

Prevalence and Incidence of HSV – 1 & 2: A Real Global Analysis

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ABSTRACT: Background: Herpes simplex disease with its first and second types is one of the most common types of infectious diseases, it varies in prevalence by regions of the world. This paper gives a global analysis of one of the infectious diseases that is characterized by the inability to cure patients. Important indicators were given on the magnitude of the prevalence of this disease by regions, age groups of both sexes. Material & Methods: The data on the disease for the year 2020 was used according to the availability of its source, giving an accurate analysis and survey of the indicators of the disease for the type one and type two, comparisons by regions and age groups for both sexes have been done. Results: The results of the analysis showed that herpes type one disease had more prevalent cases than incident cases, the most widespread area of this disease is the western Pacific. As for the herpes of the second type, the opposite was the prevalent case fewer incident cases, the most widespread areas were in the continent of Africa due to AIDS disease, the least areas for both types were the Eastern Mediterranean. Conclusion: Since this disease in the first and second types is an infectious disease and it is difficult to cure the patient, the numbers of infected people were very high, especially for prevalent cases that were much more than incident cases, so prevention and early diagnosis are required to treat cases before the outbreak.



Keywords: herpes simplex virus, HSV-1, HSV-2

1. INTRODUCTION

Herpes simplex virus is a common infection that causes symptoms of painful and fluid-filled blisters on the skin, mouth or genitals, and spreads rapidly through contact or using the tools of an infected person. Often with the first infection, fever occurs with a general feeling of illness [1, 2]. The virus infects other parts of the body, sometimes including the eyes and brain. There are two types of the virus Type I (HSV-1), which is the usual cause of the occurrence of cold sores on the lips and ulcers on the cornea of the eye. Type II (HSV-2) is the usual cause of genital herpes infection (although the HSV-1 virus can also cause genital herpes), and infection can also occur in other parts of the body, such as the brain (serious illness) or the digestive tract. Widespread infection can occur in newborns by the expectant mother or in people with weakened immune systems, especially those with AIDS infection [3]. HSV infections, however, have wider ramifications for global public health than only their virological and clinical characteristics. An important contributing factor to the global HIV

epidemic is HSV-2 infection, which has been demonstrated to double or triple vulnerability to HIV acquisition. Despite being relatively uncommon, neonatal herpes can have severe outcomes, such as high mortality and permanent brain damage, especially in environments where access to prenatal care and antiviral medications is restricted. Developing successful public health responses requires an understanding of the true worldwide burden of HSV-1 and HSV-2 [4, 5]. Thorough epidemiological data can help guide sexual health education, guide the creation and fair distribution of vaccines and antiviral treatments, and inform the design of focused awareness campaigns [6, 7]. This study aims to provide a global analysis of HSV prevalence and incidence, contributing crucial insights to help policymakers, healthcare providers, and international health organizations prioritize interventions that can reduce the burden of HSV infections and mitigate their broader health consequences [8]. The condition is diagnosed clinically most of the time without the need for laboratory tests, and to confirm the diagnosis, the doctor sometimes resorts to laboratory cultivation of the virus. When the specialist has suspicions that the brain is affected by infection, a sample of the ulcer is taken, and magnetic resonance imaging and spinal puncture are performed [9]. To prevent the virus, persons should avoid skin contact with others, use sanitary condoms, especially for pregnant women, avoid foods that stimulate infection, and avoid exposure to the sun [10]. Medications can reduce the persistence of symptoms but do not cure the patient permanently, these drugs reflect the benefit of detecting the virus early in addition to preserving the affected area [11]. The paper discusses one of the types of infectious viruses by analyzing its data by regions and age groups for both sexes, making comparisons and giving the necessary indicators for this disease. The significance of context-specific epidemiological data is highlighted by the significant regional, age, and socioeconomic-level variations in the prevalence and incidence of HSV infections.

2. METHODOLOGY

To determine the prevalence of herpes simplex virus types 1 and 2 (HSV-1 and HSV-2), stratified by region, age group, and sex, the data were analyzed using a descriptive epidemiological approach according to data in [12-23]. In order to facilitate comparison across demographic and geographic categories, prevalence estimates were presented as absolute numbers (in millions) and proportions.

