Development of skills in controlled environments and simulation for SUS undergratuated users safety

Desenvolvimento de habilidades em ambientes controlados e simulação para segurança dos usuários SUS na graduação

João Carlos da Silva Bizario¹ ⓘ
Gabriela Furst Vaccarezza² ⓘ
Carolina Felipe Soares Brandão³ ⓘ

¹,²Universidade Municipal de São Caetano do Sul (São Caetano do Sul). São Paulo, Brazil. joao.bizario@prof.uscs.edu.br, gavaccarezza@gmail.com
³Corresponding author. Universidade Municipal de São Caetano do Sul (São Caetano do Sul), Universidade Cidade de São Paulo (São Paulo). São Caetano do Sul, São Paulo, Brazil. carolinafs11@gmail.com

ABSTRACT | INTRODUCTION: The insertion of Medical Students since the beginning of Medical School in applied professional reality practices provides a potential and necessary opportunity for performance and competence development driven by the National Curricular Guidelines from 2014. The familiarity of students with professional practices in controlled environments contributes to reality comprehension, guaranteeing the development of skills, which contributes and maintain the patients' safety. **OBJECTIVE:** Describing the insertion of the curriculum performed of the professional skills and Clinical Simulation as a controlled learning environment, concurring with developed activities in different levels of health care attention, such as non-controlled environments. **METHODOLOGY:** Experience report of the academic activities of Medical Course at Universidade Municipal de São Caetano do Sul from its conception. **RESULTS:** Skills and simulations throughout the semesters contain several activities with Simulated Patient Actors, Task Trainers, Hybrid Simulation, Rapid Cycle Deliberate Practice (RCDP), and Standardized Simulation as a path to the development of medical competences since the first semester of the course. **CONCLUSION:** Medical Students' insertion in health care network (RAS) since the beginning of Medical School linked to Clinical Simulation, have played an important role and complement the curricula, preserving the main objective of promoting better practices aiming the patients' safety.

KEYWORDS: Simulation. Curriculum. Medical students. Patient's safety. Primary health care.

RESUMO | INTRODUÇÃO: A inserção do estudante de medicina desde o início do curso em atividades aplicadas à realidade profissional, propicia um campo potencial e necessário para o desenvolvimento de desempenhos e competências norteados pelas Diretrizes Curriculares Nacionais de 2014. A familiarização do estudante com a prática profissional em ambientes controlados também contribui para a compreensão da realidade, garantindo o desenvolvimento de habilidades que contribuem e mantém a segurança dos pacientes. **OBJETIVO:** Descrever a inserção curricular realizada do eixo das habilidades profissionais e simulação clínica como cenário de aprendizagem controlado concomitantemente às atividades desenvolvidas nos diferentes níveis de atenção à saúde, como ambientes não controlados. **METODOLOGIA:** Relato de experiência das atividades acadêmicas do Curso de Medicina da Universidade Municipal de São Caetano do Sul desde sua concepção. **RESULTADOS:** As habilidades e simulação clínica ao longo dos semestres possuem diversas atividades com pacientes padronizados (atores), manequins específicos (*Task Trainer*), simulação híbrida, práticas deliberadas em ciclo rápido e simulação padrão com a finalidade de propiciar o desenvolvimento de competências médicas desde o primeiro semestre do curso. **CONCLUSÃO:** A inserção dos estudantes de medicina na rede de atenção à saúde desde o ingresso no curso associado a simulação clínica, têm exercido um papel importante e complementar no currículo, mantendo o objetivo central em promover melhores práticas com foco na segurança do paciente.

PALAVRAS-CHAVE: Simulação. Currículo. Estudantes de medicina. Segurança do paciente. Atenção primária a saúde.

