

Original Research Article

Seroprevalence of syphilis among pregnant females attending antenatal clinic at a tertiary care hospital in North India

Noor Jahan¹, Swastika Singh Chandel^{2*}, Deepak Chopra³, Arshiya Khan⁴, Razia Khatoun⁵

¹Department of Microbiology, Integral Institute of Medical Sciences and Research, Integral University, Lucknow, Uttar Pradesh, India

²Department of Microbiology, Rama Medical College Hospital and Research Centre, Mandhana, Kanpur, Uttar Pradesh, India

³Department of Community Medicine, ⁴Department of Obstetrics and Gynaecology, Integral Institute of Medical Sciences and Research, Integral University, Lucknow, Uttar Pradesh, India

⁵Department of Microbiology, Hind Institute of Medical Sciences, Mau, Ataria, Sitapur, Uttar Pradesh, India

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*Correspondence:

Swastika Singh Chandel,

E-mail: swastikasingh246@gmail.com

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ABSTRACT

Background: Syphilis is a sexually transmitted disease caused by bacteria named *Treponema palladium*, subsp. *pallidum*. Nearly 1.36 million pregnant women are known to be affected by syphilis in the developing countries. When left untreated syphilis during pregnancy can result in adverse fetal outcomes such as spontaneous abortion and stillbirth. Objective of the study was to evaluate the seroprevalence of syphilis among pregnant females attending Antenatal Clinic (ANC).

Methods: A hospital based cross-sectional study was done over a period of six months from January to June 2019. A total of 132 pregnant females were included in the study who attended Antenatal Clinic for routine checkup whose blood samples were sent to Microbiology Laboratory for screening for syphilis by Rapid Plasma Reagin (RPR) test.

Results: Out of 132 samples of pregnant females screened for syphilis, none of the sample was found reactive for syphilis by RPR test. Maximum patients (57.6%) belonged to age group 20-25 years followed by (27.3%) of 26-30 years. 30.3% patients belonged to urban areas and 69.7% patients belonged to rural areas. Majority of patients (80.3%) belonged to first trimester, followed by (18.9%) patients to second trimester and (0.8%) patients to third trimester. 78.8% patients were from lower socio-economic class followed by 12.9% patients from middle class and 8.3% patients from upper class.

Conclusions: Although zero percent syphilis prevalence was observed in this study, it is recommended that free screening for syphilis should be offered to all pregnant females visiting Antenatal Clinic.

Keywords: Antenatal clinic, Pregnant females, Rapid plasma reagin test, Syphilis

INTRODUCTION

Syphilis, a Sexually Transmitted Disease (STD) caused by bacteria *Treponema pallidum* is associated with significant complications if left untreated. Usually the maternal syphilis causes impulsive abortion in 80% of

cases and long term sequelae as well as it causes intrauterine growth restriction and prenatal death.¹ It also causes ulcerative genital lesion that enhances the acquisition of sexually transmitted disease of syphilis.² Usually, the maternal syphilis has been widely reported for decades.

The screening of syphilis and treatment in antenatal care has been called as one of the most cost-effective way to reduce fetal and infant mortality and morbidity in the developing world.³ Serologic test for syphilis, with the detection of non-treponemal antibodies (cardiolipin) or antibodies against *T. pallidum* in all stages of infection, remains the diagnosis mainstay. Usually the Non-treponemal test, are largely used to monitor the status of infection, while treponemal test are primarily used to confirm the presence of treponemal infection.⁴

In year 2012 the infection of maternal syphilis varied across the region. Africa is the region with the greatest congenital syphilis burden is 63% of global maternal infections (585,664) and 64% of adverse pregnancy outcome (224,761).⁵ The specificity of the test is being limited owing to the non-specific nature of the cardiolipin antigen as biological false positive reactions can occur due to viral infections, pregnancy and malaria. Although the false negative results may occur in early primary cases and in patients with secondary syphilis, as a result of prozone reactions this may limit the sensitivity of the test.⁶

Prevalence of syphilis is changing in India recently because of availability of good laboratory diagnosis, treatment and increase health awareness. But syphilis still remains as major public health problem with significant regional variations.⁷ Keeping this fact in mind the present study was done to estimate the seroprevalence of syphilis among pregnant females attending Antenatal Clinics of authors Tertiary care hospital at Lucknow.

