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RESEARCH ARTICLE

Assessment Practices of Student's Clinical Competences in Nurse Education

WISSAM El Machtani El Idrissi[*,1], Ghizlane Chemsi[2,3], KHADIJA El Kababi[1,4] and Mohamed Radid[1,3]

[1]*Laboratory of Physical Chemistry of Materials. Ben M'Sik Faculty of Science, Hassan II University of Casablanca, Casablanca, Morocco*
[2]*Multidisciplinary Laboratory of Science and Technology of Information and Communication and Education, Ben M'Sik Faculty of Science, Hassan II University of Casablanca, Casablanca, Morocco*
[3]*Observatory of Research in Interdisciplinary Didactics and University Pedagogy, Morocco*
[4]*Regional Centre for Education and Training Professions. Casablanca-Settat, Morocco*

Abstract:

Background:

Clinical competence in nursing practices includes all the theoretical and clinical knowledge used by the student in a clinical setting. It also involves psychomotor as well as problem-solving skills. The assessment focuses on evaluating the student's ability to provide both safe and competent care for the patients. However, it requires the use of several assessment methods that must be varied according to the components of the clinical competence.

Several studies have revealed that the evaluation of this competency is mostly limited to knowledge testing or the acquisition of technical skills verification.

Aims:

This study has two objectives. Firstly, it aims to analyze the assessment practices related to clinical competence and adopted by teachers in higher institutes of nursing and health technology in Morocco. Secondly, it seeks to identify the difficulties faced by them in using a variety of appropriate assessment tools to target all the components of clinical competence.

Methods:

Based on the theoretical model adapted from the Miller's pyramid by Mehay and Burns in 2009, relating to the assessment of clinical competence, a self-administered questionnaire was shared with 129 nursing teachers.

Results:

The results indicate that 98.06% of participants use a given tool to assess clinical competence; however, using the appropriate tools to evaluate all its components is limited, and the assessment tools are not characterized by variety.

Conclusion:

Reflecting on the evaluation of clinical competences, a clinical assessment model could be proposed to be in accordance with the theoretical model and to measure its impact on nursing students' learning.

Keywords: Assessment, Skills, Clinical competence, Nursing Education, Miller's pyramid, Moroccan nursing, Technical health professions.

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1. INTRODUCTION

Assessing competence or a skill, especially in a clinical setting, is important to ensure that students, who will be nurses, are able to provide competent and safe nursing care. However, the evaluation process must reflect students' real learning instead of focusing on writing a checklist of technical skills only.

The purpose of the evaluation defines the form of the assessment. It is formative when it helps identify students' strengths and weaknesses, their learning objectives, and the

* Address correspondence to this author at Laboratory of Physical Chemistry of Materials. Ben M'Sik Faculty of Science, Hassan II University of Casablanca, Casablanca, Morocco; Tel: 212079433107;
E-mail: WISSAM.ELMACHTANI1-ETU@etu.univh2c.ma

methods used to achieve them. However, it is summative when the student shows his technical skills in a simulated environment that requires integrating both theory and practice [1, 2].

Therefore, it is important to have an appropriate assessment with pre-determined objectives and format to help the student improve his skills [3].

As a result, assessment practices that focus on clinical skills cannot be limited to knowledge control or technical skills acquisition verification. Still, they go beyond the process and the approach in the context of an authentic situation [4, 5] because they have a significant impact on student's learning as well as on the teaching approaches used by teachers [6].

In Morocco, reforming the curricula of health nurses and technicians in the Higher Institutes of Nursing and Health Technology (ISPITS), according to the competency-based approach, gave a crucial importance to assessments because the training of the nursing teacher contributes to the understanding of the objective of evaluation, its forms, the different tools to be used and the different remedial strategies to be resorted to in case students face any difficulties. In addition to that, the set of training standards for the license cycle highlights the importance of aligning evaluation methods with the components of the skill or clinical competence to be evaluated [9].

Moreover, the reform of nursing education in Morocco through the adoption of the master's degree and the doctorate system in 2013 requires rethinking assessment practices. However, several factors have an influence on the attitude of nursing teachers leading to a change in their practices. According to several authors, these factors relate to the diversity of the training received by the teacher, which stands for the differences in the evaluation of the adopted methods. Moreover, there are other factors related to the diversity of contexts and clinical situations; the objectivity of the evaluator, which is reduced by the absence of valid and reliable evaluation tools, and the complexity of the assessment process, which must integrate critical thinking, planning, knowledge application in specific situations, technical skills, and interpersonal communication skills [10 - 13].

