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Sexually Transmitted Infections: A Narrative Review with a Note on Prevalence in Nigeria

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Abstract

Sexually transmitted infections (STIs) are a group of infections in which the principal way of transmission is sexual contact. This article is a narrative review on STIs. The aim is to synthesize information on various aspects of STIs with a note on current prevalence in Nigeria, in order to provide an update for public enlightenment and so stimulate appropriate actions both individually and collectively. Information from research articles written in English published in international peer-reviewed journals that investigated STIs as well as official publications and books related to the topic were included. Google search engine was used. It was found that **S**TIs may be classified by causative organism or by type of lesion. Most risk factors for STIs emanate from lifestyle and personal behaviour. More than 1 million STIs are acquired everyday worldwide. Each year there are an estimated 374 million new infections with 1 of 4 curable STIs. A recent survey in Southern Nigeria found that the prevalence of STIs among a sexually active population is 27.7%. Signs and symptoms are many but vary depending on the particular STI. Effective treatment is available for several STIs. Methods of prevention and control are also available. The burden of STIs globally is enormous. The prevalence in Nigeria remains high. A gap in knowledge and practice of prevention exits. Therefore, there is need for more health education, including community sensitization, to improve the knowledge and practice of prevention and to reduce the prevalence of STIs in Nigeria and globally.

Keywords: prevalence, prevention, risk factors, sexually transmitted infections

Introduction

Sexually transmitted infections (STIs) are infections that are transmitted from one person to another through sexual contact (Nigussie & Yosef, 2020). The term sexually transmitted infections, which include HIV/AIDS, is usually used to describe disorders spread by intimate contact - sexual intercourse. It also includes close body contact, kissing, cunnilingus, anilingus, fellatio, mouth-breast contact, and anal intercourse (Aderibigbe et al., 2021). According to the World Health Organization (WHO, 2022), more than 30 different bacteria, viruses and parasites are known to be transmitted through sexual contact, including vaginal, anal and oral sex. Some STIs can also be transmitted from mother to child during pregnancy, childbirth and breastfeeding. Non-sexual transmission of some STIs may also occur through infected blood, blood products and unsterilized instruments (Obionu, 2007; Omatola et al., 2020).

Sexually transmitted infections (STIs) continue to exert a considerable public health and social burden globally, particularly for developing countries (Caruso et al., 2021). STIs are a major cause of morbidity. Understanding drivers of transmission can inform effective prevention programs. Young people and women are most at risk for STIs and should be a focus of future interventions due to the implications of untreated STIs in pregnant women.

Additionally, programs focused on women's health may improve outcomes in all groups (Semwogerere et al., 2021).

Available data show that sexually transmitted diseases constitute great medical, social and economic problems in Nigeria. Apart from the heavy affliction of urban dwellers, there is rapid excursion of these diseases to the rural areas as well. This situation is serious enough to attract government attention so that necessary control measures may be initiated in good time in order to avert the serious consequences (Ogunbanjo, 1989). Accordingly, in 2021 the Nigerian government launched national consolidated service delivery guidelines on HIV and sexually transmitted infections (STIs) for key populations within the country (Adebowale-Tambe, 2021).

Sexually transmitted infections (STIs) remain a major public health problem in developing countries (Kassie et al., 2019; Dagnew et al., 2020). STIs are often asymptomatic. For instance, it is found that there is a high burden of STIs among asymptomatic pregnant women in Nigeria's middle belt (Omatola et al., 2020). Women are disproportionately affected by STIs throughout their lives compared with men. This is mainly owing to the higher efficiency of male-to-female transmission of STIs and the anatomy of the female reproductive tract (Van Gerwen et al., 2022). Fortunately, as Ebong & Makinde (2021) reported, treatment seeking behaviour is observed to be better among Nigerian women than men. The burden of disease associated with STIs borne by African women in rural areas, and the implications for the acquisition and transmission of HIV and cervical neoplasia, are enormous (Menendez et al., 2010). It is reported that sub-Saharan Africa accounts for over half of the global burden of HIV/AIDS and other STIs, making it the continent most affected with HIV/AIDS and other STIs (Nzoputam et al., 2022).