3. RESULTS AND DISCUSSION

Table (1) shows the number of people aged (15 – 50) with prevalent HSV – 1 (millions) by region & sex, the number increases with age, and the number of males was greater than the number of females. The most prevalent regions of the disease were in the Western Pacific region, followed by Southeast Asia, the Americas, Europe, and the Middle East, the least prevalent regions were in the continent of Africa. The number of male prevalent globally is 186 million and 190 million for female, bringing the total number of prevalent to more than 376 million people, representing (5%) of the world's population, figures (1 and 2).

As explained in tables 1-4 age- and sex-stratified prevalence estimates of HSV-1 and HSV-2 across six WHO-defined geographic regions: Africa, The Americas, Eastern Mediterranean, Europe, South-East Asia, and Western Pacific. These regions contain data compiled from several nations per region and correspond with the worldwide epidemiological mapping of the World Health Organization. The overall prevalence by age group and sex for each of the six regions is shown in the "Overall" column. The combined overall prevalence for boys and females in each age group across all regions is indicated in the "Global" column. The percentage of people in a specific sex and age group that tested positive for HSV-1 or HSV-2 was known as the prevalence, and it was expressed in millions. Estimates were obtained from regional and national epidemiological studies utilizing established diagnostic criteria (e.g., serologic assays specific to a particular kind) when needed. A weighted average based on study sample size was utilized to produce a regional prevalence figure when there were numerous sources available for a region or age group.

Table 1. - Number of people aged (15 – 50) with prevalent HSV – 1 (millions) by region & sex 2020

	Sex	Africa	Americas	Eastern Mediterranean	Europe	South East Asia	Western Pacific	Overall	Global
15 -	M	0.1	1.0	0.5	0.6	2.0	1.7	5.9	11.6
	F	0.1	1.0	0.5	0.7	1.8	1.5	5.7	
20 -	M	0.1	3.3	1.3	2.0	5.6	5.3	17.7	34.9
	F	0.1	3.5	1.2	2.4	5.1	4.8	17.2	
25 -	M	0.1	5.2	1.7	3.4	7.5	8.3	26.3	52.2
	F	0.1	5.6	1.6	4.1	6.9	7.6	25.9	

30 -	M	0.1	6.5	1.8	4.7	8.3	12.0	33.4	67.2
	F	0.1	7.0	1.7	5.9	7.8	11.3	33.8	
35 -	M	0.1	7.2	1.7	5.3	8.5	10.9	33.7	68.6
	F	0.1	7.9	1.5	6.8	8.1	10.4	34.9	
40 -	M	0.1	7.4	1.4	5.6	8.0	11.0	33.5	68.8
	F	0.1	8.3	1.3	7.3	7.7	10.6	35.3	
45 -	M	0.1	7.4	1.2	5.8	7.3	13.6	35.4	73.0
	F	0.1	8.5	1.1	7.7	7.2	13.1	37.6	
Total	M	0.7	38.0	9.7	27.5	44.7	62.9	186.0	376.2
	F	0.7	41.7	8.8	35.1	47.3	59.3	190.3	

