# Construction and validation of medical simulation scenario in teaching immunization

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## ABSTRACT

**Introduction:** In medical education, the use of clinical simulation as a pedagogical strategy has been increasingly present in curricula. However, there is still a gap in the use of the strategy in teaching Primary Health Care topics. By recognizing the attributions of the medical professional in this context, it becomes increasingly necessary to offer simulated clinical experiences. **Objective:** The study aimed to construct and validate three clinical simulation scenarios in immunization for medical education. **Material and methods:** This is a descriptive, construction, and validation study. Three scenarios focused on immunization in Primary Health Care were built and validated, namely: immunization of adults, children, and pregnant women. All scenarios were developed based on seven criteria: prior knowledge of the learner, learning objectives, theoretical background, scenario preparation, scenario development, debriefing, and evaluation. Sixteen health professionals participated in the study. The adopted Content Validation Index (CVI) was 0.80. **Results:** The scenarios obtained, in all items, CVI between 87.50% to 100%, judged by physicians or nurses with experience in simulation and a minimum master's degree in health care. **Conclusion:** The scenarios may be replicated both in research and in the development of medical skills in students and professionals. Provided they are adapted, these scenarios may also be used for teaching other healthcare courses and professionals.

**Keywords:** Immunization, Simulation training, Primary health care, Validation study.

## INTRODUCTION

Conceptually, clinical simulation refers to a teaching strategy that uses technologies to reproduce health situations. It is the imitation of a real event in order to teach, train skills, reflect and analyze performance. Therefore, the simulation occurs in a planned, controlled, and purposeful space.[1]

Furthermore, it is crucial to point out that the National Curriculum Guidelines for the Undergraduate Course in Medicine[2] encourage the use of this teaching method, mainly because it finances the student's experience of health situations without dependence on a real context and chance. It is notable that students do not always find, in practices in health equipment, clinical cases that allow them to learn empirically. Clinical simulation, therefore, can fill gPHC like this. In addition, it is known that, in medical education, simulation promotes satisfaction, self-confidence, improves the cognitive performance of students, among others.[3]

Added to this, the use of simulated scenarios is also justified because it meets bioethical characteristics and the principles of Human Rights, because it respects dignity, does not instrumentalize the person, or inflicts damage to the health of users. From this perspective, clinical simulation enables the infinite repetition of skills in health situations without mistakes being made to translate into any harm.[4]

Brazil is recognized as a world leader when it comes to immunization because, despite its vast territory and large population, it has historically managed to eradicate or keep vaccine-preventable diseases under control after the creation of the National Immunization Program (PNI) in 1973[5]. In order to perpetuate the success of this program, the figure of the physician is configured as an important ally to public health as he/she acts in the prescription of immunobiological, updates the vaccine booklet of children, adolescents, adults, and the elderly, combats myths and pseudoscientific information, and has autonomy at the time of specific contraindications to immunization.

In this aspect, when recognizing the attributions of the medical professional in this context, it is necessary to offer simulated clinical experiences in immunization to the medical student during graduation since it can allow him to master skills and a high degree of satisfaction and self-confidence to face real situations[6]. To do so, it is necessary to define and build well-designed simulation scenarios.

Thus, this study aimed to build and validate three clinical simulation scenarios in immunization for medical education, paying attention to the PNI precepts and associated clinical circumstances, such as the correct management of the vaccination status of patients in Primary Health Care (PHC).

## METHOD

This is a descriptive study of construction and content validation of three scenarios in clinical simulation on the Immunization theme. Since this research involves human beings, the study took into account the guarantee of the ethical and legal principles that govern research with human beings. It was submitted to and approved by the Research Ethics Committee of UFRN under opinion number 4,144,757 and CAAE 33353620.8.0000.5568.

