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Medical training and clinical simulation: sharing an educational product to and with Medical students

Formação médica e simulação clínica: partilhando um produto educacional para e com estudantes de Medicina

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ABSTRACT

Introduction: The update of the 2014 National Curricular Guidelines (NCD) for medical courses in Brazil highlights the importance of meaningful learning aligned with the Unified Health System. To achieve this, it is essential to adopt innovative methods that promote the training of critical and autonomous professionals.

Objective: To present the development and evaluation/validation of the "Practical Guide: Learning Process in Clinical Simulation Settings in Medical Training".

Method: This study was characterized as a qualitative-quantitative study of a cross-sectional nature. Students who were studying (regularly registered) in the 6th and 7th periods in the first semester of 2024 year were included. The course of preparation and evaluation/validation of the Educational Product (EP) covered three stages, namely, Stage 1: Application of the Satisfaction with Simulated Clinical Experiences Scale (SSCES), Stage 2: Preparation of the EP - Practical Guide: Learning Process in Clinical Simulation Settings in Medical Training and Stage 3: Evaluation and Validation of the EP and data analysis processes involved statistical analysis and analysis of content.

Results and Discussion: Stage 1 involved 71 responses, with 45 female participants, 74.6% in the 7th semester and 25.4% in the 6th semester, with an average age of 26 ± 7 years. All of them reported having already participated in simulations during their medical degree. In Stage 2, Version 1 of the Practical Guide: Learning Process in Clinical Simulation was developed, aligned with the literature and in Stage 3, based on 7 interviews, core meanings were identified: evaluation of the clinical simulation (comfort, joy and satisfaction); simulation learning (predictions of medical work); strengths and weaknesses of simulation settings; and the Guide as an instrument for learning in medicine.

Final Considerations: All analysis taken indicate that a well-structured approach and adequate preparation are essential for clinical simulation to achieve its pedagogical objectives. The development of the **Practical Guide: Learning Process in Clinical Simulation Settings in Medical Training** as an EP, emerged and was validated/evaluated during this research and represents an advance in the structuring and accessibility of information for students about clinical simulation in medical education.

Keywords: Education, Medical; Simulation Training; Students, Medical.

RESUMO

Introdução: *A atualização das Diretrizes Curriculares Nacionais (DCN) de 2014 para cursos médicos no Brasil destaca a importância de aprendizagens significativas e alinhadas ao Sistema Único de Saúde. Para isso, é fundamental adotar métodos inovadores que promovam a formação de profissionais críticos e autônomos.*

Objetivo: *Este estudo teve como objetivo apresentar a elaboração e avaliação/validação do Guia prático: processo de aprendizagem em contextos de simulação clínica na formação médica.*

Método: *Este estudo caracterizou-se como um estudo qualiquantitativo de natureza transversal. Foram incluídos estudantes que estivessem cursando (regularmente matriculados) o sexto e o sétimo período no primeiro semestre do ano de 2024. O percurso de elaboração e avaliação/validação do produto educacional (PE) abrangeu três etapas: 1. aplicação da Escala de Satisfação com as Experiências Clínicas Simuladas (ESECS), 2. elaboração do PE – Guia prático: processo de aprendizagem em contextos de simulação clínica na formação médica – e 3. avaliação e validação do PE. Os processos de análise dos dados envolveram análise estatística e análise de conteúdo.*

Resultado: *A etapa 1 envolveu 71 respostas, com 45 participantes do gênero feminino, sendo 74,6% no sétimo semestre e 25,4% no sexto, com idade média de 26 ± 7 anos. Todos relataram que já tinham participado de simulações na graduação em Medicina. Na etapa 2, desenvolveu-se a versão 1 do Guia prático: processo de aprendizagem em contextos de simulação clínica na formação médica com base na literatura. Na etapa 3, a partir de sete entrevistas, identificaram-se núcleos de significados: avaliação da simulação clínica (conforto, alegria e satisfação); aprendizado em simulação (antecipações do trabalho médico); fortalezas e fragilidades dos contextos de simulação; e o guia como instrumento para o aprendizado em medicina.*

Conclusão: *As análises empreendidas sinalizam que uma abordagem bem estruturada e uma preparação adequada são essenciais para que a simulação clínica alcance seus objetivos pedagógicos. A elaboração do Guia prático: processo de aprendizagem em contextos de simulação clínica na formação médica como PE emergiu durante a presente pesquisa. O guia foi validado/avaliado e representa um avanço na estruturação e acessibilidade das informações para os estudantes sobre simulação clínica na educação médica.*

