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Pharmaceutical Market in Economic Terms: Individual Analytical Moments

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ABSTRACT

The economic aspects of the pharmaceutical market are an important area of research that allows us to determine the level of sales of certain drugs, the dynamics of their sales, and ultimately, the demand for a particular group of drugs on the market. In the light of a sufficiently urgent problem - the spread of seasonal colds and viral diseases, as well as the still fairly high incidence of coronavirus infection both in Russia and around the world, we conducted an ABC- analysis of antiviral drugs in one of the pharmaceutical networks of the city of Belgorod (Russia). The purpose of this analysis is to determine the need to introduce into the range of pharmacies or exclude from it a particular group of antiviral drugs in order to form the range of antiviral drugs most in demand by consumers and, as a result, to increase the efficiency of the pharmacy network.

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INTRODUCTION

Consumers, visiting pharmacies, plan their financial expenses in different ways: someone prefers to purchase medicines by prescription, someone focuses on commercials, someone follows the advice of friends and acquaintances, someone focuses on their own analytical data, comparing the description of drugs and reviews on the Internet. At the same time, consumers together form the market of medicines and determine the market leaders in a particular group of drugs.

Despite the fact that each pharmacy organization or network must maintain the necessary assortment of certain medicines, especially vital ones, the formation of an assortment group that significantly affects the profit and profitability of a commercial pharmaceutical enterprise is an important aspect of its activities. It is for this reason that the purpose of the work is to determine the need to introduce into the range of pharmacies or exclude from it a particular group of antiviral drugs in order to form the range of antiviral drugs most in demand by consumers and, as a result, to increase the efficiency of the pharmacy network.

KEYWORDS:
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RESULTS

As world practice has shown, today the spread of viral diseases can be lightning-fast.[1] For this reason, the demand for these drugs by the population has increased several times over the past two years. It should also be said that, taking into account the innovativeness of the new virus at the initial stage of its spread, it was difficult to identify truly effective drugs that would be able to destroy the coronavirus.[2] For this reason, in 2020, consumers acted quite spontaneously, purchasing any, in their opinion, effective antiviral drugs in an attempt to combat coronavirus infection.

At the subsequent stages of the development of coronavirus, consumers began to act most deliberately, and for this reason, it became possible to analyze the demand for antiviral drugs not only as a result of spontaneous purchases, but also within the framework of conscious consumer behavior.

The viral nature of the rapidly spreading disease COVID-19 has caused an active fight against it by the entire population of the planet, starting with governments and medical organizations and ending with each individual consumer.[3]

Viruses are incredibly difficult to treat for a variety of reasons. However, the initial threat is the way they spread. Not every person infected with the virus shows symptoms. In fact, as in the case of COVID-19, the majority of infected people have the disease subclinically. This means that an infected person has almost no symptoms of infection, and therefore is unlikely to ever be diagnosed. The ability of the human immune system to stop infection before it occurs is evolutionarily beneficial on an individual scale, but can negatively affect the population as a whole, contributing to the spread of the virus.[4]

Virus replication can be broadly divided into six stages, illustrated for several common viruses. The pathogenesis of the virus includes initial attachment, penetration into the host cell, removal of the shell, transcription and replication, infection and assembly of the virion, as well as release. [5 There are several factors affecting the ability of the virus to use and capture the host cellular mechanisms. Firstly, the virus itself must be present in a sufficient load (the number of virions), the cells at the site of infection must be permissive, and the human protection system must be ineffective or absent.

Further, the viral structure, virulence, replication rate and spread can affect the course of infection. As for the environment, the spread of the virus can be affected by temperature, pH and humidity. It has been shown that in humans, the race, gender, age and weight of the host play a role in the success of virulence. Viruses, for all these reasons, pose such a danger due to the unpredictability of their behavior on individual hosts.[6]

Viral enzymes are the main targets of antiviral drugs, and inhibitors of these enzymes account for more than two-thirds of all antiviral drugs approved for human use. Of these antiviral agents, polymerase inhibitors represent the largest class of agents and represent two groups: nucleoside/nucleotide analogues and non-nucleoside/nucleotide inhibitors.

Nucleoside/nucleotide analogues are chain terminators that, after being incorporated into RNA/DNA strands, stop viral polymerases. Non-nucleoside/nucleotide inhibitors serve as non-competitive inhibitors, binding viral polymerases and disrupting their catalytic activity. Several nucleoside/nucleotide analog compounds have been marketed for exposure to various viruses, such as HIV, hepatitis B virus (HBV), hepatitis C virus (HCV), influenza virus, human cytomegalovirus, herpes simplex virus and chickenpox virus.[7]

Human herpes viruses make up a large family of viruses containing double-stranded DNA, some of which are widespread among humans. Clinical manifestations of viral infection vary widely. The herpes family is divided into three subfamilies: α-, ß- and γ- Herpesvirinae . The α-class includes herpes simplex viruses of types 1 and 2 (HSV-1 and HSV-2) and varicella-zoster virus (VVO; the causative agent of varicella).