METHODS

A hospital based cross sectional study was done to estimate the seroprevalence of syphilis among pregnant females who attended Antenatal Clinic at Integral Institute of Medical Sciences and Research (IIMSR), Lucknow. The study was done over a period of six months from January to June 2019 and was approved by Institutional Ethical Committee.

An informed consent was taken from all pregnant females included in the study prior to sample collection. A pre-designed questionnaire was used to get the information regarding socio-demographic profile of the enrolled patients.

Inclusion criteria

- Consenting pregnant females attending Antenatal Clinic who were requested for screening for syphilis at IIMSR during the study period.

Exclusion criteria

- Non-consenting and non-pregnant females were excluded from the study.

Study subjects

A total of 132 pregnant females were included in the present study whose blood samples were screened for presence of syphilis antibodies.

2 ml blood collected aseptically from the pregnant females using vein puncture technique in a well labeled plain vacutainer tube was received in Serology section of Microbiology Laboratory. Then blood was allowed to clot, and the separated serum was tested for syphilis antibodies using Rapid Plasma Reagin (RPR) card test (Tulip Diagnostics Pvt. Ltd. Goa, India) as shown in Figure 1.

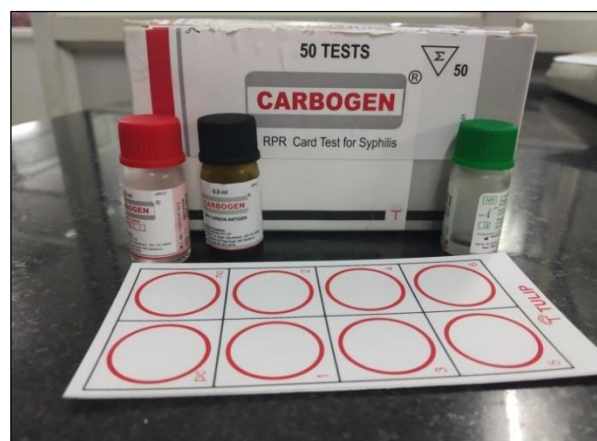


Figure 1: Kit of rapid plasma reagin test for syphilis.

The Rapid Plasma Reagin (RPR)/Carbon Antigen test is a macroscopic non Treponemal flocculation test for the detection and quantitation of antilipoidal antibodies (called as Reagins) which are produced by host in response to the lipoidal material released from damaged host cells. The test was put as per the manufacturer's instructions. One drop (50 μ l) of patient's sample along with one drop of a positive control and a negative control was pipetted onto RPR test card. Then one drop of well mixed Carbogen reagent was added onto the test specimen, positive control and negative control by using reagent dropper provided with the kit. Using mixing stick, the specimen/controls and Carbogen reagent was mixed thoroughly spreading uniformly over the entire reaction circle. The test card was then rotated either manually or on a mechanical rotor at 180 rpm for 8 minutes only. Immediately after 8 minutes presence of flocculation was observed in a good light. Flocculation is a positive test result and indicates the presence of antilipoidal antibodies in the test specimen. No flocculation is a negative test result and indicates the absence of antilipoidal antibodies in the test specimen.

Statistical analysis

The collected data was analyzed using SPSS, version 20.0. Percentage of variables was calculated.

RESULTS

A total number of 132 pregnant females were screened for syphilis by using Rapid plasma reagin test. Table 1 shows that maximum number of pregnant females (57.6%) belonged to age group 20-25 years, followed by those belonging to age group 26-30 years (27.3%), and least in age groups of 15-19 years and 37-40 years (1.5% each).

Table 1: Distribution of pregnant females enrolled in this study according to their age (N=132).

Age group (in years)	Number of pregnant females (N)	Percentage (%)
15-19	2	1.5%
20-25	76	57.6%
26-30	36	27.3%
31-36	16	12.1%
37-40	2	1.5%
Total	132	100%

It was found that majority of pregnant females (N=92) belonged to rural areas as compared to patients belonging to urban areas (N=40) as depicted in Figure 2.

