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Adolescent Sexual Development and Sexually Transmittted Infections

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Author's contribution

The sole author designed, analyzed and interpreted and prepared the manuscript.

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ABSTRACT

Sexually transmitted infections are those that are contracted solely through sexual intercourse with an infected partner or person. This group of infections includes syphilis, gonorrhea, chlamydia, herpes simplex, Human Papilloma Virus (HPV) and hepatitis B infections. Sexually Transmitted Infections (STIs) is one of the most common diseases affecting about one million persons daily worldwide. This makes its annual incidence fourth to diarrheal diseases, malaria and lower respiratory tract infection in which adolescents have the highest rates recorded. This higher rate may be a reflection of some loop holes in the accessibility and quality of STI services made available to adolescents. It may also include lack of/inadequate fund, discomfort with facilities and care providers, concerns about confidentiality, lack of youth friendly services to mention but a few. This will result in untreated or poorly treated STIs which have a lot of associated complications ranging from epididymitis to infertility in males, dyspareunia to abortions, stillbirths, perinatal and neonatal deaths in females resulting into poor and/or unhealthy future reproductive health lives. Unsafe/ unprotected sexual activity in adolescents is not only complicated by STIs, others include early motherhood, school dropout, complications of unsafe abortions and pregnancy in females and the psychological and health complications in both sexes. Although, intervention efforts targeting individual effort associated with STIs prevention and treatment have been implemented in the time past but these interventions do not still address important factors such as peer norms and media influences which may be due to the fact that adolescent sexual and reproductive health have

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been neglected for some time now. But if a healthy future is anticipated, sex education, contraception and STI services for adolescents needs to be addressed as the age of sexual maturity and that at which sexual relations become legitimate has widened.

Keywords: Adolescent; influence; sexually transmitted infections; venereal diseases; sexuality.

1. INTRODUCTION

Adolescence describes the teenage years between 10 and 19 which can be considered the transitional stage of physical and psychological human development from childhood to adulthood associated with an emerging awareness of sexuality and an age-specific drive to experiment with sex [1]. Adolescence is commonly associated with physiological changes occurring with the progression from appearance of secondary sexual characteristics (puberty) to sexual and reproductive maturity [2]. Worthy of note is the fact that the biological markers of adolescence is changing as seen in the fall in the age of onset of menarche in recent years which has been attributed to improved health and nutrition of children during the developmental years. In many literatures, the terms 'young people', 'youth', 'young adult' and 'adolescent' have been used to describe persons within the age range of 10-24 years with the age range of 19-24years referred to as the late adolescence.

Sexually transmitted infection is an infection that is passed from person to person through intimate sexual contact (including vaginal intercourse, oral sex and anal sex). Sexually Transmitted Infections (STIs) are also referred to as Sexually Transmitted Diseases (STDs) and Venereal Disease (VD) but the term STI has been preferred as it has a broader range of meaning; as a person may be infected and may potentially infect others without having the disease [3]. An infection can be regarded as that condition in which there is colonization by a parasitic specie but does not lead to negative effect in the individual organ or system functioning while in disease state, the parasitic colonization results into malfunctioning of the affected organ and/or system. Although, in both cases, the affected individual may not exhibit signs and symptoms. Increased understanding of infections like Human Papilloma Virus (HPV) which infects most sexually active individuals but cause disease in only a few has led to increased use of the term STI [4].

Sexually transmitted infections (STIs) are those diseases that are contracted mainly through sexual intercourse. They include curable ones like gonorrhea, syphilis, and Chlamydia infection as well as incurable but modifiable ones like HIV, herpes simplex, human papilloma virus (HPV), and hepatitis B infections [5,6]. In summary, an STI can be regarded as that contracted majorly by sexual contact (e.g syphilis Chlamydia, gonorrhea etc.) and not through person-to-person contact during sexual intercourse (e.g common cold, pneumonia, ring worm). Although, HIV/AIDS and Hepatitis B infections can still be contracted via other means (aside sexual intercourse) including sharing of sharp objects and hypodermic needles, blood transfusion and mother-to-child transmission.

