. Socio-demographic characteristics of students have an effect on their knowledge about HIV/AIDS (Othman, 2015).

The aim of this study was to assess the HIV/AIDS-related knowledge among secondary school students in Bangladesh and investigate the association between secondary school students' socio-demographic characteristics and their level of knowledge about HIV/AIDS. Following multistage random sampling technique, a total of 384 students aged 11-17 years were sampled from eight secondary schools and interviewed through a predesigned semi-structured questionnaire. Data analysis was done at three stages including descriptive statistics, bivariate analyses, and multivariate logistic regression. The findings of the study revealed that more than half (55.26%) of the students were above 14 years of age and their ages ranged from 11 to 17 years. This study also found that around three-fourths of the students (75.78%) watched television. With regard to knowledge, this study demonstrated that around two-fifths of the students (36.98%) had very good knowledge about HIV/AIDS and their main sources of HIV/AIDS information were television, newspaper, radio, textbooks, and teachers. The bivariate results of the

study indicated that students' age, gender, type of school, household income, fathers' and mothers' literacy, and watching television were significantly associated with level of knowledge about HIV/AIDS. In addition, students' age, mothers' literacy, and watching television were found as the significant predictors of knowledge about HIV/AIDS. Watching television was documented as the best single predictor. The results of the study strengthen the assumption that there is an influence of students' socio-demographic characteristics upon their knowledge about HIV/ AIDS. Moreover, this study suggests that more information on HIV/AIDS should be included in the textbooks of secondary school students in Bangladesh to enhance their knowledge about the taboo subject (Huda & Amanullah, 2013).

The social context of Bangladesh does not permit adolescents to discuss reproductive health topics as well as sexually transmitted diseases like HIV/AIDS openly with their parents, teachers, or other senior members of the community. The objective of this cross-sectional study was to investigate knowledge regarding HIV/AIDS and views on HIV testing before marrying migrant workers; among rural grade 11 and 12 students in Bangladesh. A total of 92 students completed anonymous, self-administered questionnaire. The average age of the students was 16.8 ± 0.9 years. All the students had heard about AIDS before they completed the questionnaire. Media (75%) was the main source of information. Overall, students had average knowledge regarding selected aspects of HIV/AIDS. A high (>73%) proportion of the students were conversant with the major modes of spread of HIV. Many misconceptions were still noted relating to HIV/AIDS: 40% believed that healthy looking persons cannot be infected with HIV while 27% and 25% believed that coughing/sneezing and mosquito bites spread AIDS, respectively. Majority (75%) of the students indicated that they would not ask to do HIV test before marriage and amongst them more than a quarter reasoned that it might lead to a break-up in the marriage or that marriage might not take place. The knowledge level appeared to be low and misconceptions held about the routes of transmission were common. It is recommended that strategies for AIDS-risk reduction among adolescents be developed in Bangladeshi high schools (Hoque , 2015).

Adolescents are more vulnerable than adults of unplanned pregnancies, sexually transmitted diseases and HIV/AIDS. Among the adolescents, girls are more vulnerable to STDs including HIV/AIDS. Their knowledge about different diseases is very poor. This

paper investigated adolescent's knowledge about sexually transmitted diseases including HIV/AIDS, its mode of transmission and ways of its prevention. Cross sectional study design was adopted for this study. A multistage cluster sampling technique was used to select the sample. Data on 3362 female adolescents irrespective of their marital status was analyzed. The study found that a large proportion of adolescents were not aware about sexually transmitted diseases and AIDS. More than half (54.8%) of the adolescents ever heard about AIDS respectively. On an average, about one tenth of them had better knowledge on AIDS in terms of mode of transmission and prevention. The multivariate logistic regression analysis revealed that adolescent age, years of schooling and knowledge on STDs appeared to be important predictors of the awareness about AIDS ($p < 0.05$) (Rahman *et al.*, 2009).

To survey knowledge of and attitudes to HIV and AIDS among high school students in the city of Jeddah, Saudi Arabia. Further, to assess the outcomes of the survey by demographic characteristics and the implications of the data for HIV/AIDS awareness and education. A cross-sectional study was conducted among high school students in Jeddah, Saudi Arabia. Thirty-two questions were asked, divided into four categories: Questions concerning routes of transmission of HIV; general knowledge about HIV/AIDS; questions about preventative measures; and attitudes toward infected patients. A total of 438 high school students were surveyed. Summary demographic information concerning the participants is given in Tables in the Supplementary material. The students were divided according to their location of residence between north Jeddah ($n=168$) and south Jeddah ($n=270$). Schools ($n=8$) were selected at random and students were randomly selected from within their schools. More than 93% of respondents considered that sexual contact is a route of transmission of HIV, with no significant difference between the north and south groups. Regarding transmission by oral sex, 74.4% of the south group considered this a route of transmission, whereas this figure was 62.5% among the north group. There was a significant difference between the south and north groups concerning transmission by kissing: 60.9% from the south considered this a route of transmission, while the corresponding figure was only 43.5% among the north group. More than 23% of respondents in the south believed that shaking hands is a means of HIV transmission, and the corresponding figure was 32.7% in the north (26.9% overall). No significant differences were observed between the groups regarding shaving (sharing of razors) as a route of transmission; a total of 81.1% were aware of this route, while 90.8%

