

# MITIGATING SEXUALLY TRANSMITTED INFECTION IN INDIA

## Abstract

The significance of STIs as a pressing public health and epidemiological issue in India. According to the World Health Organization (2016), sexually transmitted infections (STIs) are infections primarily transmitted through sexual contact. Bacteria, viruses, and parasites are just a few of the microorganisms that can cause infections. The prevalence of sexually transmitted infections (STIs) in India has been experiencing a rapid increase, according to recent research. However, there have been limited studies conducted on health-seeking behavior, knowledge, attitude, and perceptions of sexually transmitted infections (STIs) at both the community and individual levels. Policymakers might view developing a general awareness program in a diverse nation like India as utopia. Therefore, in order to gain insight into the knowledge, attitudes, and sexual behavioral patterns of various socio-economic strata in India, it is crucial to understand the healthcare-seeking behavior among Indian adolescents, youth, and pregnant women. However, it is important to note that both asymptomatic STIs and menopausal women, who are often overlooked, may be more inclined to disregard precautionary measures. Nevertheless, it is crucial to remember that sexually transmitted infections and diseases do not discriminate. The best way to address this epidemic burden is to use an anthropological lens and find community-specific sexual behaviors for implementing region specific policy to mitigate the STIs in India.

**Keywords:** Health seeking behavior; India; Reproductive Health; Reproductive Tract Infection (RTI); Sexually Tract Infection (STI); Syndromic approach; Women's health

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## I. INTRODUCTION

In developing countries, sexually transmitted infections (STIs) and reproductive tract infections (RTIs) have become prevalent public health concerns, posing a substantial economic strain on individuals (Novak, 2006) and healthcare systems alike. (Rizwan et al., 2016). According to the World Health Organization (2020), approximately 374 million individuals acquire one of four treatable sexually transmitted infections every year: chlamydia, gonorrhea, syphilis, and trichomoniasis. A national study has estimated that there is a prevalence of 40 million cases of RTI (Rizwan et al., 2015; Paul, 2023). RTI refers to the infection of the reproductive or genital tract, leading to a significant reduction in quality of life for sexually active women within the reproductive age group in developing nations (Puthuchira and Athimulam, 2014; Kafle and Bhattarai, 2016). Women within the reproductive age bracket face a heightened susceptibility to RTIs during significant physiological events, including menstruation, pregnancy, and childbirth (Mani, 2014). A woman experiencing a RTI may exhibit a range of symptoms, including but not limited to back pain, pain in the lower abdomen, the presence of genital ulcers, itching in the vulval area, swelling in the inguinal region, and abnormal discharge from the vagina (Thekdi et al., 2014). This can result in various complications, such as pelvic inflammatory disease (PID), infertility, cervical cancer, chronic pelvic pain, ectopic pregnancy, and pregnancy loss (Batia and Cleland, 2001).

**1. Etymological relationship between RTI and STIs:** The relationship between STI and RTI is very intertwined. Scholars, apart from those with medical and health backgrounds, cannot differentiate between these terms. But there is a prominent variance among these terminologies (Figure 1). RTIs can be described as a location where sexually transmitted (Human papillomavirus, Herpes simplex virus, Hepatitis B, and HIV) and non-sexually transmitted (e.g., Bacterial vaginosis, yeast infection) infections take place, whereas STIs pertain to the mode of transmission (United Nations, 2010). The failure to promptly identify and provide appropriate medical intervention for sexually transmitted infections (STIs) during the initial stages can lead to significant and potentially fatal outcomes (Chesson et al., 2017; Garcia et al., 2023). These consequences encompass a range of adverse health effects, such as infertility (Tsevat et al., 2017), miscarriage, preterm delivery, stillbirth, ectopic pregnancy (Grant et al., 2020), premature mortality, and the transmission of infections to newborns and infants, particularly among women residing in India (Warr et al., 2019). Nevertheless, this is not only a physiological problem; the management of STIs poses a formidable challenge (Singh and Singh, 2021). Public health programs should prioritize the provision of accessible and high-quality health services that offer comprehensive management of STIs. Additionally, these programs should address the biological (Grant et al., 2020), behavioral, psychological, and social determinants (Singh and Singh, 2021), and social determinants (Semwogerere et al., 2021) that contribute to the transmission of STIs. This crucial public health concern needs the utmost attention from the policymakers of India (Ray et al., 2008). Previous research on the prevalence of sexually transmitted infections (STIs) in India has primarily concentrated on individuals seeking treatment at sexually transmitted disease (STD) clinics located in major urban centers (Koeing et al., 1988).