Palavras-chave: *Educação Médica; Treinamento por Simulação; Estudantes de Medicina.*

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INTRODUCTION

In Brazil, the 2014 update of the National Curriculum Guidelines (DCN) for medical courses emphasises the importance of meaningful learning, aligned with the demands of the Unified Health System. Health teaching requires innovative methods that encourage teachers to re-evaluate their practices and train critical and autonomous individuals[1,2]. Changing health work processes involves the convergence of continuing education and realistic simulation, creating educational spaces that reflect and transform everyday work processes[3].

Clinical simulation in Brazil began in the 1990s with advanced life support courses. Simulation-based education aims to transfer competences acquired in simulated environments to clinical practice, ensuring better qualification in cognitive, affective and psychomotor skills[4].

Simulation techniques include skills training, the use of mannequins, simulated patients, *r*ole-play, hybrid simulation, virtual, *in situ* and tele-simulation. Clinical simulation is a teaching-learning strategy that supports training in the competences defined in the DCN, allowing reflection on failures as part of learning[5].

Different studies have emphasised the contributions of clinical simulation in medical training. A study carried out in 2019 evaluated 30 medical students using the role-play technique and concluded that it was an effective learning method that was well accepted by medical students[6].

In 2023, a study entitled "Simulation-Based Teaching and the Promotion of Self-Confidence in Medical Students", which applied the Student Satisfaction and Self-Confidence in Learning Scale, obtained a satisfactory result in the survey and showed that the method provided students with new experiences, increased self-confidence and expanded knowledge applicable in the long term. The study emphasises the importance of including simulation in undergraduate medical curricula and highlights the challenges of this implementation[7].

A study conducted at three medical schools in Minas Gerais, with the aim of analysing the perception of academics regarding the transition from traditional teaching to the use of active methodologies, concluded that this was a major challenge for students and that a period of adaptation to the new methods was necessary to encourage adoption of the new teaching practices[8].

Students often have their first contact with the use of simulation as an active teaching methodology during their undergraduate studies, and the evaluation of these practices by the students themselves is essential for a meaningful learning process[9]. With this in mind, the aim of this article is to present the development and evaluation/validation of the Educational Product (EP) Practical Guide: Learning Process in Clinical Simulation Settings in Medical Training, with Medicine Students.

METHOD

The process of preparing and evaluating/validating the EP Guide to the Learning Process in Clinical Simulation Settings in Medical Training was characterised as a qualitative-quantitative, cross-sectional study. The qualitative-quantitative perspective allows for a broader analysis, articulating quantitative and qualitative data and producing a more complex and multidimensional understanding of the subject matter; the cross-sectional approach is also added as a facilitator of comparison between different groups or variables[10].

This study was conducted with students from two medicine courses located in Baixada Santista/SP, created under Law 12.871 of the Programa Mais Médicos (More Doctors Programme) (2013). Students were included if they were attending (regularly enrolled in) the 6th or 7th term in the first semester of 2024. Undergraduates who were absent at the time of the first stage of the research were excluded. In this context, the universe of participants was 142 students.

This study was submitted to the UNIFESP Research Ethics Committee, with the consent of the institutions in which the participants study and was approved under Opinion No. 6.540.388.

The process of preparing and evaluating/validating the EP encompassed three stages:

Stage 1: Scale of Satisfaction with Simulated Clinical Experiences ESECS

The Satisfaction with Simulated Clinical Experiences Scale (ESECS) is a Likert-type scale with 17 statements ranging from zero to ten, where zero represents the lowest level of satisfaction and ten represents the highest level of satisfaction. The 17 statements assess satisfaction with the simulated clinical experience in three dimensions: practical (nine items: 1,2, 3, 4, 5, 6, 7, 8 and 12), realism (five items: 13, 14, 15, 16 and 17), and cognitive (three items: 9, 10 and 11)[11].

The objectives of the research were presented to the students, as well as the objectives and characteristics of the Scale of Satisfaction with Simulated Clinical Experiences (ESECS) and the Characterisation Questionnaire at each institution. The scale was applied face-to-face and was preceded by a questionnaire to characterise the participants (age, gender, university and semester).