(south) and 83.9% (north) were aware of sharing of needles as a transmission route. No significant difference was observed in the response from the two groups concerning whether pregnancy is a means of HIV transmission (south 74.9%; north 67.9%). Half of both groups considered mosquito bites a means of transmission. There was a significant difference between the two groups concerning the use of public bathrooms: 53.1% of those in the south and 32.7% of those in the north regarded this as a transmission route. Sharing food with an infected person was considered a transmission route by 32.8% of the southern group and 22.0% of the northern respondents. A large majority (78.6%) answered that HIV is a viral infection (rather than bacterial), without a significant difference between the north and south groups. Of the total, 49.2% thought that there is a vaccine against HIV (54.2% south, 41.1% north). Meanwhile, 81.3% of the total survey responded that there is no definitive treatment for HIV, without a significant difference between the groups. Regarding the existence of medications to prevent viral proliferation, 41.3% of the south group and 36.3% of the north group were not aware of these; 55.7% (south) and 64.3% (north) of respondents believed that there are medications to decrease the incidence of transmission from a pregnant woman to her fetus. Roughly half of the respondents in both groups considered AIDS to be common in Jeddah. Meanwhile, 37.8% answered that sexual contact is the only way for transmission, without a significant difference between the north and south groups; this result is perhaps surprising in light of the concerning knowledge about sharing of needles and razors as a route of transmission. There was no significant difference between the north and south groups in terms of considering the use of condoms (77.8% of the total) and sterilizing needles (82.6%) as means of reducing transmission. Similarly, both groups recognized the value of routine checkups (87% overall), without a significant difference between them. There was, however, a significant difference between the groups in considering whether isolation of infected people is a way to reduce the spread of the virus: 74.2% agreed in the south, but only 58.3% in the north. Around 56% of both groups answered that avoiding eating with an infected person is a way to reduce transmission of HIV, while 60.8% of the total number thought that avoiding using public bathrooms is way to reduce the spread of the virus, with a significant difference between south (65.7%) and north (53.0%). Overall, 61.5% of our survey participants would feel shy to ask an HIV patient about the mode of their infection. Approximately 23% of respondents did not have empathetic feelings towards patients, with no significant difference between the regions, while 34.3% of those

in the south group and 45.8% in the north group felt contempt for infected people, and, overall, 60.4% thought HIV patients should be isolated (Alotaibi *et al.*, 2016).

The study was conducted in three different girl colleges of Lahore (Pakistan). A total of 600 students were interviewed with the help of anonymous semi-structured questionnaire from September, 1999 to November 1999. Ninety-five percent students had heard about HIV/ AIDS and its presence in Pakistan, 61.7% students knew that HIV/AIDS is caused by germs and 91.2% knew about its transmissibility. Over 70% of students knew that HIV can be transmitted through sexual contact, infected blood transfusion, and re-use of infected injection needles. Moreover, only 19.2% mentioned ear/nose piercing with infected needles while 46.8% mentioned breast feeding as sources of transmission of HIV/AIDS. However, 57% were of the view that second hand clothing cannot spread AIDS. Individuals having multiple sexual partners (78.2%), drug addicts (38.8%), homosexuals (39.2%), commercial sex workers (52.2%) and health care workers (16.2%) were identified as high risk groups. Only 33.2% of students perceived that women are at higher risk of acquiring HIV as compared to men. Regarding prevention of AIDS, 61.0% mentioned avoiding promiscuous sex, 49.3% knew use of condoms and 60.2% were aware that AIDS can be prevented by avoiding homosexuality. Sixty-eight percent and 70.2% students respectively held the view that avoiding used needles for injections in hospitals and laboratories for screening blood or blood products can prevent AIDS, while 78.2% and 55.8% respectively knew that there is no cure or vaccine available for AIDS. Majority of the students (71.5%) have discussed AIDS with their friends while discussion with siblings, parents and teachers was not common. The general level of awareness regarding HIV/AIDS transmission and prevention was satisfactory among college girls included in the study. However, a number of misconceptions and myths like getting HIV/AIDS through nose/ear piercing, its relation to Islam, and use of second hand clothing need to be clarified (Farid and Choudhry, 2003).

Significance:

Human immune deficiency virus (HIV) and acquired immune deficiency syndrome (AIDS) are among the most complex health problems in the world. HIV/AIDS is a major public health problem which leads to serious challenges to humankind globally. HIV continues to be a major global public health issue, having claimed more than 35 million lives so far. In 2016, 1.0 million people died from HIV related causes globally and approximately 36.7 million people living with HIV at the end of 2016 with 1.8 million people becoming newly infected (WHO, 2017).

