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**Abstract:** STIs are widespread and have serious negative effects on both health and the economy. Worldwide, there are an estimated 500 million new instances of sexually transmitted infections (STIs) annually, with women being more vulnerable and carrying the highest burden of these illnesses. Geographically, Sudan is surrounded by nine nations, the majority of which have high rates of HIV seropositivity.

The HIV seropositive prevalence in Sudan is now between 1.2 and 1.6%, although it is predicted to rise as a result of the current political and security unrest in several of the neighbouring countries, which has caused a refugee inflow. The refugees currently make up a significant portion of the unskilled work force and live among the lower socioeconomic classes.

Although STIs are a public health problem, the incidence of STIs in Sudan has not been thoroughly studied. The population's knowledge of STIs is minimal, and there are significant differences by residency and level of education, according to survey data. In order to prevent and manage STIs, including HIV/AIDS, the Sudanese government is working with UN organisations and non-governmental organisations to implement specific interventions.

At the primary health care levels, a syndromic STI management program is put into place. The government should promote and encourage research on STIs, and stakeholders need to put in more and better efforts. On the basis of it, a suitable and empirically supported approach to the prevention and management of STIs, including HIV/AIDS, may be created. The purpose of this research is to determine Sudan's STI prevalence and level of understanding.

**Keywords:** Chlamydia; Gonorrhea; Prevalence; STIS Other than HIV/AIDS; Syphilis; Sudan; Trichomoniasis

**Methodology:** Literature review was conducted through electronic searches using the words (STIs in Sudan). In addition; the national published documents with relevant data on STIs were also searched. The findings of this study are a result of a review of 22 documents.

Sudan is a vast country in sub-Saharan Africa with a total population of around 39.2 million persons. Of the total population, rural population formed about 63.2%, urban 29.8% and nomads 7 % [1]. Sudan has a prominent diversity in, culture, religion, languages and ethnicity. Sudan has experienced long-term ethnic and political conflicts; some of them are still ongoing in Dar Fur, South Kordofan and the Blue Nile states. Sudan is bounded by nine countries, some of them having a high prevalence of HIV infection and acquired AIDS. Due to political instability and conflicts in some of the Sudan neighbouring countries, Sudan currently hosts around two million refugees reside in the eastern and southern parts of Sudan, some of them engaged in the labour forces.

This situation makes Sudan at risk for an increase in the prevalence of STIs including HIV/AIDS. The first case of HIV/AIDS in Sudan was reported in 1986 and in 2002 the total number of cases reported had increased to 4004, representing a seropositive prevalence of 1.6%. The main mode of HIV transmission is heterosexual accounting for 97% of HIV positive cases [2]. STIs are a major public health problem in all regions of the world. WHO estimated in 2005 that about 448 million curable infections occur every year worldwide in adult men and women [3].

Infections that largely spread via interpersonal sexual contact are known as sexually transmitted infections, or STIs. But other illnesses, like HIV/AIDS, syphilis, and hepatitis B, may also be passed from mother to kid via tissue transfer, blood products, pregnancy, delivery, and nursing. Sexually transmitted infections (STIs) are caused by over thirty different bacteria, viruses, and parasites [4]. Reproductive tract infections (RTIs) and STIs should be kept apart. RTIs, which include endogenous infections like bacterial vaginosis and vulvovaginitis candidiasis, are characterised as infections of the

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vaginal organs. These two illnesses may affect women who have never engaged in sexual activity and are often not sexually transmitted. Certain variables, such as using antibiotics or contraceptives, being pregnant, having uncontrolled diabetes, or having a weakened immune system, might raise the risk of endogenous infections [5].

