

# Construction and validation of a telesimulation scenario in the context of children with intestinal stoma

*Construção e validação de cenário de telessimulação no contexto da criança com estomia intestinal*

*Construcción y validación del escenario de telesimulación en el contexto de niños con estomia intestinal*

## ABSTRACT

**Purpose:** Describe the construction and validation of a telesimulation scenario for nursing care for children with a colostomy. **Methods:** Methodological study developed in three stages: construction, validation, and pilot test of the scenario. **Results:** The scenario script was constructed and subsequently approved by three stomatherapists with a 95% percentile. The scenario was then validated by telesimulation by five experts and reached a content validity index of 0.88. After validation, a pilot test was performed with three nursing students. **Conclusion:** The validation of the scenario reached a satisfactory percentile and allowed the organization and correction of the telesimulation structure, prioritizing the sum of experiences and the professional development of students. In conclusion, telesimulation is a promising alternative as an active method of simultaneous teaching to traditional clinical simulation.

**Descriptors:** Simulation training; Child; Stoma; Education, distance; Nursing.

## RESUMO

**Objetivo:** Descrever a construção e validação de um cenário de telessimulação para a assistência de enfermagem à criança com colostomia. **Método:** Estudo metodológico desenvolvido em três etapas: elaboração, validação e teste piloto do cenário. **Resultados:** O roteiro do cenário foi construído e posteriormente aprovado por três estomaterapeutas com percentil de 95%. Subsequente o cenário foi validado por telessimulação com cinco peritas e atingiu índice de validade de conteúdo de 0,88. Após a validação foi realizado teste piloto com três acadêmicas de enfermagem. **Conclusão:** A validação do cenário atingiu um percentil satisfatório e permitiu organizar e corrigir a estrutura da telessimulação, priorizando a soma de experiências e o desenvolvimento profissional de estudantes. Foi traçado que a utilização da telessimulação consiste em uma promissora alternativa como método ativo de ensino simultâneo à simulação clínica tradicional.

**Descritores:** Treinamento por simulação; Criança; Estomia; Educação à distância; Enfermagem.

## RESUMEN

**Objetivo:** Describir la construcción y validación de un escenario de telesimulación para la atención de enfermería de niños con colostomía. **Método:** Estudio metodológico desarrollado en tres etapas: elaboración, validación y prueba piloto del escenario. **Resultados:** El guion del escenario fue construido y posteriormente aprobado por tres estomaterapeutas con un percentil del 95%. El escenario posterior fue validado por telesimulación por cinco peritas y alcanzó un índice de validez de contenido de 0,88. Después de la validación, se realizó una prueba piloto con tres estudiantes de enfermería. **Conclusión:** La validación del escenario alcanzó un percentil satisfactorio y permitió la organización y corrección de la estructura de la telesimulación, priorizando la suma de experiencias y el desarrollo profesional de los estudiantes. Se trazó que el uso de la telesimulación consiste en una alternativa prometedora como método activo de enseñanza simultánea a la simulación clínica tradicional.

**Descritores:** Entrenamiento simulado; Niño; Estomía; Educación a distancia; Enfermería.

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## INTRODUCTION

An intestinal stoma is a surgical procedure in which exteriorization of the small or large intestine is performed in order to eliminate fecal content and flatus<sup>(1)</sup>. Providing qualitative and comprehensive nursing care to people with stomas, whether adults or children, is a challenge for nurses, who are among the main members of the multiprofessional team to provide technical care, psycho-emotional support, as well as relevant guidance, covering the entire stoma process<sup>(2-3)</sup>.

Intestinal stomas in children are usually temporary, have particularities related to the child's evolution, and their maintenance is related to the cause of stoma surgery, requiring health professionals, when providing care, to consider these characteristics<sup>(4)</sup>. Nurse familiarization with therapeutic interventions for this population should start during undergraduate training, using active methods that prioritize scientific and practical concepts on the subject<sup>(3,4)</sup>.

Using active methods to teach care practices in health courses presents good results. Clinical simulation is one of the most common active methods, providing students with practical training in a controlled environment, and allowing them to develop technical skills, clinical competences, and clinical reasoning techniques<sup>(5)</sup>. For proper use of this method in teaching, instruments should be developed to assess and validate content that prioritizes quality, legitimacy, and reliability of simulated scenarios and the students' experience with the care reality<sup>(6)</sup>.

