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SIMULATION MEDICAL TRAINING IN UKRAINE: IS THE APPROACH AS NEW AS IT IS PORTRAYED?

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The article analyses simulation-based medical training in Ukraine through the lens of continuity and transformation. The purpose of the paper is to clarify whether simulation in Ukrainian medical education should be understood as a completely new pedagogical invention or as a modern institutionalisation of methods that have long existed within clinical and preclinical medical training. The relevance of the topic is determined by the rapid development of simulation centres, the spread of virtual patients, procedural trainers and high-fidelity manikins, and the growing demand for safe acquisition of practical skills in wartime, hybrid and clinically restricted educational contexts in Ukraine. The article argues that the post-Soviet model of medical education was traditionally conservative and teacher-centred; but Ukraine is moving towards European standards of student-centred and practice-oriented training. In this transition, simulation is a change in educational culture. The methodological basis of the article is a narrative review on healthcare simulation. Simulation is defined as an educational methodology that creates a realistic clinical or professional situation for learning, practice, assessment, reflection and patient safety. The paper shows that simulation elements were present earlier in the form of anatomical models, phantoms, bedside demonstrations, clinical case analysis, and repeated training of manipulations before independent practice with patients. The novelty of contemporary simulation therefore lies in its structured design, learning objectives, technical infrastructure and quality assurance. The article describes the central idea of medical simulation, advantages and limitations, teaching requirements, and a step-by-step procedure for implementation in a medical university. Particular attention is paid to the training of medical teachers, many of whom are not ready to accept the new teaching rules. A table of basic components of teacher readiness for simulation-based teaching is proposed. The practical significance of the article consists in offering a structured framework that can be used for designing simulation scenarios in Ukrainian medical higher education institutions.

Key words: simulation-based medical education, medical teaching, Ukraine, clinical skills, debriefing, faculty development, patient safety.

Кучин Юрій, Бєлка Катерина, Лимар Леся. Симуляція як метод навчання медицини в Україні: чи такий це новий підхід?

У статті показано симуляція як метод медичної педагогіки в Україні крізь призму наступності й трансформації медичної освіти. Ключове питання статті: чи слід розглядати симуляцію в українській медичній освіті як цілком новий педагогічний метод або як осучаснений метод, що вже тривалий час застосовується у підготовці медиків. Актуальність теми зумовлена швидким розвитком симуляційних центрів, поширенням технології «віртуальний пацієнт», тренажерів для відпрацювання практичних навичок і манекенів, а також зростанням потреби в безпечному опануванні практичних навичок в умовах війни, гібридного навчання та обмеженого доступу студентів до клінічної практики.

У статті показано, що пострадянська модель медичної освіти традиційно була консервативною і викладач-центрованою, проте перехід до європейських стандартів студент-центрованого та практико-орієнтованого навчання передбачає зміну освітньої культури, проявом якої і є симуляція як метод навчання. Стаття містить результати описового огляду літератури із симуляційного навчання у сфері охорони здоров'я. Симуляцію

визначено як освітню методологію, що передбачає створення реалістичної клінічної або професійної ситуації з метою навчання, практичного відпрацювання навичок, оцінювання, рефлексії та забезпечення безпеки пацієнтів.

Аналіз літератури показав, що елементи симуляції існували раніше у формі анатомічних моделей, фантомів, демонстрацій біля ліжка пацієнта, аналізу клінічних випадків і багаторазового відпрацювання маніпуляцій перед їх самостійним виконанням під час роботи з пацієнтами. Отже, новизна сучасного симуляційного навчання полягає в його структурованому проєктуванні, визначених навчальних цілях, технічній інфраструктурі та системі забезпечення якості.

У статті розкрито основну ідею медичної симуляції, її переваги й обмеження, вимоги до викладання, а також покрокову процедуру впровадження симуляційного навчання в медичному університеті. Особливу увагу приділено підготовці викладачів медичних закладів вищої освіти, зазначено щодо неготовності деякої частки викладачів до запровадження симуляції як навчального методу, визначено основні компоненти такої готовності викладачів. Практичне значення статті полягає у розробленні структурованої рамкової моделі, яку можна використовувати для створення симуляційних сценаріїв у закладах вищої медичної освіти України.

