

Prevalence of Herpes Simplex Virus Infection among Adults Citizens of Dhaka, Bangladesh

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Abstract

Background: Herpes simplex viruses (HSV) are communal an infection has been established an alarming problem around the world.

Objective: The objectives of this study are to scrutinize age and sex stratified prevalence in HSV seroprevalence in Dhaka the most populated metropolitan the capital of Bangladesh and under a timeline January, 2014 to June, 2014.

Patients and Methods: This cross-sectional privately representative survey was carried out at the department of biochemistry, Primeasia University, Dhaka, Bangladesh. Importance was given on statistical inferences for national seroprevalence of herpes simplex virus estimates. Analysis was done using standard procedure.

Result: Infected individuals were more likely to be female than male (50.0% vs 25.6%; $P < 0.05$). By the age of ≤ 18 y and 19-23 y, HSV IgG prevalence reached 4.6% (95% CI: 2.6-14.9) and 10.5% (95 % CI: 7.0-23.0) while male groups were zero prevalence. At middle age group (24-28 y) female showed highest HSVIgG sero-positivity ($P < 0.05$, Female vs Male) while the following age groups (29-33 y, 34-38 y and ≥ 39 y), male patients were more infected than female ($P < 0.05$).

Conclusion: The results will give awareness about the potential public health impact of HSV in Bangladesh wherever anti-HSV testing is not generally performed within all populations, especially considering the risk of neonatal transmission and the attendant complications at birth.

Keywords: Sexual transmission; Incidence; Confidence interval; Congenital infection

Introduction

The incidence of HSV infections overall and by age varies markedly by country, region within country, and population subgroup. In order to compare the prevalence of herpes infection between geographic areas or countries, age-specific or age-adjusted prevalence among similar populations is necessary. Herpes simplex viruses are among the most omnipresent of human infections. The frequency of HSV infection has been measured by testing various populations for the presence of antibody, as both virus and the immune response are thought to persist after infection for the life of the host. Worldwide, 90% of people has one or both viruses. HSV-1 is the more prevalent virus, with 65% of persons in the United States having antibodies to HSV-1 [1]. The epidemiology in Europe is similar, with at least half of the population seropositive for HSV-1. In the developing world, HSV-1 is almost universal and usually acquired from intimate contact with family in early childhood [2]. After childhood, the HSV-1

prevalence rates increase minimally with age. Rates of HSV-1 infection are similar for men and women. In the United States, African-Americans and Asians have higher rates of HSV-1 infection than whites. The majority of infections are oral, although most are asymptomatic. Some data suggest that in developed countries, acquisition of HSV-1 is delayed from early childhood to adolescence or young adulthood [3,4]. HSV-2 infections are markedly less frequent than HSV-1 infections, with 15–80% of people in various populations infected [5].

Excretion of the virus from herpetic lesions (mainly lips and genitals) in symptomatic people with recurrent infections and excretion of the virus in the saliva and genitals of asymptomatic people are regarded as the most important source of the virus [6]. Unlike HSV-1, HSV-2 is predominantly acquired through sexual activity [7] and causes the great majority of genital herpes [8]. In persons with past primary HSV-1 infection, the risk of acquiring HSV-2 is probably reduced since most antibodies cross-react between HSV-1 and HSV-2 [9]. Although no clinical signs can be recognized in many people with HSV-2 infections, as is also the case for HSV-1 infections, asymptomatic people can shed the virus, and thus there is a substantial

risk of viral transmission to their sexual partners [10]. Even though the risk of vertical viral transmission is lower than that for acquiring primary infection, recurrent genital herpes must be regarded as the most common cause of neonatal infections [11]: up to 85% of neonatal herpes infections are caused by HSV-2 [12], which are associated with a poor prognosis [13]. In this study, the prevalence of herpes simplex virus infection was anticipated among Bangladeshi citizens.

Material and Method

Experiment settings

Department of Pathology, Dhaka Hospital and Primeasia University, Dhaka-1213 Bangladesh. Both the institutes are collaborated for nonprofit based research on infectious diseases among Bangladeshi people.

Study population

Adult people aged from 16 years to 45 years were enrolled in the study from January 2014 to June 2014. People were conducted at Dhaka Hospital for HSV screening. A total of 86 people were selected for this study by random.