Scenario development

For the construction of scenarios, the criteria of Fabri et al. [7] were used, which take into account the following aspects: a) prior knowledge of the student; b) learning objective; c) theoretical foundation of the activity; d) setting the scene; e) scenario development; f) debriefing and g) evaluation. In addition, for the construction of the learning objectives, Bloom's taxonomy and the SMART structure were used. [8, 9,10]

Initially, it was necessary to rely on the literature to collect information on immunization through a search for publications in the SciELO and PubMed databases. In addition, specific books on the subject and documents made available by the Ministry of Health, such as the 2020 vaccine calendar, were also used. With the framework found in the literature, cases to be worked on in the three scenarios constructed were developed: adult patients in Primary Health Care (PHC); Child immunization to PHC; Vaccination of pregnant patients in PHC. The organization chart below summarizes the steps taken:

After the scenarios were constructed, the judges were selected and invited for content validation.
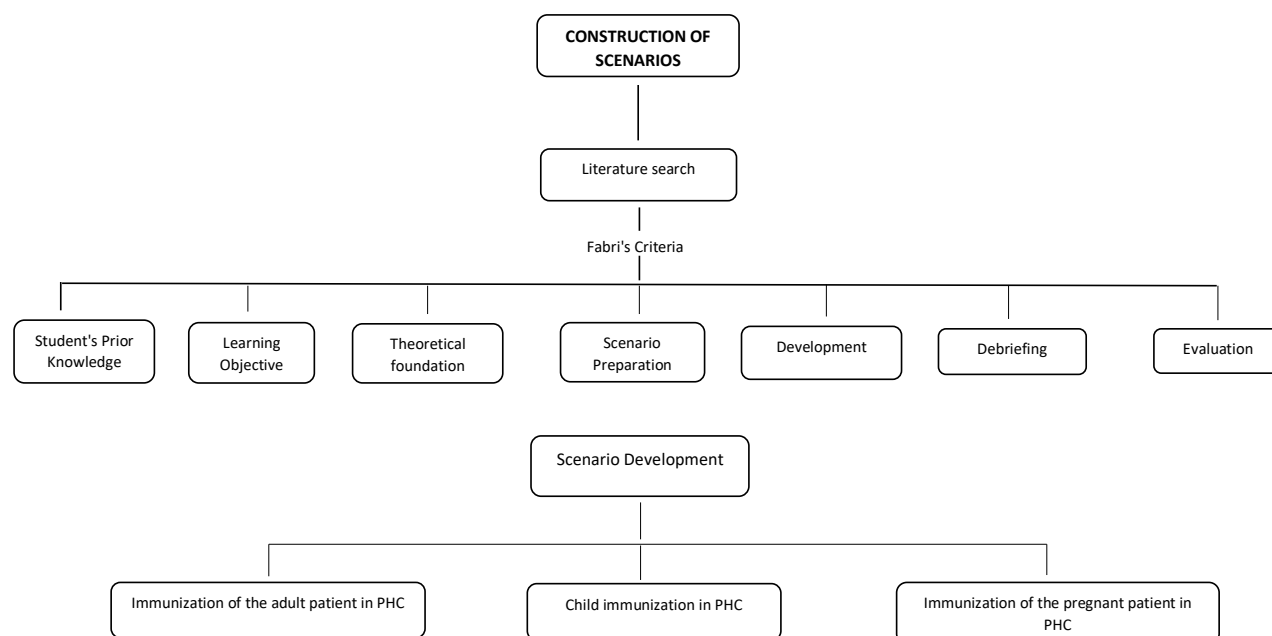
**Figure 1.** Scenario development process.
Source: own authorship.

## Selection of Judges

For this process, experts with the capacity to analyze and judge the items related to the scenario were invited. Thirty judges were invited based on the following criteria: being a physician or nurse, having experience in the area of clinical simulation and/ or experience/experience with immunization, and having at least a master's degree in the health area. The sample composition was guided by the literature, which indicates the number of six to twenty judges, as guided by Pasquali[11]. As for the selection criteria of the judges, the Fehring validation model was used. [12]

## Data collection instruments

The judges were invited, via e-mail, to participate in the validation process, with a period of 15 days available to evaluate the 3 scenarios. Each judge received a Google Forms link containing the scenarios, the agreement scale, and the sociodemographic characterization instrument.

The sociodemographic characterization presented the following items: age; sex; academic background; highest degree; professional category; professional activity (current) and time in the job;

experience in clinical simulation (if yes, how long); experience in immunization/vaccines (teaching and or assistance) and, if yes, for how long.

## Validation

For validation, the Content Validation Index (CVI) was used, which uses a Likert-type scale with scores from one to four: 1 – I totally disagree; 2 – I partially disagree; 3 – I partially agree; 4 - I totally agree.

