Journal of Medicine and Medical Specialities
Volume 1, Issue 1, March 2025; pp: 36-47
eISSN: 2455-2852 DOI: 10.65129/medical.v1i1.12

RESEARCH ARTICLE

The Great Imitator With a Greater Comeback – A Clinicoepidemiological Study of Syphilis

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Abstract

Introduction: Syphilis is a chronic systemic disease commonly acquired as a sexually transmitted infection and is caused by *Treponema pallidum* subsp. *pallidum*. It is one of the ancient diseases known for centuries now. The incidence and prevalence of syphilis worldwide observed a fall during the later part of the 19th century, with increased screening and adequate treatment of positive cases. The increased awareness of safe sexual practices helped reduce disease incidence and transmission. Since 2000, a resurgence has been observed in both developed and developing countries due to a change in sexual behaviour. **Objective:** To study the present clinico-epidemiological trend of syphilis among patients attending the STD clinic in a tertiary care centre in the Western part of Tamil Nadu. **Methodology:** A retrospective study of syphilis patients who participated in the Sexually Transmitted Diseases (STD) clinic at the department of Dermatology, Venereology and Leprosy at a tertiary care centre at Coimbatore, Tamil Nadu, for a 1-year duration (June 2022 – July 2023) was conducted. Of the 3119 clients, 170 serologically confirmed syphilis patients were included in our study whose records were analysed for the demographic distribution, clinical stage of syphilis, association with other Sexually Transmitted Infections (STIs) and sexual behaviour. The total number of positive cases was compared with the year-wise positive cases from 2019 to 2023 to study the trend of syphilis. **Results:** Of the 170 positive cases, males (71.2%) predominated over females (21.8%) and transgenders (7.1%). The most common age group was 21-30 years (52.7%), and presentation was the latent stage of syphilis (46.4%). Men having sex with men (MSM) (40.58%) was the most common high-risk behaviour, followed by heterosexuals (33.52%) and bisexuals (8.23%). Multiple STIs were found in 21.76% cases, of which 67.56% cases were positive for Human Immunodeficiency Virus (HIV) infection. Newly diagnosed HIV disease was found in 14 patients (8.23%), of whom 46.2% were MSM with multiple partners. Interestingly, 7.1% of patients reported usage of social media platforms and apps specially designed for partner selection. It was observed from this study that there is a statistically significant progressive rise in the incidence of syphilis from 1.08% in 2019 to 5.45% in 2023 ($p=0.00001$; $p<.05$ is significant). **Conclusion:** Syphilis, an age-old disease, is alarmingly rising in recent years. Early identification, treatment and preventing further spread depend on focusing on the changing trends of high-risk behaviour of patients and their psychosocial factors and on targeted interventions.

Keywords: Resurgence, Sexually Transmitted Infection, Syphilis

1. Introduction

Syphilis is one of the oldest infections known to mankind, which is usually sexually transmitted, causing local as well as multisystem manifestations. It has remained an important public health problem for centuries due to its mode of spread and the high-risk behaviours among humans. Syphilis is caused by a spirochete, viz. *Treponema pallidum* subspecies *pallidum*, with associated risk for severe complications. It also facilitates HIV transmission[1]. It mimics a number of diseases and thus may be easily missed unless there

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Article Received on: 21 Jan 2025 Revised on: 16 Feb 2025 Accepted on: 21 March 2025

is a high index of suspicion. During the later part of the 15th century, the disease was increasingly reported with its adverse implications, including mortalities[2]. In the later part of the 19th century, increased awareness about safe sexual practices in view of the fear of HIV infection led to a fall in the incidence and prevalence of syphilis. As per the national data in India, the rate of reported cases of primary and secondary syphilis at the national level in 2000 and 2001 was 2.1 cases per 100,000 population[3]. Since 2000, a resurgence has been observed in both developed and developing countries due to a change in sexual behaviour[4]. According to the CDC's 2022 STI surveillance report, there has been an 80% increase in the number of syphilis cases (all stages) over five years from 2018 to 2022[5]. As per the recent WHO report in May 2024, the new cases of syphilis among adults in the 15-49 years age group increased by around 1 million in 2022, reaching 8 million cases, with the highest increases reported in the African and American regions[6]. This study was conducted to observe the change in the clinic-epidemiological trend of syphilis over the years and to study the demographic profile, clinical stage, and high-risk behaviour among the patients diagnosed with syphilis during the study period.

