# ABSTRACT

**of Amirkhanova Gulsim Nurkenovna's dissertation on the topic: «Analysis of the issues of rational use of medicines and the level of awareness of pharmacists about falsified medicines», submitted for the degree of Doctor of Philosophy (PhD) in the educational program 8D10101 «Public health»**

**Relevance of the study:** Rational use of medicines is one of the key conditions for improving the efficiency of the healthcare system, ensuring the quality and safety of medical care and maintaining public health. According to the definition of the World Health Organization, the rational use of medicines involves the use by patients of medicines appropriate to their clinical needs, in doses appropriate to individual characteristics, for a sufficient period of time and at the lowest cost to the patient and society (WHO, 2019).

However, the irrational use of medicines remains an urgent global problem. According to WHO and international studies, a significant proportion of medicines are prescribed or used incorrectly, which leads to widespread polypragmasia, non-compliance with clinical recommendations, and the development of drug resistance (WHO, 2019; Ofori-Asenso, 2016; Nyabuti et al., 2020). A study conducted in medical organizations in Southern Malawi showed excessive purchases of medicines, their irrational use and a significant proportion of expired drugs (WHO, 2020).

In addition, doctors' non-compliance with clinical guidelines and protocols, as well as a decrease in adherence to the principles of evidence-based medicine as their work experience increases, hinder the rational use of medicines (Zurdinova, 2018). The proliferation of counterfeit and substandard medicines is one of the major threats to global health. Globalization, the expansion of online commerce and the high profitability of illicit trafficking in such drugs contribute to the intensification of this phenomenon (Strelzhova et al., 2020; Kaur et al., 2025).

Despite the regulatory and legal regulation of the rational use of medicines in the Republic of Kazakhstan, scientific research comprehensively assessing the practice of prescribing medicines, compliance with clinical protocols and Factors affecting the quality and safety of medicines in healthcare organizations remain insufficient (Ministry of Health of the Republic of Kazakhstan, 2020; Code of the Republic of Kazakhstan "On Public Health and the Healthcare System", 2020). In this regard, the scientific substantiation of mechanisms for providing the population with high-quality, safe and effective medicines is an urgent scientific and practical task.

**The purpose of the study:** To analyze the issues of rational use of medicines and the level of awareness of pharmacists about counterfeit medicines in

order to identify problematic aspects and develop recommendations for their prevention.

**Research objectives:**

1. To conduct an analytical review of modern scientific data and international practice of rational use of medicines and distribution of counterfeit products.

2. To assess the level of awareness and competence of pharmacists regarding the detection, prevention and reporting of counterfeit products.

3. To analyze the main indicators of prescribing, dispensing and consuming medicines at the primary health care (PHC) level in accordance with WHO indicators.

4. Develop scientifically based recommendations aimed at raising awareness of counterfeit products among pharmacists and improving the practice of rational use of medicines.

**Materials and research methods**

The study was conducted in the city of Shymkent and was aimed at assessing the rational use of medicines, as well as the level of awareness and alertness of pharmacists regarding counterfeit medicines. The work was carried out within the framework of a comprehensive interdisciplinary design using mixed methods.

At the first stage, a systematic and integrative review of the literature on the problems of rational use of medicines and trafficking in counterfeit medicines was conducted using international databases (PubMed, Scopus, Web of Science, etc.).

At the second stage, a quantitative survey was conducted among pharmacists working in private and chain pharmacies in Shymkent (N = 250) and qualitative research in the form of semi-structured interviews (N = 10). The Ravina–Barrett questionnaire was used to assess the awareness and alertness of pharmacists.

At the third stage, within the framework of a single-stage cross-sectional study, the indicators of prescribing, dispensing and consumption of medicines at the PHC level according to WHO indicators were evaluated. The study included 13 medical organizations, a total of 390 patients were interviewed (30 patients from each organization).

The data obtained was processed using descriptive and comparative statistical methods in the SPSS and R software environments, and qualitative data was analyzed using the thematic analysis method. By integrating quantitative and qualitative results, practical recommendations have been developed to improve the rational use of medicines and increase vigilance against counterfeit medicines.

**The main provisions submitted for defense**

1.An analysis of 155 publications has shown that falsified medicines are mainly associated with infectious diseases, and the main causes of inconsistencies are the low content of the active pharmaceutical ingredient (API) and quality defects.

2.The level of awareness of pharmacists about counterfeit medicines, their detection technologies and reporting mechanisms (YCS) is insufficient, which confirms the need for educational and regulatory measures.

3.Analysis of indicators of rational use of medicines at the PHC level revealed significant inter-center variability in key indicators (consultation time, availability of medicines, frequency of antibiotic prescribing, level of knowledge of patients).

4.Based on the data obtained, scientifically based recommendations have been developed aimed at raising awareness among pharmacists, improving the quality of prescribing and dispensing medicines, and reducing the risks associated with counterfeit medicines.