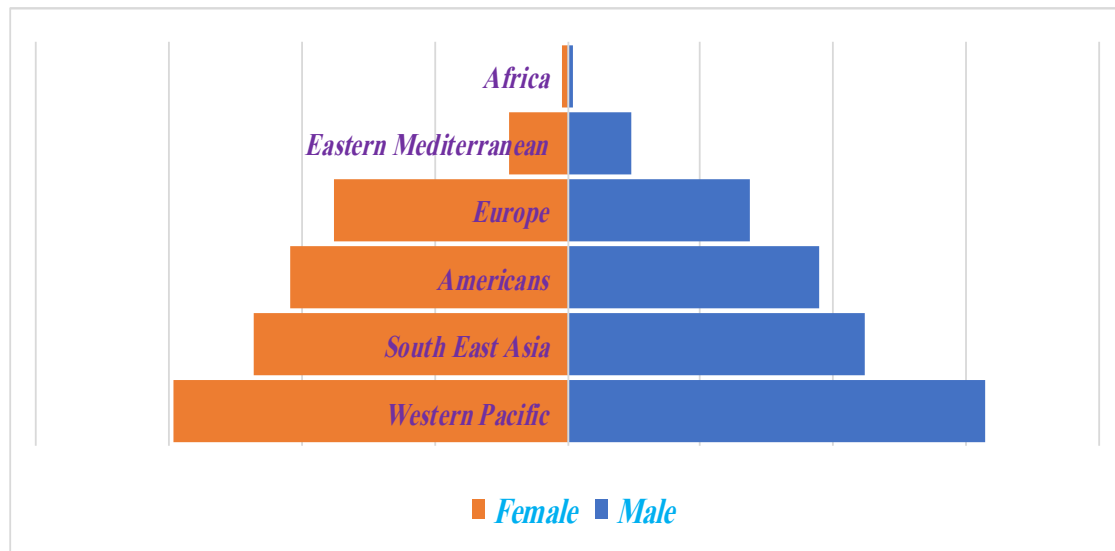


FIGURE 1. - Prevalent HSV – 1 by region & sex

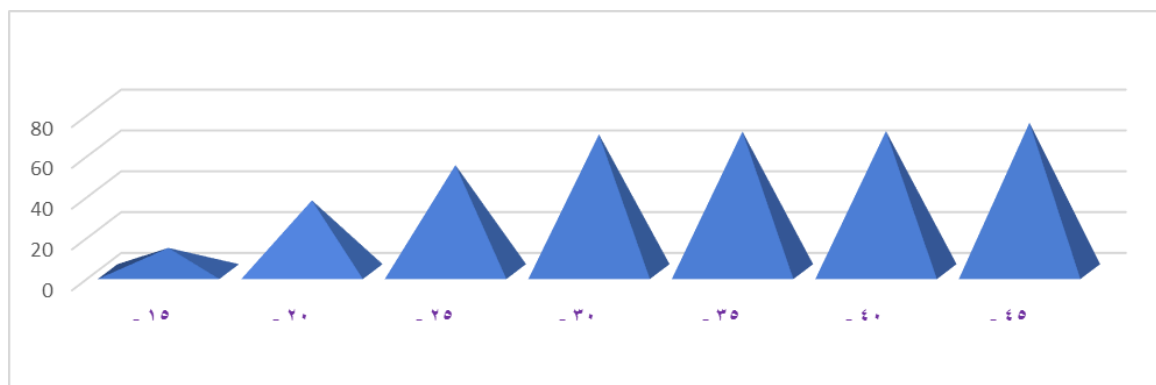


FIGURE 2. - Global prevalent age group,

The number of people aged (15 – 50) with incident HSV – 1 (millions) by region & sex, increases with age also, and the number of males and females are mostly equally likely. The most incident regions of the disease were also in the western Pacific region, followed by Southeast Asia, the Americas, Europe, and the Middle East, the least incident regions were in the continent of Africa. The numbers of (HSV – 1) incident were much less than the numbers of prevalent. The number of male incidents globally is 8.4 million which equally likely with female, bringing the total number of prevalent to more than 16.8 million people, table (2), figures (3).

The persistently high incidence of HSV-2 in Africa is consistent with epidemiological trends identified in earlier international evaluations and merits additional consideration because of its established function as a cofactor in HIV transmission. It is well established that HSV-2 increases HIV susceptibility and transmission by

means of recruitment of HIV target cells to the vaginal tract and destruction of mucosal barriers. People who are infected with HSV-2 are two to three times more likely to contract HIV, according to numerous studies. Because HIV and HSV-2 are still highly prevalent in sub-Saharan Africa and frequently coexist in the same people, this synergistic association is especially worrisome. It is essential to comprehend the co-epidemic dynamics between HIV and HSV-2 in order to guide integrated public health initiatives. Reducing HSV-2 transmission and secondary HIV risk may be two advantages of integrating HSV-2 screening and suppressive antiviral medication into HIV prevention techniques, such as sexual health education and pre-exposure prophylaxis (PrEP) programs. Therefore, rather than being understood in a vacuum, the high HSV-2 burden found in this study should be seen as an important part of Africa's larger sexual and reproductive health landscape.

