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QUALIFICATION WORK

on the topic: "**MARKETING RESEARCH OF THE ANTHELMINTIC MARKET"**

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АНОТАЦІЯ

У роботі представлена систематизація лікарських засобів, які використовуються для лікування глистових інвазій; проведено аналіз тенденцій у споживанні антигельмінтних препаратів на фармацевтичному ринку України; досліджено споживчі вподобання щодо антигельмінтних лікарських засобів. Обсяг кваліфікаційної роботи становить 40 сторінок, включаючи 11 рисунків, 5 таблиць, та список літератури з 30 джерел.

Ключові терміни: маркетингові дослідження, фармацевтичний ринок, споживач, переваги, антигельмінтні лікарські засоби.

ANNOTATION

The work presents a systematization of medicines used for the treatment of worm infestations; an analysis of trends in the consumption of anthelmintic drugs on the pharmaceutical market of Ukraine was carried out; consumer preferences for anthelmintic drugs were investigated. The volume of the qualification work is 40 pages, including 11 figures, 5 tables, and a list of references from 30 sources.

Key terms: marketing research, pharmaceutical market, consumer, benefits, anthelmintic medicines.

CONTENT

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INTRODUCTION

Relevance of the research topic. The art of planning and forming an assortment of medicines for a specific pharmacy organization consists in knowing professionally the consumer properties and characteristics of each nomenclature item, its advantages and disadvantages compared to similar medicines [20].

It has been established that the assessment and revision of the entire assortment, planning and management of the assortment are an integral part of the assortment policy [30]. Even well-thought-out sales and advertising plans will not be able to neutralize the consequences of mistakes made in planning the assortment of medicines [5]. Assortment management involves coordination of interrelated types of activities: comprehensive market research, sales organization, advertising, demand stimulation [2]. The problem of solving this task lies in the complexity of combining all these elements to achieve the ultimate goal – optimizing the assortment taking into account the strategic market goals set by the pharmacy organization [8].

Helminth infections are diseases caused by parasitic worms that have settled in the human body - helminths and their larvae. According to official statistics, more than half a million people are infected with worms every year in our country, 80% of whom are children. It should be noted that helminths cause pronounced allergy of the body, which is accompanied by suppression of immunity, both in adults and in children, contributes to the development of secondary infections and non-infectious diseases, including cancer [5].

Chemotherapy is still an effective method of combating helminthiasis. Its success is ensured by the use of highly effective, harmless, environmentally safe, inexpensive medicines with a wide spectrum of action. The anthelmintic effect of medicines consists in the destruction of various types of helminths [1]. Depending on the type of causative agent, its localization in the human body, the intensity of infection, the general invasive condition, and its reactivity, helminthiasis proceeds in different ways – from subclinical to the most severe forms with a fatal outcome.

The purpose of the qualification work is marketing research of the anthelmintic market.

To achieve the goal of the qualification work, it is necessary to solve the following **tasks**:

- to reveal the features of treatment of helminthiasis;
- to provide a classification of medicines prescribed for worm infestations;
- to analyze the dynamics of consumption of anthelmintic medicines in the pharmaceutical market of Ukraine;
- to analyze the pharmacokinetics and pharmacodynamics of anthelmintic medicines;
- to conduct marketing research on the market of anthelmintic medicines;
- to analyze the consumer preferences of anthelmintic medicines;
- to analyze the level of demand for anthelmintic medicines.

The object of the study is anthelmintic medicines.

The subject of the study is marketing research of the market of anthelmintic medicines.

In our work, we used the following **research methods**: questionnaire, analysis, systematic, graphic.

Practical significance of the obtained results. Using the results of this study will allow analyzing the dynamics of consumption of anthelmintic medicines in the pharmaceutical market.

Approbation of research results and publication. The qualification work was tested on XXX International scientific and practical conference of young scientists and students "Current issues of the creation of new medicines". The summaries of the reports were published: Hajar BizBiz, Bondarieva I.V. Marketing research of the anthelmintic market. XXX International scientific and practical conference of young scientists and students "CURRENT ISSUES OF THE CREATION OF NEW MEDICINES" (April 17-19, 2024, Kharkiv). – Kharkiv: NUPh, 2024. – P. 369-370.

Structure and scope of qualification work. The qualification work consists of an introduction, a literature review, an experimental part, general conclusions, a list of used literary sources, and appendices. The qualification work is laid out on 40 pages, includes 11 figures, 5 tables, as well as 30 sources of literature.

PART I

MODERN APPROACHES TO THE TREATMENT OF HELMINTHIASIS

1.1. Peculiarities of treatment of helminthiasis

It has been established that helminths can parasitize in various organs, tissues and systems of the body, causing both general malaise and weakness, as well as clear symptoms of worm infestation. And only timely treatment will help prevent the development of the disease [2].

In nature, there is a wide variety of parasites that cause diseases in humans. Helminths are a numerous group of parasitic worms belonging to 3 classes: Nematoda (roundworms), Cestoidea (tapeworms), Trematoda (suckers). The last two classes belong to the type of flatworms. Annelida (ringworms) and Acanthocephala (scraper worms) parasitize humans extremely rarely [30].

According to the literature, there are mainly two types of helminths found in the population, totaling 150 species. They are the cause of more than 20 serious diseases in various organs and tissues. Roundworms (nematodes) actually cause the disease the most. Enterobiosis (91%) and ascariasis (8%) occupy a significant share in the structure of helminth infections [1].

We analyzed the factors affecting the spread of helminthiasis and studied methods of treatment of this pathology [3].

With the help of the conducted sociological survey of infectious disease doctors, pediatricians and therapists, the main factors affecting the spread of helminthiasis were revealed [4].

One of the most important factors is environmental pollution and non-compliance with the rules of personal hygiene, especially by children. 98% of respondents indicated this. It is for this reason that enterobiosis and ascariasis are most common in children [10].

Among the important factors, respondents attributed the consumption of insufficiently washed fruits and vegetables, raw water from polluted open water

bodies, as well as meat and fish that have not undergone sufficient heat treatment [30].

The reduction of the incidence of helminthiasis will also contribute to the timely detection of the presence of a parasite in the human body, and for this it is necessary to consult a doctor in time and conduct the recommended full bacteriological and laboratory examination. Doctors are unanimous in the importance of preventive work, especially among children – in schools, kindergartens and nurseries. It should be noted that in families with pets, it is necessary to strictly follow all the rules for keeping them, including vaccination [7].

Treatment of helminthiasis is a rather complex process that requires long-term treatment and a complex approach to it. Among the methods of treatment, two main ones should be distinguished – medicine therapy and surgical intervention, and the latter is not an exception, but rather the most acceptable for a complex form of helminthiasis [27].

Helminth infections are treated with specific anthelmintic medicines. They can be conventionally divided into three groups: means used for intestinal nematodes; means used for intestinal cestodoses; means used for extraintestinal helminthiasis [4].

Unwashed fruits or vegetables from the garden, communication with animals, if you do not wash your hands afterwards and touch the products with them, can lead to infection with eggs or larvae of various parasites. Most of these uninvited guests belong to helminths (parasitic worms) that inhabit the intestines or (which happens less often) other parts of the body, and parasitize there. Helminths are not only unpleasant, they can cause real harm to the body, provoking allergies, digestive disorders, malfunctioning of internal organs (if they enter the lungs, brain or eyeball, muscles) [8].

Of course, it is better to avoid infection with helminths, but it is not always possible. Some parasites can enter the body with food – fish, meat, fresh fruits. In total, more than 20 types of helminthiasis are known in our country, they differ like

pathogens, and accordingly, to eliminate them, you need your own, special tablets against worms for humans [11].

Three classes can be distinguished among human parasites:

- round helminths (nematode class);
- flatworms (class trematodes);
- tapeworms (class cestodes) [4].

Different types of antiparasitic medicines can be effective against these worms, it is important to identify the helminth beforehand, as well as to determine the stage of its development.

These can be larvae (when a person is an intermediate host of a worm) or sexually mature individuals (if a person is the final host). There are medicines that affect only the larvae, and there are those that are effective against all stages of the parasite. Among the most common parasites are pinworms and roundworms, although tapeworms, various types of hookworms (dwarf, pig, bull) and hookworms can also be found [5].

Parasites can also be intestinal (inhabiting the small or large intestine) and tissue (infecting the liver, kidneys, lungs or brain). Antiparasitic medicines mainly affect the intestinal forms of worms, tissue forms are much more difficult to treat [3].

Helminth infections are parasitic infections, they mainly occur due to violations of hygiene rules. Eggs or larvae of parasites enter the digestive system from dirty hands, they are especially common among nail biters [18].

Parents can become infected with worms from children who often get ascariasis or pinworms. Rarely, infection occurs through products infested with eggs or dirty water, as well as through contact with dust with parasite eggs on the mucous membranes of the nose or pharynx [7].

Many people, finding worms in themselves, are embarrassed to consult a doctor and go to the pharmacy for antiparasitic medicines. But today a ban on the free sale of these medicines has been introduced, and this is very correct [8].

1.2. Classification of medicines prescribed for worm infestations

Medicines are prescribed for all forms of helminthic infestations [3]. As can be seen from the table 1.1, the most widely presented means used for intestinal nematodes. This group includes both medicinal products of plant origin and synthetic medicines [20].

Means used for extraintestinal helminthiasis are few and combine only medicines of synthetic origin [5].

The content analysis of the reference literature showed that the domestic pharmaceutical market, excluding different manufacturers, is represented by 18 trade names of anthelmintic medicines [4].

