

Simulation Training as a Method of Modern Technologies in Medical Practice of Students of Medical Higher Education Institutions

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ANNOTATION

To determine the effectiveness of the use of training simulators in the process of preparing students of a medical institute for practice, a study was carried out in two groups. Reliable results were obtained in students enrolled in the Clinical Skills Training Laboratory (simulation center) who performed practical skills more than three times on simulators - artificial respiration, airway patency restoration, pulse counting, auscultation of the heart, blood pressure measurement, closed heart massage up to 65, 7%, as well as Fibrogastroduodenoscopy, setting a cleansing enema, bladder catheterization, digital rectal examination - 52.5%, and self-confidence in performing cardiopulmonary resuscitation was assessed - 38.2%.

The use of phantoms, dummies, and dummies in the educational process has a greater effect than just a lecture format of training and does not pose a risk to human life.

KEYWORDS: *simulation training, simulator, practice, modern technologies.*

Introduction. Simulation training - as a mandatory component in vocational training, is the development and improvement of technical and non-technical skills and abilities using a realistic model: biological, mechanical, electronic, virtual, or hybrid (8,9). In the case of the correct functioning of the simulation training system, all its participants will achieve their own goals (3).

The system of training domestic health care personnel is undergoing significant changes today. The acquisition of professional skills by trial and error at the bedside of the patient inevitably puts his life and health at risk. For this reason, at present, there are fewer and fewer patients who are ready to take a passive part in the educational process, and simulation technologies come to the fore, with the help of which communication skills, diagnostic techniques, and algorithms for actions in unforeseen and emergencies are mastered. Basic and advanced skills, skills in internal medicine, surgery, obstetrics, gynecology, urology, and many other medical specialties with a practical component, team interaction training are conducted (10). Training in the simulation center is rapidly transforming from a little-known original educational technology, as it was only ten years ago, into a leading teaching and assessment method, becoming a separate medical education industry, and simulation centers - into a unique division of medical higher education institutions, with which the student, and then the medical specialist are firmly connected from the very first year of their professional development - and for life.

It must be recognized that at present, most teachers of medical universities consider the use of simulators and training simulators to be a desirable stage in the preparation of a doctor. Since the use of these methods in medical educational practice eliminates some of the problems that arise during the mastery of practical skills. At the same time, some authors point out that not a single most modern computer simulator can and will never replace work at the patient's bedside, independently

performing new manipulations under the supervision of an experienced specialist. The significance and obligation of this stage of training - "from hand to hand" - is undeniable. However, the well-established opinion that one can acquire medical skills only in the course of independent work at the patient's bedside sharply contradicts the world and domestic statistics of medical errors committed by young specialists (4,5,7). There is a contradiction between the traditional approach to teaching students practical skills and the reports of some authors about the advisability of using modern training simulators for these purposes, which determines the relevance of studying the possibilities of using training simulators to form the relevant professional competencies (1,2,3).

The purpose of the study was to determine the effectiveness of the use of training simulators in the formation of professional competencies in medical students in the process of preparing them for practice.

Materials and methods. The object of the study is the learning process on the subject of propaedeutics of internal diseases, and practical skills in the Laboratory for teaching clinical skills (simulation center) of the Bukhara Medical Institute, where training simulators, phantoms, and dummies are concentrated on relevant topics.

To achieve the goal and test the hypothesis, the following tasks were formulated:

1. To prove the efficiency and effectiveness of the formation of professional competence of a future medical specialist when using modern training simulators in the process of teaching practical skills.
2. To prove the expediency of multiple exercises in the formation of students' automatism in the implementation of practical skills, increasing professional competencies. Questioning of students was used as one of the research methods, with the help of which they assessed their knowledge and skills before and after classes in the Laboratory for teaching clinical skills on a ten-point scale. The results were compared using the Wilcoxon signed-rank test with a statistical significance of $p < 0.001$. The experiment involved 108 students of the medical, medical-pedagogical, and pediatric faculties of the Bukhara State Medical Institute named after Abu Ali ibn Sina, who was trained at the Department of Propaedeutics of Internal Diseases during the 2019-2021 academic year. All students were trained in the following skills: a) counting of respiratory movements; b) auscultation of breath sounds on a mannequin; c) pleural puncture; d) performing peak flowmetry; e) performing artificial respiration; f) restoration of airway patency, g) counting the pulse; h) technique for performing auscultation of the heart; i) measurement of blood pressure; j) closed heart massage, j) probing of the stomach, k) administering a cleansing enema, m) catheterization of the bladder of a man and a woman, m) digital examination of the rectum; o) palpation of the thyroid gland. The students were then divided into two groups. Participants were included in the study in representative groups according to their level of knowledge and topics of study. In the first group, the skills were performed twice, and in the second group - more than three times.