Untreated and/or poorly treated STIs has a lot of associated complications which ranges from recurrence of infection, dyspareunia and chronic pelvic pain, pelvic inflammatory disease, increased risk for ectopic pregnancies, stillbirths, spontaneous abortions, perinatal morbidities (in females) and epididymitis , urethral stricture and infertility in males which can complicated their future reproductive health lives.

1.1 Classification and Causes of STIs

STIs can be classified according to the cause as follows:

Bacterial causes

STI	**Causative agent**
• Chancroid	*Haemophilus ducreyi*
• Chlamydia	*Chlamydia trachomatis*
• Gonorrhea	*Neisseria gonorrhea*

- Granuloma inguinale — *Kleibsella granulomatis*
- Syphilis — *Treponema pallidum*

Fungal causes

STI	Causative agent
• Candidiasis	*Candida albicans*

Viral causes

STI	Causative agent
• Hepatitis B	*Hepatitis B virus*
• Hepatitis C (although rarely sexually transmitted)	*Hepatitis C virus*
• Herpes simplex	*Herpes simplex virus 1,2*
• HIV	HIV I and II virus
• HPV	HPV virus

Parasite causes

STI	Causative agent
• Crabs or pubic lice	*Pthirus pubis*
• Scabies	*Sarcoptes scabies*

Protozoa causes

STI	Causative agent
• Trichomoniasis	*Trichomonas vaginalis*

1.2 Signs and Symptoms of Some STIs

The table below contains the list all phenomenon that are either experienced by the affected individual and/or detected by another person on examination but are particular to sexually transmitted infections.

Table 1. Signs and symptoms of STIs

S/N	STI	Symptoms
1.	Bacterial vaginosis	Most women have no symptoms. Women with symptoms may have : • Vaginal itching • Dysuria • Fishy odour vaginal discharge
2.	Chlamydia	Most women have no symptoms, but women with symptom may have: • Abnormal vaginal discharge • Bleeding between periods. Untreated infections even without symptom can lead to: • Lower abdominal pain • Low back pain • Nauseas • Fever • Dyspareunia
3.	Genital herpes	Some people may have no symptoms but during an ‘outbreak’, the symptoms are clear: • Small red bumps, blisters or open sores where the virus entered the body such as the penis, vagina or mouth • Vaginal discharge • Fever • Headache

S/N	STI	Symptoms
		• Muscle aches • Pain when urinating • Itching, burning or swollen glands in the genital area • Pain in legs, buttocks or genital area. Symptoms may go away and then come back. Sores heal after 2-4weeks
4.	Gonorrhea	Symptoms are often mild but most women have no symptoms. If symptoms are present, they most often appear within 10days of becoming infected; symptoms are: • Pain or burning when urinating • Yellowish and sometimes bloody vaginal discharge • Pain during sex • Heavy bleeding during periods • Infections that occur in the throat, eye or anus might also have symptoms in these parts of the body.
5.	Hepatitis B	• Some people have no symptoms: • Low grade fever • Headache and muscle aches • Tiredness • Loss of appetite • Upset stomach or vomiting • Diarrhea • Dark-coloured urine and pale bowel movements • Stomach pain • Skin and sclera of the eye turn yellow
6.	HIV/AIDS	Some people have no symptoms for 10years or more. About half of people with HIV get flu like symptom about 3-6weeks after becoming infected. Symptoms people can have for months or even years before the onset of AIDS include: • Fever and night sweats • Feeling very tired • Quick weight loss • Headache • Enlarged lymph nodes • Headache • Enlarged lymph nodes • Diarrhea, vomiting and stomach upset • Mouth, genital or anal sores • Dry cough • Rash of flaky skin • Short term memory loss Women also might have these signs of HIV: • Vaginal yeast infections and other vaginal infections including STIs • Pelvic inflammatory disease (PID) that does not get better with treatment. • Changes in menstrual cycle
7.	Human Papilloma Virus (HPV)	Some people have no symptoms. Women with symptoms may have : • Visible warts in the genital area including the thighs. Warts can be raised or flat, alone or in groups, small or large and sometimes, they are cauliflower-flower shaped. • Growths on the cervix and vagina that are often invisible.
8.	Public lies sometimes called	Symptom include:

