

A study of various epidemiological factors that affects the seroprevalence of HSV-2 (IgG) antibodies among patients attending the STD and antenatal clinics in Telangana state

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Abstract

Background: There is a paucity of data on the prevalence of HSV2 antibodies in India and Asia. There is wide disparity between antibody prevalence and clinical infections indicating that many persons acquire sub clinical infection or lacked recognition of the infection. **Aim:** The present study is to investigate various epidemiological factors affecting the seroprevalence of HSV2 antibodies among patients attending S.T.D and antenatal clinic at Bhaskar General hospital, Moinabad. **Objectives:** The seroprevalence of HSV2 antibodies among patients attending S.T.D and antenatal clinic were studied in relationship with the epidemiological factors affecting it and the factors included the age, occupation, educational level and socio-economic status. **Materials and Methods:** Specimens were collected from 100 volunteers attending S.T.D and Antenatal clinic at Bhaskar General Hospital and tested for HSV-2 antibodies using HSV-2 Type specific IgG ELISA test kit. Data were analyzed using SPSS version 23.0. P values ≤ 0.05 were considered significant. **Results:** Out of the 100 individuals tested in S.T.D and Antenatal clinics, 26 (26.0%) were HSV-2 positive. The study has found that there is predominance of infection among young individuals of age range 20 – 29 years (17%), the labourers (16%), the uneducated and primary level educated (18%), low income group (21%). **Conclusion:** The prevention of HSV-2 infection may reduce the risk of HIV acquisition in high HSV-2 seroprevalence centers. Therefore measures for both HSV-2 and HIV prevention strategies should be focused on young generation.

Keywords: Seroprevalence, HSV 2, epidemiological factors.

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INTRODUCTION

Genital herpes is a sexually transmitted infection (STI) caused by Herpes Simplex Virus Type-2 (HSV-2) which belong to the alpha herpesvirinae subfamily. It is chronic, widespread, and infectious during both its symptomatic and asymptomatic periods. It is highly prevalent in

human populations in many parts of the world and it is the most common cause of genital ulcer disease (GUD) worldwide.¹¹ It affects an estimate of 356 million (about 16%) persons in the reproductive age range, worldwide.¹ HSV-2 prevalence is, in general, highest in Africa and America, lower in western and Southern Europe than in northern Europe and North America, and lowest in Asia. The disease has been described as an insidious and progressive worldwide pandemic; and different countries are said to be have different grades of the epidemic.¹² A meta-analysis of studies of HSV-2 found that infection with HSV-2 doubled the risk of becoming infected with HIV through transmission during sexual activity.¹⁷ The epidemiological factors determining the persistent spread of this disease are similar to those of Human Immunodeficiency Virus (HIV) infection; and both diseases have become mutually reinforcing epidemics.^{2,9} The occurrence of genital herpes among pregnant women

is particularly associated with several problems in the woman and in the offspring.¹⁴ Newborns of women known to be infected with genital herpes are at risk of neonatal transmission; hence delivery of these babies by caesarean section is desirable. Genital herpes in pregnancy is associated with definite risks of meningoencephalitis and disseminated herpes in the neonate.^{3,12} Neonatal meningoencephalitis kills about 50% of affected babies and leaves the survivors with permanent neurologic deficit,^{3,14} while disseminated neonatal disease kills close to 90% of the infected.^{4,6} There is also high risk of congenital anomalies in the newborn.^{13,16} If the primary maternal infection is acquired during near term the risk of transmission of this infection from mother to newborn can increase 10-fold¹⁰. Genital herpes is not routinely diagnosed in the laboratory and therefore there is no data available on its prevalence among the population so as to guide HSV-2 prevention efforts like that available for other common sexually transmitted infections (STIs). The aim of the present study is to determine the seroprevalence of HSV-2 antibodies among patients attending the STD and Antenatal Clinics and identify probable risk factors among STI patients.