Table 2. - Number of people aged (15 – 50) with incident HSV – 1 (millions) by region & sex 2020

	Sex	Africa	Americans	Eastern Mediterranean	Europe	South East Asia	Western Pacific	Overall	Global
5 - 1	M	0.	0.5	0.2	0.3	1.0	0.8	2.9	5.6
	F	0.	0.5	0.2	0.4	0.9	0.7	2.7	
0 - 2	M	0.	0.4	0.1	0.2	0.6	0.8	1.9	3.8
	F	0.	0.4	0.1	0.3	0.5	0.5	1.9	
5 - 2	M	0.	0.3	0.1	0.2	0.3	0.4	1.3	2.7
	F	0.	0.4	0.1	0.2	0.3	0.4	1.3	
0 - 3	M	0.	0.3	0.1	0.2	0.2	0.3	1.0	2.0
	F	0.	0.3	0.1	0.2	0.2	0.3	1.0	
5 - 3	M	0.	0.2	0.1	0.1	0.1	0.2	0.6	1.3
	F	0.	0.2	0.1	0.2	0.1	0.2	0.7	
0 - 4	M	0.	0.2	0.1	0.1	0.1	0.1	0.4	0.9
	F	0.	0.2	0.1	0.1	0.1	0.1	0.5	
5 - 4	M	0.	0.1	0.1	0.1	0.1	0.1	0.3	0.6
	F	0.	0.1	0.1	0.1	0.1	0.1	0.3	
Total	M	0.	0.2	0.8	1.2	2.3	2.5	8.4	16.8
	F	0.	2.1	0.8	1.5	2.3	2.3	8.4	

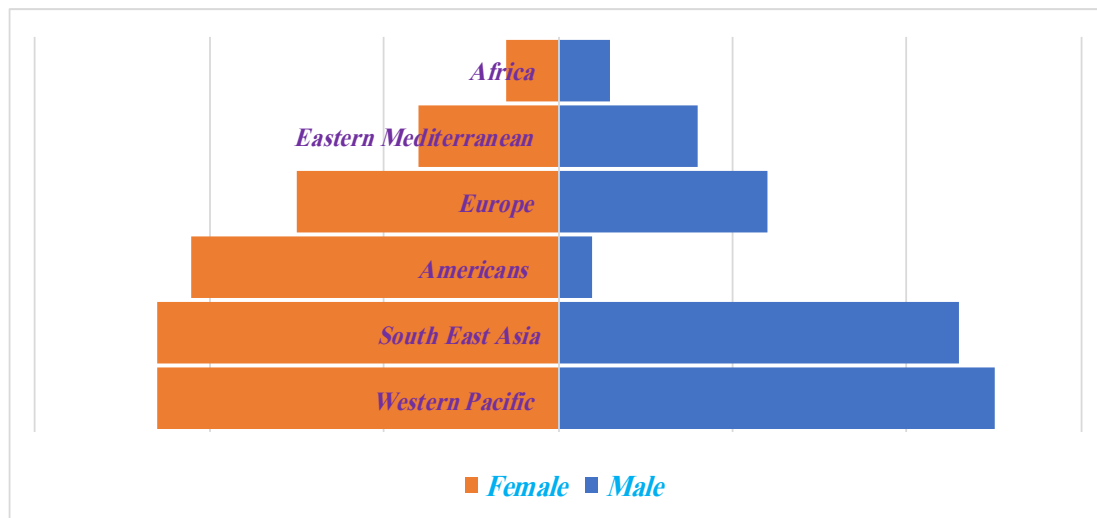


FIGURE 3. - Incident people HSV – 1,

For prevalent HSV type (2), the numbers are quite different for this type of disease, as the numbers of males were lower than females, the highest number was in the continent of Africa (37%) of the total regions, followed by the Western Pacific (19%), the Americas (17%), Southeast Asia (16%), Europe (7%), and Middle East were the lower regions (4%). The number of male prevalent globally is 194.1 million and 325.5 million for female, bringing the total number of prevalent 519.5 million people, representing (7%) of the world's population, table (3), figures (4 and 5).