Stage 2: Drawing up the EP Practical Guide: Learning Process in Clinical Simulation Settings in Medical Training

Version 1 of the Practical Guide was developed on the basis of the study of the literature and the participants' responses obtained in Stage 1: Learning Process in Clinical Simulation Settings in Medical Training.

The EP proposed is in line with research line 1 of the Professional Master's Degree in Health Sciences Teaching - Cedess, Assessment, Curriculum, Teaching and Training in Health, and with the research project entitled Medical Training and Clinical Simulation: a study with medical undergraduates.

The aim of the EP was to create material for students that contributes to the teaching and learning of clinical simulation in medicine, broadening their understanding. Developed from a careful methodological itinerary, it integrated readings from specialised bibliography, the researcher's experiences and valuable contributions from the participating students. The guide offers detailed guidance on preparing, executing and evaluating simulation activities, supporting the students' understanding of the objectives.

The body of the product contains the following technical features: cover, brief contextualisation of what the guide proposes, introduction to the topic, contextualisation of the topic, references used and conclusion page. The product is in slide format (presentation using the image creation programme "Canva"), composed of 26 pages containing illustrations and text.

Stage 3: Evaluation and Validation of the EP

This stage was divided into two stages:

Stage 3.1 Medical students

The interviews were conducted face-to-face, with audio recording, at the schools where the students were studying, scheduled in advance via email.

In the instrument applied in Stage 1 of the study, the participant was asked if they would agree to take part in Stage 3. In terms of adherence to Stage 3, 25.4% (18 participants) who were studying in the 6th semester agreed to take part, and of the 74.6% (53 participants) who were studying in the 7th semester, 45 agreed to take part. Eleven participants were randomised according to semester; eight responded and a total of seven interviews were conducted, three with participants from the 6th semester and four with participants from the 7th semester.

In order to guarantee anonymity and preserve the identification of the participants, a citation criterion was established, represented by the letter P for participant and, in addition, each student was assigned a citation number. Thus, one of the students taking part in the research will be referred to as P1, and so on.

A script was used to guide the interviews with the students: Moment 1 - welcome, explanation of the objectives of the interview, signing of the Free and Informed Consent Form, agreement to audio recording; Moment 2 - What did you think/perceive/feel when answering the Scale of Satisfaction with Simulated Clinical Experiences; Moment 3 - significant learning experience in clinical simulation settings - main strengths/positive points/advantages/difficulties/weaknesses/critical nodes that you identify in medical undergraduate learning contexts; Moment 4 - Evaluation of the EP Practical Guide: Learning process in clinical simulation settings; Moment 5 - Closing.

The Stage 1 data was analysed by collecting all the answers, where a database was prepared in the Statistical Package for the Social Sciences (SPSS), version 20 for Windows, using descriptive statistics with measures of central tendency, dispersion and frequency. The Mann-Whitney U-test was used to compare the scores between the two semesters and between the genders. This analytical process follows the guidelines of the authors of the Scale[11].

Stage 3 used thematic content analysis from Bardin's perspective, which is widely used in qualitative research to analyse textual data and interpret it systematically. Content analysis involves three essential phases: pre-analysis, exploration of the material and treatment of the results – inference and interpretation[12].

Stage 3.2 Assessor-Teachers

3.2.1. Qualification exam

During the Qualification Exam, the teachers evaluated the items presented in the checklist on the EP evaluation form, where everything from structural aspects to quality aspects were considered and evaluated.

In the aforementioned exam, the assessor-teachers were appointed due to their proximity to the object of study: assessor-teacher 1, a researcher in the field of medical education and a specialist in the field of teaching with simulation in medical training, and assessor-teacher 2, a researcher in the field of health teaching and a specialist in research using validated scales.

3.2.2. Public Defence

During the Public Defence of the Dissertation and Educational Product session, the professors on the Evaluation Board assessed the EP, also using a structured form, in which the EP is assessed in terms of pre-textual elements,

product development (presentation/synthesis of the product, objective(s) of the product, description of the target audience, theoretical-conceptual framework, description of the methodological path), application of the product (target audience, results) and post-textual elements.

The two professors who sat for the Qualification Exam also made up the Assessment Board for that session, adding another professor, a medical educator and specialist in the field of clinical simulation in medical education.