The index score was calculated by summing the agreement of items "3" and "4" marked by the experts. Items that received a score of "1" or "2" were revised. Thus, the formula for calculating the CVI and evaluating each item individually is represented by: the number of "3" or "4" responses divided by the total number of responses. Only CVI greater than or equal to 0.80 was accepted.

## Data Analysis

The data were organized in an Excel® spreadsheet, and their sociodemographic characterization information and concordance scale were evaluated.

## RESULTS

Table 1 presents the validated scenarios. Participants' previous experiences, learning objectives (primary and secondary), scenario duration, resources, scenario preparation, development, debriefing, evaluation, and procedure checklist are described.

## Validation of simulated scenarios

Thirty judges were invited, of these, sixteen returned the scenario validation instruments. Most judges (56.25%) were between 35 and 44 years old, were from the professional category of Nursing (87.50%), had a doctorate (66.67%) as the maximum degree, worked as a professor (87.50%), with a professional experience of up to 11 years (57.14%), had experience in the area of simulation (93.75%), with time of four to seven years (46.67%), with experience in immunization ( 68.75%) of up to 10 years (72.73%). In the criterion of time of operation, only 14 responded, and the percentage was calculated with these. The sociodemographic characterization is described below in Table 1.

The Content Validity Index (CVI) is described for each item in each scenario in Table 2. To calculate the CVI, the answers "partially agree" and "totally agree" that the evaluators marked for each item were considered.

## DISCUSSION

The three scenarios were built according to the criteria proposed by Fabri [7]. It is worth noting that the criteria proposed by Fabri are in accordance with the guidelines of the International Nursing Association for Clinical Simulation and Learning for the construction of a clinical simulation. Therefore, it allows the standardization of the simulation design, guiding the essential for structure, development, and results consistent with the proposed objectives. [9]

Scenario constructions allow the pedagogical development of clinical simulation, a teaching method increasingly gaining prominence in medical faculties. It allows the student to practice important situations that occur in daily reality before he is immersed in the service, and builds an environment where the student is forced to think critically and analyze the different practical situations, thus enabling greater resourcefulness, self-confidence, and knowledge when exposed to the real situation [9-13].

The immunization theme, in the global context, gained more visibility around the world in 2020 and 2021, due to the New Coronavirus pandemic, with vaccination being the new hope for the control of the disease and the resumption of normal activities. However, before the COVID-19 pandemic, Brazil stood out worldwide for its National Immunization Program (PNI), created on September 18, 1973, which aims to reduce morbidity and mortality from vaccine-preventable diseases, being of great importance for disease and injury prevention [14]. Therefore, it is clear the importance of discussing this topic in the process of medical education and the use of realistic simulated scenarios as a promising method of teaching and medical practice.

After building the scenarios, the content validation stage was carried out. Specialists in clinical simulation and immunization were invited, as already mentioned in the criteria for selecting judges in the methodology. This validation guarantees the reliability of the proposed clinical case, as well as greater proximity to reality and the use of the best evidence [11]. The content validation process was performed using the VCI. In all scenarios and items, CVI was obtained above the established minimum index (greater than or equal to 0.80). This finding is similar to another study that used the VCI to validate simulation scenarios in PHC [15.]

Regarding the clarity of the content concerning the participant's previous experience, in all three scenarios, there was partial disagreement and total disagreement. In the question, it was recommended subjects that should be addressed in the briefing, questioning the need to address the previous experience in the briefing. Judging that the issues addressed are at the discretion of the person applying the simulation and by obtaining a VCI of 87.5%, it was decided not to change this point.