2. Aim and Objectives

- To study the clinic-epidemiological trend of syphilis among patients attending the STD clinic in a tertiary care centre in the Western part of Tamil Nadu.

3. Review of Literature

Syphilis is a chronic multisystem infection with a multitude of clinical presentations. If missed in the early symptomatic phase, the disease enters a latent phase, which may last for years, leading to dreadful complications. It is one of the preventable STIs which can be easily diagnosed with a thorough history of the clinical features, sexual exposure and clinical examination, complemented with the widely available serological tests, which help in confirmation of the diagnosis. When diagnosed early, the disease is curable with arrest of further transmission to the sexual partners. Its early detection gains further importance as it can spread by vertical transmission during pregnancy with adverse pregnancy outcomes and lasting stigmatic features in the newborn if the mother is not diagnosed and treated in the pre-pregnancy or the early pregnancy period[2]. Following a fall in the number of syphilis cases in the later part of the 19th century, there occurred a steady increase in the number of cases over the years in both developed and developing countries, in view of the change in sexual behaviour among the population. The recent target set by the World Health Organisation (WHO) in 2022 regarding syphilis control is to reduce the number of adult syphilis infections by 10-fold by 2030[6]. Globally, there is a reversal of the trend of syphilis from falling incidence into a slowly growing epidemic, as reported by Melody Ren *et al*[7].

In developing countries like India, one of the major reasons for adverse outcomes in health and productivity is STIs, as they cause severe morbidities which are usually associated with social stigma and discrimination and even mortality[8]. The prevalence of the four curable STIs, namely syphilis, chlamydial infections, gonorrhoea and trichomoniasis among the general population in India ranges from 0 to 3.9% as shown in studies[9]. The burden of STIs could be even higher among populations with high-risk behaviours, like females and transgender individuals who are involved in commercial sex work, and MSM. There is no adequate data or literature to date which throws light on the disease burden among these high-risk groups[10]. Since the launch of the national AIDS control programme, the incidence and prevalence of STIs have shown a sharp decline, especially the STIs of bacterial origin[11]. In recent years, viral STIs have largely replaced the bacterial STIs, thus changing the older trend as observed in several studies[12,13]. It became common for those practising dermatology or gynaecology to have not seen a case of syphilis in years during the last two decades[11]. There have been various awareness activities which have benefited the public by increasing the knowledge on safer sex and condom usage, as shown in various community-based surveys[11].

The sexually active unmarried youth are one of the high-risk subgroups dispersed within the general population and are out of reach of the existing targeted interventions, which focus mainly on the conventional high-risk groups like sex workers and MSM[11]. The likelihood of this population engaging in high-risk sexual behaviours is higher when compared with those

who are married[14]. This is also due to changes in the government norms associated with premarital sex and same sex behaviours in recent years, which make them more liberal[15]. Hence, targeted programmes should be developed addressing the needs of these vulnerable populations.

Various studies conducted at various centres all over the country in the past two decades showcase the increase in incidence of this dreadful STI, namely syphilis, which is a preventable as well as a potentially curable disease if promptly intervened.

4. Materials and Methods

This study was conducted at the department of Dermatology, Venereology and Leprology running the STD clinic in a tertiary care centre at Coimbatore, Tamil Nadu. A retrospective cross-sectional study of syphilis patients who attended the STD clinic for a 1-year duration was conducted. The usual clients at the STD clinic include symptomatic patients with STI related complaints, referral patients who were positive for serological tests of HIV/syphilis following donated blood screening at blood banks, patients diagnosed as having STI at primary, secondary care hospitals/ private hospitals referred in case of treatment failure or in case of any diagnostic dilemma in favor of expert opinion, further evaluation and management and also pregnant mothers with positive serology for syphilis / HIV detected during their routine antenatal screening.

Of the 3119 clients who attended the STD clinic during the study period (July 2022 – June 2023), 170 serologically confirmed syphilis patients fulfilling the inclusion and exclusion criteria were included in our study.

- Inclusion criteria – All new Rapid Plasma Reagin (RPR) test positive cases during the study period, of age above 18years.
- Exclusion criteria - Negative cases on confirmatory test, viz. Treponema Pallidum Haemagglutination (TPHA) Test.

The clinical records of these patients maintained at the STD clinic were analysed for the demographic details (age, gender, education, marital status, pregnancy status in case of women), clinical stage of syphilis, sexual behaviour and association with other STIs. The total positive cases were compared with the year-wise positive cases from 2019 to 2023 to study the clinico-epidemiological trend of syphilis over the years. Appropriate consent was obtained from patients while collecting the details and clinical images during the consultation at the STD clinic.

