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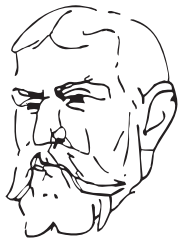

Memory of
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ORIGINAL ARTICLE

THE METHOD OF FORECASTING AS AN IMPORTANT STAGE IN SOLVING THE PROBLEMS FACING HEALTH IN THE FIELD OF MEDICAL CARE OF THE POPULATION

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Ivanna V. Sakhanda[1], Rimma L. Skrypnyk[1], Kostyantyn L. Kosyachenko[1], Lena L. Davtian[2], Olena V. Welchinska[1], Alla V. Kabachna[2], Nataliia M. Kosyachenko[3]

[1]BOGOMOLETS NATIONAL MEDICAL UNIVERSITY, KYIV, UKRAINE
[2]SHUPYK NATIONAL MEDICAL ACADEMY OF POSTGRADUATE EDUCATION, KYIV, UKRAINE
[3]ZHYTOMYR COLLEGE OF PHARMACY, ZHYTOMYR, UKRAINE

ABSTRACT

The aim: Of the work is to investigate and prove the effectiveness of medicinal products of plant origin for the treatment of cardiovascular diseases.

Materials and methods: Pharmacoeconomic, social, medical demographic and statistical studies were studied. The study involved cardiologists, pharmacists, consumers of pharmacies and patients of cardiology departments.

Results: Forecasting the need for cardiac medicines in general, and in medicinal products of plant origin (MP PO), in particular, is increasing as the population, life expectancy, under the influence of socio-demographic factors, and, most importantly, the increase in the number of elderly people. When solving problems facing public health in the field of drug provision of the population, a regular analysis of the pharmaceutical market and a forecast of the need for medicines in the context of the pharmacotherapeutic group that is being studied are necessary. An important stage in the choice of forecasting methods is the possibility of attracting the required number of indicators, which is a characteristic of the normative method, whose accessibility and simplicity make it possible to use it by specialists who do not have special mathematical training at the level of medical and pharmaceutical organizations.

Conclusions: Prevention of diseases should be based on the implementation of government programs for prevention and promotion of health. This will improve and actively use methods of early detection of social and economic factors, which is a threat of development of diseases of the cardiovascular system.

KEY WORDS: medicinal products of plant origin, cardiovascular diseases, marketing research, demand forecasting

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INTRODUCTION

At the stages of marketing research, the study of the assortment, the solvency of consumers should be conducted with the obligatory consideration of regional peculiarities, the real financial possibilities of the medical and preventive institution and the solvency of the population, as well as factors influencing the choice of the medicinal product by medical, pharmaceutical workers and the population [1, 2].

In the pharmaceutical market of Ukraine, MP PO dominated by drugs domestically, which significantly reduces the cost of therapy and makes many drugs affordable for the socially unprotected strata of the population [3].

A characteristic feature of the task of determining the need for highly effective medicinal products of plant origin is the presence of unpredictable factors affecting the complex system of formation and satisfaction of demand (the emergence of new medicines, different levels of doctors' awareness, educational work among the population, etc.) [4].

Taking into account the peculiarities of the current social and economic situation, the inadequacy of financial drug assistance at the expense of the state budget and the need to address the problems of improving the organization of medicinal care for patients with cardiovascular pathology, we have forecasted the long-term demand for medicinal products of plant origin.

THE AIM

The aim of the work is to investigate and prove the effectiveness of medicinal products of plant origin for the treatment of cardiovascular diseases.

MATERIALS AND METHODS

Pharmacoeconomic, social, medical demographic and statistical studies were studied. The study involved cardiologists, pharmacists, consumers of pharmacies and patients of cardiology departments.

RESULTS

The problem of reliability of providing consumers of medicinal products of plant origin directly depends on the creation of

Table I. Analysis of the frequency of medicinal products of plant origin for the treatment of cardiovascular disease (2006-2016)

Name of medicinal products of plant origin	The average price of the package (S)	The number of appointments	Number of packages for the course of treatment (X)	n	к
Digoxin tablets 0,25 mg № 30	8-40	323	1	156	0,37
Digoxin, solution for injection 0,25 % - 1ml №10	28-20	20	1	71	0,17
Corglycon, solution for injection 0,06% - 1 ml № 10	21-20	335	1	53	0,13
Platyphyllini hydrotartras 0,2 % - 1 ml № 10	28-50	500	1	40	0,48
Papaverine hydrochloride 2 % - 2 ml № 10	20-20	1303	1	200	0,22
Strophantine D	22-20	200	1	32	0,08
Strophantine	21-20	10	1	15	0,04

an optimal stock of these medicines. WHO recommends the following approach: «The goal is to ensure that the size of the supply meets the demand, while the stock of medicines should be minimal, but to ensure that they are available in the event of an unexpected delay in delivery» [5].