It is worth mentioning that the briefing is a step that aims to subsidize the introductory information to the members of the simulation, elucidation of the scenario and its possibilities in order to favor the appreciation of the learning objectives, reduce anxiety and increase the confidence of the participants. [16]

**Table 1.** Immunization Scenarios in Primary Care. Caicó (RN), Brazil, 2021.

| Item | ADULT PATIENT IMMUNIZATION SCENARIO IN PRIMARY CARE | CHILD IMMUNIZATION SCENARIO IN PHC | VACCINE UPDATE OF PREGNANT PATIENT IN PRIMARY CARE |
|---|---|---|---|
| 1 | **Participant's previous experience**<br>Scenario developed to act in simulation of medical and/or nursing care. Previous immunization experiences of each participant will be discussed at the briefing. | **Participant's previous experience**<br>Scenario developed to act in simulation of medical and/or nursing care. Previous immunization experiences of each participant will be discussed at the briefing. | **Participant's previous experience**<br>Scenario developed to act in simulation of medical and/or nursing care. Previous immunization experiences of each participant will be discussed at the briefing. |
| 2 | **Primary learning objectives**<br>Experience an immunization situation in adults in the environment of a Basic Health Unit.<br>**Secondary learning objectives**<br>Analyze the adult's immunization schedule;<br>Orient the patient about the function of immunobiologicals;<br>Answer the patient's possible questions about vaccines;<br>Indicate vaccination;<br>Advise on care after vaccination. | **Primary learning objectives**<br>Experience a child immunization situation in the Primary Care setting.<br>**Secondary learning objectives**<br>Analyze the child's vaccination schedule;<br>Orient the patient about the function of immunobiologicals;<br>Answer the patient's possible questions about vaccines;<br>Indicate vaccination;<br>Advise on care after vaccination;<br>Schedule the immunization schedule. | **Primary Learning objectives**<br>Experience a situation of vaccination update of a pregnant patient in the scope of Primary Health Care.<br>**Secondary learning objectives**<br>Analyze the pregnant woman's immunization schedule;<br>Recognize Vaccination Contraindications during pregnancy;<br>Orient the patient about the function of immunobiologicals;<br>Answer the patient's possible questions about vaccines;<br>Indicate vaccination;<br>Advise on care after vaccination;<br>Schedule the immunization schedule. |
| 3 | **Scenario duration**<br>40 minutes, as follows:<br>Briefing: 10 minutes;<br>Scene execution: 10 minutes;<br>Debriefing: 20 minutes. | **Scenario duration**<br>40 minutes, as follows:<br>Briefing: 10 minutes;<br>Scene execution: 10 minutes;<br>Debriefing: 20 minutes. | **Scenario duration**<br>40 minutes, as follows:<br>Briefing: 10 minutes;<br>Scene execution: 10 minutes;<br>Debriefing: 20 minutes. |
| 4 | **Human Resources**<br>A medical lecturer or nurse with experience in vaccination and clinical simulation;<br>A laboratory technician;<br>A collaborator for the dramatization (actor role);<br>A student. | **Human Resources**<br>A medical or nurse faculty with experience in immunization and clinical simulation;<br>A laboratory technician;<br>A collaborator for the dramatization (actor role);<br>A student. | **Human Resources**<br>One medical or nursing faculty member with experience in vaccination and clinical simulation;<br>A laboratory technician;<br>A collaborator for the role play (actor's function);<br>A student. |

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**Scenario Preparation**

**Proposed theme:** "Immunization of adult patients in Primary Care"

**Scenario fidelity:** medium fidelity

**Clinical case:** Lucas, 31 years old, attends the Castelo Branco ESF during a spontaneous medical consultation with the intention of being informed about his vaccination status. To do so, he carries his vaccination card from the time he was a child with him. You are the healthcare professional responsible for serving you. Below is the Physical Exam.

Clinical Exam:

General: BEG.

Respiratory system: 17 bpm, breath sounds present in both hemithoraxes, absence of adventitious sounds.

Cardiovascular system: BP: 120x80 mmHg, RCR 2T BNF without murmurs. Fc = 74 bpm.

**Conduct:** the patient must update his vaccination card when he needs a dose of MMR because he is over 30 years old (age < 30 years old requires two doses of the vaccine).

**Roadmap for student/patient training (simulated patient):** You are a 31-year-old patient, named Lucas, and you are at ESF Castelo Branco for medical care. He is healthy, with no comorbidity. He is at the UBS seeking to receive guidance on his vaccination status. He holds the children's vaccination card. When provoked, point out that all vaccination information boils down to what is on the card; who does not have any underlying disease; does not use any medication; who has never had a hypersensitivity reaction to any vaccine; if the student identifies the absence of Triple Viral, ask him about which diseases this immunobiological offers protection; and if there are any contraindications. Also ask about care after vaccination.