The screening of STIs in pregnant women living with HIV can reduce the risk of mother-to-child transmission (MTCT) and screening and treatment for STIs can also prevent adverse perinatal outcomes. It is important to recognise regional and national STI epidemics in order to promote STI prevention and control interventions considering the test and treat approach as opposed to syndromic management (Ngobese & Abbai, 2021). Although more frequent STI screening could reduce delayed diagnoses and incidence, there remain significant knowledge gaps regarding the optimal STI screening frequency (Kim et al., 2023).

This article is a narrative review on sexually transmitted infections (STIs). The aim is to synthesize information gathered from different publications on various aspects of STIs such as definition, types or classification, global epidemiology, risk factors, signs and symptoms, diagnosis, treatment, complications and methods of prevention and control with a note on current prevalence in Nigeria, in order to provide an update for public enlightenment and to stimulate appropriate actions both individually and collectively.

Method

Information from research articles written in English published in international peer-reviewed journals that investigated STIs as well as official publications and books related to the topic were included. Online databases such as PubMed, ScienceDirect, amongst others, were searched. Google search engine was used. Emphasis was placed on the aspects of STIs listed above. Articles not related to these aspects were excluded.

Results

The results of this review are presented under the following subheadings: types/classifications, risk factors, global epidemiology, prevalence in Nigeria, signs and symptoms, diagnosis, treatment, complications and methods of prevention and control.

Types/Classification of STIs

More than 30 different bacteria, viruses and parasites are known to be transmitted through sexual contact (WHO, 2022). They may be classified by causative organism (Obionu, 2007) or by type of lesion (Aderibigbe et al., 2021) as follows:

Classification by causative organism

A. Bacteria

1. Gonorrhoea, caused by *Neisseria gonorrhoea*
2. Chancroid, caused by *Haemophilus ducrei*
3. Granuloma inguinale, caused by *Calymobacter granulomata*
4. Syphilis, caused by *Treponema pallidum*
5. Gardnerella, caused by *Gardnerella vaginalis*

B. **Viruses**

1. Acquired Immune Deficiency Syndrome (AIDS), caused by Human immunodeficiency virus (HIV)
2. Hepatitis B virus (HBV) infection, Hepatitis C virus (HCV) infection
3. Genital Herpes, caused by Herpes simplex virus (HSV) Types 1 & II
4. Genital Warts (Condylomata acuminata), caused by Human papillomavirus (HPV)
5. Cytomegalovirus (CMV) infection
6. Genital molluscum contagious, caused by Pox virus

C. Clamydial and related infections

1. Lymphogranuloma venereum, caused by *Chlamydia trachomatis*
2. Non-specific genital infections (non-gonoccocal urethritis), caused by *Ureaplasma urealyticum*

D. Parasitic infections (Protozoans and others)

1. Trichomoniasis, caused by *Trichomonas vaginalis*
2. Pubic lice, caused by *Phthirus pubis*
3. Scabies, caused by *Sarcoptes scabiei*

E. Fungal infections

1. Candidiasis, caused by *Candida albicans*.

Classification by type of lesion

A. Vulvar lesions and genital ulcers

1. Herpes Simplex Virus infection
2. Condylomata acuminata
3. Granuloma inguinale
4. Lymphogranuloma venereum
5. Syphilis
6. Chancriod

B. Vaginitis

1. Bacterial vaginosis
2. Trichomoniasis
3. Candidiasis

C. Urethritis and cervicitis
1. Chlamydia
2. Gonorrhoea

D. Blood-borne infections
1. Hepatitis B
2. Hepatitis C
3. HIV/AIDS

Risk Factors
Most of the risk factors for STIs emanate from lifestyle and personal behaviour. Risk factors for STIs according to Obionu (2007), Omatola et al. (2020) and Menendez et al. (2010) include the following: (i) Having multiple sexual partners; (ii) Having unprotected sex; (iii) History of STIs; (iv) Being single, widowed, divorced or separated; (v) Low socio-economic status, poverty, poor hygiene; (vi) Social and family disruption caused by rapid urbanization, migration of labour from rural to urban cities, housing problems, loneliness, partner living in another area; (vii) Ignorance, lack of knowledge of mode of transmission and prevention of STIs; (viii) Type of occupation (commercial sex workers, barmaids, musicians, sailors, drivers, uniformed men, etc); (ix) Use of unscreened blood and blood products; (x) Alcoholism and use of hard drugs (drug abuse), sharing of needles and other cutting or piercing instruments; (xi) Decreased immunity, for example, pregnancy, HIV, diabetes mellitus, broad-spectrum antibiotics, immunosuppressive drugs.

