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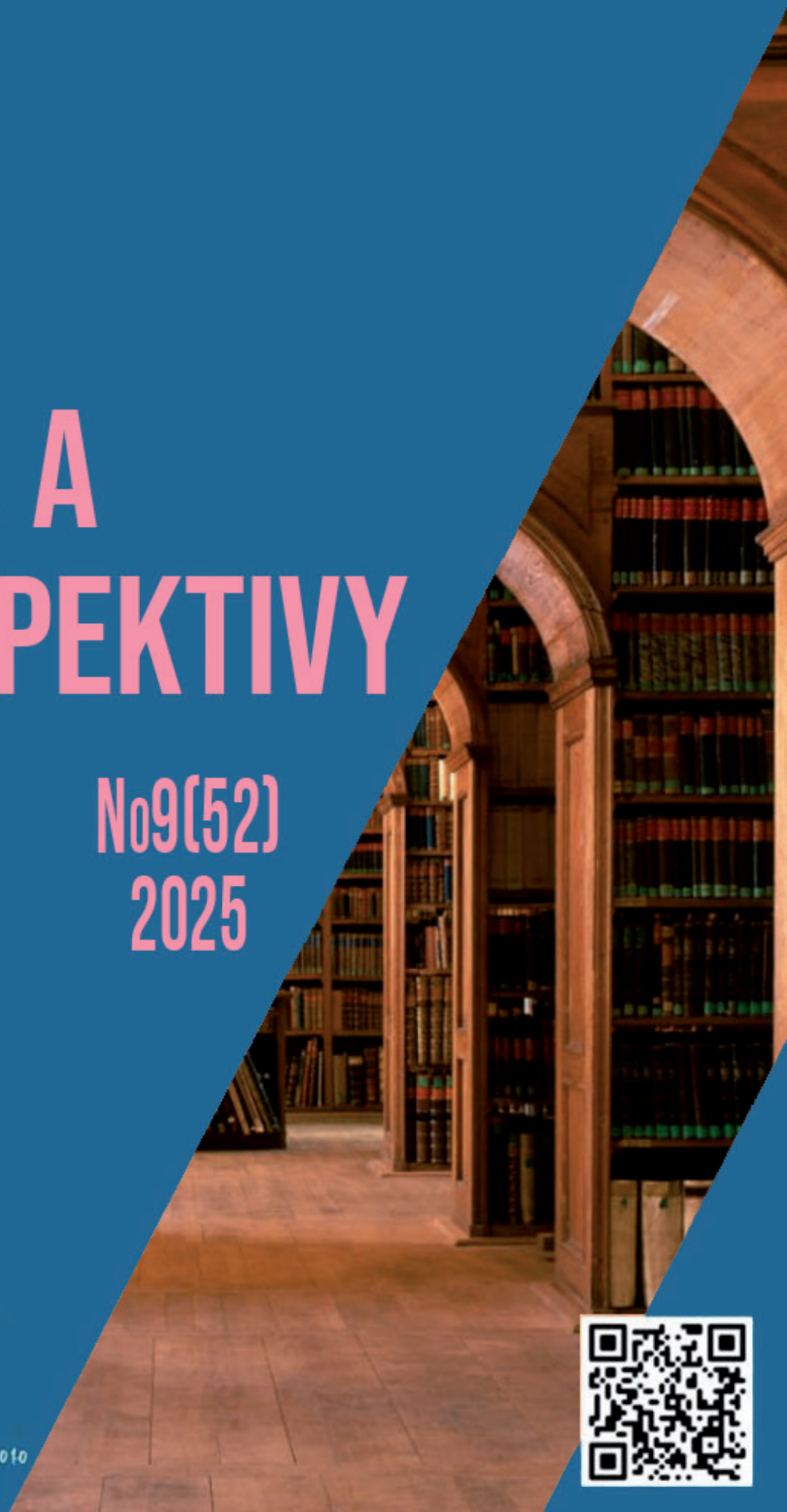