Diagnostic testing

After completion of an examination by the physician, a trained nurse collected blood samples from consenting participants to screen for HSV. Diagnostic tests were performed in the Dhaka hospital laboratory in Dhaka. A type-specific ELISA was used to detect HSV IgG antibodies in sera (Focus Technologies, Cypress, CA, USA). Tests were accomplished following manufacturer instructions using index values >1.1 to define positive results. In addition, all positive test results were duplicated to provide confirmation.

Statistical analysis

Data were analyzed using SPSS version 21. Pearson's chi-square test adjusted to account for the categorical variables and a sample size of about 86 subjects per pre-specified age group was planned to assure that a two-sided 95% confidence interval (CI) for the prevalence of HSV antibodies. Two groups were compared by using student's t test whereas more than two groups were analyzed by one way ANOVA.

Results

Out of the 86 individuals tested 65 (75.6%) were HSV IgG positive. Infected individuals were more likely to be female than male (50.0% versus 25.6%; $P < 0.05$). There were high rates of infection in all age groups, and the prevalence increased with age. Evaluation of the HSV IgG antibodies according to age and sex group showed that the highest prevalence, 21 (24.4%) of the 25 women whereas 6 (7.0%) of the 8 male in the 24-28 years age group ($n=27$, 31.4%). The following age groups, 29-33 years, 34-38 years and ≥ 39 years showed that the gradually decreased rate of HSV IgG positivity in female groups but increased in male groups, even if there was no frequency in ≤ 18 years, and 19-23 years age groups in male while female group showed significant HSV IgG positivity ($P < 0.05$). The overall prevalence of IgG antibody against HSV is shown in Figure 1.

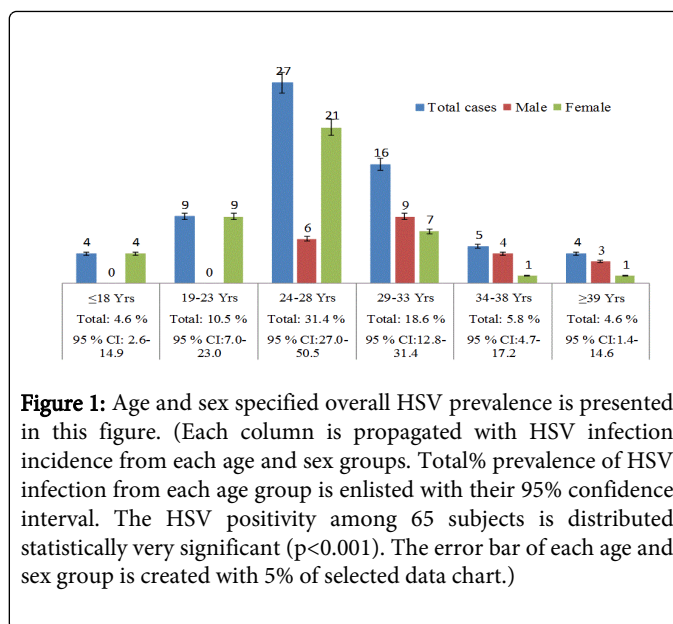


Figure 1: Age and sex specified overall HSV prevalence is presented in this figure. (Each column is propagated with HSV infection incidence from each age and sex groups. Total% prevalence of HSV infection from each age group is enlisted with their 95% confidence interval. The HSV positivity among 65 subjects is distributed statistically very significant ($p < 0.001$). The error bar of each age and sex group is created with 5% of selected data chart.)

Sex stratified frequency of HSV IgG positivity groups are presented in Figure 2. In early age groups ≤ 18 years and 19-23 years, HSV infections in male was not found whereas female was prone to HSV infection. HSV infection was raised up in 24-28 years age group of female and subsequent age groups was coped with decreasing HSV infection rate while male was more susceptible to HSV infection.