MATERIALS AND METHODS

Study population

The study was conducted at STD and antenatal clinics in Bhaskar general hospital attached to Bhaskar Medical College. A sample size of total 100 patients out of which

50 each attending the S.T.D and Antenatal clinics was randomly selected and an informed consent is obtained from each participant. The study was approved by the college ethical committee. All the participating patients were asked questionnaires on socio-demographic, complaints of the disease, personal history, past history, sexual history as given in the Proforma. A general examination, genital, pelvic and systemic examination was performed. All sera collected from the study population were maintained at -20o C until they were received by the central laboratory of the hospital for analysis.

Description of Assay

From the collected sera samples, antibodies to anti-HSV-2 were detected using Enzyme linked immunosorbent assay (ELISA) kit with purified HSV-2 antigen coated on the surface of microwells. All steps were performed according to the manufacturer’s instructions.

Table 1: Interpretation of Results

Activity index	Interpretation
<0.9	Negative
.91-1.10	Equivocal
>1.10	Positive

Statistical analysis

Data were subjected to statistical analysis using the software SPSS version 23.0 (SPSS - IBM). Multivariate logistic regression analysis was performed at 95% confidence interval. P values ≤ 0.05 were considered statistically significant.

RESULTS

Of the 100 specimens tested from STD and Antenatal clinic, 26 (26.0%) were seropositive for Herpes Simplex Virus Type-2 IgG antibodies.

Table 2: Seroprevalence of HSV-2 in relation to age group among patients attending S.T.D and antenatal clinics

S.NO	AGE	PATIENTS OF S.T.D CLINIC			PATIENTS OF A.N CLINIC		
		NO	HSV-2+	%	NO	HSV-2+	%
1	15-19	5	1	20.00	14	--	--
2	20-24	20	7	35.00	27	3	11.11
3	25-29	16	7	43.00	08	1	12.50
4	30-34	6	4	66.00	01	1	100.00
5	35-39	3	2	66.00	-	-	-
6	40-45	-	-	--	-	-	-
Total		50	21	-	50	5	-

S.T.D CLINIC: 1 out of 5(20%), Seven (7) out of 20 (35.00%), 7 out of 16 (43.00%),4 Out of 6 (66.00%),and 2 out of 3 (66.00%) of STD patients were positive for HSV-2 in the age groups of 15-19 years, 20-24 years, 25-29 years,30-34 years and 35-39 years respectively. There was no enrollment in the age group of 40-45 years.

ANTENATAL CLINIC: 14 pregnant women were enrolled in the age group of 15-19 and none of them were positive for HSV-2. Three(3) out of 27(.11.11%), 1 out of 8(1 2.50%), and 1 out of 1(100%) pregnant women were positive for the for HSV-2 in the age groups of 20-24 years, 25-29 years and 30-34 years respectively. There was no enrollment in the age groups 35-39 and 40-45.

Table 2: Seroprevalence of hsv-2 in relation to occupation among patients attending STD and antenatal clinics

S.NO	OCCUPATION	PATIENTS OF S.T.D CLINIC			PATIENTS OF A.N CLINIC		
		NO	HSV-2 +	%	NO	HSV-2+	%
1	STUDENT	04	2	50.00	--	-	-
2	EMPLOYEE	16	7	43.75	3	0	-
3	LABOURERS	21	11	52.38	42	5	11.90
4	HOUSE WIFE	09	01	11.00	5	-	-
Total		50	21	-	50	5	-

S.T.D CLINIC: 2 out of 4 students (50%), 7 out of 16 employees (43.75%), and 11 out of 21 Labourers (52.38%) and 1 out of 9 house wives (11.00%) were positive for HSV-2. **ANTINETAL CLINIC:** No students were enrolled in the AN Clinic. 3 employees were enrolled and none of them were positive for HSV-2. 5 out of 42 Labourers (11.90%) were positive for HSV-2 Five House wives attended the AN Clinic and none of them were positive for HSV-2.