The software used for statistical analysis was SPSS software version 21. The continuous variables were expressed in mean ± standard deviation. The categorical variables were expressed as percentages, and the comparison was made using the Chi-square test ($p<.05$ – significant).

5. Observations and Results

This study included 3119 clients who attended the STD clinic during the study period (July 2022 – June 2023), out of which 170 patients were serologically confirmed to have syphilis. The demographic details analysed are tabulated as follows, with the age of the patients in Table 1 and the gender of patients in Table 2. The mean age of the patients in our study was 28 ± 5.5 years, with a median age of 30 years. The commonest age group involved was 21 – 30 years (52.94%), followed by 31 – 40 years (22.9%), more than 50 years (10.59%), 41 – 50 years (7.65%) and less than 21 years (5.88%). The youngest patient was 18 years old, and the oldest was 62 years old. Among the study population, 121 (71.18%) were males, 37 (21.76%) were females, and 12 (7.06%) were transgender. The male-to-female ratio was 3.3:1.

Table 1. Age distribution of syphilis patients

S. No	Age Interval	No. of Patients (%)
1	<21 years	10 (5.88%)
2	21 – 30 years	90 (52.94%)
3	31 – 40 years	39 (22.9%)
4	41 – 50 years	13 (7.65%)
5	>50 years	18 (10.59%)

Table 2. Gender distribution among syphilis patients

S. No	Gender	No. of Patients (%)
1	Males	121 (71.2%)
2	Females	37 (21.8%)
3	Transgenders	12 (7.1%)

Table 3. Marital status among syphilis patients

S. No	Gender	Married (%)	Unmarried (%)
1	Males	52 (43%)	69 (57%)
2	Females	36 (97.3%)	01(2.7%)
	Total	88 (55.7%)	70 (44.3%)

Table 4. Spouse syphilis screening status among married patients

S. No	Spouse Screening (Among Married)	Number (%)	Syphilis Positivity (Among Screened)
1	Done	28 (31.8%)	3 (10.7%)
2	Not done	53 (60.2%)	---
3	Separated spouse	7 (8%)	---
	Total	88	3 (10.7%)

The marital status of the study population is shown in Table 3, and the spouse's syphilis screening status is shown in Table 4.

88 patients (51.8%) were married and 82 (48.2%) were unmarried. Among the married patients, 65% reported extramarital sexual contacts, which also included having sex with the same gender, specifically MSM. Among them, 7 patients (8%) reported being separated from their spouses due to various reasons. Of the remaining married patients, only 28 patients (31.8%) had brought their spouses for STI screening following counselling, and 53 patients (60.2%) had not brought their spouses for STI screening even after repeated counselling. This highlights the need for further strengthening of the counselling in relation to spouse screening, where the patients avoid bringing their marital partners for STI screening due to the fear of exposure of their infidelity. Among the spouses screened, 3 females were diagnosed with syphilis without any symptoms, and they were treated as having syphilis of unknown duration, as the duration of acquiring the infection could not be reliably ascertained. The spouses of all three 3 female patients also had histories of unprotected extramarital sexual contacts, which led to transmission of syphilis to these females who reportedly denied any pre-marital or extramarital sexual contacts. This highlights the chain of transmission of STIs to both marital partners due to the high-risk behaviour of one of the two partners. Among the unmarried patients, 76 (92.7%) had premarital sexual contacts, while 6 (7.3%) denied any kind of sexual exposure. The educational status of the study population is shown in Table 5.

Table 5. The educational status of syphilis patients

S. No	Educational Status	No. of Patients (%)
1	Literates	134 (79%)
	Graduates	50 (37%)
	College students	24 (18%)
	Less-educated	60 (45%)
2	Illiterates	36 (21%)

Table 6. Sexual behaviour among the syphilis patients

S.No	Sexual Behaviour	No. of Patients (%)
1	Heterosexuals	80 (47.06%)
2	Men who have sex with men (MSM)	63 (37.06%)
	Single partner	5 (7.93%)
	Multiple partners	58 (92.06%)
3	Bisexuals	21 (12.35%)
4	Denied sexual contact	6 (3.53%)

The educational status of the syphilis patients showed that 134(79%) patients were literate, and only 36(21%) patients were illiterate. Among the literate ones, 50(37%) patients were graduates, 24(18%) patients were college students, and 60(45%) patients were less educated.

The sexual behaviour of the study population is shown in Table 6.