Ключові слова: симуляційне медичне навчання, викладання в медицині, Україна, клінічні навички, дебрифінг, професійний розвиток викладачів, безпека пацієнтів.

Introduction. Simulation-based medical training is often associated with modern medical education. In recent years, Ukrainian medical universities have increasingly presented simulation laboratories, standardized patient programs and high-fidelity manikins as evidence that they are moving from a knowledge-reproductive model towards competence-based one, which requires clarification. Simulation is new in its current technological, organizational and standards-based form; but it is not entirely new as a medical pedagogical idea in Ukraine. Medical education has always depended on simulation and supervised approximation to real clinical practice.

The historical context of Ukrainian medical education is important for understanding this ambivalence. The post-Soviet model was largely conservative: it privileged the authority of the lecturer, extensive theoretical content, oral reproduction of knowledge and hierarchical clinical apprenticeship. Practical training existed, fragmented, dependent on the availability of clinical cases, and insufficiently protected, regarding the ethical problem of learning on real patients. Since 1991, and especially after Ukraine's alignment with European higher education principles, medical education has gradually moved towards competence-based curricula, quality assurance, academic integrity, and lifelong professional development. In this, simulation has become one of the key instruments for translating European medical educational standards into everyday teaching practice.

Simulation in healthcare should be regarded as the deliberate creation of a realistic situation in which learners can practice, make decisions, receive feedback and reflect without putting patients at unnecessary risk. It includes phantoms, anatomical models, standardized patients, role-play, computer-based scenarios, hybrid simulations. Thus, simulation represents a teaching-pedagogical component that includes needs design, facilitation, performance, debriefing, assessment and improvement of the next learning experience.

The elements of simulation have long been present in Ukrainian medical education. What is new today is the systematic design of these elements into a coherent educational method. The current challenge for Ukraine is to construct an educational culture in which simulation is used ethically and methodologically.

The aim of the article is to analyze simulation-based medical training in Ukraine as both an innovative and historically continuous approach; to define its central idea, key components, facilities, benefits and drawbacks; and to justify the need for systematic preparation of medical teachers for simulation-based teaching.

Materials and methods. This article is based on a narrative review, conceptual analysis and pedagogical reflection on the use of simulation-based learning in medical education. At the initial stage, approximately 50 sources were identified through searches in PubMed and complementary academic and professional sources, including Google Scholar, international standards on healthcare simulation, publications of professional associations, and Ukrainian sources relevant to medical education and teacher training. The search strategy included keywords and combinations such as medical simulation, healthcare simulation, patient safety, debriefing, reflective learning, faculty development, and medical teacher training, using Boolean operators such as AND to combine the main concepts.

After the initial screening, the sources were assessed according to their relevance. Sources that were only indirectly related to healthcare simulation, focused mainly on technical equipment without pedagogical analysis, or duplicated the content of more comprehensive publications were excluded. As a result, sixteen sources were selected for detailed analysis and synthesis.

The synthesis was conducted thematically and focused on several key questions: how simulation is defined in medical education; which elements distinguish contemporary simulation from earlier imitative forms of learning; what pedagogical conditions make simulation effective; what benefits and limitations should be considered by medical universities; and which competencies should be developed in teachers who design and conduct simulation-based learning. In addition to the literature review, the article draws on the teaching and organizational experience of the authors in medical pedagogy, postgraduate education, continuing professional development and teacher training. No empirical data from students, teachers or patients were collected; therefore, ethical approval was not required.

