

**ORIGINAL RESEARCH**

# Serological and Demographic study of herpes simplex virus-2 in women with bad obstetric history

<sup>1</sup>Dr. Shaik Meharunnisa Begum, <sup>2</sup>Dr. Chintapalli Suryamani, <sup>3</sup>Dr. Juveria Sultana, <sup>4</sup>Dr. L. Jayalakshmi, <sup>5</sup>Dr. R. Kondal Rao

<sup>1</sup>Assistant Professor, Department of Microbiology, Osmania Medical College, Hyderabad, Telangana, India

<sup>2</sup>Assistant Professor, Department of Microbiology, Government Medical College, Vizianagaram, Andhra Pradesh, India

<sup>3</sup>Senior Resident, Department of Microbiology, Government Medical College, Kothagudem, Telangana, India

<sup>4</sup>Associate Professor, Department of Microbiology, Government Medical College, Eluru, Andhra Pradesh, India

<sup>5</sup>Professor, Department of Microbiology, Government Medical College, Suryapet, Telangana, India

## Corresponding Author

Dr. Shaik Meharunnisa Begum

Assistant Professor, Department of Microbiology, Osmania Medical College, Hyderabad, Telangana, India

Received: 12 March, 2023

Accepted: 18 April, 2023

## ABSTRACT

**Context:** Herpes genitalis is the most common viral sexually transmitted disease worldwide. It is caused by Herpes simplex virus-2 (HSV-2) and also increasingly the Herpes simplex virus-1 (HSV-1). Maternal infections play a critical role in pregnancy wastage and their occurrence in patients with Bad Obstetric History (BOH) is a significant factor. **Aim:** The aim of the study is to evaluate the seroprevalence and demographic factors contributing to HSV-2 in pregnant women with BOH. **Methods and Materials:** A Cross sectional study was conducted on 90 pregnant women with BOH during March 2018 to August 2018. blood samples were collected after taking informed consent and tested by ELISA method to detect HSV-2 IgM and IgG antibodies. Enrolled participants history was collected in the designed data collection form.

**Results:** Out of the 90 blood samples screened, the seropositivity for HSV-2 IgM was 5 (5.6%), IgG was 9 (10%) while both IgM & IgG in 2 cases (2.3%). The predominant clinical presentation responsible for BOH with HSV-2 infection were abortions in 8 cases (50%) followed by IUD 5 (31.2%) and still births in 3 cases (18.8%). Women in the age group of 25-30 years had shown the high seropositivity of HSV-2 followed by 19 - 24 years. Majority of BOH cases belonged to lower socioeconomic group 60 (66.7%).

**Conclusions:** Association of HSV-2 seropositivity and bad obstetric outcome among low socio-economic groups suggests inclusion of TORCH profile in regular antenatal checkup along with good personal hygiene which helps in reducing the adverse fetal outcomes. Knowing the epidemiology and demographic factors are important aspects in developing new strategies and appropriate implementation for the prevention of HSV infections.

**Key words:** Bad obstetric history, HSV-2, IgG, IgM, seropositivity

---

This is an open access journal, and articles are distributed under the terms of the Creative Commons Attribution-Non Commercial-Share Alike 4.0 License, which allows others to remix, tweak, and build upon the work non-commercially, as long as appropriate credit is given and the new creations are licensed under the identical terms.

---

## INTRODUCTION

Perinatal infections account for 2% to 3% of all congenital anomalies. TORCH, which includes Toxoplasmosis, Others (syphilis, varicella-zoster, parvovirus B19, Human Immunodeficiency Virus and Hepatitis B virus), Rubella, Cytomegalovirus and Herpes infections are of the most common infections associated with unfavorable outcome of pregnancy<sup>1</sup>. Herpes genitalis is one of the most common sexually transmitted diseases<sup>2</sup>. Herpes simplex virus type 2 (HSV-2) is the major cause of genital herpes<sup>3</sup>. The

incidence of herpes simplex virus (HSV) infection has been increasing steadily in recent decades and concerns about perinatal HSV infections are growing among women of reproductive age because of the risk of transmission of the virus to their babies during pregnancy with potentially devastating consequences to the fetus<sup>4</sup>. HSV-1 predominates in orofacial lesions and is typically found in the trigeminal ganglia, whereas HSV-2 in the lumbosacral ganglia<sup>5</sup>. Young women may be increasingly likely to first acquire HSV-1 infection genitally or acquire a primary genital

HSV-2 infection during their child-bearing years and first-episode, primary HSV infection during pregnancy increases the risk of neonatal HSV transmission<sup>6,7</sup>. Bad obstetric history (BOH) implies previous unfavourable fetal outcome in terms of two or more consecutive spontaneous abortions, history of intrauterine fetal death, intrauterine growth retardation, stillbirths, early neonatal death and or congenital anomalies<sup>8</sup>. The causes of BOH may be genetic, hormonal, abnormal maternal immune response and maternal infection<sup>9</sup>. The present study was aimed to evaluate seroprevalence and demographic factors of HSV-2 infection in pregnant women with BOH.