All these factors require assessment methods or tools that incorporate clinical knowledge, skills, and attitudes to ensure the quality and safety of nursing education [14].

This problem is a part of a strategy that seeks to improve clinical competence assessment practices among students in nursing education by investigating the following questions:

(1) In higher institutes of Moroccan nursing and technical health professions, how do teachers practice clinical competence assessment among students?
(2) What methods do they use?
(3) What are the difficulties faced by teachers in assessing clinical competence?

2. LITERATURE REVIEW

2.1. Clinical Learning

Clinical learning is an important aspect of nursing education as it contributes to the acquisition of clinical skills by nurse students in complex situations. Thus, clinical evaluation, as an integral part of the teaching and learning process, makes it difficult for the nurse teacher to measure the performance levels achieved by students [15].

This complexity is a result of the different characteristics of the competency, which requires a combination of knowledge, skills, attitudes, and values. Moreover, clinical competence, according to several authors, is considered as a set of theoretical and clinical knowledge that the student must make use of in a clinical environment and which requires psychomotor and problem-solving skills. In addition to that, it is developing over time and progressing at different levels [16 - 18].

2.2. Assessment of Clinical Competence

2.2.1. Definition

Assessment is a part of the clinical teaching process similar to other teaching activities. On the one hand, it makes it possible to judge the student's ability to provide competent and secure care for patients. On the other hand, it is a means of measuring the student's progress in learning and the effectiveness of his or her achievements. It can be formative or certified, depending on the proposed objectives [2, 19]. Nevertheless, it should be planned according to the process and approach, not the procedures, methods, and tools because of its impact on the learning strategies of the student nurse [6 - 8].

2.2.2. Assessment Models

In higher education, several assessment models have been identified according to disciplines for the evaluation of students in the practical environment; they all aim to assess according to the expected knowledge, skills, and attitudes. In short, five different approaches have been identified:

(1) Attendance model: The objective of this model is to help the student establish contact with the practical environment without giving importance to the evaluation, which remains informal.
(2) Labour history model: it encourages the student to document his or her different practical experiences.
(3) Broad capacity model: it focuses on the development of skills, especially intellectual ones, and their evaluation through a comparison that is based on all students' achievements.
(4) Negotiated program model: it is based on a contract between the institution, the practical environment, and the student at the end of the course; it specifies the different practical aspects to be achieved by the student.
(5) Specific skills model: this model takes the presence of several practical environments, the existence of learning opportunities in which both skills and level of proficiency are defined.

In the same way, the assessment is important and is based on the demonstration of competence. These latter two models are used in medical and nursing education [10, 20].

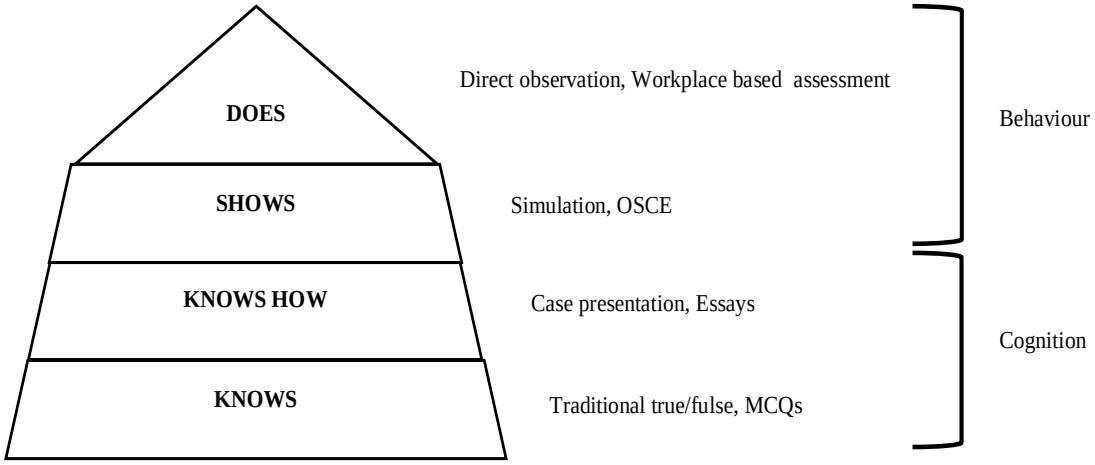

Fig. (1). Miller pyramid, the assessment of clinical skills competence/performance. Adapted by Mehay and Burns 2009.

