

Improvement of medicine provision of patients with a chronic obstructive lung illness on the basis of pharmaceutical and economical investigations

Clara Shertaeva¹, Saken Tulemissov², Rauan Botabayeva², Olga Blinova¹, Kulpan Mamytbayeva¹, Nurlan Zhanabayev³, Guzel Ibragimov⁴, Ubaidilla Datkhayev², Kairat Zhakipbekov²

¹South Kazakhstan State Pharmaceutical Academy, Kazakhstan, Shymkent

²Kazakh National Medical University named after S.D. Asfendiyarov, Kazakhstan, Almaty

³International Kazakh-Turkish University H.A. Yassau, Kazakhstan, Shymkent

⁴Bashkir State Medical University, Russia, Ufa

kairat_phd@mail.ru

Abstract: As a result of researches methodical recommendations on optimization of provision of medicines of patients with a chronic obstructive illness of lungs at regional level will be developed. These recommendations will be introduced in practical health care system. As a result of the conducted researches the following new data are obtained: Theoretical and methodological bases of improvement of provision of medicines of patients with a chronic obstructive illness of lungs are developed for the first time. The pharmaceutical and economic analysis of 4 schemes of treatment using COIL antibiotics is carried out. SWOT analysis of the studied segment state of patients before and after the held events is carried out for the first time

[Shertaeva C., Tulemissov S., Botabayeva R., Blinova O., Mamytbayeva K., Zhanabayev N., Ibragimov G., Datkhayev U., Zhakipbekov K. **Improvement of medicine provision of patients with a chronic obstructive lung illness on the basis of pharmaceutical and economical investigations.** *Life Sci J* 2014;11(9s):16-23]. (ISSN:1097-8135). <http://www.lifesciencesite.com>. 3

Keywords: Health care budget; medical expenses; medicine provision; pharmaceutical economy; SWOT analysis; methods of marketing; pharmaceutical and economical investigations

1. Introduction

Development of the pharmaceutical market, realization of the socially oriented state programs supported with financing, developing international cooperation are the essence of medicine policy in the Republic of Kazakhstan [1, 2].

The modern health system has to meet the new requirements of all concerned parties: population, health service and state. In this regard, issues of quality of provided pharmaceutical goods and services, cost-effective and estimated methods of treatment are of particular importance [3, 4].

Despite the considerable financial means of the state budget which are annually allocated for provision of medicines, shortcomings take place in the organization providing the medical assistance, especially in the system of out-patient medicine provision. National medicine policy of the Republic of Kazakhstan for the years 2012-2016 has identified insufficient coverage of diseases, medicines and groups of the population in the system of medicine provision among weak points of the sphere of medicine turnover. The chronic obstructive illness of lungs is in the list of such diseases [5, 6].

According to current statistical data the chronic obstructive illness of lungs (COIL) is one of the causes of frequent incidence around the world. Due to a wide spread of COIL medical expenses on

treatment have significant impact on the health care budget.

Experts of the European Respiratory society have noted that the adequate treatment demanding considerable financial expenses may considerably increase quality and life expectancy of the patients, suffering from this disease. In virtue of social and economic challenges the need of the thought-over expense of the health care budget on acquisition of drugs in our country on the basis of objective market researches of the pharmaceutical market has ripened.

In this regard, a profound study of medicine pharmaceutical market for treatment of a chronic obstructive illness of lungs and developing of scientifically grounded recommendations on improvement of medicine provision of the specified category of patients are getting actual significance.

2. Material and Methods

Aim of the research: development of methodical approach to improvement of provision of medicine provision of patients with a chronic obstructive illness of lungs in the market conditions.

Object of research were 400 out-patient cards of patients with an obstructive illness of lungs, statistical data of health care system.

In the course of research the following methods have been used: sociological, statistical, pharmaceutical and economical, expert content-analysis, SWOT analysis, "tree of decisions".

The obtained results, their novelty, scientific and practical significance:

According to present statistical data the chronic obstructive illness of lungs (COIL) is one of the reasons of frequent incidence around the world. Due to the wide spread of COIL medical expenses on treatment have essential impact on the health care budget.

In conformance with the data published by the World bank and the World Health Organization (WHO), it is supposed that in 2020 it will come to the fifth place on the damage caused by diseases on a global scale. Moreover, though in recent years COIL involves is grabbing attention on behalf of medical community, this disease remains rather unknown or of little importance for a layers of population, and also for official representatives of health care and governmental structures bodies.