On studying the sexual behaviour among the patients, 80(47.1%) patients were found to be heterosexual, 63(37.1%) were MSM, 21(12.4%) patients were bisexual, and 6(3.6%) patients denied any kind of sexual exposure. Among the MSM, the majority (58 patients - 92.1%) had multiple sex partners, and only 5(7.9%) patients reported having a single sex partner. On studying the awareness of safe sexual practices, more than 95% of the patients were aware of the benefit of condom usage in the prevention of STIs. Among MSM, condom usage during anal intercourse was higher, while condom usage during oral sex was almost nil. Less than 5% patients have reported the use of condoms during sexual intercourse, but not regularly.

On studying the incidence of syphilis during pregnancy among the 37 diagnosed females, 7 females (18.9%) were antenatal mothers. Among them, 6 females

Table 7. The clinical stage of syphilis among the patients.

Stage of Syphilis	Males	Females	Transgenders	Total
1. Primary syphilis	4	-	-	4
2. Secondary syphilis	17	-	2	19
3. Early latent syphilis	54	13	7	74
4. Late latent syphilis	12	4	-	16
5. Syphilis of unknown duration	35	19	3	57

were in their first trimester, and 1 female was in her second trimester at diagnosis. One of the female patients was diagnosed with syphilis during the postnatal period. In that patient, the baby was presented to a paediatrician with features suggestive of congenital syphilis at 3 months of infancy and on clinical suspicion of congenital syphilis, the baby and the parents were tested for syphilis serology, which turned out to be positive. This brings to notice that the diagnosis of syphilis and its treatment were missed during the antenatal period, which, when promptly done, would have protected the baby from developing congenital syphilis.

The clinical stage of syphilis among the patients is shown in Table 7.

On studying the clinical stage of syphilis among the patients, as shown in Table 6, the majority (90 patients - 52.9%) were diagnosed with the latent stage of syphilis, out of which 74(43.5%) patients had early latent syphilis and 16(9.4%) patients had late latent syphilis. 57 (33.5%) patients had syphilis of unknown duration, 19(11.2%) patients had secondary syphilis and 4(2.4%) patients presented with primary chancre. Among the 19 patients who presented as secondary syphilis, 8(42.1%) patients presented with maculopapular rash, 6(31.6%) patients presented with papulosquamous rash, 2(10.5%) patients each presented with *Condyloma lata* and papulosquamous rash with mucous patches and 1(5.3%) patient presented with annular lesions of secondary syphilis. This shows that most of the patients had missed their symptoms at the early stage and had presented to us in the latent stage of syphilis when serology was done to rule out syphilis as part of screening for STIs. The clinical images of a few patients with features of primary and secondary syphilis are shown in Figures 1 to 7.

Figure 1. Primary chancre.

Figure 2. Annular syphilid.

Figure 3. Papulosquamous syphilid (palm).

Figure 4. Papulosquamous syphilid (sole).

Figure 5. Condyloma lata (multiple).

Figure 6. Maculopapular syphilid.

Figure 7. Mucous patch.

On studying the association with other STIs, 41 patients (24.12%) had syphilis plus another STI, including HIV disease, with an overall syphilis plus HIV disease proportion of 14.7% of the total syphilis patients (25 patients). Among these 25 patients (61% of overall syphilis plus another STI cases), 14 patients were newly diagnosed with HIV disease, which is as high as 56% of total syphilis plus HIV disease cases. Among the patients with syphilis plus HIV disease, 46.2% were MSM with multiple sex partners, which shows the substantially increased risk associated with this behaviour.

The number of syphilis cases in 2019-2020 was 45 (1.08%) out of 4160 clients who attended the STD clinic. In the subsequent years, due to the COVID–19 pandemic, the total number of clients decreased to 1528 clients and 2229 clients attending the STD clinic during the years 2020-2021 and 2021-2022, respectively. Though the total number of clients decreased, the number of patients with syphilis kept increasing during these years,

Table 8. Comparison of year-wise statistics of the study period with the preceding 3 years

Year	Total Clients	Syphilis Cases	Percentage
2022-2023	3119	170	5.45%
2021-2022	2229	74	3.32%
2020-2021	1528	44	2.88%
2019-2020	4160	45	1.08%

