EPIDEMIOLOGY OF HIV INFECTION IN THE REPUBLIC OF MARI EL AND THE RUSSIAN FEDERATION

[a]ARTHUR AMIROVICH ALMUKHAMETOV, [b]ILIA VLADIMIROVICH PETROV,
[c]FIRUZA SALAVATOVNA PETROVA,
[d]ANAS ANVAROVICH GILMANOV, [e]NADEZHDA VALENTINOVNA SERGEEVA,

[a]Kazan Federal University, Medical sanitary; "Kazan State Medical University" Russian Ministry of Health Russia, Kremlyovskaya St, 18, Kazan, Republic of Tatarstan, 420008, Russia
[b]Kazan State Medical University, Russian Ministry of Health Russia; Mari State University, Ulitsa Butlerova, 49, Kazan, Republic of Tatarstan, 420012, Russia
[c]Mari State University; Regional Office of Rospotrebnadzor in the Republic of Tatarstan, Ploshchad' Lenina, 1, Yoshkar-Ola, Mari El Republic, 424000, Russia
[d]"Kazan State Medical University" Russian Ministry of Health Russia, Ulitsa Butlerova, 49, Kazan, Republic of Tatarstan, 420012, Russia
[e]Mari State University, Ploshchad' Lenina, 1, Yoshkar-Ola, Mari El Republic, 424000, Russia
E-mail: [a]artyr_efendi@mail.ru, [b]ilia.v.petrov@mail.ru, [c]f.s.petrova@mail.ru, [d]galmanovaa@mail.ru, [e]nsergeeva@mail.ru

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Abstract: HIV infection continues to be a global public health problem, despite the progress made in the medical science development. This study was aimed at describing the epidemiological situation associated with HIV infection in the Republic of Mari El and the Russian Federation. In this work, the authors used state reports of the Office of the Federal Service for Supervision of Consumer Rights and Human Well-Being Protection in the Republic of Mari El "On the State of Sanitary and Epidemiological Well-Being of the Population of the Republic of Mari El", the Federal Service for Supervision of Consumer Rights and Human Well-Being Protection "On the State of Sanitary and Epidemiological Well-Being of the Population in the Russian Federation".

Key words: HIV infection, epidemiology, infectious diseases, epidemic process.

1 Introduction

Infection caused by the human immunodeficiency virus (HIV infection) remains a global health care problem despite the achievements in medicine development (antiretroviral therapy (ART), global HIV/AIDS prevention and control strategies, pre-exposure and post-exposure prevention, etc.) [Sheri R. Notaro. 2020 ;Brian A. Nuyen, Jennifer L. Glick, Vanessa Ferrel and W. 2020 ;Sylvie Naar, 2020].

Medicine has stepped much forward in the prevention of HIV infection. Thus, the achievements with the greatest importance (in addition to the above) for public health include: circumcision, ART to prevent mother-to-child infection transmission, ART in people with HIV to prevent transmission. Currently, it is known that there are researches in the field of other preventive measures, for example, vaccine and vaginal microbicides [Gary Maartens, 2014;I.V. Petrov, M.O. Novikova, G.R. Khasanova et al. 2017.].

