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Original Research Article

GLOBAL EPIDEMIOLOGY OF HIV INFECTIONS: AN OVERVIEW

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Abstract
Human Deficiency Virus (HIV) targets and alter the human immune system and often leads to a stage of Acquired Immuno Deficiency Syndrome (AIDS). However, the World Health Organisation believed with advanced medical technology HIV/AIDS can be managed and infected patient's life expectancy can be increased. As of 2019, around 68% of adults and 53% of children with HIV worldwide were receiving lifelong treatment. In this article, we explore the epidemiology of HIV from 2009 to 2019.
Keyword: Human Deficiency Virus; Acquired Immuno Deficiency Syndrome (AIDS); Epidemiology; Tuberculosis; Antiretroviral therapy

Introduction

Human immunodeficiency infection (HIV) is a blood-borne infection ordinarily communicated through unsafe sexual practices, shared intravenous medication gear, and congenital transmission, which can happen during the birth cycle or breastfeeding. HIV illness is brought about by contamination with HIV-1 or HIV-2, which are retroviruses in the Retroviridae family, Lentivirus variety. HIV doesn't live in salivation, tears, urine, or sweat so it can't be spread by easygoing contact with these body liquids. HIV isn't as simple to get as other sexually transmitted infections. The infection cannot be transmitted through external contact with an infected individual. It is mainly transmitted through body fluids and other means of transmission is contamination with infected people's body fluid and mother to fetal transmission. All blood items utilized in most of the world today are pre-tested for HIV, at Blood donation centres dispose of any gave blood that tests positive, so that it never gets into the public inventory. Somebody who is HIV-positive and donated blood should be reached so that they can be treated by their primary care physician, and they can be prevented from further blood donation of blood and more.[1-3]

Transmission of infection

There are several studies conducted to study the transmission of HIV infection, and it has been found that HIV affects the immune cells and therefore can integrate into DNA. This transmission occurs mostly in vulnerable social groups like sex worker, transgender and homosexual males and females. The initial stages of HIV infection are difficult to detect thereby causing a delay in treatment. The transmission is also possible from an HIV positive pregnant mother to the child, some studies show the transmission of infection occur during labour and breastfeeding and such transmissions are known as vertical transmission of mother to child transmission (MTCT). The maximum transmission of HIV infections occurs through infected body fluids, blood or broken or infected skin. Other sexually transmitted infections like HPV can also be led to HIV.

Immunodeficiency can be one of the factors for acquiring any infections. Immune function is gradually affected by HIV infected patients. The characteristics of STD/STI differs from any other infections acquired during childhood and some STD like HIV reduces the immunity to a minimum, thereby making human susceptible to other infections. Research has proven that the most advanced stage of HIV is known as Acquired immunodeficiency syndrome (AIDS), which can be responsible for long-term compromised health status. HIV infection can also lead to other chronic conditions like

cardiovascular diseases, done diseases, renal and hepatic diseases and other co-morbidities. [4]

Worldwide epidemiology

HIV is responsible for causing the majority of infection Worldwide. Since 1980 the epidemic has begun, there were about 76 million people infected with HIV and 33 million people died due to the infection. It has been estimated that about 38.0 million people were living with HIV in 2019 and about 690,000 have died due to cause related to HIV globally.[5]

There are about 1700,000 people infected who were new with the Human immunodeficiency virus in the year 2019. The burden of the epidemic varies with region and countries along with modes of transmission but the African region, as categorized by World Health Organization remains severely affected most of the time and nearly 1 in every 25 adults are living with HIV. The high prevalence of HIV is also seen high in Thailand among injecting drug users. HIV infection is highly responsible for huge numbers of morbidity and mortality worldwide. The number of mortalities directly depends upon the duration of the infectious period.[6]

It was estimated by WHO in the 1900s to have killed more than 3 million people. HIV is one of the leading causes of death among women and men aged 20-40 years especially. One of the Global surveillance data towards the end of 1980s showed that prevalence of HIV is seen throughout the Globe, a larger number of cases were also seen in some parts of the world like North America, Oceania, Latin America, Western Europe, Sub-Saharan Africa and some parts of Asia. But Sub-Saharan Africa accounts for more than 70% of the burden of infection alone.[5-7]