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MANAGEMENT OF EDUCATIONAL MOTIVATION IN TEACHING FUNDAMENTAL DISCIPLINES FOR STUDENTS OF SPECIALTY I4 "MEDICAL PSYCHOLOGY"

Abstract. This article examines the features of enhancing educational motivation among students pursuing medical specialties, particularly during the study of *Medical Biochemistry*. Theoretical and methodological foundations for organizing the educational process are discussed, with an emphasis on motivational aspects of acquiring fundamental knowledge and developing professionally significant competencies. The authors propose an integrated model of motivational sessions, which includes clinically oriented elements and practice-based cases, thereby strengthening the connection between theoretical training and future professional activities.

The effectiveness of the model was evaluated through participant surveys and analysis of the collected data from the perspective of pedagogical management at the Department of Medical Biochemistry and Molecular Biology, Bohomolets National Medical University. It was found that motivational sessions significantly enhance students' positive attitude toward the discipline, stimulate analytical and interdisciplinary thinking, and contribute to the development of sustainable learning skills and professional motivation.

Based on the results, recommendations are proposed for improving the management of the educational process in teaching fundamental disciplines for future medical professionals, including a differentiated approach to students according to their prior motivation, implementation of horizontal learning, and integration of clinical microscenarios into educational content. The proposed model can serve as a foundation for developing effective pedagogical management strategies in medical education and advancing educational practices with high motivational value.

Keywords: Biochemistry, Training of medical psychologists, Educational process, Student motivation, Pedagogical management, Fundamental disciplines, Clinically oriented learning, Active learning methods

Problem Statement. In the modern educational landscape for training medical professionals, there is an increasing trend of declining student motivation to study fundamental disciplines, particularly *Medical Biochemistry*. This situation poses a significant challenge for educational management systems and academic staff, as fundamental knowledge is a key prerequisite for developing clinical thinking in future physicians. One effective way to bridge the gap between theoretical training and the practical needs of medicine is the implementation of specially organized motivational activities aimed at demonstrating the applied significance of biochemical knowledge.

To this end, a series of motivational sessions titled *"Biochemistry in the Practice of a Physician"* was conducted. During these sessions, participants had the opportunity to engage with real clinical cases, explore the mechanisms of pathological processes at the biochemical level, and understand the application of laboratory markers in the practice of physicians across various specialties. The aim of this article is to analyze the effectiveness of this educational initiative from the perspective of pedagogical management and to identify prospects for scaling this approach in higher medical education.

Analysis of Recent Research and Publications. In recent years, the scientific literature has increasingly focused on the issue of enhancing educational motivation among students of medical specialties during the study of fundamental disciplines. Studies [1, 2] demonstrate the effectiveness of active learning methods, the integration of clinical cases, and practice-oriented approaches in fostering sustained motivation and improving academic performance. Other works [3] highlight the importance of horizontal learning and student-centered strategies for developing analytical thinking and interdisciplinary competencies.

Despite significant achievements, several unresolved aspects remain that lack systematic approaches. First, the majority of studies focus on general medical specialties and do not adequately address students of specialty I4 *"Medical Psychology"*, for whom the combination of fundamental knowledge and the practical relevance of educational material is critically important. Second, there is a lack of clearly structured models of motivational interventions that comprehensively integrate

differentiated work with students, clinical case integration, and elements of horizontal learning. Third, the impact of such interventions on long-term academic motivation and the development of professionally significant competencies in future medical psychologists has not been systematically studied.

The present study aims to fill these gaps by developing an integrated model of motivational sessions that incorporates a differentiated approach based on students' initial motivation levels, active learning methods, elements of horizontal learning, and clinically oriented cases. Implementing this approach allows for a systematic assessment of the impact of educational interventions on the motivation and academic preparation of students in specialty I4 *"Medical Psychology"* and serves as a methodological foundation for further development of pedagogical management in medical education.

