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SEXUALLY TRANSMITTED DISEASES (STDS), PREVENTIVE MEASURES CURRENT SITUATION IN INDIA.

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ABSTRACT

Sexually transmitted diseases (STDs), also known as sexually transmitted infections (STIs), remain a significant global public health challenge, affecting millions of individuals each year. These infections are primarily transmitted through unprotected sexual contact, including vaginal, anal, and oral intercourse, and can also be spread via blood transfusion, shared needles, and from mother to child during pregnancy, childbirth or breastfeeding.

Common sexually transmitted diseases (STDs) include bacterial illnesses like syphilis, gonorrhea and Chlamydia,viral infections like HIV, HPV, HSV and parasitic infections like tr ichomoniasis.The global burden of STDs continues to rise due to factors such as lack of awareness, social stigma, inadequate healthcare access, and risky sexual behaviors. Adolescents and young adults are particularly vulnerable due to insufficient sexual education and higher rates of multiple sexual partners. Many STDs are asymptomatic, especially in early stages, leading to delayed diagnosis and increased transmission rates.

If left untreated, these infections can result in severe complications, including infertility, pelvic inflammatory disease, ectopic pregnancy, neonatal infections, and increased risk of acquiring or transmitting HIV.Early diagnosis and effective treatment are crucial for controlling the spread of STDs.

Bacterial infections are generally curable with appropriate antibiotic therapy, where as viral infections are usually manageable but not curable, requiring long-term antiviral treatment to control symptoms and reduce transmission risk. Preventive strategies play a key role in reducing the incidence of STDs and include consistent and correct use of condoms, regular

screening and testing, vaccination (such as HPV and hepatitis B vaccines), public health education, and behavioral interventions.

Recent advancements in diagnostic technologies, such as nucleic acid amplification tests (NAATs), have improved the accuracy and speed of STD detection. Furthermore, global health initiatives and awareness programs have contributed to increased screening and early intervention**.** However, challenges remain in addressing antibiotic resistance, particularly in gonorrhea, and ensuring equitable access to prevention and treatment services across different populations.

KEYWORDS: Sexually transmitted diseases (STDs), Sexually transmitted infections (STIs),Human immunodeficiency virus (HIV), Human papilloma virus (HPV), , Herpes simplex virus (HSV), Trichomoniasis, Public health(PH), Prevention, Screening, Antimicrobial resistance(AB), Sexual health(SH), Nucleic acid amplification tests (NAAT), Hepatitis B Virus (HBV) , Herpes Simplex Virus (HSV).

INTRODUCTION

Sexually transmitted diseases (STDs), also referred to as sexually transmitted infections (STIs), constitute a major global public health concern due to their high prevalence, significant morbidity, and potential long-term complications. These infections are primarily transmitted through sexual contact, including vaginal, anal, and oral intercourse, and may also spread through non-sexual routes such as blood transfusion, sharing of contaminated needles, and vertical transmission from mother to child during pregnancy, childbirth, or breastfeeding. STDs are caused by a wide range of pathogens, including bacteria, viruses, parasites, and fungi **[1] [2]**.

Globally, millions of new STD cases are reported each year, with a disproportionately higher burden observed in low- and middle-income countries. According to the World Health Organization, more than one million sexually transmitted infections are acquired daily worldwide. The most commonly reported STDs include chlamydia, gonorrhea, syphilis, human immunodeficiency virus (HIV), human papillomavirus (HPV), and herpes simplex virus (HSV**)[1][2]**.Many of these infections are asymptomatic, particularly in the early stages, which contributes to their unnoticed transmission and delayed diagnosis.

