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UDC 615.11: 001.891.5: 339.138 (477)

## SOME ISSUES OF DRUG PRESCRIBING IN UKRAINE

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*Key words: drug prescribing; Ukraine; pharmacogenetics; pharmacogenetic testing; personalized medicine*

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*Based on the survey of the population the variants for the sequence of drug prescribing in Ukraine have been studied. It has been found that most prescriptions are correct. Thus, 77.5% of the respondents said that clinical laboratory tests preceded prescribing. Despite the advances in genetic technologies and their active use in medical practice even with fairly complete preliminary examination the part of drugs are prescribed without regard to genetic polymorphism. It can also make a substantial interference in the effectiveness of treatment. The introduction of pharmacogenetic testing in clinical practice will contribute to development of personalized medicine with a subsequent increase in the effectiveness and safety of pharmacotherapy.*

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A priori prescribing drugs should be preceded by a thorough examination of the patient. The obligatory complex of examination of patients when applying for medical assistance includes the medical history. The past diseases are considered, and sometimes the patient is asked about the possible hereditary diseases and genetic traits. Then the necessary clinical and laboratory examinations are carried out.

Unfortunately, such a classical order of collecting a medical history is not always observed. Sometimes the prescription of drugs is incorrect. This is typical for all countries regardless of the health service level, and it can be due to a number of reasons.

There are the following medical errors: diagnostic, therapeutic and tactical, technical, organizational, deontological, pharmaceutical, errors when filling out medical records, and other errors associated with malfunction of medical equipment and malfunctioning of the system of providing medical care [1].

The problem of assessing the errors in the healthcare system is acute in Ukraine and around the world. Thus, 17% of all deaths in the US are due to medical errors [4]. In the United States 30% of patients have a misdiagnosis or the absence of diagnosis. In the practice of clinical trials, particularly in the USA, medical errors are also called adverse events. In 1999 according to the reports of the American Institute of Medicine 98.000 patients died in the USA due to medical errors. In 2010 according to the US Department of Health 180,000 patients became victims of medical errors. In the world there are scientific journals specializing in the analysis of medical errors. For example, according to the Journal of Patient Safety in 2013, the number of people who died each year from medical errors ranged from 210.000 to 440.000 patients [18].

In the United States daily more than 1.000 people died because of medical errors, and it costs the country \$ 1 trillion every year [15]. Victims of medical errors are: in the UK – 70 thousand people, in Germany – 100 thousand persons, in Italy – about 90 thousand patients [2].

Thus, medical errors are the third leading cause of death after heart disease and cancer. Negligence and poor-qualified doctors are the causes of every sixth deaths in the USA [10]. In Ukraine, there is no official statistics of unskilled medical care [3].

Despite the advances in genetic technologies and their active use in medical practice even with fairly complete preliminary examination the part of drugs are prescribed without regard to genetic polymorphism. It can also make a substantial interference in the effectiveness of treatment.

Due to the innovative developments in medicine and pharmacy, and appearance of a huge number of drugs the problem of safe and effective drug therapy is of vital importance. However, pharmaceutical and epidemiological studies show that drugs are not enough effective while treating various diseases [22]. Thus, 30-60% of patients with migraine do not “respond” to pharmacotherapy, 20-40% – with depression, 10-75% – with hypertension, 20-70% – with stomach ulcer, 30-75% – with hyperlipidemia, 40-75% – with asthma, 25-75% – with schizophrenia, 50-75% – with diabetes, 20-50% – with arthrosis, 70-100% – with cancer [8].

The new approach affecting the efficiency of drug treatment of many diseases is pharmacogenetic testing – identification of genetic characteristics of patients in order to choose medicines and their doses, determine the treatment regimen according to the test results [5, 8]. Intensive development of pharmacogenetics has led to emergence of personalized medicine taking into account the individual approach when choosing a drug based on the genetic characteristics of the organism.

Studies on personalized medicine are conducted abroad [14, 16, 19, 20, 21]. In the CIS countries in the field of pharmacogenetics the works of such scholars as Sychev D.A. [8, 13], Kukes V.G. [8], Gerasimova K.V. [4], Karymov O.N. [6] et al. should be mentioned. A few studies based on individual genetic approaches are known in Ukraine. In general, the analysis of pharmacogenetic testing availability in Ukraine indicates the low level of application of testing throughout the country [9, 11, 12].

