THE DEVELOPMENT OF MEDICAL SIMULATION CENTERS IN POLAND – A STRONG OPPORTUNITY FOR MODERNIZATION OF NURSING EDUCATION

ROZWÓJ CENTRÓW SYMULACJI MEDYCZNEJ W POLSCE WIELKĄ SZANSĄ NA UNOWOCZEŚNIENIE KSZTAŁCENIA PIELĘGNIAREK W POLSCE

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ABSTRACT

Introduction. Simulation based Education becomes a modern tool for nursing education.

Aim. The aim of the paper is to analyze the emerging opportunities of medical simulation in nursing education secondary to the ongoing Ministry of Health project on development of medical simulation centers.

Medical simulation can improve the quality of nursing education through various methods. First of all, with the advancement of technology in patient simulators they can be used to closely mimic the clinical conditions. The Standardized Patient program can be a valuable asset in teaching patient-nurse communication skills.

In 2015, the Polish Ministry of Health through a EU grant is supporting the development of twelve Simulation Centers in Polish Universities. The fund will support the purchase of equipment and education of the instructors between 2016 and 2021.

Summary. There is a unique opportunity of improving the quality of nursing teaching secondary to the development of medical simulation centers. It is crucial to use these funds to take part in training both internally and in other centers.

KEYWORDS: simulation, medical education, manikin, phantom, standardized patient.

STRESZCZENIE

Wstęp. Edukacja połączona z symulacją medyczną stała się nowoczesnym narzędziem kształcenia pielęgniarek.

Cel. Celem pracy była analiza nowych możliwości wprowadzenia do edukacji w pielęgniarstwie symulacji medycznej.

Symulacja medyczna poprawia jakość kształcenia poprzez wiele modeli. W związku z rozwojem technologicznym symulatorów pacjenta można je wykorzystywać przede wszystkim do wiernego odwzorowania warunków klinicznych. Dodatkowo przez program Standaryzowanych Pacjentów możliwa jest praktyczna nauka komunikacji.

W roku 2015 Ministerstwo Zdrowia zainicjowało Program Unii Europejskiej POWER mający na celu wsparcie wyposażenia 12 Centrów Symulacji na Uczelniach Medycznych w Polsce na lata 2016–2021. Z tych pieniędzy zostanie sfinansowany zakup sprzętu symulacyjnego oraz kształcenie instruktorów symulacji dla wszystkich kierunków nauczania.

Podsumowanie. Powstała unikalna sposobność na poprawę jakości kształcenia pielęgniarek poprzez rozwój krajowej sieci centrów symulacji. Konieczne jest aktywne wykorzystanie dostępnych funduszy na szkolenia instruktorskie zarówno na bazie własnej jak i obcej.

SŁOWA KLUCZOWE: symulacja, edukacja medyczna, manekin, fantom, pacjent standaryzowany.

Simulation – definition

Simulation is the imitation of the operation of a realworld process or system over time [1]. Simulation is extensively used for educational purposes. The most common use is in aviation industry where it has become not only the necessary part of basic pilot training but also a mandatory part of the maintenance of the certification process. Perhaps the most obvious part of this were the air-crashes when simulation based-training became a true life-saver. In January 2009 in New York, an Airbus airliner was forced to land on the Hudson River secondary to the engine flameout caused by Canadian geese. Another mishap happened in Warsaw Airport when the landing gear could not lower secondary to a mechanical failure. In both cases nobody was hurt and the pilots confirmed that the prior training in a simulator helped in this process tremendously. Similarly, in any industry, where the stakes are very high, i.e. nuclear power plants, simulation plays a major role in education.

In medical education simulation concentrates on improvement of the healthcare quality which translates into improving the patient's outcome.

The aim

The aim of the paper is to analyze the emerging opportunities of medical simulation in nursing education secondary to the ongoing Ministry of Health project on development of medical simulation centers.

The Development of Simulation-based Education in Medicine

Initially, the medical simulation was treated skeptically as it was believed that nothing can simulate a human being with a reliable fidelity. The advances in technology have proved it wrong. The current patient simulators can mimic live patients to an unbelievable extent. With features like coughing, seizing, vomiting and bleeding profusely, they can cause a real level of stress in students [2].

Traditionally, medical simulation is still mistakenly identified as dealing solely with single-task trainers as CPR or intubation phantoms. Although these trainers present for several decades still have a role in the basic CPR training, medical simulation has now evolved into several advanced fields.

The most innovative field is virtual reality. It can be used in procedure training such as endoscopy or laparoscopic surgery. The picture on a screen is connected to haptic part and the movements of a simulated endoscope are extremely real. The maneuvering of the endoscope into i.e. a bowel wall on the screen will result in a tactile feedback of the hardware making it extremely authentic to the operator.

Also, the advanced software for computer simulation is now used for education training. In simulation of a mass casualty the decision-making process can be exercised like Virtual Hospital of Virtual Patient.