Over the last 10 years the number of people ill with COIL in Kazakhstan has grown for more than twice, having made 321,0 people per 100 thousand population in 2011. For the comparison, one of the most widespread diseases, diabetes occurs at 158,3 people per 100 thousand population. This disease is especially widespread in Kostanay, Kyzylorda, South Kazakhstan, Almaty oblasts.

Smoking is the most studied, but not the only risk factor of COIL. Genes (heavy hereditary insufficiency α_1 antitripsine); sex and age, growth and lungs' development, occupational hazards (organic and inorganic dust, and also chemical agents and smokes); bronchial asthma are referred to the other factors.

Modern level of knowledge does not allow speaking about COIL treatment, but to achieve effective treatment and to prevent disease progressing in this way is a real task.

In this regard thorough study of pharmaceutical market of medicines for treatment of a chronic obstructive illness of lungs and developing of scientifically grounded recommendations on improvement of medicine provision of specified category of patients is acquiring actual significance.

The purpose of our researches was the development of methodical approach to improve medicine provision of patients with a chronic obstructive illness of lungs in the market conditions.

Complex and system research of the scientific and methodological, organizational and theoretical, experimental and practical character has been conducted, its objects were the subjects of pulmonological department of Shymkent and Taraz oblast hospitals.

Information base of research was presented by the following types of documents: legislative normative documents, documents of the state

statistical reporting of Health Care Ministry of RK, materials of department reports, minutes of treatment of COIL at regional level and according to special medical literature, the publication in periodicals, questionnaires of an expert assessment of drugs for COIL treatment developed by the author.

The following modern methods are used in work:

- Information analysis of the sources of scientific literature, legislative and normative documents;
- The retrospective: the epidemiological analysis, the analysis of free medical supply;
- The sociological: questioning, expert estimates;
- Pharmaceutical and economical: economic assessment of medicines;
- The statistical;
- Methods of the marketing analysis: ABC, VEN, SWOT- analyses.

However, in the conditions of an economic crisis and deficiency of budgetary funds, a rational cost management, relating to the category of obligatory ones, is of special importance.

To ensure a quality treatment-and-prophylactic assistance the population needs rational use of medicines which is both medical and pharmaceutical objectives. It is known that market researches are a systematic collecting, documenting and analyzing data concerning issues of the organization of sale of goods and services, including pharmaceutical ones.

The generalized scheme of market researches is drawn as follows (Fig. 1).

The program developed by us and technique of research have allowed to give an assessment to medicine provision of people ill with COIL in the studied region. So, methodical approach provided the solution of the following tasks: the analysis of clinical and demographic characteristics of patients, determination of rationality of structure of the medical budget of department with the use of ABC and VEN- analyses; identification of optimum medicines using expert evaluations; development of the strategic actions, allowing reaching a set goal (SWOT analysis).

The pulmonological department of Shymkent oblast hospital served as an object of research.

For collecting the information massif by a method of continuous selection 4000 clinical records of the people ill with COIL, receiving medical treatment in this hospital during 2012, were selected. For carrying out questioning all researchers, including us made the special questionnaire of 2 parts and the instruction on its filling in.