Vulnerable HIV infections include injection drug users (IDUs), commercial sex workers (CSW), and men having sex with men (MSM). The high risk group for HIV infection is comprised of CSW clients, sexual partners of IDUs, prisoners, street children, people practicing a risky model of sexual behavior (having a large number of sexual partners), migrant segments of the population (truckers, seasonal workers, including foreign citizens, working on a rotational basis and others), people, who abuse alcohol and non-injection drugs. The latter is explained by the fact that this group of people is inclined to practice more unsafe sexual behavior under the influence of various psychoactive substances [Decree of the Chief State Sanitary Doctor of the Russian Federation No. 1 dated January 11, 2011].A proven fact is that screening, as well as early detection and ART initiation, is critical to preventing further transmission of HIV infection, reducing morbidity and mortality among HIV-positive people. HIV-positive people initially do not have specific clinical manifestations, which is one of the factors that delay the detection and ART initiation. Thus, the lack of timely diagnosis of HIV infection leads to the continuation of virus transmission Veeravan Lekskulchai. 2019;Pfaender S, von Hahn T, Steinmann J et al: 2016;Jefferies M, Rauff B, Rashid H et al: 2018;Ly KN, Xing J, Klevens RM et al: 2012; Maartens G, Celum C, Lewin SR: 2014 ;O'Kelly K, Byrne D, Naughten E et al: 2016]. Various works confirm the facts described above. Thus, a cross-sectional study conducted in the People's Republic of China among 978 clients (men aged 50 years and above) of commercial sex workers revealed that voluntary counseling and HIV testing can be considered as an effective intervention tool to prevent HIV infection. In addition, voluntary counseling and HIV testing contributes to behavioral changes among high-risk groups in the provision of medical care [Qi Zhang, Yuan-Sheng Fu, Xue-Mei Liu and authors. 2017]. The above described determined the relevance of this study and set the goal to describe the epidemiological characteristics of HIV infection in the Republic of Mari El (RME) and the Russian Federation (RF).

2 Methods

The authors analyzed the official data of state reports of the Office of the Federal Service for Supervision of Consumer Rights Protection and Human Well-Being in the Republic of Mari El (Office of the Rospotrebnadzor in the Republic of Mari El) "On the State of Sanitary and Epidemiological Well-Being of the Population of the Republic of Mari El", the Rospotrebnadzor "On the State of Sanitary and Epidemiological Well-Being of the Population in the Russian Federation" and the form of federal state statistical monitoring No. 61 "Information on HIV Infection". The study included materials from 2014 to 2018. When processing the results obtained in the course of this study, we used epidemiological methods and generally accepted variation statistics taking into account the reliability degree of results and the compliance of epidemiological studies with the evidence-based medicine criteria.

3 Results

The epidemiological analysis conducted for 2014 - 2018 revealed that the average long-term incidence rate is 61.2 per 100 thousand of population in the Russian Federation. The largest excess of this level was recorded at 6.5% in 2015 (65.2 per 100 thousand of population), the smallest - at -4.6% in 2014 (58.4 per 100 thousand of population). The incidence rate of HIV infection remains at a stable level over the study. The prevalence of HIV infection over the specified period increased by 1.4 times in the Russian Federation (2014 - 494.6; 2018 - 686.2 per 100 thousand of population, respectively). As of 2018, there were 131,593 more patients entered in the dispensary register for HIV infection than in 2015 (751,712; 620,119 people, respectively) in the Russian Federation.

In the RME, the indicator of the long-term average incidence (21.4 per 100 thousand of population) was 2.9 times lower for the studied period than in the Russian Federation. The largest excess of this indicator was established at 39.7% in 2018 (29.9 per 100 thousand of population), the smallest - at -32.7% in 2015 (14.4 per 100 thousand of population). The incidence of HIV

infection increased by 1.8 times for 2014-2018 in the RME (2018 - 29.9; 2014 - 16.8 per 100 thousand of population) (Figure 1).

It is worth noting that in the RME there is a significant tendency towards an increase in the incidence of HIV infection (y = 3.9x + 9.66; R2 = 0.8246).