S/N	STI	Symptoms
	;crabs'	• Itching in the genital area • Finding lice or eggs in the genital area.
9.	Syphilis	Syphilis progresses in stages. Symptoms of the primary stage are: • A single, painless sore appearing 10 to 90days after infection. It can appear in the genital area, mouth or other parts of the body. The sore goes away on its own. If the infection is not treated, it moves to the secondary stage. This stage starts 3 ton 6 weeks after sore appears. Symptoms of the secondary stage are: • Skin rash with rough, red or reddish-brown spots on the hands and feet that usually does not itch and clears on its own. • Fever • Sore throat and swollen glands • Patchy hair loss • Headaches and muscle aches • Weight loss • Tiredness In the latent stage, symptoms go away but can come back. Without treatment, the infection may or may not move to the late stage. • In the late stage, symptoms are related to damage to internal organs such as the brains, nerves, eyes, heart, blood vessels, liver, bones and joints. • Some people may die.
10.	Trichomoniasis	Many women do not have symptoms. Symptoms usually appear 5 to 28days after exposure and can include: • Yellow, green, grey vaginal discharge (often foamy) with a strong odour • Discomfort during sex and when urinating • Itching or discomfort in the genital area. • Lower abdominal pain (rarely)

1.3 Factors that Places Adolescents at Risk for STIs and Its Complications

- **Female gender:** Most young women initiate sexual activity during adolescence and risk for sexually transmitted infections accompanies this initiation [7].

  Female adolescents are also more susceptible to STI, compared to their male counterparts, due to their anatomy. During adolescence and young adulthood, women's columnar epithelial cells which are especially sensitive to invasion by sexually transmitted organisms, such as chlamydia and gonococcus extend out over the vaginal surface of the cervix, where they are unprotected by cervical mucous, but recede to a more protected location as women age [8].

  STIs are also more likely to remain undetected in women than in men, resulting in delayed diagnosis and treatment, and untreated STIs are more likely to lead to complications in women, such as Pelvic Inflammatory Disease (PID) and cervical cancer [8].

- **Lack of health care coverage:** Adolescents face many barriers to obtaining contraceptives, including legal restrictions and social stigma against providing contraceptives to adolescents [9,10].

  This directly affects adolescent's ability to obtain professional assistance to prevent STIs, avoid transmitting infections, and receive treatment. In the U.S., thirty-nine percent of those under 25 (10 percent under 18 and 29 percent 18 to 24) lack health coverage [8].

  Even if they can obtain STI services, they may not feel comfortable in places that are not youth friendly [11].

- **Poverty and other socioeconomic factors:** This also contributes to STI risk.

Youth living in poverty may not perceive the risk of STIs or may not practice preventive behaviors if other risks—such as hunger or homelessness—appear more imminent and threatening [12].

The risk is often greater for adolescents who are in socially and economically marginalized positions as sexual activity may take place within a context of coercion or violence or in the course of selling sex for a living.

- **Cultural traditions:** Cultures that value women's passivity and subordination also diminish the ability of many women to adequately protect themselves, to refuse unwanted sex, and to negotiate condom use [13,14].

  Even when contraceptives are available to unmarried adolescents, social norms and lack of knowledge act as barriers to their use [9,10,15]. But, relatively little is known about barriers to contraceptive use among married adolescents.

- **Dating violence and sexual assault:** Twenty percent of U.S. youth report experiencing dating violence. Women who experience dating violence are less likely to use condoms and feel more uncomfortable negotiating condom use. In one study, half of girls who reported HIV or STIs had been physically or sexually abused [16,17].

