

Epidemiological features of HIV infection in Kyrgyzstan Osh region

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Abstract

This article is investigating main trends in HIV epidemic development in Kyrgyzstan, as in other Commonwealth Independent State (CIS) countries, there are an intensive increase in a number of new cases among young people, especially among reproductive age women with perinatally infected babies and among patients infected by heterosexual transmission routes. Research methods are based on statistical data obtained after analyses of HIV prevalence, distribution by gender, HIV infection incidence dynamics particularly in Osh and in Kyrgyzstan.

Keywords: HIV infection, epidemic process, prevalence, epidemiological features

1. Introduction

HIV infection is a serious public health problem worldwide; despite the importance of acute HIV, optimal clinical and public health strategies for AHI are unclear (Rutstein et al., 2017; Acácio et al., 2018; Vu et al., 2020). Due to the globalization process, HIV infection began to acquire the character of a pandemic, affecting the world community as a whole; recently, in many countries disruptions in HIV services and care due to the COVID-19 pandemic were revealed (Gatechompol et al., 2021). Disruption of healthcare services related to HIV, including HIV testing, treatment of opportunistic infections and other HIV prevention strategies already has led to increased HIV incidence (Eisinger et al., 2021). For several years, the prevalence of HIV

infection among users of psychoactive substances and drug addiction is bind with HIV infection (Lenok, 2009b). An alarming trend of the present time in the world has become the “transfer” of the epidemic to all segments of the population, the so-called heterosexual transmission. At the beginning of the epidemiological process of HIV infection, it is believed that risk of infection in women is minimal since most cases of the disease were recorded among risk groups, namely, homosexuals and drug addicts (Dumchev et al., 2020).

Analysis of HIV infection spreads ways in which EECA regions revealed a change in the epidemiological process, namely an increase in cases of heterosexual transmission of HIV infection. Nowadays more people, mostly

young women, are infected with HIV from their regular sexual partners who have a history of using psychoactive substances and who do not know or deliberately hide their HIV status.

Over the past few years, proportion of women in several countries has reached 50% among newly reported cases of HIV infection. Very often women find out about their HIV infection status during pregnancy registration. It should be noted that among HIV-infected women more than 90% are of childbearing age. Perinatal transmission of HIV infection can occur in utero, during labor and delivery, or postnatally through breastfeeding (Niragire et al., 2021; Gray & McIntyre, 2007). In the global aspect transmission rates for HIV infection can be reduced to less than 1% in pregnant women being compliant on their cART with virologic suppression and other perinatal recommendations (Rimawi et al., 2016).

With an increase in number of HIV-infected women, number of pregnancies and childbirth in these women are also increasing (Klyuchareva et al., 2008; Byrne et al., 2017). The probability of HIV-infected childbirth by HIV-infected mothers in absence of preventive measures reaches up to 40% (Ermak et al., 2010; Mayer & Venkatesh, 2010). At the same time, a total number of children born with HIV is decreasing, as an estimated children infected with HIV in 2009 was 370,000, which is a 24% decrease from five years earlier.

The purpose of this study was to determine features of the HIV epidemic spread in the Osh region and Osh city.

2. Research methods and materials

In the course of this study, data from the statistical reporting form No. 4 “On the results of a blood test for HIV infection” and form No. 4a “On the registration of HIV infection” in Osh city and region were used. Data on the HIV infection incidence analyzed by epidemiological method. For quantitative assessment, indicators characterizing HIV infection with HIV prevalence among the male and female population, among different age groups, as well as distribution indicators by risk factors obtained by survey method (Lenok, 2009a). Calculation of indicators carried out by conventional methods; processing and analysis of obtained materials carried out on a computer using Epi-Info program.

3. Results and discussion

Figure 1 is showing HIV prevalence per 100,000 population in the Kyrgyz Republic was estimated as 157.5 on 1st January 2021. Figure 1 is showing indicators after analysis of HIV in Kyrgyz republic for 2021, that infection was 365.4 in Osh, 288.4 in Chui oblast and 205 in Bishkek, respectively. In other regions was less than the republican indicator.

