



## Simulation in Medical Education: The Case of Morocco

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### Abstract

The study aim: The objective of this study was to evaluate the use of simulation laboratories in three Higher Institutes of Nursing and Health Techniques during the Covid-19 pandemic. Materials and Methods: This is a first study of its kind in Morocco, an exploratory study conducted over a period of 5 months, between January and May 2022, at the level of 3 Higher Institutes of Nursing and Technical Health Professions; pilot sites equipped with simulation laboratories in 2018, namely Marrakech, Fez and Agadir. Results: The results of this study showed that only two institutes (Marrakech and Fez) out of the three included in this study used the simulation laboratories set up for the training of students during the Covid-19 period. Based on an evaluation grid, this work has shown that the three institutes have the premises, material means, equipment and trained human resources necessary for the operation of simulation laboratories and the organization of educational activities for the benefit of students. In addition, this study has shown that the phases of the implementation of a training session in simulation are not mastered by the teachers of the three institutes, that they encounter several difficulties in this aspect and that despite this hindrance; the two institutes have used their simulation laboratories to strengthen the training of students during the period of Covid-19. Conclusion: The results of this study have illustrated several difficulties hindering the proper functioning of simulation laboratories set up by the Ministry of Health at the institutes of Agadir, Marrakech and Fez during the period of the pandemic, hence the importance of setting up a support plan for the three laboratories to achieve the objectives expected by their implementation.

**Keywords:** Simulation, medical training, pandemic, covid-19.

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### 1. Introduction

Access to a system of health protection that provides quality health care and guarantees the possibility of enjoying a better state of health is a sine qua non of the right to health. Health policy and program are indeed key pillars in the sanctification of this condition. Nevertheless, the role of health professionals is omnipresent. Indeed, according to the global strategy on human resources for health by 2030 [1], the success of any health policy and program cannot be achieved without the existence of competent human resources with the appropriate skills.

In this regard, the Ministry of Health of the Kingdom of Morocco considers that the generation of human resources and the development of their skills is intrinsically part of its core functions and a fundamental lever for increasing the efficiency of services and improving performance. [2] This attention was expressed through the strategic axes of its 2017-2021 sector strategy. These axes have emphasized the quantitative and qualitative development of health professionals to make them a hinge ensuring the realization of health programs. [3]

Nurses have always been the backbone of the health system. The vital role they continue to play in the implementation of health policy, the fight against diseases and the promotion of health of the Moroccan population is not to be demonstrated. A role that has always animated the movements of changes and reforms carried out in the training courses of nurses, health technicians and midwives. In this case, the adoption in 2013 of the system Bachelor Master Doctor (LMD), by reclassifying the training institutes in nursing and health techniques to the rank of higher education institutes not under the universities under the supervision of the Ministry of Health.[4]

Therefore, a lot of efforts have been made, and continue to be made, to guarantee the quality of this training in both pedagogical and technical terms. And this, in a will to ensure the production of health professionals competent in their fields and having a university level and an opening on the academic and professional environment. However, the production of a quantity of health care personnel with the required skills to meet the evolving needs of the population, requires the reinforcement of the know-how of future health professionals.

This necessity can only be made sacred through two modalities that are part of the continuum of training for nurses, health technicians and midwives, namely, successively, theoretical training and practical training. Clinical education or internship is the cornerstone of the training of nurses, health technicians and midwives. It plays a very important role in the training course and is a crucial element in the development of skills in the field of care. The passage of the students through the training grounds is compulsory from the 3rd semester and must continue until the end of the training at the level of the Bachelor's degree, this will allow the students to learn by living authentic situations in the professional environment.

However, the ethical requirements of the practice of medical and nursing care as stipulated in the health plan 2025 impose the passage by training in simulation before practicing in authentic situations.[5] Therefore, the students of the Higher Institutes of Nursing and Technical Health Professions (HINTHP) must benefit from simulation training as an essential modality of their practical teaching. Moreover, based on the axiom "never the first time on a patient", simulation training is an innovative teaching method, which allows the learner to master the technical gestures necessary for the development of his skills.[5] And this, by practicing in conditions that facilitate learning, namely; the availability of suitable equipment; and locals that recreate real working conditions.

To ensure the availability of these conditions at the level of the Higher Institutes of Nursing and Technical Health Professions of the Kingdom. The Human Resources Directorate has advocated for the acquisition of three simulation laboratories. Following the programming of these activities, three institutes (Fez, Marrakech and Rabat) were equipped with a simulation laboratory with a very high investment figure.

Given the importance of training by simulation in the training curriculum of health professionals and given the investment figure deployed by the Ministry of Health for the establishment of these three simulation laboratories, this study has set the objective of evaluate the use of simulation

laboratories in three Higher Institutes of Nursing and Health Techniques during the Covid-19 pandemic.

## 2. Materials and methods

This is a first study of its kind in Morocco, an exploratory study conducted over a period of 3 months, between January and May 2022, at the level of 3 Higher Institutes of Nursing and Technical Health Professions; pilot sites equipped with simulation laboratories in 2018, namely Marrakech, Fez and Agadir.

