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ANALYSIS OF THE ANTIRETROVIRAL DRUGS MARKET IN THE PHARMACEUTICAL MARKET OF UZBEKISTAN

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Abstract: The article presents the results of the marketing study of antiretroviral drugs in the pharmaceutical market of Uzbekistan. The analysis was carried out according to such criteria as the country of manufacture, the mechanism of action of the drugs, as well as the number of active substances in one drug (monoactive and combined drugs). Research results show that more than 90% of antiretroviral drugs in the pharmaceutical market of Uzbekistan are imported, while domestic enterprises produce drugs that are only nucleoside inhibitors of HIV reverse transcriptase: however, drugs with a different mechanism of action are also in demand. At the same time, the ratio of monoactive and combined drugs is almost the same.

Keywords: antiretroviral drugs, marketing research, pharmaceutical market, mechanism of action, country of manufacture, monoactive and combined drugs.

Antiretroviral drugs are widely used for HIV infection, helping to control and stop the infection of other people [1, p.71-150; 2, pp. 112-116]. Currently, the range of drugs in this pharmacotherapeutic group is extensive. The championship among the producing countries belongs to the USA, as well as Great Britain and Germany.

The antiretroviral drugs used today are classified according to their mechanism of action into the following classes:

1. Nucleoside reverse transcriptase inhibitors (NRTIs) of the human immunodeficiency virus (abacavir, lamivudine, zidovudine, stavudine, didanosine, tenofovir, phosphazide, emtricitabine).
2. Non-nucleoside reverse transcriptase inhibitors (NNRTIs) of HIV (etravirine, rilpivirine, efavirenz, delaverdine, nevirapine).
3. Protease inhibitors (PIs) of the human immunodeficiency virus (ritonavir, atazanavir, darunavir, saquinavir, indinavir, nelfinavir, fosamprenavir, tipranavir, amprenavir).
4. Fusion inhibitor (enfuvirtide) - and inhibitor of the CCR5 chemokine receptor (maraviroc).
5. Integrase inhibitor of the human immunodeficiency virus (raltegravir, dolutegravir).
6. Inhibitors of entry / fusion - enfuvirtide [3, pp.41-47].

For a scientifically grounded selection of an object in scientific research in the development of medicines, the authors analyzed the range of antiretroviral drugs in the pharmaceutical market of the Republic of Uzbekistan. The research was carried out in 2 stages: at the first stage, the numerical and percentage ratio of antiretroviral drugs were calculated in two categories: the territorial affiliation of the manufacturer and the type of the manufactured dosage form [4, pp.196-201].

The second stage of research is devoted to the analysis of antiretroviral drugs in the context of manufacturing countries, the mechanism of action of drugs, as well as the amount of active substances in one drug.

Experimental part. The objects of research were the State Register of medicines and medical devices registered in the Republic of Uzbekistan for 2017–2019 [5-7].