Introduction

The World Health Organization (WHO) estimates that tens of thousands of people experience harm associated with healthcare every year worldwide. Data from the Institute of Medicine (IOM) of the United States of America indicate that medical errors cause between 44,000 and 98,000 dysfunctions each year in US hospitals[1-2]. Recent studies show that the incidence of Adverse Events (AE) in Brazil is high. The occurrence of this type of incident in the country is 7.6%, of which 66% are considered preventable3. Research has shown links between teaching and practice in the health field - between the education of healthcare professionals and the safety of the healthcare system, so much so that in 2002, during the World Health Assembly, WHO Member States signed an agreement on patient safety. Validating the importance of this topic, in April 2013, the National Patient Safety Program (*Programa Nacional de Segurança do Paciente* – PNSP) was launched by the Ministry of Health (*Ministério da Saúde* – MS). Patient Safety is defined as "the reduction of risk of unnecessary harm associated with healthcare to an acceptable minimum". The literature demonstrates that one of the main causes of medical errors and inappropriate sites and procedures is the lack of effective communication (inadequate processes and checks) between professionals[3-5]. The WHO patient safety program has devoted considerable time and attention to the development of some important resources designed to empower the workforce and to ensure robust measurements of the extent of healthcare harm. The WHO multi-professional patient safety curriculum guide launched in 2011 not only is a valuable resource for patient safety promoters but also makes it possible to design the medical curriculum as a comprehensive program for learning patient safety in schools worldwide[3]. Including medical students, from the start of their degree, in activities applied to professional contexts provides a potential and necessary field for the development of performances and competences guided by the 2014 National Curriculum Guidelines (*Diretrizes Curriculares Nacionais de 2014*) for the medical degree[6]. Familiarizing students with professional practices in controlled environments helps them understand these real-world contexts[7]. In the literature, reports relate the efficiency of medical simulation as an educational strategy to its inclusion in the curriculum of the medical degree, that is, medical simulation should not be an extra-curricular activity or used in sporadic occasions; instead, medical students should come into contact with this activity as much as they do so with other active learning strategies to ensure its expected knowledge retention[8,9].

Professors are uncertain whether investing in theoretical models of the teaching-learning process applied to medical simulation strategies will bring more benefits than traditional models. The reflection on andragogy, which is categorical in considering that adults must recognize the need to learn and that such learning is enhanced through its applicability to real-world situations, highlights the importance of investing in new strategies, including medical simulation. Lastly, this is not about devaluing traditional teaching, which has been conducted for decades, or proving the superiority of one technique over another but about incorporating multiple methodological approaches focused on best preparing students, thereby enhancing patient safety.

This report describes the alignment between medical skills and medical simulation activities with real-world practice in uncontrolled environments, considering the level of complexity of medical students and focusing on the safety of patients and health professionals. Therefore, the objective is to describe the experience of including medical simulation and skills in the curriculum as a controlled learning environment concurrently with student activities developed within an integrated care network, as an uncontrolled environment, in the USCS medical degree to provide medical practices with improved patient safety.

Experience report

Since its conception in 2014, the Pedagogical Project of the USCS Medical Degree provides for an integrated curriculum, using multiple active learning strategies, that is, a student-centered curriculum with the student as the subject of learning and professors as facilitators of the process. Problem-based learning (PBL) and experience in professional settings are prioritized, maintaining, among other activities, a weekly period for activities included in the Family Health Strategy (*Estratégia Saúde da Família*), within the community, in the first eight semesters of the medical degree. From the fifth to the eight semester of the medical degree, the students are included in the University of São Caetano do Sul Outpatient Center (*Centro Ambulatorial Universitário da Universidade Municipal de São Caetano do Sul – CAU-USCS SCS*), whose mission, within the Healthcare Network of the municipality of São Caetano do Sul, is to create an environment of high-quality integrated care and education and to increase the resolution of Primary Care consultations by expanding the offer of consultations with Professors and medical specialists and especially the support matrix of the healthcare network made available to the intern in the last two academic years.

As a framework for outlining the competences expected by the end of the student training, the project was based on the 2014 National Curriculum Guidelines (*Diretrizes Curriculares Nacionais de 2014*) for medical degrees[5] and guided by the health needs of the population of São Caetano do Sul.

"The Curricular Guideline provides for the graduate to have general, humanistic, critical, reflective and ethical training, with the capacity to act at different healthcare levels, with health promotion, prevention, recovery and rehabilitation actions, at the individual and collective levels[6]".