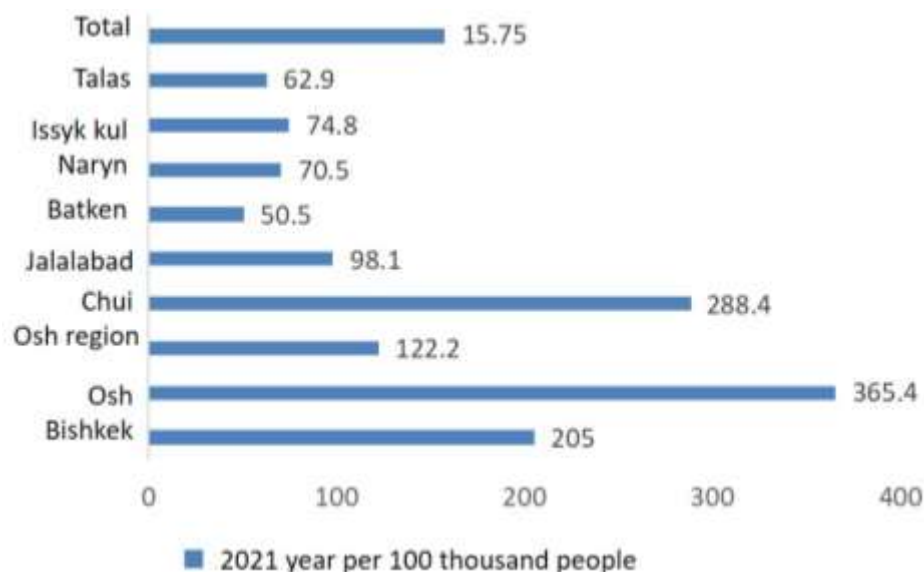


Figure 1. Prevalence of HIV infection in the Kyrgyz Republic per 100000 people in the 2021 year

3.1. The number of HIV infected people in the Osh region for periods from 1998 to 2020

Figure 2 is showing HIV infection incidence dynamics in the Osh region. Epidemiological analysis revealed that during 1998 to 2000 years in the Osh region, there were single, isolated cases of HIV infection. The initial period in a moderate increase of HIV infection

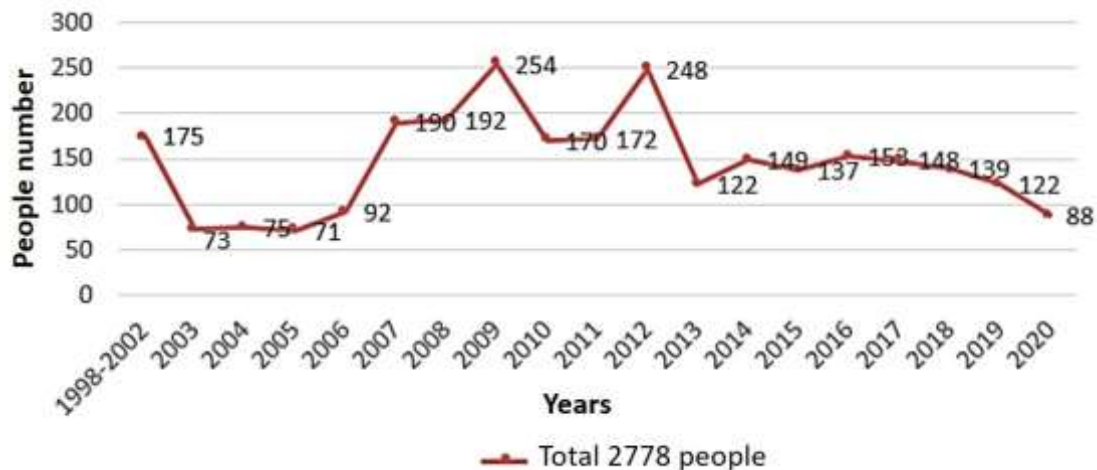


Figure 2. HIV infection incidence dynamics in Osh during 1998 to 2000 years.

The diagram shows the dynamics of the incidence of HIV infection in the Osh region. Epidemiological analysis showed that during 1998 to 2000 in the Osh region, there were single, isolated cases and, in general, the infection had a serious character. Since 2001 to 2006 belong to the initial period and there is a moderate increase in the HIV infection incidence mainly due to the spread of drug-addicted people.

From 2004 to 2005 years, and epidemiological situation was characterized by the involvement of women in the epidemiological process, which subsequently contributes to emergence of HIV infection among children.

From 2006 to 2012 years falls on the second period the period of maximum rise in the incidence. From 2006 to 2008 years, HIV infection epidemiological situation is deteriorating due to an increase in several children with a vertical route of infection and introduction of infection into medical institutions with formation of nosocomial foci of infection in children's hospitals in Osh,

incidence determined from 2001 to 2006 mainly due to drug users. From 2004 to 2005, an epidemiological situation characterized by the involvement of women, subsequently contributes to emergence of HIV infection among children.

Karasuu and Nookat districts. Such increase in number of identified patients with HIV infection in 2009 and 2012 can be explained by a mass study of children was carried out according to epidemiological indications.