In nearly all regions of the world, the prevalence of HIV is highest among the high-risk population. The high-risk population can be categorized as the population including men who have sex with men, intravenous drug users, imprisoned people, men or women with multiple sex partners, sex workers, transgender, young population and newborn. Apart from this mother to child transmission is also one of the risk factors which puts the life of an infant in danger, but ART introduction has been one of the successful methods towards the elimination of mother to child transmission.[8,9] In Sub-Saharan Africa, the adult women population are at risk. The risk of HIV infection increases with the region and is the highest in the region having a high prevalence of HIV. The regions show large differences in prevalence among the Geographic regions but in some regions of the World, the burden of HIV has remained stable for a considerably long term.[5, 7-10]

In 2014 an estimation was made which showed about 2 million new cases of HIV, although it was a 35% decline from the year 2000, as stated in some of the studies. This infection affects the productive years of life, as the population between 20-40yrs are at high risk which also affects their productivity and economy. HIV has also affected many countries economy dramatically. The US Centers for Disease Control and Prevention confirmed in a study that women account for 20% of new cases of infection alone, and this transmission of infection was mainly due to heterosexual contact. And according to another study in 2011 about 25% of women were living with HIV.[7-10]

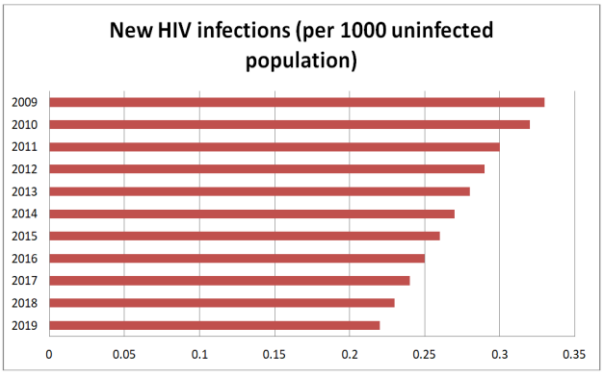

Figure 1: New HIV infections per 1000 uninfected population, from 2009-2019.

Figure 1 shows the number of new cases in time-series data collected from the World Health Organization dataset in a span of 10 years, between 2009-2019 including both males and females. The above graph shows a visible decline in the number of new cases per 1000 population left uninfected. The incidence of infection as high

as 0.35 per 1000 uninfected in 2009 and is reduced up to 0.2 per 1000 uninfected by 2019. The changing scenario can be due to improvement in the healthcare system & improved behaviour, which has been some of the factor responsible for STI (Sexually transmitted infectious diseases).[11]

Figure 2 shows a steady decline in several new cases with time among both male and female sexes between the year 2009-2019 but the number of new cases among male gradually has increased between 2017 onwards. One of the studies conducted in the past has also evident that majority of cases were associated with occupational risk factors. One of the studies conducted also shows that the majority of HIV positive patients were truck drivers, rickshaw pullers, local bus conductors/drivers and farmers, which shows a strong association between education/literacy and HIV.[10,11]

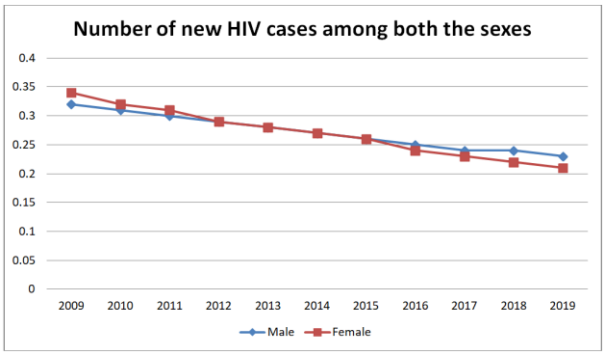

Figure 2: Number of new HIV cases among males and females, from the year 2009-2019

