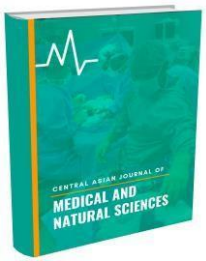

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Article

Analysis of Drugs Antihelmintic Properties in the Pharmaceutical Market of Uzbekistan

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Abstract: The article presents the results of the analysis of drugs with antihelmintic properties in the domestic pharmaceutical market. The object of research was the State Register of drugs, medical equipment and medical equipment approved for use in medical practice in the Republic of Uzbekistan. As a result of the analysis, the total number of registered drugs of this pharmacotherapeutic group was calculated, and conclusions were drawn on the share of producing countries, the form of the drug, and the nature of the active substance. Based on the results of the research, among the antihelmintic drugs registered in the Republic of Uzbekistan, the first place in terms of share is taken by the drugs produced in Uzbekistan, the second place by the drugs of foreign countries, and the third place by the drugs of the CIS countries. It was found that the average share of herbal medicines in the analyzed period among all mentioned medicines is 17.2%, the share of synthetic drugs is 76.2%, and the share of combined drugs is 6.6%. According to the form of the drug, it was found that antihelminth drugs are mainly produced in the form of a solid drug that is easy to drink and stable in storage. However, from 2019 to 2023, the share of drugs derived from plant raw materials and belonging to this pharmacotherapeutic group will decrease and the number of synthetic drugs will increase. Taking into account a number of side effects of synthetic drugs, the production and introduction of effective, stable and high-quality drugs with antihelmintic properties based on local plant raw materials has been proved to be relevant.

Keywords: marketing research, antihelmintic drugs, State Register, drug form, country of manufacture, nature of active substance.

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1. Introduction

Today, helminthiasis is one of the most common diseases among humans and animals, caused by simple parasites. According to the World Health Organization, this pathology occurs in 90% of the world's population. In humans, more than 280 species of causative agents of this disease are known, and they are divided into the following groups: roundworms Nemathelminthes (class Nematoda), flatworms Plathelminthes, tapeworms Cestoidea and suckers Trematoda [1,2,3,4].

As a result of the expansion of international cooperation and economic relations, the increase in the migration flow of people from different countries causes the spread of helminthiasis, which causes large-scale problems. Helminthiasis is most common in tropical and subtropical countries with low income and high morbidity. Children aged 2 to 7 years are affected by this disease, and it is mainly due to non-compliance with the rules of personal hygiene and low acidity of gastric juice in young children [5,6].

The most basic and effective way to deal with helminths is deworming. Today, there is a wide range of drugs on the pharmaceutical market to fight parasites, and new ones are being developed. These drugs can be both synthetic and herbal in nature, they are produced in different dosage forms and are used against various representatives of helminths [7-15].

Taking into account the above, the purpose of this research was to analyze the anthelmintic drugs registered in the Republic of Uzbekistan in 2019-2023.

2. Materials and Methods

The analysis of antihelmintic drugs on the local market was conducted on the basis of the State Register of drugs, medical devices and medical equipment approved for use in medical practice in the Republic of Uzbekistan for 2019-2023 (hereinafter the Register) [16-20]. During the research, the total registered number of drugs belonging to this pharmacotherapeutic group was calculated, and their shares were determined according to indicators such as the country of manufacture, the form of the drug, and the nature of the active substance. Each indicator was determined as a percentage of the number of drugs registered in the State Registry. The share was calculated according to the following formula.

$$X = \frac{B*100\%}{A};$$

A- the total number of drugs registered in the State Registry;

B - the number of medicines with antihelmintic properties.

For example, in 2019, the total number of registered medicines was 8883, of which 74 have antihelmintic properties. The percentage of drugs with this pharmacotherapeutic property is 0.8%.

3. Results

At the initial stage of the research, work was carried out to determine the share of drugs with antihelmintic properties in relation to the total number of drugs registered in the Register. The obtained results are presented in table 1.

