

Prevalence of Herpes Simplex Virus in Pregnant Women from Gangetic Plain Region of Allahabad, India

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Abstract

Herpes Simplex Virus (HSV) is a common pathogen that leads to lifelong latent infection and may be associated with transmission from mother to their fetus. A total of 191 blood samples of pregnant women were collected to check the prevalence of Herpes Simplex Virus (HSV). It was observed that 124 (64.9%) and 04 (2.1%) samples were positive for HSV IgG and HSV IgM, respectively. Seropositivity of HSV IgG was the highest for third trimester and it was followed by second and first trimester; while it was the highest for first trimester for HSV IgM and it was followed by third and second trimester. Seroprevalence of HSV IgG and IgM was statistically insignificant ($P > 0.05$) according to gestation age. A significant correlation was observed between HSV IgG and age groups of pregnant women; while it was insignificant for HSV IgM. Seroprevalence of HSV IgG⁺ IgM⁻ was 32 (53.3%), 61 (66.3%), and 27 (69.2%) for first, second and third trimester, respectively. Seroprevalence of HSV IgG⁺ IgM⁺ group was 02 (3.3%), 01 (1.1%) and 01 (2.6%) for first, second and third trimester, respectively. Seroprevalence of HSV IgG⁻ IgM⁻ group was 26 (43.3%), 30 (32.6%), and 11 (28.2%) for first, second and third trimester, respectively.

Keywords

Herpes Simplex Virus, Seroprevalence, IgG, IgM, Quantitative ELISA

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1. Introduction

Viral infections mainly rubella, cytomegalovirus and herpes simplex virus (HSV) account for major part of maternal infections causing unfavourable outcome of pregnancy [1]. HSV infections are among one of the most common infectious diseases in the humans [2]. Primary infection of HSV acquired by women during pregnancy accounts for half of the morbidity and mortality among neonates; while the remaining half result from the reactivation of an old infection [3]. HSV infections are caused by two strains: HSV-1 and HSV-2. Infections with both strains are widespread in all human populations and result in persistent and latent infections. HSV-1 is commonly responsible for orofacial infections and is usually transmitted during childhood and adolescence [4]; HSV-2 is more likely to cause genital lesions [5]. Genital herpes may also be caused by HSV-1 [6]. Genital HSV infection is one of the most common sexually transmitted diseases [7]. After initial infection, the virus can reside as life-long virus and remains latent until the opportunity for recurrence, thus genital herpes is generally a recurrent and incurable viral disease [1]. The majority of both primary and recurrent infections are asymptomatic diseases [8]; however, in symptomatic cases, lesions are very painful [9] and obviously affect the quality of the life in patients [10]. HSV can easily spread in populations because of asymptomatic nature of disease, and is a suitable marker to evaluate the sexual behaviours [9]. It was reported that 70% of newborn with neonatal herpes infection were infected by their asymptomatic mothers [11].

Primary genital HSV-1 or HSV-2 infection in pregnant women can result in abortion, premature labor, congenital and neonatal herpes [12]. HSV-1 is usually acquired through direct contact with infected lesions or body fluids; typically saliva [13]. Primary HSV-1 infections in children are either asymptomatic or following an incubation period of about one week which can give rise to mucocutaneous vesicular eruptions [14]. Neonatal infection with HSV is symptomatic in almost all cases and divided into localised, central nervous system (CNS) disease and disseminated disease. Localised congenital HSV infection is limited to the skin, eye or mouth; whereas CNS disease results in encephalitis, and disseminated disease leads to multiple organ damage [15]. It has also been reported that 80% of infants with disseminated disease die without treatment, and those who survive are often suffering damaged brain [16].

The information on HSV and its seroprevalence in pregnant women is very limited in gangetic plain regions of India. The objectives of the present experiment were to study seroprevalence of HSV (IgG and IgM antibodies) in pregnant women of gangetic plain regions of India and its correlation to gestation age and age groups.

2. Materials and Methods

2.1. Sample Collection and Analysis

Blood samples from pregnant women were collected by venepuncture in containers under strict aseptic precaution. A total of 191 samples during November 2012 to February 2014 were collected from Arogya Niketan obstetric clinic, Lukerganj in Allahabad, India. Collected samples were centrifuged at 1500 rpm for 10 minutes to separate serum. Serum samples were then kept at -20°C until assayed. Sera samples using Mago4 analyser were screened for the presence of HSV IgM and IgG antibodies by quantitative full automated processing of Enzyme Linked Immunosorbent Assay (ELISA).

