IMPROVING THE TEACHING OF MEDICAL CHEMISTRY TO GENERAL MEDICINE STUDENTS AT PUBLIC AND PRIVATE HIGHER EDUCATION INSTITUTIONS

Khojaniyozov Sherjon Bekboevich
Senior Lecturer, Department of Natural Sciences, Ma'mun University
ORCID: https://orcid.org/0009-0002-6353-6614
sherjon1971@mail.ru
Ataullaev Zokir Makhsudovich
Associate Professor, Department of Natural Sciences, Ma'mun University
ORCID: https://orcid.org/0000-0002-6517-8163
zokirjon16081987@gmail.com

Abstract. This paper examines ways to improve the teaching of medical chemistry to students enrolled in the General Medicine programme at public and private higher education institutions. Particular attention is paid to integrating classroom instruction with independent learning, using interactive teaching methods, and regularly assessing students' knowledge.

Keywords: *medical chemistry, General Medicine, higher education, public and private higher education institutions, independent learning, interactive teaching methods, credit-module system, knowledge assessment, teaching methodology.*

Introduction

Medical chemistry plays an important role in helping future physicians understand chemical processes, biological systems, and the chemical foundations of physiological processes occurring in the human body. Acquiring a solid knowledge of this subject provides students enrolled in the General Medicine programme with the scientific foundation necessary for studying biochemistry, pharmacology, and other medical disciplines at subsequent stages of their education.

Today, one of the pressing issues in teaching medical chemistry at public and private higher education institutions is the development of students' independent learning activities, the effective organization of classroom sessions, and the use of modern pedagogical approaches. The broad scope of the subject and the interrelationships between chemical concepts may make it difficult for students to fully master all topics through classroom instruction alone.

In particular, the chemical knowledge acquired at school is not always sufficient for mastering all the complex concepts covered in medical chemistry at the higher education level. Therefore, it is important to assess students' prior knowledge, review essential concepts, and organize the independent acquisition of new knowledge.

The aim of this article is to examine didactic and methodological approaches to improving the teaching of medical chemistry to students enrolled in the General Medicine programme at public and private higher education institutions.

Main Body

Improving the teaching of medical chemistry primarily requires ensuring continuity between classroom instruction and independent learning. If 50% of the total academic workload allocated to a subject in the curriculum is devoted to classroom instruction, it is important for students to master the remaining portion through independent learning in accordance with the established curriculum. In this context, the 50% ratio should not be regarded as a uniform requirement for all higher education institutions but should instead be considered in accordance with the relevant subject syllabus and curriculum.

Independent learning enables students to consolidate the knowledge acquired in class, study upcoming topics in advance, work with scientific sources, and relate the concepts they have learned to medical situations. For each topic, the teacher should specify clear learning objectives, assignments, recommended sources, and assessment criteria for independent study. For example, when studying solutions, students can independently review theoretical information on types of concentration, osmotic pressure, and buffer systems, and then analyse relevant problems and practical situations in class.

Second, diagnostic assessment of students' chemical knowledge acquired at school is important. At the higher education level, knowledge of chemical formulae, amount of substance, molar mass, solution concentration, acid–base concepts, and chemical bonding provides a foundation for mastering medical chemistry topics. However, students may have different levels of prior preparation. Therefore, it is advisable to identify gaps in their knowledge through an initial test, brief question-and-answer sessions, and diagnostic assignments, and to provide revision materials where necessary.

Third, it is recommended that interactive teaching methods appropriate to the content and learning objectives of each topic be used throughout the course. These methods may include brainstorming, small-group work, problem-based questions, situational tasks, concept maps, comparison tables, and short tests. Such approaches create opportunities to increase students' engagement in class, explain chemical concepts, and justify their opinions. The application of active learning strategies in medical chemistry courses has also been examined in scientific research [1].

When selecting interactive teaching methods, it is not sufficient merely to incorporate them into a lesson. Each method should serve a specific learning outcome.

For example, assignments may be designed to explain the movement of ions when studying electrolyte solutions and to analyse changes in pH when studying buffer solutions. The use of problem-based learning in practical classes encourages students to conduct independent inquiry, justify their findings, and improve their knowledge through feedback [2].

Fourth, academic staff should regularly monitor the outcomes of students' independent learning. Assessment should not be limited to the final examination but should be conducted progressively throughout the learning process. For this purpose, short tests, written assignments, individual questions, presentations, tasks on electronic learning platforms, and practical problems may be used.

The primary purpose of regular assessment is not merely to evaluate students but also to identify gaps in their knowledge and help them address these shortcomings. Teachers should analyse assignment results, provide students with clear and understandable feedback, explain errors, and recommend additional sources where necessary. Research on integrating interactive activities, problem-based tasks, and feedback into medical chemistry education highlights the methodological significance of this approach [1; 2].

Fifth, improving the teaching of medical chemistry at public and private higher education institutions requires consideration not only of general methodological principles but also of the relevant educational programmes, curricula, material and technical resources, and internal assessment procedures. Regulatory documents concerning the credit-module system establish provisions relating to the organization of the educational process, the development of educational programmes, and the assessment of students' knowledge [3]. At the same time, since the scope of application of the regulation stipulated in Resolution No. 824 of 31 December 2020 is limited, it cannot be assumed that this regulation applies uniformly to all public and private medical higher education institutions.

Thus, the teaching of medical chemistry can be improved by integrating classroom instruction with independent learning, assessing students' prior knowledge, using interactive teaching methods purposefully, and implementing regular pedagogical assessment. These approaches help orient the educational process towards students' needs and intended learning outcomes.

Conclusion

Ensuring continuity between classroom instruction and independent learning is essential for improving the teaching of medical chemistry to students enrolled in the General Medicine programme at public and private higher education institutions. The classroom and independent learning components of the subject's academic workload

should be organized in accordance with the relevant curriculum, and students should be provided with clearly defined assignments and reliable sources for independent study.

Diagnostic assessment of the chemical knowledge acquired at school, revision of essential concepts, and the use of interactive teaching methods appropriate to the topic help ensure the purposeful organization of the educational process. Regular assessment by academic staff, timely feedback, and working on errors are also important components of independent learning.

To implement the proposed methodological approaches in practice and determine their effectiveness, it is necessary to compare students' initial and final knowledge outcomes, analyse the completion of assignments, and assess the results against relevant pedagogical criteria.

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