- Some populations of adolescents also face increased risk as in- African American/ black youth, young women, homeless youth, young men who have sex with men (YMSM), and gay, lesbian, bisexual, and transgender youth.

1.4 Public Health Impact of STIs among Adolescents

Many diseases in adulthood have their roots in adolescence. For example, tobacco use, sexually transmitted infections including HIV, poor eating habit which can lead to illness or premature death later in life [2].

Sexually transmitted infections (STIs) are among the world's most common diseases, with an annual incidence exceeded only by diarrheal diseases, malaria, and lower respiratory infections. Every day nearly 1 million people acquire a new STI, and worldwide, more than 340 million new cases of curable STIs [18] and even more new viral (non-curable) infections occur each year [19]. Up to 80% of curable STIs occur in developing world settings; whereby adolescents and young adults have the highest rates of these STIs [20].

STI incidence rates remain high in most part of the world despite diagnostic and therapeutic advances that can rapidly render patients with many STI non-infectious and cure most. In many cultures, changing sexual morals and oral contraceptive use have eliminated traditional sexual restraints especially for women; additionally, the development and spread of drug resistant bacteria (e.g. penicillin- resistant gonococci) makes some STIs harder to cure. The effect of travelling is most dramatically illustrated by the rapid spread of the AIDs virus (HIV 1) from Africa to Europe and the Americans in the late 1970s [21]. STIs have been found to increase the chances of contracting HIV due to genital ulcer, inflamed urethra or cervix [18].

Adolescents and young adults, aged 15–24 years, are more at risk for STIs than older adults because of associated developmental tasks and risky sexual behaviours. The World Health Organization estimates that 20% of persons living with HIV/AIDS are in their 20s and one out of twenty adolescents contract an STI each year [22]. Adolescents are also more likely to practice unprotected sex, have multiple sexual partners, and have trans-generational and transactional sex [11]. Apart from STIs, unsafe/unprotected sexual intercourse in adolescents can also be complicated by unwanted pregnancy and early motherhood; complications of pregnancy (e.g pre-eclampsia, school dropout), birth and unsafe abortion and the psychological effects (e.g low self-esteem, rejection, and stigmatization) in females. This exposes the fact that the negative effects are more for the females than the males.

One in five Africans and one in three African adolescents live in Nigeria, the most populous country in Africa. Nigeria's birth rate for adolescents is one of the highest in the world and the prevalence among female adolescents in Nigeria of sexually transmitted infections including HIV is climbing rapidly [2]. High prevalence rates of STIs in adolescents may be a reflection of the short falls of quality STI services which include poor availability and accessibility of youth friendly services and care

providers, inadequate/ lack of fund (on the part of the adolescent), incompetent care providers, confidentiality concerns and discrimination. Traditionally, intervention efforts have targeted individual-level factors associated with STI risk which do not address higher level factors (e.g. peer norms and media influences) that may also influence behaviour [23].

2. SEXUALLY TRANSMITTED INFECTIONS AMONG ADOLESCENTS: THE NEED FOR ADEQUATE HEALTH SERVICES

Global prevalence rates among young people aged 15-24years suggest that this group acquire half of all new STDs [24] and that one out of four sexually active adolescent females have an STI [25]. This can be attributed to the decaying traditional social and moral values which permit pre-marital sex among adolescents which has led to increased number of sexually active adolescents and reduced age of sexual initiation in many societies. This is usually further complicated by unsafe and unprotected sexual practices which increases their exposure to the complications of such act including STIs. This has made it important to address sexuality in the adolescents regarding sex education, contraception and STI services for adolescents.

However, the age gap between age at first sexual contact and marriage has increased as evident by the findings that about 60% of these STIs infections occur in young people less than 25 years of age, and of these 30% are less than 20 years. Between the ages of 14 and 19, STIs occur more frequently in girls than boys by a ratio of nearly 2:1; this equalizes by age 20. This is because the specified age groups in many societies are less likely to be married especially with the increased uptake of education. Although, adolescents cannot be seen as a homogenous group with similar risk factors because of the influence of individual family setting and parenting, personality, religion and ethnic group. Also is the influence of biologic factors (as identified by [26] as in host's anatomy, microbiology, hormonal and immunologic status as well as literacy, educational level and community health belief related to STIs (as identified by Demographic Health Survey [27] that a community's willingness to support dissemination of information about STI/HIV risk and preventive strategies also affect STI acquisition, particularly for women.