Aim of the Study: The aim of this article is to investigate and substantiate effective approaches for enhancing educational motivation among students of specialty I4 *"Medical Psychology"* during the study of the fundamental discipline *Medical Biochemistry*.

Research Methods: To evaluate the effectiveness of the conducted motivational sessions, a survey was administered to students of specialty I4 *"Medical Psychology"*. The questionnaire included both closed- and open-ended questions regarding reasons for participation, changes in attitudes toward studying biochemistry, and evaluations of the format, content, and expectations of the sessions.

The study sample consisted of 24 participants in specialty I4 *"Medical Psychology"*, which aligns with contemporary approaches for working with small groups in medical education research. As Robinson [4] notes, the traditional concept of sample representativeness requires reconsideration: in studies with a limited number of participants, the focus should be not on quantitative coverage but on correctly defining the population to which the results are relevant. Therefore, a limited sample is methodologically justified when it accurately represents the target group—in this case, students of a specific specialty.

Furthermore, studies published in *Qual Health Res* [4] and by Malterud, Siersma, and Guassora [5] emphasize that a small sample does not compromise scientific validity if quantitative and qualitative analysis methods are combined, case-oriented approaches are used, and empirical data depth is ensured. This means that this study achieves an appropriate level of reliability through multidimensional analysis and careful interpretation of the results.

Thus, a sample of 24 respondents is methodologically justified and provides the basis for forming valid conclusions within the defined research context [3].

Presentation of the Main Material. The motivational activities for students of specialty I4 *"Medical Psychology"* were designed not only to maintain interest in the discipline but also to emphasize the practical value of the knowledge gained. Medical biochemistry is often perceived by students as a complex science, detached from

clinical practice. However, the inclusion of clinically oriented components in the learning process changes this perception and highlights the role of biochemistry in developing the competencies of future physicians.

The aim of the motivational sessions was not only to deepen students' understanding of biochemical processes but also to demonstrate their practical importance for medicine. This approach to competency development facilitates the acquisition of skills in applying biochemical knowledge for clinical decision-making, explaining disease pathogenesis, and exploring new therapeutic approaches.

From a pedagogical perspective, motivation to study a discipline is shaped by both internal and external factors, among which the most significant are interest in the content, awareness of its practical relevance, clarity of presentation, and a clear connection to future professional activities. In students' perceptions, medical biochemistry often appears "overly theoretical" and "removed from clinical practice," which reduces the level of academic engagement, especially in the initial stages of training.

In this context, the implementation of the motivational sessions cycle *"Biochemistry in the Work of a Practicing Physician"* aimed not only to expand traditional educational content but also to enhance professional motivation by creating a direct link between theoretical material and clinical practice. The use of problem-based approaches, case methods, and elements of narrative medicine created an interactive educational environment in which students were active participants in the learning process. This, in turn, increased engagement and raised awareness of the role of biochemistry as a foundation for medical practice.

Considering the challenges of modern medical education, one of the key tasks of educational management is the implementation of innovative practices tailored to the needs of the current generation, which demands interactivity, practical orientation, and quick access to relevant information. In this context, motivational sessions involving practicing physicians, analysis of clinical cases, and discussion of the role of biochemical diagnostics in medical practice were considered by the authors as an effective form of innovative educational activity.

The content of the activities is fully aligned with the concept of an interdisciplinary educational approach and ensures the integration of knowledge in medical biochemistry, pathophysiology, clinical laboratory diagnostics, and internal medicine. This integration provided a basis for forming a holistic perception of the educational material and facilitated the effective development of key competencies defined by educational programs: "the ability to solve complex tasks and problems in medical psychology, which involves conducting research and/or implementing innovations and is characterized by uncertainty of conditions and requirements; the ability to apply knowledge in practical situations, knowledge and understanding of the subject area and the profession; the ability to search for and analyze information from various sources; the ability to identify, pose, and solve problems; the ability to evaluate

and ensure the quality of completed work; the ability to use scientifically verified methods and techniques; the ability to implement mono- and combined schemes of complex treatment with elements of evidence-based psychotherapy; the ability to conduct psychoprophylaxis among at-risk groups, psychodiagnostics, psychocorrection, and treatment of patients with somatic and mental disorders in collaboration with relevant specialist physicians; psychological rehabilitation using specialized methods; the ability to locate necessary information in professional and scientific literature, databases, and other sources, analyze and evaluate this information, and apply it to improve professional practice" [13].

