Journal of Pharmaceutical and Scientific Innovation
www.jpsionline.com
Research Article

SERO EVALUATION OF COINFECTION OF HIV AND HSV-2

VC Bharathi [1]*, Anaparty Usharani [2]
[1]Department of Microbiology, Siddhartha Medical College, Vijayawada, India
[2]Department of Microbiology, Rangaray Medical College, Kakinada, India
*Corresponding Author Email: usharani.anaparthy@gmail.com

DOI: 10.7897/2277-4572.04449

Received on: 20/06/15 Revised on: 18/07/15 Accepted on: 13/08/15

ABSTRACT

Prevalence of HSV-2 has been increasing since 1980s with emergence of HIV pandemic which has become a major public health problem in developing countries like India. Objectives of the study was to determine the sero prevalence of HSV-2 in HIV sero positive individuals attending ICTC, GGH, Vijayawada AP, India and to find out influence of risk factors like promiscuity, occupation, migration and illiteracy on acquisition of HSV-2 and HIV. Blood samples were collected from individuals of 20-50 age group attending ICTC centre, GGH, Vijayawada after taking informed consent during the period July 2010 to December 2010 .HIV status was determined by using three ag kits as per NACO guidelines.130 HIV sero positive were tested for Abs to HSV-2 type specific Glycoprotein Ag by ELISA (Eurocumin). In 130 HIVsero positive individuals 63(48.46%) were HSV-2glycoprotein Ag. Positive. Mean age 34.5+-7.1.Most effected age group was 31-40. Most effected study group truck drivers (60%) followed by migrant labour. (50%) HSV-2 sero positivity was high among males (52.3%). Sero prevalence of HSV-2was high in unmarried people (65.87%). High HSV-2 sero prevalence in drivers, migrant labour, illiterates may be due to ignorance, promiscuity, lack of awareness of STIs. HSV-2 acquisition was high (48.46%) in HIV sero positive persons than in general population (10.7%) indicates that HIV alters the natural history of HSV-2 and accelerates disease progression.

Key words: HIV, HSV-2; co infection; High risk groups; sero prevalence; Vijayawada.

INTRODUCTION

Herpes simplex viruses (HSV) are extremely common human pathogens. The spectrum of disease ranges from asymptomatic infections to fulminant disseminated diseases like genital herpes, neonatal herpes and meningo encephalitis. There are two types of HSV, type 1 and type 2, they vary in biochemical composition and have different biological properties. HSV type 1 (HSV-1) is responsible for oro facial infections, visceral infections in immuno-compromised hosts, and herpes simplex encephalitis. HSV type 2 (HSV-2) is more commonly associated with infections of the genital tract, and it causes majority of neonatal disease [1,2] .HSV type 2 is primarily infects the genital mucosa and is mainly responsible for genital herpes and is a lifelong infection, usually transmitted by genital routes or from a maternal genital infection to a newborn and reactivated in immuno-suppressed patients.

HSV-2 is highly prevalent in many parts of world and is a common cause of genital ulcer disease. Maternal genital HSV infection pose risks to both mother and foetus. Primary infection before 20 weeks of gestation has been associated with spontaneous abortion. The foetus may acquire infection as a result viral shedding from recurrent lesions in the mother's birth canal at the time of delivery[3,4]. Prevalence of HSV-2 has been increasing since 1980s with emergence of HIV pandemic which has become a major public health problem[3,4].HSV-2 prevalence rates vary widely with generally higher rates in developing than in developed countries and higher rates in urban than in rural areas. Genital HSV infections increase acquisition of HIV infections because the ulcerative lesions are openings in the mucosal surface[5] .Majority of primary infections are asymptomatic. Recurrent genital infections may be symptomatic or asymptomatic. Genital Herpes infections recur at a higher frequency than oral infection [6].HSV-2 infection is lifelong, and serologic testing provides the best method to estimate HSV-2 prevalence. [7] Serological studies for detection of antibodies of the HSV-2 using type specific glycoprotein antigens of HSV type 2 are useful methods for assessing the HSV-2 prevalence.