Review of literature. The review of appropriate sources demonstrates that medical simulation should not be reduced to the use of mannequins, phantoms or technical equipment. Gaba [1] conceptualized simulation as a patient safety technology and as a tool for redesigning system performance. This view is important because it shifts the discussion from simulation as an "educational accessory" to simulation as part of a safer healthcare. Similarly, Ziv et al. [3] emphasized the ethical dimension of simulation, as here medical education reduces avoidable harm to patients. A major analytical conclusion from the reviewed sources is that the effectiveness of simulation depends less on the technical sophistication of equipment and more on training (or pedagogical, the term widely used in Ukraine) design. Issenberg et al. [2] showed that high-fidelity simulation becomes effective when it includes feedback, repetitive practice and a controlled learning environment. This finding is further developed by Motola et al. [7], who underlined that simulation must be aligned with learning objectives. Thus, fidelity alone is not a guarantee of quality. A high-fidelity simulator without a well-designed scenario may remain only expensive equipment.

The review also shows that contemporary simulation differs from earlier imitative forms of medical training by its systematic structure. Traditional medical education has long used elements of imitation, such as demonstrations. However, contemporary simulation-based education is distinguished by intentional scenario design, prebriefing, facilitation, debriefing, and assessment. The Healthcare Simulation Dictionary [11] and authors [12–14] define simulation as a planned educational experience. This terminological and procedural clarity is particularly relevant for Ukrainian medical universities, where international standards are being adapted to local conditions.

Another important theme is the relationship between simulation and measurable educational outcomes. Okuda et al. [4] demonstrated that simulation may be effective across undergraduate, postgraduate and continuing medical education when it is aligned with objectives and assessment. McGaghie et al. [5] emphasized outcome measurement as central principle of simulation-based education. Cook et al. [6], in their systematic review and meta-analysis, confirmed that technology-enhanced simulation can improve knowledge, skills and behaviors. At the same time, these findings show that simulation must be assessed according to its influence on clinical reasoning and readiness for real practice.

Debriefing is presented in the literature as one of the main mechanisms that transforms simulation from activity into learning. Fanning and Gaba [9] argued that reflection after simulated experience is central to learning. Rudolph et al. [8] developed the concept of "debriefing with good judgment," which combines respect for learners with analysis of their decisions. Eppich and Cheng [10] proposed the PEARLS framework, which offers a structured approach to debriefing through learner self-assessment, facilitation and feedback.

For Ukrainian medical education, the literature has particular significance because simulation should be understood both as continuity and as innovation. On the one hand, as the Ukrainian context shows, medical education has never been completely separated from simulation: students have traditionally practiced on anatomical models, phantoms, and supervised practical exercises. On the other hand, the modern concept of simulation described by Gaba [1], Issenberg et al. [2], McGaghie et al. [5] and the INACSL standards [12–14] is more complex. Therefore, the novelty of contemporary simulation is in its transformation into a structured, evidence-informed and competency-oriented educational system.

A separate issue concerns the readiness of medical teachers to work within this system. Kuchyn and Lymar [15] argued that modern medical teachers need cognitive-practical, methodological, leadership, digital, interactive and communicative competencies. This is directly relevant to simulation. Elendu et al. [16] also emphasized that simulation improves overall skills of the students and patient safety, but its implementation may be limited by cost and faculty readiness. Therefore, teacher training becomes a central requirement for meaningful simulation-based education.

So, the reviewed literature suggests that simulation-based medical education should be interpreted as a bridge between theoretical knowledge and clinical practice [17], between professional training and patient safety, and between traditional teaching and competency-based education. For Ukrainian medical universities, the key challenge is therefore to create a simulation culture based on curriculum integration, faculty development, and continuous quality improvement.

Results and discussion. The central idea of medical simulation is a supervised approximation to clinical reality. The students are placed in a situation close to professional practice to develop their clinical reasoning, technical performance and teamwork, safe enough to let for errors and reflection. In this sense, simulation is a safe bridge between theory and real patient care. Medical simulation method has numerous advantages and several drawbacks, which, however, could be turned into benefits, if managed appropriately (see fig. 1).

The approach is sometimes portrayed as entirely new because modern simulation centers are technologically advanced. However, the deeper pedagogical principle is older: students learn better when they can practice action. A well-designed simulation is an educational event with a clearly defined purpose and expected outcomes.