2.3. Mehay' and Burns's Theoretical Model

Mehay' and Burns's (2009), which was adapted from Miller's pyramid (1990), is a theoretical model that assesses clinical skill or competence. It is a hierarchical model that specifies that the proficiency of clinical skill or competence is acquired once the students graduate. The assessment adopted must be similar to authentic cases that are close to reality. Since 1990, Miller's theoretical model has been a reference for the assessment of clinical competence in educational systems such as medical education and several healthcare disciplines, including nursing education [21 - 24].

According to Mehay and Burns (2009), the model highlights that for an optimal assessment of clinical skill or competence, the four levels of clinical competence acquisition must be taken into consideration with the corresponding different assessment methods. The first two levels are related to cognition, and the last two ones are connected to clinical skills and attitudes (Fig. **1**).

With regard to cognition, two processes can be evaluated; the memorization of clinical knowledge by multiple-choice questions or classic true/false questions, and the interpretation of clinical knowledge through case presentation and developmental questions.

In the case of clinical skills and attitudes that prepare the student for his professional life, there is a simulation or objective structured clinical assessment (OSCE). These are two methods that can help the student demonstrate clinical learning in a simulated setting. However, the teacher can assess the student's performance in a real professional environment through direct observation file verification or portfolio [25, 26].

In addition to that, Sullivan *et al.* (2019) [24] explain that the simulation environment allows the student to reach the upper levels of the Miller Pyramid "to show how" and "to do" under safer conditions. However, for Wt *et al.* (2017) [27], it is believed that the clinical environment allows for some interaction between student and teacher and provides a more accurate picture of the student's performance and progression through a set of observations.

Furthermore, to ensure a valid and reliable evaluation, it is essential to use these evaluation methods, including triangulation in nursing care, and ensure better adequacy between the tool used and the evaluated level of clinical competence in order to help students transfer their clinical knowledge in a practical setting [25, 28].

3. MATERIALS AND METHODS

3.1. Study Design

In this study, a quantitative descriptive research design was adopted. It aims to analyze the assessment practices adopted by nursing educators in Moroccan nursing education to assess clinical skill or competence.

3.2. Setting and Participants

This study was conducted in seven higher institutes of nursing and technical health professions (ISPITS) in Morocco, including 129 paramedical teachers who agreed to participate in the study. In addition to their specialties in nursing or health care techniques, they are also qualified in pedagogy, contributing to both theoretical training and clinical supervision of nursing students.

3.3. Data Collection

Data collection is based on a self-administered questionnaire composed of 28 questions developed from Miller's theoretical model and adapted from Mehay and Burns (2009) with the four levels of skill acquisition or clinical competence.

The questionnaire is divided into two parts; the first part focuses on the personal and professional characteristics of participants, while the second one examines three main dimensions of evaluating clinical learning in nursing education. First, it includes teachers' knowledge of the concept of clinical learning assessment and four questions. Second, it targets nine questions related to assessment practices adopted. Finally, four questions are devoted to the education and challenges faced by nursing teachers.

A pre-test of the questionnaire with nine teachers is done before the final distribution of the questionnaire among participants.

Participants are contacted within various institutes by email or by a direct meeting depending on their availability and also on their accessibility due to the geographical distance that exists between the institutes in the different regions.

The data collection was conducted in June and July 2019.

3.4. Data Analysis

Several steps were followed to analyze the results of the questionnaire, including using the data recording on the SPSS version 20 software, the descriptive statistical analysis, and finally, the interpretation of the results.

3.5. Ethical Considerations

In this study, several considerations were taken into account with the participants, namely free and informed consent, anonymity, and the right to the confidentiality of the data collected.

4. RESULTS

There are three dimensions that are related to the findings, which are as follows: teachers' knowledge of the assessment of clinical competence, the assessment practices adopted to evaluate clinical competence, and the difficulties faced during their assessment practices.

Table 1. Characteristics of participants.

Participants Characteristics		n (%)
Gender Male	Male Female	30 (23%) 99 (77%)
Age range (year)	25-50 50 and more	112 (86.8%) 17 (13.2%)
Academic affiliation	Casablanca Rabat Marrakech Fes Agadir Tetouan Errachidia Laayoune Beni Mellal	44 (34.1%) 19 (14.7%) 21 (16.3%) 18 (14%) 11 (8.5%) 5 (3.9%) 4 (3.1%) 1 (0.8%) 6 (4.7%)
Training courses	Nursing care Midwife Health techniques Rehabilitation and re-education Medico-social assistance	68 (52.7%) 36 (27.9%) 13 (10.1%) 6 (4.7%) 6 (4.7%)
Teaching experience (year)	Less than 5 years 5-10 10-15 Over 15	26 (20.2%) 59 (45.7%) 30 (23.3%) 13 (10.1%)

4.1. Participants Characteristics

Analysis of the data collected from 129 participants shows a predominance of females (77%) with 86.8% of participants aged between 25 and 50 years old.