The impact of STDs extends beyond immediate symptoms, as untreated infections can lead to severe health consequences. These include infertility, pelvic inflammatory disease, ectopic pregnancy, chronic pelvic pain, and increased susceptibility to HIV infection. In pregnant

women, STDs can result in adverse outcomes such as miscarriage, stillbirth, premature birth, and neonatal infections [**1**] [**2**]. Moreover, certain viral infections, particularly HPV, are associated with the development of cancers such as cervical cancer, posing an additional public health challenge. Several factors contribute to the continued spread of STDs and treatment strategies have improved disease management; however, challenges such as antimicrobial resistance, particularly in gonorrhea, continue to pose serious concerns.

Types of Sexually Transmitted Diseases (STDs)

Sexually transmitted diseases (STDs), also known as sexually transmitted infections (STIs), are classified based on the type of causative organism responsible for the infection. These include bacterial, viral, parasitic and in some cases fungal pathogens **[3]**. Each category differs in terms of transmission, clinical manifestations, treatment, and prevention strategies.

1.1 Bacterial

Sexually transmitted diseases Pathogenic bacteria produce bacterial sexually transmitted diseases (STDs), which are usually treatable with the right antibiotic treatment if detected early.

(A)Chlamydia: One of the most prevalent bacterial sexually transmitted diseases is chlamydia, which is brought on by Chlamydia trachomatis. It frequently shows no symptoms **[4]**, particularly in women, but if left untreated, it can result in problems like pelvic inflammatory disease, PID, infertility, and ectopic pregnancy.

(B)Gonorrhea: Caused by Neisseria gonorrhoeae affects the genital tract, rectum, and throat. Symptoms may include painful urination and abnormal discharge. If left untreated, it can cause infertility and systemic infections. A major concern with gonorrhea is the increasing antimicrobial resistance **[5]**, making treatment more challenging.

(C)Syphilis: It is caused by Treponema palladium and progresses through multiple stages—primary, secondary, latent, and tertiary. Early symptoms include painless sores (chancres), while later stages can affect the heart, brain, and other organs, potentially becoming life-threatening. Is caused by Treponema palladium and progresses through multiple stages—primary, secondary, latent, and tertiary **[6]**. Early symptoms include painless sores (chancres), while later stages can affect the heart, brain, and other organs, potentially becoming life-threatening.

(D)Chancroid: caused by Herophilus dacrya is characterized by painful genital ulcers and swollen lymph nodes **[7]**. Though less common, it remains a concern in certain regions with limited healthcare access.

1.2 Viral STDs

Viral STDs are caused by viruses and are generally not completely curable, although their symptoms can be effectively managed with antiviral medications.

Human Immunodeficiency Virus (HIV) attacks the immune system, specifically CD4 cells, weakening the body's ability to fight infections. If untreated, it progresses to AIDS (Acquired Immunodeficiency Syndrome). While there is no cure, antiretroviral therapy (ART) allows individuals to live long and healthy lives **[8] [9] [10] [11].**

Human Papilloma virus (HPV) is one of the most common viral STDs worldwide. Certain strains cause genital warts, while high-risk strains are associated with cancers such as cervical, anal, and oropharyngeal cancers**[8][10][11][9].**Vaccination is an effective preventive measure.

Herpes Simplex Virus (HSV) causes genital herpes. It is characterized by painful blisters or ulcers around the genital or oral area. The infection remains latent in the body and can reactivate periodically, leading to recurrent episodes **[8] [10] [11] [9].**

Hepatitis B Virus (HBV) is a liver infection that can be transmitted sexually. Chronic infection can lead to liver cirrhosis and liver cancer **[8] [10] [11] [9].**Vaccination is available and highly effective in prevention.

1.3 Parasitic STDs

Parasitic sexually transmitted diseases are infections caused by parasites that are transmitted through sexual contact or close physical contact **[12]**. These infections are generally curable with appropriate medication, but if left untreated, they can cause discomfort and increase the risk of other infections **[2] [12] [14]**.

One of the most common parasitic STDs is trichomoniasis, caused by *Trichomonas vaginalis*. It primarily affects the urogenital tract and may cause symptoms such as vaginal discharge, itching, and discomfort during urination, although many individuals remain asymptomatic **[15]**.