Table 3. - Number of people aged (15 – 50) with prevalent HSV – 2 (millions) by region & sex 2020

	Sex	Africa	Americans	Eastern Mediterranean	Europe	South East Asia	Western Pacific	Overall	Global
15 - 19	M	5.8	1.3	0.3	0.4	1.4	1.1	10.5	28.7
	F	10.3	2.5	0.3	0.8	2.4	2.0	18.2	
20 - 24	M	9.5	2.7	0.6	0.9	2.7	2.4	18.8	50.8
	F	16.2	4.9	0.5	1.5	4.7	4.1	32.0	
25 - 29	M	11.6	4.0	0.9	1.5	3.9	3.9	25.8	69.0
	F	19.2	7.3	0.7	2.5	6.6	6.7	43.2	
30 - 34	M	12.7	4.9	1.2	2.2	4.8	6.1	32.0	85.5
	F	20.4	9.1	0.9	3.8	8.4	10.9	53.5	
35 - 39	M	12.7	5.7	1.3	2.6	5.6	6.2	34.3	91.4
	F	20.0	10.6	1.0	4.7	9.8	11.1	57.1	
40 - 44	M	11.8	6.2	1.3	3.0	5.9	7.0	35.3	94.0
	F	18.0	11.4	1.0	5.4	10.4	12.5	58.7	
45 - 49	M	10.6	6.5	1.2	3.4	6.2	9.6	37.5	106.2
	F	15.7	12.0	1.0	6.1	10.8	17.1	62.7	

Total	N	74.	31.3	7.0	14.0	30.6	36.5	194	519
	8							.1	.5
	F	119	57.8	5.5	24.7	53.1	64.5	325	
	.8							.5	