The highest rate of infection occurs in the sexually active age group. Antibodies specific for HSV-2 are virtually nonexistent in nuns and before puberty, but high prevalence rates are found in high risk groups such as STD populations. Homosexual men, sex workers and HIV sero positives. The appearance of HSV-2 antibodies correlates with the onset of sexual activity.[3,8] Data on HSV-2 prevalence is very scanty. Studies on HSV-2 prevalence are the need of the present day in the present HIV pandemic. During primary infection IgM antibodies appears transiently and are followed by IgG &IgA that persist for long periods. The presence of neutralizing antibodies serves as serological marker for latent infection.

MATERIAL AND METHODS

Ethical Considerations

The study was reviewed and approved by the Institutional Ethical Committee, Siddhartha Medical College and Government General Hospital, Vijayawada.

Inclusion criteria

Age group within 20 to 50 yrs
HIV Sero positive individuals
Pre ART HIV Sero positive individuals

Exclusion criteria

Age group of less than 20yrs & more than 50yrs
HIV Sero positive individuals on Anti-retroviral therapy (ART)
Blood samples were collected from 130 HIV sero positive individuals attending ICTC, GGH, Vijayawada during the period of July 2010 to December 2010. The individuals were selected based on the criteria

that they belong to the age group of 20 to 55 years and are sexually active.

History was taken from HIV Sero positive individuals regarding age, sex, marital status, education, occupation, condom usage, age at first sexual exposure, sexual orientation, number of sexual partners in the preceding years, years of sexual activity, genital ulcerations, burning micturition, genital discharge, and history of any other STD in past or present.

As per NACO (National AIDS Control Organization), India guidelines HIV testing was done using three different antigen test kits -rapid tests_Stratgy111in ICTC (Annexure-1)
1. COOMBSAIDS-RS: Dot immunoassay.
2. SD BIOLINE HIV-1/2 3.0 : Immuno chromatographic test
3. HIV 1/2/0 Tri-line: Membrane based immunoassay

All the samples were screened for human antibodies of the IgG class against the HSV-2 specific glycoprotein G2 in serum using ELISA test kit (EUROIMMUN Medizinische Labordiagnostika LOT No-E100602AF, Exp. Date : 1stJune 2011 and E101214AW,13,DEC 2011) by using ROBONIK ELISA washer and reader .

RESULTS

A total of 130 HIV sero positive individuals were studied for the presence of IgG antibodies to HSV-2. In the study group of 130 HIV sero positive persons IgG antibodies to HSV-2 were detected in63 persons. In the study group IgG antibodies to HSV–2 were detected in 63 individuals (48.4%).The prevalence of HSV-2 sero positivity was highest in the age group of 31-40years (53.8%), followed by in the age group of 41-50 years (50.0%) and in the age group of 20-30 years (40.4%). The prevalence of HSV-2 sero positivity was slightly higher (48.7%) in the urban group than in rural group (48.07%). The prevalence of HSV-2 sero positivity was found to be highest in the Drivers (60.0%) followed by the Migrant Labour group (50.0%).The prevalence of HSV-2 sero positivity was found to be highest in the illiterates (73.68%) followed by in the high school group (41.07%). The prevalence of HSV-2 sero positivity was highest in the un-married group (65.38%) than in the married group (44.23%). The prevalence of HSV-2 sero positivity was highest among those who had more than 5 sexual partners in the preceding years (71.66%), than among those who had less than 5 sexual partners (28.57%) (Table 1 & 2)