Table 1.1

Medicines prescribed for worm infestations

Means used for intestinal nematodes	Means used for intestinal cestodoses	Means used for extraintestinal helminthiasis
Piperazine adipinate	Niclosamide	Ditrazine citrate
Befinitahydroxynaftate	Aminoacryquine	Prazinquantel
Dithiazanine	Prazinquantel	Khloxil
Carbendacim	Mebendazole	Mebendazole
Pyrantel	Trichlorophene	Ivermectin
Vermox Decaris	Filixan	
The first pamoate	Tetrachloroethylene	
Levamisole	Pumpkin seeds	
Thiabendazole		
Mebendazole		
Albendazole		
Flubendazole		
Prazinquantel		
Tansy flowers		
Flowers of the cypress wormwood		

Most of the medicines are registered by domestic manufacturers (77%), and 23% by foreign manufacturers. Foreign manufacturers are represented by countries

near and far abroad. Among foreign manufacturers, Indian companies have the largest number of registrations [6].

Thus, albendazole has a wide spectrum of action among anthelmintic medicines currently available on the pharmaceutical market (table 1.2) [30].

Table 1.2

Spectrum of action of anthelmintic medicines

Helminth infections	Albendazole	Mebendazole	Praziquantel	Piperazine adipinate	Pyrantel	Levamisole hydrochloride
Nematodes						
Ascariasis						
Enterobiosis						
Trichocephalosis						
Hookworm disease						
Nectarosis						
Strongyloidosis						
Cutaneosis						
Trichinellosis						
Cestodosiasis						
Hymenolepidosis						
Taeniarhynchosis (bull ringworm)						
Taeniasis (pig ringworm)						
Gnathostomosis						
Diphyllobotriosis						
Neurocysticercosis						
Capillarosis						
Cytous echinococcosis						
Alveolar and granular echinococcosis						
Trematodoses						
Opisthorchosis (feline fluke)						
Clonorchosis (Chinese fluke)						
Fasciolosis (giant fluke)						
simple						
Intestinal giardiasis						
Duodenal giardiasis						

A wide range of anthelmintic medicines is available on pharmacy counters, which indirectly indicates the urgency of the problem of treating helminthiasis. About 30 species of helminths are common today (more than 250 species of helminths have been registered as parasites of humans in the world). A number of medicines available in pharmacies are active against only four types of roundworms. Wormil is a broad-spectrum anthelmintic medicine, which is active against both round, tapeworms and flatworms, as well as protozoa (giardia), which parasitize not only in the intestines, but also in other tissues of the body [5].

Due to the peculiarities of pharmacokinetics, Wormil is active against all forms of parasites – eggs, larvae, adults, and cysts (Table 1.3) [25].

Table 1.3

Features of pharmacokinetics and advantages of the medicine Wormil

Peculiarities of pharmacokinetics	Advantages
Poorly soluble in water – slightly absorbed from the digestive tract – the optimal concentration of the drug is created in the intestines.	High therapeutic activity
It is rapidly metabolized in the liver during the first passage	Low toxicity (at the same time, the metabolite – albendazole sulfate – retains 50% of the pharmacological activity of the primary substance)
It is excreted mainly with bile with reabsorption in the digestive tract	Targeted effect on helminths that parasitize the liver and bile ducts
Accumulation of the medicine in the organs and tissues of helminths	High activity against eggs, larvae, cysts and adults of parasites
The mechanism of action is based on the inhibition of two biological processes in the body of the helminth	Wide range of action and high efficiency

All medicines against parasites, with rare exceptions, belong to synthetic means. Herbal remedies are less effective and often cannot completely kill all worms in the intestines or tissues. The principle of action of anthelmintics is different, they affect various life processes of worms or their larvae. Based on this, when detecting parasites in the body, the doctor selects the best deworming tablets for humans [30].

There are groups of medicines that [4]:

- disrupt the functioning of the intestines of parasites and lead to their death;
- provoke blocking of absorption of nutrients, especially glucose;
- have a paralytic effect and disrupt the metabolism of parasite cells;
- block the nervous system of worms, causing their paralysis and removal from the body;
- combined means that combine several effects at the same time.

All mediciness against parasites are always selected only by a doctor. The agents are toxic, their dose should be calculated based on body weight, and additional therapy should be carried out to prevent complications. This is especially important when a large number of worms are removed at once [5].

In addition, certain medicines have their own spectrum of action – some are effective against roundworms, others only against flatworms or tapeworms. There is no universal and safe remedy that would be effective against all known worms [3].

According to expert estimates, more than 4.5 billion of the world's population are at risk of infection with geohelminthiasis. The most common helminths in the world are roundworm (Ascaris lumbricoides), roundworm (Trichuris trichiura) and hookworm – 1.5 billion, 1.3 billion and 900 million are infected with them, respectively. More than 2 billion people are infected with at least one of these parasites. Estimates of the global burden associated with these geohelminthiasis are between 4.5 and 39 million years of disability [4].

According to official statistics, 25-30 of the 342 known types of helminths are common. Among them, enterobiosis accounted for 74%, ascariasis for 22%, trichocephalosis for 3%, and another helminthiasis for up to 0.6% (Table 1.4) [27].

Table 1.4

Analysis of helminthiasis

The name of helminthiasis	Number of cases
Enterobiosis	58,984
Ascariasis	38,555
Trichocephalosis	1805
Opisthorchosis	360
Hymenolepidosis	128
Toxocarosis	273
Echinococcosis	189
Dirofilariasis	99
Taeniarhynchosis (the causative agent is bull tapeworm)	54
Strongyloidosis (the causative agent is intestinal acne)	50
Trichostrongyloidosis	24
Helminth infections caused by pig tapeworm	18
Diphyllobotryosis (causing agent - broad-leaved rootworms)	13
Helminth infections caused by rat tapeworm	11
Helminth infections caused by lanceolate suckers	5
Helminth infections caused by fasciolae	5
Helminth infections caused by dog tapeworm	2
Trichinellosis	1
Filariosis	1
Hookworms	1
Cysticercosis	1

It was found that parasitic invasion (helminths, protozoa) can be a trigger factor for the development of immunopathological, inflammatory changes in the skin (acute allergic dermatoses), as well as a factor supporting the chronic, wave-like course of dermatoses (atopic dermatitis, urticaria, psoriasis). In a number of studies, it was established that deworming helps reduce bronchial hyperreactivity, reduce allergic inflammation and allergy manifestations [1, 3, 7].

Allergic reactions in helminthiasis are based on a mechanism that was phylogenetically formed as a protective reaction of the host's body aimed at fighting the parasite. Allergic inflammation with parasitosis develops according to the classic way; at the same time, conditions are created that lead to the death and/or elimination of the parasite. A feature of the immune response in helminth-protozoan invasions is its weak specificity, due to the heterogeneity of parasitic antigens. Helminths are able to actively interfere with the host's immune system, disrupting the functioning of its various components. Virtually all species can cause a shift in the ratio of Th1/Th2 cells in a direction favorable to their survival. Among parasites, the technique of "molecular mimicry" is very common, when the molecular structure of the parasite's proteins reproduces the structure of a number of immunoregulatory proteins of the host. Individuals use host cytokines as growth factors. All these strategies to counteract the human immune system enable parasites to survive in the host's body [2, 27].

CONCLUSIONS TO PART 1

1. Features of the treatment of helminthiasis are revealed.
2. A classification of medicines prescribed for worm infestations is given.

PART II
STUDY OF THE DYNAMICS OF CONSUMPTION OF ANTHELMINTIC MEDICINES

2.1. Analysis of the dynamics of consumption of anthelmintic medicines on the pharmaceutical market

In recent years, helminthiasis has become widespread throughout the world. According to WHO statistics, 3 billion people in the world have helminths in their bodies [7]. Parasitic and infectious diseases are the cause of more than 17 million deaths out of 60 million deaths from all diseases that are registered annually in the world. Intestinal helminthiasis is the second most common disease after tuberculosis. According to world statistics, 1.7 million cases of cancer are caused by helminths. So, in the US, the number of deaths from parasites is the same as the number of deaths from cancer and stroke. The causative agent of opisthorchosis is a globally recognized carcinogenic parasite [11]. Out of 250 species of helminths capable of parasitizing the human body, 30 species have been recorded. Currently, we have more helminthiasis, which used to be a rare phenomenon. It is about opisthorchosis, echinococcosis, dirofilariasis. In particular, the number of cases of heartworm disease increased 52 times! Mosquitoes are carriers of its pathogens. 70% of detected parasitosis is enterobiosis, 30% is ascariasis. One of these parasites affects a fifth of children attending daycare centers [5].

The annual incidence rate of helminthiasis in Ukraine is 1,350 cases per 100,000 population, 82% of which are children [14]. But the real number of patients with helminthiasis in Ukraine is much higher. Consider at least this fact: according to statistics, in 2023, 340,950 cases of helminthiasis were detected in our country. At the same time, the pharmacy chain sold as many as 4,327,500 packages of anthelmintics [6].

The analysis of the range of anthelmintics was carried out by us based on the data of the analytical system of research of the pharmaceutical market "Pharmstandard" of the company "Morion" [8] for the years 2020-2023.

Antihelmintic medicinal products for systemic use, which are prescribed for the treatment of helminthiasis according to the international classification of ATC, belong to group P02. During the analysis of the pharmaceutical market for 2020, it was established that anthelmintic medicines were represented by 39 trade names based on 7 international non-proprietary names. In 2020 and 2021, the group of anthelmintics also counted 39 trade names, and in 2023 – 34 trade names. In 2023, the number of commercial indications of both domestic and foreign manufacturers decreased on the pharmaceutical market, mainly due to anthelmintic medicines of foreign manufacturers – "Nemozol" in three different forms of release, produced by the company IPCA (India) and "Levamizol", produced by the company Elegant India [20].

