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Practical aspects of the use of medical simulation in the teaching of medical and communication skills

Praktyczne aspekty wykorzystania symulacji medycznej w nauczaniu kompetencji medycznych i komunikacyjnych

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Summary

The teaching process is based on providing knowledge so that a learner knows and has an ability to perform a given activity. Simulation is the artificial reproduction of the characteristics of a given phenomenon, using its model as a point of reference. Nowadays, many centers – medical universities, clinics or other organizations involved in the education of medical staff use methods and techniques of medical simulation.

Simulation is an artificial reproduction of the properties of a given phenomenon by means of its model. Currently, numerous organizations, medical colleges and clinics involved in the process of training of medical staff employ the methods and techniques of medical simulation. The utility of medical simulation in the process of teaching of medical treatment providers aims to optimize the educational results.

Professional preparation of a medical simulation is an appropriate form of training, which leads to improvement of educational effects as compared to conventional method, on condition that all the requirements of the eight stages of preparation and conduct of medical simulation are met simultaneously.

Streszczenie

Proces nauczania polega na dostarczeniu wiedzy, tak aby uczący się znał i wiedział, jak wykonać daną czynność. Symulacja to sztuczne odtwarzanie właściwości danego zjawiska za pomocą jego modelu. Na dzień dzisiejszy wiele ośrodków – uczelni medycznych, klinik czy też organizacji zajmujących się kształceniem kadr medycznych – korzysta z metod i technik symulacji medycznej.

Symulacja to sztuczne odtwarzanie właściwości danego zjawiska za pomocą jego modelu. Liczne organizacje, uczelnie medyczne i kliniki zajmujące się kształceniem kadr medycznych korzystają z metod symulacji medycznej. Wykorzystanie symulacji medycznej w procesie nauczania kadr medycznych ma na celu optymalizację efektów kształcenia.

Profesjonalne przygotowanie symulacji medycznej jest uznaną formą kształcenia, prowadzącą do lepszego efektu edukacyjnego w porównaniu do techniki klasycznej – pod warunkiem, że spełnione zostały jednocześnie wszystkie wymagania zawarte w ośmiu etapach przygotowania i przeprowadzenia symulacji medycznej.

INTRODUCTION

The guiding idea introduced by Confucius: “Tell me and I will forget. Show me and I may remember. Involve me and I will understand” (1), confirms the

accuracy of adult learning. The most effective way of acquiring and consolidating knowledge is based on active participation of the participants in a given process, as opposed to listening to or to passive

mechanical acquisition of knowledge and understanding of the presented content.

Active forms of teaching include role-performance, playing audio/video recordings, case studies and working with a simulated patient or an advanced simulator (2, 3). All the methods mentioned prior are applied to the teaching process of medical staff as they allow them to develop integral medical skills, clinical communication and teamwork (3, 4). Medical simulation occupies a special place among the above mentioned methods.

Simulation is defined as the artificial reproduction of the characteristics of a given phenomenon by means of using its model – a simulator – in order to improve knowledge and gain the ability to solve problems in practice (5). At present, medical colleges use medical simulation methods and techniques (6, 7). Certified training courses for international organizations, i.e. the European Resuscitation Council (ERC) and the American Heart Association (AHA), are largely based on the simulation form (8) during practical classes.

The aim of this overview paper is to present the principles governing the teaching process that uses medical simulation, as well as to provide practical information for individuals working with the use of the method of medical simulation.

SIMULATION AS A TEACHING METHOD

The analysis of the learning process, i.e. the development of professional competences, shows that in contrast to all available and currently used teaching methods, only simulation allows for practical examination of students' skills, which consequently leads to achieving maximum efficiency of the teaching process (fig. 1) (9, 10). A medical simulation is different from a conventional teaching method (based on the transfer of knowledge during lectures or seminars). In the process of teaching by means of simulation, participants take an active part in the scenario, i.e. in the simulated medical event. The role of the patient is played by an advanced medical simulator and the participants become a medical team: for example, a hospital staff or a medical rescue team (12). The simulation scenario takes about 10-15 minutes and focuses on a specific event (traffic accident, exacerbation of a specific disease entity).