In 2016, 12000 adults and children are living with HIV in Bangladesh. Adults who are aged between 15 to 49 their HIV prevalence rate is <0.1% and HIV incidence per 1000 population (adults 15-49) is 0.02%. 1000 adult and child death occur due to AIDS (UNAIDS, 2017).

Early phase of youth is a delicate period due to inadequate mental, physical and social maturity. An incomplete psychological development during this period and peer group influence results in adopting risky behavior making them more vulnerable to HIV/AIDS. Young people are at high risk of HIV and AIDS infections and are, therefore, in need of targeted prevention. School and college based HIV/AIDS health education may be an effective way to prevent the spread of AIDS among adolescents (Chandramohan & Raj, 2014).

Though knowledge regarding HIV/AIDS is an important part of HIV/AIDS prevention, this has not been examined among secondary school students in Bangladesh. However, a very few notable studies have been carried out to examine the knowledge about HIV/AIDS among the adolescents in Bangladesh adolescents. One study was done among secondary school students who are aged between 11-17 years (Huda & Amanullah, 2013). The social context of Bangladesh does not permit adolescents to discuss reproductive health topics as well as sexually transmitted diseases like HIV/AIDS openly with their parents, teachers, or other senior members of the community.

This situation is getting worse in developing countries like ours due to inadequate access to modern health services and lack of awareness of the population about the disease. So we have conducted survey among school and college students for knowing about

awareness of the modes of transmission of HIV/AIDS, control and prevention and attitude towards infected people. So, this survey may help them to increase their consciousness about to this disease so that they can protect themselves from this disease as there is no cure for this.

Aims and objectives of this study:

- To assess the HIV/AIDS-related knowledge among secondary school and college students in Dhaka.
- To assess attitude to the infected persons.
- To assess their knowledge about correct mode of transmission of HIV/AIDS.
- To assess their knowledge about prevention methods.

CHAPTER 3

METHODOLOGY

Type of the study

It was a cross-sectional study.

Study area and population

The study was carried on 291 students in 3 school and college of Dhaka district. The school and colleges are:

- Nazneen School and College
- Ideal Commerce College
- Rajdhani High School

Inclusion criteria

- ✓ Students of class VIII-XII
- ✓ Both males and females
- ✓ Any discipline

Exclusion criteria

Students unwilling to take part in the survey

Development of the questionnaire

The questionnaire was developed based on different findings in available journals and research paper and also from the observation of different behavior of Bangladeshi people. The questionnaire was formed both in Bangla and English language.

Data collection method

The data was collected by both face to face interview and questionnaire supply.

Sampling technique

In this study convenient sampling was followed.

Data analysis

After collecting, all the data were checked and analyzed with the help of Microsoft Excel 2010.

CHAPTER 4

RESULTS

4.1 Age distribution among the respondents

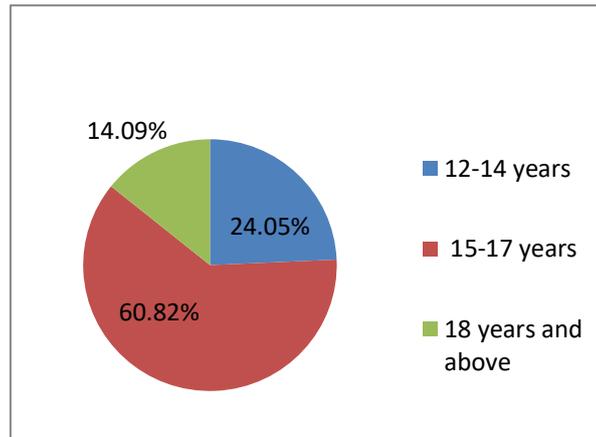


Fig 4.1: Age distribution

Among 291 respondents, majority 60.82% students were in the age group 15-17 years, 24.05% students were in the age group 12-14 years and only 14.09% students were in the age group 18 years.

4.2 Gender distribution of the respondents

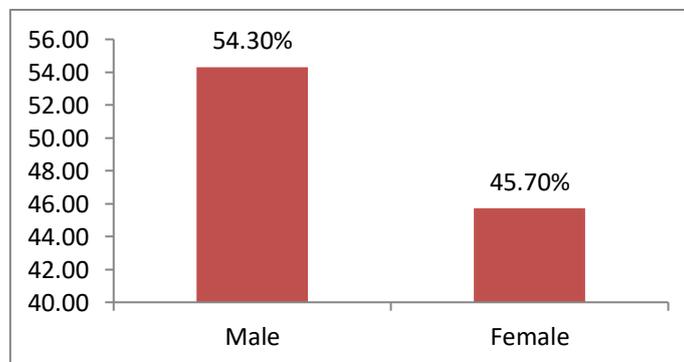


Fig 4.2: Gender distribution

Around 291 students who are school and college going, 54.30% students are male and 45.70% are female.