**Actor characterization:** student/patient will be dressed in clothing normally used in everyday life.

**Material resources:**
– Any outfit;
– A pair of shoes;
– A vaccination card with the absence of Triple Viral, only.
– Chairs;
– Table and stretcher for;
– Ambient medical office;

**Physical space:** facilities for a Skills Laboratory or Clinical Simulation.

**5**

**Scenario Preparation**

**Proposed topic:** "Child immunization in the Primary Care environment" *Conduct: the patient must update his vaccination card when he needs a dose of MMR because he is over 30 years old (age < 30 years old requires two doses of the vaccine).*

**Scenario fidelity:** medium fidelity;

**Clinical case:** You are a health professional at UBS Castelo Branco. During a childcare consultation, mother Karla welcomes her with her 4-year-old daughter Isadora. Karla brings the child's vaccination card with her so that it can be evaluated. Below is Isadora's physical exam.

**Isadora's physical exam:**

General: BEG, acyanotic anicteric, hydrated skin, and mucous membranes.

Respiratory system: eupneic, breath sounds present in both hemithoraxes, absence of adventitious sounds.

Cardiovascular system: normocardia, 2t crr, BNF without murmurs.

**Conduct:** Patient should be evaluated regarding vaccination for their age and scheduling (HPV vaccine). There is no previous vaccination pending.

**Script for training the actress (mother):** you are the mother of Isadora, 4 years old, and you are in a routine childcare consultation at UBS Castelo Branco, when you ask the doctor about the situation of your daughter's vaccination card. When provoked, state that Isadora does not have any underlying disease, does not use any medication, and has never shown hypersensitivity to any immunobiologicals. Mandatory, ask what Isadora's vaccines protect against; whether she will still need others during childhood; if there are contraindications to Isadora vaccination. Also ask about post-vaccination care and whether further doses are needed until later in childhood.

**Simulator characterization:** preschool-age child type dummy.

**Material resources:**
– A child-like simulator (preschool);
– Chairs;
– Doctor's office table;
– Children's Vaccination Card with no 2nd booster of DTP, 2nd booster of OPV and 2nd dose of Chickenpox;
– Office supplies.

Physical space: facilities for a Skills Laboratory or Clinical Simulation.

**Scenario Preparation**

**Proposed topic:** "Updating the pregnant patient's vaccine in primary care" *Medical diagnosis of the simulated patient:* Incomplete vaccination

**Scenario fidelity:** medium fidelity

**Clinical case:** Today is the day for prenatal care and spontaneous demand at UBS Nova Esperança. You are the doctor and/or nurse on the healthcare team. You are in attendance at your office. The next patient is Cláudia, 34 years old, primigravida, 18 weeks old and coming for her first prenatal consultation. You have already performed all your anamnesis, physical examination, and prescribed necessary complementary exams. The pregnancy is going as expected, without any complications. Now, to finish the consultation, you must check the patient's vaccination status.

**Vaccination Card:**

– Vaccinations present: Vaccination for hepatitis B (only one dose), complete dT schedule (the last one was at age 30)

**Conduct:** Check the pregnant woman's vaccine card and inform which ones are missing and their respective doses, forward for application.

**Script for student/patient training (simulated patient):** You are a 34-year-old patient, named Cláudia, and you are at UBS Nova Esperança for care. You are married, from Caicó. You have already been consulted by the doctor and/or nurse and he informed you that your pregnancy was calm without any complications and gave you some routine tests to monitor the pregnancy. Hand in the vaccination card. If the professional asks you which vaccines you took, say that you don't remember, but that the last one was a few years ago. If the professional asks about any symptoms, deny them all.

**Characterization of the actor:** student/patient will be dressed in clothing normally used in Family Health Units by pregnant patients, with a dress.

