ORIGINAL ARTICLE

Seroprevalence of Herpes Simplex Virus in Females of Childbearing Age in Local Population of Rawalpindi

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ABSTRACT

Objective: To determine the seroprevalence of Herpes simplex virus among females of childbearing age.

Study Design: Cross sectional study

Place and Duration of Study: Virology department, Armed Forces Institute of Pathology Rawalpindi, from 1st July 2022 to 31st December 2022.

Materials and Methods: A total of two hundred and sixty-seven (267) females of childbearing age (15-49 years) were included in this study. The blood samples were taken for detection of Herpes Simplex Virus (HSV) IgG by enzyme-linked immunosorbent assay of Vircell, Spain. SPSS version 25 was used to analyze the data.

Results: Out of total 267 samples, 213 (82%) were positive and 54 (18%) were negative for HSV IgG. The positivity for HSV IgG was most frequent in the age group-1 (20-29 years) with 111 (50%) positive cases, followed by 87 (32%) in age group-2 (30-39 years) and 15(5.6%) in age group-3 (40-49 years). People with low socioeconomic status had higher positivity of HSV IgG antibodies, while those with high socioeconomic status had a lower positivity of HSV IgG antibodies.

Conclusion: The study concluded that most females of childbearing age had previously been exposed to HSV, as evidenced by the presence of IgG antibodies. However, a significant number of women had not been exposed to the virus, putting them at risk of contracting HSV and potentially facing its complications during a future pregnancy.

Key Words: *HSV, Seroepidemiologic Studies, ELISA.*

Introduction

Herpes simplex virus (HSV) is spread through contact with lesions or mucous membranes. It migrates to nerve tissues where it remains dormant and latent. The human population is susceptible to two types of HSV (HSV-1 and HSV-2), both of which cause latent and chronic infections.[2] HSV-1 causes disease of oral cavity, whereas HSV-2 causes disease of genital tract.[3,4]

HSV-1 is usually transmitted during infancy and adolescence. Infection in persons with decrease immunity can result in severe disease and rarely disseminated infection.[5,6] Neonatal HSV infections can lead to permanent impairments or death. If a primary infection in mother develops in the second trimester of pregnancy, the chance of transmission to fetus are high.[7] Neonatal morbidity and mortality are caused by both primary HSV infection as well as reactivation of disease during pregnancy.[8]

Due to maternal HSV infections in pregnancy, neonatal infections can present as disseminated disease, skin, eyes and mouth (SEM) disease, and central nervous system (CNS) disease. HSV-2 infection is more prevalent in Sub-Saharan Africa than in the United States.[9] Recent research on HSV IgG seroprevalence has revealed that prevalence varies by geographic location. The highest seroprevalence of HSV was found in Africa and America, where as lowest prevalence was observed in Asia[10] According to estimates in 2012, there were 417 million HSV-2 infected people worldwide in the age range of 15 to 49 years. Of these, 267 million of them were women and most of them were from Africa.[11] The proportion of women in the reproductive age infected with HSV-2 varies between 30% and 80% in countries in the Sub-Saharan region countries.[12]

The majority of people become infected with HSV during their early years.[13] Adult population rates of

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HSV 1 antibodies range from 45% to 88%, depending on their gender, age, geography and socioeconomic status.[14] HSV-2 prevalence rises from 35% to 60% by 60 years, however, antibodies to the virus are seldom discovered prior to the age when sexual contact first begins. HSV-2 infection rates are comparatively lower in males than females.[15]

This study was planned to determine the seroprevalence of HSV by detecting HSV IgG antibodies in women of child bearing age in Rawalpindi. This will give us a better understanding of exposure as well as susceptibility of HSV in this population and the measures which include avoidance of oral or sexual contact with infected patients, these can be adopted to mitigate the effect of this disease during the future pregnancies.

Materials and Methods

A cross-sectional study was conducted at the department of Virology, Armed Forces Institute of Pathology, Rawalpindi from 1st July 2022 to 31st December 2022. Informed con sent was taken from all patients and ethical approval for this study was taken from Institutional Review Board (AFIP-IRB No 22/1356). A sample size of 267 was calculated by using WHO sample size calculator.

Clinical history of the patients including any contact with HSV infected person, fever and rash was collected according to predesigned proforma. Samples were collected using aseptic technique. About 5 ml of blood was drawn in a clot activator tube and ELISA was performed to detect IgG antibodies against the herpes simplex virus I and II.

In order to analyze the data, the Statistical Package for the Social Sciences (SPSS) version 25 was used. Standard deviation and the mean of quantitative variables including age as calculated. Frequencies and percentages of qualitative variables including gender, marital status, education and socioeconomic status was calculated.