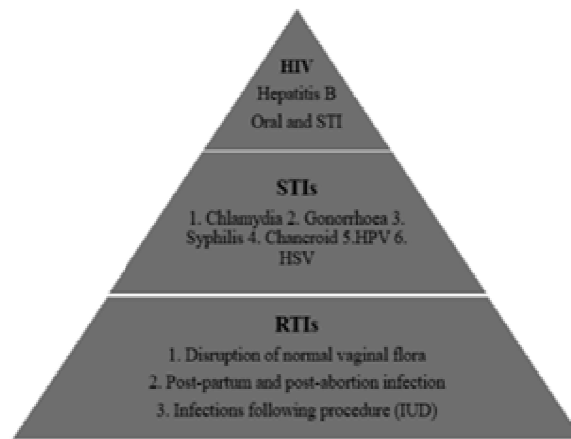


Figure 1: Relationship between RTI, STI and HIV

However, there has been a lack of investigation into the infection rates among women accessing healthcare services at smaller primary health centers situated in peripheral areas, which serve the community and are located away from major cities (Bhatia and Cleland, 2000). This particular population has not received equivalent attention in terms of STI prevalence research. Several studies at the community level have been conducted; however, the available data is characterized by its fragmented and incomplete nature (Saggurti et al., 2011). Apart from India, reproductive morbidity is a prevalent issue in developing nations, significantly impacting the overall well-being of women in other developing countries (Bhandari and Kannan, 2010). However, it has received limited attention from health planners and researchers until recent times (Ray et al., 2008). In order to effectively translate the rhetoric of the 1994 International Conference on Population and Development into practical action, it is imperative to develop the necessary tools for assessing the nature and extent of the problem in various contexts. Over the past decade, significant progress has been made in the development of laboratory-based diagnostic tests for sexually transmitted infections (STIs), which are widely recognized as the most reliable and accurate methods available (Caruso et al., 2021). The economic burden of laboratory tests for STI and RTI is impractical for implementation owing to the paucity of screening tools in a rural setting with limited resources in a country like India. In the foreseeable future, the control and management of these infections will continue to rely predominantly on the reporting of symptoms by individuals and the observation of clinical signs (Wi et al., 2019).

Hence, it is important to address public health awareness concerning sexually transmitted infections (STIs) within the context of India. To understand the present scenario, it is imperative to collect the data regarding STIs in a bottom-up approach with the help of anthropological lenses. Descriptive and community trial-based epidemiological research from different populations can provide an outcome regarding knowledge, attitude, and perceptions regarding their sexual behavior. Few studies from Bangladesh

(Bogaerts et al., 2001; Nessa et al., 2004; Alam et al., 2015), Pakistan (Mohammad and Saniotis, 2011), China (Wang et al., 2014), and Vietnam (Lan et al., 2008) have found out the prevalence of STIs. On the contrary, many studies have been reported in the USA (Lorvick et al., 2006; Haque et al., 2017), Zambia (Minnis et al., 2010; Chaponda et al., 2016), Ghana (Adanu et al., 2012), Kenya (Oga et al., 2022), and Gambia (Hough, 2010) on the specific topic because of policy implementations. In the case of Western and Middle Eastern countries, the prevalence of RTI and STI studies was really low due to their cultural orientations.

## II. RTI/STI STUDIES IN THE INDIAN SCENARIO

At present, there are an ample number of published articles in PubMed, Google Scholars, Science Direct, PsychInfo, and many other databases. A special focus is needed to understand the frequency, prevalence, and empirical research of RTI, STI, and HIV with a deep conceptual understanding of their geographical and cultural effects, as India is a diverse country (Mayaud and Mabey, 2004; Durai et al., 2019). The majority of the aforementioned study was conducted in a hospital setting (Ray et al., 2009; Torondel et al., 2018; Chaudhury et al., 2019). On the other hand, very few studies have been done in community settings and population-based settings outside the territory of a hospital (Kinkor et al., 2019; Prasad et al., 2009). The reason behind this discrepancy in the number of studies lies in the sensitivity of the issue. In the Indian context, knowledge and practices of sexual and reproductive life for any individual are not openly discussed and are also considered taboo in many cultures (Singh et al., 2020). This does not imply that Indian women and men rarely experience STIs or RTIs. Thus, the epidemiology of RTI and STI in urban and rural community settings has not been thoroughly investigated. According to the findings of the National Family Health Survey (NFHS-5), approximately 22% of women and 31% of men within the age range of 15–49 years experienced symptoms associated with STIs or RTIs in 2019–21. Most of the affected persons are symptomatic, but the frequency of individuals related to asymptomatic STIs was difficult to measure due to unawareness. Presently, only four studies have been conducted on the Knowledge, attitude, and practices (KAPs) of STIs among the Indian population, with special reference to Haryana (Agarwal and Duggal, 2004; Rizwan et al., 2011), Delhi (Singh et al., 2010), Madhya Pradesh (Saha et al., 2013), and research based on DHLS data (Tripathi, 2021). There is no outcome related to the southern, eastern, or north-eastern parts of India.

We have gained insights from these earlier studies that the knowledge related to STI is relatively higher among the older age group compared to the younger ones and among women in higher economic strata compared to their poorer counterparts (Tripathi, 2021). Studies in Haryana had shown reluctance of expression (40%) among the women who had higher symptoms of STIs (60%) (Rizwan et al., 2011, Agarwal and Duggal, 2004). The study's findings indicate that implementing a health-education strategy involving home visits, case management, and counseling for RTIs and the establishment of a weekly clinic, occasional camps, and health-education talks can effectively enhance awareness regarding RTIs and STIs among both genders and lead to improved health status. Similarly, Singh et al. (2010) found out from the interventional study that Enhancing knowledge and implementing early intervention during the initial stages of sexual activity among recently married women has the potential to alter certain high-risk behaviors, thereby mitigating the likelihood of contracting RTI or STIs.