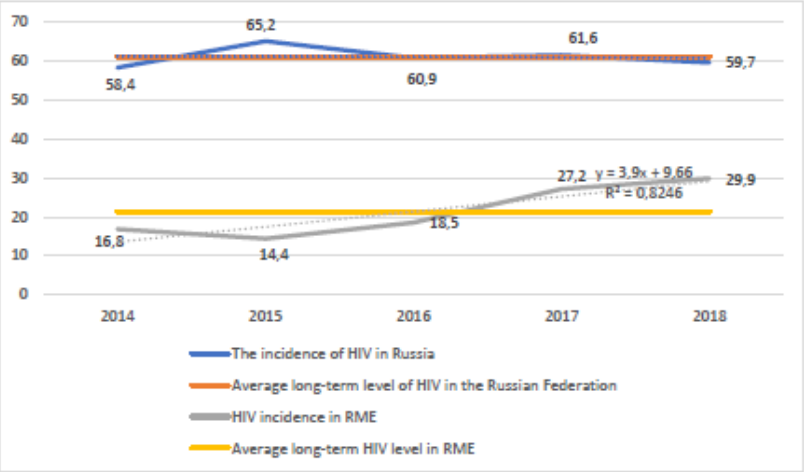

Fig.1. Incidence of HIV infection in the Republic of Mari El and the Russian Federation for 2014-2018, per 100 thousand population

When analyzing the features of the main risk factors for infection within the framework of the epidemic process of HIV infection in the Russian Federation, it was found that the share of heterosexual transmission was observed in the Russian Federation between 2014 and 2018 (2014 - 40.3%; 2018 - 57.5%). It was found that the proportion of HIV transmission by injection (IDU) decreased in the indicated period (2014 - 57.3%; 2018 - 39%). In 2016, the shares of heterosexual and injection transmission were at the same level (48.7% and 48.8%, respectively). The homosexual transmission of HIV infection slightly increased in 2014-2018 (2014 - 1.2%; 2018 - 1.8%), which requires strengthening focal prevention programs in this risk group (MSM) (Figure 2).

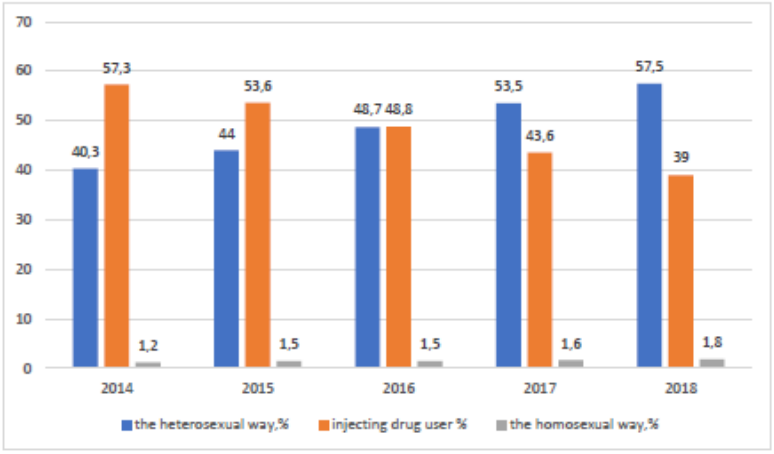

Fig 2. Structure of HIV transmission routes among the main risk groups in the Russian Federation for 2014-2018, %

In 2014 and 2015, the ratio of HIV-infected patients by gender was the same (50%, respectively) in the RME. Since 2016, there has been an increase in the share of men from 57.5% to 59.8% in 2018 (Figure 3).

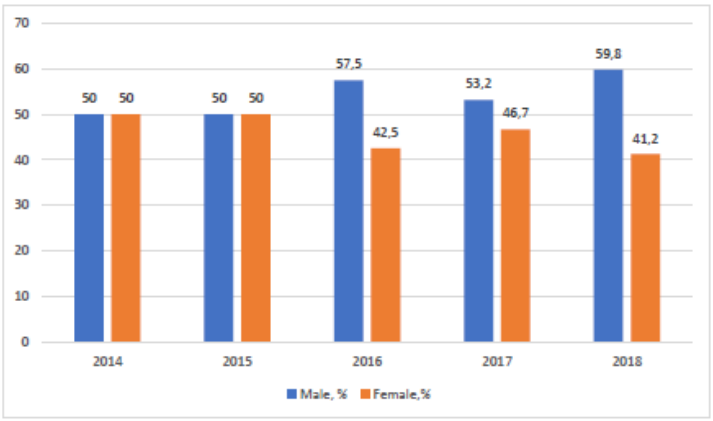

Fig. 3. Gender structure of HIV patients in the Republic of Mari El for 2014-2018, %

There is an increase in the HIV transmission share in the IDU risk group in the RME (2014 - 14.7%; 2018 - 27.5%) during the study period, which requires consideration of strengthening the interagency preventive work in this direction (Figure 4).