Global Epidemiology
More than 1 million sexually transmitted infections (STIs) are acquired everyday worldwide, the majority, however, are asymptomatic. Each year there are an estimated 374 million new infections with 1 of 4 curable STIs: chlamydia, gonorrhoea, syphilis and trichomoniasis (WHO, 2022).

Furthermore, more than 500 million people aged 15–49 years are estimated to have a genital infection with herpes simplex virus (HSV or herpes). Also, human papillomavirus (HPV) infection is associated with over 311,000 cervical cancer deaths each year, and almost 1 million pregnant women were estimated to be infected with syphilis in 2016, resulting in over 350,000 adverse birth outcomes (WHO, 2022). STIs have a direct impact on sexual and reproductive health through stigmatization, infertility, cancers and pregnancy complications and can increase the risk of HIV. Drug resistance is a major threat to reducing the burden of STIs worldwide (WHO, 2022).

Prevalence of STIs in Nigeria
A survey in Benin City, Southern Nigeria conducted by Nzoputam et al. (2022) found that the prevalence of STIs among a population of sexually active female undergraduate students is 27.7%. According to the study, the most prevalent positive STI test was for gonorrhea 26 (41.9%), then syphilis 18 (29.0%), staphylococcus 13 (21.0%), Chlamydia 6 (9.7%), HIV/AIDS 4 (6.5%) and Hepatitis B 3 (4.8%). This is the most recent prevalence figure found.

In an earlier study, gonorrhea was implicated as the most prevalent sexually transmitted disease (STD) in Nigeria. In fact, in 1963, WHO found Lagos to have the highest gonorrhea rate in the world (Ogunbanjo, 1989). Furthermore, some studies show a clear association between gonorrhea and male and female infertility (Ogunbanjo, 1989). Gonorrhoea prevalence in infertile populations is several folds higher than that in the general population, with even

higher prevalence in women with tubal factor infertility and in individuals with secondary infertility (Chemaitelly et al., 2023).

Signs and Symptoms

STIs are often asymptomatic. When symptoms occur, they can be non-specific. Over time, any symptoms that are present may improve on their own. it is possible for a person to have an STI with no symptoms and then pass it on to others without knowing it (WHO, 2022; National Institute of Health (NIH), 2008). Signs and symptoms of STIs vary depending on the particular STI. According to Aderibigbe et al. (2021), NIH (2008) and Sharkey (2022), signs and symptoms of STIs include the following: (i) Genital ulcers: sores, bumps, or rashes on or around the vagina, penis, testicles, anus, buttocks, thighs, or even the mouth. These may be seen in STIs such as genital herpes, syphilis and chanchroid, amongst others; (ii) Genital warts: papillary growths, small at first, tend to coalesce and form large cauliflower-like masses that may proliferate profusely. They may affect the vulva as well as the penis as in human papillomavirus infection (condylomata acuminata); (iii) Vaginal discharge: abnormal discharge of fluid or bleeding from the vagina accompanied by pruritus and labial pain, abnormal vaginal odour. These may occur in bacterial vaginosis, trichomoniasis or candidiasis; (iv) Painful intercourse, painful urination (dysuria), urethral discharge or unusual purulent discharge or bleeding from the penis or vagina, urinary frequency and rectal discomfort. These symptoms may be found in gonorrhoea, chlamydia and genital herpes; (v) Others include jaundice, fever, skin rash, abdominal pain, itching or burning sensation in and around the genitals, painful or swollen testicles, irregular or painful periods.