### **III. HISTORICAL ENCOUNTERS WITH STIS IN INDIA THROUGH THE EPIDEMIC LENS OF HIV**

Before doing in-depth analysis with the help of the available data regarding the KAP of STIs, it's important to know the history of literature-related STIs in the Indian context. The heightened attention towards STIs has predominantly stemmed from the significant impact of the HIV epidemic, leading to an increased focus on this subject matter during the last thirty years. In developing nations, the epidemiology of STIs has undergone transformations, primarily due to alterations in STI case management strategies and shifts in behavior prompted by the HIV epidemic. Simultaneously, advancements in STI prevention have contributed to a deeper comprehension of the complexities surrounding the transmission dynamics of STIs and the significance of interventions in the management and containment of these infections. Nevertheless, it is crucial to acknowledge that the noteworthy aspects lie not only in the alterations that have occurred but also in the persistent disparities in the epidemiology of STIs between industrialized nations and developing regions. The epidemiology of STIs in developing countries is significantly influenced by sociocultural and economic contexts, thereby rendering them a crucial focus in the realm of public health (So et al., 2006). The initial instances of HIV infection in India were identified in 1986 within the population of female sex workers in Chennai. At the onset of the epidemic, the states of Andhra Pradesh, Karnataka, Maharashtra, Tamil Nadu, and Manipur were designated as high-prevalence states, with antenatal women exhibiting HIV positivity rates exceeding 1%. The spread of the epidemic primarily affected high-risk groups, including female sex workers, men who have sex with men (MSM), and intravenous drug users (IDU). However, the transmission of the virus through heterosexual contact accounted for the majority of cases. Although transfusion-related transmissions were initially significant, diligent efforts to regulate blood supplies successfully reduced such transmissions to less than 1% of overall infections (Paranjape and Challacombe, 2016). Paranjape and Challacombe (2016) further discussed the three primary factors that contribute to the prevalence of HIV infection in India: One of the primary factors contributing to the spread of the Asian epidemic is commercial sex work.

### **IV. HEALTH-CARE-SEEKING BEHAVIOR REGARDING STIS**

The incidence of STIs, specifically gonorrhea and syphilis, is currently experiencing an upward trend among both males and females in numerous nations (World Health Organization, 2018). The management of sexually transmitted infections (STIs) is contingent upon the prompt diagnosis and treatment of these conditions, as it effectively reduces the duration of infectiousness (Mabey, 2010). Furthermore, the timely initiation of treatment has the potential to mitigate adverse health outcomes, including but not limited to infertility, persistent pain, and morbidity and mortality rates among both fetuses and neonates (Hillis et al., 1993; Cooper and Sanchez, 2018). Healthcare-seeking behavior refers to the sequential steps involved in recognizing a health issue, comprehending its significance, making a determination regarding the appropriate course of action, and actively pursuing medical assistance (Fortenberry, 1997). The primary factor that prompts individuals to seek healthcare can differ. Nevertheless, it has been observed that the primary motive for individuals seeking medical attention at sexual health clinics is the manifestation of symptoms such as abnormal vaginal discharge, urethral discharge, pain, and the presence of genital warts or ulcers.

In the present Indian scenario, a randomized trial of ART (antiretroviral treatment) on the basis of the HIVIND study protocol in South India found that the use of mobile phones is not restricted by where one lives due to a lack of resources. In comparison to other communication technologies, including the Internet, there is evidence that the so-called "digital divide" along the socio-economic gradient is less pronounced when it comes to mobile phones among the 600-study sample (DeCosta et al., 2010). At the end of the two years of therapy, the aforementioned multicenter controlled trial revealed no evidence of a meaningful impact of the mobile phone intervention among the 631 HIV patients (Shet et al., 2014). Therefore, it has been estimated that personal counseling sessions and friendly interactions with patients can be feasible approaches in the present Indian scenario. Another case-control, cross-sectional study in tertiary health care in Odissa found that 46% of HIV patients in the nonadherent group had very severe anxiety, while 17% had moderate to severe anxiety (Panigrahi et al., 2015).

## V. CULTURAL PRACTICES OF HEALTH AND HYGIENE

Within the realm of health promotion, cultural sensitivity can be conceptualized as the degree to which the ethnic and cultural (and linguistic) attributes, experiences, norms, values, behavioral patterns, and beliefs of a specific population, along with pertinent historical, environmental, and social influences, are integrated into the development, implementation, and assessment of specific health promotion materials and initiatives. Each society establishes its own understanding of health for its members, identifies the causes of diseases, sets the boundaries for defining and expressing distress, and recommends suitable methods for treating the disorder, both in terms of medical interventions and social practices (Resnicow et al., 2000). This observation holds significant relevance in the context of sexually related conditions and behavior change programs, particularly due to the intricate nature of sexuality and the long-term expectations associated with adopting specific behaviors. These factors introduce additional complexities to the cultural and linguistic aspects of the issue (Sifunda et al., 2004).