The range of prices for anthelmintics varied from 10 UAH to 500 UAH. The cheapest medicine was Piperazine Adipinat, manufactured by plant (Ukraine), tab. 200 mg N 10, and the most expensive is Wormil, produced by Mili Healthcare (Great Britain). The structural analysis of the range of anthelmintics showed that the P02C C01 "Pyrantel" subgroup is represented in the largest range, which in 2020 and 2021 had 16 tons, and in 2020 – 15 tons. Preparations based on INN "Praziquantel" (P02BA01) and "Other anthelmintics" (P02CX10) are represented only by 1-2 trade names, which requires expanding the range of trade names given by International Nonproprietary Name to meet the population's need for effective, inexpensive and safe medicines. On the pharmaceutical market of Ukraine, anthelmintic medicines are presented in various dosage forms: coated tablets, chewable tablets, powder for oral suspension, suspension for oral use, oral suspension. The most widely available medicines on the market are tablets (24 trade names) and oral suspensions (10 trade names). The Ukrainian market of anthelmintics is formed by manufacturers of 11 countries, among which the largest number of trade names are represented by manufacturing companies from Ukraine (21 trade names), India and Great Britain (6 trade names each), France and Hungary (3 trade names each) [12].

So, the number of anthelmintic medicines has a wide selection of international unpatented names, but 2 of them – "Praziquantel" (P02BA01) and "Other

anthelmintic medicines" (P02CX10) are presented on the pharmaceutical market of Ukraine in a limited number of trade names (1-2 trade names), which creates opportunities to expand the range of medicines of these subgroups [27].

2.2. Analysis of pharmacokinetics and pharmacodynamics of anthelmintic medicines

Therefore, immunopathological processes in helminthiasis have an acute and chronic period. In the early stages of helminth invasion, an anaphylactic type of allergic reactions is formed. This stage is characterized by the formation of sensitization. When helminth antigens (polysaccharides, glycopeptides) enter the human body, they interact with macrophages and present them to T-lymphocytes. T-lymphocytes release cytokines that activate B-lymphocytes. The latter turn into plasma cells and synthesize IgE, which binds to high-affinity receptors (FcεRI) on the surface of mast cells. The binding of two or more IgE molecules to the allergen (helminth antigen) on the membrane of the mast cell causes the process of its degranulation and the release of mediators of allergic inflammation. These are biologically active substances (histamine, serotonin, bradykinin, proteolytic enzymes), chemotoxic factors of eosinophils and neutrophils, leukotrienes, platelet activation factor, prostaglandins, cytokines (interleukins 3, 4, 5). With those helminthiases, the causative agents of which do not migrate in the host's body and do not come into close contact with its tissues, the clinical picture of the acute stage is less pronounced. In the development of allergic reactions in the acute phase of helminthiasis, the degree of antigenic proximity of the parasite and the host is important. For example, the most pronounced allergic reactions are observed in cases of human infection with non-specific helminth species (toxocariasis). In the chronic stage of helminthiasis, sensitization by products of helminth metabolism remains the leading factor. However, it does not have such a pronounced character as in the acute stage [4, 12].

Against the background of helminthiasis, secondary immunodeficiency conditions can develop, even when they occur in the form of carriers [9].

The result of immunosuppression caused by parasites is a reduced immune response to vaccination. It has been established that pinworms inhibit the development of post-vaccination immunity against diphtheria and measles. Even after three injections of AKDP1, 18% of children lack anti-diphtheria antibodies, and 14.5% have them in very low titers [3].

In ascariasis, toxocariasis and, to a lesser extent, enterobiosis, the immune response is suppressed after revaccination against diphtheria and vaccination against measles [8].

With ascariasis and trichocephalosis, titers of antibodies to diphtheria toxoid decrease faster. With ascariasis, a weaker immune response to the administration of an oral vaccine against poliomyelitis is registered [4].

The pharmaceutical market offers the following anthelmintics: Praziquantel, Piperazine, Pyrantel, Levamisole, Pyrvinium, Mebendazole and Albendazole. These medicines are used for treatment [12]:

- trematodes – Praziquantel;
- nematodes – Mebendazole, Albendazole, Pyrantel, Piperazine, Levamisole;
- dracunculiasis – Metronidazole;
- cestodoses – Praziquantel and Albendazole.

The main method in the treatment of echinococcosis and cysticercosis is surgical, Albendazole is used in them as an auxiliary agent. Among most antiparasitic medicines, Albendazole stands out positively.

The medicine is highly effective in most helminth infections, has a wide range of antihelminthic action and a high safety profile.

Features of pharmacokinetics and pharmacodynamics, the spectrum of anthelmintic action of albendazole, which give it advantages compared to other anthelmintic agents, are presented in table 2.1 [6].

On the pharmaceutical market of Ukraine, among several registered albendazole preparations, the domestic preparation Albela (produced by Kusum Pharm LLC, Sumy, Ukraine) appeared [3].

Table 2.1

Peculiarities of pharmacokinetics and pharmacodynamics of albendazole

Pharmacological features	Pharmacological effects
The mechanism of action is based on two processes of inhibition of biological reactions in the body of the helminth: inhibition of tissue respiration and inhibition of protein synthesis	High therapeutic activity Wide range of action
It is rapidly metabolized in the liver during the first passage	Low toxicity
Accumulation of the medicine in the organs and tissues of helminths	High activity against eggs, larvae, cysts and adults of helminths at the same time

A large-scale study on the effectiveness of albendazole in the most common helminthiasis (A. lumbricoides, T. trichiura, Necator americanus / Ancylostoma duodenale – nematodes) was conducted in 7 countries of the world (Cameroon, Ethiopia, Tanzania, Cambodia, India, Vietnam, Brazil). The results of the study showed the high effectiveness of the medicine in helminthiasis in children, which, however, depended on the type of helminth and the country in which the study was conducted. According to the general results, the effectiveness of Albendazole was: when infected with A. lumbricoides – 98.2%; with Necator americanus / Ancylostoma duodenale – 87.8%; with T. trichiura – 46.6% [30].

Strong differences in the effectiveness of Albendazole were observed for T. trichiura: from 21% (Tanzania) to 89% (India). 100% result was obtained in Brazil and Cambodia. The effectiveness of Albendazole against nematodes and A. lumbricoides ranged from 75% (India) to 100% (Vietnam, Cambodia). In Tanzania, the indicator was 96%, in India – 95%, in Ethiopia and Cameroon – 99% [22].

A meta-analysis of observational and case studies of single-dose Albendazole, Mebendazole, Pyrantel, and Levamisole in geohelminthiasis identified 168 studies conducted from 1960 to 2007 in 54 countries, including 20 placebo-controlled studies conducted from 1974 to 2007. The effectiveness of a single dose of Albendazole (400 mg) was evaluated in 14 studies, Mebendazole (500 mg) in 6 and Pyrantel (10 mg/kg) in 4 [4].

Albendazole for ascariasis was evaluated in 10 studies involving 557 patients. In four studies, the original medicine was tested, in the others, the manufacturer of Albendazole was not specified. It was found that the intensity of the release of roundworm eggs decreased by 85-100%. For hookworms, Albendazole was tested in 14 studies (742 patients): in 6 – with hookworm infestation, in 2 – with hookworm. In another 6 studies, the species of hookworm was not specified. The intensity of the release of helminth eggs decreased by 64.2-100%. Tolerability of Albendazole was satisfactory. No significant adverse events were observed in 11 studies. Cases of nausea and vomiting were isolated in one of the studies [6]. The effectiveness of Mebendazole in ascariasis was studied in 3 studies involving 500 patients. It was found that the intensity of the release of helminth eggs decreased by 96-99%. Mebendazole for hairy head infestation was used in only 3 studies that met the criteria for inclusion in the meta-analysis. The intensity of the release of helminth eggs in these studies decreased by 81.0-92.8%. The effectiveness of Mebendazole in the treatment of hookworms was studied in 6 studies (853 participants). In one study, the intensity of the release of helminth eggs did not decrease, in another, a decrease of 98.3% was noted. Mebendazole was well tolerated. No adverse events were observed in 3 studies. In one randomized controlled trial (RCT), 6 out of 45 children clearly complained of abdominal discomfort; these children received Mebendazole in a dose of 500 mg [19].

Pyrantel in ascariasis was tested in 3 studies involving 131 patients. The reduction in the intensity of the release of helminth eggs reached 87.9% (according to one study). Only 2 studies tested Pyrantel for head lice infestation. The share of effective treatment was 11.5 and 38.1%, respectively. The effectiveness of Pyrantel

in hookworm was evaluated in 4 studies (152 patients). The intensity of the release of helminth eggs decreased by 56.4-75.0%. Data on adverse events were heterogeneous: in one study they were observed frequently (abdominal pain, nausea and vomiting in 47.8% of patients), in another – adverse events were not mentioned, and in the third – the medicine was well tolerated. Levamisole at a dose of 2.5 mg/kg was tested in 3 studies, the treatment was effective in 91.5% of cases. Two studies were non-randomized placebo-controlled. Only one RCT investigated levamisole for head lice infestation: in Tanzania, children received 40 or 80 mg of the medicine (or at the rate of 1.25-2.5 mg/kg). The results were unsatisfactory: positive treatment was completed in 9.6% of cases, reduction in the intensity of helminth egg release was 41.5%. In two nonrandomized studies, the proportion of those who completed treatment was 8.6%. The effectiveness of Levamisole in hookworm was evaluated in 2 studies. The results were unsatisfactory, the proportion of positively completed treatment cases was 11.9 and 10%, respectively. In 4 non-randomized studies, the proportion of positively completed treatment cases was 38% [15].

