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Evaluation of TPHA and RPR Tests in the Serodiagnosis of Primary and Secondary Syphilis

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Abstract - Syphilis is one of the most enthralling diseases of humans. Widespread use of antibiotics now has declined the occurrence of primary syphilis and recognized new cases of late syphilis has decreased. Serological tests are the basis for the diagnosis of latent syphilis. They vary in their sensitivity and specificity. RPR and TPHA are most frequently used as screening procedures. The purpose of this study was aimed to analyse clinico-epidemiological profile and socio-economic status of infected patients with various sexually transmitted diseases (STDs) in population of Gujarat and its vicinity. The second commonest STD through bacteria in the present study was Syphilis accounting for 158 (16.77%) cases as indicated by clinical RPR and TPHA tests and separated by advanced clinical syndrome for primary and secondary types. Out of 158 cases, 119 were males (75.3%) while 39 were females (24.7%). Out of these cases, 41 cases were Primary Syphilis (4.35%) and other 117 cases of Secondary Syphilis (12.42%). However, our study documented syphilis was the second the highest in our study which is bacterial type.

Keyword - *Rapid plasma reagin, Treponema pallidum hemagglutination assay, Primary and Secondary Syphilis.*

I. Introduction

Sexually transmitted infections (STIs) represent a large and diverse category within infectious diseases, comprising more than thirty-five pathogens infectious through sexual contact. Curable bacterial and protozoal STIs apparent with ulceration (Syphilis, Chancroid, LGV) or inflammation and discharge (Gonorrhoea, Chlamydia, Trichomonas) are asymptomatic. Syphilis is an acute and chronic contagious disease caused by the bacterium *Treponema pallidum* subspecies *pallidum* (T. pallidum) and transmitted either by direct contact, sexual intercourse or congenitally from a pregnant mother to her newborn foetus. *Treponema pallidum* is the causative agent of syphilis. Syphilis primary appeared in the late 15th century, shortly after Columbus and his men returned from the New World. T. pallidum is capable of infecting all tissues. Syphilis is a relatively painless, slow evolving disease marked by long asymptomatic periods followed by short symptomatic periods during which the organism is multiplying quickly. The signs and symptoms of syphilis vary depending in which of the four stages it presents (primary, secondary, latent, and tertiary).

The annual global number of cases of congenital syphilis is estimated to be between 713 600 and 1 575 000. Newborn infants are infected by congenital syphilis than any other infection including human immunodeficiency virus and tetanus (Saloojee, 2004). Previous reports from Ahmedabad by Parmar et al. (2001) and Burzin (2006) who documented 28.90% and 15.19% of the Syphilis patients respectively. Sarwat et al. (2013) from Hyderabad obtained 25-34 years of age were found more syphilis positive. Few studies in India have shown a rise in the prevalence of Syphilis (Ray et al., 2006 and Sasidharanpillai et al., 2014) which is also by western studies as well (Schumacher et al., 2008 and Muldoon and Mulcahy, 2011). Jain et al (2012), a hospital based 5-year study mentioned that long term studies are necessary to reinforce the association of syphilis with various parameters and observe the resurgence of this old age disease in our country. Sethi et al (2015) recently reported rising trends of syphilis in a tertiary care centre in North India.

II. Materials and Methods

A number of 942 patients were analyzed who attend the Sexually transmitted disease (STD) Clinic or Suraksha Clinic of Civil Hospital Ahmedabad having complaint of genital ulcers, genital discharge or genital growths were studied in detail. These patients were interviewed according to standard Proforma which contained details about the demography-age, sex, education, occupation, marital status, socioeconomic status, domicile of the patients and other details. This work also approved by Department Internal Human Ethical Committee (IHEC) project No: HEC-01.

A detail clinical examination of the patient was done for various STDs like herpes progenitalis, genital warts etc. Examination of the external genitalia, perianal and anal region, skin and oral mucosa were also done. Examinations of body lesion were carried out to rule out Primary and secondary syphilis.

