

## Seroprevalence of Herpes Simplex Virus Type -2 IgG Among Pregnant Women Attending Rajendra Institute of Medical Sciences, Ranchi, Jharkhand



### Medical Science

**KEYWORDS :** - Herpes simplex virus type 2; seroprevalence; pregnant women; IgG ELISA

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### ABSTRACT

**Background:** Infection with herpes simplex is one of the most common sexually transmitted infections. It is common in women of reproductive age as it can be contracted and transmitted to the fetus during pregnancy resulting in miscarriage, premature labor, inhibited fetal growth or transmission of the infection to the infant leading to death or long-term disabilities.

**Objective:** This study aimed to detect seroprevalence of HSV-2 IgG antibodies among pregnant women.

**Methods:** Serum samples from 218 pregnant women attending Rajendra Institute of Medical Sciences, Ranchi, Jharkhand were taken from (October 2012 to September 2015) and further analysed with commercial HSV type-2 specific IgG Enzyme Linked Immunosorbent Assay (ELISA Calbiotech) kits.

**Results:** Of the 218 pregnant women, 76(34.86%) were seropositive and 142(65.13%) were seronegative for HSV 2 IgG antibody. Seroprevalence of HSV IgG group was 51 (57.12%), 14 (22.58%), and 11 (25.0%) for first, second and third trimester, respectively with seropositivity being highest for first trimester followed by second and third trimester. A statistical association existed between the prevalence of HSV-2 IgG antibodies and history of abortion and gravidarum studied ( $p < 0.05$ ) except for demographic variables ( $p > 0.05$ ).

**Conclusion:** Our data shows that HSV-2 IgG seropositivity among pregnant women in Ranchi, Jharkhand is high; thus serological screening for HSV might be advisable for antenatal attendees for the possibility of HSV infection so that infectivity could be minimized by proper medication and vaccine should be introduced for HSV.

### Introduction

Herpes simplex virus (HSV) is classified in the alpha virinae subfamily within the

family Herpesviridae. Herpes simplex virus (HSV) is neurotropic virus that has a large linear, double-stranded DNA genome (1). Two closely-related viruses are designated HSV types 1 and 2. HSV-1 is the usual cause of orolabial infection (gingivostomatitis or herpes labialis), whereas HSV-2 is the major cause of genital infection. However, either virus can infect either location (3). Genital herpes infection is the primary cause of genital ulcer disease (GUD) (2) worldwide mainly caused by herpes simplex virus type 2 (HSV-2). In recent years, genital herpes has become an increasing common sexually transmitted infection (7). A primary symptomatic genital herpes infection is usually the most severe, especially in women. It causes blistering and ulceration of the external genitalia and cervix leading to vulval pain, dysuria, vaginal discharge and local lymphadenopathy [4]. Intra-uterine herpes simplex virus infection can cause significant morbidity and mortality in the developing fetus if the pregnant mother gets acute infection during pregnancy, the acquisition of genital herpes during pregnancy result in spontaneous abortion, stillbirth, intrauterine growth retardation, preterm labour, congenital and neonatal herpes infections [5]. Pregnant women then become a target for surveillance of the infection in order to avoid the risk of

neonatal transmission. Seroprevalence studies showed wide variations in infection rates by geographic location (6). The antibody response to HSV glycoprotein G (IgG) is highly specific, and IgG-based assays can accurately determine whether individuals have past infection with HSV-1 and/or HSV-2 (8,9). From the late 1970s, HSV-2 seroprevalence in the US has increased by 30%, resulting in one out of five adults is infected (12). Comparing the developing countries, substantially higher rates of HSV2 have been observed in sub-Saharan Africa, here prevalence in adults ranges from 30% to 80% in women, and more than 80% of female commercial sex workers are infected (7). In South America, available data are mainly for women, in whom HSV2 prevalence ranges from 20% to 40%. Prevalence in the general population of Asian countries shows lower incidence, from 10% to 40% (10) Regarding pregnant population, there is a high prevalence of genital herpes, among pregnant women, HSV-2 seroprevalence rates between 6.2% - 24.4% have been reported [11]. Thus this study aims to determine presence of anti-HSV-2 IgG among pregnant women and study the correlation with different parameters like age, area of residence, duration of pregnancy and history of abortions.