Despite much publicity promoting adolescents' use of contraception, their uptake is still low which can be attributed to accessibility problems and lack of insistence of its use in females. Even with the knowledge of these, little effort have been put in place to address adolescent sexual and reproductive health. Although, many schools have incorporated sex education in their curriculum, but this is usually started late and/or insufficient. However, in many cases, young people are not provided with the skills to protect themselves against the risk of infection and also access to health services tailored to their needs [28].

STIs in adolescents may be as a result of unprotected sex with a number of short-term partners and / or unfaithful long-term partners which may be a older person or husband (for females). Despite the availability of safe and effective modern contraceptives suitable for use in adolescents and have been proven to prevent unintended pregnancies and/or reducing the transmission of sexually transmitted infections, there is still no well documented record on adolescent contraceptive uptake in Nigeria. This can be well supported by the fact that approximately 40% of all new HIV infections occur in people between 15 and 24 years of age [29].

3. CONSEQUENCES OF UNTREATED AND POORLY TREATED STIs IN ADOLESCENTS

The HIV PANDEMIA has increased the awareness about other STIs. Most of the burden of STIs is borne by women, yet women are less likely than men to seek treatment for STI [30]. In the developing countries, complications related to STIs are a major cause of mother and child mortality during pregnancy as well as to the high incidences of cervical cancer [31]. Untreated and poorly treated STI has serious negative effect(s) on future reproductive health lives and part of the most prevalent ones includes:

3.1 Pelvic Inflammatory Infection, Ectopic Pregnancy and Infertility

Untreated and poorly treated bacterial infection in women is a major cause of infertility in females. This is usually as a result of pelvic inflammatory disease which can also result into ectopic pregnancy as a result of damage to the uterine walls and/or tubal damage. Ectopic pregnancy is a medical emergency and a contributor to

maternal mortality when not treated promptly and can also be a contributor to infertility. Untreated bacterial STIs in women result in pelvic inflammatory disease in up to 40% of infections; and 1 in every 3 of these will result in infertility. Tubal damage from STIs can lead to ectopic (tubal) pregnancy, the cause of up to 10% of maternal mortality in settings with high STI prevalence. Chronic pelvic pain from untreated bacterial STIs is an important cause of health care visits among women [32].

3.2 Neonatal Eye Infections and Blindness

Many new born babies suffer eye infections as a result of untreated maternal STI that could have been prevented. Some may lead to congenital blindness or the blindness may be a complication of late detection and/or poor treatment of the eye infection. This can be corroborated by the finding of WHO [32] that about 4000 newborn infants become blind as a result of eye infections attributable to untreated maternal STIs.

3.3 Perinatal Deaths

Many of the STI causes adverse pregnancy outcomes (e.g congenital abnormalities, stillbirths and early neonatal deaths) that can lead to perinatal death. Syphilis is specifically implicated in this regard and has been found to be one of the most important causes of adverse pregnancy outcomes in infected women for up to 1,500,000 perinatal deaths each year and an overall perinatal mortality of 40% [32].

3.4 Chronic Diseases and Death

Chronic hepatitis B virus infection is usually a major contributor to disability and death from liver disease. Worst still, this infection can be transmitted to the infant at birth and the infection sustained if such infant is not immunized within 72hours of birth: contributing to perinatal morbidity. This immunization if provided for neonates could prevent 30 to 70percent of all deaths related to liver cancers and cirrhosis among adults living in developing countries [32].