In the context of primary care, the students will be integrated into the same Family Health Strategy (*Estratégia de Saúde da Família – ESF*) team of a single Basic Health Unit (*Unidade Básica de Saúde – UBS*) from the beginning to the end of their graduation. The dynamics in this service involve the experience of each student, using the problematization method in the UBS work process, based on the reality of the territory and on the people in the coverage area of each team, making it possible to develop various skills[7]. Simultaneously, professional skills are an axis of the longitudinally structured curriculum with the purpose of developing competences contextualized within the scope of performing anamnesis, physical examination and other procedures, using clinical reasoning, requesting and interpreting complementary examinations, and applying good social communication techniques and adequately accessing scientific information using controlled environments with different levels of simulation complexity that seeks to develop clinical skills in students, focusing on the safety of patients who will come into contact with undergraduate students during their training. In this context, the axis of professional skills of the USCS consists of activities related to the development of clinical/ semiological, communication, surgical and high-fidelity and -complexity medical simulation skills during the medical internship, all divided between the 1st and the 12th semesters of the medical degree and into different methodological presentations and increasing levels of complexity, which are inserted into the curriculum according to the experiences to which the students are exposed towards mitigating potential adverse events in uncontrolled primary care settings, where these students are placed early, from the first to the eighth semester in ESF teams in the Education - Community Service Interaction Curriculum Unit (*Unidade Curricular Interação Ensino Serviço Comunidade – IESC*), at the USCS Outpatient Center (*Centro Ambulatorial Universitário – CAU USCS*) from the fifth to the eighth semester and in medical internship settings. These tools have a direct role in developing competences that students should acquire, based on performance criteria, considering knowledge, skills and attitudes in a practical, balanced and reproducible way. According to Gaba 2009, medical simulation can be understood as an educational process which replicates patient care settings in an environment close to reality towards analyzing and reflecting safely performed procedures or as a technique aimed at replacing or broadening supervised experiences which considerably evoke real-world aspects in an interactive environment[8,10,11].

