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S.A. Bulatov

*Kazan State Medical University, Kazan, Republic of Tatarstan, Russia, [boulatov@rambler.ru](mailto:boulatov@rambler.ru)*

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## **SIMULATION TECHNOLOGIES IN THE COMPETENCY-BASED APPROACH OF MASTERING THE PRACTICAL SKILLS OF A DOCTOR**

**S.A. Bulatov**, M.D, Professor, Head of the Department of Simulation Methods of Education in Medicine of the Kazan State Medical University, Kazan, Republic of Tatarstan, Russia.  
Contacts: 79173902302, boulatov@rambler.ru

### **ABSTRACT**

**Objectives.** The work presents discussion and analysis of the applied simulation methods for teaching students to the practical skills. The role of the university center in the organization of a learner-centered pedagogical approach in the educational process is noted. **Material and methods.** For significant improvement of teaching quality of medical disciplines, the method of simulation training basing on the technique a "standardized patient" was applied in the Kazan State Medical University since 2004 as the basis of a separate training course for students of the 4rd and 5th courses of medical and pediatric faculties. **Results and discussion.** The method of training with the use of "standardized patient" technique forced the student to activate his memory, to integrate all methods of working with the patient, and to apply them in a specific situation. The analysis was carried out on the effectiveness of the "standardized patient" methodology both as educational and examinational methods. **Conclusion.** The technique "standardized patient" should be accepted as one of the effective simulation methods of training, which allows students to show their competence and creativity in resolving situational problems, to develop communicational skills with the patient, to form the necessary algorithm of actions in work with the real patient. **Key-words:** learner-centered approach, a "standardized patient" methodology, communication skills, center for simulation training methods.

### **Introduction.**

**Background.** The Russian higher medical educational system has seriously changed in recent years. As the main pedagogical paradigm, a vector of development is adopted, aimed at a learner-centered approach in students training [1.3]. It implies that the main figure of the educational process should be the student himself as well as the individual approach to the educational process of providing knowledge, competence and skills [5]. On the other hand, the new FSES

and the long-expected professional standards of medical specialties created a need for rapid transformation of the educational process for the medical educational institutions in the spirit of time. But what is relevant, that the main task is to train highly qualified specialists for higher medical education in these new conditions. The requirements for the educational process also changed - first of all, it concerns the enhancement of the role of future doctors practical training. Mastering the practical competences of the profession became the general objective of the educational process. There is no single solution for realization of this matter, so each university is looking for its own way.

One of the popular directions is the development of simulation training. The advantages of simulator training are obvious: the learner can spend the time he needs personally, and repeat many times a manipulation to develop automatism. Besides, there is a psychological comfort, so one cannot be afraid to harm with his actions. This can explain the creation of educational and training centers at the educational institutions. The development of simulation technologies and the progress of technical solutions contribute to the complication and expansion of the functions of mannequins, which allows to use them in the post-graduate stage of education. Training process of students became a mandatory component of the educational programs. In its turn, a powerful incentive appeared for development of industry for the manufacturers of simulators, that led to the production of a variety of mechanical, electronic, virtual simulators, meeting various tasks in the training process.

Today the supply market of training simulator equipment greatly exceeds demand. However, with all the variety of supplies, unfortunately, there is also a trend of non-justified complication and rise in prices of produced goods. The example is a five-to-seven-fold increase in prices over the past 10 years for simulators for the first aid training, mastering of a nurse and an ambulance nurse. It can be agreed that this group of equipment is designed to train students in primary courses. However, the next group of simulation equipment is formed by more integrated complexes - robots and simulators, designed to work out techniques of endosurgical interventions, operative gynecology, carrying out anesthesia and others. These simulators are designed to increase the professional level of skills of specialists at the postgraduate stage. Their using in the educational process with students is very limited, and is provided only on the 6th course of the study.

Thus, a certain "thematic" gap appeared between these two groups of simulator equipment. We analyzed the qualitative and quantitative composition of the simulation equipment in the Kazan State Medical University. At the beginning of 2019, there were 165 units of various training simulator complexes on the

balance (Fig.1). Of these, there were 63 (38.4%) units focused on providing first aid and patient care, 55 (33.6%) units on training in the skills of nurse and medical assistant, 39 (23.8%) units on high-tech for professional development, and 8 (4.9%) units on training the skills of the patient physical examination.