Considering the above aspects of the organization and content of the motivational sessions, the question arises regarding their impact on students' academic performance. In particular, an important criterion for evaluating the effectiveness of such educational activities is the correlation between participation and the results of the final assessment. Therefore, the next stage of the study was aimed at comparing the influence of the motivational sessions with the actual results of the medical biochemistry exam.

To assess the effectiveness of the implemented motivational sessions, a comparative analysis of students' success in the medical biochemistry exam over two academic years was conducted. The data for the 2023–2024 academic year (control group) reflect the preparation of students without additional support in the format of motivational sessions (67 participants), whereas in the 2024–2025 academic year (experimental group), the exam was taken by students who participated in these sessions (65 participants). This approach allows for tracing the potential impact of the intervention on both the level of material mastery and the final results.

For comparing exam results, two main indicators were used: the mean score and the grade distribution in percentage terms.

The mean value was calculated using the classical arithmetic average formula:

$$\overline{X} = \frac{\sum_{i=1}^{n} x_i}{n},$$

where x_i are the individual students' scores, and n is the total number of students in the sample. This allowed us to obtain a generalized characteristic of the group's performance level [4].

For the experimental group (2024–2025 year, n=65), the mean score was 3,14. For the control group (2023–2024 year, n=67), the mean score was 3,11.

The slight increase in the mean score in the experimental group indicates a positive, though moderate, effect of implementing the motivational sessions.

The proportion of students who received a particular grade was calculated using the relative frequency formula:

$$P = \frac{n_i}{N} \times 100\%,$$

where n_i is the number of students with a particular grade, and N is the total number of students in the group. This approach is standard in educational research [9, 12]. Accordingly, the grade distribution (%) was as follows:

- experimental group (n=65): 5 points: 6,2%; 4 points: 24,6%; 3 points: 46,2%; 2 points: 23,1%

- control group (n=67): 5 points: 1,6%; 4 points: 25,4%; 3 points: 55,6%; 2 points: 17,5%

It can be noted that after implementing the motivational sessions, the experimental group showed a noticeable increase in the number of students with the highest grades ("5"), while the percentage of "3" grades slightly decreased. At the same time, compared to the control group, the proportion of students receiving a "2" increased, which may indicate a polarization of results.

The comparison of medical biochemistry exam results between the control (2023–2024 year, n=67) and experimental (2024–2025 year, n=65) groups revealed certain differences. The mean score in the control group was 3,11, while in the experimental group it was 3,14, indicating a general improvement in performance following the implementation of motivational sessions. A qualitative analysis showed significant changes in grade distribution: in the experimental group, the proportion of students with the highest grade ("5") increased substantially – 6,2% versus 1,6%, while the share of students with a "3" decreased (46,2% versus 55,6%). At the same time, the proportion of students with a "2" increased (23,1% versus 17,5%), indicating a polarization of results: strong students show improvement, whereas some weaker students remain in the lower-performance zone. These findings confirm the effectiveness of motivational sessions as a factor in enhancing academic achievement, while also emphasizing the need to develop additional support mechanisms for students with lower preparation levels.