Diagnosis

Sexually transmitted infections are diagnosed through history taking, physical examination and laboratory investigations. The laboratory investigations include blood tests, urine test and swab culture. Swab samples are collected from the penis, vagina, urethra, cervix, anus, cheek, throat, or open sores. The decision on the type of test to order is made after sexual health history and physical examination (National Institute of Allergy and Infectious Diseases (NIAID), 2009; Boskey, 2021).

Laboratory tests rely on blood, urine or anatomical samples. Numerous laboratory tests and platforms have been developed for gonorrhea, chlamydia, syphilis, trichomoniasis, genital mycoplasmas, herpesviruses, and human papillomavirus (Caruso et al., 2021). Laboratory test is one of a number of tools in the diagnosis of the patient with STIs. Delay in diagnosis is one of the factors that justifies the difficulty to infections control. Diagnostic tests allow the introduction of aetiological treatment and also leads to treating symptomatic and asymptomatic patients more effectively, as well as to interrupt the epidemiological transmission chain without delay (Rodríguez-Granger et al., 2020).

Recently, there has been rapid development of new point-of-care (POC) tests for STIs. Point-of-care tests have the potential to revolutionize the prevention and control of STIs by enabling rapid diagnosis and early treatment of infections, thus interrupting transmission and preventing the sequelae of untreated infections. Currently, there are several point-of-care (POC) tests available for the diagnosis of *Treponema pallidum, Chlamydia trachomatis, Neisseria gonorrhoeae,* and *Trichomonas vaginalis* infections (Adamson et al., 2020).

Treatment

Effective treatment is currently available for several STIs. This involves the use of antibiotics, antifungals and antivirals. Eight pathogens are linked to the greatest incidence of STIs. Of these, 4 are currently curable, while 4 are incurable. The curable STIs are syphilis, gonorrhoea,

chlamydia and trichomoniasis. The incurable, which are viral infections, are hepatitis B, herpes simplex virus (HSV), human immunodeficiency virus (HIV) and human papillomavirus (HPV) (WHO, 2022).

Three bacterial (chlamydia, gonorrhoea and syphilis) and one parasitic STIs (trichomoniasis) are generally curable with existing single-dose regimens of antibiotics (WHO, 2022). Ceftriaxone, doxycycline, penicillin, moxifloxacin, and the nitroimidazoles are effective treatments for gonorrhea, chlamydia, syphilis, Mycoplasma genitalium, and trichomoniasis, respectively, but antimicrobial resistance limits oral therapies for gonorrhea and Mycoplasma genitalium, and no cure is available for genital herpes (Tuddenham et al., 2022).

The fungal infection, candidiasis, is treated with an antifungal such as the polyzene – nistatin or an imidazole, for example, clotrimazole, or a triazole anti-fungal, for example, fluconazole (Aderibigbe et al., 2021). 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. Current regimens are effective. For hepatitis B, antivirals can help fighting the virus and slowing damage to the liver (WHO, 2022). For genital warts, topical application of cream (5% Imiquimod) or gel (0.5% Podofilox), cryosurgery, electrosurgical destruction, excision, laser vaporization or ablation, or intralesion interferon in refractory cases may be used (Aderibigbe et al., 2021).

Complications

STI complications arise from partially treated or untreated infections (Garcia et al., 2022). The complications, as presented in various publications, include the following: (i) Salpingitis, which may result in tubal scarring, infertility, increased risk of ectopic gestations. These may be caused by gonorrhoea and chlamydial infection (Aderibigbe et al., 2021); (ii) Conjunctivitis, chlamydial pneumonia, miscarriages (fetal and perinatal wastage by abortion), premature delivery or stillbirth (Aderibigbe et al., 2021; Rowley et al., 2019); (iii) Cervical cancer, rectal cancer and others may result from human papillomavirus (HPV) infection (Aderibigbe et al., 2021; WHO, 2022). Hepatitis B resulted in an estimated 820,000 deaths in 2019, mostly from cirrhosis and hepatocellular carcinoma (WHO, 2022); (iv) Pelvic inflamatory disease (PID), preterm labour, premature rupture of membranes (PROM) and increased perinatal loss, low birth weight infants (Newman et al., 2015; WHO, 2018); (v) Chronic pelvic pain, neurological and cardiovascular diseases in adults, neonatal death, premature delivery, blindness, or severe disability in infants (Aderibigbe et al., 2021; Newman et al., 2015); (vi) STIs have a direct impact on sexual and reproductive health through stigmatization, infertility, cancers and pregnancy complications (WHO, 2022); (vii) Damage to organs such as the liver, kidneys, brain which may occur in hepatitis, syphilis, HIV encephalopathy and finally death (Aderibigbe et al., 2021; Obionu, 2007).