### 2.1 Inclusion criteria:

Were included in this study all Higher Institutes of Nursing and Technical Health Professions with simulation laboratories in 2018.

### 2.2 Exclusion Criteria:

Were excluded from this study the Higher Institutes of Nursing and Technical Health Professions were not equipped with a simulation laboratory in 2018.

### 2.3 Data collection:

This study is conducted through an interview guide, with teachers who have benefited from the simulation training organized by the Ministry of Health, on:

- The organization of simulation sessions;
- Scenario design ;
- The contribution of simulation in training;
- Difficulties encountered during the implementation of the simulation sessions.

In addition, this study used two grids:

An observation grid for the conduct of a simulation session covering the stages of a simulation session, namely:

- Local preparation ;
- Reception ;
- Briefing ;
- Setting the situation ;
- The Debriefing ;
- The closing of the session.

A simulation laboratory evaluation grid including the following elements:

- The Locals ;
- The material means and equipment;
- Human resources ;
- Educational activities.

### 2.4 Ethical considerations

Informed consent was obtained from each teacher at the time of study entry. Participation in the study was free, respecting confidentiality and anonymity.

### 2.5 Some definitions

#### 2.5.1 Higher Institutes of Nursing and Technical Health Professions (HINTHP)

The Higher Institutes of Nursing and Technical Health Professions (HINTHP) are higher education institutes that do not belong to universities, they are under the supervision of the Ministry of Health, and they are specialized in training in nursing and health techniques.

**2.5.2 Evaluation**

It is a question of objectively assessing the functioning of the simulation laboratories set up at the level of the three Higher Institutes of Nursing and Technical Health Professions concerned by this study.

**2.6 Statistical analysis**

The collected data were coded and subjected to computerized analysis using SPSS V20 software. Variables were expressed as percentages or verbatims.

**3. Results and Discussions**

**3.1 Results**

**The number of indices (positive: yes) listed for the simulation center by HINTHP:**

Using the evaluation grid designed for this study, it was found that of the 14 criteria included on the grid, the three institutes scored 11 each.

**Table 1:** The number of indices (positive: yes) listed for the simulation center by HINTHP

HINTHP	Indexed listed/14	Percentage
Rabat	11	78,6%
Fes	11	78,6%
Marrakech	11	78,6%

**The number of indices (positive: yes) listed for the simulation center by item and by HINTHP:**

The study of the different items included in the evaluation grid used in this work showed that the three institutes have the locals of simulation laboratories, namely at least one simulation room, a control room and another for briefing and debriefing of students. Similarly, the three institutes have all the material resources and equipment necessary for the operation of a simulation laboratory, including: simulators, care equipment, consumables and audio equipment. The human resources trained in simulation, including educational managers, technical staff and trainers are available at the three institutes evaluated. Before our visit, the HINTHP of Rabat had not organized any pedagogical activities in simulation and the HINTHP of Fez and Marrakech had organized one session each.

**The number of clues (positive: done) listed for the simulation session by HINTHP:**

By attending a simulation session at the three institutes included in this study, and using the observation grid of the progress of a simulation session, this work found that the Rabat institute listed 07 indices out of 41, the Fez institute 11 indices out of 41, and the Marrakech institute 34 indices out of 41.

**Table 2:** The number of hits (positive: yes) listed for the simulation center by item and by HINTHP:

HINTHP	Rabat	Fes	Marrakech
	Indexed found	Indexed found	Indexed found
Locals	3/3	3/3	3/3
Material resources and equipment	4/4	4/4	4/4
Human Resources	3/3	3/3	3/3
Educational activities	0/4	1/4	1/4

**Table 3:** The number of clues (positive: done) listed for the simulation session by HINTHP:

HINTHP	Indexed listed/41	Percentage
Rabat	07	17,07%
Fes	11	26,83%
Marrakech	34	82,93%

**The number of clues listed (positive: done) for the simulation session by item and by HINTHP:**

Using the observation grid of a simulation session designed for this work, the institutes of Marrakech and Fez obtained a score of 3/3 and the institute of Rabat a score of 2/3. The institutes of Rabat and Fez did not do a briefing so they got a score of 0/15. While the institute of Marrakech obtained a score of 12/15 in the briefing phase. For the phase of the situation setting the institute of Rabat obtained a score of 5/15, the institute of Fez obtained a score of 8/15 and the Institute of Marrakech a score of 13/15. The institutes of Rabat and Fez did not do the debriefing phases nor the closing of the session so they obtained a score of 0/3. While the institute of Marrakech has obtained for these, two phases a successive score of 3/3 and 1/1.

**Table 4:** The number of clues (positive: yes) listed for the simulation session by item and by HINTHP

HINTHP	HINTHP		
	Rabat	Fes	Marrakech
Preparation of the locals	2/3	3/3	3/3
Briefing	0/15	0/15	12/15
The situation Setting	5/15	8/15	13/15
Debriefing	0/3	0/3	3/3
Closing of the session	0/1	0/1	1/1

**Strengths and areas for improvement by HINTHP:**

### **The experience of simulation and the contribution of simulation to training:**

Through the focus group conducted with the teachers of the three institutes having benefited from a simulation training showed that at the level of the two institutes having organized simulation sessions for the benefit of their students, the setting up of these laboratories allowed the improvement of the quality of training, the influence of the establishments, the respect of the ethical aspect during teaching/learning, the increase of the students' self-confidence, while developing their reflection, with better management of stress and a better assessment of learning, without forgetting the motivation of the teachers

This work has also illustrated that the simulation sessions are carried out in practical work using scenarios that are written individually and with planning that is done according to the levels of training and according to the options.