Comparative studies on the effectiveness of some anthelmintic medicines for A. lumbricoides exist in the literature. Thus, when comparing the effectiveness of Albendazole and Mebendazole, it was shown that in the Albendazole group, 4 weeks after the end of antiparasitic therapy, unfertilized helminth eggs were released in 13.8%, in the Mebendazole group in the 4th week, roundworm eggs were released in 28.3% of cases ($p < 0.01$). The authors concluded that both medicines have a high ovicidal effect, but the effectiveness of a single dose of Albendazole was higher than the effectiveness of a single dose of Mebendazole [18]. The effectiveness of anthelmintic therapy may depend not only on the type of helminth, a specific medicine, but also on the dose of the latter. The effectiveness of different doses of Albendazole and Mebendazole was evaluated in 314 children aged 5 years and older with T. trichiura, A. lumbricoides and Taenia infestation. The outcome was evaluated based on the excretion of helminth eggs in the feces 3-4 weeks after the administration of a single dose of Albendazole (400 mg) or Mebendazole (500 mg) or a triple dose of Albendazole (3×400 mg for 3 days) or Mebendazole (3×500 mg

for 3 days). It was concluded that with the introduction of a single dose of Albendazole, the effectiveness of treatment was 97%, with the introduction of a single dose of mebendazole – 84%. With the introduction of a triple dose of Albendazole, the effectiveness of treatment was 99.7%, with the introduction of a triple dose of mebendazole – 96% [11]. In the literature, cases of the occurrence of reactions according to the type of bacteriolysis reaction (Yarysh-Herxheimer) are described. When antiparasitic therapy was administered to patients with helminthiasis, scientist described the occurrence of such a reaction against the background of anthelmintic therapy in the case of invasions by dwarf stickleback (Hymenolepis nana), pinworms (Enterobius vermicularis) and hairyhead (T. trichiura) [30]. This fact also requires the inclusion of antihistamine medicines and enterosorbents in the complex of treatment of helminthiasis [11].

Treatment of helminthiasis should not be limited to anthelmintic medicines. It should be comprehensive and additionally include medicines whose action is aimed at preventing toxic reactions when using anthelmintic medicines and at restoring the functions of organs affected by helminths. Medicines that are used to treat helminthiasis include: antihistamines (among them L syrup, the active substance of which is levocetirizine, an active blocker of H1-histamine receptors); enterosorbents [17].

In addition, adjuvant therapy is widely used, which may include: probiotics; enzyme preparations; anti-anemic drugs; hepatoprotectors. The latter are included in the complex of treatment of helminthiasis due to the fact that in some helminthiasis the liver can be directly affected (toxocarosis, opisthorchosis, echinococcosis). In addition, treatment with anthelmintic drugs can also be accompanied by liver damage. Especially with their long-term appointment, in several courses, which is recommended for toxocariasis, echinococcosis, trichinellosis [11]. In such cases, along with anthelmintic drugs, it is recommended to prescribe hepatoprotectors (Ukrliv suspension (ursodeoxycholic acid) and others) [9].

The treatment of helminthiasis should be carried out in three stages: 1) 3-5 days before the appointment of an anthelmintic medicine, a course of treatment with

antihistamines (L-cet syrup – levocetirizine) and enterosorbents (silicate, aluminosilicate, organominerals) is carried out; 2) children from 3 years of age Albela (Albendazole 400 mg): take one tablet on the 1st day of treatment; whether the therapy should be continued up to 3 days – the doctor decides depending on the patient's clinical picture. Against the background of taking the drug, treatment with antihistamines (L-cet syrup – Levocetirizine) and enterosorbents continues; 3) for 5 days after the end of treatment with Albela (Albendazole), antihistamines and enterosorbents continue to be taken. At this stage, the correction of dysfunctions of various organs and systems caused by helminths is carried out. When prescribing the drug Albela (Albendazole), on the day of its administration and the day after treatment, children are recommended to consume foods that contain little fat and are easily digested, in liquid and semi-liquid form (soups, liquid porridges, pureed meat and vegetables, fermented milk products) [3].

The prevention of helminthiasis primarily consists in observing general sanitary and hygienic norms and rules. First, it is possible to be infected with helminths from dogs and cats. Therefore, a pet needs a regular examination by a veterinarian and periodic deworming. Close contact with "street" animals should also be avoided. Proper cooking of food products, especially meat and fish, is also necessary. Thirdly, you should thoroughly wash vegetables, berries and fruits. Hand washing is also necessary, especially after walking outside and contact with a "street" dog or cat [30].

Fifth, obtaining personal hygiene rules (each family member must have personal bed linen, towels, hygiene items) [9].

There are categories of people for whom compliance with the rules of hygiene may not be sufficient to prevent helminth infections. They need to additionally carry out chemoprophylaxis with anthelmintic agents. Risk factors for helminth infection include: permanent residence in closed collectives (boarding schools, orphanages); constant contact with pets; contact with the land (living in the countryside, staying in out-of-town houses, playing on the ground, etc.); frequent trips to countries with a high incidence of helminthiasis; fond of hunting, fishing [22]. For the

chemoprophylaxis of helminthiasis, drugs with a wide spectrum of action and a high safety profile are recommended. These include Albendazole preparations (Albela) [18]. The recommended scheme of chemoprophylaxis of helminthiasis: Albela (Albendazole) once every six months for the whole family – adults and children from three years old – 400 mg once a day for three days, after meals [5].

CONCLUSIONS TO PART 2

1. The dynamics of consumption of anthelmintic medicines on the pharmaceutical market were analyzed.

2. The pharmacokinetics and pharmacodynamics of anthelmintic medicines were analyzed.

PART III
MARKETING RESEARCH OF THE MARKET OF ANTHELMINTIC MEDICINES

3.1. Analysis of consumer benefits of anthelmintic medicines

We conducted a survey of 62 users of anthelmintic medicines (Appendix). It was determined that 67% of respondents are women and 33% are men (Fig. 3.1).

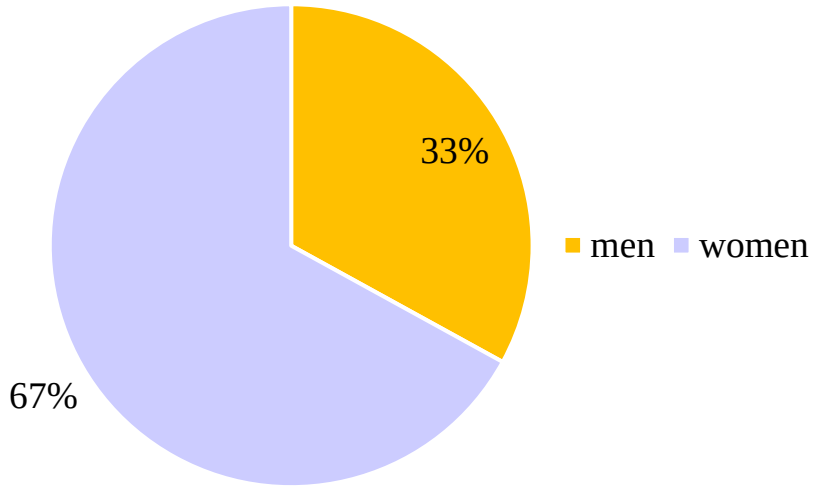

Fig. 3.1. Analysis of respondents' gender

Next, we determined the age of consumers (Fig. 3.2).

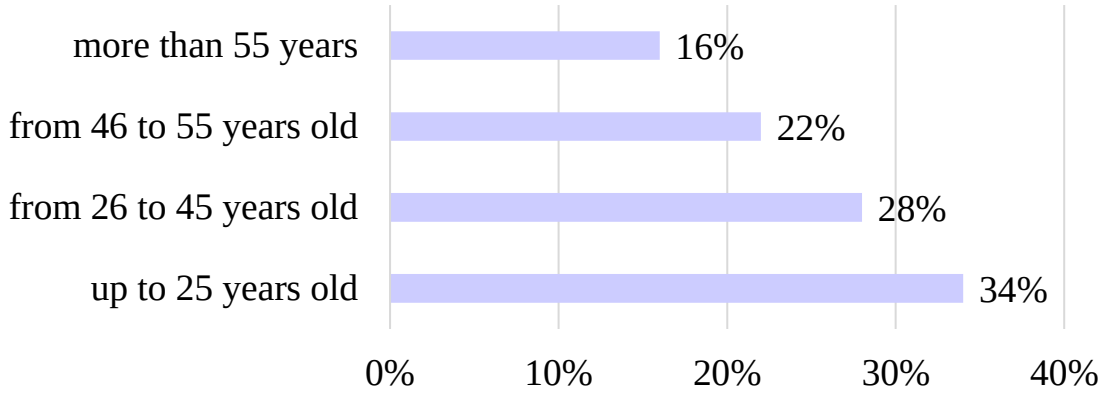

Fig. 3.2. Analysis of the age of the respondents

It was found that 34% of respondents were under the age of 25, 28% were between 26 and 45 years old, 22% were between 46 and 55 years old, and 16% were over 55 years old (Fig. 3.2).