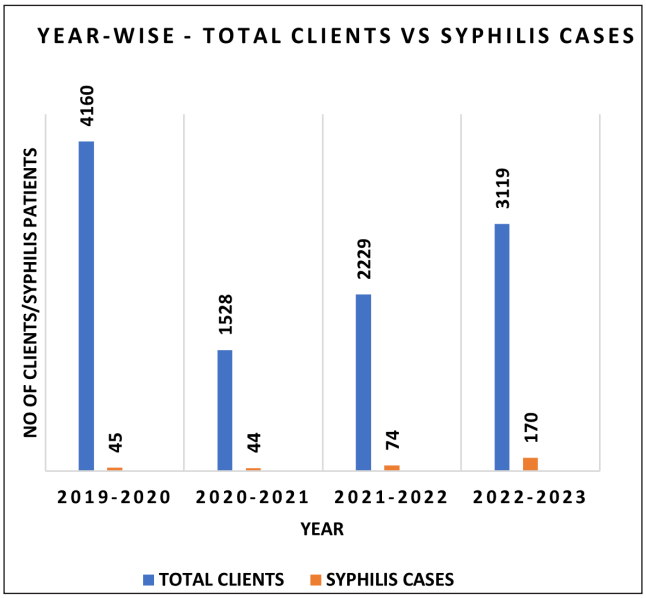

Chart 1. Year-wise comparison of total clients vs syphilis cases.

with 44 (2.88%) patients and 74 (3.32%) patients in 2020-2021 and 2021-2022, respectively. In the year 2022-2023, the number of clients attending the STD clinic started increasing following the pandemic, with 3119 clients, and the number of syphilis cases also increased to 170 (5.45%). On comparing the year-wise statistics in the preceding 4 years, there has been a statistically significant rise in the number of patients diagnosed with syphilis from 1.08% in 2019-2020 to 5.45% in 2022-2023 ($p<0.00001$). Table 8 shows the year-wise comparison of the total number of clients who attended the STD clinic vs the total number of syphilis cases. The year-wise comparison of total clients vs syphilis cases is shown in Charts 1 and 2.

Other notable observations of our study are as follows. Around 3.52% (6 patients) have acquired syphilis for the second time, and in one of the patients, it was the third episode of acquiring syphilis. Around 10 patients (5.88%) were identified during screening of

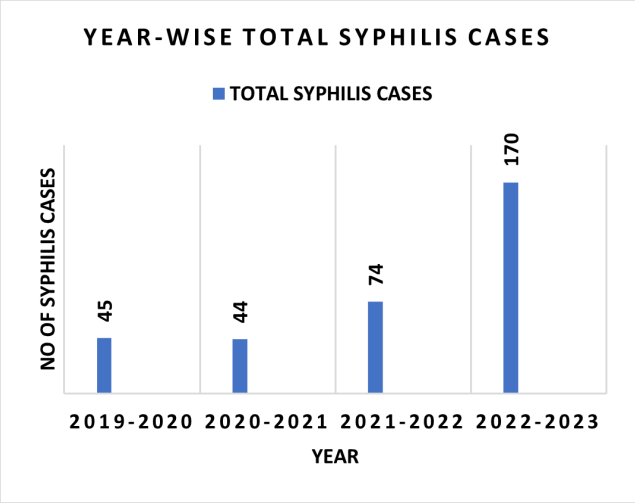

Chart 2. Year-wise comparison of syphilis cases.

the donated blood. Another novel finding in our study is that 7.1% of patients reported usage of social media platforms and specially designed partner selection apps and dating apps to find their sexual partners.

6. Discussion

Syphilis is a chronic multisystem infection which, in the early stages, produces local manifestations like genital ulcers, which are painless and heal spontaneously without treatment, which may not draw much attention from the infected patients. It then progresses to the secondary stage, where asymptomatic skin and mucosal features may appear, which can also resolve even without treatment. Thus, after the initial symptomatic stages, which may be easily missed by patients, the disease enters a latent stage where patients do not exhibit any external features of the disease. The infection can only be detected by serology, and patients remain infectious during this stage when untreated. After years of latency, the disease enters the tertiary stage with severe internal organ involvement with destructive cardiac/neurological manifestations and severe cutaneous, visceral and bony involvement in the form of gumma. As the disease can be diagnosed only by serological tests during the asymptomatic latent stage, a high index of suspicion is needed to diagnose it during the latent stage.

Various population-based studies in developed countries over the past few years have reported the

increasing trend of syphilis cases among the high-risk populations like MSM and sex workers[7]. But in developing countries, the scenario is even worse with higher prevalences among high-risk groups as well as the general population[7]. Over the past 10 to 15 years, there have been various single-centred studies in various parts of our country showing the trend of syphilis cases over the years. This study is a similar single-centred study showing the trend of syphilis among the clients of the STD clinic in a tertiary care centre in Tamil Nadu. The results of various studies are compared with this study, as shown in Table 9.