Table 1

## The sequence of drug prescribing

The sequence of prescribing treatment regimens and diagnosis of the patient	Gender		Total
	Male	Female	
The number of respondents, persons (%)			
Prescribing of drugs by a physician with the subsequent diagnosis of the patient	61 (12.5%)	176 (7.2%)	237 (8.1%)
Prescribing of drugs by a physician without diagnosing a patient	34 (6.9%)	178 (7.3%)	212 (7.3%)
Conducting classical laboratory tests (clinical blood tests, urine tests, X-ray diagnostics, etc.) by a physician before starting the treatment	338 (69.3%)	1934 (79.2%)	2272 (77.5%)
A respondent does not make any analysis in principle	55 (11.3%)	154 (6.3%)	209 (7.1%)
Total	488 (16.7%)	2442 (83.3%)	2930

Note:  $\chi^2 = 33.37$ ,  $v = 3$ ,  $p < 0.001$ .

The aim is to study some issues of drug prescribing in Ukraine.

### Materials and Methods

A survey of the sample of the population of Ukraine studied previously [17], and directly related to the health-care system was performed.

Collection of the personal information was conducted taking into account the ethical requirements when working with a person. The relationship between the qualitative characteristics was evaluated by  $\chi^2$  test. The conclusion regarding statistical hypotheses was performed at the significance level of  $p \leq 0.05$ . The database was created in the Microsoft Excel program. The calculations were performed in Microsoft Excel and Statistica 6.

Over 80% of the respondents were aged 15 to 25 years. The respondents represented different regions of Ukraine. The vast majority of the respondents (98% men and 99% women) were permanent residents of Ukraine.

Most of the respondents were students of pharmaceutical (47.4%) and medical (20.4%) specialities of the universities, 7.3% – the nursing staff, 3.5% – physicians, 3% – the students of biological specialities of the universities. 6% of males and 3% of females had no relation to the health sector.

### Results and Discussion

When studying the sequence of drug prescribing it was found that the majority of the respondents (77.5%) took classical clinical laboratory tests before prescribing

Table 2

## Diseases that the respondents were suffered from

Diseases that the respondents were suffered from	Gender		Total
	Male	Female	
The number of respondents, persons (%)			
Some infectious and parasitic diseases	60 (12.3%)	282 (11.5%)	342 (11.6%)
Neoplasms	2 (0.4%)	22 (0.9%)	24 (0.8%)
Diseases of the blood-forming organs and some disorders involving the immune mechanism	13 (2.7%)	29 (1.2%)	42 (1.5%)
Endocrine diseases, nutritional and metabolic disorders	36 (7.4%)	318 (13%)	354 (12%)
Mental and behavioral disorders	20 (4%)	51 (2%)	71 (2.4%)
Diseases of the nervous system	18 (3.7%)	81 (3.3%)	99 (3.4%)
Diseases of the eye and its adnexa	35 (7.2%)	195 (8%)	230 (7.8%)
Diseases of the ear and mastoid	4 (0.8%)	16 (0.7%)	20 (0.7%)
Diseases of the circulatory system	17 (3.5%)	70 (2.9%)	87 (3%)
Respiratory diseases	30 (6.1%)	176 (7.2%)	206 (7%)
Digestive diseases	31 (6.3%)	176 (7.2%)	207 (7.1%)
Diseases of the skin and the subcutaneous tissue	5 (1%)	38 (1.5%)	43 (1.5%)
Diseases of the musculoskeletal system and the connective tissue	5 (1%)	31 (1.3%)	36 (1.2%)
Diseases of the genitourinary system	2 (0.4%)	57 (2.3%)	59 (2%)
I am healthy	211 (43.2%)	909 (37%)	1120 (38%)
Total:	489 (16.6%)	2451 (83.4%)	2940

Note:  $\chi^2 = 39.69$ ,  $v = 14$ ,  $p < 0.001$ .

drugs. For females this figure was higher by 10%. Females often had similar tests before taking drugs (79.2%).