The field of HIV/AIDS intervention research has not extensively explored the topic of culture and the local interpretations of sexual behavior and sexual infections. This is primarily because the research has predominantly concentrated on collecting descriptive data, which is considered crucial for promptly implementing preventive measures. The lack of attention given to the sociocultural and linguistic factors influencing sexual experiences has had negative consequences for the effective management of STIs and HIV/AIDS in the long run (Perker et al., 1995). Furthermore, Parker highlights the importance of expanding the scope of measures used to assess sexually transmitted diseases. This expansion should not only focus on the frequency of specific behaviors but also take into account the subjective and interjective social, cultural, and linguistic significance attributed to these diseases. This approach is necessary in order to develop a more profound comprehension of these issues within diverse sociocultural contexts (Toroyan and Reddy, 1997). Consequently, it is imperative to undertake a comprehensive examination of these matters in order to promote the inclusive development of customized HIV/STI interventions that are culturally sensitive, linguistically suitable, and appealing to the intended populations (Toroyan and Reddy, 1997; Perker et al., 1995).

## **VI. THE PREVALENCE OF STI AMONG THE ADOLESCENT POPULATION OF INDIA**

Adolescents and youth, aged 10-24 years, make up approximately 30% of our population (Census, 2011). STIs pose a significant burden of morbidity and mortality in numerous developing countries, particularly among adolescents. Adolescents may be more susceptible to contracting STIs due to their increased likelihood of engaging in unhealthy lifestyles (Korey et al., 2022). However, it is important to note that these adolescents possess a limited understanding of the utilization and obstacles associated with sexual and reproductive health information and access to care services. Globally, adolescents and young adults account for more than 50% of incident STI cases and roughly 27% of incident HIV cases (Nagata et al., 2022). In a recent study, it was found that a staggering 80% of adolescents were aware of the existence of HIV/AIDS. However, the same study revealed a concerning statistic: a mere 11% of these young individuals had any knowledge regarding sexually transmitted infections (STIs). The prevalence of STIs was found to be higher among individuals with lower literacy levels, residing in rural areas, and coming from socioeconomically disadvantaged backgrounds. The study findings suggest that individuals who received sex and family life education from trustworthy sources had a higher likelihood of reporting issues related to sexually transmitted infections (STIs) (Sinha and Siddhanta, 2017). Another important study entitled "Udaya (Understanding the Lives of Adolescents and Young)" demonstrated a noteworthy improvement in their understanding of HIV from wave 1 to wave 2, with the knowledge rate rising from 38.54% to 50.14%. The increase in knowledge about STIs was observed to be minimal, with a slight difference of 18.41% compared to 18.97%. The study found a significant association between knowledge of HIV and contraceptive use ( $\beta = 0.010$ ,  $p < 0.001$ ). Individuals who were knowledgeable about HIV were more inclined to use contraceptives compared to those who lacked knowledge about HIV. It further revealed a significant positive relationship ( $\beta = 0.014$ ,  $p < 0.001$ ) between knowledge of STIs and contraceptive usage among these adolescents (Maurya et al., 2023).

## **VII. EFFECT OF STIS ON MATERNAL AND CHILD HEALTH**

The present analysis aims to reassess the significant and avoidable impact of STIs on women, particularly mothers, as well as infants, children, and youth within the given framework. Females, particularly those in their adolescent years, exhibit heightened susceptibility to STIs owing to various factors. These factors include a greater extent of exposed mucosal surface area, hormonal influences, alterations in the protective microflora of the female genital tract, and the intermittent occurrence of ectopy, particularly during adolescence (Hook, 2012). These demographic cohorts are additionally susceptible to heightened vulnerability as a result of engaging in sexual relationships with older males, experiencing limited agency in determining the timing, location, and manner of sexual encounters, and being influenced by various social and cultural determinants (Lee et al., 2006). Nevertheless, it is important to acknowledge that poverty, neglect, and inequality significantly contribute to the heightened vulnerability experienced by women and children (World Health Organization, 2001). The maternal and child populations in low- and middle-income countries experience the most significant consequences as a result of STIs, with more than 75% of reported STI cases occurring in these regions (Mayaud and Mabey, 2004). STIs persistently exert a disproportionate impact on the most marginalized women and children, both in underserved populations within industrialized countries and across various nations

(Leichliter et al., 2013). A recent study found a low prevalence of STIs (5.43%) among pregnant women in the tertiary care center in central India (Tanwar et al., 2022). Another implementational study in southern India showed 22 cases of HIV (0.6%), 19 cases of hepatitis B (0.5%), 2 cases of syphilis (0.1%), and 250 cases of bacterial vaginosis (7.1%) were identified and subsequently managed among the 15000 study participants (Kojima et al., 2017). Similar research on Chlamydia trachomatis (CT) infection has found a total of 71 positive rapid CT tests, with a true positive CT infection rate of 0.1% (1/784; 95% CI: 0-0.38%) determined through the use of nucleic acid amplification testing (NAAT) in CMC Vellore (Vidwan et al., 2012)

The relationship between sexually transmitted infections (STIs) and pregnancy can be understood in two distinct ways. The primary focus of this discussion is the impact of sexually transmitted infections (STIs) on pregnant women, which represents a significant epidemiological burden in India. Additionally, the impact of pregnancy on STIs is a relatively unexplored topic within the context of India. According to the National AIDS Control Organization (2014), an overview of sexually transmitted infections (STIs) is provided, as further described in Figure 2.

