Strategies Towards the Prevention of Human Immunodeficiency Virus Transmission in Pediatrics

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Almost 40 years have passed since the first clinical descriptions of acquired immunodeficiency syndrome (AIDS) in 1981 and the discovery of a new human retrovirus, human immunodeficiency virus (HIV), in 1983. Antiretroviral drugs that efficiently prevent and treat HIV infection were only available in the mid-1990s.[1] With the progress in HIV research and the development of new therapies, HIV infection has shifted from being an acute fatal disease to a chronic manageable condition, with a reasonably good life expectancy in those that comply with treatment. Nevertheless, treatment is not without issues, with inflammation-associated and immunodeficiency-related complications, such as cardiovascular disease and cancer, becoming more frequent. In addition, long-term exposure to antiretroviral drugs causes cumulative toxicity which leads to metabolic disturbances and end-organ damage.[2]

In 2018, 37.9 million people worldwide lived with HIV, of which 23.3 million (62%) were receiving antiretroviral treatment. The estimated number of new infections in 2018 was 1.7 million and the estimated number of deaths was 0.7 million.[3] In the pediatric age group (< 15-year old), in 2018, an estimated number of 1.7 million children lived with HIV, of which 100,000 died, with an estimated 160,000 new infections occurring in this age group.[3] However, although high, these figures have significantly reduced in comparison to previous years.

Portugal is one of the countries in Western Europe with a higher incidence of HIV infection and where the total number of people living with HIV is increasing. The most recent data, published in 2017, shows an incidence of 10.3 per 100,000 inhabitants, with a European average of 6.3 per 100,000. In 2017, 1,068 new cases were notified, of which 99.6% were in ≥ 15-year old, mostly young adults.[4]

In 2014, the Joint United Nations Programme on HIV/AIDS (UNAIDS) revealed its ambitious treatment target, the 90-90-90 plan. Its aim is that, by 2020, 90% of all people living with HIV will know their HIV status, 90% of all diagnosed with HIV infection will receive sustained antiretroviral therapy and 90% of all receiving antiretroviral therapy will have viral suppression.[5] In July 2019, the Direção Geral de Saúde (DGS) declared that Portugal has exceeded these goals, with 92.2% of those living with HIV knowing their diagnosis, of which 90.2% are undergoing antiretroviral treatment and 93% with an undetectable viral load.[6]

Therefore, the next step in controlling the HIV epidemic is assuring that appropriate strategies that reduce the spread of infection have been and will be implemented, to try to achieve the UNAIDS goal of ending the HIV/AIDS epidemic as a public health threat by 2030.[5] So which strategies are already being used and can be used in the future in children and adolescents?

In pediatrics, infection by HIV occurs most frequently through mother to child transmission during pregnancy, labor, delivery, and post-partum through breast-feeding.[7] Without suitable prophylaxis, the transmission rates are around 15%-40%.[8] Breastfeeding is known to be one of the most important risk factors for HIV mother to child transmission, with a postnatal transmission rate estimated at 15% in prolonged breastfeeding for about two years, but at 6% in children exclusively breastfed for six months.[7]

At present, strategies to reduce mother to child transmission have been well studied and are applied in a number of settings with great success. The single use of zidovudine during pregnancy and delivery by the mother and during the first six weeks of life in the non-breastfed new-born reduces transmission from 25.5% to 8.3%.[8] Moreover, the combination of the zidovudine protocol and elective caesarean delivery reduces this transmission rate to 2%,[9] and the use of highly active antiretroviral therapy during pregnancy combined with an optimized route of delivery and neonatal prophylaxis reduces this rate even further to under 0.5%.[10]

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In other pediatric age groups, different sources of transmission must be considered, such as consented or non-consented sexual intercourse with an infected person, drug abuse, contact with contaminated needles or other sharp objects, all of which can pose a risk of infection. Recommendation for safe sexual practices in adolescents, such as the use of condoms, as well as advising against drug abuse, will limit the threat. Still, in situations where it is considered that there was a risk of the child or adolescent being infected, post-exposure prophylaxis (PEP) is recommended. PEP is a short course of four weeks of antiretroviral medication within 72 hours of a possible or probable exposure to HIV and has shown to reduce significantly the risk of transmission.[11]

Another noteworthy strategy for the prevention of transmission of HIV is treatment as prevention (TasP), for which the 90-90-90 programme has contributed significantly. By treating everyone infected with HIV with the aim of all having non-detectable viral loads, subsequent transmission to the community will be significantly reduced.[11]

Yet, even with all the strategies outlined above, selected populations, which can include adolescents, remain at increased risk of HIV infection, such as those with high risk sexual behavior or drug users. In 2014, the World Health Organization recommended the introduction of pre-exposure prophylaxis (PrEP), the use of antiretroviral medication to prevent the acquisition of HIV by uninfected persons considered at very high risk of infection.[12] As the highest rate of HIV infection in Portugal is in young adults, the development of strategies that reduce the number of new cases is a priority. In the current issue of the Portuguese Journal of Pediatrics, the advantages and disadvantages of the use of PrEP in the setting of adolescent care are discussed in detail.[13]

The paradigm has now shifted, and HIV infection has ceased to be the "elephant in the room" and is, perhaps, undervalued by adolescents who see it as a treatable, albeit chronic disease. However, both the infection and its treatment are not harmless and reinforced attitudes towards the prevention of the spread of disease, particularly in high risk groups, is vital to avoid a further increase in the number of cases.

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Conflicts of Interest

The authors declare that there were no conflicts of interest in conducting this work.

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