Among the leading causes of sickness and mortality for women in underdeveloped nations are sexually transmitted infections (STIs) and their consequences. STIs are linked to a higher risk of HIV infection and transmission. At least one-third of female infertility is thought to be caused by an untreated chlamydia infection. Additionally, the risk of an ectopic pregnancy is six to ten times higher in women with pelvic inflammatory diseases (PIDs) than in those without. Untreated Neonatal fatalities and stillbirths may result from a mother's syphilis infection. Premature births, spontaneous abortions, and up to 10% of perinatal fatalities occur in up to 35% of pregnancies among women with untreated gonococcal infection [4]. Gonorrhoea symptoms might be so subtle in some women that they are not detected. Many women who have gonorrhoea discharge self-treat with over-the-counter drugs because they believe they have a yeast infection. It is advisable to always see a physician to ensure proper diagnosis and treatment since vaginal discharge may indicate a variety of issues [6]. Additionally, contact with infected body fluids may transmit gonorrhoea, allowing an infected mother to infect her infant during delivery. Acute conjunctivitis may result from the gonorrhoea germs coming into touch with the newborn's eyes [7]. Furthermore, a large number of individuals have non-curable sexually transmitted infections (STIs), mostly viral illnesses such genital herpes, hepatitis B, and HIV/AIDS. In 2000, it was estimated that 536 million individuals between the ages of 15 and 49 had type 2 herpes simplex virus [8].

### **Understanding and STI Transmission Modes in Sudan**

There is virtually little information about STIs in Sudan. Due to the societal stigma associated with these illnesses, fundamental information about them cannot be properly disseminated. Women who had ever been married were asked about their awareness of HIV/AIDS and two signs of other STIs [5]. The purpose of the survey was to find out whether women had heard of these illnesses and what they knew about their method of transmission, prevention, and treatment.

In general, 43% of women are aware about AIDS. Just 28% of rural women are aware about AIDS, which is a fairly low level of knowledge. Additionally, there are significant differences in knowledge based on education: 22% of women who are illiterate have heard of AIDS, compared to 95% of women with secondary education and above [9]. Sexual activity was identified as the primary mechanism of transmission by 91% of women who were aware of AIDS. Eighty-three percent of respondents said that having only one sexual partner may prevent AIDS. In order to avoid STIs, 37% recommended using condoms and 94% recommended using disposable syringes [9]. Merely 30% of females were aware of vaginal ulcers. Sexual activity was cited by 59% of women as the primary mechanism of HIV transmission [5]. Many women held false beliefs about how HIV is spread, including contact with AIDS patients (17%) and dirty toilets (24%).

Awareness of abnormal vaginal discharge was indicated by 51% of women. Compared to 66% of urban women, 42% of rural women are aware of abnormal vaginal discharge [9]. According to a 2006 poll, 70% of women between the ages of 15 and 49 had heard about AIDS; uneducated women are less aware of the disease than educated women (49.6% vs. 90.5%) [6]. In terms of HIV transmission methods, 51.5% reported having sex, 39.7 via tainted blood transfusions, and 38.8 through injectables. Just 7.5% of women said that using condoms prevents HIV transmission, 12.9% said that bug bites may spread HIV, and 1.6% said that eating and sharing meals with AIDS patients helps prevent HIV transmission. HIV vertical transmission is known to 54% of women. 85% of educated women are aware of vertical HIV transmission, compared to 29.7% of illiterate women [10].

Similar to males aged 15-49, 87% of men aged 15-24 had heard of HIV/AIDS, and 11% of men aged 12-24 and 12% of those aged 15-49 have extensive knowledge on HIV prevention [11]. In 2007, a survey of dental students from six dental institutions in Khartoum, the capital of Sudan, conducted a cross-sectional research on their understanding about AIDS. According to 61% and 44% of the students, lectures and radio/TV were the most common sources of knowledge on

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HIV/AIDS. 47.6% of students said that they needed more information on a variety of HIV/AIDS-related subjects. 97% of students said that tainted blood transfusions may spread HIV. Condoms are a safe way to stop HIV transmission, according to around half of the students [12].