**Material resources:**
– A dress;
– A vaccination card;
– Chairs;
– Doctor's office table;
– Office supplies.

**Physical space:** facilities for a Skills Laboratory or Clinical Simulation.

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| # | Scenario development | Debriefing | Evaluation |
|---|---|---|---|
| **6** | Adult assessment and management of their vaccination card according to the Ministry of Health vaccination schedule, 2020. | The debriefing will be carried out in a structured way according to Coutinho (2016). The three proposed phases are reaction, analysis and synthesis:<br>1. Initially, the health team will describe the scenario used;<br>2. Scenario participants will talk about their feelings and reactions to what happened in the simulation;<br>3. The positive aspects that occurred in the simulation will be enhanced;<br>4. Analysis and reflection will be carried out on the aspects experienced in the simulation that need to be improved;<br>5. Possibilities of applying the content in professional practice will be discussed. | - Knowledge assessment;<br>-Student Satisfaction and Self-Confidence in Learning Scale proposed by Almeida et al., (2015).<br>- Skills assessment. |
| **7** | Child assessment and management of their vaccination card according to the Ministry of Health vaccination schedule, 2020. | The debriefing will be carried out in a structured way according to Coutinho (2016). The three proposed phases are reaction, analysis and synthesis:<br>1. Initially, the health team will describe the scenario used;<br>2. Scenario participants will talk about their feelings and reactions to what happened in the simulation;<br>3. The positive aspects that occurred in the simulation will be enhanced;<br>4. Analysis and reflection will be carried out on the aspects experienced in the simulation that need to be improved;<br>5. Possibilities of applying the content in professional practice will be discussed. | - Knowledge assessment;<br>-Student Satisfaction and Self-Confidence in Learning Scale proposed by Almeida et al., (2015).<br>- Skills assessment |
| **8** | Vaccination update of the pregnant patient. Evaluation of pregnant women and management of their vaccination card according to the Ministry of Health's vaccination schedule, 2020. | The debriefing will be carried out in a structured way according to Coutinho (2016). The three proposed phases are reaction, analysis and synthesis:<br>1. Initially, the health team will describe the scenario used;<br>2. Scenario participants will talk about their feelings and reactions to what happened in the simulation;<br>3. The positive aspects that occurred in the simulation will be enhanced;<br>4. Analysis and reflection will be carried out on the aspects experienced in the simulation that need to be improved;<br>5. Possibilities of applying the content in professional practice will be discussed. | - Knowledge assessment;<br>-Student Satisfaction and Self-Confidence in Learning Scale proposed by Almeida et al., (2015).<br>- Skills assessment |

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### Checklist

| CONDUCT | Y | P | N |
|---|---|---|---|
| Introduce yourself to the patient; | | | |
| Identify the patient; | | | |
| Ask the reason for the consultation; | | | |
| Check the vaccination card and identify pending issues; | | | |
| Identify the absence of the Triple Viral in the vaccine card; | | | |
| Search for history of hypersensitivity to vaccines; | | | |
| Search for comorbidities in the patient; | | | |
| Research current use of any medication; | | | |
| Explain that the Triple Viral protects against Measles, Mumps and Rubella; | | | |
| Comment on the physical examination of the patient (everything is normal); | | | |
| Indicate the administration of MMR (one dose); | | | |
| Guide on the importance of the vaccine and care after its application; | | | |
| Identify whether the guidelines were understood; | | | |
| Refer the patient to the UBS vaccine room; | | | |
| Student evaluator: knowing that Lucas is 31 years old, how many doses should he receive of the identified vaccine? **NOTE: if the student has correctly identified the Triple Viral, he must state that Lucas will receive only one dose, as he is over 30 years old.** | | | |

**Y-Yes; P-Partially; N-No;**

### Checklist

| CONDUCT | Y | P | N |
|---|---|---|---|
| Identify yourself. | | | |
| Identify mother and daughter; | | | |
| Ask the reason for the consultation (vaccination); | | | |
| Check the vaccination card; | | | |
| Conclude that vaccines for Isadora's age are | | | |
| DTP, Varicella and VOP; | | | |
| Conclude that there are no previous vaccines pending; | | | |
| Research underlying diseases in the child's anamnesis; | | | |
| Research the child's history of hypersensitivity to immunobiologicals; | | | |
| Research the use of any medication by the child; | | | |
| Explain to the mother that vaccines protect against diphtheria, tetanus, whooping cough, chickenpox and polio; | | | |
| Schedule the HPV vaccine for Isadora, when she is 9 years old; | | | |
| Explain the mother that there are no contraindications for vaccinating Isadora; | | | |
| Tell the mother that the child's physical examination is normal; | | | |
| Guide on the importance of the vaccine and care after its application; | | | |
| Identify whether the guidelines were understood; | | | |
| Refer the patient to the UBS vaccine room; | | | |
| Student evaluator: cite at least one contraindication common to all vaccines. **NOTE: the student must respond to an anaphylactic reaction after a previous dose of a given vaccine OR a history of hypersensitivity to any component of immunobiologicals.** | | | |
| Student evaluator: assuming that Isadora lives in Caicó-RN, would vaccination against Yellow Fever be indicated? **NOTE: the student must answer NO, as it is not an endemic area.** | | | |