It was found that 67% of surveyed consumers prefer domestic and 33% – foreign medicines (Fig. 3.3).

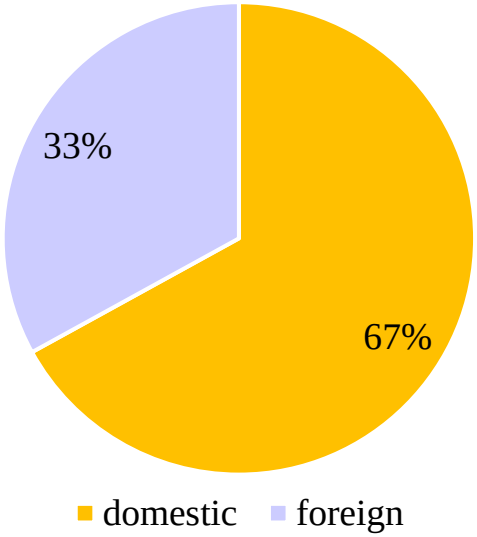

Fig. 3.3. Analysis of countries producing anthelmintic medicines

Information about the country-producer of the anthelmintic medicines chosen by consumers was also of interest (Fig. 3.4). It was found that 42% of respondents choose Ukrainian-made anthelmintic medicines, 23% – anthelmintic medicines from France, 15% – from Great Britain, 13% – from India, 7% – from Hungary (Fig. 3.4).

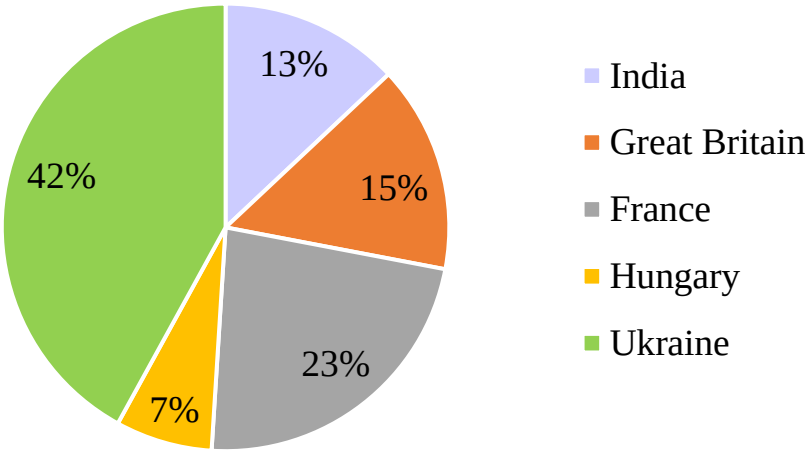

Fig. 3.4. Ratio of anthelmintic medicines producing countries

It was established that 86% of the respondents conduct prevention of helminthiasis for themselves and family members, and only 14% do not (Fig. 3.5).

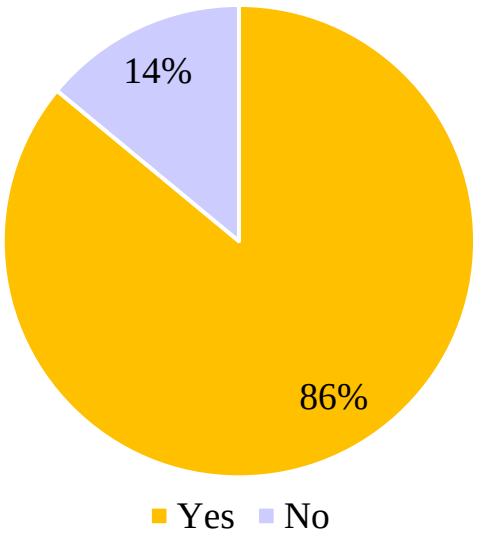

Fig. 3.5. Analysis of prevention of helminthiasis in consumers and members of their families

It was established that the majority of respondents (60%) carry out prevention of helminthiasis with a frequency of once a year. 21% of surveyed consumers take prevention of helminthiasis 1 time per six months. 11% of respondents carry out preventive measures once a quarter, 8% of respondents do not carry out anthelmintic preventive therapy at all (Fig. 3.6).

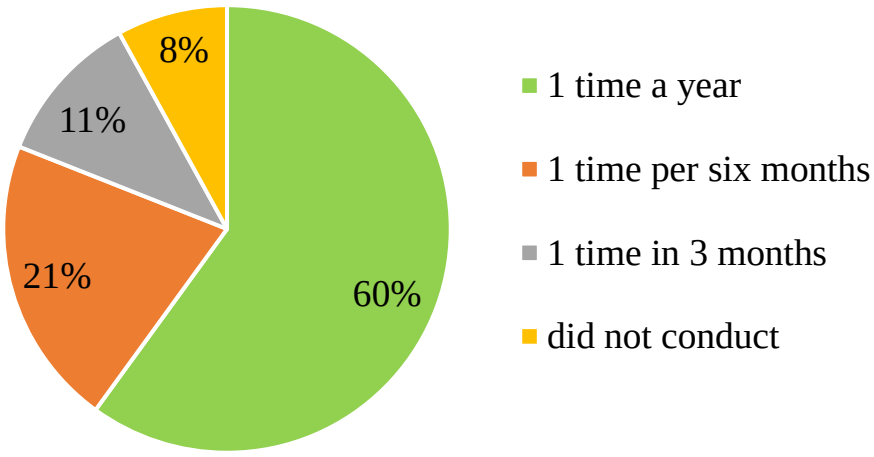

Fig. 3.6. Analysis of the frequency of prevention of helminthiasis

It was revealed that consumer preferences of anthelmintic medicines belong to Vermox (36%), Wormil (21%), Pyrantel (19%), Decaris (14%) and Piperazine adipinate (10%) (Fig. 3.7).

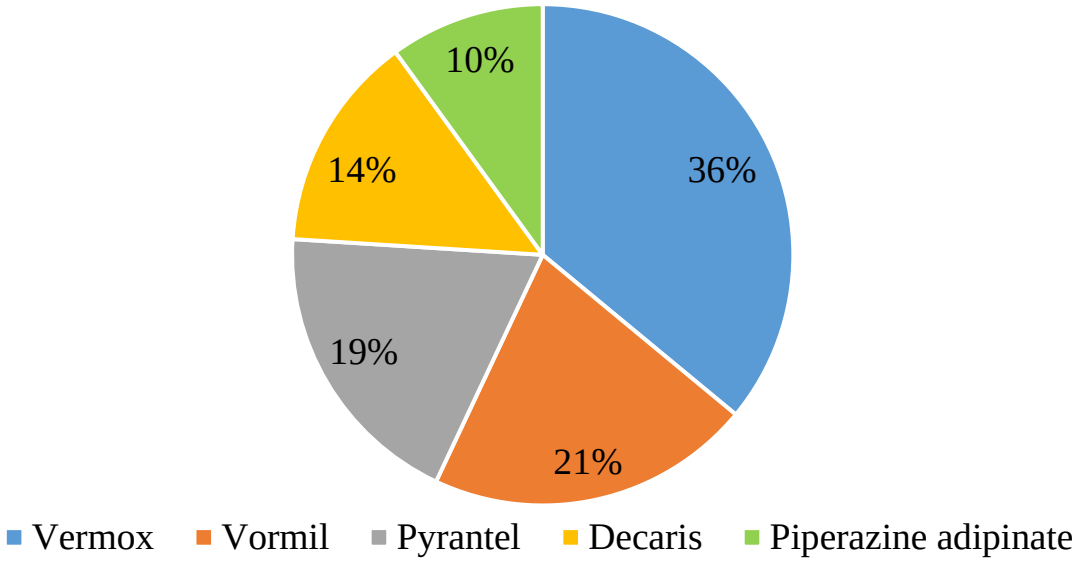

Fig. 3.7. Analysis of consumer preferences of anthelmintic medicines

It was found that only 9% of respondents use veterinary medicines for the prevention of helminthiasis in pets, i.e. 91% of respondents use anthelmintic medicines intended for the treatment of humans for prevention of animals (Fig. 3.8).

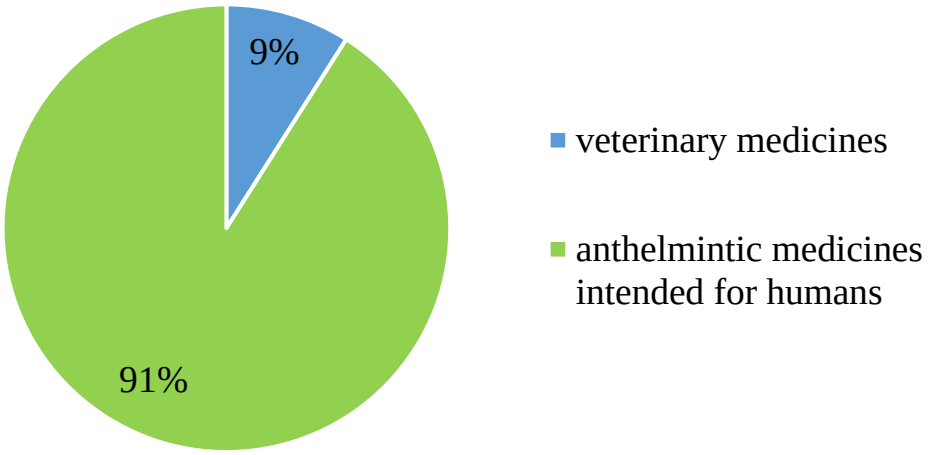

Fig. 3.8. Analysis of anthelmintic medicines used for the prevention of helminthiasis in domestic animals