The participants are from several institutes; however, strong participation is noted within the institutes of Casablanca, Marrakech, Rabat, and Fez. In addition to that, they work in several training courses, with notable participation in the nursing course followed by the midwifery course.

Besides these characteristics, the participants have a variable experience of nursing education; less than 5 years for 20.2%, between 5 and 10 years for 45.7%, 10 and 15 years for 23.3%, over 15 years for 10.1% (Table **1**).

4.2. Clinical Competency Assessment Practices

4.2.1. Dimension 1: Teachers' knowledge of the Concept of Assessment of Clinical Competence

4.2.1.1. Forms of evaluation adopted by teachers

The teachers' survey (71.2%) declared that they prefer the combination of formative and summative forms of evaluation to assess their students' clinical competence. (Table **2**).

Table 2. Forms of evaluation adopted by teachers.

Forms of clinical assessment adopted	n (%)
Formative evaluation	27 (17.3%)
Summative evaluation	18 (11.5%)
Combination of formative and summative evaluation	111 (71.2%)

4.2.1.2. Purposes of the Forms Adopted during the Evaluation

On a Likert scale, teachers express their agreement with the purposes of formative evaluation, which aims, on the one hand, at monitoring the student's progress in learning and to resolve the difficulties experienced. On the other hand, they agreed with summative evaluation, which makes it possible to judge the degree of mastery of the student's learning (Tables **3**-**4**).

Table 3. Purposes of the formative evaluation of clinical competence.

Items	Strongly Agree (%)	Agree (%)	Neutral (%)	Disagree (%)	Strongly Disagree (%)
Situate the learning progression	72.1	27.1	0	0.8	0
Identify gaps in the student	75.2	22.5	1.6	0.8	0
Remedy for learning disabilities	69.8	27.1	2.3	0.8	0
Making adjustments	70.5	26.4	2.3	0.8	0
Adapting clinical teaching	63.6	31.8	3.9	0.8	0

4.2.1.3. Clinical Competence's Components

As for the components of clinical skill or competence, technical skills of care and critical clinical judgment take the first place compared to clinical attitudes and knowledge (Table **5**).

Table 4. Purposes of the summative evaluation of clinical competence.

Items	Strongly Agree (%)	Agree (%)	Neutral (%)	Disagree (%)	Strongly Disagree (%)
To verify the acquisition of skills	64.3	31.8	3.1	0.8	0
To situate the students in relation to each other	18.6	42.6	16.3	16.3	6.2
To certify the degree of mastery of skills	40.3	47.3	7.8	3.9	0.8
To draw up a report on the learning tasks carried out	31.8	41.9	18.6	5.4	2.3

Table 5. Clinical competence's components.

Clinical Competence's Components	n (%)
Clinical Knowledge	92 (22.2%)
Technical care skills	116 (28%)
Attitudes and behaviours	98 (23.7%)
Clinical judgment and criptic mind	108 (26.1%)

4.2.2. Dimension 2: Clinical Learning Assessment Practices

4.2.2.1. Methods of Assessing Clinical Competence

The majority of participants (98.06%) report that they use an assessment tool in their practices. These tools vary depending on the component to be assessed in the clinical competence. Thus, the most commonly used tools are the case presentation (64.5%) for knowledge assessment; the criterion-based assessment scale (61.3%) for technical skills and direct observation (50.8%) for attitudes and behaviors. (Table **6**)

Table 6. Methods of assessing clinical competence.

Methods	Clinical Knowledge	Technical Care Skills	Attitudes and Behaviours
MCQ	52 (9.9%)		
Case presentation	80 (15.2%)		
Development questions	41 (7.8%)		
Check list		53 (10.1%)	
Criterion-based assessment scale		76 (14.5%)	
OSCE		43 (10.7%)	
Simulation		59 (13.3%)	
Direct observation			63 (12%)
Portfolio			22 (4.2%)
File verification			12 (2.3%)

4.2.2.2. Modalities for the Assessment of Clinical Competence

The respondents indicated that the assessment is conducted in two settings, clinical with patients and simulation in 65% of cases.