Table 9. The comparison of various parameters among similar studies done in various periods at various centres

Study	Place	Year/ Duration of the study (in years)	Syphilis %/ total number of syphilis cases	Age (mean/ range) in years	M: F	Married (%)	Literates (%)	Stage of Syphilis (%)	Associated HIV Disease (%)
Sasidharan Pillai *et al*[23].	Kerala	January 2003 - December 2012 (10)	5.6% (113)		1.9:1	-	-	PS 1.8 SS 3.5 LS 82.3	-
Jain *et al*[22].	New Delhi	January 2005 - December 2009 (5)	7% (50)	27	2.3:1	66	80	PS 46 SS 22 LS 32	4
Nishal *et al*[21].	Rohtak (Haryana)	January 2008 - December 2012 (5)	6.2% (91)	18-40	6:1	52.6	-	PS 23 SS 41.7 LS 35.2	8.8
Wahab *et al*[24].	Kuala Lumpur	January 2010 – December 2012 (3)	67	48.97	1.57:1	-	-	PS 0 SS 23.9 Overlap (PS, SS) 4.5 LS 65.7 TS 5.9	26.4
Shah *et al*[20].	Ahmedabad (Gujarat)	January 2013 December 2014 (2)	10.9% (110)	21–40	2.4:1	60.9	26.4% (secondary level education)	PS 25.5 SS 42.7 EL 31.8	24.5
Sivayadevi *et al*[16].	Thanjavur (Tamil Nadu)	January 2013 - December 2017 (5)	0.95% (140)	21–50	2.6:1	71.4	-	PS 12.8 SS 27.1 LS 60	7.85
Solaimalai *et al*[4].	Vellore (Tamil Nadu)	January 2015 December 2020 (6)	265 cases	36±10.2	4.63:1	77.7	-	PS 6.3 SS 10 LS 79 TS 8	
Mathupal *et al*[18].	Chennai (Tamil Nadu)	June 2018 - December 2018 (7months)	14% (14)	21–40	2.2:1	-	-	PS 0 SS 85.7 LS 14.3	0
Gupta M *et al*[17].	Shimla (Himachal Pradesh)	July 2012 - June 2022 (10)	0.99% (31)	35	3:1	80.65	45.1% (Graduates and postgraduates)	PS 19.35 SS 38.7 LS 38.7 PS & SS 3.2	12.9
Our study	Coimbatore (Tamil Nadu)	July 2022 - June 2023 (1)	5.45% (170)	28 ± 5.5	3.3:1	51.8	79% (Graduates -37%, College students -18%, less educated - 45%)	PS 2.4 SS 11.2 LS 52.9	14.7

M – Male, F – Female, PS – Primary Syphilis, SS – Secondary Syphilis, LS – Latent Syphilis, HIV – Human Immunodeficiency Virus.

The comparison of the findings in various other similar studies with those of this study is shown in Table 8. In this study, there has been a rising trend in the number of syphilis cases from 1.08% in 2019-2020 to 5.45% in 2022-2023. A similar observation was made in studies by Sivayadevi *et al.*[16], and Gupta M *et al*[17]. This observation of our study differs from other studies in that the increased number of syphilis cases reported in total over the entire study period of a few years in other studies has been observed in a short span of 1 year in our study.

The probable reasons could be due to the

1. Impact of the COVID-19 pandemic with implications like
   a) Decreased access to STI clinics
   b) Lockdown status with dual effects, like decreased access to commercial sex workers and, at the same time, increased promiscuous activities and MSM behaviour among people within their neighbourhoods and accessible areas.
   c) Under-reporting of cases
   d) Non-functioning of Non-Government Organisations (NGO).
   e) Lack of mechanisms for condom distribution to eligible couples / high-risk groups.
   f) Increase in usage of social media platforms, which could promote high-risk behaviours.
2. Subsequently in the post COVID period, majority of the cases detected in our study were in the latent stage which could be because the patients either missed the features of primary and secondary stages of syphilis or they could have had no access towards the health facilities during the initial symptomatic stages due to COVID – 19 pandemic situation and presented to the STI clinic later due to other STI related complaints or for voluntary screening with fear of having acquired STIs as a result of their high-risk behaviour.