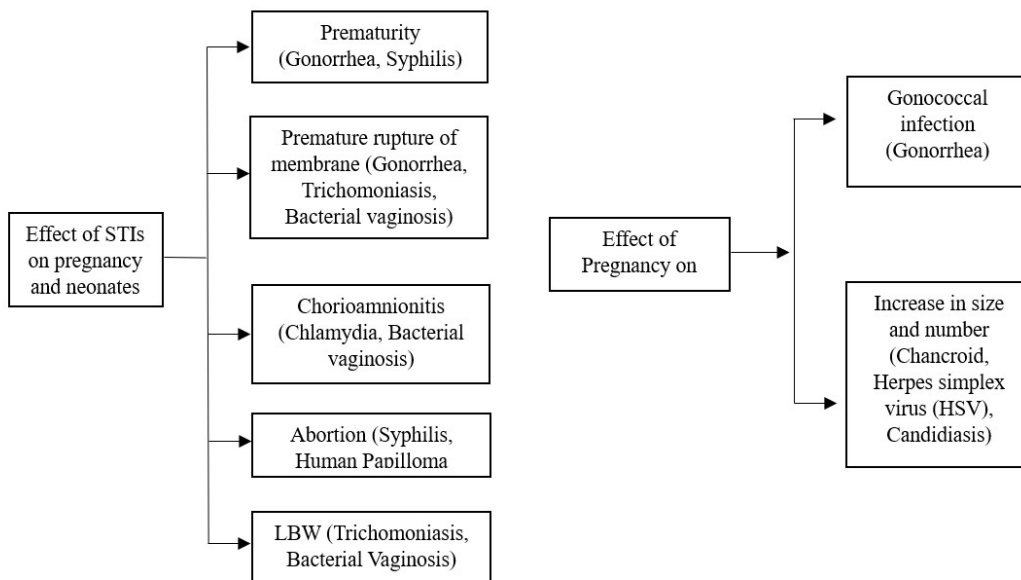


Figure 2: Interaction between STI and Pregnancy

### VIII. STI AND MENOPAUSE

STIs are a potential risk for all sexually active women. Menopausal women need not worry about unintended pregnancy and are likely to skip the "precautionary measures," but sexually transmitted infections and diseases do not discriminate. This renewed sexual freedom without awareness about STIs can pose serious health risks to older women. Hence, it is important that menopausal women are made aware of the use of barrier methods of



contraception as a means of STD and STI prevention, and their use should not stop once reproductive ability is lost.

Bodily changes related to menopause can put women at greater risk of STD and STI transmission. Perimenopausal and menopausal women experience urogenital changes assisted by hormonal changes, resulting in vaginal dryness (Bachmann & Leiblum, 2004; Kessel et al., 2003). Vaginal dryness and thinning of the mucosa may increase the risk of transmission of STIs because the vaginal mucosa can become easily irritated and inflamed, potentially facilitating transmission of STIs (Senanayake, 2000; Sherman et al., 2005). There is a deficiency of estrogen hormone as women get older, and this can cause reduced vaginal secretions and thinning of vaginal tissue (vaginal atrophy) and cervical tissue (Drew, O., & Sherrard, J., 2008). Vaginal atrophy and decreased vaginal secretions during sex can lead to tears and microabrasions as a result of sexual intercourse, which could increase the risk of transmission of STIs (Minkin, 2010). These gynecological changes in perimenopausal and postmenopausal women increase the susceptibility to contracting STIs, especially when safe sex methods are not adopted during intercourse.

Symptoms of STIs are often non-specific or absent (asymptomatic) and may be misinterpreted as being due to the menopause. In addition, both the women and their clinicians may not be aware of their infection risk, thus leading to a delayed or missed diagnosis. Therefore, risk assessment and referral for screening of infections should be carried out (Drew, O., & Sherrard, J., 2008).

The sexual and reproductive health of older women needs proper attention. A conducive environment for older women is a prerequisite for them to be able to communicate with respect to their sexual health. Also, health care providers and government policies should pay attention to creating awareness about STIs and how they can also affect older people, especially women, and the precautionary measures, symptoms, and management in case of contracting STIs or STDs.

## **IX. POSSIBLE INTERVENTION FOR STIS**

The timely identification and successful management of sexually transmitted infections (STIs) are crucial elements in the overall effectiveness of STI control initiatives. The conventional approach to diagnosing STIs involves laboratory analysis to identify the specific causative agent. Although this method is still widely used in many industrialized regions, it is important to note that it can be costly due to the expenses associated with diagnostics, infrastructure, and maintenance. Moreover, this frequently leads to setbacks in the process of diagnosing and treating the condition. In addition, it is important to note that a significant number of health centers and dispensaries in non-industrialized countries lack reliable laboratory facilities. As a result, clinicians face the challenge of either referring their patients to specialty centers, which can cause additional delays, or attempting to make a presumptive clinical diagnosis by identifying specific clinical features associated with different agents. The accuracy and completeness of this method have frequently been called into question (Yin et al., 2008).