**SUBJECTS AND METHODS**

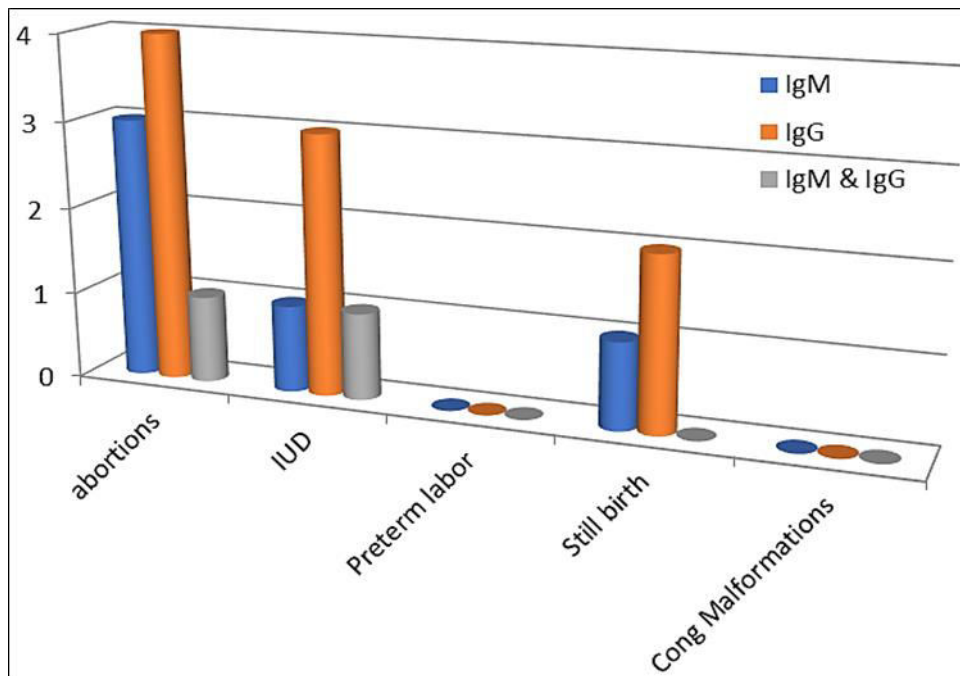
The present cross-sectional study had been conducted at a tertiary care centre, Warangal from March 2018-August 2018 to estimate the seroprevalence of HSV-2 infection among 90 pregnant women with BOH after obtaining the Institutional Ethics Committee approval. Pregnant women attending antenatal clinics with history of BOH were included and informed consent was taken from the participants. Medical Termination of pregnancies, other causes of abortions like cervical incompetence, Rh incompatibility and other medical disorders were excluded from the study. A study proforma prepared and patient’s information recorded accordingly where demographic features also taken. 5ml of blood was collected under aseptic precautions and serum was separated and used for

detection of IgM and IgG antibodies for HSV-2 infection by ELISA method using the commercial kits ENZYWELL, DIESSE Diagnostic, Monteriggioni (Siena)-Italy following the kit instructions. The optical density (OD) was read at 450 nm using ELISA reader. The index value of each determination was calculated by dividing the value of each sample by kit calibrator values. Sero-titres were interpreted as negative (<0.8), equivocal (0.8-1.2) and positive (>1.2) as per the literature supplied along with the kits. In case of equivocal results, the test was repeated on a fresh sample and if still equivocal, it was not included in data analysis.

**RESULTS**

Among 90 study group, seropositivity for HSV-2 was 16 (17.8%). HSV-2 IgM antibodies were found in 5 cases (5.6%), IgG in 9 cases (10%) and both IgM & IgG in 2 (2.3%) cases. The predominant clinical presentation responsible for bad obstetric history with HSV-2 infection was abortions in 8 cases (50%) followed by intrauterine deaths 5 (31.2%), still births in 3 cases (18.8%) as shown in (table-1, figure-1). Age group of 25-30 years had shown the maximum serological evidence of HSV-2 followed by the 19-24 years age group (table-2).

Maximum distribution of number of pregnancy losses was observed in third gravida followed by multi gravida (>4 pregnancy losses). In the present study, the low socioeconomic group and rural population showed majority of BOH cases (table-3).