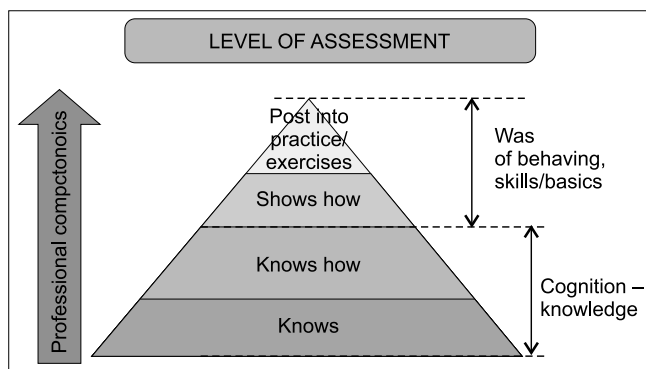


Fig. 1. Levels of evaluation

After the completion of the simulation session, the whole situation is analyzed both in medical and communication terms. In comparison with other types of activities, instead of analyzing the patient's imagined medical condition, discussing and planning the procedure, the participants act as in the case of an event under real medical conditions. All procedures, from taking a medical history of a patient to the implementation of advanced medical procedures, have to be carried out in real time. As a rule, the teacher/simulation trainer should not be present in the simulation room when the scenario is performed. Thanks to audio-video systems, actions of the team can be observed. Moreover, the teacher/simulation trainer can communicate with the team, for example, using the patient's voice. The participants have to rely on their own without external support.

A simulator, for example, the Human Patient Simulator HPS, Simman 3G, is used during the simulation session. It offers the possibility of examining individual reflexes, symptoms (respiratory murmurs, heart rate, reaction of the pupils to light, etc.) and has the function of performing medical procedures (advanced airway irritation, defibrillation, injection, etc.) (11).

The student's working environment with the simulated patient has to faithfully reflect real work environment, that is the rooms in which they will work in the future. The simulation room is usually equipped with the same tools which one may see in the real hospital rooms.

The student acquires knowledge how to use the medical equipment and perform actions in the surrounding environment in simulated conditions while learning about handling of medical equipment, its distribution and functioning.

The learning process is about providing knowledge so that the learner knows how to perform the given activity. One should pay attention to the fact that passing knowledge is not enough since it should be consolidated and put into practice by the student.

The learner has to have the opportunity to be shown how the medical procedure is performed in order to perform a given activity (under the supervision of the teacher) independently. A medical simulation offers all these possibilities (12, 13). However, the method has to be applied properly in order to produce the desired results in the form of satisfied, confident and well-educated medical experts. Moreover, the instructor should remember about eight stages of preparing and conducting medical simulation in a professional manner and which is aimed at achieving a pre-set didactic goal.

The first important step is to define the target audience precisely and adapt the scenario to capabilities of the students. There should be no "one-size-fits-all" scenario due to the diversity of level of knowledge and experience of the students, as the learning objectives and therefore the complexity of the scenario will be different for each group of participants.

Setting the target precisely is the second meaningful stage which should be based on reliable sources.

The assumed educational results are included in: the syllabuses of a given subject, contemporary literature or guidelines published by scientific societies. Each simulation should have a clearly stated objective, as conducting a simulation that focuses on too many elements may not be effective. The simulation should include one of the two learning objectives described within the three areas: knowledge, skills and social competences.

The next step refers to making effort to get the participants acquainted with requirements they will have to meet during the simulation. It is important that the students know the material in advance in order to prepare for the simulation classes. Outlining an area of knowledge which should be remembered becomes essential for successful simulation activities. Under no circumstances should a simulation be an unannounced test of knowledge after which a participant may get a critical feedback.

The fourth stage is dedicated to practising the procedures, planned in the scenario, on the trainers beforehand. If scenario assumes that the participant has to perform a given procedure (for example, tracheal intubation), it is necessary to make sure that this skill has already been acquired by a student. Furthermore, this medical procedure should be practised with the student on the simulators prior. During the simulation, the participant shows how to perform the procedure in order to receive feedback from the teacher and to improve their own skills. Next time, the participant will perform the task independently and correctly, which will allow the teacher to add more skills that will have to be practised. Teaching the basics is not the aim of simulation. The simulation class is not a place to learn the subject from scratch. However, the teacher cannot require from the participant to perform the task which they have never performed before.

A professional establishment and preparation of a scenario that is focused on the purpose and effect of education is the fifth, extremely important step. The simulation scenario shall take the form of a diagram describing the clinical case which is the subject matter of the classes. The diagram is briefly summarized as follows: basic data of a patient, current ailments, history of illness, life parameters and their changes during the classes. The scheme mentioned prior should include giving participants a helping hand ("lifebuoys"), i.e. teacher's interventions, if the participants depart from the goal of teaching by means of their actions or are unable to take the appropriate actions due to stress. One should be aware of the fact that the medical cases from the last standby duty shift in the hospital, presented as material during simulation classes, may be too complex and complicated for some students. Therefore, the scenario cannot be made by chance. In addition, testing the scenario before applying it to the target group is also good and recommended practice. It gives the possibility to detect the inaccuracies in the scenario and allows the teacher to check whether the

sequence of events happen in accordance with the reference scenario. The duration of the scenario is another issue. It should not last longer than 15-20 minutes. Scenarios exceeding this time limit may turn out to be too long and complex. According to the principle: "less is more", one should try to focus on one, maximum two didactic goals mentioned in the script. It is essential to plan key issues, which have to be discussed during the summary, in order to achieve one's objective.