Table 1

The share of antihelmintic drugs in relation to the total number of drugs registered in the State Register of drugs, medical products and medical equipment allowed to be used in medical practice in the Republic of Uzbekistan

State Register, year	Total number of registered drugs	Antihelmintic drugs include:	
		quantity	%
SR № 23 (2019)	8883	74	0,8
SR № 24 (2020)	4534	76	1,7
SR № 25 (2021)	10257	76	0,7
SR № 26 (2022)	11169	62	0,6
SR № 27 (2023)	7054	61	0,86

According to the data presented in Table 1, it was found that the share of antihelmintic drugs registered in Uzbekistan is very small, despite the increasing demand from year to year. In the analyzed 5 years, this indicator was 0.7-1.7%. In this case, from 2019 to 2020, the indicator increased almost twice, that is, from 0.8% to 1.7%, but in 2021 and 2022, it decreased sharply, making 0.7% and 0.6%, respectively. By 2023, the share of drugs of this pharmacotherapeutic group increased to 0.86%. It can be assumed that the situation in 2021 and 2022 depends mainly on the worldwide Covid-19 pandemic.

The listed antihelmintic drug manufacturers were also analyzed by region. They were divided into three groups: those produced in the Republic of Uzbekistan, CIS countries and foreign countries (Table 2).

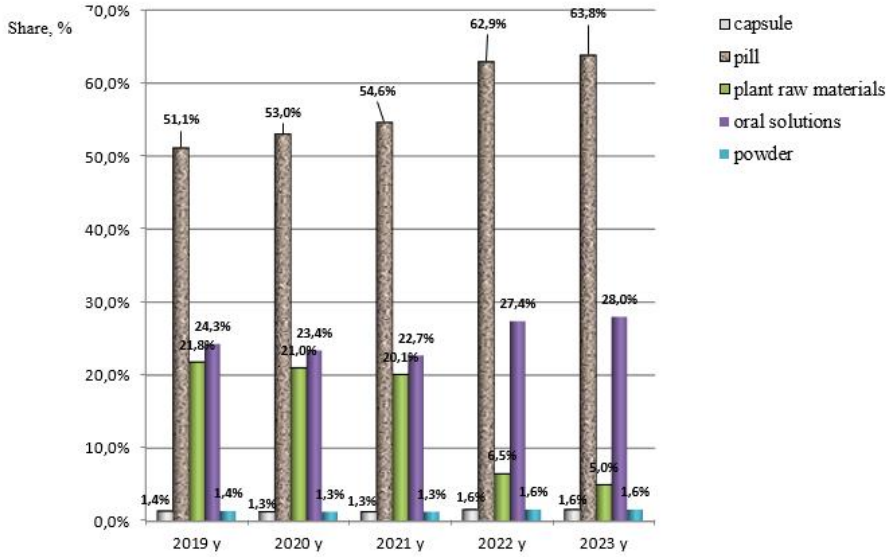
Table 2

The share of antihelmintic drugs registered in the Republic of Uzbekistan depending on the territorial affiliation of the producers

State Register, year	General antihelmintic drugs	Including					
		local medicines		Medicines of the CIS countries		drugs of foreign countries	
	number of positions	number of positions	%	number of positions	%	number of positions	%
SR № 23 (2019)	74	40	54,0%	5	6,8%	29	39,2%
SR № 24 (2020)	76	44	57,9%	4	5,3%	28	36,8%
SR № 25 (2021)	76	40	52,6%	4	5,3%	32	42,1%
SR № 26 (2022)	62	27	43,5%	4	6,5%	31	50,0%
SR № 27 (2023)	61	29	47,5%	3	4,9%	29	47,5%

According to the results of the analysis, the number of antihelmintic drugs produced and registered by local pharmaceutical enterprises in our republic increased in 2019-2021 (from 40 to 44) in the following years, it was found that it decreased sharply: 40 in 2021, 27 in 2022, and 29 in 2023. The percentage has decreased from 54% to 47.5% in the analyzed 5 years. The number of antihelmintic drugs produced by enterprises of the countries of the Commonwealth of Independent States and registered in Uzbekistan decreased slightly, from 6.8% to 4.9%. The number of drugs produced in foreign countries was almost the same (28-32 names), but it can be seen that the percentage increased from 39.2% to 47.5%. So, it turned out that the demand for antihelmintic drugs is increasing, but this demand is being met at the expense of imported drugs.

The next stage of marketing analysis focused on identifying the manufactured drug forms of antihelmintic drugs registered in the Register. The obtained results are presented in Figure 1.