4.3 Distribution of class among students

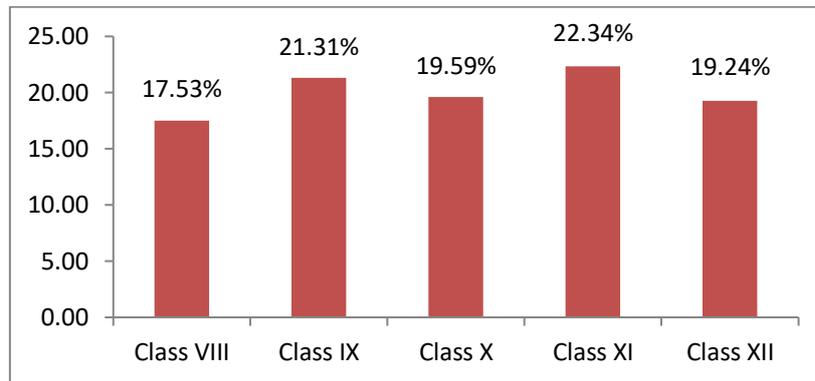


Fig 4.3: Distribution of students according to class

Here, the majority students 22.34% were from class XI, 21.31% students were from class IX, 19.59% students were from class X, 19.24% students were from class XII and 17.53% students were from class VIII among the 291 students in total.

4.4 Students having different study groups

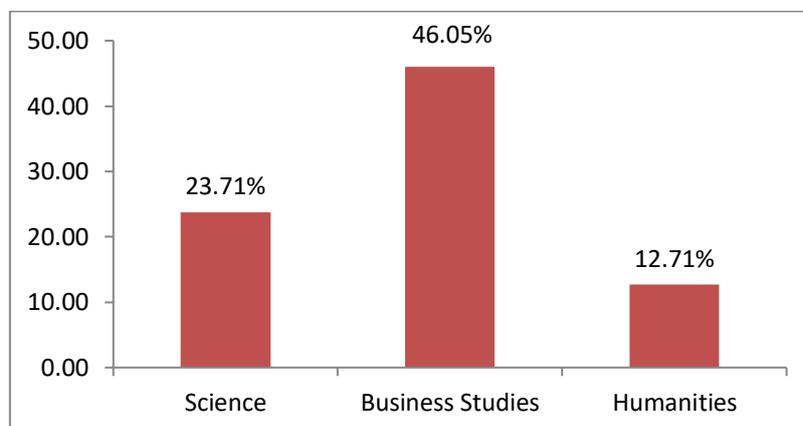


Fig 4.4: Students distribution based on groups

The study was conducted between 291 students but class 8 has no groups. So this graph has shown groups of class 9-12. Among them majority of the students were from business studies group which were about 46.05%, about 23.71% students were from science group and 12.71% students were from humanities group.

4.5 Marital status of the participants

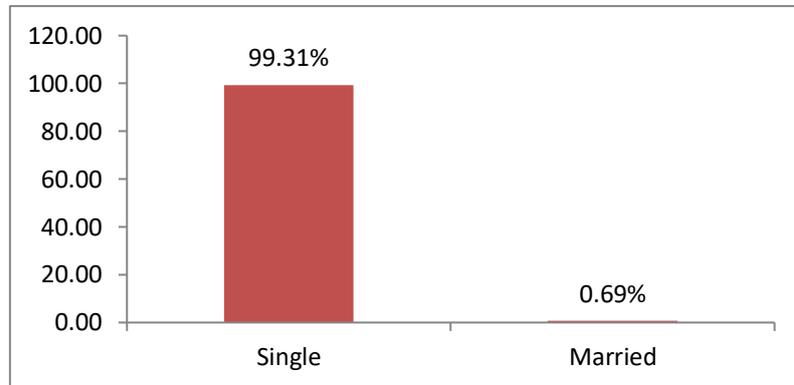


Fig 4.5: Marital status of the participants

Almost all (99.31%) students were single. Only 0.69% students were married.

4.6 Awareness of the term HIV/AIDS

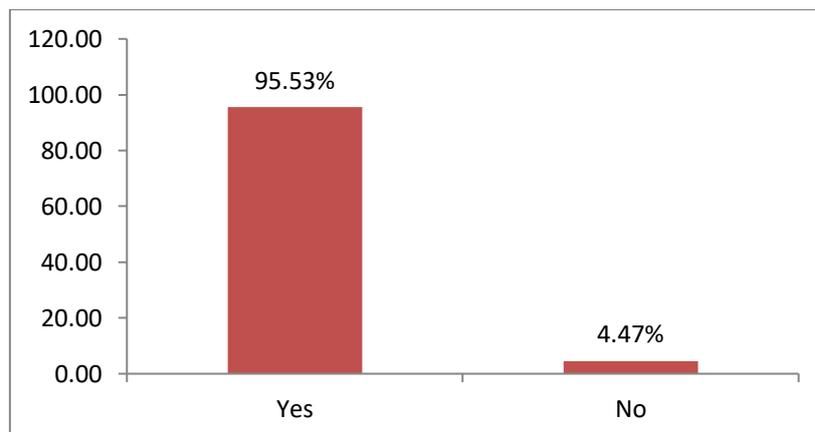


Fig 4.6: Awareness of the term HIV/AIDS

During this study it was found that almost all 95.53% students had heard about HIV/AIDS. Only a few 4.47% students did not hear the term.