Currently, the scenario of practical teaching in undergraduate health courses has been reformulated, especially after the COVID-19 pandemic was announced in March 2020<sup>(7)</sup>. After this new reality, the teaching and learning process has significantly changed, with the incorporation of remote classes for subjects that were exclusively face-to-face. In this sense, the active practical teaching methods also had to be adapted, given the importance of protecting the safety of students and professors, and the

quality of teaching, including the practice of clinical simulation by students in laboratories<sup>(8)</sup>.

This new experience in education highlighted the importance of combining alternatives to ensure the continuity of teaching methods, including simulated teaching, by using remote simulation or telesimulation<sup>(9)</sup>. This resource shows online simulations to students based in different locations, allowing synchronous discussions, sharing of experiences, and development of active communication<sup>(10)</sup>.

Telesimulation has been used in many countries. It combines the theoretical concepts of standard simulation with telecommunication resources, providing knowledge and training to students away from simulation centers<sup>(9)</sup>. This method allows connectivity through the internet, using distance education and clinical simulation standards, aiming to understand clinical cases, train non-technical skills, improve clinical reasoning, and evaluate the situations presented<sup>(9, 10, 11)</sup>.

Considering the importance of clinical simulation for nursing students, the critical role of nurses in assisting children with an intestinal stoma, and the convenience of using virtual technologies in teaching, especially in the period of restrictions to face-to-face classes, the following guiding question was identified: Is it possible to validate a telesimulation scenario for the care of children with intestinal stomas? Based on this question, the following hypothesis is assumed: The validation of a telesimulation scenario for the care of children with intestinal stomas is feasible.

Given the considerations above, this study aimed to describe the construction and validation of a telesimulation scenario of nursing care for children with a colostomy.

## METHOD

This is a methodological study for the construction and validation of a telesimulation scenario focused on the training of nursing students in the care of children with a colostomy, conducted at a public university in the Center-West region

of Brazil. This study was developed in three stages, starting with the bibliographic research in June 2020 and the conclusion of all stages in May 2021.

The first stage of the study consisted of the theoretical development of the scenario and subsequent evaluation of the content by experts in stomatherapy. For content development, a narrative review was conducted about intestinal stomas and care for children with these stomas. Then, the scenario was built with a focus on nursing care for children with a colostomy who were treated in an outpatient clinic, in order to observe the students' prior knowledge, learning objectives, theoretical foundations, scenario preparation, scenario development, debriefing, and evaluation. Debriefing based on principles of transfer of learning was adopted, using the oral debriefing technique<sup>(12)</sup>.

For the scenario construction, the structure of the Simulation in Nursing Education/NLN was used to ensure the context, background, design, experience, facilitator, participant, and possible outcomes<sup>(13)</sup>. After content development, the scenario was evaluated by three stomatherapy nurse specialists, through an electronic form created by the researchers, which assessed 10 items: 1 – appearance and organization of the content; 2 – learning objectives; 3 – plausibility of the clinical case; 4 – realism of the clinical case; 5 – complexity of the clinical case; 6 – briefing; 7 – materials and equipment; 8 – human resources; 9 – simulator; and 10 – debriefing. The selection of evaluators was based on their experience in stomatherapy, clinical simulation, higher education teaching, and consent to participate in the study.

The second stage involved the scenario validation. This phase had the participation of five experts, who had at least a master's degree, with a dissertation in the area of interest of this study, or a doctoral thesis, with clinical practice of at least one year, or specialization or publication of a relevant study, or publication of an article in a reference journal in the study fields – stomatherapy or clinical simulation<sup>(14)</sup>.

The experts were contacted after analyzing their curriculum. After they accepted to participate in the study, they received an email with a link to access the electronic validation page with four forms: informed consent form, sociodemographic characterization form, scenario description form, and scenario evaluation form.

The experts watched, by synchronous transmission, a telesimulation session performed in the nursing practice laboratory by two nurses, one acting as the nurse and the other as the mother of the child receiving nursing care. The nurses received previous training about the clinical case, dynamics of the scenario, and handling of adjuvants and manikins. For child simulation, an infant manikin simulator was used for low-fidelity nursing training, and makeup was applied to simulate peristomal dermatitis in the peristomal region of the manikin.

The telesimulation was streamed by synchronous transmission via Zoom® in April 2021. To represent the actual observation of the activity, two laptops and three smartphones with the cameras turned on and connected to the Zoom® platform were distributed at a distance of one meter from the actresses and the manikin. Four cameras were focused on the scene to ensure the transmission from different angles of the telesimulation, and one camera on the table of materials and adjuvants. An omnidirectional microphone was also positioned on the bed where the simulator was located, connected to one of the computers. Telesimulation lasted around 15 minutes, and after the end of its stages, the experts made considerations regarding relevant adjustments and filled out the scenario evaluation form.