The patients after clinically diagnosed as having sexually transmitted diseases (STDs) were then advised to give blood to perform following tests. Approximately 5 ml of venous blood was aspirated and the following tests were performed. Rapid Plasma Reagin (RPR- Carbogen, Tulip Diagnostics, Goa) test was done to rule out syphilis and confirmed with the Treponema pallidum hemagglutination assay (TPHA- OMEGA, diagnostics IMMUTREP TPHA, Scotland, UK).

III. Results

In the present study of 942 patients were included with various STDs, 728 (77.28%) were males and 214 (22.71%) were females who attended the Suraksha Clinic, Civil Hospital, Ahmedabad, from 2011 to 2015. Out of 942, 158 cases of Syphilis patients were included. A number of 119 were males (75.3%) while 39 were females (24.7%) (Fig 1, Table.1). Age group wise majority of the patients 71 belonged to 25-34 years (44.9%) followed by 35-44 years (20.9%), 45-54 years (14.6%) and 15-24 years (8.9%), A total of 5 patients were from the paediatric age group 0-14 years (3.2%) and 13 patients were in the age group of 55-64 years (5.7%). A total of 3 patients belonged to age group 65 and above (1.9%) (Fig 2). Out of 158 cases, 41 cases were Primary Syphilis (S1) and other 117 cases of Secondary Syphilis (S2) (Table 1). In the present study Syphilis prevalence is very high in Ahmedabad e.g. Kalapinagar (10.7%), Chamanpura (5.7%), Civil (5.06%), Naroda (5%), etc.

Our study most of the patients were illiterate group (43.0%), followed by primary education (24.7%), high school education (15.2%) and higher secondary education was completed by 10.8% of the cases and 5.7% were graduates and 0.6% were post graduates (Fig 3).

The diagnosis of syphilis was done on the clinical basis along with Rapid Plasma Reagin test (RPR). The test was positive in 85.36% in primary syphilis and 83.76% in secondary syphilis (Fig 4). The Treponema Pallidum Haemagglutination Test (TPHA) was positive in 41.46% in primary syphilis and 44.44% in secondary syphilis (Fig 5). RPR and TPHA both were positive in 26.82% in primary syphilis and 28.20% in secondary syphilis (Fig 6).