For Ukraine, this distinction is important. If simulation is understood as a training method, it can transform the relationship between teacher, learner and patient, where the teacher becomes a designer of experience, and the student becomes an active participant who must make decisions, act and analyze their own performance.

A simulation program requires several interdependent components (see fig. 2). The first is educational design: needs assessment, learning outcomes, scenario objectives and integration into the curriculum. The second is the simulation modality: task trainer, standardized patient, computer-based case, virtual patient, hybrid simulation, high-fidelity manikin or team scenario. The third is facilitation: the way the teacher introduces the scenario, manages learner participation and maintains a psychologically safe environment. The fourth is debriefing and feedback, where experience is transformed into learning. The fifth is assessment and quality assurance, including checklists, rubrics, reflective tasks, learner feedback and revision of scenarios.

The simulation facilities should correspond to educational purpose. A basic skills laboratory may include procedure trainers, injection pads, venipuncture arms, airway trainers, suturing models, obstetric and surgical phantoms, ultrasound training devices and resuscitation equipment.

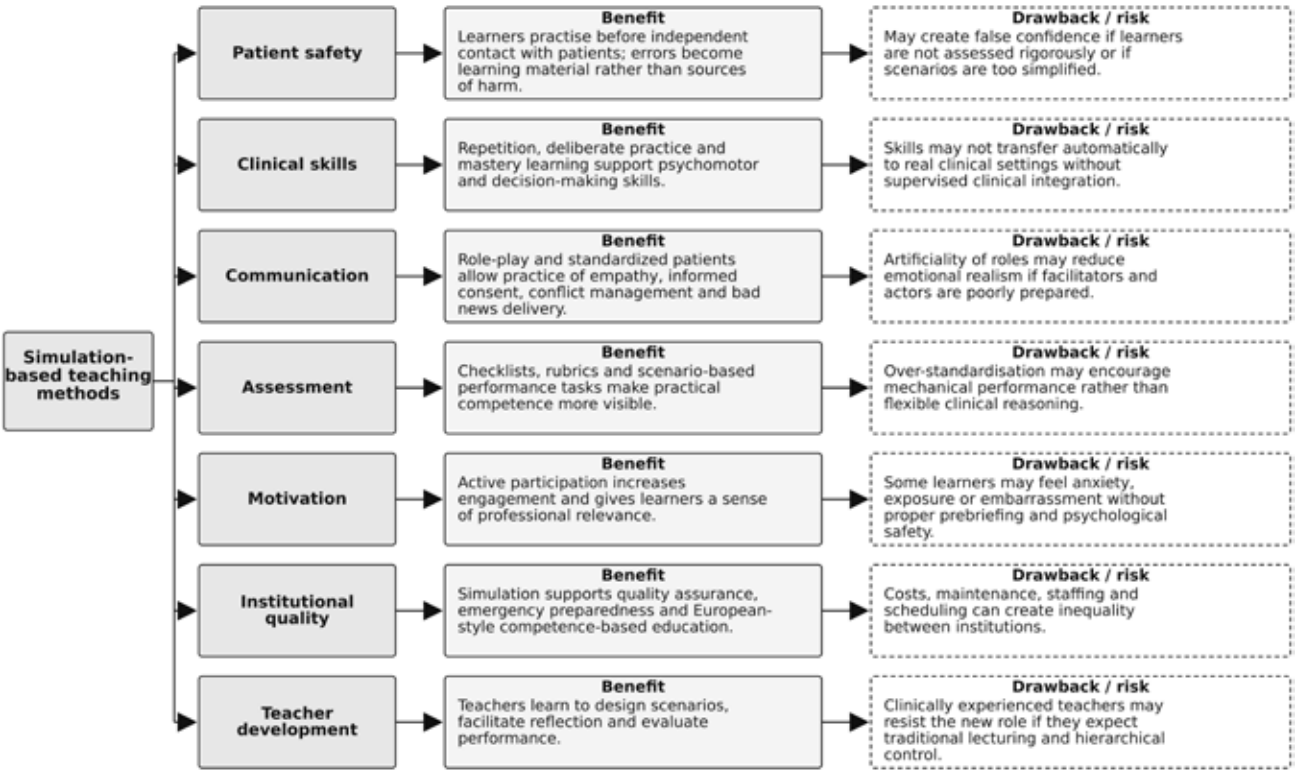

Fig. 1. Benefits and drawbacks of simulation-based teaching methods

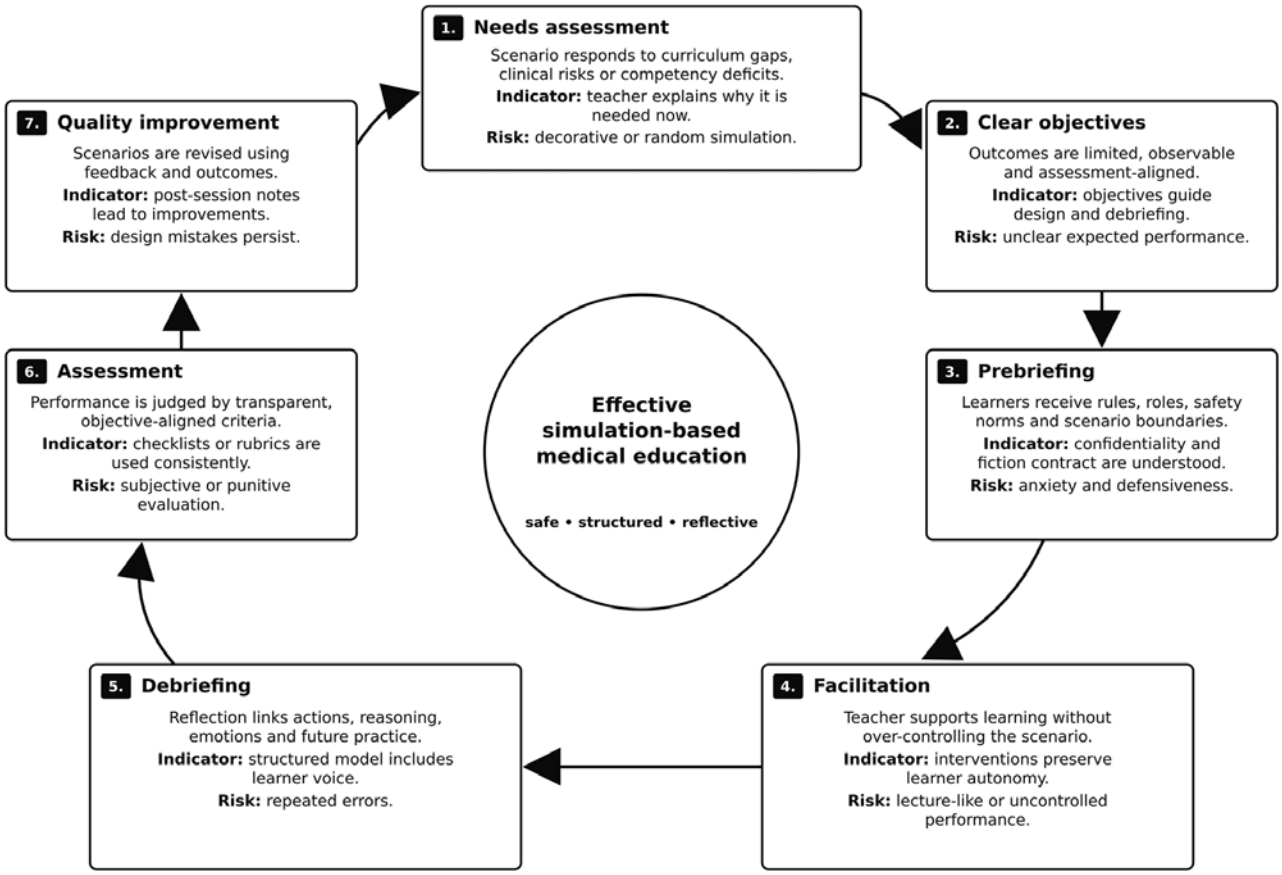

Fig. 2. Stages for effective simulation-based medical education class

A higher-level simulation center may include hospital-like rooms, audiovisual recording, standardized patient spaces, communication rooms and interprofessional team training areas. Yet even a modest facility can support effective simulation if objectives, facilitation and debriefing are strong.