**Y-Yes;  P-Partially; N-No;**

### Checklist

| CONDUCT | Y | P | N |
|---|---|---|---|
| Introduce yourself to the patient; | | | |
| Identify the patient; | | | |
| Ask the reason for the consultation (vaccination); | | | |
| Check the vaccination card; | | | |
| Conclude that 2 doses of the HEPATITIS B vaccine were missing | | | |
| Conclude that 1 dose of Tdap vaccine was missing | | | |
| Recognize that other vaccines are not necessary | | | |
| Research history of vaccine hypersensitivity; | | | |
| Research comorbidities in the patient; | | | |
| Research current use of any medication; | | | |
| Comment on the physical examination of the patient (everything is normal); | | | |
| Guide on the importance of vaccines and care after their application; | | | |
| Identify whether the guidelines were understood; | | | |
| Refer the patient to the UBS vaccine room; | | | |

**Y-Yes;  P-Partially; N-No;**

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**Table 1.** Sociodemographic characterization of the evaluators (n = 7). Caicó (RN), Brazil, 2020.

| Variable | n (%) |
|---|---|
| **Age range (years)** | |
| 25-34 | 5 (31.25%) |
| 35-44 | 9 (56.25%) |
| 45-55 | 2 (12.5%) |
| **Academic education** | |
| Nursing | 14 (87.5%) |
| Medicine | 1 (6.25%) |
| Psychology | 1 (6.25%) |
| **Degree** | |
| PhD | 10 (66.67%) |
| Master's Degree | 5 (33.33%) |
| **Professional performance** | |
| Out of action | 1 (6.25%) |
| Teaching | 14 (87.5%) |
| Medicine | 1 (6.25%) |
| Working time (years) | |
| 1-11 | 8 (57.14%) |
| 11-21 | 3 (21.43%) |
| 21-31 | 3 (21.43%) |
| **Experience with Simulation** | |
| Yes | 1 (6.25%) |
| No | 15 (93.75%) |
| **Time of experience with Simulation (years)** | |
| 1-4 | 6 (40.00%) |
| 4-7 | 7 (46.67%) |
| 7-10 | 2 (13.33%) |
| **Have experience with immunization** | |
| No | 5 (31.25%) |
| Yes | 11 (68.75%) |
| **Time of experience with immunization (years)** | |
| 1-10 | 8 (72.73%) |
| 11-20 | 2 (18.18%) |
| 21-31 | 1 (9.09%) |

As for the learning objectives, all scenarios obtained a VCI of 100%. The beginning of an efficient clinical simulation goes through the proper design of learning objectives[9]. The entanglement or reliability of a simulation is directly associated with the determination of learning objectives. These are based on Bloom's Taxonomy and need to be specific, measurable, achievable, realistic, and achievable in a timely manner.[16] Bloom's taxonomy is a tool that enables the leveling of objectives for the expected learning outcomes, classifying them as affective, cognitive, and psychomotor in nature[8, 17].

The criteria of the duration of time and human resources also obtained VCI equal to 100%. The suggested time to complete the simulations was 40 minutes for each, with 10 minutes for briefing, 10 minutes for scenario execution, and 20 minutes for debriefing[9]. The definition of time was based on the literature, adopting a total that was not too long and a debriefing with twice the execution time[18]. Regarding human resources, it is important to have an expert body on the addressed and simulation content to assist the methodological structuring of the simulated scenarios and the use of simulators, if necessary[19, 20].

