

Association of IgG Antibody with Herpes Simplex Virus Type-2 among Women Having Spontaneous Abortion & Normal Delivery

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Abstract

Background: HSV-2 is a common human pathogen that leads to lifelong latent infection. Infection with HSV-2 is one of the most common sexually transmitted infections. Maternal infections may be associated with transmission to the fetus as the infection is common in women of reproductive age. It can be contracted and transmitted to the fetus during pregnancy and the newborn. The greatest risk for miscarriage, premature labour, inhibited fetal growth or transmission of the herpes infection to the infant cause of neonatal infection, which can lead to death or long-term disabilities.

Objective: To estimate IgG antibody to Herpes Simplex Virus type 2 in women with spontaneous abortion and women with normal delivery.

Methods: This Cross-sectional study carried out among 40 patients (group-I) with spontaneous abortion and 40 patients (group-II) of normal delivery attended at the department of Obs & Gynae, Gonoshasthaya Samaj Vittik Medical College Hospital, Savar, Dhaka, Bangladesh for a period of 1 years from July 2015 to June 2016. Laboratory facilities were availed from the Molecular Biology Laboratory, Institute of Biological Sciences, the University of Rajshahi, Bangladesh and the Department of Microbiology, Gonoshasthaya Samaj Vittik Medical College & Hospital.

Results: The mean age was found 25.5±5.7 years in group I and 25.2±5.5 years in group II. The mean age was not statistically significant ($p>0.05$) between two groups. Anti-HSV-2-IgG was found among 10(25%) women with spontaneous abortion (group I) and 7(17.5%) women with normal delivery (group II). The difference of the result was not statistically significant ($p>0.05$) between two groups. The highest rate of past history of abortion was found in 6(37.5%) cases out of total 16 seropositive women with spontaneous abortion group (group I). History of abortion was higher in spontaneous abortion group (group I) but not statistically significant ($p>0.05$).

Conclusion: The seroprevalence of HSV-2 was relatively high in women with spontaneous abortion. Sero positive HSV-2 antibodies occurred at highest rate in age group 18-23 years old in both group.

Keywords: HSV-2, Spontaneous Abortion, Normal delivery

Introduction

Earlier and recent reports globally, as well as in

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Bangladesh, have shown increasing rates of prevalence of HSV-2 infection. The acquisition of genital herpes during pregnancy has been associated with spontaneous abortion, intrauterine growth retardation, pre-term labour, congenital and neonatal herpes infections. Pregnancy loss in human has been attributed to several factors. Genetic and uterine abnormalities, endocrine and immunological dysfunctions, infectious agents, environmental pollutants, psychogenetic factors and endometriosis are most important causes of spontaneous abortion¹. Some maternal infections, especially during the early gestation, can result in fetal loss or malformations because the ability of the fetus to resist infectious organisms is limited and the fetal immune system is unable to prevent the dissemination of infectious organisms to various tissues¹. Recurrent pregnancy wastage due to maternal infections transmissible in utero at various stage of gestation can be caused by a wide array of organisms including the TORCH complex (Toxoplasma gondii, Rubella virus, Cytomegalovirus, Herpes simplex viruses) and other agents like *Chlamydia trachomatis*, *Treponema pallidum*, *Niesseria gonorrhoeae*, HIV, *Coxiella burnetii* etc.¹

The ability of these viruses to cross the placenta, infect the foetus and cause the damage depends on the mother's immune status against the specific virus although primary infections during pregnancy are known to be significantly more damaging than secondary infections or reactivations, the trimester in which the infection occurred is also a determining factor.²

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 oro-fecal infections and is usually transmitted during childhood and adolescence and HSV-2 is more likely to cause genital lesions³. Genital HSV infection is one of the most common sexually transmitted diseases. 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.⁴ The majority of both primary and recurrent infections are asymptomatic diseases, however, in symptomatic cases, lesions are very painful⁵ and obviously affect the quality of the life in patients. HSV can easily spread in populations because of asymptomatic nature of disease and is a suitable marker to evaluate the sexual behaviours.⁵

HSV-2 infection in pregnant women can result in abortion, premature labor, congenital and neonatal herpes⁶. Herpes simplex virus type 2 (HSV-2) is the major cause of genital herpes; 78-97% of HSV-2 infections are asymptomatic⁷. The worldwide prevalence of HSV-2 seropositivity is alarmingly high especially among women of reproductive age group. Antibodies to HSV-2 have been detected in approximately 20% of pregnant women; however, only 5% reported a history of symptomatic infection.⁸

Global prevalence of Herpes Simplex Virus type 2 (HSV-2) infections is calculated to be 16.2%. In Bangladesh, screening pregnant women for these infections are only carried out upon a clinician's request which has contributed to the lack of data on the prevalence of Herpes Simplex-2 viruses in pregnant women in the country. In our country, there are very few studies relating to HSV-2 prevalence, 11.71% reported by Nabi *et al.* and 12% by Bogaerts *et al.*^{9,10} The acquisition of genital herpes during pregnancy has been associated with spontaneous abortion, intrauterine growth retardation, pre-term labour, congenital and neonatal herpes infections.