Teaching requirements for simulation. Simulation-based teaching imposes specific requirements on curriculum designers and teachers. The scenario must answer a real educational need; objectives must be measurable; learners must understand the rules of participation; debriefing must be planned as an essential learning phase; and assessment must be transparent.

This predisposes for the extensive teacher training. Traditional medical teachers are often poorly competent simulation facilitators. Simulation changes the classroom contract. The teacher allows learners to act, observe consequences, and analyze mistakes. For some teachers this may feel like a loss of authority. That's why introducing simulation should be an institutional practice.

Procedure of implementing simulation in a medical university. Implementation should be gradual. Many institutions begin by purchasing equipment without proper teacher training. A more effective strategy begins with curriculum mapping. The university first determines which competencies are difficult to form: emergency algorithms, invasive procedures, communication with difficult patients, triage, error disclosure or crisis resource management. Then appropriate simulation modalities are selected. The next stage is scenario writing and teacher training. Only after this should the session be piloted, evaluated and scaled.

In the Ukrainian context, implementation also needs flexibility due to the war-related circumstances which require hybrid and modular formats. However, the methodological cycle remains the same: diagnosis of problem, scenario design, resources analysis, faculty preparation, piloting, integration, assessment and improvement (see fig. 3). The presented scheme of a methodological cycle contains these stages with their key questions and main problems which a teacher should solve.

Training of medical teachers for simulation-based teaching. A teacher who is used to a lecture format may find it difficult to allow learners to act before receiving the correct answer. A clinician accustomed to direct supervision may interrupt too early. An examiner accustomed to punitive assessment may turn debriefing into public criticism.

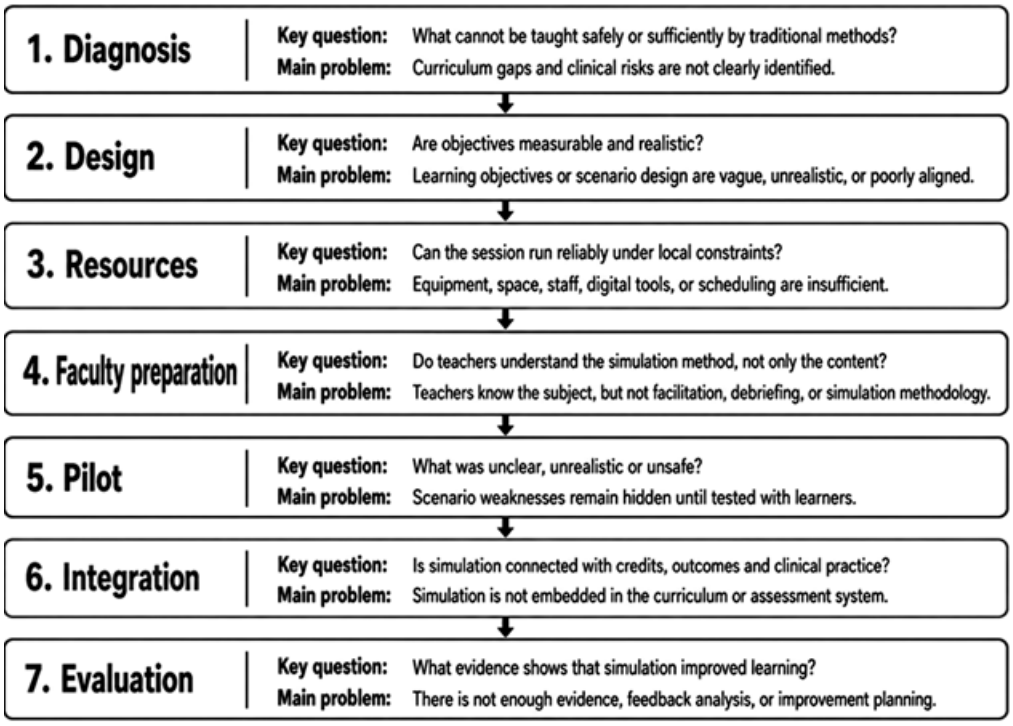

Fig. 3. Procedure for implementing simulation-based training

Therefore, faculty development makes a condition of safe and effective simulation.