An important stage in the choice of forecasting methods is the possibility of attracting the required number of indicators, which is a characteristic of the normative method, whose accessibility and simplicity make it possible to use it by specialists who do not have special mathematical training at the level of medical and pharmaceutical organizations.

The basis of this method is calculated norms of consumption of drugs, which reflect the characteristic properties and regularities of the normalized object. Calculation of the rate of consumption of drugs is based on the study of morbidity by nosological forms and the optimal set of drugs for the course of treatment, as well as the quantitative consumption of these drugs while being prescribed to the patient.

The advantage of this method is the ability to take into account changes in factors that affect the need. The most difficult problem of using the normative method is the considerable laboriousness of the development of norms, which requires the processing and analysis of large amounts of information.

The application of the normative method requires the calculation of the following indicators:
- forecast of the number of medicinal products of plant origin users;
- consumption intensity factors for each drug;
- consumption of each medicinal product for one year of use by one consumer.

Calculation of the need for drugs for the treatment of i-th nosology in the hospital in physical terms (in packages) for both outpatient and inpatient patients was carried out according to the formula:

$$Nij = Xij\ fact * Iij * Ei \quad (1),$$

where: Nij – the need for the j-th drug in the i-th nosology;

i – disease nosology;

j – specific drug;

Xij – an approximate norm of the need of j-drug for the course of treatment of one patient;

Iij – intensity factor of the j-drug requirement;

Ei – expected number of patients in the i-clinical group.

According to the proposed methodology, we determined the long-term need in 2011-2017 years in medicinal products of plant origin. The consumption of this group of drugs is predictable, since most drugs are prescription drugs. This fact makes it possible to accurately take into account the number of consumers in polyclinics and hospital departments. The need is calculated separately for each drug name in both quantitative and summary terms. In sum, the need for a drug for a course of treatment for one patient was determined by the formula

$$S = Nij * C \quad (2),$$

where: Nij – the need for medicinal product in quantitative terms;

C – the cost of medicinal product.

According to the scheme for determining the need for medicinal products of plant origin, it is necessary to know:
- the optimal assortment of medicinal products of plant origin;
- the amount of medicinal products of plant origin for one patient;
- the intensity of consumption of the medicinal product;
- the planned number of patients.

At the first stage, the intensity of consumption of drugs was calculated.

Calculation of the intensity of consumption, which was conducted on the basis of the study of letters of appointment in the history of the disease of cardiac patients of the cardiac dispensary. The intensity factor of consumption shows how often each specific medication is prescribed, in how many percentages of cases it is used, which part of consumers in total use this medication, and is calculated by the formula:

Table II. Calculation of hospital needs in medicinal products of plant origin which used to treat patients with cardiovascular pathology

Name of medicinal products of plant origin	Forecast needs for years					
	2015		2016		2017	
	absolute unit	sum	absolute unit	sum	absolute unit	sum
Digoxin tablets 0,25 mg № 30	333	2797-20	343	2881-20	353	2965-20
Digoxin, solution for injection 0,25 % - 1 ml № 10	21	592-20	22	620-40	23	648-60
Corglycon, solution for injection 0,06 % - 1 ml № 10	345	7314-00	355	7526-00	366	7759-20
Platyphyllini hydrotartras 0,2 % - 1 ml № 10	515	14677-50	530	15105-00	546	15561-00
Papaverine hydrochloride 2 % - 2 ml № 10	1342	26840-00	1382	27640-00	1423	28460-00
Strophantine D	2060	45732-00	2122	47108-40	2186	48529-20
Strophantine	21	233-20	12	254-40	13	275-60
Allapinin	149	54385-00	154	56210-00	159	58035-00
Total:		152570-90		157345-40		162233-80

$$I\,ij = \frac{n\,i}{N} \quad (3),$$

where: Iij – intensity factor of medicinal products of plant origin consumption;

n – the number of consumers who use the drug in this sample;

N – the total number of consumers in the sample (N=420 people) [6].

The results of the calculation of the intensity factors are given in Table 1.

Then based on the analysis of the patient's case histories, drug intake standards were determined (Xij fact).

Recommendations for the obtained values Xij fact as indicative of standards initially held their statistical processing on the coefficient of variation, which confirmed that the value of the average actual flow has little variation.

So the obtained values of Xij fact can be used as an approximate standard and used to determine the need for medicines in the treatment of cardiovascular diseases. The expected number of patients was determined by the method of average geometric parameters according to statistical data for the period 2011-2016:

$$T2 = \frac{Б3}{Б2} \quad (4)$$

$$Tcp = \sqrt[n]{T1 * T2 * T3 * T4 * T5} \quad (5),$$

where: Б1, Б2...Б5 – the number of patients with cardiovascular diseases for the first, second ... the 5th considered years in this hospital;

Tcp (middle) – average growth rate.