The WHO (2016) has developed and promoted the syndromic management approach to address the limitations of aetiological and clinical diagnosis in managing STIs, especially

for patients at the first level of primary health care. STI-associated syndromes refer to distinct clusters of symptoms and clinical findings that healthcare providers can use to make a preliminary diagnosis. The use of clinical flowcharts simplifies management processes, enabling more time during consultations to deliver straightforward education messages, engage in partner notification discussions, and encourage condom use. Antimicrobial therapy is promptly administered to target the most common pathogens believed to be responsible for the syndrome, taking into account the specific geographical location.

Syndromic management is a straightforward approach that can be applied in various settings, including STI clinics, primary healthcare facilities, pharmacies, family planning/maternal and child health services, and private practitioners' clinics. The sensitivity and specificity of the approach used for diagnosing and managing urethral discharge syndrome and genital ulcer syndrome in different settings have yielded highly satisfactory results (Mayaud and McCornick, 2001). Some additional benefits to consider are the cost-effectiveness of the approach, the ability to diagnose and treat conditions during the initial visit, and the potential for increased patient satisfaction.

Syndromic management is subject to two primary limitations. Firstly, it is important to consider the financial implications of overdiagnosis and treatment for patients who do not have any or only one infection. The costs associated with antimicrobials encompass both direct expenses and indirect consequences such as adverse drug reactions, disruption of normal gut flora (e.g., shigella), and the potential for domestic violence (Gupta and Sharma, 2019). Areas with a low prevalence of STIs are particularly affected by the issue of overtreatment. According to a study conducted in Matlab, Bangladesh (Hawkes, 1999), the researchers discovered that among 320 women who reported abnormal vaginal discharge, only three of them had cervical infections (Marx et al., 2010). However, the prevalence of endogenous infections was found to be 30%. In this particular scenario, it was observed that the WHO algorithm exhibited a sensitivity of 100%, indicating its ability to accurately detect all cases of the condition under consideration (Dyson and Hollingsworth, 2018). However, its specificity was found to be quite low at 56%, suggesting a higher likelihood of false-positive results. On the other hand, a locally adapted speculum-based algorithm displayed varying sensitivity levels ranging from 0% to 59%, depending on the specific pathogens being targeted for identification. This algorithm demonstrated a higher specificity, ranging from 80% to 97%, indicating a lower probability of false-positive results. The effectiveness of syndromic management in addressing vaginal discharge in this particular context was found to be insufficient. It was determined that a significant portion of the allocated costs, ranging from 36% to 87%, were utilized for treating women who did not have an infection (Kairu et al., 2022).

One significant drawback is the limited sensitivity and specificity of the syndromic approach when it comes to identifying cervical infections in women, even in areas with a higher prevalence of sexually transmitted infections (STIs) (Chauhan et al., 2014). The addition of a risk assessment score to the vaginal discharge syndrome, as recommended by the WHO, aims to enhance the efficiency of algorithms (Zemouri et al., 2016). The evaluation of this approach has been conducted in multiple countries, but the outcomes have been disappointing (Chesson et al., 2017). It has been observed that the scores need to be tailored to specific settings, as there are significant variations even within the same country. Additionally, the performance of algorithms did not show significant improvement.

Furthermore, a study conducted using Matlab revealed that the risk score was found to be inadequate in societies where women refrain from admitting to extramarital or premarital sexual activity due to the fear of social consequences (Stephenson, 2010).

## X. VACCINATION

Vaccines show significant promise in addressing the prevention and management of sexually transmitted infections (STIs). Ongoing research is focused on developing vaccines for *Neisseria gonorrhoeae*, *Chlamydia trachomatis*, herpes simplex virus, human papillomavirus, and HIV. The availability of effective vaccines for those in need poses certain challenges (Van Gerwan et al., 2022).

Firstly, it is important to note that many STI agents do not induce long-lasting immunity, even after a person has been naturally infected. The constant evolution of agents like *N. gonorrhoeae* and HIV poses a significant challenge in developing a dependable and universally effective vaccine. Additionally, there are logistical challenges associated with the delivery of vaccines. Despite the availability of a hepatitis B vaccine for approximately two decades, a significant number of sexually active adults continue to lack protection against this virus. The practical aspects of vaccination have been extensively studied and understood based on our experiences with EPI immunization programs. However, an equally significant consideration for STI vaccines is their level of acceptance among the intended population (Lovett and Duccan, 2018). There are likely to be specific obstacles that hinder the acceptance of STI vaccines. One perspective suggests that providing STI vaccinations to adolescents may inadvertently promote extramarital sexual activity. Despite evidence indicating otherwise, some individuals still employ these arguments to oppose sex education or condom distribution programs in schools. According to Zimet, it is important to address issues related to consent, both from parents and adolescents, when designing programs. This implies that extensive research is needed to inform the development of these programs. Additionally, it is worth considering that vaccination could potentially impact sexual behavior by fostering a sense of invincibility, which may lead to an escalation in risky behaviors (Fisher et al., 2019).