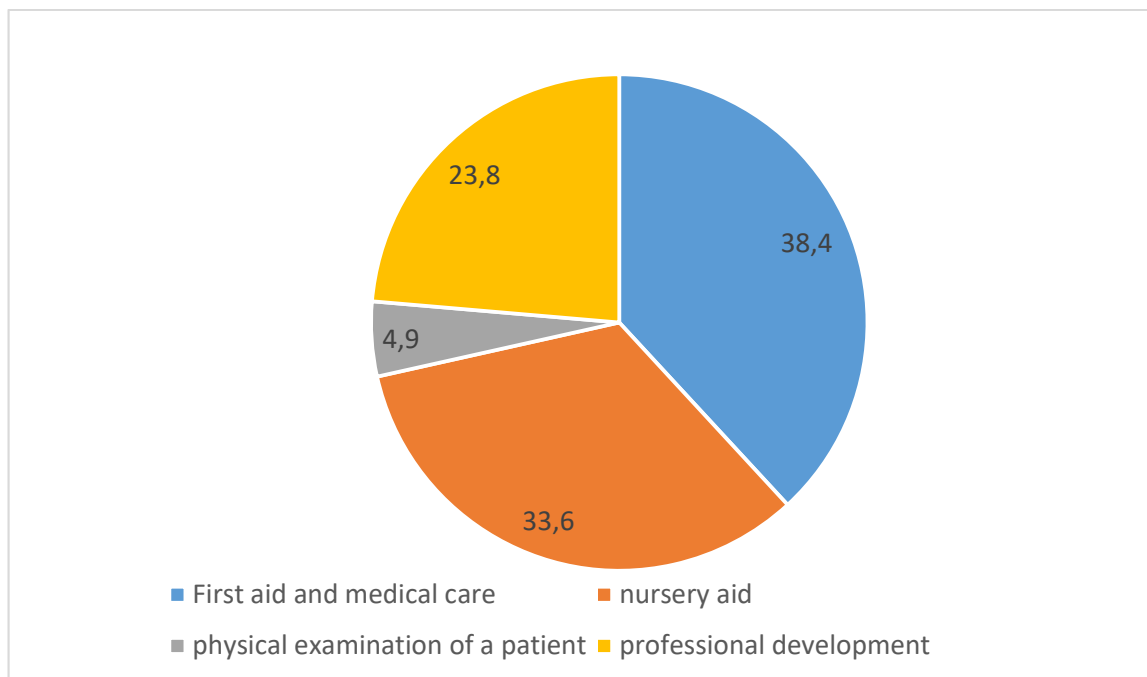


Fig.1. Qualitative and quantitative composition of simulation equipment of the Center of Practical Skills at the Kazan State Medical University (January, 2019)

As it is seen from the presented diagram, the smallest group of simulators (4.9%!) was the one intended for training of medical skills in medial training courses. But precisely in the period from 3 to 5 courses students intensively study basic clinical disciplines, form approaches stereotype to diseases treatment, comprehend the skills of communication with the patient. In other words, the formation of the future specialist is carried out during this period. And as far as this basis of knowledge and skills is strong and without defects, so qualitative will be the efficiency.

**Material and methods.** Most number of modern researchers note that the quality of student training depends directly on the time spent at the clinic, on the number of methods learned and the variety of clinical situations that the student saw and "experienced through himself." Meanwhile, the modern realities of students' state in the clinic suggest an increasing distance between the student and the real patient. And that minimum of time given for the clinical discipline to work with the patient during the class, is distributed by the teacher among all students of the academic group. Therefore, it is often possible to meet the opinion of graduates on insufficient practical training in the clinical departments in social networks. One

of the solutions, in our opinion, to significantly improve the quality of teaching of medical disciplines in medical courses is simulation training at the university training center basing on the method "a standardized patient" [2.6]. The point of the method is quite simple - instead of a real patient, the student deals with a specially trained actor and solves the presented medical case with the available potential of his knowledge, skills and competence.

Simplicity, accessibility and objectivity of this method provided its wide popularity in the world [7] and allowed to use as an examinational assessment of practical skills of the specialist. The example is the stage testing of professional skills when passing the examination for obtaining a medical license in the USA (USMLE). Unfortunately, in Russia there is an ambiguous attitude to this method. Many leading clinicians are skeptical to the idea of replacing the real patient with the actor during the training process. Their logic is clear - no actor will truthfully play a role of really ill patient. It is impossible to disagree with this statement, but the fact is that the "standardized patient" method is designed to solve very different problems.