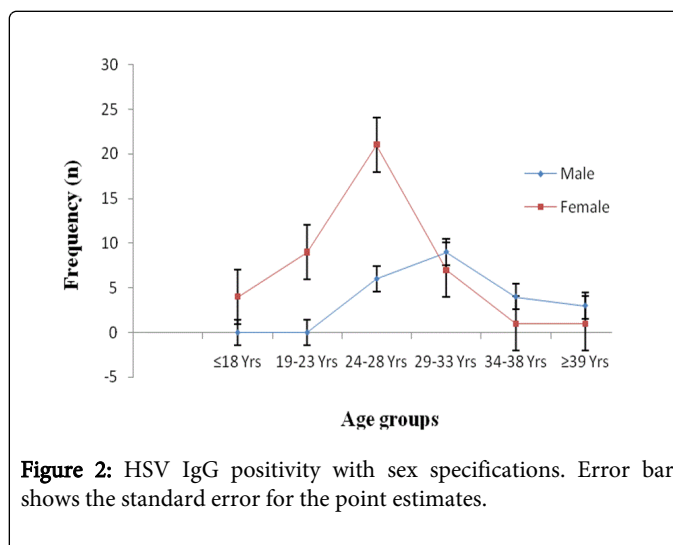


Figure 2: HSV IgG positivity with sex specifications. Error bar shows the standard error for the point estimates.

The distribution of HSV positive cases (65 out of 86) in this study was presented as cosmologically in Figure 3. The nucleus (zero indicated) of cosmos starting with zero age and outermost shell is shielded with 50 years age of HSV IgG positive cases. The intermediate shells with 10, 20, 30, and 40 years are distributed of different age groups. The Cosmology showed the distribution of HSV IgG positivity among adult people with age stratifications who were involved in this retrospective study. The maximum HSV IgG positivity was found in 24-28 yrs age group, $n=27$, and $n=16$ respectively. The suffixed (≤ 18 yrs and 19-23 yrs) and prefixed (34-38 yrs and ≥ 39 yrs) age groups of middle age groups (24-28 yrs and 29-33 yrs) showed the lowest rates of HSV IgG positivity.

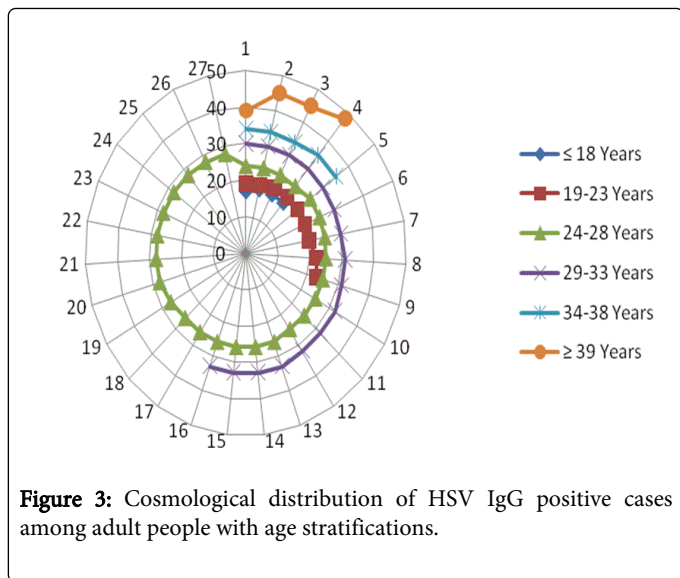


Figure 3: Cosmological distribution of HSV IgG positive cases among adult people with age stratifications.

The HSV IgG positivity with HSV IgG titer (IU/ml) was also documented as mean HSV IgG titer with standard deviation (SD), as shown in Figure 4. Although the 24-28 yrs age group of 21 female showed outermost HSV IgG prevalence with comparatively low HSV IgG titer, 14.57 IU/ml than male group with 15.00 IU/ml.

Discussion

Seroprevalence studies of HSV-1 and HSV-2 are vital for a better understanding of the public health significance of disease due to HSV. In this study, we were particularly interested in determining the HSV seroprevalence of adult aged from 16 years to the age of 45 years, since there is little known about this. As anticipated, the prevalence of antibodies against HSV was significantly lower in early and older adult age groups and in female than male; however, for HSV, this concerned adult age group of only at 24-28 years.

This study found HSV prevalence of 75.6% among 86 suspected adult people attending Dhaka hospital, Bangladesh. In our study we have studied within different age groups and sex specifications of HSV infection among 86 suspected people.