### 1. Health education interventions and their impact on the uptake of HPV vaccination:

The Human Papillomavirus (HPV) is widely recognized as the prevailing STI affecting the reproductive tract. It is estimated that a significant proportion of individuals who engage in sexual activity will contract this virus at some stage during their lifespan (Ramavath and Olyai, 2013). Limited evidence-based research has been directed in Indian scenario regarding vaccine hesitancy of HPV. Geiger et al. (2022) provided valuable insights into the psychological factors that play a significant role in determining an individual's readiness for vaccination. By drawing upon the 3Cs and 5Cs models of vaccine hesitancy, the researchers identified seven key factors that contribute to this readiness. This research sheds light on the complex dynamics that influence individuals' decision-making processes when it comes to vaccines (McDonald, 2015). Recent studies have shown gradual increase in accepting vaccination in the studied Asian population (Huang et al., 2022; Zhou et al., 2022; Machida and Inoue, 2023).

## XI. MANAGEMENT

To effectively manage and prevent STIs among women, a combination of evidence-based strategies is crucial:

- 1. Comprehensive Sexual Health Education:** Sex education programs should address consent, contraceptive options, and condom use, promoting responsible decision-making and reducing risky behaviors. Providing comprehensive sexual health education is essential to providing young women with accurate information about STI prevention, transmission, and safe sexual practices (Zheng et al., 2022b; Spielberg et al., 2003).
- 2. Accessible and Youth-Friendly Services:** Mobile clinics, online platforms, and school-based health centers can improve accessibility and encourage young women to seek medical assistance. Ensuring access to confidential and youth-friendly sexual health services is essential. These services should include STI testing, treatment, and counseling, with a focus on non-judgmental and gender-sensitive care (Spielberg et al., 2003).
- 3. Vaccination:** Expanding vaccination coverage is crucial to preventing cervical cancer and other HPV-related diseases. The introduction of safe and effective vaccines for viral STIs, such as the human papillomavirus (HPV) and hepatitis B, can significantly reduce the burden of STIs among young women (Drolet et al., 2019).
- 4. Condom Use Promotion:** Education and awareness campaigns can encourage young women who are sexually active to use condoms, which not only protect against STIs but also have contraceptive benefits, as a fundamental preventive measure against STIs (Drolet et al., 2019).
- 5. Pre-Exposure Prophylaxis (PrEP):** Providing PrEP in conjunction with routine STI screening and counseling can lower the risk of HIV transmission in high-risk populations, such as young women at risk of HIV infection (Hodges-Mameletzis et al., 2019).
- 6. Partner Treatment:** Partner notification and treatment interventions can help control the spread of STIs among sexually active individuals by encouraging partners to seek testing and treatment for STIs and reducing transmission rates (Hodges-Mameletzis et al., 2019).
- 7. Management of STIs at the community and individual level:** A crucial factor to be taken into account in the realm of STI control involves the determination of strategies that aim to address the needs of individuals, communities, or specific subpopulations that exhibit elevated risk or heightened vulnerability to STIs within their respective communities. Several strategies focus on the individual, such as screening, case management, and partner notification. On the other hand, community strategies primarily involve primary prevention measures, such as information, education, and communication (IEC) campaigns, as well as vaccine programs. In recent years, there have been attempts to implement mass treatment programs as a means of controlling sexually transmitted infections (STIs).

Interventions aimed at individuals may encounter limitations in identifying and modifying the behaviors of individuals who possess a certain level of risk but do not self-

identify as part of the target group. Conversely, while implementing general population or community measures may result in a less concentrated intervention for each individual, it is dispersed among a sizable population that encompasses numerous individuals with low-risk profiles. During the initial stages of an epidemic, when it is challenging to differentiate individuals who are at risk, implementing interventions that target the general population is deemed appropriate. Targeting strategies are employed when sexual mixing patterns have been discerned, followed by the implementation of universal interventions as the epidemic transitions into the general population and core groups become prominent.

Sexually transmitted infection (STI) control programs necessitate a combination of interventions targeting both individuals and the general population. The primary concern lies in determining the most effective approach to utilize and integrate interventions, as well as ensuring that policy and political backing are conducive to facilitating alterations in the social or physical environment where risk is prevalent. For instance, the implementation of stringent regulations pertaining to prostitution will impede efforts aimed at assisting individuals engaged in sex work. Similarly, sociocultural contexts that foster homophobia or restrict the dissemination of sexual health education to adolescents will hinder the ability of these vulnerable groups to obtain suitable sexual health services and may even promote covert engagement in risky behaviors. The efficacy of women's economic empowerment can also be observed. Global efforts can successfully lower the burden of STIs and improve sexual and reproductive health outcomes in this vulnerable population by implementing these management and prevention strategies, which are tailored to the particular needs of young individuals.

## **XII. STI PREVENTION STRATEGIES IN INDIA**

The national STD control program, which has been in operation since 1946, has proven to be a vital and enduring initiative in addressing the prevalence of sexually transmitted diseases. The current program has set forth commendable objectives aimed at reducing the prevalence of STD cases and effectively curbing the transmission of HIV. Additionally, it seeks to address the immediate and long-term health consequences associated with STDs, with the ultimate goal of minimizing morbidity and mortality rates. The program boasts an array of impressive highlights, showcasing various captivating areas (MoHFW, 1997).