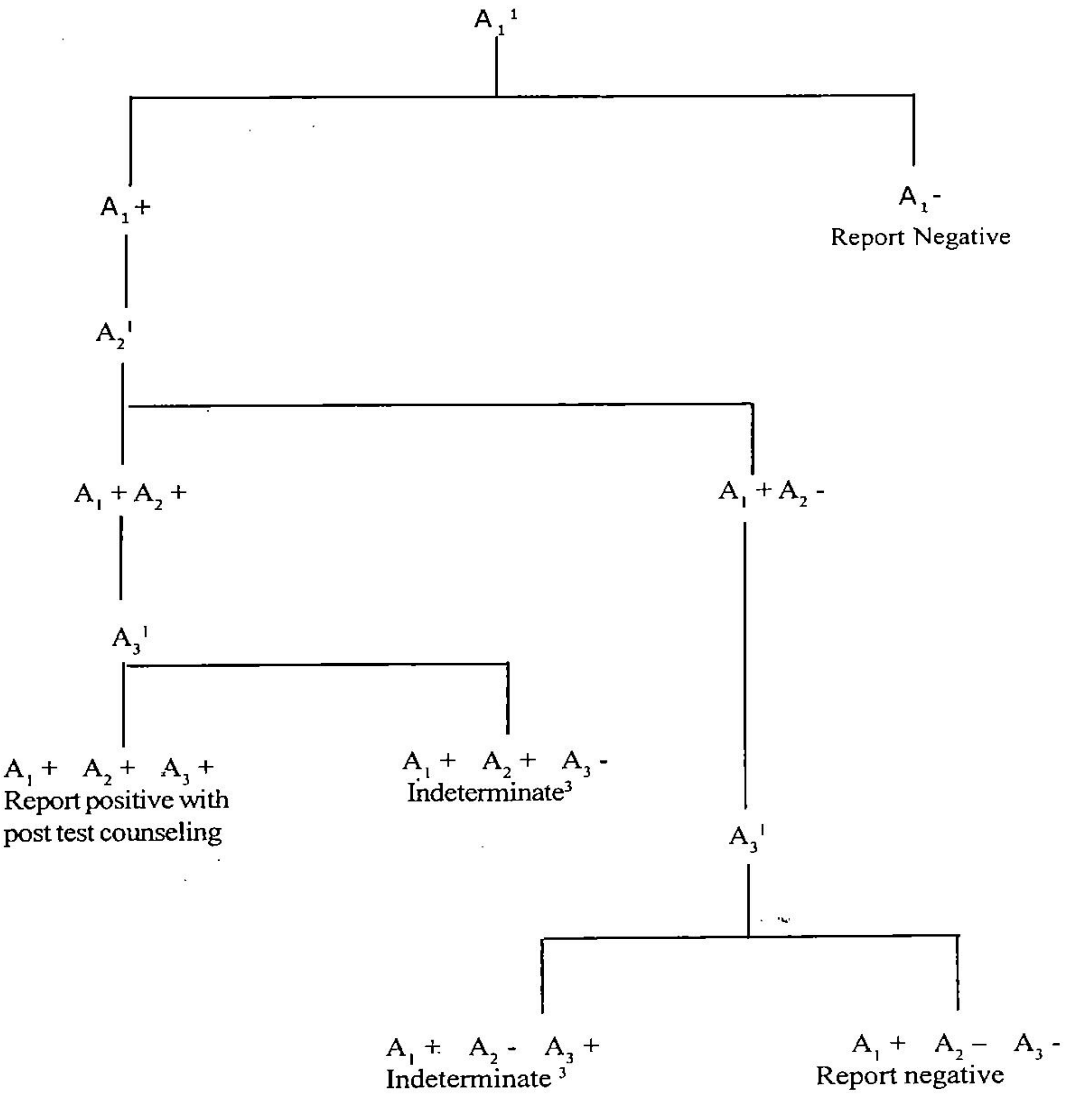
DISCUSSION

Genital herpes is one of the commonest sexually transmitted diseases .Sixteen percent of world's population age between15-49 years were estimated to be living with HSV-2 in 2003.HSV-2seropevalence increase steadily after sexual debut and with age. Of all the sexually transmitted diseases (STDs), there appears to be true "epidemiologic synergy" between HIV and HSV-2[9].Over the last thirty years, the global, intersecting epidemics of HSV-2 and HIV have demonstrated a complex relationship between pathogens. Several studies have revealed that genital herpes is currently the most common genital ulcerative disease (GUD).As a leading cause of genital ulceration, HSV-2 plays a role in facilitating the transmission of HIV. There is a strong correlation between decrease in CD4 count and increasing rate of HSV reactivation suggesting that reactivation is linked to immune suppression. Most HIV-1 infected persons are co infected with HSV-2, and most experience frequent subclinical and clinical reactivations of HSV-2. It is recommended that all individuals with HIV should be serologically tested for HSV-2. HSV-2 infection should be targeted as a modifiable risk factor for HIV acquisition by testing, counselling, behavioural intervention, treatment and antiviral suppression. HSV-2 sero prevalence rates in the general adult population in India have been reported to range from 7.9 to 18.9%[10] A total number of 130 HIV sero positive individuals with a mean age of 34.5 ± 7.1 years (ranging from 20 to 50 years) were included for the study. Among them, 76 were men and 54were women, most of them married and were from low socio-economic background. All were heterosexuals and active. 43 of them had more than five sexual partners in the preceding years HSV-2 sero prevalence was (63)48.4%in HIV sero positive individuals The results of works done by various authors were arranged chronologically shown in the(Table 3). The various authors presented in the table had chosen different study groups. Low sero prevalence was observed in the study of B van Benthem et al [11] (42%) where as high prevalence was observed by Gwanzura L,et al Zimbabwe (82.7%)[12.] HSV-2 sero prevalence increased along with advancement of age. Prevalence rates of40%, 53.8%, and 50% (Table 1) were found in the age groups 20-30, 31-40, 41-50 years respectively (Table 1). The increase in the prevalence at each higher level of age may be related to increasing years of sexual activity. A similar association of HSV-2 prevalence and age was reported by Gita Ramjee Ph.D et al, South Africa[13.] The same results were observed in the study of K.Anuradha et al, India (2008) [14.], Nilanjan Chakraborty et al.