Prevention and Control

(i) Lifestyle modification and behavioral change (WHO, 2022); (ii) ABCD of prevention: A for Abstinence: Abstain from sex; B for Be faithful: Be faithful to your partner; C for Condom: Use a condom; D for Drugs: Use drugs called prophylactics (Aloni et al., 2019; De Wit et al., 2022). When used correctly and consistently, condoms offer one of the most effective methods of protection against STIs, including HIV. Although highly effective, condoms do not offer protection for STIs that cause extra-genital ulcers (i.e., syphilis or genital herpes) (WHO, 2022). Research on STI prevention behaviour has extended from a focus on abstinence, partner reduction and condom use, to also include novel preventive behaviours, notably treatment-as-prevention, pre-exposure prophylaxis (PrEP), which is the preventive use of medicines by uninfected people (De Wit et al., 2022); (iii) Vaccination: Safe and effective vaccines are

available for 2 viral STIs: Hepatitis B and human papillomavirus (HPV) (WHO, 2022; De Wit et al., 2022); (iv) Health education: Adequate knowledge of sexually transmitted infections (STIs) is critical for effective control of disease. Health education/counselling at the point of care provides ample opportunities to improve knowledge of patient seeking treatment WHO, 2022; Morhason-Bello & Fagbamigbe, 2020); (v) Screening, periodic check up, treatment of infected partner. Due to the hidden nature of STIs, ensuring the extensive and rapid screening of at-risk people and their partners is pivotal to successfully controlling these infections (Caruso, et al., 2021); (vi) Personal hygiene; (vii) Avoid use of unscreened blood and blood products; (viii) Avoid use of unsterilised instruments (needles, syringes, blades, etc); (ix) Avoid alcoholism and use of hard drugs; (x) Other biomedical interventions to prevent some STIs include adult voluntary medical male circumcision, microbicides, and partner treatment (WHO, 2022; Obionu, 2007).

Discussion

Sexually transmitted infections (STIs) are a group of infections in which the principal way of transmission is sexual contact. However, there are non-sexual ways of transmission of STIs. The non-sexual ways include transmission through infected blood, blood products and unsterilized instruments and transmission from mother to child during pregnancy, childbirth and breastfeeding. These points are well documented (WHO, 2022; Obionu, 2007; Omatola et al., 2020). The results of this review are the outcome of a succinct synthesis based on information obtained from over 30 journals, official publications and books on the topic. This is important and timely because STIs continue to exert a considerable public health and social burden globally with more than one million cases of STIs acquired every day. This has been documented (WHO, 2022; Caruso et al., 2021). This review may be seen as an update on STIs. Although there is no national figure on STI prevalence in Nigeria, and previous studies reported a range of prevalence of curable STIs among the low-risk population to be 0%–18% and 23% among sex workers (Morhason-Bello & Fagbamigbe, 2020), this review adopted the 27.7% reported in the study done in Benin City, Southern Nigeria by Nzoputam et al. (2022) because it is the most recent prevalence figure available. In recent times, research on STI prevention has extended from a focus on abstinence, partner reduction and condom use, to also include novel preventive behaviours, notably treatment-as-prevention and pre-exposure prophylaxis (PrEP). This has been articulated by De Wit et al. (2022).

Conclusion

Sexually transmitted infections (STIs) are diseases of public health importance. The burden of STIs globally is enormous. The prevalence of STIs in Nigeria remains high. A gap in knowledge and practice of prevention exits. Therefore, there is need for more health education, including community sensitization, in order to improve the knowledge and practice of prevention and to reduce the prevalence of STIs in Nigeria and globally.

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