A case: a person lies on the bed and moans in pain. The task is to provide qualified medical care to the patient. For the solution the student is given the opportunity to use all his practical skills obtained during the educational process and to realize it independently alone with the patient: to establish contact, to make up disease history, to carry out an objective examination, to formulate a preliminary diagnosis, to determine the list of necessary laboratory and instrumental research and to outline a treatment plan. Thus, the "standardized patient" method makes it possible to collect and evaluate competently the knowledge and skills acquired in clinical departments. Since 2004 this method was applied in the Kazan State Medical University as the basis of a separate training course for students of 4 and 5 courses of medical and pediatric faculties.

**Results and discussion.** Mandatory conditions have been worked out to achieve the best results. The first condition was the individual work of the student with the actor. So-called active method of training was a pedagogical technique, forcing a student to activate his memory, to apply together all methods of working with the patient, and to apply them in a specific situation. According to the survey, it was established that for most of the 4th course students, it was the first independent work with the patient in the role of a doctor. The second condition for effective use of the "standardized patient" method was discussion of case results and error analysis (debriefing). The staged analysis of the actions performed by the student, carried out by the teacher in the form of a private conversation, with the analysis of his errors, allowed the student to understand his omissions and draw the

correct conclusions. The third condition was documentation of each stage of the student's work. To date, the standard of reporting documentation is two-position video recording and standard checklists. It is very important to emphasize that this method allowed to estimate the results of the student's work not only by the final outcomes (clinical diagnosis and case management plan), but also by the demonstrated skills in the field of history collection, objective examination, knowledge of medical documentation and communication skills. The objectivity of the assessment was achieved by the system of cross-monitoring of all participants of the process. Thus, the method of "standardized patient" was intended to train and provide necessary skills in collection of history, objective examination of the patient, formulation of diagnosis and standard methods of communication with the patient. The situational task itself, played by the actor, was not intended to illustrate the clinical picture of a disease, but served only as the general theme of communication between the actor and the student. This is the answer to the question that medicine cannot be studied on the base of an actor play. The methodology and the case were intended to provide the student with techniques of working with the real patient and to give the necessary practice in building relationships. As a student research work, the study on the practical value of the "standardized patient" methodology through the students' experience was conducted in 2017. The respondents were 230 students of the Medical Faculty of the 5th course of the Kazan SMU. The results are presented in Fig.2.