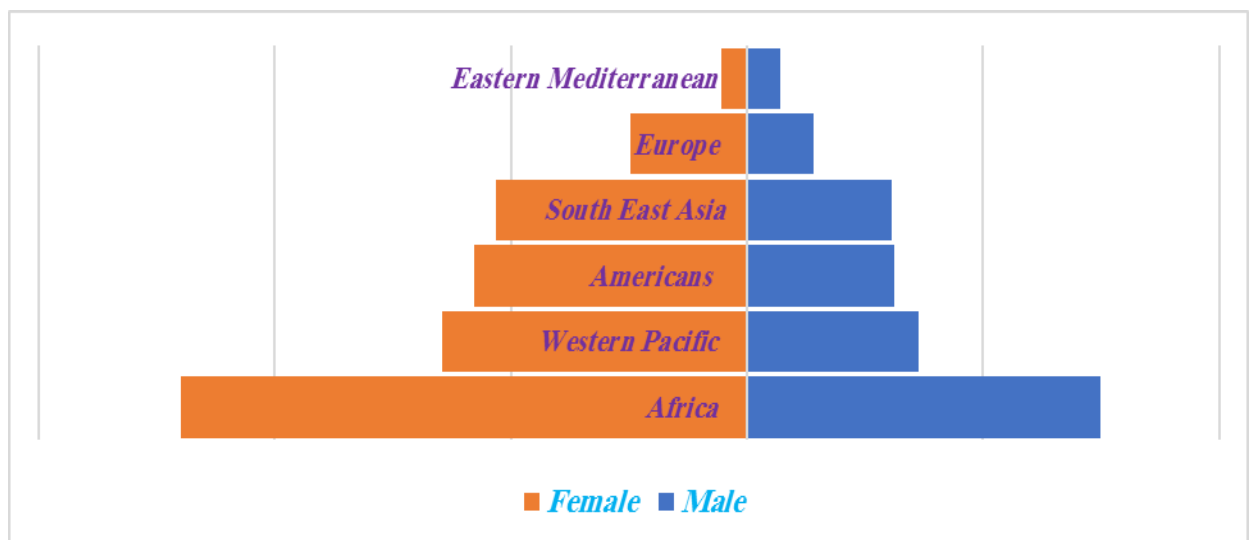


FIGURE 4. - Number of people with prevalent HSV – 2

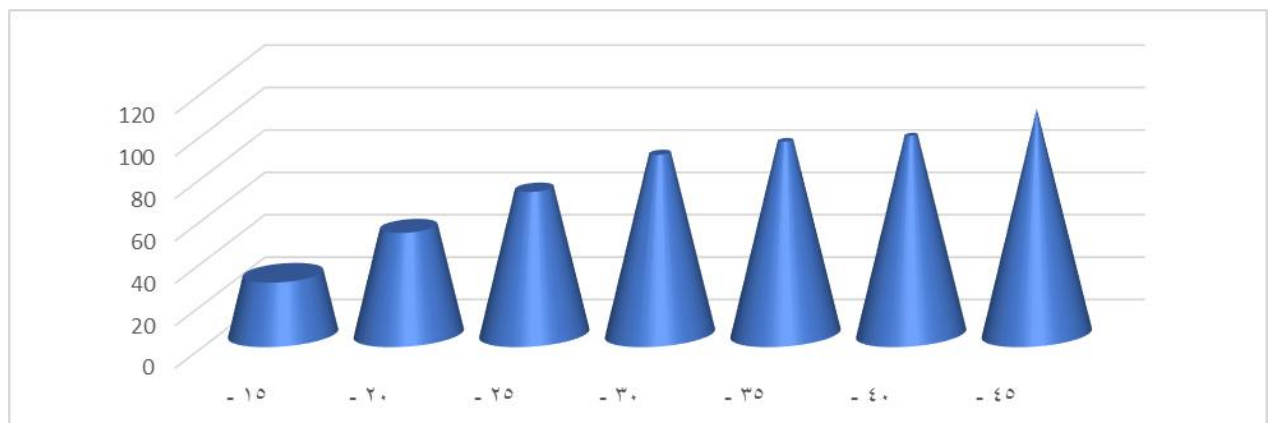


FIGURE 5. - Global prevalent age group HSV – 2

The incident of this species was much lower than the prevalent cases, the number of males were less than females, Africa ranked first (38%), followed by Western Pacific (18%), the Americas and Southeast Asia accounted for the same percentage (17%), Europe (7%), and the Middle East also had the lowest percentage (3%). The number of male incidents globally is 10 million and 15.6 million for female, bringing the total number of prevalent to more than 25.6 million people, table (4), figures (6).

Table 4. - Number of people aged (15 – 50) with incident HSV – 2 (millions) by region & sex 2020

	Sex	Africa	Americans	Eastern Mediterranean	Europe	South East Asia	Western Pacific	Overall	Global
15 - 19	M	1.1	0.3	0.1	0.1	0.3	0.2	2.0	5.5
	F	1.9	0.5	0.1	0.1	0.5	0.4	3.4	
20 - 24	M	0.9	0.3	0.1	0.1	0.3	0.2	1.8	4.6
	F	1.3	0.5	0.1	0.1	0.5	0.4	2.8	
25 - 29	M	0.7	0.3	0.1	0.1	0.3	0.3	1.6	4.0
	F	0.9	0.4	0.1	0.2	0.4	0.4	2.4	
30 - 34	M	0.5	0.2	0.1	0.1	0.2	0.3	1.4	3.6
	F								

0 -	F	0.7	0.4	0.1	0.2	0.4	0.5	2.2	
3	M	0.4	0.2	0.1	0.1	0.2	0.2	1.2	3.0
5 -	F	0.5	0.4	0.1	0.2	0.4	0.4	1.8	
4	M	0.3	0.2	0.1	0.1	0.2	0.2	0.1	2.5
0 -	F	0.3	0.3	0.1	0.2	0.3	0.4	1.5	
4	M	0.2	0.2	0.1	0.1	0.2	0.3	0.9	2.3
5 -	F	0.2	0.3	0.1	0.2	0.3	0.4	1.4	
T	M	4.0	1.6	0.4	0.7	1.6	1.7	10	25.
otal	F	5.8	2.7	0.3	1.1	2.7	2.9	15.	6