Table 3: Seroprevalence Of Hsv-2 In Relation To Educational Status Among Patients Attending S.T.D And Antenatal Clinics

Sr.No	Literacy Status	Patients Of S.T.D Clinic			Patients Of A.N Clinic		
		NO	HSV-2+	%	NO	HSV-2+	%
1	UNEDUCATED / PRIMARY	25	15	60.00	28	3	10.71
2.	SECONDARY	20	5	25.00	19	2	10.52
3.	HIGHER	5	1	20.00	03	--	--
Total		50	21		50	5	

S.T.D CLINIC: 15 out of 25 primary /uneducated (60.00%), 5 out of 20 with secondary education (25.00%) and 1 out of 5 with higher education(20.00%) were positive for HSV-2. **ANTENATAL CLINIC:** 3 out of 28(10.71%) of primary/uneducated, and 2 out of 19 (10.52 %) with secondary Education were positive for HSV-2. Three were enrolled with higher education and none of them were positive for HSV-2.

Table 4: Seroprevalence Of Hsv-2 In Relation To Economic Status Among Patients Attending S.T.D And Antenatal Clinics.

Sr. No	Income Group	Patients Of S.T.D Clinic			Patients Of A.N Clinic		
		NO	HSV-2+	%	NO	HSV-2+	%
1.	LOW	38	17	45.00	40	4	10.00
2.	MIDDLE	08	03	37.00	09	1	11.11
3.	HIGH	04	01	25.00	01	-	-
Total		50	21		50	5	

S.T.D CLINIC: 17 out of 38 (45.00%) from low, 3 out of 8 (37.00%) from middle and 1 out of 4 (25.00%) from high income groups were positive for HSV-2. **ANTENATEL CLINIC:** 4 out of 40 (10.00%) of low and 1 out of 9 (11.11%) from middle income groups were positive for HSV-2. Only one pregnant woman was enrolled from higher economic group and was negative for HSV-2.

DISCUSSION

Herpes simplex infection occurs worldwide but its epidemiology varies between different countries and between groups of individuals. A Seroprevalence of HSV-2 antibody is a more accurate method of determining epidemiology of this infection. Variations in HSV-2 seroprevalence between regions and between populations with different demographical and sexual behavioural parameters is likely to be due to variations in epidemiological factors, such as the dynamics of sexual mixing patterns, age at first sex, condom use, mobility and the presence of other STIs. Another important influence in the dynamics of HSV-2 infection may be

prior infection with HSV-1. The prevalence of HSV-2 infection overall and by age varies and markedly by country, region within country and population sub-group. In order to compare the prevalence of herpes infection between geographic areas or countries, age specific or age- adjusted prevalence among similar populations is necessary. The prevalence of HSV-2 antibody provides an epidemiologic measure of the population burden of this infection. The strong association between HSV-2 prevalence and sexual behavior in different studies suggest that age specific HSV-2 prevalence may in some circumstances provide an useful marker for sexual behavior. HSV-2 prevalence is, in general, highest in