This form was distributed to the experts as a Likert scale, consisting of 10 items to be evaluated as: 1 – inadequate (non-relevant or non-representative item); 2 – partially adequate (item needs revision to be representative); and 3 – adequate (relevant or representative item)<sup>(14-15)</sup>. The content validity index (CVI) was calculated for each item of the

evaluated scenario, for both individual items and general content evaluation<sup>(14)</sup>.

The third stage of the study was performed after the validation of the experts and proposed adjustments. It involved testing the telesimulation scenario with students from the 8th semester of the nursing course. Students from the 8th semester were selected because they had completed the theoretical subjects of Nursing Foundations and Child and Adolescent Health. The scenario was tested only once and had three students as observers. The students filled a form consisting of eight questions that evaluated the items as a Likert scale: 1 - inappropriate (non-relevant or non-representative item); 2 - partially adequate (item needs revision to be representative); and 3 - adequate (relevant or representative item)<sup>(14-15)</sup>.

The statistical analysis of the findings used Microsoft Office Excel® spreadsheets. To calculate the CVI, the agreement of the experts was measured regarding the investigated items, considering only the domains classified as adequate by the experts. For each domain, the number of adequate items was added up

and this sum was divided by the total number of answers<sup>(15-16)</sup>, as described in formula below<sup>(16)</sup>:

$$CVI = \frac{\text{Number of answers classified as adequate}}{\text{Total number of answers}}$$

The agreement rate considered acceptable for evaluating the items individually must be higher than 0.78, preferably higher than 0.90<sup>(16)</sup>.

The study complied with ethical requirements for research involving human beings and was approved by a research ethics committee under approval 4.626.575 and certificate of submission to ethical review no. 40811820.3.0000.0030.

## RESULTS

In the scenario construction stage, three expert stomatherapists analyzed the plausibility of the clinical case, materials and equipment available, and the realism of the scenario, and assigned the final percentage of 95% (0.95)<sup>(15)</sup> of approval for the scenario content, based on the items classified as adequate by the experts. Chart 1 below shows the planning and development of the main items contained in the scenario.

**Chart 1** – Description of scenario elements. Brasilia, Federal District, Brazil, 2021.

Nursing care for children with a colostomy	
<b>Students' previous experience</b>	Nursing students who had attended the 5th semester.
<b>Learning objective</b>	Provide comprehensive nursing care to children with a colostomy.
<b>Duration</b>	15 to 20 minutes
<b>Previous material</b>	Expository class and provision of references for prior reading.
<b>Case description:</b>	João Gabriel, 3 years old, on the 13th postoperative day of a temporary left colostomy construction surgery, and discharged from hospital three days ago. During the neonatal period, he underwent a surgical intervention to treat Hirschsprung's Disease, developed intestinal complications, with poor adaptation to conservative therapies. The patient was conscious, oriented, crying, with a slightly distended abdomen, presence of intestinal waste collection equipment on the left, functioning colostomy with pasty stool of brown color and characteristic odor.
<b>Information to students</b>	You are the nurse responsible for the regional outpatient clinic and were called to room 1 to provide care to a 3-year-old child, on the 13th postoperative day of a colostomy construction surgery.
<b>Material resources available</b>	Drainable collection equipment of the following types: one piece (flat and convex) and two pieces (flat and convex), opaque and transparent, in adult and child sizes. Stoma gauge, straight and curved scissors, gauze, tray, sterile glove box, protective eyewear/visor, mask, disposable apron, sterile glove, saline solution 500 and 250 ml, 10 and 20 ml syringe, 40x12 needle, bandage, micropore tape, dressing pack, bedpan, medical waste bag, skin protection materials (powder, skin protection paste, skin protection spray, moldable ring for stoma), and antiseptics. Documents available: referral and patient report containing history, description, and evolution of the clinical case.

(Continues)

Nursing care for children with a colostomy	
Scenario development	Students must communicate with the child's mother; change the collection equipment; evaluate the intestinal waste, the stoma, and the peristomal skin; apply adjuvants (if necessary); attach new collection equipment; offer pertinent guidance to the mother; and write down the information. Note: The child has the conditions indicating peristomal dermatitis.
Debriefing	Estimated time: about 20 minutes.