### Materials and Methods

#### Design

This was a cross-sectional study conducted at ICMR Grade

II VRDL, Department of Microbiology, Rajendra Institute of Medical Sciences, Ranchi, Jharkhand. The study population consisted of all pregnant women aged (16-40) years old with mean age 24.7 years. The period of the study was three years (October 2012 to September 2015). Information on age, month of pregnancy, residence, history of abortion and gravida was recorded by personal interview. Ethical approval was taken from research ethical board.

**Experimental work**

Serum specimens were collected from pregnant women, and screened for Herpes simplex virus type -2 IgG antibodies using ELISA (Calbiotech) technique at ICMR Viral Diagnostic and Research Laboratory, Department of Microbiology, RIMS, Ranchi

**Collection of specimens**

Three milliliters of blood were collected under aseptic technique into plain container, the sera were separated after centrifugation at 1500 rpm for 10 minutes and stored frozen until serological examination was performed.

**Testing of samples for HSV-2 IgG**

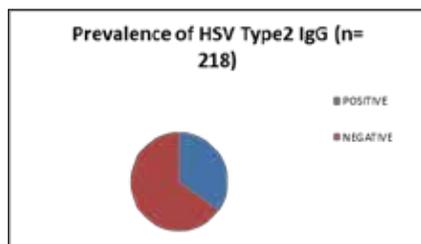
The serum samples were tested for the presence of HSV-2 IgG antibodies using Calbiotech ELISA kits. Sample Optical density (OD) was read at 450nm using ELISA reader within 15 minutes. The samples were diagnosed as per the pack insert.

**Statistical analysis:**

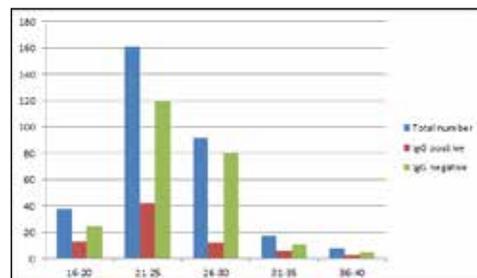
Data obtained in this study were analyzed using CHI-Square. A statistically significant difference was considered if  $P < 0.05$  was obtained.

**Results**

**Figure\_1: Seroprevalence of herpes simplex virus\_2 IgG among pregnant women (n=218).**



A total of 218 pregnant women, attending Rajendra Institute of Medical Sciences, Ranchi, during October 2012 to September 2015, were included in this study. Their mean age was 24.7 years. The results revealed that the rate of anti-herpes simplex type 2 IgG antibody among pregnant women was 76 out of 218 (34.86%), while 142 out of 218 (65.13%) were negative. (fig\_1)



**Figure\_ 2: Seroprevalence of herpes simplex virus 2 among pregnant women according to their age (n=218)**  
Evaluation of HSV-2 IgG antibodies according to age

showed a statistically significant correlation with seropositivity ( $P < 0.05$ ) (figure\_2). In our study, it was maximum in the age group 21-25 years (19.26%), followed by  $\leq 20$  years (5.96%), 26-30 years (5.70%), 31-35 years (2.75%) and 36-40 years (1.38%). (Table\_1).

**Table\_2 Seroprevalence of HSV-2 among pregnant women according to gestational age:**

Age	Gestation	Total number (%)	IgG Positive (%)	Statistics
First trimester		112(51.37)	51(57.12)	$\chi^2=11.63$ df = 2, $p < 0.05$
Second trimester		62(28.44)	14(22.58)	
Third trimester		44(20.18)	11(25.0)	
Total		218(100)	76(34.86)	

According to gestational age seroprevalence of HSV IgG group was 51 (57.12%), 14 (22.58%), and 11 (25.0%) for first, second and third trimester, respectively (table\_2). The positivity for HSV IgG indicates past infection of HSV, highest seropositivity of HSV IgG was observed among first trimester

**Table\_3 Seroprevalence of HSV-2 among pregnant women according to residency**

Residency	Total number (%)	IgG positive (%)	Statistics
Rural	161(73.85)	59(36.65)	$\chi^2= 0.86$ df = 1, $p > 0.05$
Urban	57(26.14)	17 (29.83)	
Total	218 (100)	76 (34.86)	