4.7 Source of knowledge

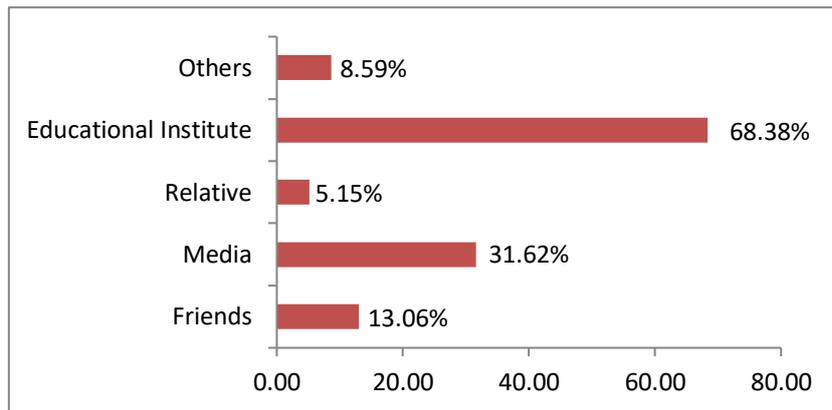


Fig 4.7: Source of knowledge

Among the 291 students, 68.38% gained their knowledge on HIV/AIDS from the educational institutes which was the major source. 31.62% students heard about it from the media which was the second highest source of knowledge. 13.06%, 5.15% students also heard the term from friends and relatives respectively and for 8.59% students there were other sources.

4.8 Knowledge about the difference between HIV and AIDS

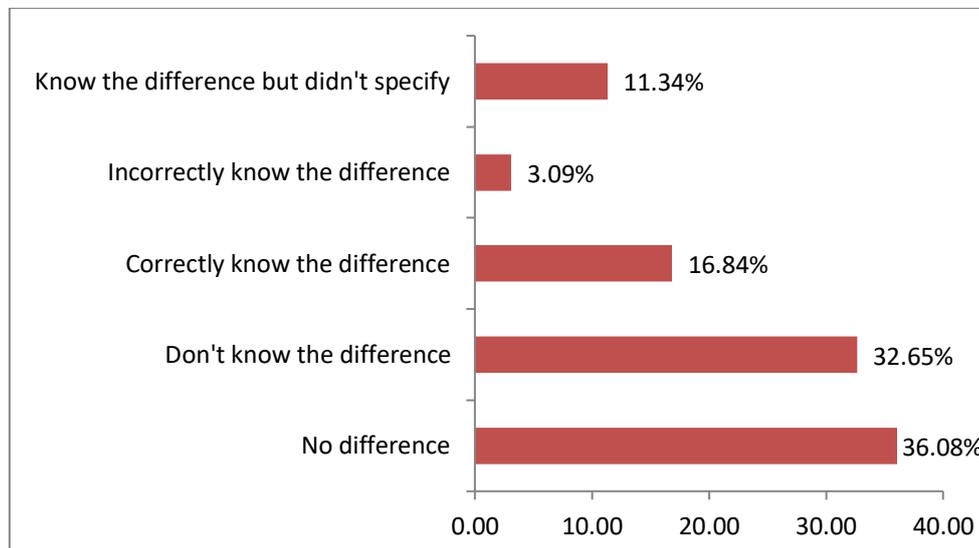


Fig 4.8: Knowledge about the difference

Majority 36.08% students thought that there is no difference. 16.84% students knew the correct difference but 3.09% students didn't know about the correct difference and 11.34% students knew that there is a difference between HIV/AIDS but they didn't

specify what is the difference. 32.65% students didn't know there is a difference between HIV/AIDS.

4.9 Knowledge about AIDS treatment

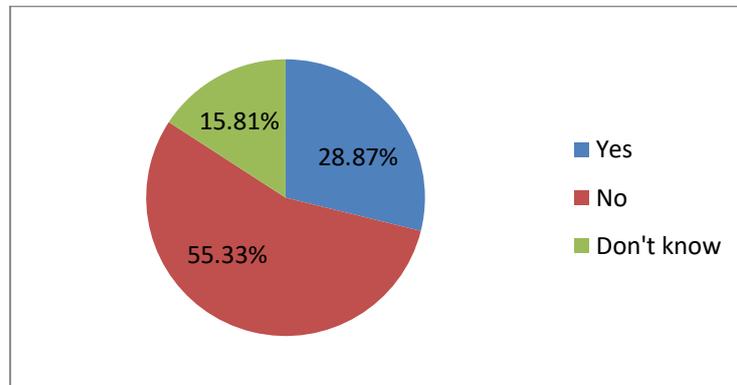


Fig 4.9: Knowledge about treatment of HIV and AIDS

Those students who were participated in this study around 28.87% students were told that AIDS is treatable, about 55.33 % students confirmed it is not treatable and 15.81% students were told that they don't know about this.