Another parasitic infection is pubic lice (crabs), caused by *Pthirus pubis*. These parasites infest the hair in the pubic region and cause intense itching and irritation. They are mainly transmitted through close sexual contact **[16]**.

Scabies, caused by *Sarcoptes scabiei*, is another parasitic infestation that can be sexually transmitted among adults. It is characterized by severe itching and skin rashes due to the burrowing of mites into the skin **[17]**.

Parasitic STDs are usually treated with specific medications such as antiprotozoal drugs for trichomoniasis and topical insecticides for lice and scabies. Maintaining personal hygiene and avoiding close contact with infected individuals are important preventive measures **[12]**.

1.4 Fungal Infections (Associated with Sexual Transmission)

Fungal infections are not always strictly classified as sexually transmitted diseases (STDs), but certain infections can be transmitted through sexual contact, especially under favorable conditions **[13]**. The most common fungal infection associated with sexual transmission is candidacies, caused by Candida albicans **[16]**.

Candidiasis, also known as a yeast infection, primarily affects the genital area and is more common in females. It is characterized by symptoms such as itching, irritation, redness, and thick white vaginal discharge **[18]**. In males, it may cause redness, itching, and discomfort of the genital region. Although it is not exclusively sexually transmitted, sexual activity can contribute to its spread between partners **[16]**.

Several factors increase the risk of developing candidacies, including poor hygiene, antibiotic use, diabetes, hormonal changes, and weakened immune system **[18]**. These factors create a favorable environment for fungal growth and infection.

Sexually transmitted Disease (STD) Table 1

Bacteria	Chlamydia	Chlamydia trachomatis	Often asymptomatic, discharge, pain during urination
Bacteria	Gonorrhea	Neisseria gonorrhoeae	Discharge, painful urination, pelvic pain
Bacteria	Syphilis	Treponema palladium	Painless sores, rash, systemic complications
Bacteria	Chancroid	Haemophilus ducreyi	Painful genital ulcers, swollen lymph nodes
Viral	HIV/AIDS	Human Immunodeficiency Virus	Weak immunity, weight loss, recurrent infections
Viral	HPV	Human Papillomavirus	Genital warts, risk of cancer
Viral	Herpes (Genital)	Herpes Simplex Virus (HSV)	Painful blisters, recurrent outbreaks
Viral	Hepatitis B	Hepatitis B Virus	Liver infection, jaundice
Parasitic	Trichomoniasis	Trichomonas virginals	Itching, discharge, irritation
Parasitic	Pubic Lice	Pthirus pubis	Intense itching in pubic area

Parasitic	Scabies	Sarcoptes scabies	Severe itching, rash
Fungal	Candidacies	Candida albicans	Itching, thick white discharge

Preventive Measures of Sexually Transmitted Diseases (STDs)

Prevention of sexually transmitted diseases (STDs) is essential to reduce their spread and associated health complications. Effective prevention involves a combination of behavioral, medical, and public health strategies Safe sexual practices are essential for preventing sexually transmitted diseases (STDs) and maintaining overall sexual health **[13]**. The consistent and correct use of condoms is one of the most effective methods to reduce the risk of infection transmission **[14]**.

2.1 Safe Sexual Practices

Practicing safe sex is one of the most effective ways to prevent STDs. The consistent and correct use of condoms (male or female) significantly reduces the risk of transmission. Limiting the number of sexual partners and maintaining a mutually monogamous relationship with an uninfected partner also helps in reducing exposure. Limit your sexual activity to only one partner who is having sex only with you to reduce exposure to disease-causing organisms. Follow these guidelines, which may provide for safer sex **[19]**.