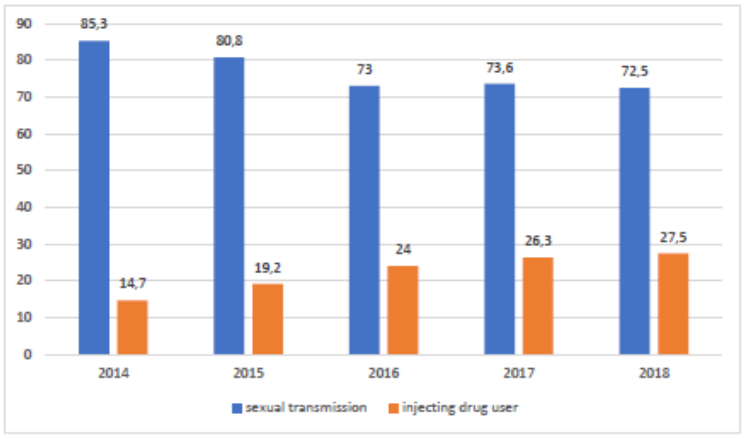

Fig. 4. Structure of HIV transmission routes in the Republic of Mari El for 2014-2018, %

Analysis of the age structure of HIV-positive patients in the Russian Federation revealed that the epidemic process actively involves the general population in addition to key risk groups.

There is an increase in the share of women with HIV infection diagnosed during pregnancy by 128.4% in the RME. So, this indicator was 15.5% in 201, and 35.4% - in 2018 (Table 1). The results obtained indicate the need for more detailed preventive work within the framework of the family institution.

Table 1. Proportion of women who had HIV infection during pregnancy in the Republic of Mari El for the period 2014-2018, %

year / indicator	2014	2015	2016	2017	2018	trend
pregnant woman	15.5	40.0	35.2	21.8	35.4	128.4

The ART coverage for patients undergoing medical examination decreased by 15.5% for 2014-2018 in the RME. If ART covered 97% of the number of subjects in 2014, then it was 82.1% in 2018 (Table 2). This situation requires increased work on patient adherence to therapy. An example of such a preventive measure is the “Patient School”, where the specialists involved in the provision of medical care to HIV-infected patients (infectious disease doctors, epidemiologists, clinical psychologists, social workers, etc.) can easily explain the need for ART.

Table 2. Coverage of antiretroviral therapy from the number of eligible patients in the Republic of Mari El for 2014-2018, %

year / indicator	2014	2015	2016	2017	2018	trend
Proportion of patients	97.0	94	90.8	95.1	82.1	15.5

4 Summary

Based on the epidemiological analysis of the situation associated with HIV infection in the Russian Federation and the RME, the following conclusions can be made: The average annual incidence is 2.9 times lower in the RME than in the Russian Federation for 2014-2018; There has been a 1.4-fold increase in the prevalence of HIV infection in the Russian Federation in the studied period; Different trends are observed when analyzing the incidence in two studied territories. Thus, the incidence rate of HIV infection for 2014-2018 remains at a stable level in the Russian Federation, while an increase of this indicator by 1.8 times is observed in the RME for the same period, demonstrating a reliable trend; Analysis of the transmission routes among the main risk groups The results indicate the need to expand coverage of preventive measures, taking into account the increasing risks associated with the fact that the epidemic process of HIV infection is increasingly involving the general population.

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