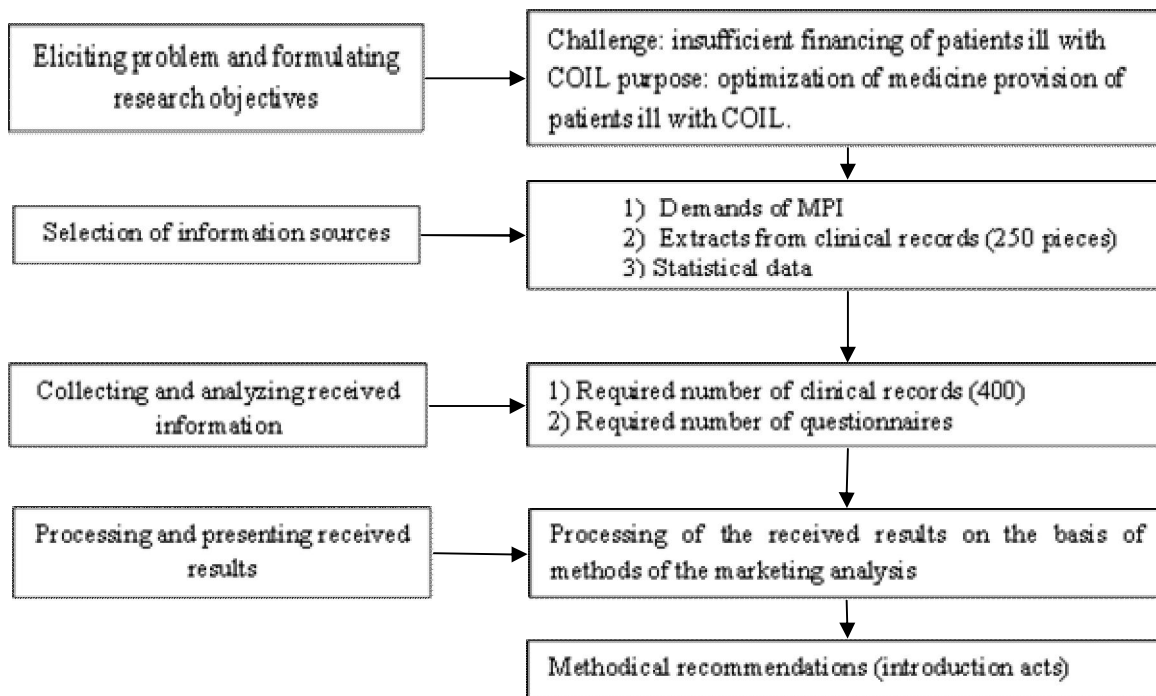


Figure 1 - Scheme of market researches of a pharmaceutical market segment

The first part of the questionnaire is intended for determination of competence of the expert on the basis of his professional characteristics (work experience in the specialty, availability of qualification category, a scientific degree).

Indicators are transferred to points according to a special scale and summarized which is a quantitative index of expert competence (Kj).

In the second part of the questionnaire the expert is given opportunity to estimate pharmaceutical goods using specially developed scale. Its feature is the reasoned assessment in points (5-3-1 points) of efficiency, convenience in application, existence of side effects, the price, a type of a medicinal form, a dosage, a preparation producer, a type of packaging, availability of information on a preparation, etc.

The number of questionnaires was determined by a formula of the minimum volume of selection (formula 1) by means of which it is possible to calculate the minimum number of institutions necessary for questioning:

$$n = \frac{N}{1 + 0,015N} \quad (1)$$

As a result of clinical and demographic data analysis we have revealed:

According to sex patients were divided in the following way: male-56 %, women - 44% (Fig. 2).

Distribution of respondents by an age sign showed that more often 36% of ill people are from the group of the age of 41 to 50 , 28% - elder than 60, 24 of % - from the age of 50 to 60, 2 % - up to the age of 40. The level of getting illness between the ages of 40 to 60 and elder is 88%.

According to the social status, more than 90% of patients are disabled people of 2nd group.

The analysis of data on hospitalization is given as follows: 19% of patients were treated for the first time, 81% - according to plan. The number of bed-days composes 13 in average. At the same time we have noted, the least number of bed- days is 8, the longest duration of treatment makes 20 days. Next, as a result of further processing of clinical records it has been revealed that 94,7% of cases are made by a chronic obstructive illness of lungs of average level and 5,3% - a heavy form of a course of disease.

The main complications of an illness are emphysema of lungs-88,2% and chronic bronchial bronchitis. Pulmonary heart occurs at 18% of people ill with COIL. In accordance with research objectives expert assessment of the medicines applied to treatment of COIL has been implemented, this allowed defining efficiency of medicines, their interchangeability, and here the cost of preparations was of no less importance.