In addition to its commendable efforts in strengthening case management, the implementation of other pillars of public health interventions for STI control across the country appears to be somewhat inconsistent (Sharrif, 1990). The implementation of a public-sector syphilis screening program for pregnant women dates back to the 1950s. However, it is unfortunate that this program lacks a systematic approach and faces additional challenges due to the low national rate of 57% of women receiving antenatal care in the public sector. The provision of antenatal care for women, unfortunately, falls short of offering a comprehensive range of services. Shockingly, less than half of these women have their blood pressure checked, highlighting a significant gap in the quality of care provided. In rural India, the statistics reveal a concerning situation regarding childbirth. A mere 33.6% of births receive the necessary attention from healthcare professionals, which is cause for alarm (NFHS-IIPS, 1999). Additionally, less than 25% of births take place in institutional settings, which poses a

significant challenge for implementing effective prevention programs such as those targeting ophthalmia neonatorum. This data highlights the urgent need for improved healthcare access and infrastructure in rural areas to ensure the well-being of both mothers and newborns. Cervical cancer screening, much like a budding program in India (Hawkes and Santhya, 2005).

### **XIII. OBSTACLES TO STI PREVENTION**

There exists a consensus regarding the imperative of incorporating STI services within the framework of reproductive health services. The justification lies in the fact that certain contexts already witness reproductive health initiatives that enjoy significant visibility and participation, thereby potentially serving as a means to secure the supplementary funding required for the treatment of sexually transmitted infections (STIs). Additionally, the implementation of integrated services has the potential to effectively reach a broad demographic of women. There is a proposal advocating for the provision of STI/HIV risk assessment and prevention services as a basic requirement in all maternal and family planning clinics. Additionally, it is recommended that integrated services encompass syphilis testing and treatment for all pregnant women who seek antenatal care. The integration of sexually transmitted infections (STIs) and reproductive health services may inadvertently overlook a significant demographic, namely men. The significance of this matter lies in the fact that men, due to their sexual behavior and greater mobility, face a higher initial susceptibility to contracting sexually transmitted infections (STIs). Furthermore, once infected, the clinical management of STIs in men is comparatively less complex than that in women. The findings of the investigation conducted in Bangladesh revealed a significant gap in the provision of sexually transmitted infection (STI) services specifically targeted at men. Furthermore, the study identified a notable demand for additional reproductive and psychosexual services among the population.

At the programmatic level, evidence from various countries indicates that integrating STI control programs within HIV/AIDS programs is likely the most effective approach to achieving greater synergy. This is because both programs employ similar control strategies, such as behavioral interventions and condom distribution, as well as interventions aimed at high-risk populations that are typically not reached by conventional reproductive health services.

**1. Reasons For Failing STI Control Programs In India:** There are an ample number of explainable reasons behind failing STI control programs in India.

- The allocation of resources by policymakers and planners is often given low priority due to the perception that STIs arise from behavior that is considered discreditable.
- The failure to acknowledge the extent of the issue within the populace
- The failure to establish a correlation between diseases and their potential for significant complications and subsequent conditions
- The focus of control measures is primarily centered around individuals displaying symptoms, typically men, while neglecting to detect asymptomatic individuals, often women, until complications arise.

- The absence of uncomplicated screening tests for cervical infections that could be employed to assess women seeking services at family planning, antenatal, or maternal and child health clinics
- The provision of services through specialized healthcare facilities for sexually transmitted infections (STIs) is characterized by insufficient coverage and the perpetuation of stigmatization.
- The treatment strategies prioritize the attainment of a definitive diagnosis, which may involve unrealistic requirements, rather than emphasizing practical decision-making approaches.
- The persistent utilization of cost-ineffective antibiotics due to economic considerations.
- There is a limited focus on educational and other interventions aimed at proactively mitigating the occurrence of infections, particularly among adolescents, both within and outside of educational institutions.
- The lack of authoritative guidance regarding a comprehensive, evidence-based framework for prevention and care programs.
- The inadequate consideration of structural factors that influence the transmission of STIs is a notable concern. These factors encompass poverty, literacy levels, conflict, the suppression of homosexuality and prostitution, as well as societal attitudes towards marginalized communities.

#### XIV. CONCLUSION

The significance of sexually transmitted infections (STIs) has garnered increased acknowledgment following the emergence of the HIV/AIDS epidemic. Condoms, effective medications, and the syndromic approach to case management are all cost-effective ways to prevent sexually transmitted infections (STIs). However, more research needs to be done to find other ways to prevent STIs, such as vaginal microbicides, vaccines, and strategies for changing behavior. Thus, the most crucial approach is to observe this epidemiological burden through an anthropological lens and seek the cultural notion of practices about sexual behavior in a community-specific model. To conclude, STIs represent a significant health challenge for young adults in India, necessitating immediate attention and robust preventive measures. It is imperative for public health authorities and policymakers to implement targeted interventions, prioritize sexual health education, and provide accessible healthcare services to effectively curb the impact of STIs on the young adult population in India.

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