Africa and parts of the Americas, lower in western and Southern Europe than in northern Europe and North America, and lowest in Asia.¹⁵ The age wise seroprevalence of HSV-2 in S.T.D clinics was 20% in 15-19 years, 35% in 20-24 years, 35% in 25-29 years, 43% in 25-29 years, 66% in 30-34 years and nil in 40-44 years age groups. This was in agreement with the study done by Gottlieb *et al*⁷ who in their study reported the seroprevalence of HSV-2 as 23.6% in 15-19 years, 34.30% in 20-24 years, 42.50% in 25-29 years, 49.90% in 30-34 years, 64.60% in 35-39 years and nil in 40-44 years age groups and also the study of seroprevalence of SHV-2 by age and sex in random sample of adults aged 15-54 years in Mwanza region, Tanzania reported 15;95%,41.95%,49%,68% and 63% in the age groups of 15-19,20-24,25-29,30-34 and 35-39 years respectively.⁸ In the antenatal clinic the HSV-2 seroprevalence was nil in 15-19 yrs, 11.11% in 20-24yrrs, 12.50% in 24-29 yrs, 100% in 30-34 yrs, and nil in 35-39 yrs age groups. In 15-19 yrs age group the HSV-2 was less this might be due to decreased extramarital contacts. The 11.11% and 12.5% in 20-24 and 25-29 yrs may be because of unfaithful partners and unprotected sexual activity. A 100% seroprevalence of HSV-2 in 30-34 yrs might be because of the small sample size to give an explanation. Helen Weiss *et al*⁸ in her study at Brazil reported that the HSV-2 seroprevalence among pregnant women was 11% in 14-20 yrs 35% in 21-29 yrs and 19% in 30-42 yrs. There was a gradual increase from 11% to 35% from 14-24 to 21-29 yrs and fall to 19% in 30-42 yrs. This gradual increase in seroprevalence of HSV-2 infection with age is because HSV-2 is a persistent infection with a relatively high rate of transmission or may be due to an early age at first coitus, a higher lifetime number of sexual partners and unprotected sexual activity. The seroprevalence of HSV-2 when compared in relation to occupation among the patients of STD and antenatal clinic, a high seroprevalence of 50% was recorded among the students attending the S.T.D clinic. This study is in agreement with the study done by Abuhar eil N *et al*¹¹ who in their study have reported 47.15% of seroprevalence among the students in northern Jordon. In the S.T.D clinics, a seroprevalence of 44% of HSV-2 was recorded among the employees attending STD clinic. This is in agreement with the study of Helen wises *et al*.¹⁸¹ who in her study reported that 40 % seroprevalence of HSV-2 among employees of Zimbabwe. The seroprevalence of HSV-2 in relation to educational status among patients attending the STD and antenatal clinics, A 60% of HSV-2 seropositivty was reported among the primary /uneducated, 25% in secondary education, and 20% in highly educated attending STD clinic. This is in agreement with the study done by Doiuglas T *et al*.¹⁵¹ who

reported HSV-2 seroprevalence 40.9% in people with elementary education, 24.2% in high school education and 22% with degree qualifications. The study of seroprevalence of HSV-2 in relation to the economic status among patients attending STD and antenatal clinics shows that a 45% of seroprevalence of HSV-2 was recorded among lower, 37% among the middle and 25% among the high income groups of patients attending in STD clinic. This is in accordance with the study of Helen wises *et al*.¹⁸¹ who in his study in Sao Paulo region of Brazil reported 42% of HSV-2 among the low income group and 31% among the middle income group.

CONCLUSION

The present study is to investigate various epidemiological factors affecting the seroprevalence of HSV2 antibodies among patients attending S.T.D and antenatal clinic at Bhaskar General hospital, Moinabad. A study cohort consisted of 100 patients each attending STD and antenatal clinics. The overall HSV-2 seroprevalence of 42% and 10% were reported among patients attending STD and antenatal clinics respectively. There was a strong association between HSV-2 seroprevalence and age, with infection rates rising rapidly between the ages of 15 and 34 years before becoming stable. The highest seroprevalence of HSV-2 was reported among labourers followed by students, employees and housewives. Patients with no education/primary education showed higher seroprevalence of HSV-2 than in the highly educated. Patients from low economic strata, showed the highest prevalence of HSV-2. This study showed the varying influences of epidemiological factors including age, occupation, educational status and socio-economic levels on the seroprevalence of HSV-2. The high seroprevalence HSV-2 of 42% among patients of STD clinics i.e., high risk behaviour with or without manifestations of genital herpes suggests the influence of various social and demographic factors and that the virus circulation may be restricted to certain risk groups and reflects high rates of undiagnosed HSV-2 infection. HSV-2 is an important etiological agent for genital ulcer disease which facilitates heterosexual HIV transmission and acquisition. HSV-2 is associated with other viral STDs like HIV, Genital Warts and Molluscum Contagiosum. This study stresses the need for serological screening of HSV-2 in STD patients and HIV screening to any person with genital ulcer disease because of the association of genital ulcer disease and HIV. The 10%of HSV-2 seroprevalence in pregnant women is considerably high and constitute a potential source for spreading the HSV-2 virus. This stresses the need for serological screening of HSV-2 and prophylactic measures for vertical transmission of HSV-2 for all the

pregnant women attending the antenatal clinics. Thus prevention of HSV-2 infection may reduce the risk of HIV acquisition in high HSV-2 seroprevalence centers. Therefore measures for both HSV-2 and HIV prevention strategies should be focused on young generation.

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