Results and discussions. The first subgroup of students was trained on simulators with varying degrees of certainty, the other subgroup, under the guidance of teachers, was trained on patients, on each other, or the traditional training format was used. Students studying on simulators according to the criterion of "own assessment of effectiveness" mastered the following skills: counting respiratory movements, auscultation of respiratory sounds, performing pleural puncture, peak flowmetry, performing artificial respiration, restoring airway patency, counting the pulse, the technique of performing auscultation of the heart, measuring blood pressure, closed heart massage, gastric probing, cleansing enema, bladder catheterization for men and women, digital examination of the rectum, palpation of the thyroid gland. The obtained results of the study participants on the implementation of practical skills of both groups were compared. In the first group, where students had the opportunity to perform one-time practical skills on simulators and were trained in traditional

ways, inaccurate results were obtained in the performance of skills. Students were unable to demonstrate satisfaction and ability to perform these skills. The participants in this group showed the following results - in performing artificial respiration, restoring airway patency, counting the pulse, the technique of performing auscultation of the heart, measuring blood pressure, closed heart massage of 15.7%, as well as probing the stomach, setting a cleansing enema, catheterization of the bladder of men and women, digital examination of the rectum - 22.5%, and self-confidence in performing cardiopulmonary resuscitation - 16.7%.

In the second group, where students practiced on simulators more than three times, they showed higher satisfaction and confidence in the performance of skills. More reliable results were obtained in performing artificial respiration, restoring airway patency, counting the pulse, the technique of performing auscultation of the heart, measuring blood pressure, closed heart massage of 65.7%, as well as probing the stomach, setting a cleansing enema, catheterization of the bladder of men and women, digital examination of the rectum - 52.5%, and self-confidence in performing cardiopulmonary resuscitation - 38.2%.

The questionnaire also included a question about the advisability of using training simulators to prepare students for practical activities.

The analysis of the results of the study showed a significant improvement in the knowledge and skills of students who were trained using training simulators for all the studied manipulations. At the same time, the most significant dynamics were observed in the group of students with whom more than three classes were held. When asked about the advisability of using training simulators in preparing students for professional activities, 100% of the respondents answered positively.

To assess the competence of second-year students in mastering the above skills, we developed a questionnaire that consisted of 6 parts: the first included an assessment of skills: counting respiratory movements, auscultation of respiratory sounds, performing pleural puncture, peak flowmetry, performing artificial respiration, restoring airway patency, counting heart rate, cardiac auscultation technique, blood pressure measurement, closed heart massage, gastric sounding, cleansing enema, male and female bladder catheterization, digital examination of the rectum, thyroid palpation, second: assessment of the time to master practical skills in the Simulation Center, third : assessment of the effectiveness of staying in the Laboratory for teaching clinical skills and practicing practical skills on phantoms and dummies, fourth: assessment of skills for practicing each skill to automatism, fifth: students' opinion on the effectiveness of simulators with different degree of certainty, and the last sixth part of the questionnaire included suggestions for improving the educational process. In our study, students' confidence and the quality of acquired skills and abilities directly depended on the time spent in the Clinical Skills Training Laboratory - 61.4% of cases, students were in the simulation center for more than 10 days. Lack of confidence in achieving the required level of competencies was noted by 21.2% of students.

In participants of the study, who practiced practical skills in the therapeutic departments of the hospital in traditional ways, only 36.5% of cases mastered the skills and 12.3% of the students mastered the technique of performing skills. At the same time, the following shortcomings were identified: students' fear of patients, lack of communication skills communicating with patients, patient dissatisfaction, lack of time to practice each skill, limited admission of students to treatment rooms, psychological fear of performing the procedure, high risk to the patient's health. The majority (84.2%) of the second-year students participating in this study rated the experience of using the simulators as useful, regardless of whether the simulations were of low or medium confidence. According to the students, the use of phantoms, dummies, and mannequins in the educational process has a greater effect than just a lecture format. The study also evaluated the effectiveness of each

component of the exercise separately and the use of debriefing after it. 94% of the participants agreed that debriefing the results was the most effective component of the exercise.

The final stage of this study was the answers of students and teachers to the question of whether training on simulators can be applied in real practice. At the same time, in 100% of cases, teachers answered that the acquired skills would be useful during real practice, but less than half of the students participating in the study agreed with this.

Thus, the effective use of simulators with varying degrees of realism is a valuable learning tool, as they provide an opportunity to acquire knowledge in a realistic environment without risk to the health and life of the patient.

Conclusion

1. The results of the study confirm the expediency of using training simulators and simulator mannequins in the process of developing professional competence among students of medical institutes.
2. To increase the effectiveness of teaching practical skills, it is necessary to repeat skills repeatedly using training simulators more than three times, until it is automatically performed.
3. The use of training simulators contributes to the formation of professional competencies necessary for the effective completion of industrial practice.

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