The true aspect of medical simulation is high-fidelity training with patient simulators. These are technically advanced manikins that can simulate almost all physiological and pathological conditions in the real-time. Also the vital signs as heart rate, respiratory rate, pulse oximetry, body temperature may be simulated on a patient's monitor. The simulators also have pupils reactive to the light, heart, lungs that can be auscultated, their pulses are palpable. The simulators can bleed with artificial blood, sweat, vomit and urinate. The students can perform various procedures on these patients, such as cardioversion, percutaneous pacing, intravenous access, not to mention inserting the endotracheal tube or tracheotomy. Some of the manikins can detect the diverse medications being injected and react accordingly. There are no clinical scenarios that could not be simulated in that manner. The simulation allows to present clinical scenarios safely, repeatedly and in a standardized way. It can guarantee that each student will see and manage the most common pathologies to become a competent nurse or a doctor. More advantages can be found in **Table 1**. However, it should be stated that simulation is not an equivalent to a real patient contact, however it can be an invaluable asset to education.

Table 1. Advantages of medical simulation

Advantages of medical simulation
The teaching standardization
Safety of patients during training
The use of real medical equipment in simulated conditions.
Practical teaching of invasive procedures (colonoscopy, bronchoscopy)
without inadvertent damage
Making errors in simulated conditions
Scheduling of clinical activities based on students' needs not on pa-
tients' availability
Possibility of presenting unusual cases
Prompt feedback after the clinical scenario during a debriefing session Standard and procedure validation in safe conditions

Source: author's own analysis

Simulation Scenarios

A disoriented patient, an acute coronary syndrome or acute arrhythmias are examples of clinical situations that may be practiced using simulation based learning. During the actual scenario, the instructor controls the patient's simulator in a control room behind one-way looking mirrors (**Figure 1**). The nursing students can examine the patient, perform an interview and even call a doctor using the phone in the room. The scenarios last usually around 15 minutes. The instructor may talk to the students using a speaker inside the manikin's head and listen using microphones in its ears (**Figure 2**). The entire clinical scenario is recorded and then played back during a debriefing phase.

Debriefing is considered to be the most important part of the simulation [3]. During this segment the instructor discusses freely what happened during the scenario and while playing back the recorded video pinpoints most important events during the encounter. The students then discuss the imperfections of their actions with the instructor.



Figure 1. View from the control room through the one-way looking mirror into the sim lab. Source: Medical Simulation Center



Figure 2. Interdisciplinary team (physician, nurse and paramedic) during a simulated scenario Source: Medical Simulation Center

Standardized Patients

Standardized Patients are actors trained to play roles of real patients. The use of Standardized Patients has been utilized for over 30 years in the USA. In the emerging simulation market in Poland in the majority of Polish Universities there will be SP employed to interact with medical and nursing students. One of the possible uses is practicing communication skills with difficult patients [4]. Again, this can be done with an audio-video recording and debriefed afterwards.

Medical Simulation Centers

Designing a Medical Simulation Center from a scratch may be challenging. On one hand, those Centers have to be almost identical to clinical rooms, i.e. the Emergency Room or ICU room. On the other hand, they have to be universal in order to provide a number of various clinical activities in the same room. There are also rooms pertaining to simulation that normally are not present in hospital facilities, i.e. a control room or debriefing rooms. Additionally, there has to be an appropriate audio-video system for recording and archiving of the simulation scenarios. In each room there are microphones and cameras in certain locations. The video must be correlated with the real-time data from the manikin. After the simulation, the recorded session is then played back to the students in the debriefing room.

Development of Medical Simulation Centers in Poland

Poland became a unique country in the world to have a national network of Simulation Centers in Medical Universities supported by a governmental grant. In 2015 the Polish Ministry of Health initiated a national development program of twelve Simulation Centers in major Medical Universities. It supports both medical and nursing simulation-based education. The program based on EU funds (POWR.05.03.00-00-0005/15-00) worth of 282 million Polish zlotys (around 68 million Euro) is designed to support the equipment and training for five years. No funds are given for construction works. After 2021 there should be twelve new Simulation Centers operating, providing at least 5% of the entire training through medical simulation at each of the Schools. This is an unusual opportunity to set the bar of simulation high in Poland. The grant will cover the cost of teaching instructors, the manikins purchase and even the operating costs of Simulation Centers for the entire period of five years.

National Database of Simulation Scenarios

Another innovative idea of the EU grant project is creating and maintaining an on-line base of simulation scenarios. The scenarios will be designed at each of the participating institutions and stored on a server. Every instructor from those Universities will have access to the database. Thus, every instructor will be able to print and use any scenario for the database for his or her simulation activities. The common format will make sure that it is universal and suitable for various kinds of simulators.

Summary

Medical simulation has become an integral part of nursing education. The ongoing project of the Ministry of Health carries an opportunity of modernizing nursing education. There is a need of using the funds for instructor training which is supported by the grant. Moreover, the active participation in nursing education conferences should be encouraged.

With the rapid development of Simulation Centers in Poland there is a unique opportunity for Universities to grow into a major European leader in this field.

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