

# Relation of IgM Antibody with Herpes Simplex Virus Type-2 among Women with Spontaneous Abortion and Normal Delivery

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## ABSTRACT

**Background:** HSV-2 is one of the most common sexually transmitted infections and that leads to lifelong latent infection. Maternal infections may be associated with transmission to the fetus Because 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. Earlier and recent reports globally, as well as in 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. To estimate IgM antibody to Herpes Simplex Virus type 2 in women with spontaneous abortion and normal delivery.

**Materials and methods:** This cross-sectional study carried out among 40 patients (Group-I) with spontaneous abortion and 40 patients (Group-II) of normal delivery 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 and Department of Obs & Gynae, Gonoshasthaya Samaj Vittik Medical College and Hospital, Savar, Dhaka, Bangladesh.

**Results:** The mean age was found  $25.5 \pm 5.7$  years in group I and  $25.2 \pm 5.5$  years in group II. The mean age was not statistically significant ( $p > 0.05$ ) between two groups. Women with spontaneous abortion (Group I) Anti-HSV-2-IgM 03(7.5 %). Regarding the women with normal delivery (Group II) IgM (0.00%). The difference of the result was not statistically significant ( $p > 0.05$ ) between two groups due to small sample size. The highest rate of past history of abortion was found 6(37.5%) 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 ( $p > 0.05$ ) due to small sample size. Highest rate of abortion was occurred in 1<sup>st</sup> trimester in both groups, however the difference was not statistically significant ( $p > 0.05$ ) between two groups.

**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.

## KEY WORDS

Anti HSV-2 IgM; Normal delivery; Spontaneous abortion.

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## INTRODUCTION

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 abortion.<sup>1</sup> 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 tissues.<sup>1</sup> 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.<sup>1</sup>

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.<sup>2</sup> 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.

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. HSV-2 is more likely to cause genital lesions.<sup>3</sup> Genital HSV infection is one of the most common sexually transmitted diseases (Howard et al. 2007). 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.<sup>4</sup> The majority of both primary and recurrent infections are asymptomatic diseases, however, in symptomatic cases, lesions are very painful and obviously affect the quality of the life in patients.<sup>5-7</sup> HSV can easily spread in populations because of asymptomatic nature of disease and is a suitable marker to evaluate the sexual behaviours.<sup>6</sup>

HSV-2 infection in pregnant women can result in abortion, premature labor, congenital and neonatal herpes.<sup>8</sup> Herpes simplex virus type 2 (HSV-2) is the major cause of genital herpes; 78-97% of HSV-2 infections are asymptomatic.<sup>9</sup>

The worldwide prevalence of HSV-2 seropositivity is alarmingly high, especially among women of reproductive age group.<sup>10</sup> Antibodies to HSV-2 have been detected in approximately 20% of pregnant women, however, only 5 % reported a history of symptomatic infection.

Global prevalence of Herpes Simplex Virus type 2 (HSV-2) infection is calculated to be 16.2% in Bulletin of WHO, 2008. 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.*<sup>11,12</sup> 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-2 (IgM antibodies) in pregnant women of Bangladesh and its correlation to age groups.

As far as our knowledge goes, there is no previous study to detect the prevalence of HSV-2 markers in women with spontaneous abortion and normal delivery in Bangladesh. So, this study is designed to determine the sero-prevalence of HSV-2 markers in women with spontaneous abortion and normal delivery.

The information's emerging from this study might be a 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 infection in pregnant women. To estimate IgM antibody to Herpes Simplex Virus type 2 in women with spontaneous abortion and normal delivery.

## 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 and purposive sampling was done. 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 IgM 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 I** 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
	n	%	n	%	
Age (In years)					
18-23	19	47.5	17	42.5	
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 $\pm$ SD	25.0 $\pm$ 5.7		25.2 $\pm$ 5.5		0.873 <sup>ns</sup>
Range (Min-max)	(18-40)		(18-40)		

Table I 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 $\pm$ 5.7 years in group I and 25.2 $\pm$ 5.5 years in group II.

ns: not significant.

**Table II** 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
	n	%	n	%	
IgM (+)	06	15.0	04	10.0	0.498 <sup>ns</sup>
IgM (-)	34	85.0	36	90.0	

Table II showed the anti-HSV-2-IgM was found in 15 % of women with spontaneous abortion (Group I). Regarding the women with normal delivery (Group II), IgM was 10.0 % .other 34 women (85%) in group I and 36 women (90.0%) in group II was IgM negative. The difference of the result was not statistically significant (p>0.05) between two groups.

ns: not significant.

## DISCUSSION

In this study the mean age was found 25.5 $\pm$ 5.7 years in group I and 25.2 $\pm$ 5.5 years in group II. Our above findings are very similar to the findings of Abdulla who found 50.0% women were aged 18-23 years.<sup>13</sup> 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%.<sup>14</sup> 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.<sup>15</sup> On the other hand Kim et al. reported that the mean age was 31.6 $\pm$ 4.6 years in the HSV-2 positive group and 30.4 $\pm$ 4.2 years in the healthy

control group, which was higher than the findings of the current study.<sup>16</sup> It was observed that anti-HSV-2-IgM was found in 15 % of women with spontaneous abortion (Group I). Regarding the women with normal delivery (Group II) the rate of IgM is 10.0%. In a Saudi study by Al-Marzoqi et al. revealed Toxoplasma IgM antibodies were detected in 35.6%, CMV total IgM antibodies were found in 92.1%, rubella IgG antibodies in 93.3%, HSV-1 IgG antibodies in 90.9%, HSV-2 IgM in 27.1% which was similar to the current study.<sup>17</sup> Abdulla in his study showed that anti-HSV-2-IgM is 35.22%, which was higher than the current study.<sup>13</sup> Regarding the control group, the rate of IgM was 15.38 % 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.<sup>18,19</sup>

## LIMITATION

This study had its limitation of being a cross sectional study one. Data from a single centre does not reflect the actual scenario.

## 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 1<sup>st</sup> trimester was more common in women with HSV-2.

## RECOMMENDATION

Further multicenter research works are recommended with the inclusion of large number of sample size for actual picture.

## DISCLOSURE

All the authors declared no competing interest.

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