Simulation in Healthcare Education

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The healthcare industry is considered to be a high-risk field as it deals with patients' lives. The major responsibility of the healthcare professional is to ensure the patients' safety while giving them proper care (Alinier & Oriot, 2022). Therefore, it is crucial for healthcare professionals to possess competency in clinical skills with theoretical knowledge (Al-Elq, 2010). There is a growing demand worldwide for educational institutions to enhance the clinical competency of their students and the students are required to gain a comprehensive understanding of academic knowledge together with clinical skills (Chau et al., 2022). The acquisition of better clinical practice through the repetitive performance without compromising the patients' safety led to introduce the simulation-based learning in healthcare education (Al-Elq, 2010)

Simulation has a very long history in various fields. The first successful use of simulation began in the aviation industry (Aebersold, 2016). Then it was introduced into various other fields including military and healthcare education. In recent decades simulation-based education has been incorporated by different healthcare institutes to improve clinical competency, decision-making, critical thinking ability, and confidence of the students, thus Simulation plays a vital role in filling the theory-practical gap in healthcare education (Munazza Saleem & Khan, 2023).

Simulation can be defined as an "activity or technique that mimics real-life experiences" (Karunathilake, 2018). In healthcare education, simulation is used to replicate the reality of the clinical environment (Eyikara & Gocmen Baykara, 2017). These activities provide an opportunity for individuals to improve their knowledge, skills, and attitudes, as well as analyze and respond to realistic situations in a simulated environment (Korayem et al., 2022). It provides a safe and proper learning experience in the means of not using real patients (Alinier & Oriot, 2022).

Simulation-Based Education

According to the Lai Kun Tong study, the simulation will be conducted in three steps namely, pre-briefing, simulation, and briefing. Pre-briefing is conducted prior to the simulation session. In the pre-briefing session, students get adequate information regarding the simulation scenario and their roles in the simulation. The second step "simulation" states the students' participation in a simulated environment. Students will run the simulation scenario developed by the instructor. In the debriefing session, students get immediate feedback from the instructors. They'll recall their simulated experience ad discuss what went well and what are areas to be improved (Tong et al., 2022)

Types of simulation

Clinical teaching in healthcare professionals can incorporate a range of simulation methods including:

- Part Task Trainers

Part-task trainers are specifically designed to mimic only certain parts of the body or environment. These trainers often represent particular anatomical parts of the human body and are used to teach fundamental psychomotor skills and procedures(Mary et al., 2020).

- Simulated Patients/ Standardized patients

Simulated patients are individuals who are trained to act as a real patient, portraying specific symptoms or physical signs. They undergo specialized training to simulate the experience of an actual patient (Karunathilake, 2018; Koukourikos et al., 2021).

- Integrated Simulators

Integrated simulators utilize a mannequin and advanced computer program to generate various patient monitoring parameters, including respiratory and pulse rate, blood pressure, oxygen saturation level and ECG readings (Karunathilake, 2018).

- Virtual Reality

This is a simulated environment created by a computer that offers multi-sensory experiences to the learner. Simulated hospitals and communities can be created by the computer with sophisticated facilities (Karunathilake, 2018; Mary et al., 2020)

- Human patient simulators

Using human patient simulators for instruction is a modern and advanced technique in the field of healthcare education. These are interactive mannequins that are capable to elicit realistic physiologic responses, including respiration, pulses, heart sounds, breath sounds, urinary output, and pupil reaction. Moreover, the advanced models possess the ability to interact with the student. They can provide real-time responses to any queries raised by the learner while they undertake the simulation exercise (Mary et al., 2020).

- Hybrid Simulation

This simulation involves combining two or more simulation types to create a more realistic experience (Koukourikos et al., 2021)

These various simulation methods offer healthcare professionals the opportunity to gain realistic clinical experience and improve their skills in patient and community care within a safe environment.

Apart from the above-mentioned types, simulation can take many forms in healthcare education, ranging from simple to highly complex. This is known as

the fidelity of the simulation. Fidelity refers to how closely the simulator matches the appearance and functionality of the system being simulated (Mary et al., 2020).

Eyikara & Gocmen Baykara, 2017 categorized fidelity into three levels: low, medium/moderate, and high. The low-fidelity simulation application is typically static and lacking in realism like using partial task trainers, anatomical models, case studies and role plays. Medium/moderate simulation provides a more realistic experience than a low-fidelity one. High-fidelity simulation is the most realistic form of simulation, as it can accurately replicate physical symptoms. It's carried out by using full-scale computerized patient simulators (Eyikara & Gocmen Baykara, 2017; Mary et al., 2020)

As an evidence-based practice simulation helps to foster the clinical skills in the health care professionals. While participating in the simulation scenario they could build team spirit, communication skills, leadership, and team solidarity. Debriefing helps them to improve their decision-making skills, clinical reasoning, and critical thinking ability. Thus, it helps to improve their self-confidence (Koukourikos et al., 2021). Even though there are so many advantages, simulation-based learning should be considered as an adjuvant and not a replacement for clinical practice in a real clinical environment. So, it is important to incorporate simulation-based teaching along with clinical training in hospitals to provide effective clinical teaching in healthcare professional education (Al-Elq, 2010).

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