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Disease Burden of Herpes Simplex Virus among Patients Attending Rajendra Institute of Medical Sciences, Ranchi, Jharkhand

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A B S T R A C T

HSV-1 has been associated with oro-labial disease, with most infections occurring during childhood, and HSV-2 with genital disease. Additionally, HSV-2 likely contributes substantially to the spread of HIV infection. To estimate the disease burden of Herpes Simplex Virus among the patients attending Rajendra Institute of Medical Sciences. Samples of clinically suspected cases of herpes simplex virus received in the Department of Microbiology, RIMS, Ranchi, from January 2020 to December 2021 were included in the study. Results: During the study period, a total of 1737 samples from clinically suspected cases of herpes simplex virus were received for testing. Of these 1737 samples, 150 samples tested positive for herpes simplex virus. Of total suspected cases, 935 were males and 802 were females. The global burden of HSV-2 infection is large, causing increased risk of genital ulcer disease, HIV acquisition, and transmission of HSV-2 to partners or neonates. These estimates highlight the critical need for development of vaccines, and other new HSV prevention strategies.

Introduction

Herpes simplex virus (HSV) exists as two types, 1 and 2 (HSV-1 and HSV-2), and causes a lasting infection with recurrent lesions. Generally, HSV-1 has been associated with oro-labial disease, with most infections occurring during childhood, and HSV-2 with genital disease (Nahmias *et al.*, 1990). However, it is possible for HSV-2 to cause oro-labial herpes and HSV-1 to cause genital herpes (Lafferty *et al.*, 1987). Herpes simplex virus type 1 (HSV-1) is a widespread and incurable infection (WHO, 2017; Looker , 2012). Although this infection is usually asymptomatic (Wald and Corey, 2007), the virus is shed frequently and subclinically (Ramchandani, 2016; Mark, 2008).

Clinically-apparent HSV-1 infection most often manifests as orolabial herpes lesions (Bernstein, 2012; Brady and Bernstein, 2004), but the virus

causes a diverse spectrum of diseases including neonatal herpes, corneal blindness, herpetic whitlow, meningitis, encephalitis, and genital herpes (Brady and Bernstein, 2004; Fatahzadeh and Schwartz, 2007).

Herpes simplex virus type 2 (HSV-2) infection is a highly prevalent, sexually transmitted infection (STI) worldwide (James *et al.,* 2016). It is a leading cause of genital ulcer disease (GUD) and genital herpes, manifesting in the form of painful, recurrent, and frequent genital lesions (Ahmed *et al.,* 2003; Gupta *et al.,* 2007; Halioua and Malkin, 1999; Mertz *et al.,* 1998; Morse, 1999; O'Farrell, 1999; Weiss *et al.,* 2001). Its vertical transmission from mother-to child can lead to neonatal herpes, a severe and sometimes fatal outcome in newborns (Gupta *et al.,* 2007; Halioua and Malkin, 1999; Mertz *et al.,* 1998; Morse, 1999; O'Farrell, 1999; Weiss *et al.,* 2001; Looker *et al.,* 2017).

HSV-2 infection has received renewed attention in recent years, due to improvements in the understanding of the epidemiological synergy between HSV-2 and HIV. HSV-2 infection increases the risk of HIV acquisition by approximately three-fold (Freeman *et al.,* 2006), and the increase in risk is even greater in those with newly-acquired (incident) HSV-2 infection (Brown *et al.,* 2007; Reynolds *et al.,* 2003).

Daily suppressive antiviral therapy against HSV- 2 has been shown to reduce symptomatic recurrences and asymptomatic HSV shedding; however, in clinical trials, suppressive therapy did not reduce the excess risk of HIV acquisition or transmission due to HSV-2 nor fully suppress HSV-2 shedding (Celum *et al.,* 2008; Watson-Jones *et al.,* 2008; Celum *et al.,* 2010). Efforts to develop a vaccine against HSV are advancing. In clinical trials, a prophylactic vaccine failed to prevent HSV-2 infection and disease (Belshe *et al.,* 2012). However, preliminary results from ongoing trials of post-exposure therapeutic vaccines against genital HSV-2 infection have been encouraging, demonstrating reductions in HSV-2 shedding in vaccine recipients compared to placebo (Genocea website, 2014; Agenus website, 2014).

HSV-1 is endemic globally as indicated by the high HSV-1 antibody prevalence (seroprevalence) across regions (Nahmias *et al.,* 1990; Looker, 2015).

Our main objectives of this study was to describe the disease burden of Herpes Simplex Virus infections in Jharkhand region between 2020 -2021 and study the various demographic variables.