From 2014 to 2020 years, there is a trend towards a decrease in the spread of HIV infection, as of January 1, 2021, in the Osh region, 1.589 cases of HIV infection were registered with a cumulative total and 1.189 cases of HIV infection were registered in Osh city. In 2013 to 2021 there is reduction and stabilization of incidence, when intensive indicators decreased almost 2 times compared to 2012.

3.2. Distribution of HIV infection by gender in years

Figure 3 shows the distribution of HIV infection by gender. At the beginning of the epidemiological process development, men prevailed mainly due to drug addict risk group, then with involvement of women in the

epidemiological process in 2004 to 2005, a gradual increase in women was noted. For the period 2013 to 2020, there is a uniform

detection of HIV infection, both among men and women. A diagram is showing that number of males prevailing females number.

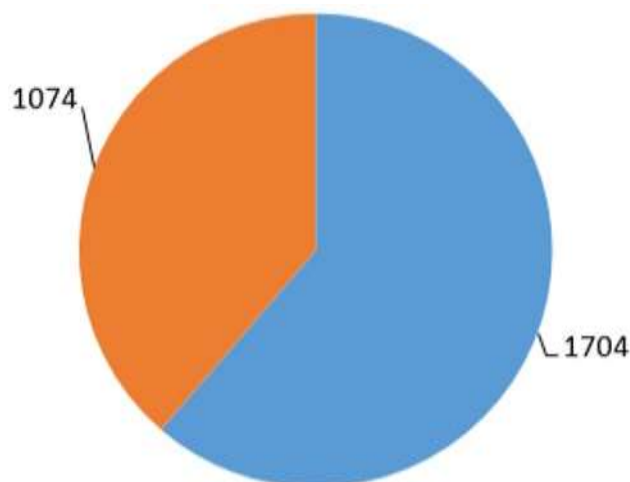


Figure 3. Distribution of HIV-infected people by gender.

3.3. Age characteristics of HIV infected people distribution in Osh region

HIV infection in the Osh region was detected in three districts (Karasuu, Nookat and Uzgen) and is equal to 88.7%. Prevalence rates in Osh exceed HIV infection rate in the country, Karasuu and Nookat districts are in second and third places, respectively. In Alai

were 61 people infected, in Aravan were 52 people, in Nookat 334 people, in Uzgen 180 people, in Karasuu 897 people, in Karakuldzha were 59 people and in Chon Alai were 6 people. Table 1 is showing the age characteristics of HIV-infected people in Osh region.

Table 1. Age characteristics of HIV infected people in Osh region.

Age	Quantity (absolute number)	Percentage %
0-14	505	18.2
15-24	355	12.8
25-28	360	12.9
29 and older	1558	56.1
Total	2778	100

More than half of HIV-infected people were aged 29 years and older and account for 56.1%. In second place were children aged from 0 to 14 years old and makeup 18.2%, in third place were people aged from 15 to 24 and 25 to 28 years old that is 12.8 and 12.9%, respectively.

3.4. Transmission routes

Common route of HIV infection transmission is mother-to-child transmission in which the risk of HIV transmission was highly

correlated with cell-associated viral load (Showa et al., 2019).

In an analysis of transmission routes in Figure 4, the parenteral route of transmission prevails in 1362 cases, of which in 1006 cases are drug-addicted people, but in dynamics, there is a downward trend and in 356 cases were children from nosocomial foci of infection. After was prevailed sexual route of transmission in 1224 cases, which has been

increasing in recent years due to the involvement of women in the epidemiological process and the increase in sexual route of transmission among young people and migrants. Children with vertical transmission of

HIV infection were 137 cases. With introduction of prevention from mother to child transmission of HIV infection, vertical transmission is decreasing and in last years was not registered.

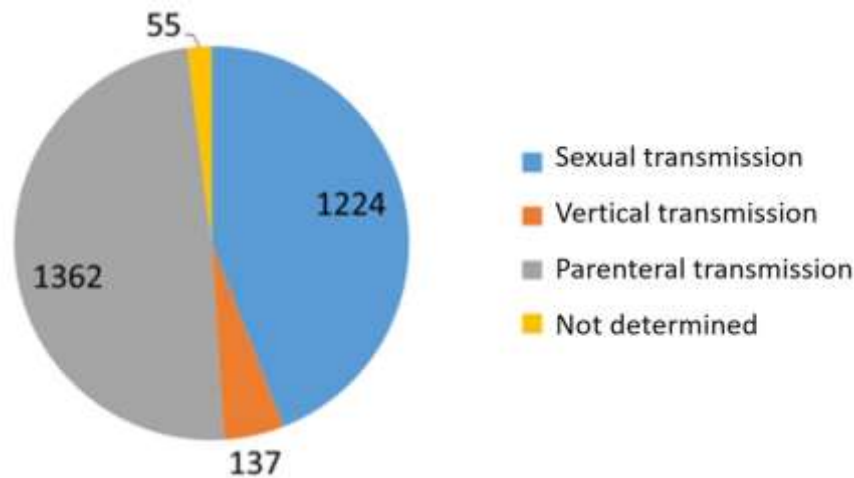


Figure 4. HIV infection transmission routes.