Next, we conducted a comparative characterization of anthelmintic medicines used for the treatment of humans and animals. It was determined that some active substances included in anthelmintic medicines can be used both for the treatment and prevention of helminthiasis in humans and animals, namely: Albendazole, Levamisole, Mebendazole, Pyrantel, Praziquantel, Piperazine adipinate. In addition to the listed international names of anthelmintic medicines for the treatment and prevention of helminthiasis in animals, medicines with anthelmintic action are used, which also contain such active substances as Fenbendazole, Febantel, Abamectin, Doramectin, Ivermectin, Niclosamide, Oxibendazole [8]. A comparative analysis of anthelmintic medicines used for the treatment of humans and animals showed that they have certain differences, namely: anthelmintic medicines for the treatment of animals contain a smaller amount of active substances; as a rule, veterinary medicines are a combination of several active substances (the most common combination of pyrantel and praziquantel) and due to this, they have a wider spectrum of action and are characterized by a higher price than anthelmintic medicines for the treatment of humans. For example, the cost of an average prophylactic dose of veterinary medicines manufactured by Bayer Health Care company Drontal Junior, Drontal for kittens, Drontal with the taste of meat, Profender Spot-on is 80 UAH, 19 UAH, 15 UAH, 40 UAH, respectively. However, the weighted average price of 1 package of anthelmintic medicines for the treatment of humans is about 25 UAH, and is lower than the price of some veterinary medicines.

Next, we studied consumer preferences for types of dosage forms of anthelmintic medicines. It was found that 67% of respondents more often choose solid dosage forms — tablets, coated tablets, chewable tablets. Liquid dosage forms are chosen by 16% of consumers — they are presented in the form of oral suspensions. The specific weight of medicinal products from plant raw materials is 17% (crushed plant raw materials and raw materials in filter bags) (Fig. 3.9). Specialist doctors note that the use of medicinal forms in the form of a suspension

is recommended for children. For 15% of respondents, the type of dosage form does not matter.

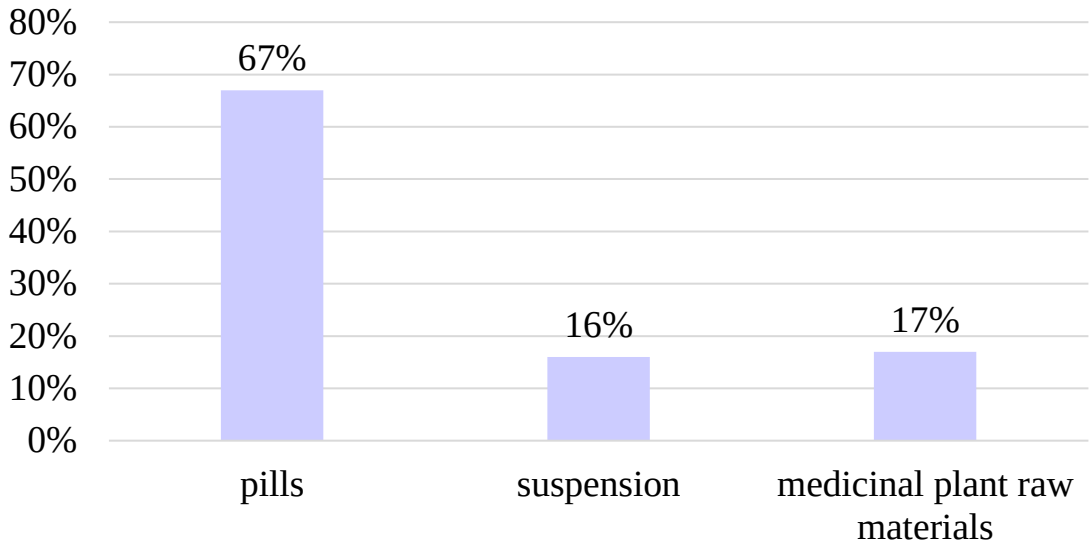

Fig. 3.9. Analysis of dosage forms of anthelmintic drugs

3.2. Analysis of the level of demand for anthelmintic medicines

The employees of the pharmacy organization, which is engaged in the dispensing of medicinal products, noted that such anthelmintic medicines as Decaris, Pyrantel in the form of tablets and Pyrantel in the form of a suspension are in high demand. The analysis showed that Nemozol (coated tablets), Nemozol (chewable tablets), Vermox (tablets), Helmintox (tablets), Helmintox (suspension) are in average demand. It was also noted that Nemozole (suspension), Mebendazole (tablets), Wormin (tablets), Piperazine (tablets), Biltricide (tablets), Namocid (tablets), goldenrod grass (crushed raw materials and raw materials in filter bags), tansy flowers (crushed raw materials and raw materials in filter bags), pumpkin seeds are in low demand.

Thus, most medicines are in low demand (60%) and medium demand (27%). Only 13% of medicines are in high demand.

Price is an important criterion for choosing a medicinal product, along with its effectiveness.

We carried out a price segmentation of the anthelmintic medicines market, which made it possible to distinguish four groups of medicines according to their cost (Fig. 3.10).

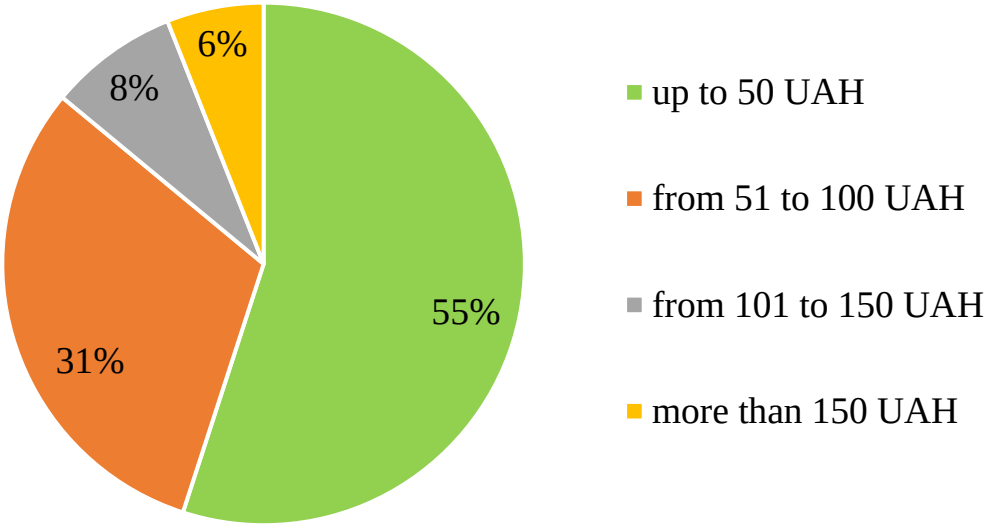

Fig. 3.10. Analysis of an acceptable price for consumers for anthelmintic drugs

From fig. 3.10 it follows that 55% of the available medicines cost up to 50 UAH. 31% of medicines have an average price (from 51 to 100 UAH), and 4 names of them, Decaris 50 mg, Decaris 150 mg, Pyrantel 250 mg, and Pyrantel suspension are in high demand. The price range from 101 UAH to 150 UAH includes 8% of medicines for which average demand is noted. The cost of 6% of medicines exceeds 150 UAH. Biltricid belongs to this group of medicines.

Next, we analyzed the age of patients with worm infestation (Fig. 3.11).

It was established that 34% of people for whom consumers buy anthelmintic medicines are under 10 years old, 34% – from 11 to 25 years old, 22% – from 26 to 50 years old, and 16% – over 50 years old (Fig. 3.11).

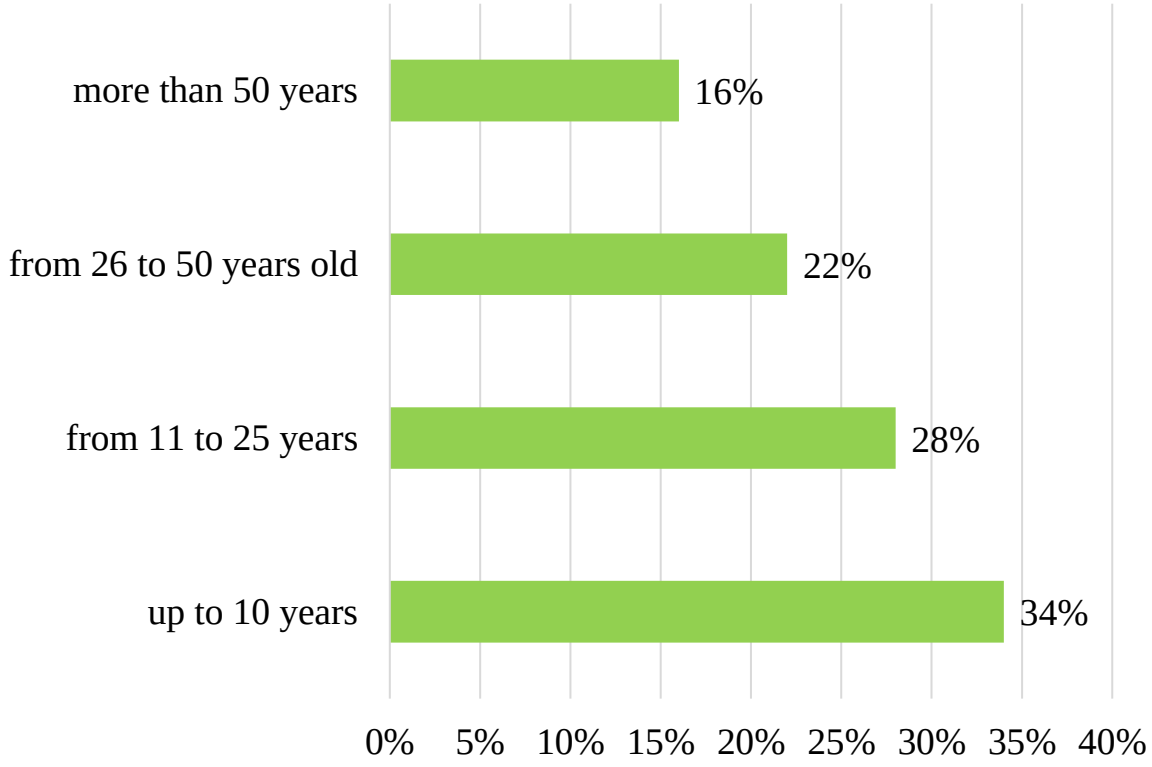

Fig. 3.11. Analysis of the age of people for whom anthelmintic medicines are prescribed

The figure shows that the number of patients with helminthic infestation decreases with increasing age. The main number of patients with worm infestation is in the age group up to 10 years (34%) and in the age group from 11 to 25 years (28%). The age group of patients over 50 years old is insignificant and makes up only 16%.