The information on HSV and its sero-prevalence in pregnant women is very limited in Bangladesh. Information on the occurrence of asymptomatic HSV-2 infection among pregnant women in our region is scanty. Keeping the above facts in mind, this study was undertaken to determine the occurrence of genital HSV-2 infection among asymptomatic pregnant women and HSV-2 shedding during the birth of the child. The objectives of the present experiment were to study the sero-prevalence of HSV (IgG antibodies) in pregnant women of Bangladesh

and its correlation to age groups.

The information's emerging from this study might be useful background information for further large scale study in defining the extent of problem for development of interventional strategy and it will extend the number of few studies that have been carried out on the general population regarding Herpes Simplex Virus type 2 infections in pregnant women.

Materials and Methods

This was a cross-sectional study for a period of 1 years from July 2015 to June 2016 carried out in the Molecular Biology Laboratory, Institute of Biological Sciences, University of Rajshahi, Bangladesh availing the Laboratory facilities of the Department of Microbiology, Gonoshasthaya Samaj Vittik Medical College & Hospital, Savar, Dhaka, Bangladesh. Women with spontaneous abortion (40 patients, group I) and women with normal delivery (40 patients, group II) attending at Gonoshasthaya Samaj Vittik Medical College Hospital, Savar, Dhaka, Bangladesh during the study period. Patients having induced abortion, therapeutic abortion and criminal abortion were excluded from the study.

Serum IgG antibody against Herpes Simplex Virus type 2 was measured by ELISA method following the instructions provided by manufacturers along with it. Statistical analyses were carried out by using the Statistical Package for Social Sciences version 20.0v for Windows (SPSS Inc., Chicago, Illinois, USA). Unpaired t-test and chi square test were performed for continuous and categorical variable respectively. A "p" value <0.05 was considered as significant.

Results

Table 1: Distribution of study population(women with spontaneous abortion and normal delivery) by age (n=80)

Variable	Group-I (n=40)		Group-II (n=40)		P value
	f	%	f	%	
Age (in years)					
18-23	19	47.5	17	42.5	0.873
24-29	12	30.0	15	37.5	
30-35	7	17.5	6	15.0	
36-40	2	5.0	2	5.0	
Mean±SDRange (Min-max)	25.0±5.7 (18-40)		25.2±5.5 (18-40)		

Table 1 Showed almost half (47.5%) patients belonged to age 18-23 years in group I and 17(42.5%) in group II. The mean age was calculated to be 25.5±5.7 years in group I and 25.2±5.5 years in group II.

Table 2. Distribution of study population (women with spontaneous abortion and normal delivery) by HSV-2 antibodies sero-prevalence (n=80)

Sero-prevalence of HSV-2 antibodies	Group-I (n=40)		Group-II (n=40)		P value
	f	%	f	%	
IgG (+)	10	25.0	7	17.5	0.331
IgG (-)	24	60.0	29	72.5	

Table 2 showed the anti-HSV-2-IgG was found in 25 % of women with spontaneous abortion (group I). Regarding the women with normal delivery (group II), IgG was 17.5 % .other 24 women (60%) in group I and 29 women (72.5%) in group II was IgG negative. Rest of the 6 sample in group I and 4 sample of group II, IgM was positive which was not included in the current study. The difference of the result was not statistically significant ($p>0.05$) between two groups.

Discussion

In this study the mean age was found 25.5 ± 5.7 years in group I and 25.2 ± 5.5 years in group II. The findings of this study were very similar to the findings of Abdulla who found 50.0% women were aged 18-23 years.¹¹ Biskup *et al.* reported that the HSV-2 seroprevalence increases simultaneously from puberty onwards and in the age group > 56 years in the women's group it reaches 50.0%.¹² A study by Aljumaili *et al.* showed a significant variation in current HSV 2 infection between age groups, the highest incidence in women with age of 20-29 years old, while the lowest rate in women of < 19 years old, which were consistent with the current study.¹³ On the other hand Kim *et al.* reported that the mean age was 31.6 ± 4.6 years in the HSV-2 positive group and 30.4 ± 4.2 years in the healthy control group, which was higher than the findings of the current study.¹⁴ It was observed that anti-HSV-2-IgG was found in 25 % of women with spontaneous abortion (group I). Regarding the women with normal delivery (group II), the rate of IgG is 17.5%. In a Saudi study by Al-Marzoqi *et al.* revealed Toxoplasma IgG antibodies were detected in 35.6%, CMV total IgG antibodies were found in 92.1%, rubella IgG antibodies in 93.3%, HSV-1 IgG antibodies in 90.9%, HSV-2 IgG in 27.1% which was similar to the current study.¹⁵ Abdulla in his study showed that anti-HSV-2-IgG is 35.22 % ,which was higher than the current study.¹¹ Regarding the control group, the rate of IgG was 22.38 % and almost same to the current study. On the other hand Ariani & Chaichi studied on 150 women; only 2.7 % were IgG and IgM positive for HSV virus, which was lower than the findings of the current study.¹⁶

Conclusion

The seroprevalence of HSV-2 was relatively high in women with spontaneous abortion. Sero positive HSV-2 antibodies occurred at highest rate in age group 18-23 years old in both group. Past history of abortion and 1st trimester was more common in women with HSV-2

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