Therefore, skills and simulation-based learning help to train healthcare students and professionals, making it possible to repeat tasks in a safe and controlled environment, without harm to real patients[8-11].
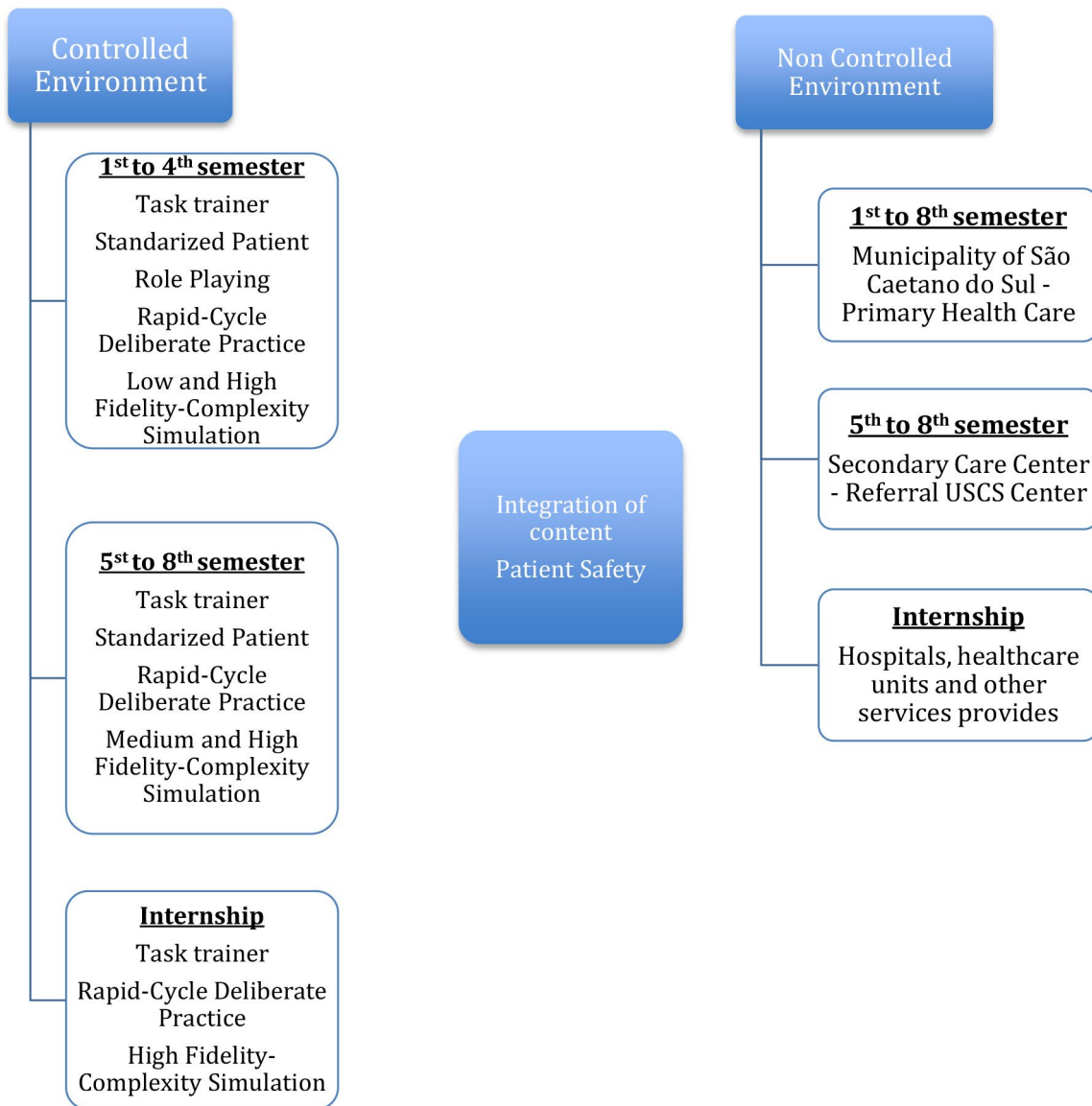
The IESC is a curricular module aimed at studying public health with ESF teams as its main practice setting. Thus, always in the context of active methodologies and problematizing tools, since the beginning of the degree, the students come into contact with the reality of their profession, gradually assuming responsibilities in serving the population.

Clinical skills and medical simulation are present since the beginning of the degree, with activities aimed at basic life support and first aid, using low-fidelity patient simulators. Throughout the semesters, students perform activities with simulated patients (actors) and specific mannequins (Task Trainer) for procedures and activities combining simulated patients with dolls (hybrid medical simulation), in addition to using medium- and high-fidelity patient simulators to focus on clinical reasoning and decision making through simulated cases. The institution has a wide infrastructure with rooms and high-fidelity adult, pediatric, obstetric and neonatal patient simulators, audiovisual resources, where activities are divided between standard medical simulation followed by debriefing or in Rapid-Cycle Deliberate Practice (RCDP), where the clinical case is simulated several times until the desired competence is acquired, subsequently starting a new cycle, gradually increasing the complexity of the tasks[12]. In addition, in simulated doctor's offices, Objective Structured Clinical Examinations (OSCE) are performed from the 1st semester of the medical degree, using simulated patients, in addition to dolls and peer assessment. During the internship, clinical performance is evaluated using the Mini Consultation Evaluation Exercise (MiniCEX), which has good validity and reliability, according to the literature[13], the Global Rating and the OSCE, which guide clinical simulation scenarios. Patient safety and skills and simulation have been strongly intertwined since the first report by the American Institute of Medicine more than 10 years ago, entitled "To err is human: Building a Safer Health System", which estimated that between 45 and 98 thousand people died as a result of medical errors each year[2,14]. In this context, the objective is to include in the curriculum activities that involves the routine scenarios and the most frequent cases of the uncontrolled environment where students are exposed to the simulated environment, enabling repetition and best practices with an impact on patient safety.