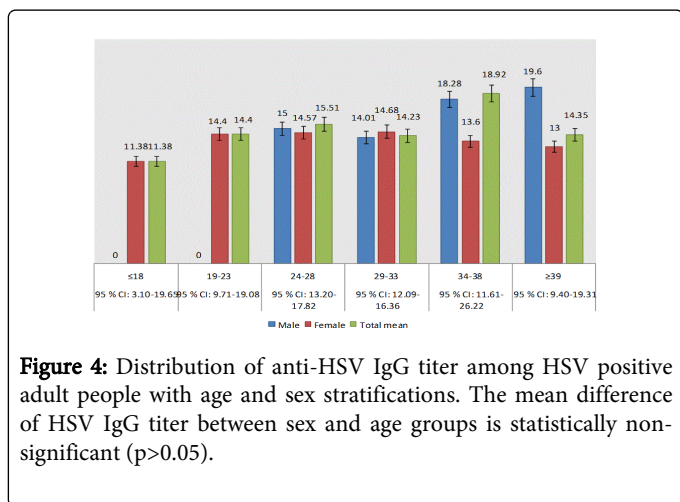


Figure 4: Distribution of anti-HSV IgG titer among HSV positive adult people with age and sex stratifications. The mean difference of HSV IgG titer between sex and age groups is statistically non-significant ($p > 0.05$).

Age and sex stratified prevalence of HSV IgG (combined) positivity among selected individuals were documented in this study and demonstrated in Figure 1 with 95% confidence interval and percent prevalence of infections. Early age groups such as ≤ 18 years and 19-23 years were showed no HSV infection among adults male while adult female having HSV infection with demonstrating recognizable HSV IgG titer (Figures 2 and 4). The middle age groups such as 24-28 years were always high rate of HSV infection among adult female and then the following age groups like 29-33 years, 33-38 years, and ≥ 39 years showed decreasing rate of HSV infection in female group.

Although, the HSV infection in early age groups of male was absent but the comparatively highest rate of infection was found in 29-33 years and then following age groups were also highest prevalence of this infection (Figure 2). Assuming, the HSV infection in female may be congenital or acquired and they grow with this infection. This infection in female may opportunistic during their menstruation. The male in infection may with congenital or acquired because of this HSV infection is transmitted sexually. A projected 536 million people aged 15-49 are infected with the herpes simplex virus type 2 (HSV-2) worldwide [14]. HSV-2 is typically extent through sexual contact and results in a lifelong infection. The principal symptom of the disease is genital lesions, but a majority of infected individuals practice no symptoms or mild ones that are often unrecognized [15]. The high rate of asymptomatic cases boosts HSV-2 transmission because asymptomatic individuals hut the virus and spread the disease [16].

Besides sexual transmission, HSV is transmitted through physical contacts. A review of the literature suggests that the incidence of neonatal diseases caused by both types of HSV ranges widely, from 5 to 31 per 100,000 live births [17]. Relatively high prevalence rates of HSV-2 infection in Tanzanian children suggest that non-sexual transmission of HSV-2 (e.g. person-to-person contact by fingers and hands contaminated with the virus) might also be a reason for HSV-2 sero-positivity in childhood [18].

A low prevalence of HSV IgG antibodies of 4.6% was seen in female aged up to 23 years. In those aged 19-23 years, the prevalence increased to 10.5%, indicating a rising incidence of primary HSV infections, probably due to the start of sexual activity. Our data suggest that between 4.6% and 10.5% of all female belonging ≤ 18 years and 19-23 years age groups seem to acquire HSV IgG antibodies in response to intrauterine or neonatal infection. Such infections may be clinically imperceptible or not predictable clinically [19].

It should not be forgotten, however, that the low HSV-2 IgG prevalence might also be caused, at least partially, by false-positive test results because of the limited specificity of HSV-2 antibody tests [20]. Our finding of a higher seroprevalence of HSV among women than among men is in agreement with several other studies [21,22]. In contrast, infected women are more often symptomatic, which may stop them from having sexual intercourse.

This study provides needed information regarding the prevalence of HSV among Dhaka dweller in Bangladesh and will serve as an important baseline measurement as investigators continue to monitor rates of HSV in the future in Bangladesh.

Conflict of Interest

The authors declare no conflict of interests.

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