(2009)[15] which shows that the increased level of sexual activity is the important contributing factor for the highest sero prevalence of HSV-2The prevalence of HSV-2 was more in males (52.3%) than in females (44.4%) (Table 1) in the present study. The sero prevalence was more in the males compared to females. Similar results were also reported by Flavia.C. Set al (2006) [16.] HSV-2 sero positivity was assessed in relation to rural and urban groups (Table 1). Studies showing the difference in the sero prevalence in rural and urban areas are scanty. The urban group showed a slight increase in sero positivity (48.71%) when compared to the rural group (48.07%). In the present study there was 60% HSV-2 sero positivity among drivers, (Table 1) one of the high risk groups for HIV infection. Migrant labour (50%) can also be considered as high risk group for HSV-2 transmission as promiscuity in the group was also high.

Any health care programme is best implemented when the literacy of the target population is high. In the present study persons who are illiterates had a higher percentage sero positivity of 73.6% (Table 1) compared to the sero prevalence of HSV-2 (41.07%) in the persons with high school education. Sero prevalence of HSV- 2, was 51% reported in persons with primary education in the study of Flavia. C.S et al 2006[16] which was higher than the present study. The sero prevalence rates in illiterates (60.6%) was reported by Raynolds et al 2003[17]was comparable with present study. In the present study the study group was divided into two groups based on marital status, (Table-1) the percentage of HSV-2 sero positivity in unmarried (65.38%) was high compared to the married (44.23%).

The prevalence of antibody to HSV-2 was higher among individuals with sexual partners more than five (71.6%) (Table 2) in the preceding years than those with less than five (28.5%). A similar association between HSV-2 sero prevalence and increasing number of lifetime sexual partners was reported by Cowan F.M et al (2003)[18] by Gwanzura L, et al (1998) [12] and Flavia. C.S et al (2006)[16]. The promiscuous behaviour is one of the risk factor for acquiring both HIV and HSV-.2

Strategy III
[To detect HIV infection in asymptomatic individuals (ICTC, PPTCT)
3 Different Test kits required



[1]Assays A1, A2, A3 represent 3 different assays

[2] Such a result as in strategy I is not adequate for diagnostic purposes: use strategies IIB or III. Whatever the final diagnosis, donations which were initially reactive should not be used for transfusions or transplants. Refer to ICTC/VCTC after informed consent for confirmation of HIV status

[3]Testing should be repeated on a second sample taken after 14-28 days. In case the serological results continue to be indeterminate, then the sample is to be subjected to a Western blot /PCR if facilities are available or refer to the National Reference Laboratory for further testing.