**Fig1: Obstetric history of HSV-2 seropositive cases**

**Table1: Obstetric history of HSV- 2 seropositive cases (n =90)**

	HSV-2 Seropositivity			Total (%)
	IgM (%)	IgG (%)	IgG+IgM (%)	
Abortions	3 (3.4)	4 (4.4)	1 (1.1)	8 (8.9)

Intrauterine death (IUD)	1 (1.1)	3 (3.4)	1 (1.1)	5 (5.6)
Preterm labor	0 (0)	0(0)	0 (0)	0 (0)
Stillbirths	1 (1.1)	2 (2.2)	0 (0)	3 (3.4)
Congenital Malformations	0 (0)	0 (0)	0 (0)	0 (0)
Total	5(5.6)	9 (10)	2 (2.2)	16 (17.8)

**Table-2: Positive serological evidence of HSV-2 infection among Various age groups (N=90)**

Age Years	Total tested	Herpes simplex virus-2			
		IgM (%)	IgG (%)	IgM+IgG (%)	Total (%)
19-24	48	1 (1.1)	3 (3.3)	--	4 (4.4)
25-30	38	3 (3.4)	5 (5.6)	1 (1.1)	9 (10)
31-36	4	1 (1.1)	1 (1.1)	1 (1.1)	3 (3.3)
Total (%)	90	5 (5.6)	9 (10)	2 (2.2)	16 (17.8)

**Table3: Distribution of demographic characteristics of BOH cases(N=90)**

Maternal age	Number of participants	Percentage (%)
19-24	48	53.33%
25-30	38	42.22%
31-36	4	4.44%
Number of pregnancy Losses		
2	43	47.77%
3	22	24.44%
>3	25	27.77%
Residence		
Rural	80	88.88%
Urban	10	11.11%
Maternal Occupation		
Housewife	38	42.22%
Labourers	26	28.88%
Skilled workers	18	20%
Professionals	8	8.8%
Socioeconomic status		
Upper class	3	3.3%
Upper middle class	7	7.7%
Lower class	10	11.11%
Lower	60	66.66%

**Table4: Seropositivity of HSV-2 among various other studies**

Authors Name	Year of Study	IgM Seropositivity (%)
Turbadkar Detal	2003	3.6%
Chawla <i>et al.</i>	2008	8.6%
Shagufta <i>et al.</i>	2010	7.5
Biswas D <i>et al.</i>	2011	8.7%
Lavansinghet <i>al.</i>	2014	7.40%
Namrata Saxena <i>et al.</i>	2016	8.57%
Maimoona Mustafa	2017	10%
Present Study	2018	7.7%

**DISCUSSION**

In pregnancy, primary genital herpes infection manifests clinically in a manner similar to that in a

non-pregnant female but with an increased risk of dissemination and mortality<sup>10</sup>. In the present study, seropositivity is found to be higher in the age group 25-30 years followed by 19-24 years. Similar observations were found in the study of Rajendra B Surpamet *et al.*<sup>11</sup> (2006) where 52% of BOH cases belong to the age group of 26-30 years. Padmavathy M *et al.*<sup>12</sup> (2011) concluded maximum serological evidence of either IgM or IgG for HSV-2 with an age group of 25-30 years and similar observations seen in Alijumaili Z K M *et al.*<sup>13</sup>. Seropositivity of HSV-2 antibodies with relation to previous clinical presentations revealed that the HSV-2 seropositive patients had history of two or more spontaneous abortions was 8 (50%) while IUD were 5 (31.2%). Similar results concluded by Bhavesh R Falduet *et al.*<sup>14</sup> (2014) with n =150, the HSV-2 seropositivity with abortions as 23.5%. Shagufta Rathore *et al.*<sup>10</sup> (2010) with (19.56%) of the 46 cases with history of abortions tested positive for antibodies to HSV-2. Haider M *et al.*<sup>15</sup> (2011) observed, n=76 HSV-2 seropositive patients, a majority (89.4%) had a history of abortion. The present study observed seropositivity for HSV-2 IgM was 5(5.6%), IgG9 (10%) and both IgM, IgG 2 (2.2%). Dipankar Biswas *et al.*<sup>16</sup> (2011) showed 8.7% seroprevalence of HSV-2 infection. Bhavesh R Falduet *et al.*<sup>14</sup> study (2014) shown 10.7%, Namrata Saxena *et al.*<sup>17</sup> in 2016 shown 8.57% and Maimoona Mustafa *et al.*<sup>18</sup> in (2017) had shown seroprevalence of HSV-2 infection as 10%. Tiwari *et al.*<sup>19</sup> reported highest seropositivity for HSV-2 IgM. It was observed that the majority of high-risk pregnant women with seropositivity for HSV-2 infection were of younger age group residing in rural areas and of low socioeconomic status and more in housewives which was comparable to a study done by Rebekah *et al.*<sup>20</sup> and Turbadkar D *et al.*<sup>21</sup>.