RESULTS

The process of drawing up and evaluating/validating THE PRACTICAL GUIDE: LEARNING PROCESS IN CLINICAL SIMULATION SETTINGS IN MEDICAL TRAINING, following the methodology described, comprised a significant network of data on the study subject matter.

In the process of drawing up the GUIDE, the Satisfaction with Simulated Clinical Experiences Scale (ESECS) was initially applied to 75 medical students. In accordance with the methodological procedures adopted, a characterisation/profile questionnaire was presented to the respondents before the Scale, and 74 responses were obtained. Of these, three failed to answer at least one of the questions on the Scale and were excluded from the analysis. The entire analysis was based on 71 answers.

The respondent group is characterised by being female (45 responses /63.4%); it is worth noting that all the participants in this survey declared themselves to be cisgender. Of the participants, 74.6% were in their 7th semester, while 25.4% were in their 6th semester. The average age of the students was 26 ± 7 years.

All 71 respondents reported that they had already taken part in a simulation scenario during their medical degree. Of these, 28 (37.83%) were unable to remember how many times they had taken part as observers or role players. Of the participants who recalled taking part in a simulation scenario, there was an average of 15 ± 8 participations as observers and 8 ± 5 participations as role players.

The number of people participating in simulations as observers was 13 (34.2% of respondents). The number of participants in simulations as role players was 11 (28.9% of respondents).

With regard to the results for each question that makes up the ESECS, the scores for all the questions were high, with the majority (76.5%) of the questions having a median of nine points and all having a 25% quartile of at least seven points. Question two, referring to the lessons learnt, had the lowest median score, with eight points, while questions 15, 16 and 17, which address the quality of the material used in the practicals, the quality of the equipment used in the practicals and the quality of the simulators, respectively, had the highest median score, with 10 points.

The median ESECS total score was 8.8 points, with an interquartile range of 8.1 to 9.2 points. The practical dimension scored 8.6 [8.0-9.2], the realism dimension 9.0 [8.4-9.8] and the cognitive dimension 8.7 [7.7-9.3] points. Thus, it can be seen that all the dimensions had a median score greater than 8.6, and the realism dimension had the highest median compared to the other dimensions.

Comparisons of the results for each ESECS question between the two semesters and between the two genders are shown in Tables 1 and 2, respectively. There was a statistically significant difference when comparing the genders for the questions "satisfaction with the post-scenario debriefing" and "realism of the scenarios developed". In both questions, the score was higher among those who declared themselves to be female compared to those who declared themselves to be male: median 9.0 [8.0-10] versus 8.0 [7-9.75] for the question related to debriefing and 9.0 [9.0-10] versus 8.0 [7.0-9.0] for realism of the scenarios.

The set of data and analyses carried out from the application of the Scale, combined with the literature review, made it possible to propose a version of the Practical Guide: Learning Process in Clinical Simulation Settings in Medical Training.

With a view to evaluating the Guide, meetings were held with students and assessor-teachers. The meetings with the students were held with participants who had answered the ESECS. Seven medical students were interviewed, four of whom were female and three male, in the sixth (three interviewees) and seventh (four interviewees) semesters.

In analysing the seven interviews conducted and transcribed, 68 setting units and 95 recording units were identified. During the process of reading, re-reading and apprehending these units, the following meanings clusters emerged: expressing an assessment of clinical simulation in learning medicine: comfort, joy and satisfaction; learning in clinical simulation settings: expectations of medical work; clinical simulation settings in the medical course: strengths; clinical simulation settings in the medical course: weaknesses; Guide: an instrument for approaching learning in medicine.

The cluster "expressing an evaluation of clinical simulation in medical learning: comfort, joy and satisfaction" enabled understanding of various and repeated manifestations from the participants interviewed in relation to "feeling good" about answering the ESECS and being aware of the results of phase 1 of this research. Participants P5 and P3 express themselves:

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Table 1. Comparisons of the results presented in each ESECS question by semester.