Source: Research data.

The validation was performed by five expert nurses, two of them had a doctor's degree and three had a master's degree in nursing, all with experience in undergraduate or graduate research, and 2 to 20 years of experience in stomatherapy (two participants) and clinical simulation (three participants). Among the experts, two were professors at public universities and three worked in public

health institutions. According to Fehring's index (1987)<sup>(14)</sup>, the experts were classified with the following percentages: one expert with six points, one with eight points, one with nine points, one with 10 points, and one with 13 points.

The general CVI was 88% (0.88), calculated from the sum of items with a rating higher than 78% (0.78)<sup>(16)</sup> divided by the total number of items evaluated (10 items were evaluated) (Table 1).

**Table 1** – Content validity index (CVI) of the scenario validation process by the experts. Brasilia, Federal District, Brazil, 2022.

Items evaluated	Inadequate	Partially adequate	Adequate	CVI
	N (%)			
1. Appearance and organization of the scenario.	---	---	5 (100)	1.0
2. Coherence and adequacy of the objective described in relation to that presented during the simulation.	---	---	5 (100)	1.0
3. Availability of sufficient materials that were relevant to the scenario.	---	---	5 (100)	1.0
4. Availability of sufficient human resources for the scenario case execution.	---	---	5 (100)	1.0
5. Adequate time of scenario case duration.	---	2 (40)	3 (60)	0.6
6. Simulator.	---	---	5 (100)	1.0
7. Scenario realism.	---	1 (20)	4 (80)	0.8
8. Promotion of critical thinking.	---	---	5 (100)	1.0
9. Debriefing (questioning and reflections)	---	---	5 (100)	1.0
10. The development of the scenario allows reaching the objective.	---	---	5 (100)	1.0
General CVI	---	---	---	0.88

Source: Research data.

Some suggestions were made by the experts: installation of two more cameras for the telesimulation, one on the ceiling with a focus on the abdomen of the simulator and one in front of the table of materials and adjuvants; more time available (more than 15 minutes) to perform the telesimulation; incorporation of more realism to the scene when providing instructions to the

child's mother; and the use of cotton wool instead of gauze to clean the stoma and peristomal skin, due to the sensitivity of the child's skin.

The adjustments proposed by the experts were incorporated to improve the scenario, and then the telesimulation was synchronously transmitted to three nursing students, as a scenario test. In order to ensure the students

would understand the topic addressed in the simulated activity, 15 days before the telesimulation, a theoretical class was provided, whose central theme was nursing care for children with an intestinal stoma, and theoretical references were offered on the subject.

After the telesimulation, the students remained in the virtual meeting room and were

encouraged to talk about their perceptions of the activity in the debriefing. During this period, the students talked about the scenario, approach to the theme, obstacles and contributions of the method for learning, and help of telesimulation to understanding the role of nurses and care for children with a colostomy. After that, the students filled out the telesimulation evaluation form (Table 2).

**Table 2** – Telesimulation evaluation by the students. Brasilia, Federal District, Brazil, 2022.

Items evaluated	Inadequate	Partially adequate	Adequate
	N (%)		
1. Information provided in the debriefing	---	---	3 (100)
2. Scenario realism	---	1 (0.33)	2 (66)
3. Simulator	---	---	3 (100)
4. Environment	---	1 (0.33)	2 (66)
5. Scenario visualization	---	---	3 (100)
6. Audio	---	---	3 (100)
7. Promotion of critical thinking	---	---	3 (100)
8. Assistance in problem solving	---	---	3 (100)

Source: Research data.

The scenario test with the students allowed testing the adjustments suggested by the experts to the positions of the microphone and cameras, the time for telesimulation and debriefing, and manikin positioning, in order to reach the objectives of the scenario.

During the debriefing, the students highlighted telesimulation as a valid and important strategy for the initial contact with nursing care to individuals with stomas, and emphasized the relevance of such experience as spectators, which is similar to real life, before providing care to a real patient. Based on the analysis of the students' answers, domains 2 (scenario realism) and 4 (environment) were revised for future scenario testing.

## DISCUSSION

Many studies have been published in recent years with positive results regarding the use of clinical simulation in nursing to enhance clinical skills, critical thinking, clinical reasoning,

cognitive skills, and interpersonal development of students participating in the simulation<sup>(17-18)</sup>.