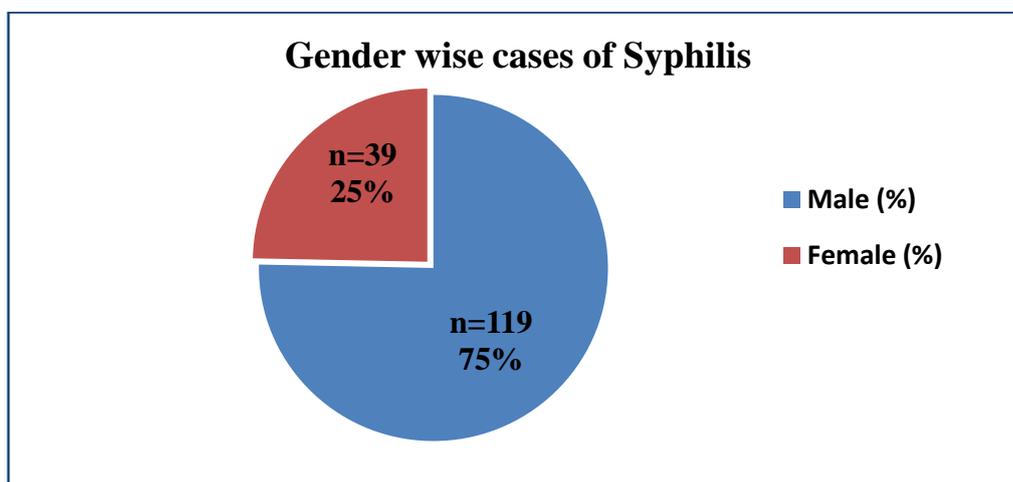


Fig 1: Gender wise cases of Syphilis

Type of STD	Total Cases	Percentage (%)
Herpes Progenitalis	449	47.66
Syphilis (S1)	41	4.352
Syphilis (S2)	117	12.42
Gonorrhoea	48	5.095
Chancroid	51	5.414
Molluscum contagiosum	63	6.687
Condyloma acuminata	24	2.547
Granuloma Inguinale	6	0.636
Lymphogranuloma venereum	4	0.424
Mixed VD's	60	6.369
Nongonococcal urethritis	14	1.486
HIV	65	6.900
Total	942	100