Particular attention in this study should be given to the analysis of the small subgroup of students who directly participated in the motivational sessions. Among the 65 students in the experimental group, only 26 participants (40%) were actively involved, which, from a methodological perspective, imposes limitations on forming definitive generalizations, but allows identification of certain trends. The analysis of results showed that this subgroup exhibited the most pronounced improvement in attitude toward the discipline and an increase in the proportion of high grades. This suggests that the impact of motivational sessions is statistically significant even at the level of a small sample, and the effectiveness could be higher when applied on a larger scale.

At the same time, using a small sample implies the need for further research involving a larger number of students and multi-year repetition of the experiment. This will not only increase the reliability of the results but also allow a deeper analysis of which factors (clinical examples, interactivity, practitioner comments) have the greatest impact on the dynamics of learning motivation. Thus, even within a limited

sample, the potential of motivational sessions as an innovative educational tool was demonstrated, highlighting the need for further scaling and testing in a broader context of medical education.

The survey of students in specialty I4 "Medical Psychology" made it possible to identify the most significant components of the educational process that influence the formation of educational motivation orientations. The most important factor was the use of clinical examples (76%), indicating a strong need among students to connect abstract biochemical concepts with their practical application in medical and psychodiagnostic activities. The second most significant component was the combination of theoretical instruction with real-life examples (68%), confirming students' demand for a "problem–analysis–solution" model and the development of clinical thinking. Interactivity was highlighted as an important educational factor (46%), ensuring active student engagement in the learning process. Additionally, the participation of practicing physicians was highly valued (42%), as their commentary helped model professional identity and provided students with a realistic understanding of clinical practice.

The aggregated survey results indicate a high level of achievement of the main goal of the motivational sessions – the formation and enhancement of a positive attitude toward medical biochemistry as a discipline with clinical significance. Only about 18% of participants reported no significant changes in perception, confirming the high potential for scaling this educational format and its effective use in other foundational disciplines.

Cross-analysis revealed that in the group where 56% of respondents reported improved attitudes toward biochemistry, there was a direct correlation with high subjective ratings of the usefulness of the sessions: 88% of students rated them 4 or 5. This indicates that for most participants, the sessions became not only an educational experience but also a professionally meaningful one.

The study also showed that over 85% of respondents who noted positive changes rated the session as "5" in terms of usefulness, emphasizing that their perception of medical biochemistry shifted significantly toward a practice-oriented view of the discipline. Additionally, 73% of students noted that the acquired information is directly important for their future professional activities, and more than 81% emphasized the particular significance of clinical examples. These results demonstrate that the integration of theory and practice is a key factor in forming positive motivation to study medical biochemistry.

Thus, participants who experienced positive changes in their attitude toward biochemistry not only highly rated the motivational sessions but also recognized their practical significance. Clinical examples, comments from practicing physicians, and interactive elements became key educational tools that ensured a connection between theoretical knowledge and future professional activities. The obtained data demonstrate that the effectiveness of learning medical disciplines, including medical

biochemistry, largely depends on the integration of theory and practice, as well as on the ability of educational activities to meet the needs of future specialists in the field of medical psychology.

An important aspect of analyzing the effectiveness of the series of motivational sessions dedicated to the applied aspects of biochemistry in medicine was examining how participation in these events influenced students' attitudes toward medical biochemistry. This allowed tracking not only the emotional and value-based perception of the initiative but also possible changes in interest, learning motivation, and understanding of medical biochemistry as a foundation for clinical knowledge.

Within the survey of participants in the series of sessions "Biochemistry in the Work of a Practicing Physician," one of the central tasks was to determine whether the attitude of students in specialty I4 "Medical Psychology" toward medical biochemistry had transformed after participation. Four response options were provided: "yes, attitude improved," "remained positive," "remained negative," "did not change." The results allowed assessment of how effective the sessions were in forming a new understanding of the role of biochemistry. It was particularly important to determine whether positive shifts in perception of the discipline were achieved, demonstrating its relevance in the daily practice of a physician.