Antifungal medicines are prescribed to varying degrees by doctors. Thus, in the analyzed pharmacies, 26.1% of the names of anthelmintic medicines are constantly prescribed by doctors, 20.1% of medicines are often prescribed, 46% of the names are sometimes prescribed by doctors, and 7.8% are prescribed extremely rarely.

Generalized questionnaire data showed that doctors constantly recommend such medicines as Decaris, Vermox and Pirantel, especially for children; Nemozol, Nemocid, Helmintox are often prescribed; very rarely, yarrow is prescribed, and other medicinal preparations are sometimes prescribed.

The reason for prescribing anthelmintics was also analyzed. 52% of respondents prescribe anthelmintic medicines for the prevention of worm infestations and 48% – directly for the treatment of the disease.

Therefore, helminth infections are widespread in the world and cause a number of serious diseases. And the availability of a sufficient number of anthelmintic medicines in the pharmacy organization contributes to the timely and high-quality treatment of this pathology. A rational assortment of a pharmacy organization provides for the availability of products that meet the demands of all consumers and the requirements of current regulations.

Thus, a rationally formed assortment is given great attention, as it accelerates the turnover of the product mass, leads to the equality of supply and demand, thus increasing the efficiency of the pharmacy organization's economic activity.

Anthelmintic medicines play a vital role in combating parasitic infections in humans and animals. Understanding the level of demand for these medicines is crucial for ensuring effective healthcare delivery and addressing public health challenges. This article presents a comprehensive analysis of the factors influencing the demand for anthelmintic medicines, including trends, consumer behavior, and market dynamics.

Factors Influencing Demand:

1. Prevalence of parasitic infections: the demand for anthelmintic medicines is directly influenced by the prevalence of parasitic infections in a given population. Regions with high incidences of parasitic diseases typically exhibit greater demand for these medicines, driven by the need for treatment and prevention.

2. Awareness and education: public awareness campaigns and educational initiatives about the risks of parasitic infections and the importance of deworming contribute to increased demand for anthelmintic medicines. Greater awareness leads to proactive healthcare seeking behavior and higher adoption rates of preventive measures.

3. Veterinary use: anthelmintic medicines are not only used in human healthcare but also in veterinary medicine to treat and prevent parasitic infections in

animals. The demand for these medicines in the veterinary sector also impacts overall market demand, reflecting the interconnectedness of human and animal health.

4. Access to healthcare: the availability and accessibility of healthcare services, including access to anthelmintic medicines, significantly influence demand. Factors such as affordability, proximity of healthcare facilities, and healthcare infrastructure play a crucial role in determining the level of demand in different regions.

5. Regulatory environment: regulatory frameworks governing the sale, distribution, and use of anthelmintic medicines can impact demand dynamics. Stringent regulations may affect availability and affordability, while regulatory changes or approvals for new medicines can stimulate demand.

Market trends and consumer behavior:

- Shift towards preventive healthcare: increasing emphasis on preventive healthcare practices, including regular deworming, is driving demand for anthelmintic medicines. Consumers are increasingly proactive about maintaining their health and preventing parasitic infections, leading to higher demand for preventive treatments.
- Preference for safe and effective products: consumers prioritize anthelmintic medicines that are safe, effective, and easy to administer. Market demand is skewed towards products with proven efficacy, minimal side effects, and convenient dosage forms, reflecting consumer preferences for quality healthcare products.
- Growing pet ownership: the rising trend of pet ownership globally is contributing to increased demand for anthelmintic medicines for companion animals. Pet owners prioritize the health and well-being of their animals, driving demand for veterinary anthelmintics.

Analyzing the level of demand for anthelmintic medicines requires a multifaceted approach that takes into account various factors, including disease prevalence, awareness, access to healthcare, and consumer behavior. By

understanding these dynamics, healthcare providers, pharmaceutical companies, and policymakers can develop targeted interventions and strategies to meet the evolving healthcare needs of populations and ensure effective control of parasitic infections. As awareness grows and healthcare systems evolve, continued monitoring and analysis of demand trends will be essential for guiding decision-making and optimizing healthcare delivery.

Preventing worm infestations can be an effective way to maintain your health and well-being. Here are a few steps you can take to avoid hookworm infections: Observe personal hygiene: wash hands thoroughly with soap and water before eating, after using the toilet, and after contact with animals. Cleanliness of products: wash mushrooms and vegetables thoroughly before use. Jam or hellmeat properly can also prevent worm infestation. Avoid contact with infected bodies of water: by avoiding contact with contaminated bodies of water, you will reduce the risk of infection with worm larvae that may be present in the water. Thorough treatment of animals: If you have pets, regularly carry out preventive treatment against worms. Consult your veterinarian for proper treatment methods and frequency. Avoid eating raw or undercooked food: Follow safety rules for cooking and eating meat, fish, and seafood to avoid the risk of hookworm infection. Conducting regular medical examinations: regular medical examinations will help detect possible diseases and respond to them in time.

Remember that prevention is always better than cure. By following these simple tips, you will reduce the risk of hookworm infection and maintain your health.

CONCLUSIONS TO PART 3

1. To analyze the consumer preferences of anthelmintic medicines, we conducted a survey of 62 consumers. It was determined that 67% of respondents are women and 33% are men.

2. It was found that 34% of respondents were under the age of 25, 28% were between 26 and 45 years old, 22% were between 46 and 55 years old, and 16% were over 55 years old.

3. It was found that 67% of surveyed consumers prefer domestic and 33% prefer foreign medicines.

4. Information about the country-producer of the anthelmintic medicines chosen by consumers was also of interest. It was found that 42% of respondents choose anthelmintic medicines of Ukrainian production, 23% – anthelmintic drugs from France, 15% – from Great Britain, 13% – from India, 7% – from Hungary.

5. It was established that 86% of the respondents conduct prevention of helminthiasis for themselves and family members, and only 14% do not.

6. It was established that the majority of respondents (60%) carry out prevention of helminthiasis with a frequency of once a year. 21% of surveyed consumers take prevention of helminthiasis 1 time per six months. 11% of respondents carry out preventive measures once a quarter, 8% of respondents do not carry out anthelmintic preventive therapy at all.

7. It was found that consumers prefer the following anthelmintic medicines: Vermox (36%), Wormil (21%), Pyrantel (19%), Decaris (14%) and Piperazine adipinate (10%).

8. It was found that only 9% of respondents used veterinary medicines to prevent helminthiasis in domestic animals, i.e. 91% of respondents used antihelminthic meducines intended for human treatment to prevent animals.

9. Consumer preferences for types of dosage forms of anthelmintic medicines were analyzed. It was found that 67% of respondents more often choose solid dosage forms — tablets, coated tablets, chewable tablets. Liquid dosage forms are chosen by 16% of consumers — they are presented in the form of oral suspensions. The specific gravity of medicines from plant raw materials is 17% (crushed plant raw materials and raw materials in filter bags).

10. The level of demand for anthelmintic medicines was analyzed. It has been established that such anthelmintic medicines as Decaris, Pyrantel in the form

of tablets and Pyrantel in the form of a suspension are in high demand. The analysis showed that Nemozol (coated tablets), Nemozol (chewable tablets), Vermox (tablets), Helmintox (tablets), Helmintox (suspension) are in average demand. It is also noted that Nemozole (suspension), Mebendazole (tablets), Wormil (tablets), Piperazine (tablets), Biltricid (tablets), Namocid (tablets), goldenrod grass (crushed raw materials and raw materials in filter bags), tansy flowers (crushed raw materials and raw materials in filter bags), pumpkin seeds are in low demand. Thus, most medicines are in low demand (60%) and medium demand (27%). Only 13% of medicines are in high demand.

11. An acceptable price for consumers of anthelmintic medicines was analyzed. Yes, for 55% of respondents, a price for consumers of up to 50 UAH is acceptable. The average price (from 51 to 100 UAH) is acceptable for 31% of respondents, for 8% — from 101 to 150 UAH, and for 6% of medicines — more than 150 UAH.

12. Next, we analyzed the age of patients with worm infestation. It was found that 34% of people are under 10 years old, 34% are between 11 and 25 years old, 22% are between 26 and 50 years old, and 16% are over 50 years old.