4.10 Knowledge about vaccine availability

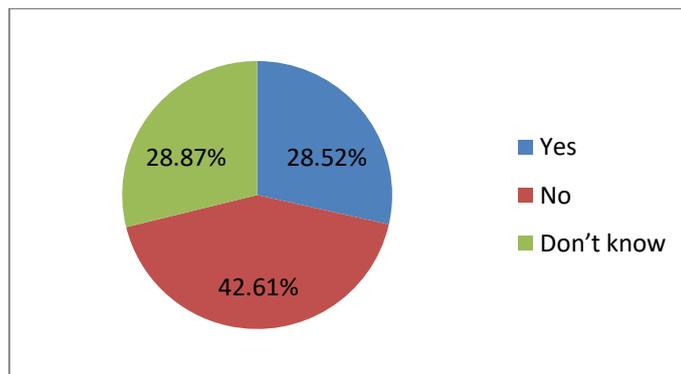


Fig 4.10: Knowledge about vaccine availability

In the survey maximum (42.61%) students answered "there is no vaccine available". About 28.52% informed there is vaccine available, and 28.87% marked they don't know about this topic.

4.11 Correct mode of transmission

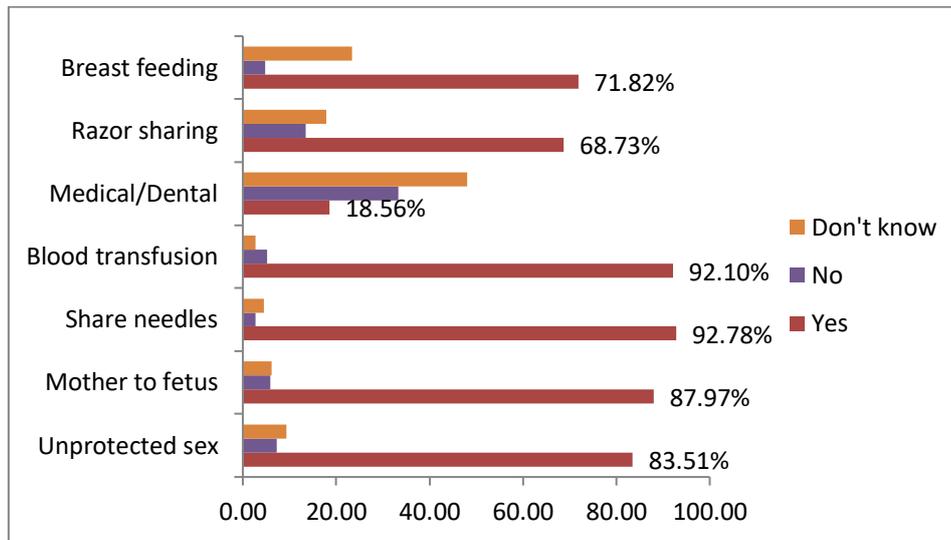


Fig 4.11: Knowledge about correct mode of transmission of HIV/AIDS.

We found that among the responders (83.51%) supported that “HIV can be transmitted by unprotected sex”. About 87.97% students said HIV can be transmitted from mother to fetus, 92.78% marked sharing infected needles or syringe as a way of mode of transmission, 92.10% claimed “by blood transfusion HIV can be transmitted”. About 18.56%, 68.73% and 71.82% population informed HIV can be transmitted by medical or dental procedure, razor sharing, breast feeding, respectively.

4.12 Misconception about mode of transmission of HIV/AIDS

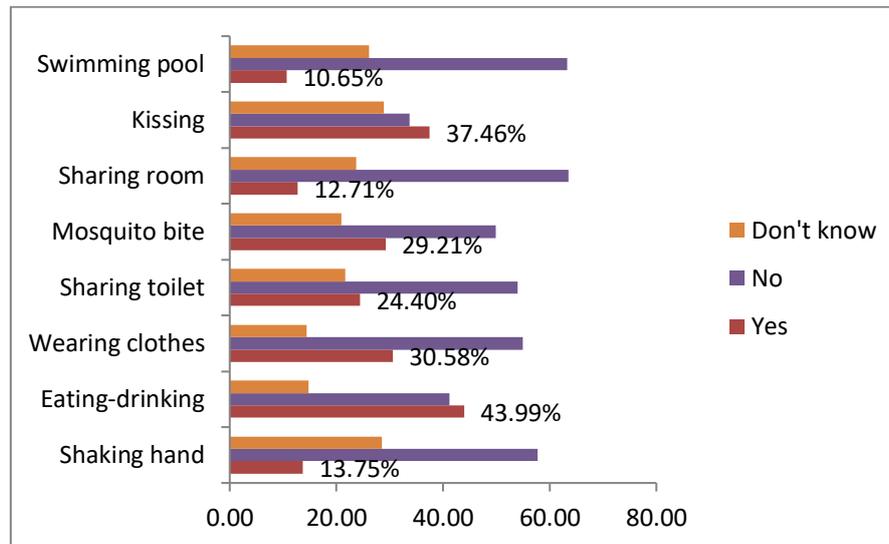


Fig 4.12: Misconception about mode of transmission of HIV/AIDS

Some students from the total 291 population had some misconceptions about mode of transmission. About 13.75% thought that by shaking hand HIV can be transmitted, 43.99% said by drinking and eating on same glass or plate HIV can be transmitted, 30.58% responders said by wearing same cloth it also can be transmitted and 24.40% said by sharing toilet with infected person HIV can be transmitted. About 29.21%, 12.71%, 37.46%, 10.65% responders marked mosquito bites, sharing room, kissing, swimming pool, respectively as a mode of transmission.