The highest number of cases among the compared studies was 265 over a period of 6 years in a study at Vellore, Tamil Nadu, by Solaimalai *et al*[4]. The second highest number of cases was reported by Sivayadevi *et al.*[16] in a 5-year study in Thanjavur, Tamil Nadu, with 140 cases. In two other studies in Tamil Nadu by Mathupal *et al.*[18] at Chennai (14 cases in 7 months in 2018) and by Rajakumari *et al.*[19] at Madurai (12 cases over a short span of 2 months in 2018), there has been a notably high incidence of syphilis cases as in our study. This could be explained by the strength of health infrastructure in Tamil Nadu, with increased access to health care facilities and the increased awareness created by the government and NGOs via Information, Education and Communication (IEC) activities, thereby increasing the number of clients approaching for voluntary screening of STIs.

The various STI-related activities in Tamil Nadu include an increase in the outreach activities, which were earlier (in the pre-COVID era) focused mainly on the spouse and contacts of the STI cases and are now modified to target high-risk groups in an area-based manner, focusing on hotspots which are identified based on the number of cases reporting from a particular area. With NGO partnership, awareness and IEC activities in the form of field mock shows and group discussions among high-risk groups are being held now, which promote the health care-seeking behaviour among the target groups. Thus, there has been an increase in the number of clients who visit the STI clinic for voluntary screening of STIs in the post-COVID period, with an increase in the detection of more cases in the latent (asymptomatic) stage, as in this study. All these activities are reviewed every month through meetings where the field-level staff are strengthened with more knowledge and guidance towards the implementation of various such activities to increase the client inflow in STI clinics.

Similarly, a high number of cases was also reported in studies at Ahmedabad by Shah *et al.*[20] (110 cases in 2 years) and at Pune by Kulkarni *et al.*[11] (36 cases over 16 months). In a study at Rohtak (Haryana) by Nishal *et al.*[21], there had been a decreasing trend of syphilis cases from 2008 to 2012, while there was a constant trend in the number of syphilis cases in another study by Jain *et al.*[22], between 2005 and 2009. The increasing incidence of syphilis in the subsequent years, as shown in our study and various other studies, could be either due to the true rise in spread of syphilis due to the increased high-risk behaviour over the years or could be due to increased access to health care facilities and increased awareness of sexually acquired illnesses and their available treatment methods.

Comparing the age and sex distribution among various studies, male predominance was noted in

all the studies, with the peak incidence seen in the reproductive age group in most of the studies, as in this study. A high proportion (79%) of syphilis patients were literate in this study, which is similar to the observation in the studies by Jain *et al.*[22] (80%) and Gupta M *et al.*[17] (45%). This could be due to the increased awareness of STIs and their consequences among literates who would also seek health care facilities early. But this observation also points towards the inadequacies in indulging in safe sexual practices despite the awareness, thereby acquiring preventable STIs like syphilis. Another finding of this study is that 18% of the patients were college students, which points towards early initiation of sexual activity with a desire to explore new forms of sexual activities with inadequate knowledge towards safe sexual practices due to easy access to sexual networks and pornographic materials.

Among the various high-risk behaviours, unprotected sex was the most common behaviour seen in 100% of patients in this study, with less than 5% of patients reporting the use of condoms during sexual activity but not regularly. This is similar to the observation by Gupta M *et al*[17]. On comparing the MSM behaviour among various studies, the highest proportion was noted in the study by Sasidharanpillai *et al.*[23] (22.1% in 10 years) and by Shah *et al.*[20] (22.7% in 2 years). These were outnumbered by a higher proportion of MSM behaviour as high as 37.06% observed in our study over 1 year. Among them, 58 (92.06%) patients revealed having multiple sex partners, which shows the intensity of the high-risk associated with such behaviour. These two other studies were conducted around 10 years preceding this study. The rise in MSM behaviour noted in this study could be either due to a true increase in such behaviour due to change in the sexual orientation among the population over the years or it could be an apparent increase as higher number of people with MSM behaviour are out of their stigma in revealing their sexual orientation and seeking appropriate medical care as a result of liberations in sexual behaviour norms.

Compared with other studies, this study shows a lower proportion of patients with primary syphilis (2.4%) and a higher proportion of patients with latent syphilis (52.9%). This is similar to the observations by Solaimalai *et al.*[4], Sasidharanpillai *et al.*[23] and Wahab *et al.*[24], while most other studies have reported a higher proportion of patients with primary syphilis. Association of syphilis with other STIs was noted in 14(45.16%) patients by Gupta M *et al.*[17] while it was noted in 41(24.12%) patients in this study. The proportion of associated HIV disease as reported by Gupta M *et al.*[17] was 12.9% and it was similar in this study, with 14.7%. Among them, 14 patients were newly diagnosed with HIV disease. Among the patients with associated HIV disease in this study, 46.2% were MSM with multiple partners, pointing to the higher risk associated with such behaviour.