Table 7. Number of evaluation situations used.

Number of Evaluation Situations used	n (%)
1 situation	25 (19.4%)
2 to 3 situations	93 (72.1%)
3 to 4 situations	11 (8.5%)

The results show that 72.1% of the participants affirmed the use of 2 to 3 situations to evaluate students. They rarely use the same situations with all students or several tools during the same evaluation (Table **7**).

However, the permanent use of feedback was reported by 48.8% of respondents.

4.2.3. Dimension 3: Difficulties Faced by Teachers in Assessing Clinical Competence

4.2.3.1. Teacher's Training on the Assessment of Clinical Competence

Teacher qualification in a clinical competence assessment remains important in helping teachers assess in a valid and reliable way. According to the results, 80.7% received training in basic education which was continuous.

In addition to that, the components covered in training on clinical assessment occupy the following percentages; theoretical concepts of evaluation (40.6%), the design of evaluation tools (34.6%) at the expense of the use of innovative tools, and adaptation and remediation strategies (Table **8**).

Table 8. Teacher's training on the assessment of clinical competence.

Teacher's training on the assessment of clinical competence		n (%)
Training framework for clinical competence	Basic training Continuing training Self-training	78 (57.7%) 31 (23%) 26 (19.3%)
Components covered in training on clinical assessment	Theoretical concepts Design of evaluation tools Use of innovative assessment tools Coping and remediation strategies in the event of failure	103 (40.6%) 88 (34.6%) 35 (13.8) 28 (11%)

4.2.3.2. Difficulties Faced by Teachers During Evaluation

As far as the difficulties experienced by teachers in carrying out their assessment practices are concerned, they are primarily related to a limited number of resources and a high number of students followed by the insufficient time (Fig. **2**).

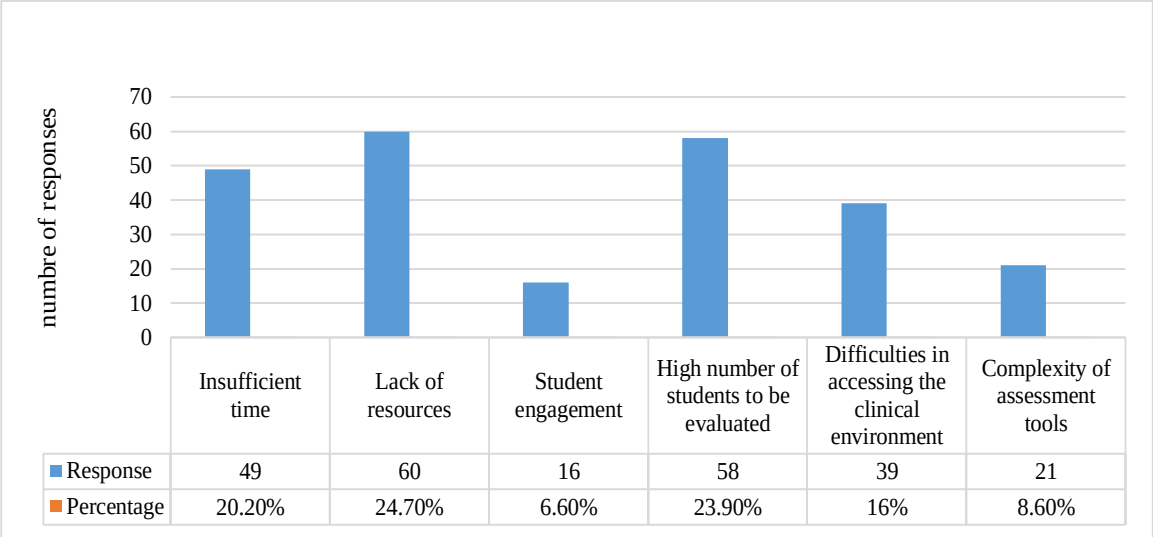

Fig. (2). Difficulties faced by teachers during evaluation.

5. DISCUSSION

Assessing clinical competence is a challenging task for the nursing teacher as it must be realized in contextualized situations, and at the same time, it needs to cover the assessment of the student's knowledge, skills, attitudes, and values [14, 16, 18].

The results of this study highlight that the practices of skill assessment or clinical competence adopted by educators in the institutes are the result of their knowledge and training. In addition to that, they use various methods, but they encounter several difficulties in their practices.