- Think twice before beginning sexual relations with a new partner. First, discuss past partners, history of STIs, and drug use.
- Use condoms every time to have sex. Choose a male condom made of latex or polyurethane--not natural materials. Only use polyurethane if their is allergic reaction to latex. Female condoms are made of polyurethane.
- The CDC recommends that latex condoms, with or without spermicidal, should be used to help prevent sexual transmission of HIV **[16]**.
- Women should not douche after intercourse--it does not protect against STIs. And, it could spread an infection farther into the reproductive tract, and can wash away spermicidal protection.
- Be aware of your partner's body. Look for signs of a sore, blister, rash, or discharge.
- Check your body frequently for signs of a sore, blister, rash, or discharge.
- Consider sexual activities other than vaginal, oral, or anal sex.

These are techniques that do not involve the exchange of body fluids or contact between mucous membranes and this help in safe sexual practices.

2.2 Regular Screening and Testing

Routine screening and early diagnosis are crucial, especially because many STDs are asymptomatic. Sexually active individuals, particularly those with multiple partners, should undergo regular STD testing. Early detection allows timely treatment and prevents complications and further transmission [**20**].

- Women under 25 who engage in sexual activity. Experts advise women in this age range to undergo an annual gonorrhea and chlamydia test. If a woman who is sexually active and 25 years of age or older has a partner who has been diagnosed with a sexually transmitted infection (STI) **[20]**, she should be tested.
- Women in the 21–30 age range. A Pap smear should be performed on women in this age range to look for cervical cell abnormalities **[20]** that, if left untreated, could develop into cancer. The human papillomavirus (HPV) may be the cause of these.
- Women over the age of thirty. Women in this age range should discuss with their healthcare provider whether to get an HPV test, a Pap smear, or both.
- •Typically be tested for syphilis, hepatitis B, HIV, and chlamydia if you are pregnant. You might also be tested for hepatitis C and gonorrhea if you have certain risk factors and are pregnant **[20].**

2.3 Vaccination

Vaccines are available for certain viral STDs and play a key role in prevention. HPV vaccine helps prevent cervical and other cancers. Hepatitis B vaccine protects against liver infection. Vaccination is most effective when administered before exposure to the infection.

Effective treatment is currently available for several STDs [**21**].

1. Three bacterial (chlamydia, gonorrhoea and syphilis) and one parasitic STIs (trichomoniasis) are generally curable with existing single-dose regimens of antibiotics.
2. For herpes and HIV, the most effective medications available are antivirals that can modulate the course of the disease, though they cannot cure the disease.
3. For hepatitis B, antivirals can help fighting the virus and slowing damage to the liver.

2.4 Health Education and Awareness

Proper sexual health education increases awareness about STDs, their modes of transmission, symptoms, and prevention methods. Educating adolescents and young adults helps them make informed and responsible decisions regarding sexual behavior The Ministry of Health and Family Welfare (MoHFW) is instrumental and responsible for the implementation of

various programmers on the national scale in the areas of health and family welfare, prevention and control of major communicable and non-communicable diseases as well as promoting research across the country such as **[22].**

- ❖ National Aids Control Program (NACP)

2.5 Avoid Sharing Needles

Sharing contaminated needles, especially among intravenous drug users, increases the risk of transmitting infections such as HIV and hepatitis B. Using sterile**,** single-use needles is essential for prevention.

2.6 Early Treatment and Partner Management

Prompt treatment of infected individuals reduces the duration of infection and prevents its spread. It is also important to inform and treat sexual partners to avoid reinjection and further transmission.

2.7 Personal Hygiene and Protection

Maintaining good personal hygiene and avoiding contact with infected areas or personal items can help prevent certain infections such as scabies and pubic lice.

Maintaining proper genital and personal hygiene by adhering to these guidelines is another crucial strategy for preventing STDs **[23]:**

- Wash thoroughly both before and after intimacy.
- Use the proper cleansers to clean the genital area on a regular basis.
- During menstruation, change sanitary pads often.