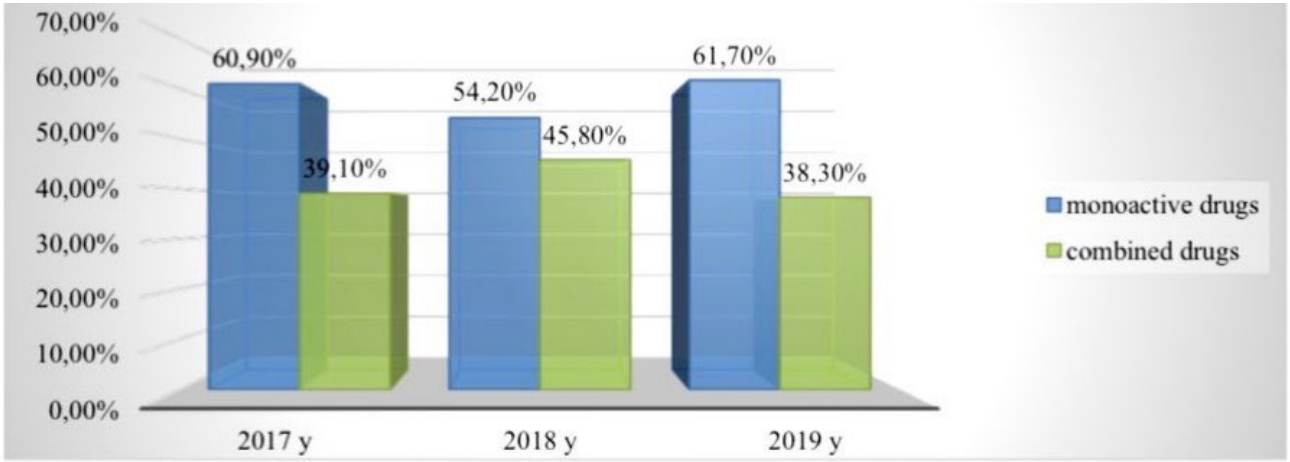

Fig. Share of monoactive and combined antiretroviral drugs in the pharmaceutical market of Uzbekistan

The data shown in the figure show that for all three analyzed years the share of monoactive drugs exceeded the combined drugs and amounted to 60.9%, 54.2% and 61.7%, respectively. However, combined preparations containing from two to three active substances were also presented in considerable quantities and ranged from 38.3% to 45.8%.

Next, we analyzed antiretroviral drugs by country of origin (Table 1).

Table 1

Analysis of antiretroviral drugs by country of manufacture

Manufacturer country	2017		2018		2019	
	Number of drugs	%	Number of drugs	%	Number of drugs	%
Uzbekistan	2	3.1%	3	5.1%	3	6.4%
Russian Federation	6	9.3%	6	10.2%	6	12.8%

The data in Table 1 indicate the leading position of India: thus, despite the fact that over the three analyzed years, the share of Indian drugs decreased from 68.8% (2017) to 53.3% (2019), drugs manufactured in this country accounted for more half of all registered antiretroviral drugs in the Republic of Uzbekistan. The next line is occupied by Russian drugs: all of them are manufactured at Pharmasintez JSC (2017 -9.3%; 2018 - 10.2%; 2019 -12.8%). The increase in the percentage of Russian drugs with a constant amount (6 drugs) is explained by the annual decrease in the total number of registered antiretroviral drugs.

Also in the pharmaceutical market of Uzbekistan there are antiretroviral drugs from Germany (3.1% -8.5%), Poland (4.2% -5.1%), Canada (1.6% -4.2%), Great Britain (4 , 7% -6.4%), Spain (2.1% -5.1%) and Romania (1.6% -2.1%).

The number of domestic drugs in this pharmacotherapeutic group was 2 drugs (3.1%) in 2017 and in 2018 and 2019. 3 medicines (5.1% and 6.4%, respectively). Thus, the demand for these drugs is mainly (more than 90%) covered by imported drugs.

The final studies were aimed at calculating the representatives of antiretroviral drugs with different mechanisms of action [3].

The groups of drugs by the mechanism of action were numbered as follows:

Group 1 - nucleoside inhibitors of HIV reverse transcriptase (NRTIs);

Group 2 - non-nucleoside inhibitors of HIV reverse transcriptase (NNRTI);

Group 3 - HIV protease inhibitors (PI);

Group 4 - a fusion inhibitor and an inhibitor of the CCR5 chemokine receptor;

Group 5 - HIV integrase inhibitor;

Group 6 - entry / fusion inhibitors.

Also in the pharmaceutical market of the Republic of Uzbekistan there are combined preparations, which include active substances that have the same and different mechanism of action. The results are shown in Table 2.

According to the data presented, the bulk of antiretroviral drugs registered in the State Register belongs to the 1st group. Their share ranges from 37.3% to 46.9%. The second place is taken by combined drugs, also belonging to the first group. So, in 2017 their share was 20.3%, in 2018 - 25.4%, in 2019 - 19.2%. The third place in

Mechanism of action	2017	
	Number of drugs	%
Group 1	30	46.9%
Group 2	9	14.0%
Group 3	2	3.1%
Group 5	1	1.6%
Combined drugs: Gr.1	13	20.3%
Gr.1 and gr.2	7	10.9%
Gr. 3	1	

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