The structure of teachers' readiness for implementing simulation in a medical classroom includes conceptual, methodological, clinical-practical, facilitation, debriefing, digital, assessment and reflective components, represented in tab.1. All these components must be equally developed to provide for a high quality of the medical education. Hence, teacher training should include at least four levels.

The first is conceptual: teachers must understand what simulation is and what it is not. The second is design-based: teachers must learn to write the simulation manuscripts with scenarios, objectives, and assessment criteria. The third is facilitative: teachers must practise pre-briefing, observation, questioning, debriefing and feedback, new for the Ukrainian medical education. The fourth is reflective and ethical, which includes creating a protective learning environment.

Is simulation as new as it is portrayed?

The answer depends on the level of analysis. At the level of educational philosophy, simulation is not new: medicine has always used models, imitation, rehearsal and supervised approximation to practice. At the level of technology and educational culture, simulation is relatively new for many Ukrainian institutions.

The risk of over-portraying simulation as new is that institutions may ignore their own teaching heritage. "Classical" teachers may feel that their work is being replaced by fashionable terminology. However, modern simulation does not devalue earlier teaching methods; it enriches and assesses them. This continuity is especially important in Ukraine, where medical education has to modernize under conditions of war, limited resources and rapid digital transformation.

Therefore, simulation should be framed as a stage in the globalization and professionalization of Ukrainian medical education, and its successful implementation depends less on the novelty of equipment and more on the readiness of teachers and institutions.

Conclusions. Simulation-based medical training in Ukraine should be understood as both innovation and continuity. The central value of simulation is safe, purposeful and reflective approximation to clinical reality. It allows learners to practice technical, cognitive, communicative and team skills before full responsibility for patient care. At the same time, simulation has limitations: cost, teacher resistance, and risk of formalism.

For Ukrainian medical education, the priority is wider than to create simulation centers. It is to train a new generation of medical teachers who can work in simulation. Institutional faculty development should become a compulsory element of simulation implementation. Further research should include empirical studies of teacher readiness for simulation-based teaching in Ukrainian medical universities, comparative evaluation of different simulation

Table 1

Basic components of teacher readiness for simulation-based medical teaching

№	Component	Necessary knowledge and skills of a medical teacher	Training activity
1	Conceptual	Types of simulation, fidelity, scenario structure and patient safety.	Introductory seminar with examples of low-, medium- and high-fidelity simulation.
2	Methodological	Learning outcomes, curriculum alignment, Bloom's taxonomy, competence-based assessment. Assigning measurable objectives and aligning tasks with assessment.	Workshop on scenario blueprinting.
3	Clinical-practical	Clinical algorithms, standards of care, typical errors and risk points. Designing clinically accurate and level-appropriate cases.	Case-writing with clinical peer review.
4	Facilitation	Principles of prebriefing, psychological safety, learner autonomy. Opening the session, assigning roles and supporting participation.	Microteaching and observed facilitation.
5	Debriefing	Models of debriefing, inquiry, feedback literacy. Conducting reflective discussion.	Video-based debriefing practice.
6	Assessment	Checklists, global rating scales, formative and summative evaluation. Evaluating performance fairly and providing evidence-based feedback.	Assessment session.
7	Digital	Virtual patients, online simulation, audiovisual recording, data protection. Using digital tools for hybrid simulation and feedback.	Training on virtual patient platforms and recording systems.
8	Reflective-ethical	Ethics of simulation, confidentiality, emotional safety and non-punitive error analysis. Managing learner emotions.	Reflective journaling and peer feedback.

modalities and development of national faculty development programs aligned with international standards and Ukrainian educational realities.

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