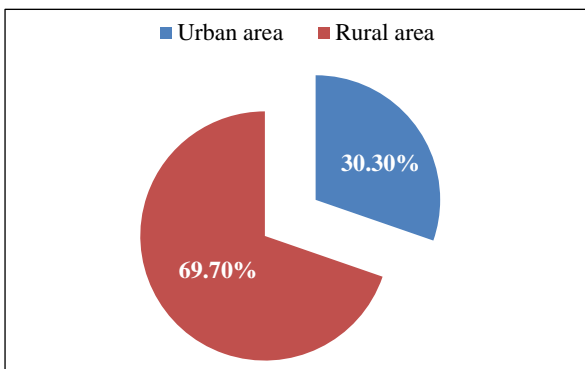


Figure 2: Distribution of pregnant females according to their residence.

Table 2 shows that majority of pregnant females were illiterates (69.7%), followed by education up to primary school (13.6%), preprimary (6.8%), high school (6.1%) and least number of patients were graduate and above (3.8%).

Table 2: Distribution of pregnant females according to their educational status (N=132).

Educational status	Number of pregnant females (N)	Percentage (%)
Graduate and above	5	3.8%
High school	8	6.1%
Primary	18	13.6%
Pre-primary	9	6.8%
Illiterate	92	69.7%
Total	132	100%

Table 3 shows the distribution of pregnant females according to their duration of pregnancy when they were registered for testing of syphilis by RPR. Out of 132 pregnant females, majority (80.3%) were in their first trimester, followed by 18.9% patients who were in second trimester and 0.8% patients were in their third trimester.

Table 3: Distribution of pregnant females according to their duration of pregnancy (N=132).

Duration of pregnancy	Number of pregnant females (N)	Percentage (%)
First trimester	106	80.3%
Second trimester	25	18.9%
Third trimester	1	0.8%
Total	132	100%

It was found that majority of pregnant females belonged to lower socio-economic class (N=104), followed by those belonging to middle class (N=17) and upper class (N=11) as shown in Figure 3.

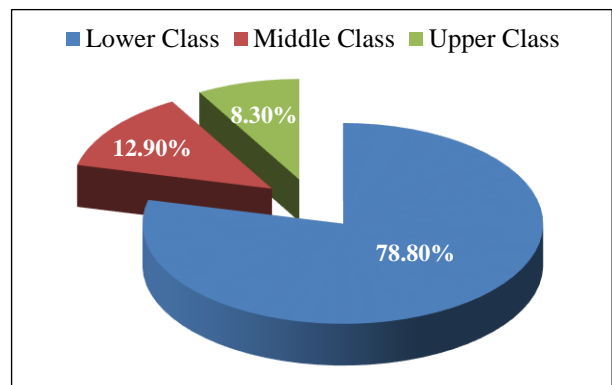


Figure 3: Distribution of pregnant females according to their socio-economic status.

As shown in Table 4, all 132 pregnant females enrolled in the study were found to be non-reactive for syphilis by RPR test.

Table 4: Result of Rapid Plasma Reagin (RPR) test for syphilis among pregnant females enrolled in study (N=132).

Result of RPR test	Number of pregnant females (n)	Percentage (%)
Reactive	0	0%
Non-reactive	132	100%
Total	132	100%

DISCUSSION

The syphilis seroprevalence varies among different regions of the world, among them many regions showing rising trend of Syphilis in the recent years. During 2018, there were 115,045 reported newly diagnosed cases of

syphilis (all stages), compared to 583,405 cases of gonorrhoea.⁸ Since infection can be transmitted from a pregnant woman having syphilis to her unborn baby, all pregnant women should be tested for syphilis at the first prenatal visit. For women who are at high risk for syphilis, those living in areas of high syphilis morbidity, are previously untested, or had a positive screening test in the first trimester, the syphilis screening test should be repeated during the third trimester and again at delivery.⁹

Sero-reactivity of syphilis among pregnant females is highly variable from being as low as 0.02% to as high as 12.1% among the whole world population.¹⁰ But in India as compared to other countries syphilis is having low seroprevalence of 1.9% and the study was conducted in ANC patients by WHO.¹¹ This is in concordance with this study, as we have also reported lowest seroprevalence of syphilis to be 0.00% among pregnant females included in this study. However, another study reported seroprevalence of syphilis to be 0.3% among Antenatal cases.¹²

Other studies done from various parts of India which showed similar seropositivity among ANC cases were depicted in Table 5.^{1,7,11,13-15}

Table 5: Comparison of prevalence of syphilis among ANC cases as depicted in various studies from india.