Within the sample of 24 students in specialty I4 "Medical Psychology," the largest group consisted of respondents who reported a positive transformation in their attitude toward biochemistry after participating in the motivational sessions. This result was reported by 13 individuals (≈55%), directly indicating the productivity of the chosen educational strategy. Notably, the positive dynamics in perception were associated with the actualization of the practical significance of biochemical knowledge, its integration into the clinical context, and its relevance for future professional activities.

Additionally, 6 participants (25%) noted that their attitude remained positively stable. This indicates the presence of sustained interest and a high level of initial motivation, allowing this subgroup to be considered as a foundation for further development of the academic core of the educational community. Together, these two categories constitute 80% of the total respondents, which can be interpreted as evidence of the effectiveness of the educational initiative in both informative and motivational dimensions.

At the same time, 2 respondents (≈6%) reported maintaining a negative attitude, and 3 individuals (≈14%) indicated no change in their perception of medical biochemistry. Thus, 20% of the sample remained outside the influence of the implemented educational practices. Probable determinants of this result may include low baseline learning motivation, cognitive or emotional barriers in perceiving the material, as well as insufficient adaptation of the content to the specifics of the future specialization.

Analyzing this subgroup of students is fundamentally important for optimizing the management of similar educational activities in the future. Respondents who

remain indifferent or demonstrate a consistently negative attitude outline the boundaries for further enhancement of the program's effectiveness. Their position is largely shaped by the entrenched perception of medical biochemistry as a "difficult" discipline, which requires individualized pedagogical influence and reconsideration of teaching communication strategies.

A comparative analysis of the obtained results, combined with other indicators, allows a comprehensive identification of factors contributing to the positive dynamics in the perception of biochemistry. In the group of respondents where 55% reported an improved attitude toward the discipline, there is a clear association with high ratings of the practical usefulness of the sessions: over 90% of participants in this category rated the effectiveness at 4 or 5 points. This indicates that for them, the sessions were not only informative but also served as a practical resource.

Further detailing of the indicators confirms this conclusion: over 87% of respondents in the group with positive changes rated the event at the highest score. Thus, it can be stated that the transformation in attitude toward biochemistry is closely related to the perceived practical benefit rather than to abstract academic value. Clinical examples and practice-oriented components of the program played a significant role in this, providing participants with a clear understanding of how to apply the acquired knowledge in professional practice.

Moreover, a significant portion of students (74% of the total respondents) emphasized the direct relevance of the obtained information for their future profession. This demonstrates that the event not only introduced theoretical aspects of biochemistry but also served as a tool for enhancing professional readiness. The combination of educational and practical components proved to be a key factor in increasing academic motivation and changing attitudes toward the discipline.

The obtained results indicate that such motivational activities can serve as an effective mechanism for forming a positive attitude toward disciplines traditionally perceived as difficult, including medical biochemistry. Their greatest impact is observed at the early stages of professional training, when student engagement and emotional involvement are critical factors.

A comparative analysis of the experimental group, which participated in the motivational meetings, and the control group without additional educational interventions revealed statistically significant differences in students' attitudes toward medical biochemistry. The mean score on a five-point scale in the experimental group was 4,29 (SD = 0,91; n = 24), whereas in the control group it was 2,92 (SD = 0,78; n = 24). The mean difference was 1,38 points (95%). According to the independent Welch's t-test, this difference was statistically significant: $t(44.9) = 5,64$, $p < 0,001$. The effect size, calculated using Cohen's d, was $d = 1,63$, which is interpreted as a large effect [10]. This indicates a substantial impact of the motivational meetings on the positive shift in students' attitudes toward the discipline.

Additionally, an analysis of differences in the distribution of positive responses between the groups was conducted. In the experimental group, a positive attitude

(categories “improved” and “remained positive”) was demonstrated by 19 out of 24 participants (79%), whereas in the control group only 6 out of 24 (25%) showed a positive attitude. The χ^2 test results confirmed the presence of a statistically significant difference: $\chi^2(1) = 12,02$, $p = 0,0005$ [11].