The demographic variables studied, like place of residence, failed to show any significant correlation with seropositivity of HSV-2 ( $P > 0.05$ ). (Table\_3)

**Table\_4 Seroprevalence of HSV-2 among pregnant women according to gravida**

Gravida	Total number (%)	IgG positive (%)	Statistics
Primigravida	145 (66.51)	68(46.90)	$\chi^2= 27.58$ df = 1, $p < 0.05$
Multigravida	73 (33.48)	8 (10.96)	
Total	218 (100)	76( 34.86)	

A statistically significant association between HSV-2 seropositivity and parity was found ( $P < 0.05$ ). 46.9% of primiparous females and 10.96% of multiparous females tested positive. (Table\_4)

**Table\_5 Seroprevalence of HSV-2 among pregnant women according to previous abortions**

Previous abortions	Total number (%)	IgG positive (%)	Statistics
With previous abortions	34 (15.59)	2(5.89)	$\chi^2= 29.26$ df = 1, $p < 0.05$
Without previous abortions	184 (84.4)	74(40.22)	
Total	218 (100)	76( 34.86)	

Seropositivity was found to be associated with history of previous abortions ( $P < 0.05$ ). 5.89% of the cases with

history of abortions tested positive for antibodies to HSV-2, whereas 40.22% cases had no history of abortion. (Table\_5).

Out of the total, 69(31.7%) pregnant women had symptoms like discharge and no other lesion was observed in any pregnant women in this study. None of our cases tested positive for HIV.

### Discussion

Epidemiology of genital herpes varies between different countries and between groups of individuals depending on the demographic and clinical characteristics of the population. The seroprevalence of HSV-2 antibodies is an accurate method of determining the epidemiology of this infection. In this study, seroprevalence of anti- HSV-2 IgG antibodies among pregnant women was 34.86% and the present results were consistent with the study done by El-Amin et al (2013), in Sudan who found 45 (34.6%) positive for the IgG of Herpes virus out of 130 pregnant women (13) but lower than studies of Omer et al (2015), in India who reported that 124(64.9%) samples were positive for HSV IgG out of 191 pregnant women (14). Prevalence in developing Asian countries appears to be lower (10–30%) (15) Maitra and Gupta (16) found a seroprevalence of 23.3%. Compared to this study the results of other researcher (Al-Marziqi et al.) (17). who reported seroprevalence rate of (22.2%). Our study higher than other study done by Abul-Razak et al (2013), found seropositivity of 2.2% (18) while Idress, et al., (2015) showed 63.3%seropositivity in Sudanese pregnant women (19). Rathore et al reported that (7.5%) of Indian pregnant women were positive for anti-HSV-2 IgG antibodies (20), another study in northeast India, found that the seropositivity rate of anti-HSV-2 IgG among pregnant women was 8.7% (21). The results also showed that the seroprevalence of HSV-2 infection was significantly associated with age, duration of pregnancy, gravida and previous history of abortion. This seroprevalence rate reflects that many pregnant women have already been in contact with the virus HSV-2 without having the ability to date the time of infection. As subclinical forms are found more, many patients carry antibodies without any memory of the initial herpes. The risk of transmission is higher in case of herpes lesions during primary infection or reactivation. In this context, the presence of ulceration, especially near term of pregnancy, should prompt the obstetrician to ask a herpes serology to confirm or refute the clinical diagnosis. This will have the advantage of earlier diagnosis and decision-making to improve the management and thereby reduce the risk of transmission to the newborn.

### Conclusion

This study revealed high sero-frequency of HSV IgG among pregnant ladies, further studies using advanced techniques is important to validate this result. Therefore, it is necessary to diagnose the pregnant women for the possibility of HSV infection so that it could be minimized by proper medication. We also believe that health awareness and personal hygiene will be helpful to decrease the risk of HSV infection in pregnant women. Results in this study denote that immunity to Herpes develops early in life. We could not state with certainty when but probably in childhood because children in the tropics generally meet with many viral illnesses in the environment. Neonatal Herpes infection was not documented in this study and this is partly due to the small number of candidates in the study.

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