The use of clinical simulation in teaching requires planning, good methodological structuring, trained professionals, and efficient resources. When preparing the scenario, the following aspects should be considered: careful selection of content, the physical space to perform the activity, the material resources required such as audio and video, hospital medical materials, patient documentation, selection of the most appropriate simulator for the training practice, and if relevant, the participation of actors<sup>(19)</sup>.

When used as an active method for acquiring skills for a particular type of care, such as assisting an individual with an intestinal stoma, a successful simulation experience requires the planning of clear learning objectives to provide a consistent correlation with reality, multiprofessional work, and the availability of relevant information to ensure

care continuity<sup>(5,17)</sup>. In this aspect, the feasibility of validated scenarios contributes to the quality and loyalty of the simulated practice<sup>(19-20)</sup>.

Teaching students how to think clinically is usually based on a hands-on face-to-face experience. However, many situations require adaptations, changing the face-to-face teaching process to a hybrid or strictly remote process. Case studies, simulations, and group discussions have records of successful remote teaching strategies, including for the promotion of clinical reasoning of students<sup>(21)</sup>.

For successful remote teaching of practical concepts, a well-founded plan must be developed with clearly defined objectives. Simulated practice, even by remote transmission, can reduce student stress and anxiety, allowing a focus on specific non-technical skills and acquisition of content mastery, preparing students for a real-life face-to-face situation<sup>(22)</sup>.

Clinical simulation resources have been used in combination with digital and telecommunication resources to shorten distances and allow students located far from simulation centers to participate in simulations<sup>(9-10)</sup>. Thus, new types of standard simulation have been created, including telesimulation<sup>(23)</sup>.

The COVID-19 pandemic showed a new reality for teaching clinical practices in nursing. These changes brought challenges for students and professors, who were forced to reformulate and reorganize clinical education in nursing with the incorporation of distance education and its remote educational technologies, reorganization of field practical teaching and laboratory simulated teaching<sup>(24-25)</sup>.

In this context, telesimulation, already used before the pandemic, became an applicable and safe method for the association of theoretical concepts with practical resources, one of the objectives of nursing education, especially considering the impossibility of face-to-face training, or even as a resource to prepare students who will start practical field activities<sup>(26)</sup>.

Telesimulation as an active teaching method enables the observation and development of

a communication process among students, favors the visualization of the professional profile during nursing care, and contributes to the identification of roles and improvements in cognitive aspects of students<sup>(27)</sup>. It is an active positive learning method that introduces new knowledge to students during the teaching process<sup>(23)</sup>, which can be applied to the context of nursing care for children with an intestinal stoma.

The implementation of remote active learning techniques in health disciplines does not replace face-to-face teaching, but can help improve theoretical learning outcomes, as a complement to traditional clinical practice, promoting safe work, self-confidence, and security in decision making, especially when combined with face-to-face activities<sup>(28-29)</sup>.

It should be noted that face-to-face practical teaching is indispensable and irreplaceable for the clinical maturation of students and the development of specific skills and abilities. Therefore, telesimulation can help in this process by promoting reflections on the simulation of realistic situations and improving students' knowledge regarding specific care<sup>(24, 27)</sup>.

## CONCLUSION

This study highlighted the relevance of the construction and validation of scenarios for education, especially in the context of telesimulation. The validation of the scenario reached a satisfactory evaluation percentage and supported the definition of future goals for telesimulation in nursing education. According to this study, telesimulation is a promising tool, as long as its limitations and aptitudes are considered.

Traditional clinical simulation is a widely explored and crucial resource for training processes, and improving this resource offers high potential when face-to-face practice is not possible, with telesimulation as a variation tool.

Considering the above, the validation of the telesimulation scenario was positive. This study contributes to envisaging possible uses of telesimulation as an active method to assist the education process in nursing.

Significant study limitations included internet variation and structural inadequacy at the site of telesimulation transmission in terms of audio resources, factors that influenced the quality of the transmission, as well as the failure to develop a checklist of actions during the scenario execution.

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**Note:** Taken from the Doctoral thesis entitled Telesimulation as a teaching strategy for the care of children with intestinal ostomy.

**Received in:** 18/04/2022

**Approved in:** 06/09/2022

#### How to cite this article:

Silva PN, Rocha IC, Silva A, et al. Construction and validation of telesimulation scenario in the context of children with intestinal stoma. *Revista de Enfermagem do Centro-Oeste Mineiro.* 2023;13:e4709. [Access \_\_\_\_]; Available in: \_\_\_\_\_. DOI: <http://doi.org/10.19175/recom.v13i0.4709>