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Memory of
dr Władysław
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COUNTERFEITING DIETARY SUPPLEMENTS BY ADDING UNDECLARED ACTIVE PHARMACEUTICAL INGREDIENTS OR THEIR ANALOGUES TO THEIR COMPOSITION IS A NEW THREAT TO THE HEALTH OF THE POPULATION AND A CHALLENGE TO THE NATIONAL HEALTH CARE SYSTEM

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Introduction: One of the public health challenges is the counterfeiting of dietary supplements by adding undeclared active pharmaceutical ingredients or their analogues into their composition in order to obtain illegal commercial advantages.

The aim: To draw attention to the problem of falsification of dietary supplements, as well as to propose chemometry methods to solve this problem.

Materials and methods: Visible and ultraviolet spectroscopy and chemometric method of reverse calibration were applied for the model mixtures with numerous DS-s to determine undeclared API-s or their analogues.

Results: It is no exaggeration to say that with the development of mankind and medicine, a tendency to prevent disease become stronger. So Benjamin Franklin wrote the famous words that became a proverb: «An apple a day keeps the doctor away.» The meaning of these words in Franklin's time was that vitamin C contained in an apple prevented one of the most terrible diseases of that time - scurvy. The role of this apple in the modern world is played by dietary supplements (DS), which contain such food ingredients (vitamins, minerals, amino acids, etc.), the lack of which in the diet leads to the occurrence of certain disease states. However, any good business can be ruined by unscrupulous people, such as the undeclared introduction of DS intended for weight loss (by creating a feeling of satiety or improving intestinal motility) of synthetic substances (once being active pharmaceutical ingredients (API)) such as sibutramine or phenolphthalein, or adding of undeclared phosphoesterase type 5 inhibitors such as sildenafil, vardenafil, etc. in dietary supplements designed to improve men potency can lead to serious health disorder and even death (we will further refer to such APIs or their analogues as counterfeiters). Reports of this kind of fraud grew up as snowball, leading to the release of a General Chaptersdietary Supplements (2251) Screening For Undeclared Drugs And Drug Analogues) In 2017.

In the general USP article, methods for undeclared ingredients detecting are divided into targeted, used when the analytes (i.e. counterfeiters) are known, and non-targeted, which are aimed to detect any undeclared ingredients. Both types of methods have their advantages and disadvantages and can complement each other harmoniously.

In our opinion, spectrophotometry in the visible and ultraviolet regions of the spectrum, along with chemometric methods, provides a good basis for developing of non-target methods for undeclared APIs detecting. Thus, the use of the chemometric method of reverse calibration made it possible to detect with a high level of reliability a large number of APIs in model mixtures with numerous DSs (and, moreover, to quantify these APIs if DSs if they were included in the calibration set).

This approach is currently being developed using the principal components method and some innovations, and we hope that in the near future it will lead to the creation of an express inexpensive method for controlling the DS market for the presence of undeclared APIs or their analogues, which will allow us to answer the challenge indicated in the title.

Conclusions: The threat of falsified dietary supplements is one of the many threats to human health that can lead to a serious deterioration of the quality of human life. Research in the field of chemometric identification methods is promising for solving both this problem and related ones, such as API standardization, and, according to the authors of this thesis, deserve the attention of the scientific community.

KEY WORDS: healthcare; chemometrics; standartization; dietary supplement.

SYSTEM-EXPERT ANALYSIS OF THE PROSPECTS FOR THE DEVELOPMENT OF PRIVATE HEALTHCARE INSTITUTIONS IN UKRAINE IN CONDITIONS OF HIGH UNCERTAINTY

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Introduction: In the current realities, due to the Russian-Ukrainian war, the issue of taking into account probable risks in strategic planning for the development of private healthcare institutions (PHI) has become particularly relevant. However, the war can also open up new opportunities for the development of both PHI and state-owned healthcare institutions. Therefore, having knowledge and skills to timely assess and analyze potentially attractive trends in the market for the provision of medical services to the population acquires new importance.

The aim: System-expert analysis of the opportunities, limitations, and prospects of PHI activities in conditions of high uncertainty in the medical market of Ukraine. Such an assessment contributes to the preparation of targeted recommendations for this category of medical institutions in the medical services market regarding their development strategy, funding, and effectiveness enhancement in conditions of war.

Materials and methods: For the study we used literature review, analysis of the official websites of PHI in Kyiv, survey method, expert-business communication with leading experts and PHI executives, system and SWOT analysis.

Results: The conducted complex system study allowed to determine the following risks for PHI:

- Insufficiency of medical resources due to increase of the volume of work;
- Economic crisis: increasing unemployment, migration of the population and specialists, high mortality rate of working-age population, rising prices for drugs, equipment, etc;
- Power outages, air raids, and the danger of destroying healthcare institutes due to shelling or missile and bomb strikes.

The opportunities that exist and may open up for PHI are as follows:

- Changes in the demand structure and expansion of the spectrum of medical services: increasing demand for rehabilitation and neurology, occupational therapy, and prosthetics;
- Changes in the evaluation of the Ukrainian healthcare system compared to European and US systems, with a greater willingness of the population to receive paid medical services;
- Development of telemedicine and acceleration of digitalization;
- Intensification of medical tourism after the end of the war due to the increased investment potential of Ukraine, and so on.

Conclusions: War poses a major challenge to private medicine in Ukraine; However, PHI have significant potential for development in conditions of high uncertainty due to their flexibility in responding to the challenges of the wartime medical environment. To succeed, PHI must consider the risks mentioned for the development and implementation of the strategy, and the results mentioned can help medical regulators make more balanced management decisions regarding the healthcare sector's development.

KEY WORDS: strategic planning, healthcare systems, uncertainty.