For the first dimension, which relates to knowledge of clinical assessment, the study revealed that teachers consistently adopt a combination of formative and summative evaluation in their clinical competence assessment practices. Indeed, nursing teachers must use these forms of assessment according to clinical learning objectives and the expected outcomes on the cognitive, emotional, and psychomotor levels [2, 5, 19].

Moreover, the teachers' responses are consistent with the purposes of the formative evaluation, which plays a major role in supporting learning through informal regulations to correct students' errors and help them deal with their difficulties [18, 29]. The summative evaluation provides a formal account of the student's skills, knowledge, strategies, and level of learning [30].

Respondents primarily identify the components of clinical skill or competence, namely knowledge, technical care skills, attitudes, behaviors, clinical judgment, and critical thinking. This is consistent with the different definitions of clinical competence, the characteristics of each dimension of clinical competence, and the fact that it is evolving over time [18, 31].

For the second dimension on clinical competence assessment practices, the demonstration of clinical competence requires assessment in levels 3 “showing how” and 4 “doing” to help the student demonstrate clinical learning in a simulated setting primarily using OSCE or simulation and in a real clinical setting through observation [26, 28].

The study revealed that the majority of teachers use a single tool to evaluate clinical competencies. However, nursing assessment requires the use of multiple methods to assess whether the student has acquired the knowledge, skills, and attitudes necessary to practice the competency [23].

In addition to that, the tools used are selected according to the components of assessment skill [25, 26, 28]. According to this study, teachers use case presentations to assess clinical knowledge, a criterion-referenced assessment grid to assess clinical skills, and direct observation to assess attitudes and behaviors. Unlike Murray *et al.* (2000), who also used simulation and structured objective clinical evaluation (OSCE) in addition to these tools, the file consultation covers all areas of clinical competence and solicits more in-depth learning strategies from the student in order to reach the higher levels of Miller's pyramid [19, 24].

Teachers use a variety of situations to assess students, but students are not assessed in the same way. Nevertheless, the World Health Organization (2016) recommended that nursing educators should fairly assess student achievement, especially attitudes and behaviors, using the same assessment conditions [5].

Feedback is important in every clinical assessment because it allows the student to gain self-confidence and integrate the knowledge and skills needed to develop competence [32].

In most cases, the feedback given is oral, ignoring the written form, which provides the same opportunity as the first one to give the student a precise, concrete, constructive, and timely annotation. Duers and Brown (2009) found in their study that students prefer oral feedback for its clarity compared to the written one, which is unreadable and has difficult vocabulary [33].

Finally, for the dimension relating to evaluating difficulties, teachers report that they receive training on

assessment during their basic training. However, this gives more importance to the theoretical concepts and the design of assessment tools than to the use of innovative tools such as simulation and OSCE and remediation strategies in case of failure. In addition to that, they express that the difficulties encountered in their practices are related to lack of resources, high numbers of students, and insufficient time. In fact, the teacher must consider all the factors that may influence his or her assessment practices [34].

CONCLUSION

The study of teachers' practices in assessing clinical competence in the nursing education system highlights the nurses' knowledge of the practice of clinical competence assessment, the different methods used, and their degrees of adequacy with the different dimensions of clinical competence. At the same time, it identifies the various difficulties encountered by teachers as well as the inadequacies that exist between practice and recommendations. This opens the possibility for considering the best evaluation methods to be adopted, which makes it possible both to assess the degree of acquisition of clinical skills by nursing students and to reconsider practices in a new context of reforming the educational system using a competency-based approach.

Therefore, it is appropriate to propose a clinical evaluation model that responds to the recommendations of Mehay and Burns' (2009) theoretical model for assessing clinical skill or competence and measuring its impact on nursing students' learning.

Moreover, this study provides an overview of the existing situation. These results will serve as significant support to our primary perspective to develop a standardized clinical learning assessment tool at ISPITS, either in simulation or the clinical setting. Furthermore, the results measure the impact on the development of clinical competencies among nursing students and on teachers' assessment practices.

ETHICS APPROVAL AND CONSENT TO PARTICIPATE

This study was approved by the central ethics committee of the Ministry of health, Morocco.

HUMAN AND ANIMAL RIGHTS

Not applicable.

CONSENT FOR PUBLICATION

Informed consent was obtained from all participants.

AVAILABILITY OF DATA AND MATERIALS

The data supporting the findings of the article is available from the corresponding author [E.E.W] upon request.

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None.

CONFLICT OF INTEREST

The authors declare no conflict of interest, financial or otherwise.

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Not applicable.

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