Assertions	6th Semester	7th Semester	p
1. overall satisfaction with practical classes	9.0 [8.0-10]	8.0 [7.0-10]	0,310
2. learnings gathered	9.0 [8.25-10]	8.0 [7.0-9.0]	0.059
3. motivation when coming to practical classes	8.0 [7.25-9.75]	9.0 [7.0-10]	0.802
4. dynamism of practical classes	9.0 [8.0-9.0]	9.0 [8.0-10]	0.854
5. active participation in the scenarios developed	9.5 [8.0-10]	9.0 [8.0-10]	0.423
6. interaction with peers	9.0 [8.0-10]	9.0 [8.0-10]	0.696
7. interaction with teachers	9.5 [9.0-10]	9.0 [8.0-10]	0.168
8. satisfaction with the degree of difficulty of the scenarios	8.5 [7.25-10]	9.0 [7.0-10]	0.566
9. satisfaction with the post-scenario debriefing	9.0 [7.25-10]	9.0 [8.0-10]	0.890
10. linking scenarios to theory	9.0 [7.0-10]	9.0 [8.0-10]	0.658
11. suitability for the themes developed in tp classes	8.0 [7.25-9.0]	9.0 [8.0-9.0]	0.351
12. productivity during practical lessons	9.0 [8.0-10]	9.0 [8.0-10]	0.741
13. realism of the scenarios developed	9.0 [7.0-10]	9.0 [7.0-10]	0.989
14. credibility during the scenario	9.0 [8.0-10]	9.0 [8.0-10]	0.559
15. quality of the material used in the practicals	10 [8.25-10]	9.0 [8.0-10]	0.554
16. quality of the equipment used in the practicals	10 [9.0-10]	10 [8.0-10]	0.308
17. quality of the simulators	10 [9.0-10]	10 [9.0-10]	0.906

Legend. Tp: theoretical-practical
Source: The authors.

Table 2. Comparisons of the results presented in each ESECS question by gender.

Assertions	Female	Male	p
1. overall satisfaction with practical classes	9.0 [8.0-10]	8.0 [7.0-10]	0.366
2. learnings gathered	9.0 [8.0-10]	8.0 [7.0-9.0]	0.409
3. motivation when coming to practical classes	9.0 [7.0-10]	8.0 [7.0-10]	0.686
4. dynamism of practical classes	9.0 [8.0-10]	8.0 [8.0-9.75]	0.352
5. active participation in the scenarios developed	9.0 [8.0-10]	9.0 [8.0-10]	0.946
6. interaction with peers	9.0 [7.0-10]	9.0 [8.0-10]	0.720
7. interaction with teachers	9.0 [8.0-10]	9.0 [8.25-10]	0.218
8. satisfaction with the degree of difficulty of the scenarios	9.0 [8.0-10]	8.0 [7.0-10]	0.345
9. satisfaction with the post-scenario debriefing	9.0 [8.0-10]	8.0 [7.0-9.75]	0.028
10. linking scenarios to theory	9.0 [8.0-10]	9.0 [7.25-9.75]	0.486
11. suitability for the themes developed in tp classes	9.0 [8.0-9.0]	8.0 [7.0-9.0]	0.280
12. productivity during practical lessons	9.0 [8.0-10]	9.0 [8.0-10]	0.955
13. realism of the scenarios developed	9.0 [9.0-10]	8.0 [7.0-9.0]	0.024
14. credibility during the scenario	9.0 [8.0-10]	9.0 [8.0-9.75]	0.309
15. quality of the material used in the practicals	10 [8.0-10]	9.0 [8.0-10]	0.271
16. quality of the equipment used in the practicals	10 [9.0-10]	9.5 [8.25-10]	0.438
17. quality of the simulators	10 [9.0-10]	9.0 [9.0-10]	0.142

Source: The authors.

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> *"Yes. In my opinion, this is very important, especially to know the students' feedback, right? Because someone doesn't always come and ask how it's going and so on, and for me as a student I think it adds a lot, because it brings us closer to practice than we realise." P5*

> *"I felt comfortable answering, it's... I thought all the information was very clear about what it wanted to know from us, so I was very sincere and felt very comfortable about being sincere." P3*

The cluster "learning in clinical simulation settings: significant expectations of medical work" were the manifestations from the participants' perspective in relation to the contributions of simulation practice for future medical professionals. They emphasised the importance of the skills developed in safe and controlled scenarios, which favour the improvement of practices and greater security for the challenges that will be encountered in their future professional careers. P4 said:

> *"'If I'm not mistaken it was neurology, it was general neurology, we had a scenario to identify skull base lesions, identify some of the patients' signs and symptoms, do the initial tests, like the patient's gait, if they can walk, score them on the Glasgow Coma Scale" (...)*
> *"We have to train in that, because we're going to need to know it all on the spot with the patient, so these scenarios were good for us, because as we went to the rotations in the hospital, it helped a lot, it guided us in what we have to do so we don't lose our way, so it's very helpful."*