Author and year	Place	Prevalence of Syphilis
This study	IIMS and R, Lucknow	0.00%
Mythily N et al, ¹⁴	Tamil Nadu	0.39%
Patel HK et al, ¹	Valsad	0.28%
Sethi S et al, ¹³	Chandigarh	0.48%
Kumar G et al, ¹¹	Varanasi	0.87%
Chopra S et al, ⁷	New Delhi	0.24%
Nair N et al, ¹⁵	Navi Mumbai	0.36%

However, studies done outside India reported higher prevalence of Syphilis among pregnant women. In a study conducted in Bahir Dar, Northwest Ethiopia reported seroprevalence of Syphilis among pregnant women to be 2.6%.¹⁶ Another study from South Gondar, Northwest Ethiopia reported seroprevalence of Syphilis among among pregnant women attending Antenatal clinic to be 1.9%.¹⁷

In this study majority of pregnant females (57.6%) belonged to age group 20-25 years, followed by those belonging to age group 26-30 years (27.3%), and least in age groups of 15-19 years and 37-40 years (1.5% each). A study from Navi Mumbai reported that majority of pregnant women belonged to age group 20-25 years (41.7%, 1127/2704), followed by those belonging to age group 26-30 years (34.1%, 923/2704) and least in age group 41-45 years (4.3%, 117/2704).¹⁵ A study from Ethiopia also reported that majority of participants

(73.8%) belonged to age group 21-30 years.¹⁷ These findings were comparable to present study.

In the present study, we found that majority of pregnant females (69.7%) belonged to rural areas as compared to patients belonging to urban areas (30.3%). In contrast to this finding a study from Ethiopia reported that majority of participating pregnant women belonged to urban areas (60.5%) as compared to those from rural areas (39.5%).¹⁷

Present study reported that majority of pregnant females were illiterates (69.7%), followed by education up to primary school (13.6%), preprimary (6.8%), high school (6.1%) and least number of patients were graduate and above (3.8%). In contrast to this finding a study from Ethiopia showed that majority of participating pregnant women attended college and above (31.8%), followed by those who attended high school (30.2%) and those who could read and write (26.8%).¹⁶

Present study showed that out of 132 pregnant females, majority (80.3%) were in their first trimester, followed by 18.9% patients who were in second trimester and 0.8% patients were in their third trimester. A study from Ethiopia reported that majority of pregnant women were in their first trimester (64.3%), followed by 22.9% patients who were in second trimester and 12.9% were in their third trimester.¹⁷

The present study reported that majority of pregnant females belonged to lower socio-economic class (78.8%), followed by those belonging to middle class (12.9%) and upper class (8.3%). In contrast to this finding a study from Ethiopia showed that majority of pregnant women belonged to upper class (45.3%), followed by those from middle class (32.6%) and lower class (22.1%).¹⁷

CONCLUSION

The present study was done to detect the seroprevalence of syphilis among pregnant females attending Antenatal Clinics of Integral Institute of Medical Science and Research, Lucknow, by Rapid Plasma Reagin (RPR) test method, in which we detected that none of the samples were reactive for syphilis. Although zero percent seroprevalence of syphilis was observed in this study, it is recommended that free screening for syphilis should be offered to all pregnant females.

Also, the importance of Antenatal Clinic follow-up during early pregnancy is highly emphasized because maternal syphilis if undiagnosed and untreated can result in adverse fetal outcomes such as still births, abortions, low birth weight babies and those suffering from congenital syphilis.

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Conflict of interest: None declared

Ethical approval: The study was approved by the Institutional Ethics Committee

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