4.13 Knowledge about control and prevention of HIV and AIDS

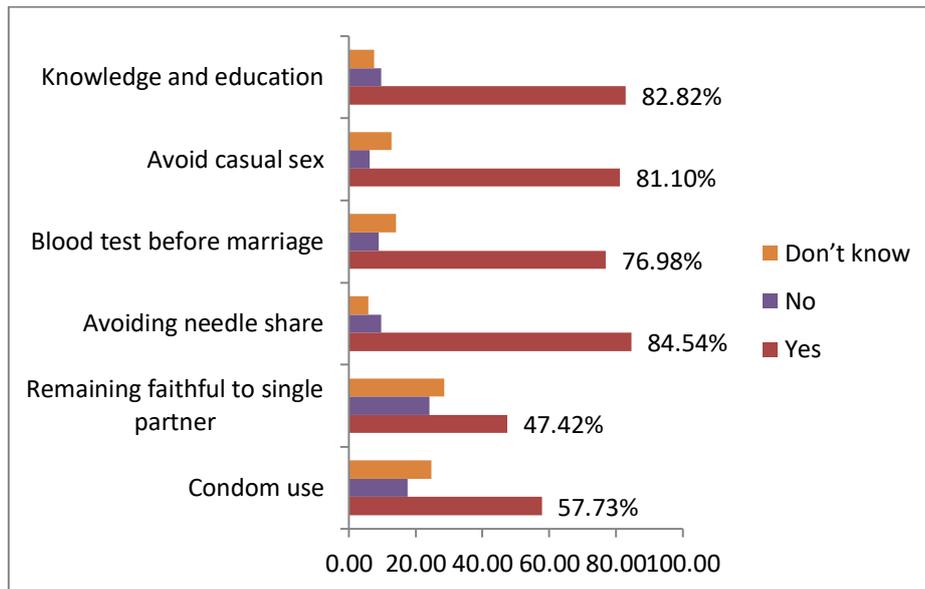


Fig 4.13: Knowledge about control and prevention of HIV and AIDS

In our study we found, most of the students (84.54%) said “avoiding needle share is prevention and control method”. About 47.42%, 81.10%, 76.98%, 57.73%, 82.82% marked remaining faithful to single partner, avoiding casual sex, blood test before marriage, condom use, knowledge and education, respectively as the control and prevention method.

4.14 Attitude towards infected people

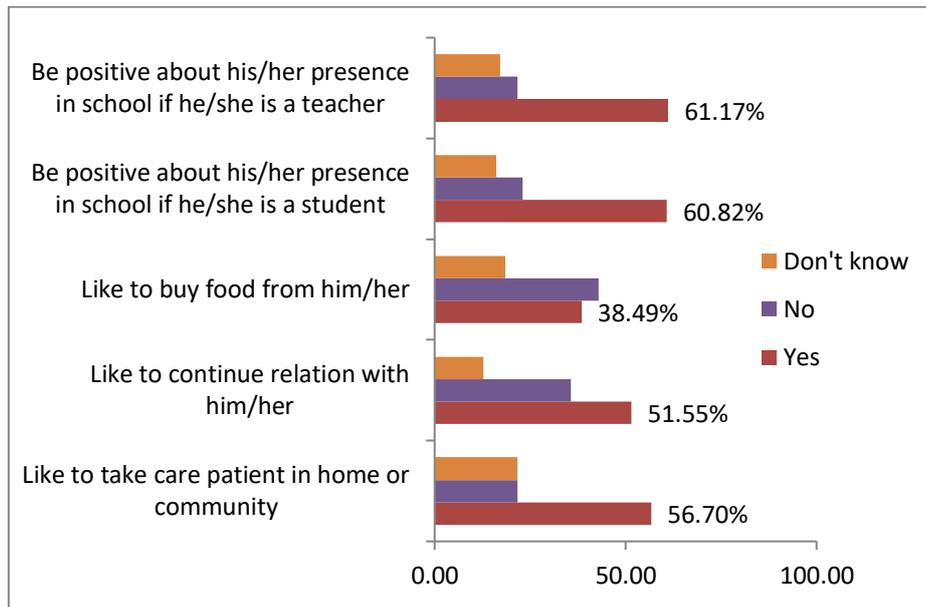


Fig 4.15: Attitude towards infected people

From total 291 responders, 61.17% students said that if the patient is a teacher, they would be positive about his/her presence in the school or college, 60.82% would be positive if he/she is a student, 38.49% students would buy food from the infected person, 51.55% would like to continue relation with the patient and 56.70% students would like to take care of the patient.