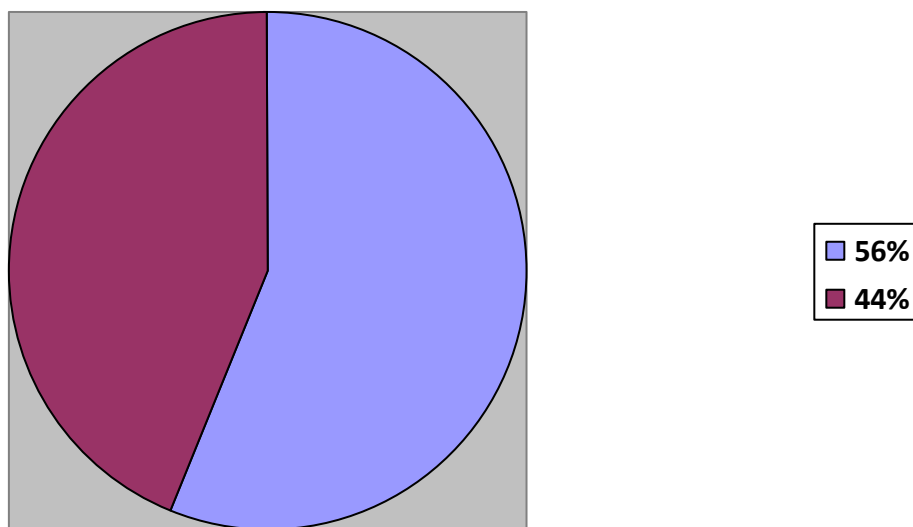


Figure 2 - Distribution of patients with COIL according to a sexual characters

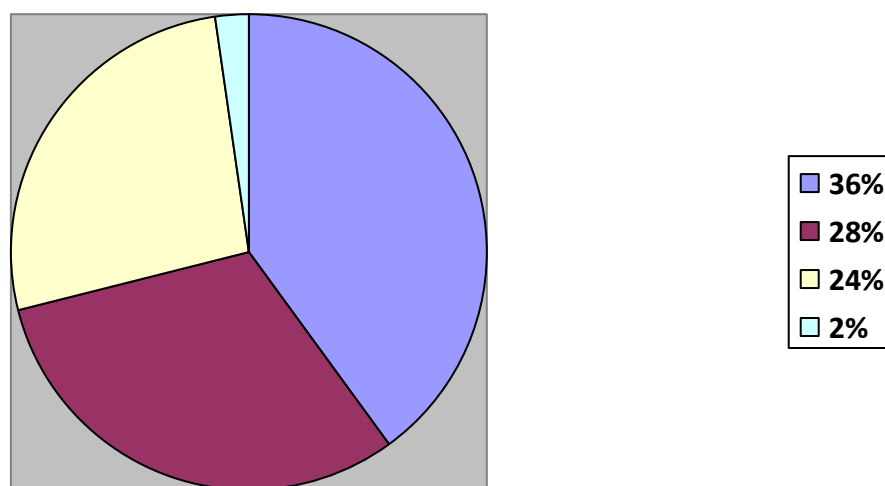


Figure 3 - Distribution of patients with COIL by an age specifics

At prescribing medicines all experts were guided by standards of treatment and personal experience.

As a result of researches the clinic and demographic structure of patients with COIL in the Southern Kazakhstan oblast has been established, the main forms of a course of a studied illness and their specific weight are revealed; accompanying diseases are defined, the optimum range of medicines for COIL treatment is identified.

After obtaining questionnaires, their statistical processing was carried out in the following

way. First the medicine assessment was calculated taking into account expert competence:

$$C_{ij} = a_{ij} + K_j \quad (2)$$

where: C_{ij} – assessment of i preparation by j expert taking into account the competence;

a_{ij} – evaluation of i -good by j - j expert;

K_j – competence of j expert.

After defining the estimates of i preparation according to all questionnaires having estimated points, the "average" assessment was counted:

$$C_i = \frac{\sum_{j=1}^{j=n} a_{ij} \cdot K_j}{\sum_{j=1}^{j=n} K_j} \quad (3)$$

The received estimates are grouped in the size that allows holding range testing.

During calculations the "average" estimates of medicines taking into account competence of experts are received.

The analysis of experts professional data showed that 5% have work experience for more than 25 years, in the specialty 10 years. 60% had qualification category. On the basis of the analysis of clinical records and expert estimates the nomenclature of the medicines applied to treatment of COIL is made.

Carried out ABC and VEN analyses allowed us to define the priority directions of an expenditure of budgetary funds and to develop the optimum range of medicine for the treatment of patients with COIL.