Table 1: Number of cases of each STDs

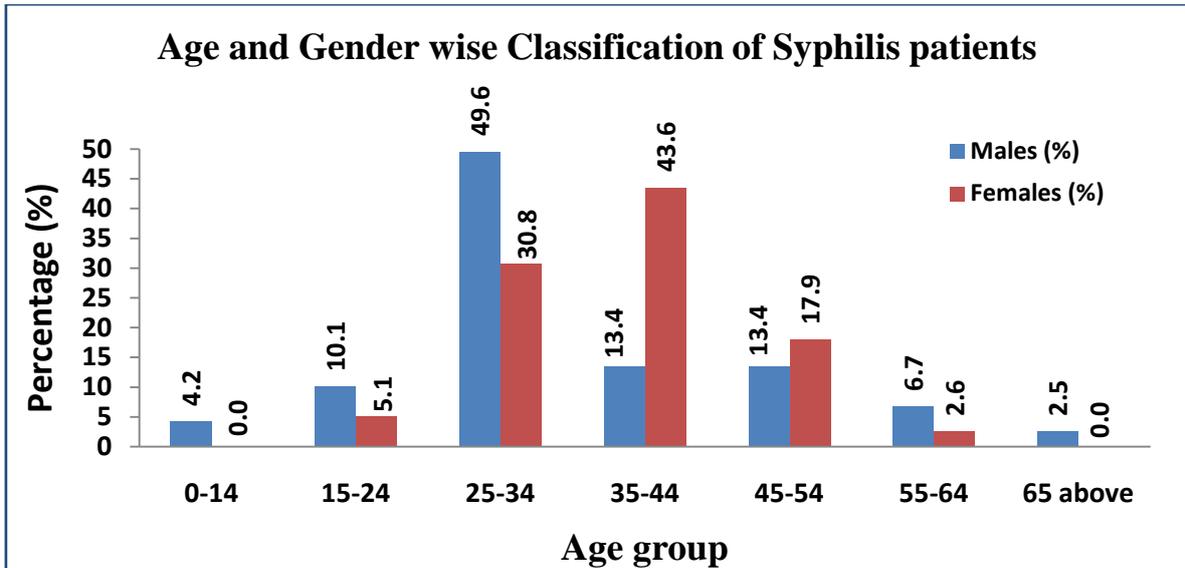


Fig 2: Age and Gender wise Classification of Syphilis patients

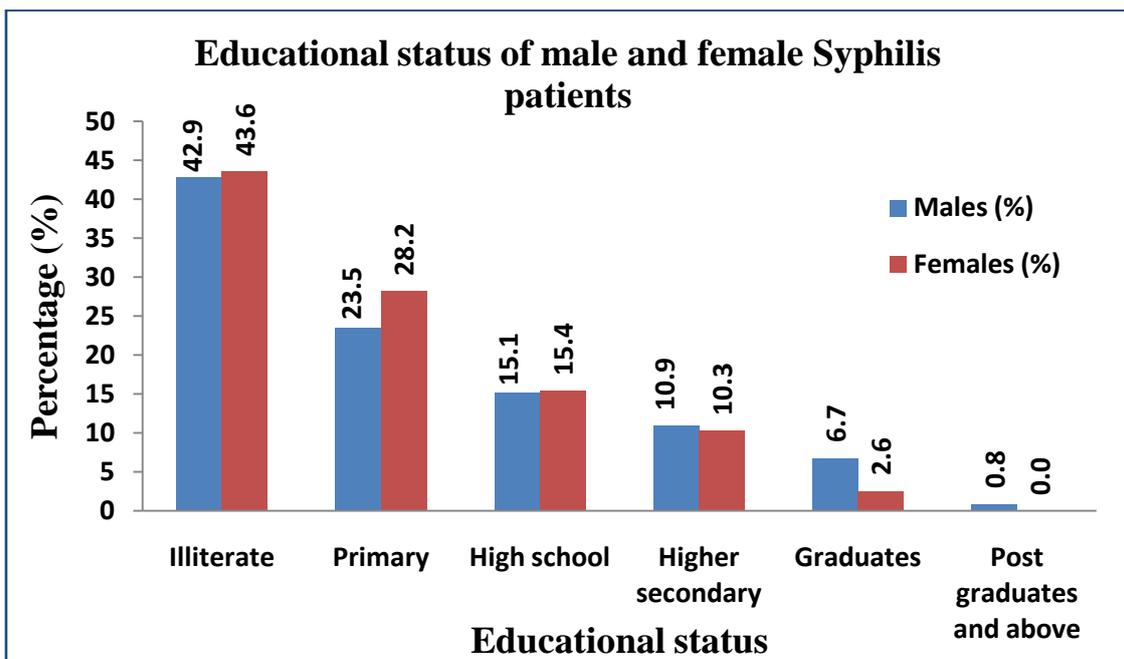


Fig 3: Educational status of male and female Syphilis patients

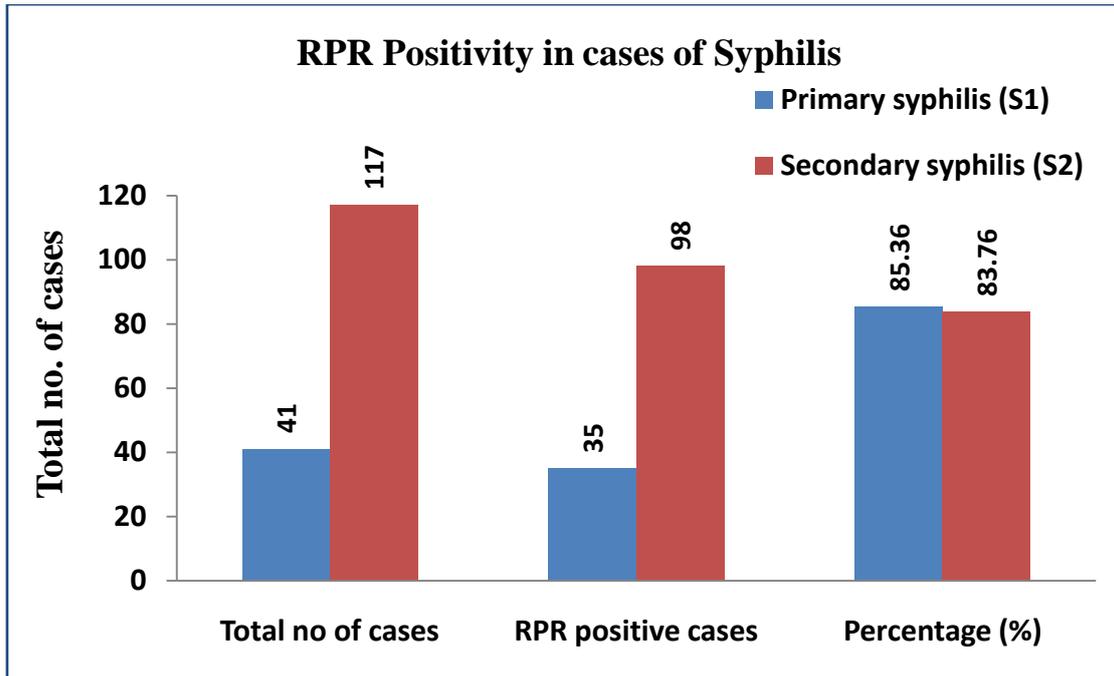


Fig 4: RPR Positivity in cases of Syphilis

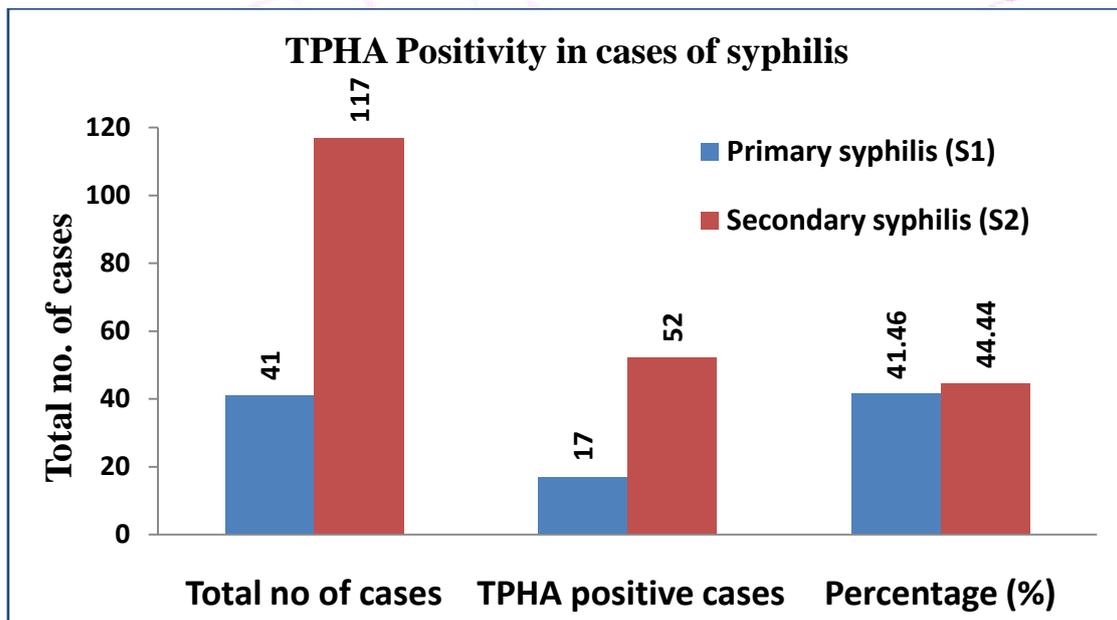


Fig 5: TPHA Positivity in cases of syphilis

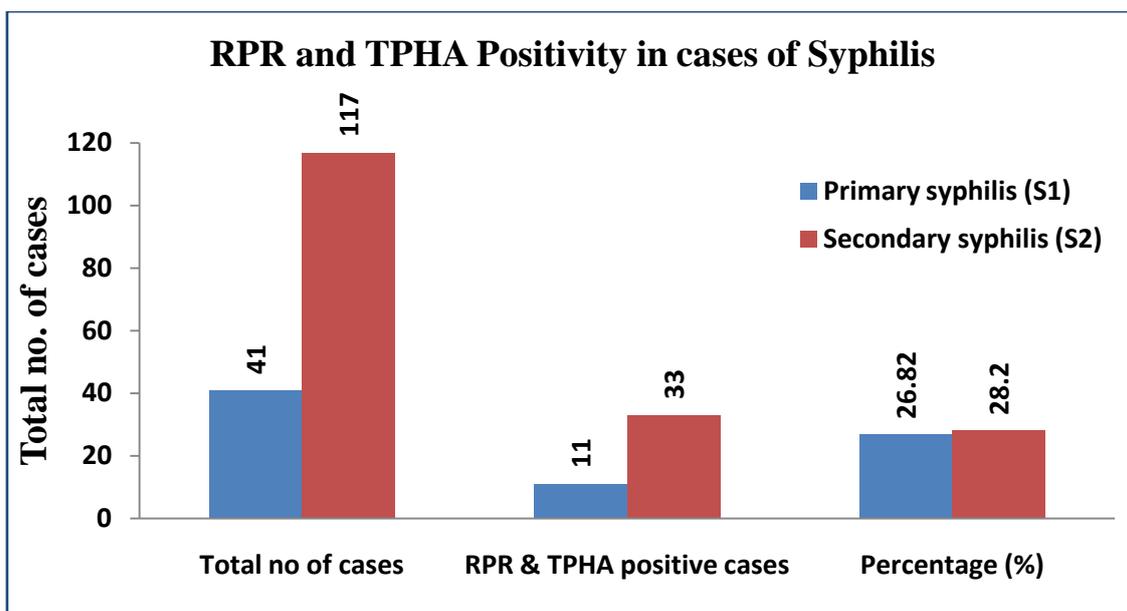


Fig 6: RPR and TPHA Positivity in cases of Syphilis

IV. Discussion

The present study was undertaken to study the demographic profile, gender variation and pattern of various sexually transmitted diseases including HIV/AIDS in 4 years i.e. from 2011 to 2015 in Civil Hospital, Ahmedabad consisting of 942 patients ranging in age ranging from 1 to 65 years. The patient attendees were asked to fill Proforma and consent form before diagnosis. This study revealed some important insights in STIs health status of general population.

The second commonest STD through bacteria in the present study was Syphilis accounting for 158 (16.77%) cases as indicated by clinical RPR and TPHA tests and separated by advanced clinical syndrome for primary and secondary types. Out