In 8.1% of cases drug prescribing was incorrect. In this case, examination and diagnosis did not precede, but followed them. But it should be noted that this approach is possible and justified in emergency medicine (resuscitation procedures, in the case of wounds, field conditions, etc.). However, it is not acceptable to the vast majority of scheduled calls. In 7.1% of the cases the respondents were engaged exclusively in self-treatment. Moreover, these males were almost twice as much (11.3%) than females (6.3%). The results are shown in Tab. 1.

The lack of the right patient's diagnoses can lead to side effects and deaths. In Ukraine the highest growth rates are observed in such classes of diseases as: complications of pregnancy and childbirth, the postpartum period; diseases of the genitourinary system and neoplasms [7].

Since the incorrect sequence of prescribing for different diseases can have different effects, the respondents were studied with respect to their health status. It was done in order to conduct a rough estimate of the number of potential incorrect prescriptions with very serious consequences in our further studies, and therefore, to identify such risk groups. The results are shown in Tab. 2.

In the survey of the healthy mainly young population of Ukraine it has been found that more than a third of the respondents (43.2% of males and 37% females) considered themselves to be healthy. According to their own story, most often the respondents suffered from infectious diseases, endocrine diseases, nutritional and me-

tabolic disorders. Thus, 12.3% of males and 11.5% females suffered from infectious diseases, and 7.4% of males and 13% of females suffered from endocrine diseases, nutritional and metabolic disorders, respectively. Probably, the subjective data presented can be something different from the information obtained on the basis of medical records. However, because of their prevalence the classes of diseases stated should be the subject of more thorough analysis when taking the drugs prescribed.

#### CONCLUSIONS

1. When studying the sequence of drug prescribing it has been found that most prescriptions are correct. Thus, 77.5% of the respondents said that clinical laboratory tests preceded prescribing.

2. Particular attention should be given to people with such common diseases as infectious diseases, endocrine diseases, nutritional and metabolic disorders. Therefore, according to the information presented by the patients themselves more often 12.3% of males and 11.5% females suffered from infectious diseases, and 7.4% of males and 13% of females suffered from endocrine diseases, nutritional and metabolic disorders, respectively. This population is the risk group and needs a more thorough analysis when taking the drugs prescribed.

3. The data of our research indicate the need to raise awareness among healthcare professionals in the field of pharmacogenetics when taking into account drug prescribing; and in the future it will contribute to improvement of pharmacotherapy.

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#### **ДЕЯКІ ПИТАННЯ ЛІКАРСЬКИХ ПРИЗНАЧЕНЬ В УКРАЇНІ**

**М.М.Кобець**

**Ключові слова:** лікарські призначення; Україна; фармакогенетика; фармакогенетичне тестування; персоналізована медицина

На підставі опитування населення вивчені варіанти послідовності лікарських призначень в Україні. Встановлено, що значна частина лікарських призначень проводиться коректно. Так, 77,5% респондентів заявили, що лікарським призначенням передують клінічні лабораторні дослідження. Незважаючи на успіхи генетичних технологій і їх активне застосування в практичній охороні здоров'я, навіть при досить повному попередньому обстеженні частина лікарських призначень виконується без урахування генетичного поліморфізму. Це також може створити суттєві перешкоди для ефективності лікування. Впровадження фармакогенетичного тестування в клінічну практику сприятиме розвитку персоналізованої медицини з подальшим підвищенням ефективності і безпеки фармакотерапії.

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#### **НЕКОТОРЫЕ ВОПРОСЫ ЛЕКАРСТВЕННЫХ НАЗНАЧЕНИЙ В УКРАИНЕ**

**М.Н.Кобец**

**Ключевые слова:** лекарственные назначения; Украина; фармакогенетика; фармакогенетическое тестирование; персонализированная медицина

На основании опроса населения изучены варианты последовательности лекарственных назначений в Украине. Установлено, что большая часть лекарственных назначений проводится корректно. Так, 77,5% респондентов заявили, что лекарственным назначениям предшествуют клинические лабораторные исследования. Несмотря на успехи генетических технологий и их активное использование в практическом здравоохранении, даже при достаточно полном предварительном обследовании часть лекарственных назначений выполняется без учета генетического полиморфизма. Это также может создать существенные помехи в эффективности лечения. Внедрение фармакогенетического тестирования в клиническую практику будет способствовать развитию персонализированной медицины с последующим повышением эффективности и безопасности фармакотерапии.