In a study by Gupta M *et al.*[17], the referral from the blood bank was 16.1% while in this study, it was 5.88% being identified during screening of the donated blood, which emphasises the importance of routine screening of the donated blood. Among them, 3 patients had a long-term history of high-risk behaviour with h/o blood donations in the previous 1 year of diagnosis with syphilis. This could be either due to low serological titres, which could not have been detected by rapid test kits during donated blood screening at blood banks and also points to the fact that only non-treponemal tests are being used at blood banks as preliminary tests during donated blood screening. Another notable observation is that many of the MSM have come forward for voluntary screening of STIs, having insight into their high-risk behaviour. At the same time, around 3.52% (6 patients) have acquired syphilis for the second time due to continued high-risk behaviour despite being diagnosed, counselled and treated for syphilis earlier. In one (0.6%) of the patients, it was the third episode of acquiring syphilis, which points to the need for improved ways of counselling to ensure adherence to safe sexual practices, along with addressing the psychological aspects leading to continuation of such high-risk behaviour.

In this study, more than 95% of the patients were aware of the benefit of condom usage in the prevention of STIs. But they were reluctant to use the same. Some of the various reasons quoted by the patients include non-availability of condoms at the time of sexual act, as many of such acts are usually unplanned and in the case of MSM, the need for usage of a condom as a barrier method of contraception is absent. Among these patients, the awareness of the increased risk of acquiring STIs with unprotected anal and oral intercourse is low. At least some sort of fear of acquiring STIs with anal

intercourse is there, but there is no such fear associated with oral intercourse. Among MSM, condom usage during anal intercourse was higher, while condom usage during oral sex was almost nil.

In this study, out of the female patients with syphilis, 18.9% were antenatal mothers, which emphasises the need for routine screening of antenatal mothers for syphilis and the diagnosis in one patient in the second trimester points to the need for implementing serological tests for syphilis in all three trimesters, as early diagnosis and treatment protect the foetus from developing congenital syphilis. The retrospective diagnosis in one patient in the postnatal period following the diagnosis of congenital syphilis in the baby points to the need for increasing vigilance in the already existing third-trimester screening for syphilis.

Another novel and interesting finding in our study is that 7.1% of patients reported usage of social media platforms and specially designed partner selection apps and dating apps to find their sexual partners. This showcases the increased risk associated with choosing multiple partners, thereby increasing the risk of acquiring STIs. Some of the various apps named by them include Grindr, Gay chat, Tinder, etc., Such apps promoting high-risk behaviours and propagation of STIs should be scrutinised and banned.

Syphilis, though preventable and easily curable, continues to be a public health problem due to various reasons. Some of them are a plethora of manifestations which may be easily missed when presenting to non-venerologists in view of the non-genital complaints, where syphilis may not be commonly suspected in such cases and hence serological tests for syphilis may not be offered. Its initial manifestations, like painless genital ulcers and mucocutaneous manifestations, are usually self-limiting with time and may be unnoticed by the patient or thought to be benign or spontaneously resolved due to its self-limiting nature. And the fear of the patients about being judged based on their sexual behaviour by the health-care personnel, the knowledge of their disease by their partners or family members and the tendency of the patients to self-medicate with over-the-counter medications leads to a delay in diagnosis and treatment of syphilis, thereby continuing the spread of the disease. Hence, continued efforts are required to be made in increasing the awareness among the public, students, high-risk groups and other medical and surgical professionals so that more people would reach the STI diagnostic facilities either directly or through referral by vigilant doctors, which will increase the detection and treatment rates, thereby curtailing the growth of the evolving indolent pandemic.

7. Summary and Conclusion

Syphilis, an age-old disease, has been alarmingly rising in recent years. This is a wake-up call towards reviewing the existing awareness, screening and treatment activities. Early identification, treatment and preventing further spread depend on focusing on the changing trends of high-risk behaviour of patients and their psychosocial factors and on targeted interventions. There is a need to introduce more effective methods, including active case search along with continued counselling and follow-up support to ensure continuation of safe sexual practices so that further increase in the incidence can be controlled and effectively managed. The awareness of sexual health and safe sexual practices among college students should be increased to develop a healthy future generation.

8. References

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