Medical simulation has become an increasingly used tool focused on patient safety; at the Royal Colleges, in the United Kingdom, for example, this type of training must be included in the curriculum because it is regarded and well described in the literature as effective in retaining knowledge on not only technical but also behavioral skills, enabling the student to reflect on the impact that poor communication can have on the patient outcome[15]. In this context, an effective team is that whose members, including the patient, communicate with each other, reconciling their observations, skills and responsibilities for decision making towards optimizing patient care. Communication and information flow between healthcare professionals and patients can be complicated tasks due to the spread of clinical and professional responsibility among different members of the healthcare team[16].

Figure 1. Curricular inclusion of medical simulation and its modalities

Controlled Environment

1ˢᵗ to 4ᵗʰ semester
Task trainer
Standarized Patient
Role Playing
Rapid-Cycle Deliberate Practice
Low and High Fidelity-Complexity Simulation

5ˢᵗ to 8ᵗʰ semester
Task trainer
Standarized Patient
Rapid-Cycle Deliberate Practice
Medium and High Fidelity-Complexity Simulation

Internship
Task trainer
Rapid-Cycle Deliberate Practice
High Fidelity-Complexity Simulation

Integration of content
Patient Safety

Non Controlled Environment

1ˢᵗ to 8ᵗʰ semester
Municipality of São Caetano do Sul - Primary Health Care

5ᵗʰ to 8ᵗʰ semester
Secondary Care Center - Referral USCS Center

Internship
Hospitals, healthcare units and other services provides

Figure 2. High-fidelity and complexity pediatric setting at the Medical Simulation Laboratory of the USCS Medical Degree

The complexity and purpose of the scenarios and stations depend on the level of training of the students and on the activity that they must perform in the real-world environment. Thus, the same scenario can be repeated on several occasions with greater depth of the theme and reviewing the main aspects related to patient safety, such as hand hygiene, patient identification, medication dispensing, conflict management and soft skills, among others.

The limiting factors for including this strategy in the curriculum are based on the high costs of not only organizing a space dedicated to medical simulation, such as paying for patient simulators, dolls and audio and video resources and hiring actors, among others, but also investing in the instructor, who is essential for adequate educational management and best pedagogical practices. The main advantage is the possibility of applying meaningful and motivating learning in combination with other techniques, favoring an environment where the student can have an integral perception of numerous different contexts, respecting patient safety and teaching ethics.

Conclusion

Reducing the risk of unnecessary healthcare harm, as well as avoiding as many serious incidents or adverse events as possible, promotes the search for risk management and systematic application of various strategies that maintain the integrity of healthcare professionals, patients and institutions, thereby creating a safety culture with clear benefits for all.

The main pedagogical difficulty was to integrate and improve contents on healthcare practices with activities developed in simulated environments, leading to activities that contribute to patient safety.

Understanding how to work as a team involves more than self-identification with the group of co-workers. It requires students to know the benefits of multidisciplinary teams and how they can be efficient in improving care and reducing errors, which justifies including several simulated strategies in different objectives.

Redoing actual care, repeating procedures and allowing feedback and self-assessment promote best practices. Direct communication between Healthcare Network instructors and skills and medical simulation teachers was essential to create and validate scenarios with patients and to select the procedural skills taught and repeated throughout the semesters.

Therefore, including USCS medical students in the healthcare network since they start the degree, in combination with medical simulation, plays a key and complementary role in the curriculum, maintaining the central objective of promoting best practices focused on patient safety. Studies with measurable objectives on the impact of these student activities on patient safety are under way.

Author contribuitions

All authors participated in all research stages, writing, revising and approving the final version of the manuscript.

Competing interests

The authors declare that there are no financial, legal or political conflicts involving third parties (government, companies and private foundations, among others) regarding any aspect of this study (including, but not limited to, grants and funding, participation in advisory councils, study design, manuscript preparation and statistical analysis, among others).