Thus, the data confirm that motivational meetings enhance the positive perception of medical biochemistry among students. The combination of parametric analysis (t-test) and frequency analysis (χ^2) allows us to conclude the effectiveness of this educational format as a tool for increasing academic motivation and shaping value-based attitudes toward challenging fundamental disciplines.

The empirical research results convincingly demonstrate the effectiveness of using motivational meetings as a tool to enhance educational motivation and foster a positive attitude toward challenging fundamental disciplines, particularly medical biochemistry. The statistically significant difference between the experimental and control groups supports the hypothesis that integrating practice-oriented content and emphasizing the clinical relevance of biochemical knowledge creates additional conditions for shifting students’ value orientations. The high Cohen’s d effect size ($d = 1,63$) indicates a substantial educational impact that goes beyond random fluctuations and reflects qualitative changes in the perception of the discipline.

The χ^2 test results further confirm that a positive attitude toward medical biochemistry is formed significantly more frequently among students who participated in the meetings (79%) compared to the control group (25%). This allows us to conclude that educational initiatives aimed at demonstrating the practical relevance of theoretical knowledge can serve as an effective means of overcoming barriers to perceiving fundamental disciplines as “overly difficult” or “detached from clinical practice.”

The obtained data are consistent with modern pedagogical concepts emphasizing the necessity of a student-centered approach and the use of active learning methods.

In a broader context, the results of the study indicate the potential of such educational formats to bridge the gap between fundamental and clinical disciplines. The development of differentiated strategies that take into account students’ academic level and professional needs may ensure higher efficiency of the educational process overall. It is also important to further investigate the long-term impact of such meetings on students’ academic performance and their attitudes toward other fundamental disciplines.

Conclusions. The conducted study confirmed that the management of educational motivation is a key factor in enhancing the effectiveness of teaching fundamental disciplines in medical education, particularly for students of the I4 “Medical Psychology” specialty. The results demonstrated that integrating motivational meetings, which combine theoretical material with demonstrations of its clinical relevance and practical applicability, significantly increases students’ positive attitudes toward medical biochemistry.

Analysis of both parametric and non-parametric indicators showed high statistical significance and intervention effect, indicating the practical importance of these activities in shaping value-based attitudes toward the discipline.

Thus, the study results confirm that a differentiated approach to organizing the educational process, which considers students' academic level, professional interests, and practical skill needs, is an effective tool for fostering stable academic motivation and improving the quality of learning in fundamental disciplines within medical-psychological education. The implementation of such approaches can serve as a foundation for systemic changes in strategies for training highly qualified specialists in the field of medical psychology.

The obtained data allow for outlining strategic directions for improving the management of the educational process at the Department of Medical Biochemistry and Molecular Biology, aiming to enhance the quality of material assimilation, stimulate motivational engagement, and develop stable professionally relevant competencies.

It is advisable to implement a differentiated approach to planning and delivering educational content, taking into account students' prior interest levels. This approach allows adapting teaching methods and content to individual educational needs. Based on the diagnosis of motivational profiles and learning attitudes, micro-groups with specific educational trajectories can be formed, ensuring personalized knowledge acquisition and maximum student engagement.

A further promising direction is involving senior students in adapting the content of thematic blocks. Implementing the principle of horizontal learning facilitates the exchange of knowledge, experience, and practical skills among participants in the educational process. This active learning model is based on equal partnership and ensures the translation of clinical experience into the academic context, creating inter-level continuity in professional training.

The integration of mini-cases in clinical reasoning, built on the analysis of biochemical markers and laboratory data, strengthens the connection between theoretical preparation and clinical practice, stimulates analytical thinking, and promotes interdisciplinary interaction.

Systematic monitoring of students' academic outcomes after participation in interactive motivational activities allows for adjustments in the content and organizational parameters of the educational process and helps to develop a predictable model of the impact of motivational practices on learning effectiveness.

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