Materials and Methods

Case selection for the purpose of this study :

Participants were selected on the basis of having a medical condition (e.g., orolabial lesions, genital ulcer disease, vaginitis, urethritis), since this may be associated with HSV infection

Patients presenting with central nervous symptom manifestations

Blood samples were received in the Department of Microbiology from IPD of Rajendra Institute of Medical Sciences. µ capture IgM ELISA method was used for HSV detection.

Results and Discussion

During two-year period, from January 2020 to December 2021, total number of samples tested were 1737, out of which, 150 were positive, 51 samples tested equivocal and 1536 were negative.

Maximum number of positive cases was found in the age group of 10-19 yrs., followed by 2-10 yrs. of age group, 20-29 yrs. of age group, 30-39 yrs. and 40-49 yrs. of age group. Least number of cases were found in < 2 yrs. age group.

Maximum number of cases occurred in September (36 cases), followed by July, August and October. Least number of cases were found in APRIL (2 cases) and May.

Table.1 Total number of cases of HSV tested by IgM ELISA

Year	Total number of samples tested	Positive	Equivocal	Negative
2020	613	99	27	487
2021	1124	51	24	1049
2020-2021	1737	150	51	1536

Table.2 Age -wise distribution of HSV positive cases

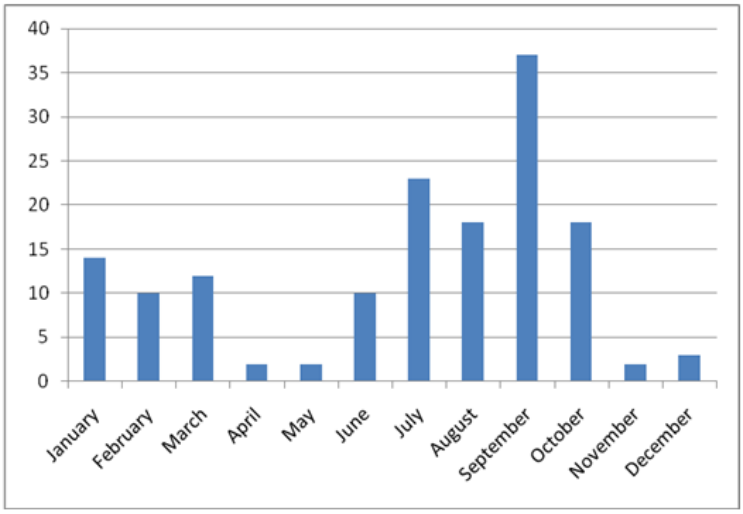
Age group	HSV Positive Cases		Total HSV positive cases
	2020	2021(till date)	
<2 yrs.	3	1	4
2-10 yrs.	21	8	29
10-19 yrs.	27	5	32
20-29 yrs.	12	13	25
30-39 yrs.	11	10	21
40-49 yrs.	12	9	21
50-59 yrs.	6	1	7
>60 yrs.	7	4	11

Table.3 Gender-wise distribution of HSV positive cases

Gender	Total cases tested		HSV positive cases		Total HSV positive cases
	2020	2021(till date)	2020	2021(till date)	
Male	336	599	54	26	80
Female	277	525	45	25	70

Of total positive cases(150), 80 males (53.33%) and 70 (46.66%) females were positive.

Fig.1 Month-wise distribution of HSV positive cases



January - 14 cases
February - 10 cases
March - 11 cases
April - 2 cases
May - 2 cases
June - 10 cases
July - 22 cases
August - 18 cases
September - 36 cases
October - 18 cases
November - 4 cases
December - 3 cases

The present study review of epidemiological studies identified extensive data on the pattern of herpes simplex virus infections by age group, gender and season variation. Some studies on seroprevalence studies have been published. The first analysed samples from selected populations in Brazil, Estonia, India, Morocco, and Sri Lanka[29]. The second analysed samples from general populations in eight European countries.[30] Both studies found a trend towards increasing HSV-1 and HSV-2 infection with age, and higher rates of HSV-2 infection among women than men. In our study, maximum number of positive cases was found in the age group of 10-19 yrs., followed by 2-10 yrs. of age group, 20-29 yrs. of age group, 30-39 yrs. and 40-49 yrs. of age group. Least number of cases were found in < 2 yrs. age group. With regard to gender distribution, of total positive cases (150), 80 males (53.33%) and 70 (46.66%) females were positive.

IgM HSV serology may be useful in the management of some patients with first episode genital herpes and provide an indication of the source of infection. Drawbacks include the low sensitivity, lack of availability, IgM antibodies may occasionally be produced in response to recurrent infection and, finally, IgM antibodies may take up to 10 days to develop and last 7–10 days. IgM serologic assays are unable to distinguish between HSV type 1 vs. HSV type 2 infections, which may be important in certain clinical scenarios, including, for example, in pregnant women.

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