Figure 3 shows the new HIV infections per 1000 uninfected population in a different region of the world each year, Africa shows a visibly higher number of new cases of both males and females irrespective of their age compared to all other regions, whereas Southeast Asia has lesser number of cases comparatively. The difference among these regions is consistent over 10 years from 2009-2019. The changing number of cases has shown a considerable decline from 2009 to 2019. The new cases of HIV in Sub-Saharan Africa have also seen a decline in ten years. Whereas, other regions remain consistent over years. Despite numerous numbers of studies and researcher conducted to understand the biology of the human immune deficiency virus the public health planning continues to get affected by the changing parameters of the virus.[12]

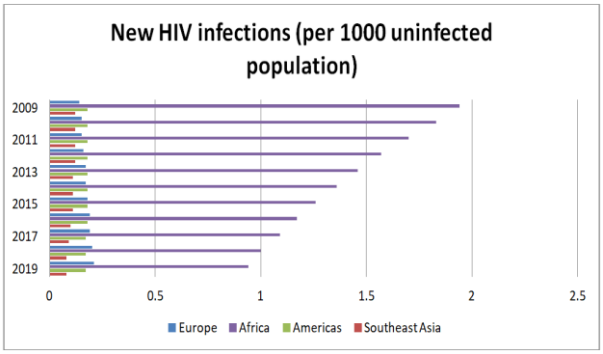

Figure 3: HIV cases in different regions of the world like Europe, Africa, the Americas, Southeast Asia, from 2009-2019. Source: WHO

TUBERCULOSIS AMONG HIV/AIDS PATIENTS

The advent of HIV infection has given rise to tuberculosis as a major challenge in developing countries. The HIV infection causes a destructive effect on the immune system and the rising cases of tuberculosis along with HIV makes the situation more severe. Though HIV is the deadliest disease tuberculosis is one of the leading cause of death among patients suffering from HIV. The advent of TB and HIV has nearly remained the same in the early 20th century. It was identified in one of the studies that children <5years of age are at higher risk of TB than adults, but for children with HIV the risk of TB prevalence is high along with higher mortality rates. It has also been observed TB among HIV patients are more prevalent than among HIV negative patients.[13]

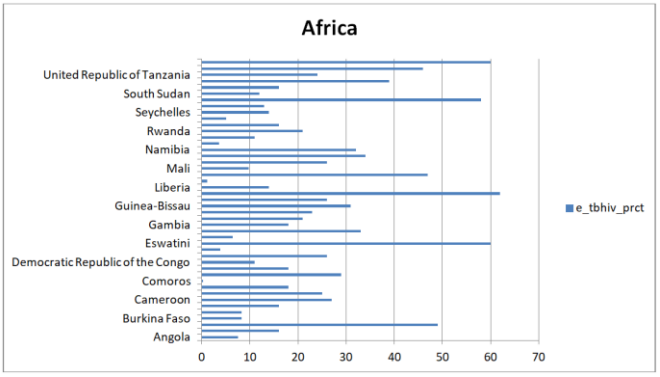

Figure 4: Shows prevalence of TB-HIV (%)in the African region till 2019

An observation was made in some parts of the world especially; South Africa TB cases are found among the HIV population which accounts for not less than half of all TB cases. This unique factor of HIV being associated with TB needs more public health interventions. As in HIV existing conditions, TB is more difficult to diagnose and treat. Figure **4** shows how the percentage of both TB and HIV in regions of Africa, as it is considered one of the HIV prone region.[14, 15]

Conclusion

HIV infection continues to get transmitted to various regions of the World, but to the continuous development of treatment and healthcare system the numbers of infections have been reduced in 2019 as compared to 2009. The patient with HIV positive are immune-compromised and are susceptible to other types of co-infections. Tuberculosis is one of those cases seen widely among HIV affected individual which causes serious illness and is responsible for large numbers of mortality irrespective of sexes. Low-income, Low-middle income nations are more prevalent to these types of STI and Africa is one among those regions which have a higher number of HIV infections and TB infections in the later years. Though because of HIV infection, the lifespan of people is reduced to years and then to months because of Tuberculosis. ART has been proven to reduce or eliminate the risk of transmission of infection, but need to be more improvement in prevention, treatment and implementation. The use of proper preventive measures like the use of condoms can be a helpful measure. Other measures like safe injection practices also reduce HIV transmission, drug users need to take proper precaution and avoid sharing of syringe for prevention of infection. Moreover, other preventive tools are required to meet up the prevention strategies.

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