Table 1: Prevalence of HSV-2 in different groups

	Study group	total no.	positive(%)	negative(%)
Status	HIV sero positive Individuals	130	63 (48.4)	67(51.6)
	21-30	47	19(40.4)	
age	31-40	65	35(53.5)	
	41-50	18	9(50.0)	
	Male	76	39(52.3)	
sex	Female	54	24(44.4)	
	Rural	52	28(48.07)	
Geographic distribution	Urban	78	38 (48.7)	
	Occupation			
Social status	Student	4	1(25.0)	
	Housewives	32	14(43.75)	
	Drivers	30	18(60.0)	
	Migrant labourer	26	13(50.0)	
	Agricultural workers	21	10(47.6)	
	Businessman	7	2(28.5)	
	Employees	10	5(50.0)	
	Illiterates	38	28(73.6)	
Literacy	Primary school	12	4(33.0)	
	High school	56	23(41.7)	
	College	24	8(33.3)	

Table 2: Prevalence rates of HSV-2 in No. of sexual partners

S no.	Group	No. of samples	No. of positives	%
1.	Less than 5 sexual partners	70	20	28,53
2.	More than 5 sexual partners	80	43	71.66
	Total	130	63	48.84

Table 3: Prevalence of HSV-2 in various studies

S. no.	Year of study	Author	Test group	Test done	No .of samples	No. of positives	%
1.	1998	Gwanzura L et al.	HIV positive	ELISA	191	157	82
2.	2000	Francois Xavier et al.	same	ELISA	300	234	78
3	2001	BHB van Benthem et al.	same	ELISA	276	116	42
4.	2002	PS Allan et al.	same	ELISA	92	67	61.6
5.	2006	Flavia et al.	same	ELISA	150	78	52
6	2008	K.Anuradha et al.	same	ELISA	100	49	49
7.	2010	Nilanjan Chakravarthy et al.	same	ELISA	200	94	47
8.	2011	Vijayawada, India	same	ELISA	130	63	48.4

CONCLUSION

High sero prevalence of HSV-2 in drivers, migrant labour, illiterates may be due to ignorance, lack of awareness and lack of understanding about disease profile and spread.HIV alters the natural history of HSV-2; HSV-2 accelerates HIV disease progression, so high sero prevalence in HIV positive individuals warrants greater attention, new approaches from clinicians, epidemiologists, and public health persons. The rapid and accurate diagnosis of genital HSV infection can be made by the type specific serological tests for HSV-2 antibody. Type specific serological tests are useful in confirming diagnosis of genital herpes and to diagnose persons with unrecognized infection and to manage sexual partners of persons with genital herpes. Early detection, patient care, treatment, counselling, and health education will reduce the rate of transmission of HSV-2 infection.

REFERENCES

1. Robert B.Belshe : Text book of Human virology Robert B.Belshe .publisher PSG.pub.co.2nd edition.1984; Pg, 810,811,812, 815
2. Harrison's Principles of Internal Medicine: 18th edition. Vol.1 McGraw Hill Medical publishers: Chapter 173: 1076-77,1086,1103,1139.
3. Topley Wilson's: Microbiology & Microbial infections.Virology 10th edition: Publisher Hodder Arnold,338 Easton Road, London NW-1chapter26:506-510.
4. Ananthnarayan and Jayaram Panicker's. Text book of Microbiology.8th edition. Publisher Universities Press.chapter62:571
5. Jawetz, Melnick, & Adelberg's Text book of Medical Microbiology. publisher McGraw HillMedical:25th edition, chapter:33: 437-441
6. Lafferty. WE, Coombs. RW, Benedetti et al . Recurrences after oral and genital herpes simplex virus infection: Influence of site of infection and viral type. N Eng J Med.316, 1444-97.
7. Mortality Morbidity Weekly Report (MMWR). April 23,2010/59(15);456-459
8. Jennifer S Smith and Jamie Robinson. Age specific prevalence of infection with HSV-2&1: A Global Review. Journal of Infectious Diseases,2002. Volume 186. Issue Supplement1S3-S28, DOI: 10.1086/343739