2.2. Interpretation of Results

A negative result indicated that there was no prior exposure to HSV. A positive result indicated that there was a prior exposure to HSV at some undetermined time. A highly positive result may indicate acute or recent disease.

2.3. Statistical Analysis

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

3. Results and Discussion

A total of 124 (64.9%) and 04 (2.1%) out of 191 samples were positive for HSV IgG and HSV IgM, respectively. The positivity for HSV IgG indicates past infection of HSV, and our findings are similar with the previous study [17]. The positivity for HSV IgM indicates current or recent infection of HSV as also reported in another study

[18]. According to gestation age of pregnant women, seropositive of HSV IgG was the highest for third trimester followed by second and first trimester (Table 1). Seropositive of HSV IgM was the highest for first trimester followed by third and second trimester (Table 1). The findings of seropositivity of HSV IgM for first trimester are in accordance to previous study [18]. Seroprevalence of HSV IgG (P = 0.2404) and HSV IgM (P = 0.6229) in relation to gestation age was statistically insignificant. Some of the previous reports have indicated lower seropositivity rate of HSV IgM [19]-[22]; while some other reports have indicated much higher seropositivity [23]-[25] than our findings.

Seropositivity of HSV IgG was 100% for the age group 36 - 40 years and it was followed by the age groups 21 - 25, 31 - 35, 26 - 30 and ≤20 years, respectively (Table 2). One of the previous studies has also shown the 100 % seropositivity of HSV IgG in the age group of 36 - 40 years [26]. A significant correlation was observed between HSV IgG and age groups of pregnant women; while it was insignificant for HSV IgM (Table 2). Seropositivity for HSV IgM was only positive in the age group of 21 - 25 years (Table 2).

The seropositivity of IgG⁺/IgM⁻ was the highest in third trimester and it was followed by second and first trimester; while seropositivity was the highest in the first trimester for IgG⁺/IgM⁺ and IgG⁻/IgM⁻ (Table 3). Primary HSV infection during first half of pregnancy is associated with an increased frequency of spontaneous abortion, still birth, and congenital malformation [3] (Table 3).

4. Conclusion

A high seroprevalence of Herpes Simplex Virus was detected in the examined samples. It was much higher for IgG compared to IgM. Therefore, it is necessary to diagnose the pregnant women for the possibility of HSV in-

Table 1. Seroprevalence of HSV IgG & IgM in pregnant women according to gestation age.

Gestational age	Total number (%)	HSV IgG		HSV IgM	
		Positive (%)	Negative (%)	Positive (%)	Negative (%)
First trimester	60 (31.4)	34 (56.7)	26 (43.3)	02 (3.3)	58 (97.7)
Second trimester	92 (48.2)	62 (67.4)	30 (32.6)	01 (1.1)	91 (98.9)
Third trimester	39 (20.4)	28 (71.8)	11 (28.2)	01 (2.6)	38 (97.4)
	191	P-value = 0.2404		P-value = 0.6229	

Table 2. Seroprevalence of HSV IgG and IgM according to age groups of pregnant women.

Age group (years)	Total number	HSV IgG		HSV IgM	
		Positive (%)	Negative (%)	Positive (%)	Negative (%)
≤ 20	18	08 (44.4)	10 (55.6)	00 (00)	18 (100)
21 - 25	115	86 (74.8)	29 (25.2)	04 (3.5)	111 (96.5)
26 - 30	45	26 (57.8)	19 (42.2)	00 (00)	45 (100)
31 - 35	11	08 (72.7)	03 (27.3)	00 (00)	11 (100)
36 - 40	02	02 (100)	00 (00)	00 (00)	02 (100)
	191	P-value = 0.0364		P-value = 0.6092	

Table 3. Distribution of three groups of HSV IgG/IgM in pregnant women according to gestation age.

Gestation age	Total number (%)	IgG ⁺ /IgM ⁻ (%)	IgG ⁺ /IgM ⁺ (%)	IgG ⁻ /IgM ⁻ (%)
First trimester	60 (31.4)	32 (53.3)	02 (3.3)	26 (43.3)
Second trimester	92 (48.2)	61 (66.3)	01 (1.1)	30 (32.6)
Third trimester	39 (20.4)	27 (69.2)	01 (2.6)	11 (28.2)
	191	P value = 0.3966		

fection 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.

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