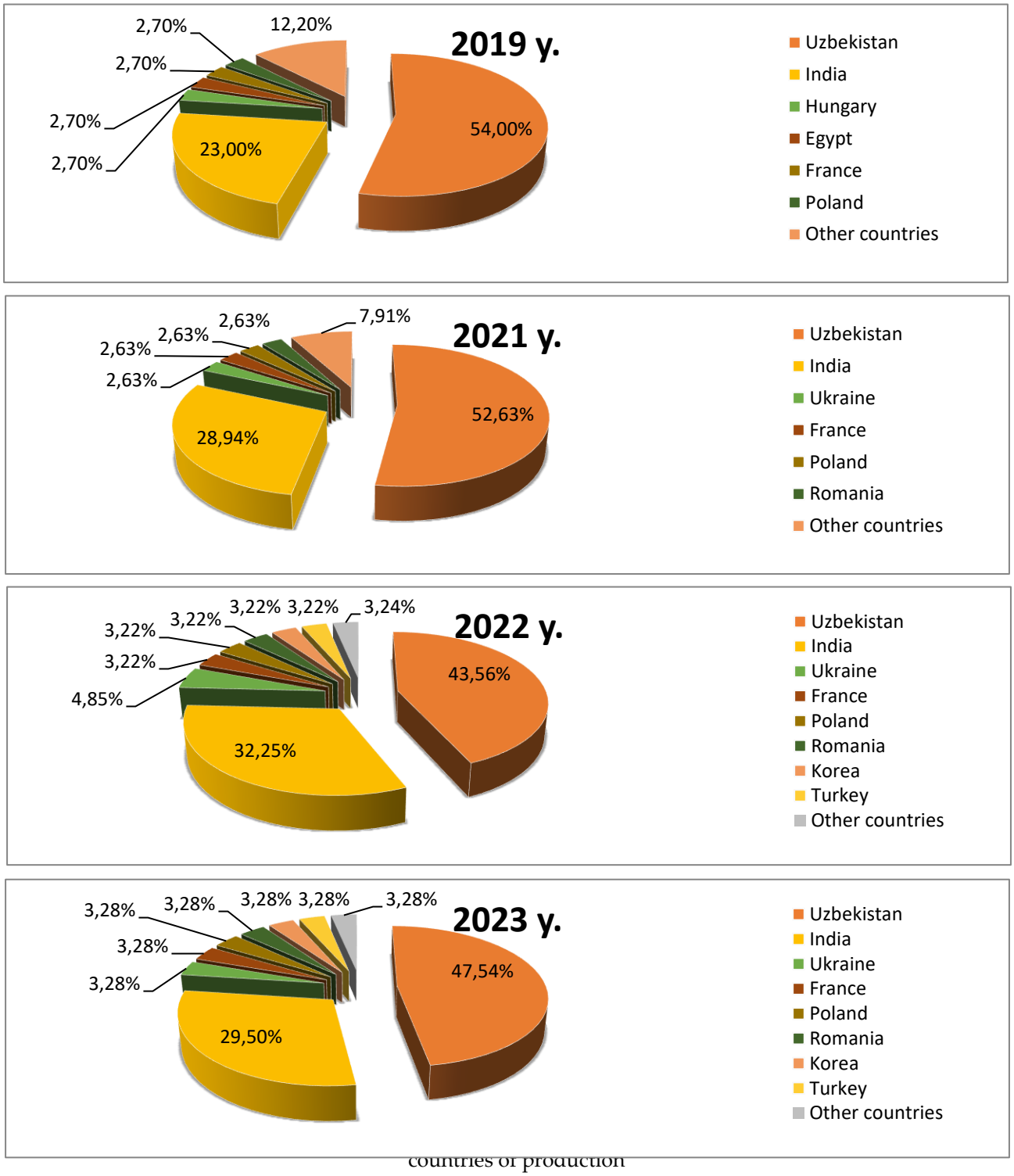
Picture. 1. Analysis of antihelmintic drugs registered in the Republic of Uzbekistan by drug forms

According to the data presented in Figure 1, in the period from 2019 to 2023, all antihelmintic drugs registered in the Register were produced in the following drug forms: capsule, solution, tablet, suspension, powder, and in the form of packaged herbal raw materials.

In the analyzed period, the share of tablets in the total assortment of antihelmintic drugs is 51.1-63.8%, capsules 1.3-1.6%, oral liquids - 22.7-28.0%, powders - 1.4-1, 6%, medicinal plant raw materials were -5.0-21.8%.