3.5. HIV infection among patients at risk and distribution by clinical stages

HIV infection prevailed among contingents that are at risk as 1/3 of patients are drug-addicted (36.2%) people and migrants (22.7%). A small number are men who have sex with men and commercial sex workers. From 2778 HIV infected, 123 patients were not under dispensary observation, and the remaining 95.6% were registered with dispensaries.

From the database of electronic tracking of 95.6% of HIV infected patients with 3rd clinical stage were 936 patients (93.7%), patients with 1st clinical stage were 792 patients (28.5%), and patients with 4th clinical stage were in 559 cases (20.1%) of all registered cases. The smallest number was found in patients at 2nd clinical stage, which is 368 cases (13.2%) respectively.

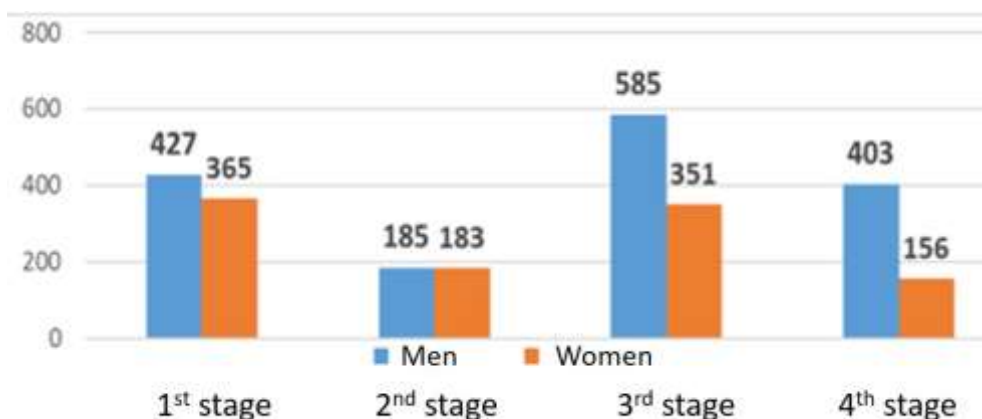


Figure 5. HIV infection distribution by clinical stages.

Age characteristics of HIV-infected people at various clinical stages of the disease (abs. hours). It was found that first clinical stage prevails at a patient with age from 20 to 40 years, the second clinical stage is recorded in

small quantities in all age categories, the third clinical stage prevails in children under 14 years and at age from 30 to 49 years old, fourth clinical stage is more common between patient aged from 30 to 49 years.

Comparative characteristics of prevalence and mortality among HIV infected people in the Osh region. Out of 2778 HIV-infected patients, 715 patients died, which is 25.7%. Among those who died at the terminal stage of the disease, 406 patients (56.8%).

Conclusion

In summary, epidemiological process of HIV infection in Osh region can be divided into following stages: 1) initial period of epidemic including 1998 to 2006 years HIV infection registered cases among risk groups, namely among injecting drug users; 2) maximum rise in epidemic from 2007 to 2012 years where women and children are involved in the epidemiological process with the subsequent spread of HIV infection in nosocomial foci among children; 3) period of decline and stabilization of the epidemic (2013-2021) there is a trend towards a decrease in case registrations.

References:

- [1] Acácio, S., Nhampossa, T., Quintó, L., Vubil, D., Sacoor, C., Kotloff, K., Farag, T., Dilruba, N., Macete, E., Levine, M. M., Alonso, P., Mandomando, I., & Bassat, Q. (2018). The role of HIV infection in the etiology and epidemiology of diarrheal disease among children aged 0-59 months in Manhica District, Rural Mozambique. *International journal of infectious diseases*, *73*, 10–17. <https://doi.org/10.1016/j.ijid.2018.05.012>
- [2] Byrne, L., Sconza, R., Foster, C., Tookey, P. A., Cortina-Borja, M., & Thorne, C. (2017). Pregnancy incidence and outcomes in women with perinatal HIV infection. *AIDS (London, England)*, *31*(12), 1745–1754. <https://doi.org/10.1097/QAD.0000000000001552>
- [3] Dumchev, K., Kornilova, M., Kulchynska, R., Azarskova, M., & Vitek, C. (2020). Improved ascertainment of modes of HIV transmission in Ukraine indicates importance of drug injecting and homosexual risk. *BMC public health*, *20*(1), 1288. <https://doi.org/10.1186/s12889-020-09373-2>
- [4] Eisinger, R. W., Lerner, A. M., & Fauci, A. S. (2021). Human Immunodeficiency Virus/AIDS in the Era of Coronavirus Disease 2019: A Juxtaposition of 2 Pandemics. *The Journal of infectious diseases*, *224*(9), 1455–1461. <https://doi.org/10.1093/infdis/jiab114>
- [5] Ermak, T.N., Kravchenko, A.V., Shahgildyan, V.I., Kanestri, V.G. (2010). Analysis of the causes of deaths in patients with HIV infection in the Russian Federation. *Epidemiological infectious Diseases*, *3*, 46-51.
- [6] Gatechompol, S., Avihingsanon, A., Putharoen, O., Ruxrungtham, K., & Kuritzkes, D. R. (2021). COVID-19 and HIV infection co-pandemics and their impact: a review of the literature. *AIDS research and therapy*, *18*(1), 28. <https://doi.org/10.1186/s12981-021-00335-1>
- [7] Gray, G. E., & McIntyre, J. A. (2007). HIV and pregnancy. *BMJ (Clinical research ed.)*, *334*(7600), 950–953. <https://doi.org/10.1136/bmj.39176.67497.7.AD>
- [8] Klyuchareva, A.A., Shilova, S.D., Astapov, A.A., Germanenko, I.G., Petrovich, I.V., Goloborodko, N.V., Oskirko, A.N. (2008). Providing medical care to HIV-infected pregnant women and mothers. Users guide, Belarus Republic Ministry of Health, Minsk, 1-24.
- [9] Lenok, G. W. (2009a). Reproductive health care system, training of specialists on the problem of preventing HIV infection. *Siberian Medical Journal (Irkutsk)*, *88* (5), 151-153.
- [10] Lenok, G. W. (2009b). HIV infection - the current state of the problem. *Siberian Medical Journal (Irkutsk)*, *90* (7), 145-148.
- [11] Mayer, K. H., & Venkatesh, K. K. (2010). Chemoprophylaxis for HIV prevention: new opportunities and new questions. *Journal of acquired immune deficiency syndromes (1999)*, *55* Suppl 2(Suppl 2), S122–S127. <https://doi.org/10.1097/QAI.0b013e3181fbcb4c>

- [12] Niragire, F., Ndikumana, C., Nyirahabimana, M. G., & Uwizeye, D. (2021). Prevalence and factors associated with fertility desire among HIV-positive women in Rwanda in the context of improved life expectancy. *Archives of public health = Archives belges de sante publique*, 79(1), 209. <https://doi.org/10.1186/s13690-021-00742-w>
- [13] Rimawi, B. H., Haddad, L., Badell, M. L., & Chakraborty, R. (2016). Management of HIV Infection during Pregnancy in the United States: Updated Evidence-Based Recommendations and Future Potential Practices. *Infectious diseases in obstetrics and gynecology*, 2016, 7594306. <https://doi.org/10.1155/2016/7594306>
- [14] Rutstein, S. E., Ananworanich, J., Fidler, S., Johnson, C., Sanders, E. J., Sued, O., Saez-Cirion, A., Pilcher, C. D., Fraser, C., Cohen, M. S., Vitoria, M., Doherty, M., & Tucker, J. D. (2017). Clinical and public health implications of acute and early HIV detection and treatment: a scoping review. *Journal of the International AIDS Society*, 20(1), 21579. <https://doi.org/10.7448/IAS.20.1.21579>
- [15] Showa, S. P., Nyabadza, F., & Hove-Musekwa, S. D. (2019). On the efficiency of HIV transmission: Insights through discrete time HIV models. *PloS one*, 14(9), e0222574. <https://doi.org/10.1371/journal.pone.0222574>
- [16] Vu, G. T., Tran, B. X., Hoang, C. L., Hall, B. J., Phan, H. T., Ha, G. H., Latkin, C. A., Ho, C., & Ho, R. (2020). Global Research on Quality of Life of Patients with HIV/AIDS: Is It Socio-Culturally Addressed? *International journal of environmental research and public health*, 17(6), 2127. <https://doi.org/10.3390/ijerph17062127>