B-class includes human cytomegalovirus (CMV), human herpes virus 6 (HHV6) and human herpes virus 7 (HHV7). Class γ includes Epstein-Barr virus (EBV), human herpes virus type 4 (HHV4) and Kaposi's sarcoma-associated herpes virus (KSHV; HHV8).

A variety of compounds are licensed for use as antiviral agents or are currently under development. Most of these compounds are analogues of nucleosides.[8]

There are several types of influenza virus that affect humans. Influenza A and B viruses contain single-stranded RNA with a negative meaning. The virus is usually spread by airborne droplets when coughing or sneezing. Influenza spreads around the world in annual outbreaks of varying severity, usually with a significant number of deaths. Larger outbreaks of a pandemic nature are less common.

Well-known influenza pandemics associated with the influenza A virus are Spanish influenza (H_1N_1) in 1918, Asian influenza (H_2N_2) in 1957, Hong Kong influenza (H_3N_2) in 1968 and Mexican influenza (H_7N_9). In 2018, influenza can also affect animals such as pigs and birds, for example, the outbreak of avian influenza (H_5N_1) in 2004. Flu vaccines are available, but they are not always effective due to virus mutations.

The most common treatment for influenza is the use of acetaminophen to relieve fever and muscle pain associated with the disease. There are two classes of antiviral drugs used against influenza: Matrix-2 proton channel antagonists of influenza A virus (adamantane derivatives) and neuraminidase (sialidase) inhibitors (oseltamivir, zanamivir, laninamivir and peramivir).[9]

As can be seen from the current state of HIV, the lives of people with chronic viral infections have improved significantly. However, with the emergence of new strains of influenza every year and the emergence of new viruses around the world, modern antiviral therapies face unprecedented problems. One of the main problems associated with antiviral drugs is bioavailability, which is affected by the ability of the drug to be absorbed in the gastrointestinal tract. When taking antiviral acyclovir in some patients, the absorption rate was only 15% of the administered drug. Bioavailability depends on solubility and permeability. The consequences associated with low bioavailability are a higher required dose, which can lead to toxic effects. The method of drug delivery is usually oral.[10]

In clinical practice, patients receive antiviral drugs under the supervision of a doctor, and purchases of drugs for inpatient hospital organizations are carried out centrally. Consumers are guided by certain needs and their own decision within the framework of the purchase of certain antiviral drugs. For this reason, it was decided to analyze the dynamics of sales of antiviral drugs on the basis of one of the pharmacies included in the "Socialochka" network (this network is quite popular among the population due to optimal prices for individual medicines), located in one of the residential neighborhoods of Chekhov, Moscow region.

DISCUSSION

In order to identify the sales leaders and determine which of the drugs are in the least demand, it is necessary to conduct an ABC-analysis of antiviral drugs in the pharmacy "Socialochka".

The analysis was carried out for the 4th quarter of 2021.

Table 1 shows the cost of antiviral drugs, the volume of sales and the amount of revenue from their sale.

As can be seen from Table 1, in the pharmacy "Socialochka" for the 4th quarter of 2021, 1698 packages of antiviral drugs were sold in the amount of 817092.2 rubles. In order to conduct an ABC-analysis, it is necessary to calculate the share in turnover. These calculations are presented in Table 2.

Next, it is necessary to calculate the percentage of the accumulation, the calculation is presented in Table 3.

Based on the calculations obtained in Table 3, we will conduct an ABC analysis of antiviral drugs presented in the pharmacy "Socialochka" (Table 4).

Thus, as the study showed, the following antiviral drugs fall into group A: Arbidol, 0.1 No. 40, Ocillococcinum, No. 30, Amixin, 0.125 No. 10, Ingavirin, 0.09, No. 7, Cycloferon, 0.15, No. 50, Tamiflu, 0.0075, No. 10, Kagocel, 0.012 No. 20. The following antiviral drugs belong to group B: Anaferon, No. 20, Aflubin, No. 12, Remantadine, 0.1 No. 10, Grippferon, 10 ml. Group C includes: Polyoxidonium, 0.012 No. 10, Interferon, 5 ml.

Based on the work carried out, it is recommended:

1. To increase the purchase of AD, which are in group "A", it is recommended that the purchase be carried out not under the order, but in order to form a stock;
2. To introduce into the purchase of AD from group "A" expensive medicines in a minimum amount;
3. To ensure the interaction of pharmacy workers and the public to inform about the availability of medicines and pharmacy assortment products in the pharmacy network in order to avoid failures;

Table 1: Data for ABC analysis on antiviral drugs of the pharmacy "Socialochka"