9. Lawrence Corey, MD, Anna wald, MD Connie L,Celum MD, Thomas C Quinn,MD." The Effects of Herpes Simplex Virus-2 on HIV-1 Acquisition and Transmission: A Review of Two Overlapping Epidemics" J Acqur Immune Defic. Syndr 2004:35;435-445.
10. John A Scehnelder, Vemu Lakshmi, Rakhi Dandona,,G Anilkumar, Talasila Sudha, Latith Dandona. Population based seroprevalence of HSV-2 and syphilis in Andhra Pradesh sta te of India. BMC Infectious Diseases,2010,10:59. Pp3-12
11. BHB van Benthem, J Spargaren,,JAR van den Hoek L Merks, RA Coutinho, M Prins The European study on the Natural History of HIV Infection in Women. Sex Transim Inf Prevalence and risk factors of HSV-1 and HSV-2 antibodies in European HIV infected women" Sex Transm Infect 2001;77:120-124
12. LGwanzura,A. Latif, M. Basett, R Machekano, DA Karzenstein,PR manson. Syphilis serology and HIV infection in Harare, Zimbabwe. Sex Transim Infect.1999.75(6);426-430
13. Gita Ramjee, Williams B, Gouws E, Dyck E, Deken B, Karim S.et al. The impact of incident and prevalent herpes simplex virus-2 infection on the incidence of HIV-1 infection among commercial sex workers in South Africa. J Acquir Immune Defic Syndr. 2005;39(3):333.
14. K Anuradha,,H mann Singh, KVT Gopal, G Raghurama Rao, T V Ramani, Jyothi Padmaja. Herpes simplex virus 2 infection: A risk factor for HIV infection in heterosexuals. Indian J Dermatol Venereol, Leprol [serial online]2008[cited2011Aug.13];4:230-3
15. Nilanjan Chakraborty, Sohinee Bhattacharyya, Chandrav De, Anirban Mukherjee, Dwipayan Bhattacharya, Shantanu Santra et al. Incidence of multiple *Herpesvirus* infection in HIV seropositive patients, a big concern for Eastern Indian scenario. Virology Journal 2010. 7:147
16. Flavia Cunha Santos, Solange Artimos de Oliveira, Sérgio Setúbal ,Luiz Antonio Bastos Camacho·Tereza Faillace· José Paulo, Gagliardi Leite· Guillermo Coca Velarde. The HSV International Seroprevalence Study Group[1]" Seroepidemiological study of herpes simplex virus type 2 in patients with the acquired immunodeficiency syndrome in the city of Niterói, Rio de Janeiro, Brazil, MEM INST OSWALDO CRUZ, RIO DE JANEIRO, 101(3) May 2006 Vol 101(3);315-319.
17. Steven J Reynolds, Arun k Risbud, Mary E Shepard, Jonathan M Zenilman, Ronald S Brookmever, Ramesh S paranjepeet al . Recent Herpes Simplex Virus Type 2 Infection and Risk of human immunodeficiency Virus Type 1 Acquisition in India. The Journal of Infectious Diseases Vol.187. No 10(May 15 2003)
18. Cowan FM, French RS ,Mayaud P, Gopal R, Robinson NJ ,Artimos de Olveira , Faillace T et al. Sero epidemiological study of herpes simplex virus types 1 and2 in Brazil, Estonia ,India Morocco and Srilanka. Sex Trans Infect. 2003 Aug;79(4):286-90.
19. Jeykumar Williams, Prasanna G, Thiruvannakkarasu D . HSV-2 IgG, IgM, Antibody markers in HIV/AIDS Patients. Indian J Sex Trans Dis 2005. Vol. 26(2), 78
20. N Kumaraswamy, p Balakrishnan, KK venkatesh, AK Srikrishnan, A j Cecelia,E Thamuraj et al. AIDS Patient Care STDs. August 2008, 22(8):677-82

Source of support: Nil, Conflict of interest: None Declared

QUICK RESPONSE CODE	ISSN (Online) : 2277 –4572
	Website http://www.jpsionline.com

How to cite this article:
VC Bharathi, Anaparty Usharani. Sero evaluation of coinfection of HIV and HSV-2. J Pharm Sci Innov. 2015;4(4):217-221 http://dx.doi.org/10.7897/2277-4572.04449