References

1. Joint Commission on Accreditation of Healthcare Organizations (JCAHO). Guidelines for implementing the universal protocol for preventing wrong site, wrong procedure and wrong person surgery [Internet]. 2003. Disponível em: https://www.acep.org/imports/clinical-and-practice-management/resources/joint-commission/the-joint-commission-tjc/

2. Kohn LT, Corrigan JM, Donaldson MS, editors. To Err is Human: Building a Safer Health System. Washington (DC): National Academies Press; 2000. doi: 10.17226/9728

3. Mendes W, Martins M, Rozenfeld S, Travassos C. The assessment of adverse events in hospitals in Brazil. Int J Qual Health Care. 2009;21(4):279-84. doi: 10.1093/intqhc/mzp022

4. Agência Nacional de Vigilância Sanitária – ANVISA. Assistência Segura: uma reflexão teórica aplicada à prática. Brasília: ANVISA; 2013. (Série Segurança do Paciente e Qualidade em Serviços de Saúde) [Internet]. 2013. [Acesso em 2020 fev 21]. Disponível em: https://proqualis.net/sites/proqualis.net/files/1%20Assist%C3%AAncia%20Segura_%20Uma%20reflex%C3%A3o%20te%C3%B3rica%20aplicada%20%C3%A0%20pr%C3%A1tica.pdf

5. Ministério da Educação. Resolução nº 3, de 20 de junho de 2014. Institui Diretrizes Curriculares Nacionais do Curso de Graduação em Medicina e dá outras providências [Internet]. 2014. [acesso em 2020 fev 21]. Disponível em: http://portal.mec.gov.br/index.php?option=com_docman&view=download&alias=15874-rces003-14&category_slug=junho-2014-pdf&Itemid=30192

6. Vasconcelos RNC, Ruiz EM. Formação de Médicos para o SUS e a Integração Ensino e Saúde da Família – Revisão Integrativa. Rev Bras Educ Med. 2015;39(4):630-8. doi: 10.1590/1981-52712015v39n4e02772014

7. Cyrino EG, Toralles-Pereira ML. Trabalhando com estratégias de ensino-aprendizado por descoberta na área da saúde: a problematização e a aprendizagem baseada em problemas. Cad Saude Publica. 2004;20(3):780-8. doi: 10.1590/s0102-311x2004000300015

8. Issenberg SB, McGaghie WC, Hart IR, Mayer JW, Felner JM, Petrusa ER et al. Simulation technology for health care professional skills training and assessment. JAMA. 1999;282(9):861-6. doi: 10.1001/jama.282.9.861

9. Motola I, Devine LA, Chung HS, Sullivan JE, Issenberg SB. Simulation in healthcare education: a best evidence practical guide. AMEE Guide No. 82. Med Teach. 2013;35(10):1511-30. doi: 10.3109/0142159X.2013.818632

10. Gaba DM. Do as we say, not as you do: using simulation to investigate clinical behavior in action. Simul Healthc. 2009;4(2):67-9. doi: 10.1097/SIH.0b013e3181a4a412

11. Gaba DM. The future vision of simulation in healthcare. Qual Saf Health Care. 2004;13(suppl 1):2-10. doi: 10.1136/qhc.13.suppl_1.i2

12. Castro LT, Bittencourt CT. Prática Deliberada em Ciclos Rápidos: uma estratégia moderna de simulação. Sci Med. 2018;28(1):ID28849. doi: 10.15448/1980-6108.2018.1.28849

13. Nair BR, Alexander HG, McGrath BP, Parvathy MS, Kilsby EC, Wenzel J et al. The mini clinical evaluation exercise (mini-CEX) for assessing clinical performance of international medical graduates. Med J Aust. 2008;189(3):159-61. doi: 10.5694/j.1326-5377.2008.tb01951.x

14. James JT. A new, evidence-base estimate of patient harms associated with hospital care. J Patient Saf. 2013;9(3):122-8. doi: 10.1097/PTS.0b013e3182948a69

15. Forrest K, McKimm J, Edgar S. Essential Simulation in Clinical Education. 1.ed. Chichester (UK): John Wiley & Sons; 2013.

16. Marra VN, Sette ML. Guia curricular de segurança do paciente da Organização Mundial da Saúde: edição multiprofissional. Rio de Janeiro: Autografia; 2016.