3.5 Cervical Cancer

The incidence of cervical cancer is increasing and HPV infection (an STI) has been implicated in its development. Also is the history of multiple sexual partners which is part of the risky sexual behaviour engaged in by adolescents. Therefore, if preventive and treatment measures are well implemented for adolescents (as in HPV vaccine), many of the cervical cancer attributed deaths can be abolished. These deaths have been estimated to about 240,000 yearly [32] which happens especially in poor resource settings.

4. FACTORS IMPEDING ADOLESCENT TREATMENT SEEKING BEHAVIOR

A lot of factors have been identified as impeding adolescents' access to STI treatment; some of which are as follows:

Inadequate provision of youth friendly centres: Youth friendly centres are those health service outlets established to specifically cater for the health needs of adolescents. They offer a wide range of health care services ranging from treatment of common diseases and injury including malaria to reproductive health concerns like contraception, HIV screening and treatment, STI screening and treatment (to mention but a few). These services are provided by competent health care providers who have been trained and certified to provide such care. And because there are few of these centers around, adolescents have no option than to make use of the same services as that of the adults which discourages many of these adolescents' as a result of location, high cost, provider incompetency and confidentiality issues.

Aside from these, adolescents who patronize the adult centres have reported having experiencing fear, judgmental attitudes and embarrassment from the care providers and unmet health needs. This has also contributed in part to the poorly treated infections as a result of dropout and lack of follow up.

5. HELPING ADOLESCENTS IN THE PREVENTION AND CONTROL OF STIs

- Creating and sustaining a supportive environment needed for healthy sexual and reproductive development in adolescents
- Providing adolescents with enough information and skills necessary to make informed choices
- Increasing access to reproductive health services.

- Proper attention to adolescent sexual and reproductive health
- Creating youth-friendly centres where adolescent sexual and reproductive needs can be attended to.
- Provision of free or affordable sexual and reproductive health services to adolescents
- Improved STI monitoring and surveillance among adolescents through the provision or adequate tracking systems.
- Training care providers in the skills necessary to provide comprehensive STI prevention, management and treatment.
- Adequate monitoring and evaluation of adolescent STI programs to measure effectiveness and efficiency and make appropriate modification(s).
- Sex education focusing on STI risks and prevention, and how to access preventive methods e.g male and female condoms.

6. CORE COMPONENTS AND SUPPORTIVE ELEMENTS OF STI PREVENTION AND CONTROL (CDC, 2009)

This figure represents all the core components necessary for the prevention and control of sexually transmitted infections (as identified by CDC, 2009). Within which are the elements necessary to achieve the components. The strategies when combined will be more effcetive and efficient than when used independently of one another.

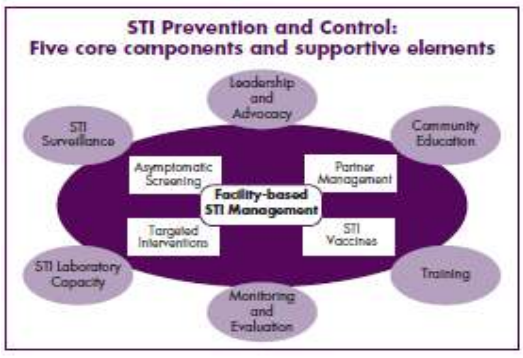

Fig. 1. Core components and supportive elements of STI prevention and control

7. SUMMARY AND CONCLUSION

Adolescence is a period of transition from childhood to adulthood characterized by sexual reproductive development with subsequent experimentation with sexual activities. Since sexuality cannot be separated from human existence, there is need for measures to make the encounter a safe and satisfying one as exemplified in the definition of reproductive health which implies that individuals must be able to enjoy an uncomplicated and fulfilling sexual life and to be able to make free and informed choices about their reproductive lives.

The ability to make free and informed choices implies that individual have must indiscriminate and equal access to contraceptive commodities at an affordable cost; also to abortion services and post abortion care. Neglecting the adolescent in this regard is tantamount to violation of their sexual and reproductive health right.

CONSENT

It is not applicable.

ETHICAL APPROVAL

It is not applicable.

COMPETING INTERESTS

Author has declared that no competing interests exist.

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