CHAPTER 5

DISCUSSION

This study was carried on 291 students of class VIII-XII studying in 3 different school and colleges of Dhaka district in Bangladesh. Among the study population majority (60.82%) students were in the age group 15-17 years, 24.04% students were in the age group 12-14 years and only 14.09% students were in the age group 18 years. Among the students 54.30% were male and 45.70% were female.

The majority of the students (22.34%) were from class XI, 21.31% students were from class IX, 19.59% students were from class X, 19.24% students were from class XII and 17.53% students were from class VIII among the 291 students in total. Among them 46.05% were from business studies, 23.71% were from science and 12.71% students were from humanities group. Almost all (99.31%) students were single.

Most of the students (95.53%) said that they had heard about HIV/AIDS. The major source of their knowledge was educational institute (68.38%) and media was the second source (31.62%). In a study done by Gao *et al.* (2012) it was found that 68.32% Chinese students reported television/broadcast as the major source of information and the other source of information were newspaper/books/magazines 67.85%, internet 48.02%, lectures 40.40%, school education 35.76%, friends/classmates 30.04% about HIV/AIDS. From the study results it was noticed that, 31.27% students knew that there is a difference between HIV and AIDS but only 16.84% students correctly mentioned the difference.

About 55.33% students confirmed that HIV is not treatable and 15.81% had no idea about this. Only 28.87% students informed HIV and AIDS can be treated. In a study done in Saudi Arabia by Alotaibi *et al.* (2016) 81.3% students mentioned that there is no definite cure for HIV which is quite higher than our study results.

In this survey (42.61%) students answered that there is no vaccine available for HIV while 28.52% informed about availability of vaccines. But a higher portion of Saudi Arabian students (49.2%) had no idea regarding this that vaccine against HIV was available. (Alotaibi *et al.*, 2016).

Most of the students knew about the mode of transmissions of HIV/AIDS. Among the responders majority (92.78%) mentioned that by needle sharing HIV can be transmitted and many responders knew that HIV can be transmitted by unprotected sex (83.51%),

from mother to fetus (87.97%), 92.10% by blood transfusion. About 68.73% and 71.82% population informed HIV can be transmitted by razor sharing, breast feeding respectively. Only a few students (18.56%) mentioned that HIV can be transmitted by medical or dental products. In a similar type of study done by Gupta *et al.* (2013), 95.1% of the Indian students identified that it was transmitted through unprotected sex followed by sharing injections (88.2%), blood transfusion (84.3%).

But it was also observed that some misconceptions about mode of transmission were prevailing among the study respondents such as kissing or talking (37.46%), mosquito bites (29.21%), drinking and eating on same glass or plate (43.99%), sharing toilets with infected persons (24.40%). In a study done by Hoque (2015) it was found that 27% and 25% Bangladeshi students believed that coughing/sneezing and mosquito bites spread AIDS, respectively.

According to our study population, remaining faithful to single partner (47.42%), blood test before marriage (76.98%), condom use (57.73%), knowledge and education (82.82%) can play important roles in the control and prevention method. In a study done by Farid and Choudhry (2003) found that 49.3% Pakistani students knew use of condoms and 60.2% were aware that AIDS can be prevented by avoiding homosexuality which is quite lower than our study results. In our study some students held the view that avoiding used needles for injections in hospitals (68%) and laboratories for screening blood or blood products (70.2%) can prevent AIDS.

In our study it was observed that positive attitude towards HIV infected person was lower to medium. From total 291 responders, students said that if the patient is a teacher (61.17%) or a student (60.82%) they would be positive about his/her presence in the school or college, 38.49% students would buy food from the infected person, 51.55% would like to continue relation with the patient and 48.74% students would like to take care of the patient. The reason behind this type of attitude towards the HIV infected person was maybe due to the misconceptions about mode of transmission of this disease such as some responders thought that by drinking and eating on same glass or plate, sharing toilets with infected persons, shaking hands HIV can be transmitted. In a study done by Maswanya *et al.* (2000) found that most of the Japanese female students (85%) would be able to study in the same class with HIV-positive classmates. However, only

(28%) of the students responded that they could take care of a person with AIDS without worry.

CHAPTER 6

CONCLUSION

In this survey, it has found that almost all of our population had heard the name of HIV/AIDS and they had a good knowledge regarding the disease. But a moderate level of misconceptions about transmission was also observed. Due to their misconceptions their attitude towards infected person was not satisfactory. This study should be done on a large scale population to evaluate the actual situation. Combined approach of media, educational institute, and government are strongly needed for creating knowledge and awareness to control the spread of HIV and AIDS among young people in Bangladesh. Our study suggest that more information on HIV/AIDS should be included in the textbooks of secondary school students in addition to teachers' training that can facilitate the teaching process of this taboo subject. However, schools and colleges should come forward to design awareness campaigns for the benefit of the students.

CHAPTER 7
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