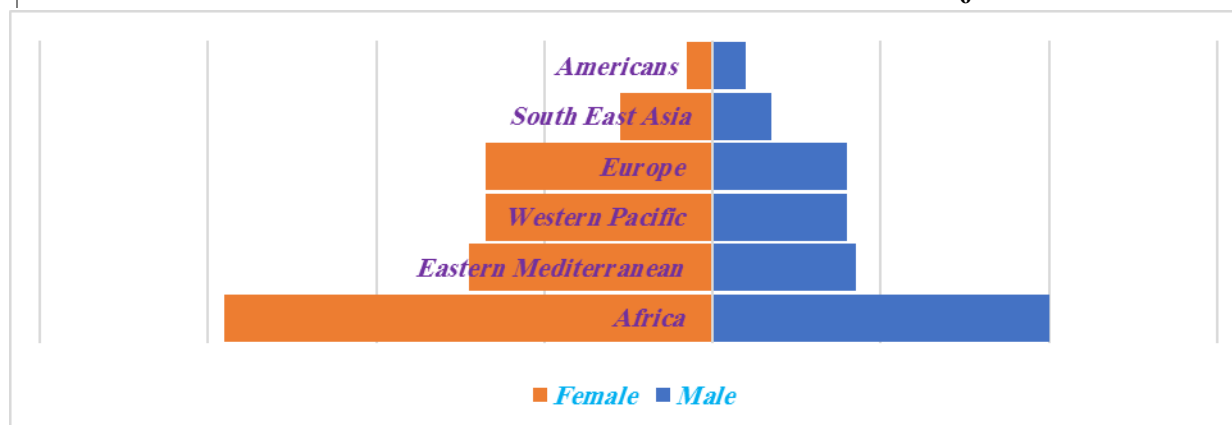


FIGURE 6. - Number of people with incident HSV – 2

Regional differences in HSV-1 and HSV-2 prevalence found in this study point to a complicated interaction between sociocultural, biological, and healthcare access factors. For example, poorer condom use rates, gender imbalance in negotiating safer sex, younger sexual debut ages, and limited access to routine STI screening and antiviral treatment may all contribute to the greater prevalence of HSV-2 in Africa and portions of South-East Asia. The stigmatization of sexually transmitted illnesses and cultural taboos around sexual health conversations may also deter people from getting timely diagnosis and treatment. These increases are in line with findings from earlier global meta-analyses, such as Looker et al. (2015), which found comparable trends but did not include current age and sex stratification among WHO regions. Conversely, the lower incidence rates seen in areas like Europe and the Western Pacific might be the result of more extensive access to diagnostic and preventive services, stronger sexual health education, and better healthcare infrastructure. However, because HSV is frequently asymptomatic, it is nonetheless underdiagnosed even in these areas, highlighting the need for ongoing monitoring and public education. These results point to significant chances for focused clinical and policy interventions. Mitigating transmission can be greatly aided by region-specific health initiatives, such as increasing access to type-specific diagnostic testing, enhancing community-level sexual health literacy, and combining HSV screening with HIV prevention programs. Additionally, funding research on the HSV vaccine and public health campaigns that normalize STI testing could lessen stigma and encourage early detection. Lastly, to lower the direct disease burden and related HIV transmission risk, authorities should think about integrating HSV-2 suppression medication into larger sexual and reproductive health programs, particularly in high-burden areas.

4. CONCLUSION

Since HSV-2 greatly enhances vulnerability to HIV infection, this may be partially explained by overlapping epidemics of HIV/AIDS. These results demonstrate the critical need for improved awareness, access to preventative and treatment measures, and region-specific public health programs.

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CONFLICTS OF INTEREST

The authors declare no conflict of interest

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