## CONCLUSION

The present study showed that seropositivity for HSV-2 infection with high-risk factors was found to be associated with adverse perinatal outcomes. As it is not made a protocol for screening of HSV-2 routinely in antenatal checkups, it should be considered for BOH cases for diagnosis and management to get a better perinatal outcome. Significant observation was found between HSV-2 seroprevalence and socioeconomic factors and education levels. Screening and early diagnosis of HSV-2 infection in high-risk patients have a definite role in appropriate management to prevent perinatal morbidity and mortality.

## REFERENCES

1. Johnson P, Barnes R, Hart C, Francis W: Determinants of immunological responsiveness in recurrent spontaneous abortion. *Transpl*; 38(3):280-4, 1994.
2. Howard M, Sellors JW, Jang DI. Regional distribution of antibodies to herpes simplex virus type 1 (HSV-1) and HSV-2 in men and women in Ontario, Canada. *J Clin Microbiol* ;41:84-89,2003.
3. Duran N, Fugen Y, Cuneýt E, Fatih K. Asymptomatic herpes simplex virus type 2 (HSV-2) infection among pregnant women in Turkey. *Indian J Med Res*;120, 106-110,2004.
4. Duran N. Serological Evaluation of HSV-1 and HSV-2 Infection in Pregnancy. *Turk J Med Sci* 37: 97-101,2003.
5. Gupta R, Warren T, Wald A. 'Genital herpes', the *Lancet*.2007;370:2127-2137.
6. Kimberlin D.W. The Scar3let H. *J Infect Dis*. 2014;209:315-317.
7. Brown Z.A, Wald A, Morrow R.A. Effect of serologic status and Caesarean Delivery on Transmission Rates of Herpes Simplex Virus from Mother to Infant. *JAMA*. 2003;289(2):203-209.
8. Kumari N, Morris N, Dutta R: Isscreening of TORCH worthwhile in women with bad obstetric history: An observation from Eastern Nepal. *J Health, Pop Nutr*. 2011;29:77-80.
9. Meka A, Reddy BM. Recurrent spontaneous abortion: an overview of genetic and non-genetic background. *Int J Hum Gen*. 2006;6:109-17.
10. Rathore S, Jawwal A, Gupta V. Herpes simplex virus type-2: Seroprevalence in antenatal women. *Indian J Sex Transm Dis*. 2010;31(1):11-15.
11. Surpam R.B, Kmalakar U.P, Khadse R.K, Qazi M.S, Jalgaonkar S.V. Serological study for TORCH infections in women with bad obstetric history. *J Obstet Gynaecol India*. 2006;56(1):41-43
12. Padmavathy M, Mangala Gowri, Malini J, Umamathy B.L, Navneeth B.V, Mohit Bhatia, Shruthi Harle. Seroprevalence of TORCH Infections and Adverse Reproductive Outcome in Current.
13. Alijumaili Z.K.M, Alsamarai A.M, Najem W.S. Seroprevalence of Herpes simplex virus in women with BOH. *American J Dermatol & Venerol*. 2013;2(3):31-38.
14. Bhavesh R Faldu, Payal Panchal, Harshid L Patel, Alpesh Patel. Study of seropositivity for TORCH infection in women with BOH. *Int J Adv Res*. 2015;3(8):1324-1332.
15. Haider M, Rizvi M, Khan N, Malik A. Serological study of herpes virus infection in female patients with *Biology and Medicine*. 2011;3(2):284-290.
16. Sana Tiwari, Balbinder Singh Arora, Poornima Sen, Rupali Dewan. Current status of IgM seroprevalence in women with adverse reproductive outcomes in current pregnancy. *Int J Reprod Contracept Obstet Gynaecol*. 2016;5(10):3518-3521.
17. Namrata Saxena, Manju Lal, Garima Mittal. Is Screening of Torch worthwhile in women with BOH: An Observational Study from Himalayan Hospital. *Int J Biol Med Res*. 2016;7(2):5492-5494.

18. Maimona Mustafa, Qursheed Sultana, Nazima Begum, Madiha Nooren, Shafia Fatima. A study of TORCH Screening in women with BOH. *Int J Curr. Microbiol App Sci.* 2018;7(4):2155-2160
19. Sana Tiwari, Balvinder Singh Arora, Poornima Sen, Rupali Dewan. Current status of IgM seroprevalence in women with adverse reproductive outcomes in current pregnancy. *Int J Reprod Contracept Obstet Gynaecol.* 2016;5(10):3518-3521
20. Prasoona KR, Srinadh B, Sunitha T, *etal.* Seroprevalence and influence of torch infections in high risk pregnant women: a large study from
21. Turbadkar D, Mathur M, Rele M. Seroprevalence of torch infection in bad obstetric history. *Indian J Med. Microbiol.* 2003;21:108-110.