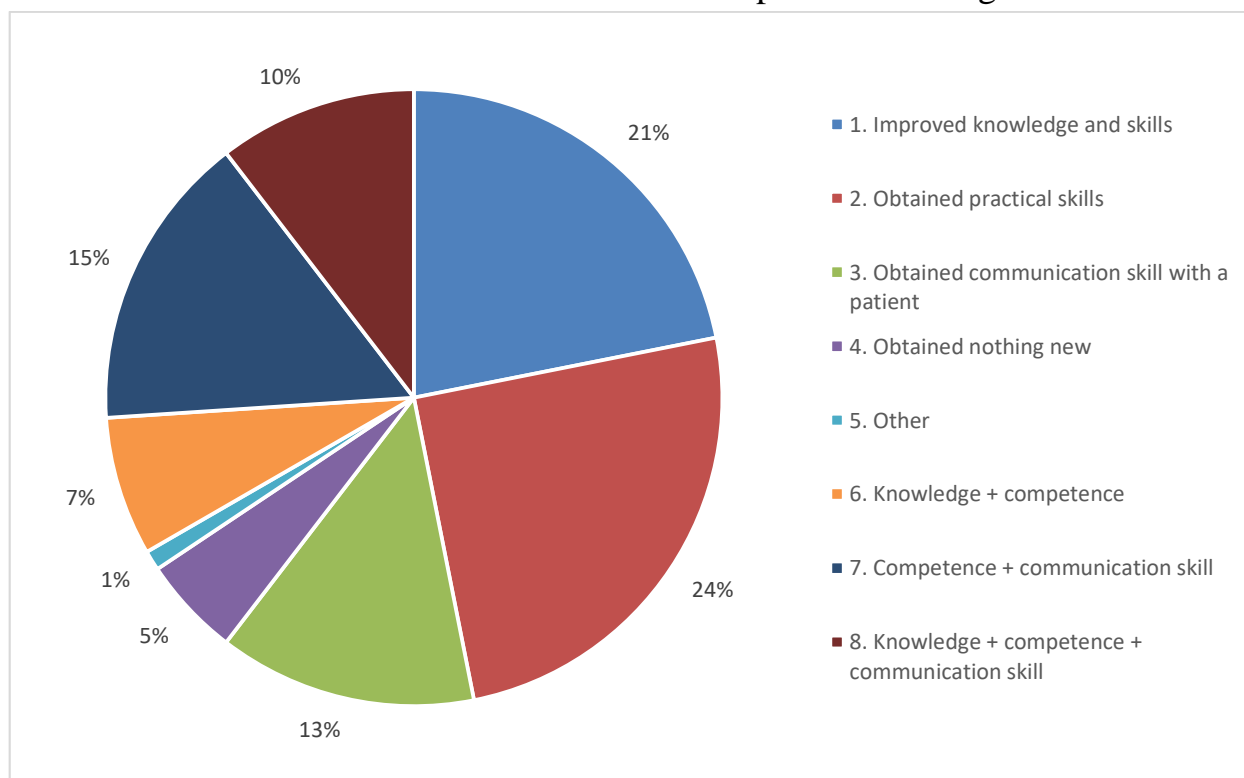




Fig. 2. The question was “What have you obtained by completing the “standardized patient” cycle?”

As it is seen from the Fig.2, the total number of positive replies made 94%. The majority of respondents noted "obtained practical skills" - 24%, "improved knowledge" - 21%, "skills + communication experience" - 15%, "acquired experience of communication with the patient" - 13%.

In recent years, the "standardized patient" method received three different vectors of development in the Kazan SMU. It means that in response to the urgent needs of training, it has the opportunity to emphasize certain components of the doctor's work, directing the student 's actions to the solution of the specific task. So the characteristics of each of these directions are given in short:

- the first group of tasks was called "Training Case." It simulated the situation of patient admission to the clinic and provided the following scope of work for the student: collection of history, objective examination, formulation of preliminary diagnosis, preparation of a plan for laboratory and instrumental researches. The actor described and demonstrated a clinical picture of a particular disease. The student had 45 minutes to work with the patient, 15 minutes to complete the medical records and 15 minutes for the case defense with the teacher. The "training case" was designed for students of the 4rd courses. During one class, the student had enough time to work with two patients;

- the next situational task named "Difficult Patient" was used for students of the 5th courses. In fact, those were a complicated version of training cases, but the tasks which should be solved by the students were more diversified: the patient had, as a rule, several associated diseases (differential diagnostics); requested laboratory analyses and instrumental research data were provided immediately, but only actual data (ability to read and analyze laboratory data); the formulation of a detailed clinical diagnosis and the preparation of the treatment plan was required. Another feature of the case "Difficult Patient" was the presence of a difficult psychological situation. During the examination the actor demonstrated negativity towards the “doctor”, aggressiveness, irritability, constantly calling on the mobile phone, and etc. The student – “doctor”, alongside with resolving the patient 's "medical issue", had to use a number of psychological techniques to make a contact during personal communication. The actor playing the role of the patient could improvise, vary by secondary details within the framework of the created psychological portrait of the patient. As a rule, the solution of such cases took about 2 hours.

The third type of situational tasks was "Examinational Case." This type of case is widely used worldwide for testing the practical skills of professionals in

various types of accreditation and certification examinations. The main distinctive feature is an integrated approach in the provision of medical care for a limited period of time working with the patient. As a rule, those were various situations connected with the patient's seek to the polyclinic for medical care. The actor presented complaints and showed a certain symptom complex, associated with some psychological portrait. The task of the student was to make up the history (emphasis on the local pathology), carry out objective examination (local), resolve the psychological problem (if any), study the data of laboratory and instrumental studies of the patient and accept a tactical decision on the further plan of examination and treatment. 15 minutes were given for the examination case and 8 minutes to complete the documentation. The student was invited to solve 4-6 cases on end at a certain time. To date, this type of situational task is considered as an optional class for students of the 6<sup>th</sup> course within the preparation for the accreditation examinations.

### **Conclusion**

Summarizing the above stated, it should be noted that modern simulation technologies applied in the medical educational institutions provide a wide use of simulators of varying degrees of realism and complexity. However, not all issues of mastering practical skills of medical competence can be realized with the help of mannequins.

In terms of the competence-based approach to teaching practical skills of the future profession, the students need a closer and longer contact with the real patient in clinical conditions. The technique "standardized patient" should be accepted as one of the effective simulation methods of training, which allows students to show their competence and creativity in resolving situational problems, to develop communicational skills with the patient, to form the necessary algorithm of actions in work with the real patient.

The described method fully coincides with the concept of the learner-centered approach in the training of the medical specialist and allows students to realize and implement personality development programs.

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