The expected (planned) number of patients is determined by the formula:

$$Bi = B3*Tmiddle \quad (6),$$

where: Bi – expected number of cardiac patients;

B3 – number of patients in the pre-planning period;

Tmid – average growth rate.

According to statistical data, the number of patients treated in the planned hospitals for the period 2006-2016 was:

- 2011year – 2630 people;
- 2012 year – 2560 people;
- 2013 year – 2631 people;
- 2014 year – 2664 people;
- 2015 year – 2690 people;
- 2016 year – 2720 people.

From 2011 to 2016, the number of patients treated was steadily increasing.

The increase in morbidity, which occurs, we associate with the increase in the proportion of older age groups in the total population of the country. We calculated the expected number of patients with this pathology for city hospitals [7].

Next the calculation of the need for each medicinal products of plant origin over the period 2015-2017 was carried out. The calculation took into account the period of treatment of 1 patient – 21 days. The results of the calculation are shown in Table 2.

DISCUSSION

The educational goals of this study are fully achieved. The results of our work are original. The article has prospects for further study of cardiac drugs of plant origin. Health forecasting is a dynamic process and requires frequent updates. This can be done with novel techniques and data, taking into consideration the principles of health forecasting. The methodologies currently used involve time series analyses with smoothing or moving average models.

The horizons of health forecasting are important but not classified in the literature, and so the approaches used to forecasting various horizons have no common benchmarks to guide new health forecasts. Health forecasting is a valuable resource for enhancing and promoting health services provision; but it also has a number of drawbacks, which are related either to the data source, methodology or technology. This overview is presented to stimulate further discussions on standardizing health forecasting approaches and methods, so that it can be used as a tool to facilitate health care and health services delivery [1].

The activities which form an established part of the program of health departments and nonofficial health agencies are directed in relatively small degree to health supervision of persons of middle and old age.

This limitation is a natural consequence of the traditional restriction of public health services to those involved in the control of preventable disease. Thus, the changing age structure of the population may be expected to produce effects opposite in nature on public health and medical services.

Finally, an important approach to the solution of this broad problem is offered through the extension of research in the cause and control of the chronic diseases characteristic of advanced life. Effective control of certain of these diseases is in part dependent on the demonstration of the etiologic agents involved.

Opportunity should be provided for the appraisal of existing methods of diagnosis and treatment, and the exploration of new procedures designed to bring the chronic diseases under early control. But an equally fruitful field of research consists in the development of public health methods which will solve the unique problems involved in coordinating the control of the chronic diseases in the community health program [1, 2].

CONCLUSIONS

1. Economic evaluation, together with studies of clinical effectiveness, allows a more rational allocation of available resources. Unfortunately, it should be noted that the low demand for pharmacoeconomic analysis results does not yet allow the full redistribution of the financial flow of budget funds to the full extent. In this regard, special attention should be paid to the profitability of the drug from the «cost-minimization» position, which should be evaluated in a comprehensive manner, taking into account the cost of inpatient and outpatient care.
2. The system of measures to improve the organization and improve the quality of therapeutic care for the population should include organizational and methodological issues of providing and managing the quality of medical care and drug provision.
3. The most important place in reforming the industry should be allocated to improving the outpatient and polyclinic service are increasing the efficiency of using material and human resources, introducing new progressive forms of work into practice.
4. The solution of these problems is determined by the wide introduction of fairly simple and massive measures to improve the living environment, the implementation of preventive measures to prevent the realization of the risk of developing cardiovascular diseases, giving the maximum results at minimum costs.
5. In the present conditions, it is important to standardize the structure, types and volumes of treatment and rehabilitation activities, technologies and results, and the functioning of the system of medical and social care institutions for patients.
6. Prevention of diseases should be based on the implementation of government programs for prevention and promotion of health. This will improve and actively use methods of early detection of social and economic factors, which is a threat of development of diseases of the cardiovascular system.

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ORCID and contributionship:
Ivanna V. Sakhanda: 0000-0003-4171-5160 [A, B, D, F]
Rimma L. Skrypnyk: 0000-0002-3393-4649 [A, C, F]
Kostyantyn L. Kosyachenko: 0000-0002-0472-2196 [A, C, F]
Lena L. Davtian: 0000-0001-7827-2418 [A, D, F]
Olena V. Welchinska: 0000-0001-7023-8493 [C, E]
Alla V. Kabachna: 0000-0002-5809-5298 [A, E, F]
Nataliia M. Kosyachenko: 0000-0002-0496-6908 [B, E]

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CORRESPONDING AUTHOR
Ivanna V. Sakhanda
Bogomolets National Medical University
13 Tarasa Shevchenko boulevard, 01601 Kyiv, Ukraine
tel: +380991943687
e-mail: sahanda.ivanna@ukr.net

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