Hospitalization is one of the major indicators, characterizing level of social policy of the state and meeting the requirements of the population in the medical assistance. In terms of this, making VEN analysis of the drugs' nomenclature enables to estimate the validity of their prescription proceeding from treatment efficiency of a certain disease and degree of satisfaction of the population in the most effective drugs. Thus it is necessary to consider the basic standards and forms of treatment of specific diseases, priorities in experts' drug choice.

So, according to our research it is established that the group A included 14 names of the medicines applied to treatment of COIL, from which 8 (60%) are of vital (V) necessity, 4 drugs (30%) are (E) - necessary, 2 drugs (10%) are of N category. The group B was made by 8 medicines, 5 from which (62,5%) compose the group V, 2 medicines (25%) - make group E, the group N includes 1 medicine. The group C included 22 medicines which were

distributed as follows: 70,3% (15drugs) - group V, 19,3% (5 drugs) – group E, 11,4% (2 drugs) - N.

Thus, we on the basis of integration of ABC and VEN analyses decisions are made on inclusion of medicines in tender purchases, exclusion from the initial list of minor medicines.

As a result of application of ABC-and VEN analyses the specific weight of a nomenclature position of medicines is defined and validity of their prescription proceeding from efficiency of treatment of a chronic obstructive illness of lungs is estimated. Medicines were divided into 3 classes according to their annual consumption, medicines of a class A are presented generally by antihistaminic means, bronchial tubes expanding and expectorant means. Antibiotics, sulfanilamids and anti-protozoan means make up class B. all the rest preparations which are used for strengthening immunity, the improvements of exchange processes presented by different therapeutic groups complete the group C. Further, according to the set objectives, we carried out an expert assessment of medicines and the VEN analysis.

Thus, the analysis of schemes of treatment and medical prescription showed that for treatment of the studied contingent of patients in stationary conditions 43 names of drugs from 3 classification groups were used. The main medicines are united in a class A and about 60% of the budgetary funds are spent on this group, the group of necessary made a class B, and auxiliary group is a class C.

We carried out an assessment of economic efficiency of treatment of a chronic obstructive illness of lungs by means of the "expense efficiency analysis" method. For this purpose algorithm of a technique of a pharmaceutical economy assessment of treatment of COIL by different antibiotics was made for the first time (Fig. 4).

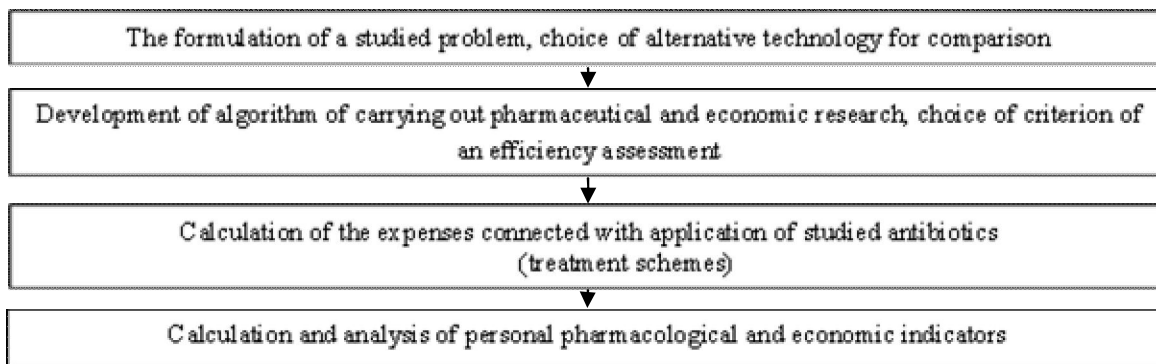


Figure 4 - Algorithm of a technique of a pharmacological and economical assessment of treatment of COIL by different antibiotics

COIL treatment by antibiotics by ampicillin, lincomycin, cefazolin, azithromycin was compared

between above-mentioned antibiotics. The course of treatment made 13 days.

Table 1 – Results of the pharmaceutical and economical analysis of schemes of treatment by COIL antibiotics

Way of treatment	Ampicillin	Lincomycin	Cefazolin	Azithromycin
№ schemes	1	2	3	4
Clinical efficiency	25	25	25	25
Ratio of «cost efficiency»	111,9	43,04	98,16	80

So, in the 1st scheme of treatment with average clinical efficiency (25%) a ratio "expenses - efficiency" makes 111,9 tenge, it is higher than an average indicator of 83,27 tenge for 28,63 tenge.