**The results of the study:**

1.An analysis of the publications showed that 86% of the studies are devoted to infectious diseases, primarily antimalarial drugs (46%), antibiotics (15%) and anti-tuberculosis drugs (8%). The main reasons for the inconsistencies in the quality of medicines were the low content of the active substance (63.2%) and visual defects (52.6%).

2.The level of participation of pharmacists in official information campaigns was extremely low, but the majority of respondents recognized their effectiveness ($p = 0.003$). The use of the YCS system also remained limited, despite the high assessment of its effectiveness by the study participants, which indicates a gap between the level of knowledge and practical application.

3.Statistically significant differences were found in the main WHO indicators: consultation time ($p < 0.001$; from 3 to 35 minutes), availability of prescription drugs ($p < 0.001$; minimum value — 77%), level of knowledge of patients about dosages ($p = 0.002$; minimum — 60%), frequency of prescribing antibiotics ($p = 0.01$; range from 0% to 8%).

4.Based on data integration, a system of recommendations has been developed, including standardization of the processes of prescribing and dispensing medicines, strengthening the role of pharmaceutical consulting, as well as the introduction of training modules and seminars tested in 13 medical organizations and 250 pharmacies in Shymkent. The practical applicability and effectiveness of the proposed measures have been confirmed.

**Scientific novelty**

For the first time in Kazakhstan:

1.The main gaps in the knowledge of pharmacists about counterfeit medicines and the reasons for the lack of awareness about them have been identified.

2. A comprehensive assessment of the rational use of medicines according to WHO indicators at the primary health care level was carried out, which made it possible to identify factors affecting the quality of prescribing and dispensing medicines.

3.Based on the data obtained, new recommendations and educational measures were developed to improve the competence of pharmacists and reduce the spread of counterfeit medicines.

**Theoretical and practical significance:**

1. The research forms new scientific ideas about the level of awareness of pharmacists about counterfeit medicines and the problems of their detection.

2. Indicators of the rational use of medicines (IRILS) at the primary health care level expand the theoretical base of pharmaceutical and medical sciences and complement models of factors affecting the quality of drug provision.

3.The data obtained form the basis for the development of scientific approaches to monitoring counterfeit medicines and strengthen the conceptual foundations of drug safety.

4. The results of the study serve as a basis for the development of practical recommendations for preventing the spread of counterfeit medicines and increasing the level of professional alertness of pharmacists.

5. The results of the survey and the analysis of RILS indicators can be used to develop and implement measures aimed at improving the rationality of prescribing and dispensing medicines.

6. The research results have been implemented into the educational process and included in the syllabus of the discipline "Management in Healthcare" of the educational program 6B10104 "Pharmacy" (4th year).

7. In order to deepen the knowledge of pharmacists on the rational use of medicines and counterfeit drugs, webinars and seminars were held. The training covered pharmacists from 13 municipal medical organizations and 250 private and chain pharmacies in Shymkent, explaining the regulatory legal acts of the Republic of Kazakhstan in the field of drug policy.

**Personal contribution of the doctoral student:** Within the framework of the study, the author independently developed the purpose and objectives of the study, which provided a comprehensive analysis of the problem under study. Data collection and interpretation were performed directly by the author. The doctoral student made a significant personal contribution to the process of statistical data processing, which made it possible to ensure the reliability and reliability of the

results obtained. In addition, scientifically based conclusions were formulated and practical recommendations were developed that would contribute to the further development of the research area. The analysis of the data obtained, the interpretation of the results and their generalization in the form of scientific publications made a significant contribution to the theoretical and practical significance of the research.

**Approbation of the dissertation results:** The main results of the dissertation research were presented at the International Scientific and Practical Conference «Interdisciplinary approach in Nursing», NAO «West Kazakhstan Medical University named after Marat Ospanov», report on the topic: «International experience in monitoring counterfeit medicines», Aktobe, April 18-19, 2024.

**Connection of the topic with the plans of research programs.**

The dissertation work was carried out within the framework of an initiative topic.

**Publications on the topic of the dissertation**

9 scientific papers have been published on the topic of the dissertation research, including:

1 article in an international journal indexed in the Scopus and Web of Science Core Collection databases (Scopus, 2025);

2 articles in scientific journals recommended by the Committee for Quality Assurance in Science and Higher Education of the Ministry of Education and Science of the Republic of Kazakhstan;

1 thesis in the materials of the international scientific and practical conference;

5 acts of implementation of research results.

**The structure and scope of the dissertation**

The dissertation consists of the content, a list of definitions, symbols and abbreviations, an introduction, a review of the literature, sections "Materials and methods of research", "Research results and discussion", conclusions, a list of sources used and appendices.

The total volume of the dissertation is 129 pages of typewritten text. The work includes 7 tables and 13 figures.

The list of references contains 179 sources, including 4 domestic and 175 foreign publications.