№	*Name of the antiviral drug*	*Country of origin*	*The cost of 1 pack., rub.*	*Sales volume for the 3rd quarter of 2019, pcs.*	*Sales amount, rub.*
1	Kagocel, 0,012 № 20	Russia	450,4	120	54048
2	Remantadine, 0,1 № 10	Belarus	183,9	210	38619
3	Amixin, 0,125 №10	Russia	879,10	105	92305,5
4	Cycloferon, 0,15, №50	Russia	848,50	94	79759
5	Arbidol, 0,1 № 40	Russia	830,5	164	136202
6	Ingavirin, 0,09, №7	Russia	472,2	174	82162,8
7	Tamiflu, 0,0075, № 10	Italy	1036,80	68	70502,4
8	Anaferon, № 20	Russia	220,2	204	44920,8
9	Aflubin, № 12	Austria	274,90	155	42609,5
10	Grippferon, 10 ml	Russia	289,80	101	29269,8
11	Ocillococcinum,№30	France	1589,0	59	93751
12	Intereferon, 5 ml	Russia	119,0	202	24038
13	Polyoxidonium, 0,012 № 10	Russia	688,20	42	28904,4
14	In total	-	-	1698	817092,2

Table 2: Calculation of the share in the turnover of antiviral drugs available in the pharmacy "Socialochka", %

№	*Name of the antiviral drug*	*Sales amount, rub.*	*Share in turnover, %*
1	Arbidol, 0,1 № 40	136202	16,68
2	Ocillococcinum, № 30	93751	11,48
3	Amixin, 0,125 №10	92306	11,29
4	Ingavirin, 0,09, №7	82163	10,06
5	Cycloferon, 0,15, №50	79759	9,76
6	Tamiflu, 0,0075, № 10	70502	8,62
7	Kagocel, 0,012 № 20	54048	6,62
8	Anaferon, № 20	44921	5,49
9	Aflubin, № 12	42610	5,21
10	Remantadine, 0,1 № 10	38619	4,73
11	Grippferon, 10 ml	29270	3,58
12	Polyoxidonium, 0,012 № 10	28904	3,54
13	Intereferon, 5 ml	24038	2,94
14	In total	817092,2	

Table 3: Calculation of the proportion of the accumulation of antiviral medicines of the pharmacy "Socialochka"

№	*Name of the antiviral drug*	*Share in turnover, %*	*Accumulation share of drugs, %*
1	Arbidol, 0,1 № 40	16,68	16,68
2	Ocillococcinum, № 30	11,48	28,16
3	Amixin, 0,125 №10	11,29	39,45
4	Ingavirin, 0,09, №7	10,06	49,51
5	Cycloferon, 0,15, №50	9,76	59,27
6	Tamiflu, 0,0075, № 10	8,62	67,89
7	Kagocel, 0,012 № 20	6,62	74,51
8	Anaferon, № 20	5,49	80,0
9	Aflubin, № 12	5,21	85,21
10	Remantadine, 0,1 № 10	4,73	89,94
11	Grippferon, 10 ml	3,58	93,52
12	Polyoxidonium, 0,012 № 10	3,54	97,06
13	Intereferon, 5 ml	2,94	100

Table 4: ABC-analysis of antiviral drugs in the pharmacy "Socialochka"

№	Name of the antiviral drug	Accumulation share of drugs, %	Group ABC
1	Arbidol, 0,1 № 40	16,68	A
2	Ocillococcinum, № 30	28,16	A
3	Amixin, 0,125 №10	39,45	A
4	Ingavirin, 0,09, №7	49,51	A
5	Cycloferon, 0,15, №50	59,27	A
6	Tamiflu, 0,0075, № 10	67,89	A
7	Kagocel, 0,012 № 20	74,51	A
8	Anaferon, № 20	80,0	B
9	Aflubin, № 12	85,21	B
10	Remantadine, 0,1 № 10	89,94	B
11	Grippferon, 10 ml	93,52	в
12	Polyoxidonium, 0,012 № 10	97,06	c
13	Intereferon, 5 ml	100,0	c

4. To ensure interaction with doctors of medical institutions, in particular with cardiologists, gastroenterologists on AD;
5. To adjust prices in comparison with the prices of competitors on AD;
6. Conduct a similar study in all branches of the pharmacy chain to increase turnover and for a more complete range of medicines.

All the proposed measures will increase sales of drugs, and systematic ABC-analysis will allow to identify drugs "leaders" and "outsiders" and timely apply measures to correct the range of antiviral drugs in the pharmacy "Socialochka".

CONCLUSION

Thus, we can conclude that the profitability of any pharmacy directly depends on a well-chosen assortment. The analysis of assortment indicators is necessary, first of all, for the reason that it is precisely those medicines of a particular group that are in demand by the consumer that are presented in the pharmacy window. The second reason is that these medicines, taking into account their demand in the market, will be profitable for the pharmacy enterprise, which will increase its profitability and build a forecast of financial resources for the future. Conducting various analytical activities to determine the most popular and profitable pharmaceutical positions will enable entrepreneurs to keep abreast of the pulse and conduct a competent assortment policy.

AUTHOR CONTRIBUTIONS

All authors contributed in reviewing the final version of this paper.

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