of 158 cases, 119 were males (75.3%) while 39 were females (24.7%). Out of these cases, 41 cases were Primary Syphilis (4.35%) and other 117 cases of Secondary Syphilis (12.42%). An increasing trend was observed during the study period in a tertiary care centre in North India (Sethi et al., 2015). Jaiswal et al. (2003) also reported 37% of the cases in their studies. In this study, statistically, there were no significant association of syphilis positive cases with age, sex, pregnancy, ethnic group, literacy, and occupation. But with marital status and STI history pattern, there were significant association with syphilis positive cases.

Previous studies from Ahmedabad by Parmar et al. (2001) and Burzin (2006) documented 28.90% and 15.19% of the Syphilis patients respectively. The low incidence of percent in our investigation and Burzin (2006) might be the following factors. One of the reasons may be due to increased availability of antibiotics for curable bacterial STD and another reason is the reactivation of latent herpes simplex virus infection.

A study by Parmil et al. (2015) from Haryana reported 23.08% of cases of primary syphilis and 41.76% cases of secondary syphilis which is higher than present study. Similar to our data where primary is lower than the secondary. Overall in India it has shown higher incidence of secondary syphilis as compared to primary syphilis. The reasons for this may be inadequate treatment for primary stage or due to poor health seeking behaviour comparatively (Kar, 2004). Another study by Kar (2004)

from Delhi reported primary syphilis in 5.5% and secondary syphilis (8.7%) of the cases also comparable to our observation.

V. Conclusions

In laboratory settings of high HIV seroprevalence and poor accessibility of syphilis diagnosis and treatment, patients who are TPHA-positive/RPR-negative would probably benefit from treatment. Our results demonstrate comparable performance among the two treponemal assays evaluated (RPR and TPHA). A wide spread screening program for syphilis should be implemented to know the accurate occurrence of syphilis. Use of condom during sexual relation should be encouraged and homosexual as well as unhygienic practice should be avoided. Our findings are important for the calculation of the cost-effectiveness of the intervention.

VI. Acknowledgement

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VII. References

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