Prebriefing, which is an introduction to the simulation, is the sixth important stage. The way in which participants are introduced into the medical simulation will have a direct impact on the level of their commitment and satisfaction with the activities. It may be said that a good participant is a motivated one. They know the purpose of the class and is aware of expectations which they have to meet. During this part of classes, the objective, detailed teaching effects and the schedule of the classes should be discussed. It is also recommended to take a few moments to get to know each other and to listen to students' expectations. It is important to familiarize participants with the workstation, discuss the functions of the simulator, for example, to remind them how to examine the peripheral heart rate on the manikin or how to identify convulsions look.

It should take participants about 5-10 minutes to get to know the equipment and the conditions of the simulation. However, the first contact with the simulation environment should take even 30-45 minutes. Such time extension decreases the level of situational stress and eliminates irregularities in the course which may result from lack of skills in using the medical equipment or simulator. It is also important for this stage to assign roles to students during the pre-branding, to provide information about the place and time when the simulation will take place and to inform them who the patient is and what the medical problem is.

The seventh stage is devoted to carrying out the simulation itself, i.e. to enable the participants to achieve the objective by means of their actions. A simulation session is indeed defined as experience, as learning by performing activities (14). Students have to make their own decisions about the procedures and patient's treatment process. They practice teamwork and communication with patients and their families. Thanks to their commitment to the classes, they experience true emotions and their willingness to help is observed, as well.

It is very important to avoid complicating the scenario by adding additional elements that were not originally included in it. This will cause chaos and, as a result, discontent and resistance of the participants.

The eighth, final stage is called debriefing. It is the right time to carry out an analysis of the work of the students. Debriefing is the most important stage in the process of teaching by means of simulation (15). At this point, the participant has the opportunity to analyze their actions and attitude towards the patient, as well as their own emotions. During the debriefing session, participants have the opportunity to verify

their mistakes made during the classes. As a consequence, gained experience will let them to face a real clinical case with ease (16). One should remember that the moment of presenting the activities in front of the group is also stressful and anxious. It is very important to build a sense of security and trust within the group. The role of the teacher is to moderate the discussion and to encourage the participants to analyze their actions during debriefing. The teacher leading the debriefing session should lead the participants to draw their own conclusions (17).

A diagram of the debriefing is provided in figure 2.

It should be kept in mind that if the teacher gives feedback to the students, it refers to particular actions. The conclusions which are reached should be briefly summarized, for example, by providing students with knowledge about the scheme of medicating, informing about potential complications or of referring to the current guidelines. Each time this stage should be completed with addressing participants a question what they remember and take as a point of reference in their future work (take a message home).

CONCLUSIONS

In conclusion, professional preparation of medical simulation, for the training needs of medical staff in the field of simulation, is a recognized form of education. Moreover, it produces better educational effects, in comparison to a conventional technique (based on imparting knowledge by means of lectures or seminars). However, such effectiveness may

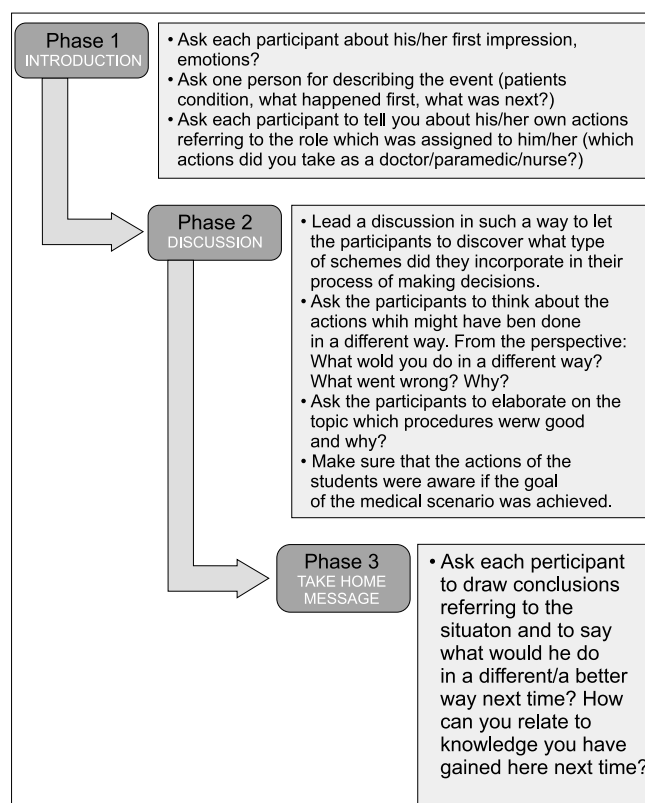


Fig. 2. Debriefing scheme

be observed on condition that all the requirements included in the eight stages of preparation and conducting medical simulation have been fulfilled.

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