**Sudan's STI Epidemiology** Despite the fact that STIs are a major source of morbidity, mental illness, and societal issues, many developing nations now ignore them. Facilities for accurate diagnosis and treatment are few. In the case of Sudan, insufficient data and research have been conducted to ascertain the extent of STI prevalence. 338 women between the ages of 15 and 69 were chosen at random and examined in order to determine the incidence of STIs among women in a Sudanese community. According to the findings, 7.7% of the participants had trichomoniasis, 1.2% had gonorrhoea, 1.2% had HIV, and 0.9% had syphilis [13]. To evaluate the STIs in Sudanese men, a research was carried out at two venereal disease clinics in Khartoum, the country's capital. 61 individuals (47.1%) of the 138 patients who were sent to the clinic with a referral diagnostic of STIs were confirmed to be free of any STIs. The most prevalent STI among male adult patients was Non-Gonococcal Urethritis (NGU) (35.1%), followed by Gonococcal Urethritis (25.9%). Just 1.3% of the patients under investigation had syphilis. The majority of STI patients were between the ages of 20 and 39. Prostitutes were the source of infection for 49.3% of the affected patients. 71.4% of the patients who were evaluated and found to have STIs were unmarried, and almost half of them belonged to the low-income socioeconomic category [14]. Clinical and laboratory screenings for STIs other than HIV/AIDS were conducted on impoverished pregnant women who attended prenatal clinics for regular examinations in displacement camps, a women's jail, and other peripheral health centers. In all, 426 women between the ages of 14 and 45 were involved. Cervical and vaginal swabs, blood, and clinical data were gathered.

Everyone present was HIV/1/2 negative. 7.8% of women had *Trichomonas vaginalis*, 49% had *Chlamydia trichomatis*, 0% had *Neisseria gonorrhoea*, and 5% had *Treponema pallidum*. The authors of this research reported that their determined predictive value was only 14.1%, despite the fact that vaginal discharge, among other symptoms, is acknowledged to be the most important signal for STIs. They came to the conclusion that many readily treatable STIs would go unnoticed and that the syndromic technique has little therapeutic benefit when used to diagnose and treat attendance in prenatal settings [15].

According to reports, there were about 7,245 HIV-positive patients in 2000, of whom 3,638 had AIDS [9]. Over 95.5% of these instances involve heterosexual activity. Given that Sudan borders nine African nations, six of which have the highest rates of HIV/AIDS and STIs, there is a greater chance that STI rates may rise in Sudan. Prevention. The government is now concentrating mostly on HIV/AIDS concerns and, to a lesser extent, syphilis and hepatitis B virus for unknown reasons. The technical organization in charge of national strategy, planning, and coordination is the Sudan National AIDS Program (SNAP).

By the end of 2011, there were 144 VCT centers, 30 ART centers, and 80 PMTCT facilities under SNAP supervision and with assistance from the United Nations Development Program (UNDP), with an emphasis on lowering HIV transmission.

All of these websites provide free services that follow WHO principles and rules. Since 1996, NGOs in Sudan have been participating in HIV activities, namely increasing awareness and conducting specific outreach interventions for HIV important and vulnerable groups, due to the relative benefit of reaching the community. Despite these efforts, new study indicates that HIV/AIDS is still spreading in Sudan, with a prevalence that is expected to almost double from 2009 to 1.2% of the population by 2015 [17]. The most well-known STIs, apart from HIV/AIDS, are trichomoniasis, syphilis, gonorrhoea, and chlamydia. It is much more critical to prevent and manage treatable STIs because of the relationship between HIV and other STIs. Every first-level healthcare institution, including health centers, rural hospitals, and STI clinics, regularly uses syndromic case management. The number of STI patients treated rose from 35,263 in 2009 to 89,625 in 2011 as a consequence of the introduction of syndromic case management and the integration of STI treatment in primary healthcare [16].

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### Results:

In general, STIs are epidemics and present an enormous health and economic consequences. Currently the prevalence of HIV infection in Sudan is within a range of 1.2-1.6% and expected to increase. The main mode of HIV transmission is heterosexual accounting for 97% of HIV positive cases. The awareness on AIDS is poor especially among women in rural areas. The prevalence of trichomoniasis was found in 7.7%, gonorrhea in 1.2%, HIV in 1.2% syphilis in 0.9%, non-gonococcal urethritis 35.1%, and *Chlamydia trichomatis* 49%. Syndromic case management is consistently applied at all first-level health facilities.

### Conclusion:

Sexually Transmitted Infections (STIs) are important public health problem and major health threats affecting people globally; however, the burden of STIs is greatest in low-income countries including Sudan. There are few data on STIs other than HIV/AIDS in Sudan. The current prevalence of HIV/AIDS is low but, expected to increase. The most accounted STIs among the studied groups are gonorrhea, trichomoniasis, chlamydia, syphilis and HIV/AIDS. The most frequent transmission mechanism of STIs, in Sudan, is heterosexual relations. Syndromic approach is commonly used for diagnosing and treating STIs other than HIV/AIDS.

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