2.8 Avoid Alcohol and Drug Abuse

Substance abuse can impair judgment and lead to risky sexual behaviors such as unprotected sex, increasing the likelihood of STD transmission. Therefore, addressing substance abuse through education and support services is essential for effective STD prevention.

Current Situation of Sexually Transmitted Diseases (STDs) in India

Sexually transmitted diseases (STDs) continue to be a significant public health concern in India, despite ongoing prevention and control programs. The burden of STDs varies across different regions and populations, with higher prevalence observed among high-risk groups and underserved communities. Recent studies indicate that approximately 6% of adults in India are affected by sexually transmitted infections (STIs) or reproductive tract infections annually India **[24] [25]** [**26**].However, the prevalence of curable STDs in the general population is estimated to be lower, ranging between 0% to 3.9%, suggesting underreporting

and lack of diagnosis in many cases. National surveys such as NFHS-5 have reported that around 12% of women and 9% of men aged 15–49 years experience STI symptoms within a year **[24] [25] [26**]. India also faces a considerable burden of viral STDs, particularly Human Immunodeficiency Virus (HIV). According to recent government reports, about 25.6 lakh people are living with HIV in India **[24][25]**[**26**], making it one of the largest HIV-affected populations globally, although the overall prevalence remains relatively low at around 0.2% among adults.

This indicates that while the spread is controlled to some extent, the absolute number of cases remains high due to India's large population. Another concern is the increasing trend of viral STDs, which are now more prevalent than bacterial infections in some clinical settings. Studies have shown that over 60% of STD cases are viral in nature, including infections like herpes and HPV **[24] [25]** [**26**]. Additionally, the emergence of antimicrobial resistance, especially in gonorrhea, poses a serious challenge to treatment and control strategies.

High-risk populations such as sex workers, men who have sex with men (MSM), transgender individuals, and intravenous drug users show significantly higher prevalence rates compared to the general population.

Behavioral factors, lack of awareness, stigma, and limited access to healthcare services contribute to the increased vulnerability of these groups. India has implemented several national programs under the National AIDS Control Organization (NACO) to address STDs and HIV. Free diagnosis and treatment services are provided through more than 1,000 government-supported clinics (Suraksha Clinics) across the country **[27**]. Awareness campaigns, condom promotion, and targeted interventions have contributed to a decline in new HIV infections over the past decade. Efforts to enhance awareness and access to healthcare services are crucial in combating the rising trends of STDs, particularly among high-risk populations in India.

Despite these efforts, challenges remain, including social stigma, low treatment-seeking behavior, inadequate sexual education, and poor partner notification practices. Many individuals do not complete treatment or fail to treat their partners, leading to reinfection and continued transmission.

CONCLUSION

Public health concern due to their widespread prevalence, asymptomatic nature, and potential for serious long-term complications. As discussed, STDs are caused by a variety of pathogens including bacteria, viruses, parasites, and fungi, each differing in their mode of transmission,

clinical manifestations, and treatment approaches. While bacterial and parasitic infections are generally curable with appropriate therapy, viral infections such as HIV and HPV remain incurable but can be effectively managed with modern medical interventions. The increasing burden of STDs, particularly in developing countries like India, is influenced by multiple factors such as lack of awareness, social stigma, unsafe sexual practices, and limited access to healthcare services. The rise in antimicrobial resistance, especially in infections like gonorrhea, further complicates treatment strategies and highlights the need for continuous surveillance and research. Addressing these challenges requires a multifaceted approach that includes enhancing public awareness, improving healthcare access, and implementing effective prevention strategies tailored to high-risk populations.

Preventive measures including safe sexual practices, regular screening, vaccination, and public health education play a crucial role in controlling the spread of these infections. National programs and healthcare initiatives have contributed to improved awareness and reduced incidence of certain STDs; however, challenges still persist in terms of early diagnosis, treatment adherence, and partner management. In conclusion, a comprehensive and multidisciplinary approach involving education,

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