As noted, among the registered drug forms of this pharmacotherapeutic group, those with a solid state, i.e. tablets, capsules and powders take the first place (up to 67%), drugs in the form of herbal raw materials - the second place (up to 21.8%), liquid drugs It was found that preparations in the form of - occupy the third place (up to 28.0%).

At the next stage of the research, antihelmintic drugs registered in the State Register were analyzed by countries producing them. The results are presented in Figure 2.



countries of production

The results show that in 2019 there are 15 countries (76 positions), in 2020 - 11 countries (76 positions), in 2021 - 12 countries (76 positions), in 2022 and 2023 - 10 countries (62 and 61 positions, respectively) registered drugs belonging to this pharmacotherapeutic group in the State Register of the Republic of Uzbekistan.

The leading place in terms of the number of antihelmintic drugs registered in the register was occupied by local manufacturers of Uzbekistan: the share of these drugs during the analyzed period was from 43.56% to 54.0%. The next place is occupied by medicines produced in India with an indicator of 23.0-32.25%. At the same time, in 2019, the share of anthelmintic drugs registered by manufacturers in Hungary, Egypt, France and Poland was 2.7% for each country.

In 2020 and 2021, Ukraine joined these countries with a share of 2.63%. In 2022 and 2023, the anthelmintic drugs of Romania, Turkey, and Korea were registered in the State Register and had a share of 3.22% to 4.85%.

Also, at the end of the marketing research, all antihelmintic drugs registered in the Register were analyzed according to their origin, that is, they were classified into drugs obtained from plants, drugs made from synthetic active substances, and combined drugs (Table 3).

According to the data presented in Table 3, the percentage of preparations depending on the nature of the active substance was different in the analyzed years. In particular, herbal preparations produced in our country accounted for 42.5% in 2019, 41.0% in 2020, 40.0% in 2021, 18.5% in 2022, and 13.8% in 2023. A decrease in the share of drugs of this group led to an increase in the share of drugs of a synthetic nature: during the analyzed period, this indicator increased from 55% to 86.2%.

Based on the conducted analysis, it was found that antihelmintic drugs produced in the CIS countries are only of synthetic nature, and drugs of this pharmacotherapeutic group produced in foreign countries belong to the group of synthetic and combined drugs.

Table 3

Analysis of antihelmintic drugs registered in the Republic of Uzbekistan according to the origin of the active substance

The origin of the active substance	*2019*			*2020*			*2021*			*2022*			*2023*		
	Local	*CIS*	*Foreign*	*Local*	*CIS*	*Foreign*	*Local*	*CIS*	*Foreign*	*Local*	*CIS*	*Foreign*	*Local*	*CIS*	*Foreign*
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
herbal preparations	17	-	-	18	-	-	16	-	-	5	-	-	4	-	-
	42,5%	-	-	41%	-	-	40%	-	-	18,5 %	-	-	13,8%	-	-
Synthetic preparations	22	5	26	26	4	24	24	4	27	22	4	26	25	3	24
	55%	100%	89,7%	59%	100%	85,8%	60%	100%	84,4%	81,5 %	100%	83,8%	86,2%	100%	82,8%
Combined preparations	1	-	3	-	-	4	-	-	5	-	-	5	-	-	5
	2,5%	-	10,3%	-	-	14,2	-	-	15,6%	-	-	16,2%	-	-	17,2

In this case, the share of synthetic drugs was in the range of 82.8-89.7%, and drugs with a combined composition were equal to 10.3-17.2%, respectively.

4. Conclusion

The results of marketing research among antihelmintic drugs registered in the Republic of Uzbekistan, the first place in terms of share is taken by drugs produced in Uzbekistan, the second place - drugs from foreign countries, and the third place - drugs from the CIS countries. It was found that the average share of herbal medicines in the analyzed period among all mentioned medicines is 17.2%, the share of synthetic drugs is 76.2%, and the share of combined drugs is 6.6%. According to the form of the drug, it was found that antihelminth drugs are mainly produced in the form of a solid drug that is easy to drink and stable in storage. However, from 2019 to 2023, the share of drugs derived

from plant raw materials and belonging to this pharmacotherapeutic group will decrease and the number of synthetic drugs will increase. As it is known that there are a number of side effects of synthetic agents, it is considered necessary to process local medicinal plants with anti-helminthic activity, to extract the maximum amount of biologically active substances, and to develop a drug form technology that is convenient for patients to drink.

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