As for the scenario preparation, scenarios 2 and 3 presented a VCI of 100%, while simulation 1 reached a VCI of 87.5%, with a partial disagreement and a total disagreement. Due to the VCI value being adequate and the recommendations being related to the Portuguese standards, the nationality of the evaluator not applied to the Brazilian immunization standards, the changes were not accepted. Alluding to the development of the scenario, a VCI corresponding to 100% was obtained. In this step, the progression of the unfolding of the simulated patient's attitudes is described according to the actions expected by the individual exposed to the simulation[7].

In the items referring to debriefing and evaluation, in the three scenarios, the VCI was 100%. The first refers to the questions that will lead to discussions and reflections about the simulation carried out, and the theme addressed, strengthening that the learning objectives are achieved.[17, 21] The second relates to evaluative learning tools and acquired skills and abilities that need to be improved[7].

In the last item evaluated, the checklist, an instrument to monitor the evolution of the evolution participants and demarcate deficient points to be discussed in the debriefing, reached a VCI of 93.75% in scenario 1 and 100% in scenarios 2 and 3. Scenario 1 obtained this value due to a partially discordant assessment, the recommendations do not apply to the reality of the location to be carried out; for this reason, and for obtaining a VCI greater than 80%, it was decided not to change the checklist.

**Table 2.** Content Validity Index (%) by scenario among experts (n=16). Caicó (RN), Brazil, 2020.

| Scenarios Evaluated Items | SCENARIO 1 | | | | | SCENARIO 2 | | | | | SCENARIO 3 | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | VCI(%) | 1 | 2 | 3 | 4 | VCI(%) | 1 | 2 | 3 | 4 | VCI(%) |
| Is the content clear? | 1 | 1 | 1 | 13 | 87.50% | 1 | 1 | 1 | 13 | 87.50% | 1 | 1 | 1 | 13 | 87.50% |
| Are the objectives adequate? | 0 | 0 | 4 | 12 | 100.00% | 0 | 0 | 7 | 9 | 100.00% | 0 | 0 | 2 | 14 | 100.00% |
| Is the time adequate? | 0 | 0 | 0 | 16 | 100.00% | 0 | 0 | 0 | 16 | 100.00% | 0 | 0 | 0 | 16 | 100.00% |
| Are the resources adequate? | 0 | 0 | 4 | 12 | 100.00% | 0 | 0 | 6 | 10 | 100.00% | 0 | 0 | 4 | 12 | 100.00% |
| Does the scenario preparation contain the basic and relevant information for its performance? | 1 | 1 | 8 | 6 | 87.50% | 0 | 0 | 6 | 10 | 100.00% | 0 | 0 | 4 | 12 | 100.00% |
| Is the content adequate? | 0 | 0 | 2 | 14 | 100.00% | 0 | 0 | 1 | 15 | 100.00% | 0 | 0 | 1 | 15 | 100.00% |
| Are the debriefing steps adequate? | 0 | 0 | 1 | 15 | 100.00% | 0 | 0 | 2 | 14 | 100.00% | 0 | 0 | 2 | 14 | 100.00% |
| Are the evaluation methods relevant? | 0 | 0 | 2 | 14 | 100.00% | 0 | 0 | 2 | 14 | 100.00% | 0 | 0 | 1 | 15 | 100.00% |
| Is the procedure checklist adequate? | 0 | 1 | 4 | 11 | 93.75% | 0 | 0 | 3 | 13 | 100.00% | 0 | 0 | 4 | 12 | 100.00% |

Finally, it is possible to point out the limitations found in the development of the work. There was a scarcity of content published in clinical simulation in the area of medicine, being mostly publications in the area of nursing, being then a limiting factor for making it difficult to compare with studies in the same area. In addition to the scarcity of publications, there was also a reduction in medical professionals specializing in clinical simulation, being a minority in the selection of judges. However, similar works have referred to the same limitation[22]. In addition, the New Coronavirus pandemic made it impossible, due to the current sanitary conditions in the country, to apply the scenarios (face validation) after their content validation.

## CONCLUSION

Three scenarios related to immunization within the scope of Primary Health Care were constructed and validated. Sixteen judges with experience in clinical simulation participated in the validation process. The scenarios obtained, in all items, VCI between 87.50% and 100%, and can be replicated both in research and in the development of medical skills in students and professionals. As long as they are adapted, these scenarios can also be used for teaching in other courses and professionals in the health area.

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