Results

HSV positivity was highest in women with education status matric or below while lowest in women with a master degree or above. People with low socioeconomic status had higher positivity of HSV IgG antibodies, while those with high socioeconomic status had the low positivity of HSV IgG antibodies

Out of total 267 samples, 213 (82%) were positive for HSV IgG antibody, while 54 (18%) were negative. The positivity for HSV IgG was most distinct in the age group 1 (20-29 years) with 111 (50%), followed by age group-2(30-39 years) with 87(32%), and age group-3(40-49 years) with 15(5.6%)

Table I: HSV IgG Antibody in Different Age Groups

Age	Positive cases (%)	Negative cases (%)
<20 years	5(2.3%)	2(4.2%)
20-29 years	111(50.9%)	25(9.1%)
30-39 years	87(39.9%)	16(33.3%)
40-49 years	15(6.9%)	5(10.4%)

HVS - Herpes Simplex Virus

Table II: Prevalence of HSV According to Different Parameters

Parameters	HSV Positive	HSV Negative
History of past HSV Infection		
Yes	11(5%)	0
No	202(95%)	48(100%)
Education		
Matric or below	74(33%)	20(41%)
Intermediate	55(25%)	14(29%)
Bachelor's degree	56(25.7%)	12(25%)
Master's degree or above	33(15%)	2(4.2%)
Socioeconomi status (Monthly income in rupees)		
<25000	38(17%)	8(16%)
25000-60000	166(76)	37(77%)
60000-150000	13(6%)	3(6.3%)
>150000	1(0.5%)	0
Joint family system		
Yes	196(89%)	47(97%)
No	22(10%)	1(2.1%)

HVS - Herpes Simplex Virus

Discussion

Herpes Simplex Virus (HSV) infection is a global health concern with far-reaching implications, particularly in reproductive health. In Pakistan, where infectious diseases are of significant concern, understanding the seroprevalence of HSV is crucial for designing effective healthcare strategies. Over the past 20 years, the frequency of HSV had considerably increased in both developed and developing countries.[16]

In this study, a total of 267 samples underwent ELISA analysis to detect HSV IgG antibodies. Positive results for HSV IgG were found in 213 cases (82%), while 54 cases (18%) tested negative. The research revealed a higher prevalence of HSV IgG antibodies among individuals with lower socioeconomic status, whereas those with higher socioeconomic status showed a lower prevalence. This difference is

attributed to the poorer nutrition and less hygienic conditions experienced by individuals of lower socioeconomic status.

A study carried out by Anthony *et al.,* in Australia in which a total of 270 samples were tested for detection of HSV-1 and HSV-2 antibodies. The seroprevalence of HSV-1 and HSV-2 was 97.8% and 58.5%, respectively.[17] These results found higher prevalence of HSV in comparison with our study. This difference in HSV seroprevalence could be due to difference in lifestyle, study population, travel, migration and demographic causes.

In another study conducted by Ahmed *et al.,* in Sudan, higher seroprevalence of HSV was reported, reaching a positivity rate of 97.8%.[18] These findings are contrary to the outcomes of our study, in which lower seroprevalence of HSV was found. The disparity between these two studies in terms of seroprevalence could potentially be attributed to regional differences.

The study carried out by Monica *et al*., in United States, reported a seroprevalence of 59.3% for HSV-1 and 21.1% for HSV-2 among the studied population.[19] Seroprevalence of HSV in this study was lower in comparison with the results of our study, possible explanation for this disparity in seroprevalence could be due to geographical and population density variations which could have influenced the prevalence of infections.

Similarly, in a study conducted by Drisu *et al.,* it was found that the seroprevalence of HSV infection among young adults was 74.7%. This study also found increased seroprevalence of HSV infection among young adults which depicts the significance of this age group as a susceptible population.[20] This study had lower seroprevalence as compared to our study

A study conducted by Mahmood *et al.,* in KPK Pakistan, found that seroprevalence of HSV as 13 %.[21] These results showed much lower seroprevalence in comparison with our study. Moreover, accuracy and sensitivity of the diagnostic methods used to detect HSV antibodies can influence the reported seroprevalence. Differences in the quality and type of diagnostic tests employed could lead to differing outcomes.

Limitations

The study was conducted in a single center, so the results may not be generalizable to the entire population of females of childbearing age in Pakistan. The sample size was relatively small, which may have limited the ability to detect statistically significant differences between subgroups.

Conclusion

The study concluded that most females of childbearing age had previously been exposed to HSV, as evidenced by the presence of IgG antibodies. However, a significant number of women had not been exposed to the virus, putting them at risk of contracting HSV and potentially facing its complications during a future pregnancy.

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CONFLICT OF INTEREST

Authors declared no conflicts of Interest.

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DATA SHARING STATMENT

The data that support the findings of this study are available from the corresponding author upon request.