In the 2nd scheme of treatment with average clinical efficiency of 25%, a ratio "expenses - efficiency" is lower than average level almost for twice (lower for 40 tenge).

In the 3rd scheme of treatment with average clinical efficiency, a ratio "expenses - efficiency" makes 98,16 tenges that is 15 tenge higher than an average indicator.

In the 4th scheme with average clinical efficiency of 25%, a ratio "expenses - efficiency" makes 80 tenges that is insignificantly lower than an average indicator.

Thus, results of research show that the most acceptable from the clinical and economic point of view is application of 2nd and 4th schemes of therapy (lincomycin and azithromycin), when costs of preparations are significantly low, and clinical efficiency is similar. WHO developed the key actions promoting rational use of drugs:

1. Establishing the body coordinating the principles of medicine prescription. The form of the specified organization may vary in the different countries. According to WHO, it has to include representatives Ministry of Health, medical experts and pharmaceutical industry, consumers and non-governmental public organizations. This body has to solve interdisciplinary problems since use of drugs is defined by a set of factors: state of society, health system and its financing, training of medical experts, drug consumption culture of population etc. The integrated approach to the solution of this problem provides bigger success in comparison with single actions. The integrated approach to the solution of this problem provides bigger success in comparison with single actions.

2. The clinical managements (standards of treatment, the recommendation to drugs' prescription) help experts to make decisions on the correct treatment in concrete clinical situations. The clinical managements based on evidential medicine are extremely important for rational use of drugs.

Firstly, they give certain standards of diagnostics and therapy, which are possible to compare with real treatment. Secondly, introduction of more rational use of drugs provided that they were developed with participation of practicing doctors and are verified by audit inspections and feedback of users – clinical physicians is the most tested way. For each level of health care (starting from the experts giving first aid to the medical centers) taking into account prevailing conditions, knowledge and skills of the personnel the manuals have to be developed. Employment of results of evidential medicine and regular updating of information promotes quality support of the clinical manuals.

3. List of the required drugs (LRD) on the basis of choice preparations. The required preparations are the drugs satisfying the key needs of the population. The state LRD has to be based on the clinical manuals and regularly be updated.

4. Medicine and therapeutic committees (MTC). MTC are urged to provide safe and effective use of drugs in medical institution. In the developed countries MTC successfully solve problems of expensive-effective use of drugs. The chairman usually is a chief physician, and the secretary is a senior pharmacist. Objectives of MTC are:

- development, introduction and adaptation of the clinical manuals to institution requirements;
- continuous training of employees in issues of rational use of drugs.

To substantiate the need in improvement of medicine provision of studied patients methods of the marketing analysis were used. One of the most convenient and effective methods of data comparison for development alternative choice is the method of SWOT - analysis or a matrix of possibilities and threats of environment, of strong and weak points of the enterprise. This method is adapted to research the state of pharmaceutical market.

Comparison of a state of medicine provision of patients with COIL before carrying out the researches and after introduction of methodical recommendations on improvement of their medicine provision is as follows (Tab. 2 and 3).

Table 2 - Matrix of SWOT analysis of a medicine provision state of patients with COIL before carrying out researches

Strengths <ul style="list-style-type: none"> • Free medicinal help in hospital conditions • Control of prescription of medicines • Protocols of treatment of patients 	Weakness <ul style="list-style-type: none"> • Low level of satisfaction of demands for medicines • Absence of the program of provision of medicines of studied patients • Irrational use of budget allocations • Insufficient accounting of specific features of an organism of each patient
Opportunities <ul style="list-style-type: none"> • Purchases of medicines on a tender basis 	Threats <ul style="list-style-type: none"> • Price level change on medicines • Failure of medicines supply • Increase in number of patients

Table 3 - Matrix of SWOT analysis of a condition of medicine provision of patients with COIL after introduction of methodical recommendations

Strengths : <ul style="list-style-type: none"> • Providing the free medicinal help; • prescribing drugs with the proved efficiency and safety on the basis of method of expert evaluations; • opportunity to adapt the range of drugs taking into account features and requirements of medical institution; • rational use of drugs on the basis of pharmacological and economic analysis; • possibility of ensuring the control of appointment and ration use of drugs; • Reduction of duration of patient's stay in a hospital; • Forecasting the demand for drugs and rational use of budgetary allocation. 	Weakness: <ul style="list-style-type: none"> • impossibility of taking into account of all unforeseen situations; • labor input of process of defining the demand for medicines; • Duration of procedure of implementing pharmacological and economic analysis of drug nomenclature.
Possibilities: <ul style="list-style-type: none"> • the guaranteed volume of medicinal and medical care; • Drugs' purchases on a tender basis. 	Threats: <ul style="list-style-type: none"> • price level changes on drugs; • Failure of deliveries.