In the cluster *Clinical simulation settings in the medical course: strengths*, the participants provided several comments regarding the value and importance that students see in this learning context. The role of each member of the simulation was considered essential for success, as well as emphasising the role of the teacher in this teaching-learning process, considering the relationship between theory and practice. Participants P1 and P6 said:

> *"When the teacher is very good, he manages to fit you into the setting and I think that when the clinical case has been very well described to you, that it is actually just that, it doesn't give you any leeway to think about anything else, or it might give you leeway in the sense of thinking of different diagnostic hypotheses, but not to have something that is not in line with the matter at hand." P1*

> *"You learn a lot more through practice, right? When you read a book you imagine and when you practice with either a mannequin or an actor you have to retrieve that theory you picked up days or weeks ago and it makes you push much harder, reinforce your knowledge..." P6*

The cluster "Clinical simulation settings in the medical course: weaknesses", made it possible to learn about the needs to be taken into account for clinical simulation to achieve its objectives. According to them, structured knowledge, organisation and the commitment of all participants have an impact on the outcome of the learning process in clinical simulation contexts. This core emerged when analysing statements such as those made by P6 and P4:

> *"A little bit of organisation with regard to the teachers, with regard to hitting study points, following a logical order of the subjects." P6*

> *"I don't think the simulation has a standard, we've bee getting that standard recently, with the teachers who are being aligned, with the coordination, now there's a team of actors who are a bit more standardised." P4*

The students evaluated the proposed Educational Product in Version 1 in terms of its format, content, relevance and other suggestions: the following statements show a positive evaluation from the students:

> *"I thought it was really nice, everything I got to see, what types of simulation there are, because I thought there were only two." P5*

> *"I thought the whole format was really cool. I liked it, I liked it a lot. I understood it and thought it was really nice. I thought it was pretty self-explanatory... I thought it was great." P6*

> *"I liked it! The design, the lettering, there are references throughout the text too, I thought it was didactic." P1*

> *"I think this guide is important in the sense of... especially when the student is having their first contact, because it's different to what we're used to before entering university. So this guides and even makes the student understand, realise why they are in that scenario." P3*

The meetings with teachers, during the Qualification Exam and the Public Defence session, provided the basis for a final version of the Educational Product. The evaluations focused on various aspects, using the checklist in the UNIFESP Educational Product Evaluation Form. Both structural issues and the quality of the material presented were scored. During the evaluation, the teachers stressed the need to add basic information about the institution, the programme and the authors, as well as asking for emphasis on the specific destination of the material for students, adding information about the role of the student at each stage of the process. It's important to note that of the three assessor-teachers, two are medical educators and specialise in the field of simulation in medical training.

DISCUSSION

Simulation is considered a learning approach that not only facilitates a more lasting retention of knowledge, but also offers a more engaging and enjoyable experience compared to traditional teaching methods[13]. The knowledge and practice acquired in clinical simulation training makes it possible to anticipate risk situations that may occur in routine medical practice and serves as a strategy to support organisations in their quest for high reliability[4]. Thus, the main purpose of simulation should be to create a connection with clinical practice and give students the chance to apply theoretical knowledge and psychomotor skills in a practical context[7].

Accordingly, it can be said that the construction of scenarios enables the pedagogical development of clinical simulation, and the standardisation of simulation design ensures that the structure, development and results are aligned with the established objectives[14].

Organisation, teacher training and the structuring of learning objectives need to be considered if the use of clinical simulation as a teaching method is to be effective. In order to promote the transformation of health work processes, it is essential to adopt an appropriate political-pedagogical approach. In this context, integrating the objectives of continuing education with the technique of realistic simulation in healthcare becomes crucial[3].

One of the main points for the simulation to be conducted correctly is to plan the strategy to be used. The choice needs to be made in line with the proposed learning objectives, and it is essential to identify the necessary resources. A checklist or list of the essential items for this organisation is a strategy for a good result[4]. The standardisation of clinical simulation within a medical school is crucial for levelling and a longitudinal view of the learning objectives proposed in the curriculum[15].