Among the difficulties encountered in the use of simulation in terms of appropriation, understanding, and application, this study found that teachers suffer from the over-staffing of students, the non-assignment of technical staff and the absence of managers at the center, the lack of commitment of some teachers with an insufficient hour of modules and time-consuming techniques.

To face these difficulties, the teachers interviewed expressed the following needs: advanced training for teachers, the constitution of a database of scenarios, the assignment of a pedagogical manager to the simulation center, and the assignment of teachers dedicated to simulation.

### **3.2 Discussion**

With the objective of the objective of this study was to evaluate the use of simulation laboratories in three Higher Institutes of Nursing and Health Techniques during the Covid-19 pandemic.

Using the evaluation grid designed for this study, it was found that out of the 14 criteria included in the grid, the three institutes scored 11 out of 14 each, including mainly the availability of the simulation room, the control room, the briefing room, the simulators, the care equipment, the consumables, the audio equipment, the trainers, the pedagogical managers and the technical staff trained in simulation, and the planning of the sessions. The High Authority for Health has stated in its guide to good practice in health simulation that all these criteria are important in the success of simulation training.

By attending a simulation session at the three institutes included in this study, and using the observation grid of the conduct of a simulation session, this work found that the institute of Rabat listed 07 indices out of 41, the institute of Fez 11 indices out of 41 and the institute of Marrakech 34 indices out of 41. The institutes of Marrakech and Fez have obtained a score of 3/3 and the institute of Rabat has a score of 2/3 for the local preparation. The institutes of Rabat and Fez did not do a briefing so they obtained a score of 0/15. While the institute of Marrakech obtained a score of

12/15 in the briefing stage. For the phase of the situation Setting the institute of Rabat obtained a score of 5/15, the institute of Fez obtained a score of 8/15, and the Institute of Marrakech a score of 13/15. The institutes of Rabat and Fez did not do the debriefing phases nor the closing of the session so they obtained a score of 0/3. While the institute of Marrakech obtained for these two phases a successive score of 3/3 and 1/1. Ben Amor et al in their article on simulation stated that the success of any training in simulation revolves around several phases that are indivisible, namely; the preparation of the locals; the briefing, the unfolding of the scenario; the debriefing in the descriptive phase, analytical phase, and synthesis phase. The basic elements that the teachers of the three simulation laboratories did not respect systematically.

Through the focus group carried out with the teachers of the three institutes have benefited from training in simulation showed that at the level of the two institutes having organized sessions of simulation for the benefit of their students the installation of these laboratories allowed the improvement of the quality of training, the influence of the establishments, the respect of the ethical aspect during teaching/learning, the increase of the confidence of the students in themselves, while developing their reflection, with better management of the stress and a better evaluation of learning, without forgetting the motivation of the teachers. Corroborating the words of several authors including Queva in his study on medical simulation as a teaching tool. [7], [8], [9] This researcher attested that simulation has several advantages for students, including those highlighted by our study.

Among the difficulties encountered in the use of simulation in terms of appropriation, understanding, and application, this study found that teachers suffer from the over-staffing of students, the non-assignment of technical staff and the absence of management officials at the center level, the lack of commitment of some teachers with an insufficient hour of modules and time-consuming techniques. While the High Authority of Health has emphasized the importance of the organization of simulation centers and the availability of human resources motivated and trained to achieve their expected objectives.[10] Essential conditions corresponding to the needs expressed by the teachers interviewed in this study and which are: advanced training for teachers, the constitution of a database of scenarios, the assignment of a pedagogical manager to the simulation center, and the assignment of teachers dedicated to simulation.

**Table 5:** Strengths and areas for improvement by HINTHP

	<b>Strengths</b>	<b>Areas for improvement</b>	<b>Main suggestions</b>
<b>Rabat</b>	-Locals available.	-Operation of the centre ; -Centre management; -Occasional planning of sessions.	- Redeployment of staff to manage the centre ; -Planning of the centre's activities.
<b>Fes</b>	-Locals available.	- Management of the centre ; -Team commitment.	-Exploitation of the centre's data; -Redeployment of staff to manage the centre ; -Use of the entire building for the simulation centre.
<b>Marrakech</b>	-Collaboration with another simulation centre ; -Locals available.	- Team commitment; -Exploitation of data relating to the centre's activities.	-Development of performance indicators (dashboard).

#### 4. Conclusions

The results of this study have illustrated several difficulties hindering the proper functioning of simulation laboratories set up by the Ministry of Health at the institutes of Agadir, Marrakech and Fez during the period of the pandemic, hence the importance of setting up a support plan for the three laboratories to achieve the objectives expected by their implementation.

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#### Conflicts of Interest

None.

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