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**MASTERING PROFESSIONAL COMPETENCIES WITH USE OF SIMULATION-BASED TRAINING BY 6<sup>th</sup> YEAR MEDICAL STUDENTS (RATIONALE, CLASS CONDUCTING METHODOLOGY, ANALYSIS)**

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The ultimate goal of current system of higher medical education in Ukraine is to develop the proper professional competencies in future doctors. However, the basic qualification deficit and insufficient level of practical skills formation among medical students and novice doctors are constant problems [1-3], and searching for ways of their solution remains relevant. One of them could be introducing a simulation-based training in teaching process, because it was proved that adding a simulation component to learning promotes longer memorization and better skill performance [1, 4]. In addition, its use provides a "relaxed", safe pedagogical environment that promotes the experience gain, and creates an appropriate psychological atmosphere for correcting mistakes, which ultimately leads to improved learning quality [5].

The process of receiving medical education must be effective and safe for all participants, including patients. At the same time, the learning process may require numerous practical skill repetition, which is not always acceptable in training on a real patient [6]. Simulation in medicine makes it possible to turn routine procedures into habits and allows practicing skills without risk of harm to a real patient [7, 8].

Simulation-based training in higher education is a simplification of reality to a simulation scenario, which should realistically represent professional decision-making. Careful design of a simulation scenario based on a correct understanding of the learning objectives is a key to effective simulation as an educational method [9]. Therefore, the topic for simulation-based class has been chosen very carefully, given the prevalence of diseases and their impact on population health in Ukraine. Currently, it is recognized that high blood pressure (BP) and cholesterol are the risk factors contributing the most to the increase in the mortality of cardiovascular diseases [10]. Therefore, the staff of the Department of Internal Medicine 3 of the State Institution "Dnipropetrovsk Medical Academy of the Ministry of Health of Ukraine" have designed a simulation scenario, through which the 6th year students have the opportunity to improve their skills in choosing a treatment of patients with cardiovascular disease based on blood pressure and indicators of lipid profile [11].

During planning of the lesson in the simulation center, the following learning objectives of the simulation were determined:

- to check the accuracy of BP measurement,
- to assess the 10-year risk of fatal cardiovascular disease on the SCORE chart,

- to choose an intervention strategy based on the total cardiovascular risk and low-density lipoprotein cholesterol (LDL-C) level.

Materials required for the class: mannequin with a cuff with the programmable blood pressure levels, patient card with relevant data (age, gender, smoking status, lipid profile), the SCORE cardiovascular risk chart for high-risk regions of Europe (2019), the table "Intervention strategies as a function of total cardiovascular risk and untreated LDL-C levels", a checklist to assess student's performance. Additionally, a student must have an account in Moodle to take a final theme test and be prepared for the lesson in advance.

Before the class, students were divided into groups of 5-6 people. The lesson consisted of 4 main stages: work in a room with a mannequin (simulated patient), debriefing, the final testing, and analysis of errors made during the test.

During the work with the mannequin (first stage), the teacher initially demonstrated the practical skill performance, explaining the actions algorithm, drawing attention to the most frequently asked questions and possible mistakes (maximum 15 minutes). Then, he showed an example of how students should perform the practical skill, repeating the entire algorithm without any comments. After the teacher's explanations, a student measured blood pressure and received the data required for risk assessment from the simulated patient (the teacher answered on his questions). Next, lipid profile and the SCORE chart were given to the student who in 1 minute had to assess the 10-year risk of fatal cardiovascular disease in the patient. Subsequently, using a table "Intervention strategies as a function of total cardiovascular risk and untreated LDL-C levels", he determined the further treatment tactics for the simulated patient («lifestyle advice», or «lifestyle intervention + consider adding drug if uncontrolled», or «lifestyle intervention + concomitant drug intervention»). If it was necessary to prescribe the drug, its international non-proprietary name with dosage, time, route and frequency of administration had to be specified. While the student performed the practical skill, the teacher had to fill in a checklist on each participant of the simulation, which was then used to provide feedback during the debriefing.

After the completion of practical skills by all the students in a group, the teacher using his notes in the checklist made the mistakes correction during debriefing. Since the emotional component is very important for memorization, the teacher always tried to highlight the positive aspects in skills performance by each student. Afterwards, student was asked to identify on his own ways to improve his skills performance next time, and then the teacher pointed out the shortcomings that were not mentioned.

The next, third step, was to take 20 similar tests in Moodle to assess the 10-year risk of fatal cardiovascular disease of the patient on the SCORE chart. Every test was randomly selected from the base on the topic, and a student had to answer each one in a minute. For convenience reason, students were required to have the SCORE chart during the test (in print, or open in a separate browser window, or on the phone).

Analysis of the mistakes made by students in tests was carried out at the end of the class. Moodle allows viewing the tests that have been marked wrong and correcting errors immediately after testing. In this part of the lesson, the teacher also answered students' questions and reported the grades.

According to the results of the survey after the class, 90.24% of students positively assessed the proposed version of the class, 95.35% - expressed the wish to increase the number of such practice-oriented simulations. It should be noted that students who did not prepare for the class showed unsatisfactory results during the simulation in the room with a mannequin, almost

did not participate in the debriefing, and, accordingly, could not pass the final testing (scored less than 75% of correct answers).

Conclusions. Given the prevalence of cardiovascular disease and their significant contribution to the mortality structure, raising the awareness of the medical students about their prevention should be one of the education priorities. With this in mind, as well as taking into account the numerous positive aspects of medical simulation for effective and controlled acquisition of competencies, the staff of the Department of Internal Medicine 3 developed and implemented in teaching process a practical simulation scenario "Blood pressure measurement followed by assessment of the 10-year risk of fatal events from cardiovascular disease on the SCORE chart and the choice of intervention strategies in the simulated patient".

Most students appreciated the use of simulation-based training and expressed the wish to increase the number of practice-oriented simulations. However, to get all the benefits of the proposed training method, the student must be carefully prepared in advance.

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