GENERAL CONCLUSIONS

1. Features of the treatment of helminthiasis are disclosed. A classification of drugs prescribed for worm infestations is given.

2. The dynamics of consumption of anthelmintic drugs on the pharmaceutical market were analyzed. The pharmacokinetics and pharmacodynamics of anthelmintic medicines were analyzed.

3. To analyze the consumer preferences of anthelmintic medicines, we conducted a survey of 62 consumers. It was determined that 67% of respondents are women and 33% are men.

4. It was found that 34% of respondents were under the age of 25, 28% were between 26 and 45 years old, 22% were between 46 and 55 years old, and 16% were over 55 years old.

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7. It was established that 86% of the respondents conduct prevention of helminthiasis for themselves and family members, and only 14% do not.

8. It was established that the majority of respondents (60%) carry out prevention of helminthiasis with a frequency of once a year. 21% of surveyed consumers take prevention of helminthiasis 1 time per six months. 11% of respondents carry out preventive measures once a quarter, 8% of respondents do not carry out anthelmintic preventive therapy at all.

9. It was found that consumers prefer the following anthelmintic medicines: Vermox (36%), Wormil (21%), Pyrantel (19%), Decaris (14%) and Piperazine adipinate (10%).

10. It was found that only 9% of respondents used veterinary medicines to prevent helminthiasis in domestic animals, i.e. 91% of respondents used antihelminthic meducines intended for human treatment to prevent animals.

11. Consumer preferences for types of dosage forms of anthelmintic medicines were analyzed. It was found that 67% of respondents more often choose solid dosage forms — tablets, coated tablets, chewable tablets. Liquid dosage forms are chosen by 16% of consumers — they are presented in the form of oral suspensions. The specific gravity of medicines from plant raw materials is 17% (crushed plant raw materials and raw materials in filter bags).

12. The level of demand for anthelmintic medicines was analyzed. It has been established that such anthelmintic medicines as Decaris, Pyrantel in the form of tablets and Pyrantel in the form of a suspension are in high demand. The analysis showed that Nemozol (coated tablets), Nemozol (chewable tablets), Vermox (tablets), Helmintox (tablets), Helmintox (suspension) are in average demand. It is also noted that Nemozole (suspension), Mebendazole (tablets), Wormil (tablets), Piperazine (tablets), Biltricid (tablets), Namocid (tablets), goldenrod grass (crushed raw materials and raw materials in filter bags), tansy flowers (crushed raw materials and raw materials in filter bags), pumpkin seeds are in low demand. Thus, most medicines are in low demand (60%) and medium demand (27%). Only 13% of medicines are in high demand.

13. An acceptable price for consumers of anthelmintic medicines was analyzed. Yes, for 55% of respondents, a price for consumers of up to 50 UAH is acceptable. The average price (from 51 to 100 UAH) is acceptable for 31% of respondents, for 8% — from 101 to 150 UAH, and for 6% of medicines — more than 150 UAH.

14. Next, we analyzed the age of patients with worm infestation. It was found that 34% of people are under 10 years old, 34% are between 11 and 25 years old, 22% are between 26 and 50 years old, and 16% are over 50 years old.

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APPLICATIONS

Appendix A

МІНІСТЕРСТВО ОХОРОНИ ЗДОРОВ'Я УКРАЇНИ
НАЦІОНАЛЬНИЙ ФАРМАЦЕВТИЧНИЙ УНІВЕРСИТЕТ

АКТУАЛЬНІ ПИТАННЯ СТВОРЕННЯ НОВИХ ЛІКАРСЬКИХ ЗАСОБІВ

МАТЕРІАЛИ
XXX МІЖНАРОДНОЇ НАУКОВО-ПРАКТИЧНОЇ
КОНФЕРЕНЦІЇ МОЛОДИХ ВЧЕНИХ ТА СТУДЕНТІВ

17-19 квітня 2024 року
м. Харків

Харків
НФаУ
2024

can influence the image of the pharmacy chain. The ways in which a pharmacy chain communicates with customers include advertising, social media, loyalty programs, and other marketing initiatives. Pharmacy chains may offer additional services such as vaccination, consultations, health programs, and charity, which also impact their image. Commitment to ethical practices, adherence to quality standards, and community involvement can strengthen customers' trust in the pharmacy chain.

Problems with the image of pharmacy chains can arise due to various reasons: low-quality service, product quality issues, negative events, or scandals, competition, and market instability. The perception of the pharmacy's image is influenced by both positive and negative customer experiences. Examples of positive consumer experiences are friendly and helpful staff, a wide range of products, and fast and efficient service. Negative consumer experiences include long queues and waiting times, lack of necessary medications, and poor pharmacist consultation. These examples underscore the importance of quality service and product availability in pharmacies to meet customer needs.

Conclusions. According to experts, several measures can contribute to improving the image of a pharmacy chain: providing excellent customer service through well-trained staff, personalized interactions, and efficient problem resolution; being transparent about pricing, policies, and procedures fosters trust and confidence among customers and stakeholders; engaging with the local community through health education programs, sponsorships, and participation in community events; introducing innovative services such as telepharmacy, medication synchronization programs, or health screenings; maintaining an informative and user-friendly website, as well as active engagement on social media platforms; actively seeking and responding to customer feedback; investing in employee training, development, and satisfaction. By implementing these measures, a pharmacy chain can strengthen its image, build customer loyalty, and position itself as a trusted and reputable healthcare provider in the community.

MARKETING RESEARCH OF THE ANTHELMINTIC MARKET

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Introduction. The anthelmintic market is dynamic, driven by factors such as increasing incidences of parasitic diseases, advancements in drug development, and growing awareness about the importance of deworming. To navigate this complex problem effectively, thorough marketing research becomes indispensable.

Aim. The aim is marketing research of the anthelmintic market.

Materials and methods. The methods of questionnaire, analysis, grouping, comparison, generalization have been used in study.

Results and discussion. We conducted a survey among consumers to explore their preferences regarding anthelmintic drugs. Our findings revealed that 67% of the respondents favor domestically produced drugs, while 33% prefer foreign alternatives. Specifically, 42% of participants opt for anthelmintic drugs made in Ukraine, 23% prefer those from France, 15% from Great Britain, 13% from India, and 7% from Hungary. Furthermore, our study uncovered that 86% of the surveyed individuals engage in helminthiasis prevention for themselves and their families, with only 14% abstaining from such measures. The majority of respondents (51%) conduct helminthiasis prevention

once every six months. Additionally, 21% take preventive measures annually, 11% do so quarterly, and 8% do not engage in anthelmintic preventive therapy at all. Regarding preferences for specific anthelmintic drugs, our research indicates that Vermox is favored by 36% of respondents, followed by Wormil (21%), Pyrantel (19%), Decaris (14%), and Piperazine adipinate (10%). Interestingly, only 9% of respondents reported using veterinary drugs for helminthiasis prevention in domestic animals, indicating that 91% utilize anthelmintic drugs intended for human treatment to prevent infestations in animals. We also examined consumer preferences regarding dosage forms of anthelmintic drugs. It was found that 67% of respondents prefer solid dosage forms such as tablets, coated tablets, and chewable tablets, while 16% opt for liquid dosage forms, typically presented as suspensions for oral administration. Additionally, 17% of participants express a preference for medicinal preparations derived from plant raw materials, including shredded plant raw materials and raw materials in filter bags. Lastly, our analysis of demand levels for anthelmintic drugs identified high demand for products such as Decaris and Pyrantel in tablet form, as well as Pyrantel in suspension form.

Conclusions. Marketing research of the anthelmintic market was conducted.

USING MARKETING TOOLS TO ANALYZE THE PHARMACEUTICAL MARKET

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Introduction. Marketing tools play a significant role in modern business, providing pharmaceutical companies with effective means to study various aspects of the market and business processes. With their help, current trends, consumer behavior, competitive environment, and other important factors affecting the business activities of organizations are analyzed.

Aim. Analysis of the results of using marketing tools using the example of a study of the national pharmaceutical market.

Materials and methods. The work uses systematic and statistical methods, content analysis of publications, and analysis of Internet sources.

Results and discussion. Analysis of the national market is based on the usage of marketing tools that allow you to research the market, competitors, segment consumers and diagnose the marketing strategy and marketing mix.

Marketing tools provide information about the needs and preferences of consumers, factors influencing purchasing decisions, information for developing personalized marketing strategies and improving interaction with the target audience. In this direction, marketing panels that provide data on purchases and behavior of drug consumers are used. Also among the key types of information obtained using marketing panels is data on drug sales volumes over various periods of time. Market trend analysis provides information on the market share of various segments, growth trends, and market forecasts, which form the basis for assessing the strategic development and effectiveness of marketing campaigns. Pricing research provides information on drug prices, discounts, and promotions, and also allows for a comparative analysis of prices for products from different manufacturers.

cont. app. A

МІНІСТЕРСТВО ОХОРОНИ ЗДОРОВ'Я УКРАЇНИ
НАЦІОНАЛЬНИЙ ФАРМАЦЕВТИЧНИЙ УНІВЕРСИТЕТ

ДИПЛОМ
II СТУПЕНЯ

нагороджується

Бізбіз Хажар

у секційному засіданні студентського наукового товариства кафедри фармацевтичного менеджменту та маркетингу

XXX Міжнародна науково-практична конференція молодих вчених та студентів
"Актуальні питання створення нових лікарських засобів"

В.о. ректора
Національного фармацевтичного університету

Алла КОТВІЦЬКА

17-19 квітня 2024 р.
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