The results presented indicate a high rate of participation by medical students in clinical simulation scenarios, with a considerable average number of participants, both as observers and role players. However, some studies show that student participation in simulation scenarios can vary according to the institution and educational context[16].

The data obtained indicates a higher number of participants who identified as cisgender women, compared to the existing literature. Some studies conducted with medical students versus clinical simulation, such as the one by Engelhorn et al also obtained a higher rate of female participants[6]. The research by Silva et al indicated a higher rate of male participants[7].

The results indicate that the average age of the participants in this study was 26 ± 7 years. In comparison with the literature, a study carried out by Moliterno et al aimed to describe student perceptions of the use of realistic high-fidelity simulation in paediatric emergency modules during their medical clerkship, the average age of the participants in this study was 24± 1.8 years and they also obtained a higher rate of female participants[17].

Considering the existing studies on clinical simulation and undergraduate medical studies, we can see that the research takes place with students from the third year onwards: Santos et al conducted a study with fifth semester medical students, Roderjan et al conducted a study with sixth year medical students and Moliterno et al investigated fifth- and sixth-year clerkship students[17,19].

Students who take part in simulations are better able to deal with complex clinical situations. Furthermore, these students tend to develop more self-confidence and knowledge compared to those who are trained through traditional teaching methods[7].

The participating students clearly expressed the importance they attach to training technical and non-technical skills through simulations. They emphasise how this will contribute to greater knowledge and safety in medical practice. The role of each participant in the clinical simulation setting was highlighted as fundamental for the learning objectives to be achieved, from the creation and development of the scenario, which involves the teacher's training and knowledge of the methodology, to the debriefing.

As regards the proposal to use active methodologies in teaching, which place the student as the protagonist in their learning process, feedback is very important. Students usually have their first contact with the use of simulation as an active teaching methodology during their undergraduate studies. Therefore, their evaluation of the practical activities is fundamental to good performance in the teaching-learning process[9].

By incorporating active methodologies as a pedagogical strategy, medical education allows students to assume a central role in the search for knowledge and to take a critical, reflective look at the learning processes of their training[18]. In view of this, it is imperative that students actively participate in their teaching-learning process in order to contribute suggestions for improving this process. It can be seen how innovative clinical simulation is for undergraduate students and it is therefore of the utmost importance that their perceptions of the practices used are taken into account, since each student may have a specific sensory modality for their learning process[18].

In this regard, the analysis and discussion of the results reveal the importance of clinical simulation in medical training, from the perspective already emphasised in the National Curriculum Guidelines (DCN) for Medical Courses[1]. It is therefore clear that clinical simulation goes beyond methodological

parameters, contributing to curricular development in its complexity, historicity and dynamism. It also expands its contributions when medical training is designed together with other health professionals, building a multiprofessional culture for and in health work[15].

FINAL CONSIDERATIONS

The development of the Practical Guide: The Learning Process in Clinical Simulation Settings in Medical Training represents a contribution to the structuring and accessibility of information for students. This Guide aims not only to inform, but also to promote critical reflection on simulated practice, enriching the educational experience and learning of future physicians.

The Guide is an innovation in its drafting process, given the pioneering use of the Satisfaction with Simulated Clinical Experiences Scale (ESECS) in medical school contexts and contributes to the improvement of clinical simulations.

It is important to point out the limits of this study in terms of the scope of the evaluation/validation: by covering a group of students from two medical schools and analyses by experts in the evaluation stages of the Professional Master's Programme it did not involve other levels of validation (such as application to other groups of students and/or evaluation by experts using the Delphi Technique) and therefore the generalisation of the results is limited.

The development of this research reveals the importance of investigative studies with a wider range of participants, as well as the expansion of those involved to include teachers who use clinical simulation in undergraduate medical courses.

It is hoped that this educational product can contribute to students' understanding of the use of simulation as a learning space, a more critical and reflective evaluation of this approach, reaffirming its role in medical training and commitment to the Unified Health System.

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CONTRIBUTION OF THE AUTHORS

Yasmin Duarte: Design and development of the study, production and analysis of the data, as well as the final writing of the manuscript. Sylvia Helena Sousa da Silva Batista: Design and monitoring of the development of the study (including data production), analysing the data and final writing of the manuscript.

CONFLICT OF INTEREST

We declare no conflict of interest.

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DECLARATION OF DATA AVAILABILITY

Research data is available in the body of the document.

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