3. Results

The following conclusions have been drawn by the results of the research:

1. The scheme of carrying out market researches of the pharmaceutical market segment has been made and the program of market researches of the pharmaceutical market segment has been offered.

2. Criteria of pharmaceutical market segment have been grounded.

3. The social and demographic structure of patients with COIL in the studied oblast has been established. The main forms of a streams of COIL and their specific weight have been revealed.

4. The range of medicine for COIL treatment is identified and on the basis of ABS and VEN analyses three groups for further expert estimation have been defined.

5. The expert assessment of drugs has been carried out and the list of drugs which included the

interchangeable drugs which are available in a drugstore in sufficient quantity has been made.

6. The assessment of economic efficiency of schemes of COIL treatment has been carried out by means of the expenses efficiency method which showed that application of 2nd and 4th schemes (lincomycin and azithromycin) are the most acceptable ones.

7. Methodical approach to rational use of medicines for COIL treatment has been offered.

8. As a result of SWOT analysis the matrix is defined which visually reflects positive tendencies, connected with the conducted researches.

4. Discussions

Thus, on the basis of SWOT analysis, we revealed and structured strengths and weaknesses of internal state of provision of medicines of the patients, a studied segment of the pharmaceutical market before carrying out researches and expected

changes after introduction of recommendations on improvement of the medicinal help, and also potential opportunities and threats from environment of a complex of marketing. As it is apparent from tables 2 and 3, provision of medicines after improvement has more strengths, than weaknesses. Besides, weaknesses are removable (for example, by automation of the pharmacological and economic analysis)

Corresponding Author:

Dr. Shertaeva
South Kazakhstan state pharmaceutical academy
Sq. Al-Farabi, 1, 160019, SKR, Shymkent,
Kazakhstan
Email: kairat_phd@mail.ru

References

1. Datkhayev U., Shopabayeva A., Zhakipbekov K., Yermekbayeva D., Orazbekov E., Turgumbayeva A. Basic aspects of the organization of the pharmaceutical industry. *Life Sci J* 2013; 10(7s): 677-683] (ISSN:1097-8135). <http://www.lifesciencesite.com>. 106.
2. Botabayeva R., Shertaeva C., Blinova O., Datkhayev U., Shopabaeva A., Zhanabayev N., Zhakipbekov K. Methodical approaches to a strategy of diversification to advance domestic production of medicines. *Life Sci J* 2013;10(12s):302-309. (ISSN:1097-8135). <http://www.lifesciencesite.com>. 53.
3. Zhumabayev N., Makhatov B., Makhatova A., Magay T., Zhakipbekov K., Sapakbay M., Makhatova B. The use of mathematical methods of analysis in the pharmaceutical area of Kazakhstan. *Life Sci J* 2013;10(10s):36-40. (ISSN:1097-8135). <http://www.lifesciencesite.com>. 7.
4. Utegenova G., Blinova O., Shertaeva C., Tulemissov S., Sapakbay M., Umurzakhova G., Zhakipbekov K. About the standards of development and the placement of pharmacy network in the Republic of Kazakhstan. *Life Sci J* 2013; 10(12s):664-672. (ISSN: 1097-8135). <http://www.lifesciencesite.com>. 107.
5. Tagibayev, D.O., Shertayeva, K.D., Blinova, O.V., Makhatov, B.K., Sapakbai, M.M., 2014. On market researches of groups of consumers of the regional pharmaceutical market. *Medicine*, 3: 24-26.
6. Sapakbai, M.M., Umurzakhova, G.Zh., Shertayeva, K.D., Blinova, O.V., Tagibayev, D.O., 2014. Communicative skills are competitive advantages of the modern pharmacist. Materials of all-Russian conference «Modern issues of chemical science and pharmacy», Cheboksary, (April, 3-4), pp: 239-240.

5/23/2014