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REVIEW ARTICLE

Assesment of students' clinical skills in Primary Care

Avaliação de habilidade clínicas de estudantes na Atenção Primária

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ABSTRACT

Introduction: The Brazilian medical undergraduate curriculum mandates a compulsory rotation in Primary Health Care (PHC), requiring an understanding of the assessment modalities for acquired clinical competencies. **Objectives:** The study aims to identify the currently employed methods for evaluating clinical skills in the PHC setting, contributing to a comprehensive medical education. **Method:** A systematic review was conducted across PubMed, Medline, LILACS, SciELO, and Portal Capes databases, encompassing articles written in English, Portuguese, and Spanish, utilizing the following descriptors: "Clinical Competence", "Medical Student", and "Primary Health Care". 743 quantitative and qualitative studies were identified, 40 selected for full-text reading, and 24 ultimately for analysis. **Results:** Among the 24 studies analyzed, 12 evaluated methodologies employing real patients, and 12 others discussed evaluations involving simulated patients. OSCE was the most employed method in simulated patient scenarios, while in real patient scenarios, the checklist, teacher feedback, and direct observation were noteworthy. OSCE allows standardized evaluation, but its implementation proves resource-intensive. Assessment involving actual patients cannot be fully replicated and requires checklists and direct observation to mensurate the acquired skills. **Final considerations:** The evaluation methods were diverse; however, feedback stands out as a guiding and qualifying tool for learning and reflective practice, as well as the refinement of the activities implemented.

Keywords: Medical education; Primary care; Clerkship in medicine.

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RESUMO

Introdução: O currículo de graduação médica brasileiro estabelece o estágio obrigatório na Atenção Primária à Saúde (APS), tornando-se essencial conhecer as formas de avaliação das habilidades adquiridas. **Objetivos:** Identificar os instrumentos avaliativos de habilidades clínicas que estão sendo utilizados no cenário de APS e que contribuem para uma formação generalista. **Método:** revisão sistemática nas bases de dados PubMed, Medline, LILACS, SciELO e Portal Capes em inglês, português e espanhol, utilizando os descritores: "Clinical Competence", "Medical Student", "Primary Health Care". Foram identificados 743 artigos quantitativos e qualitativos, dos quais 40 foram selecionados para leitura completa e 24 incluídos para análise. **Resultados**: Dos 24 estudos analisados, 12 avaliam métodos com pacientes reais e outros 12 discutem avaliações com pacientes simulados. O OSCE foi o mais utilizado em cenários com pacientes simulados, enquanto para pacientes reais o *checklist*, a observação direta e o feedback foram mais notórios. O OSCE permite avaliação padronizada, mas é dispendioso para ser aplicado. A avaliação com paciente real não pode ser replicada integralmente, com *checklist* e observação direta sendo utilizados para mensurar as habilidades aprendidas. **Conclusão:** Os métodos avaliativos utilizados foram diversos, porém o *feedback* destaca-se como ferramenta norteadora e qualificadora para a aprendizagem e reflexão-ação da atividade implementada.

Palavras-chave: Educação médica; Atenção primária; Estágio em medicina.

Introduction

The coordination for human resources training for Health Care is contemplated in the Brazilian Constitution through the establishment of Sistema Único de Saúde (SUS). The 2014 National Curricular Guidelines for medical programs reflect this interministerial collaboration. They emphasize the imperative need for medical schools to direct their efforts in training generalist professionals, able to address the most common health issues that affect the Brazilian population. They advocate greater student involvement, from the very early years of the course within the Primary Health Care (PHC) setting, understanding these local scenarios as ideal for cultivating generalist physicians able to work within the SUS.

Within these scenarios, the student may have interprofessional experiences, based on the comprehensive care of the individual. It must be contextualized within family and community dynamics, recognizing the importance of social determinants of the disease and ethical medicine practice centered on individual care[1].

Within Primary Care, students have the opportunity to develop activities with a broad perspective on the diverse needs of individual and community health, exerting a patient-centered medicine practice rather than disease-centered. This coordination involves planning actions through shared decision-making between the physician and the individual who is the focus of care[2-5].

In this context, PHC contributions to students' training include the opportunities: (1) to refine skills to conduct and deal with different life situations and their cycles; (2) to engage with people within the local social context; (3) to work along multi-professional teams, integrated, longitudinal and of continuum care; and (4) to cope with conflicts that require critical and reflexive thinking over the local reality[3]. To evaluate the development of these skills, diverse evaluative tools are required[6].

In accordance with the new Curricular Guidelines issued by the Ministry of Education (MEC), which recommend that 35% of total internship hours must be conducted in PHC, preferably within the Family Healthcare Strategy, medical schools have expanded PHC clerkships, revealing the need to understand the key methods to assess PHC-related clinical skills. Therefore, the practical evaluation of students' clinical abilities is an essential activity for their educational journey, making it possible to verify the acquisition of professional skills, to detect flaws, and indicate ways of solving them[7,8].

Despite the existence of several validated assessment methods and tools, there is a lack of studies that objectively

enlist the currently employed methods. There is also a lack of consensus and coherence among medical schools about their choice of assessment methods.

In light of this, this study aims to identify the evaluative instruments for clinical skills utilized in PHC settings, in order to support the critical and reflective training of medical students and equip them with the essential skills for their success as generalist physicians in PHC.

Methods

A systematic review was conducted in accordance with PRISMA protocol recommendations, under the registration number 365350 in PROSPERO Systematic Review database. The purpose was to address the following question: "What are the evaluative methods employed to assess medical students' clinical skills during Primary Health Care rotation?"

Data was collected from November 6th to 12th of 2022, encompassing articles published up to June of 2022, written in Portuguese, English, or Spanish, in PubMed, Medline, LILACS, SciELO, and Portal Capes databases.

The following search strategy was employed: ((("Clinical Competence" OR "Clinical Competencies" OR "Clinical Competency" OR "Clinical Skill" OR "Clinical Skills") AND ("Educational Measurement" OR "Educational Assessment")) AND ("Medical Student") AND ("Primary Health Care" OR "Primary Care" OR "Primary Healthcare" OR "Family Health Program" OR "Family Health Strategy")).

As for inclusion criteria, it was established as inclusion criteria quantitative and qualitative studies investigating the assessment of clinical skills in undergraduate medical students currently available on the Internet. Articles involving other graduation programs besides Medicine, languages other than those mentioned above, and articles not available on the Internet were excluded.

The titles and abstracts extracted from the databases were independently and blindly analyzed by two different researchers. The RAYYAN platform[9] was used for this research stage.

The following data was extracted from the selected articles that underwent full-text reading: Author, title of the article, publication year, the publishing journal, DOI, methodology, description of the method, results, whether or not the article was aligned with the research objectives, and whether the evaluation was conducted with real or simulated patients. he identification, screening, eligibility assessment, and inclusion of studies are summarized in Figure 1.

Results

The initial evaluation identified 783 articles, and 110 were detected as duplicates. Among the 673 remaining articles, two pairs of researchers blindly and independently evaluated 336 and 337 articles, respectively, by their titles and abstracts. A total of 312 articles were included, while 324 resulted in conflicts and were resolved by consensus. 40 articles had their text fully analyzed. 16 were excluded as they were not in accordance with the inclusion criteria.

The analysis of the 24 articles included revealed diverse evaluative methods employed; however, the assessment of practical clinical skills were

Of these 24 articles, 12 evaluated students using simulated patients, and the Objective Structured Clinical Examination (OSCE) was the most utilized method.

The articles proposed different approaches to address the OSCE method and simulated environments. One of them was the discussion about which parameters should be prioritized.

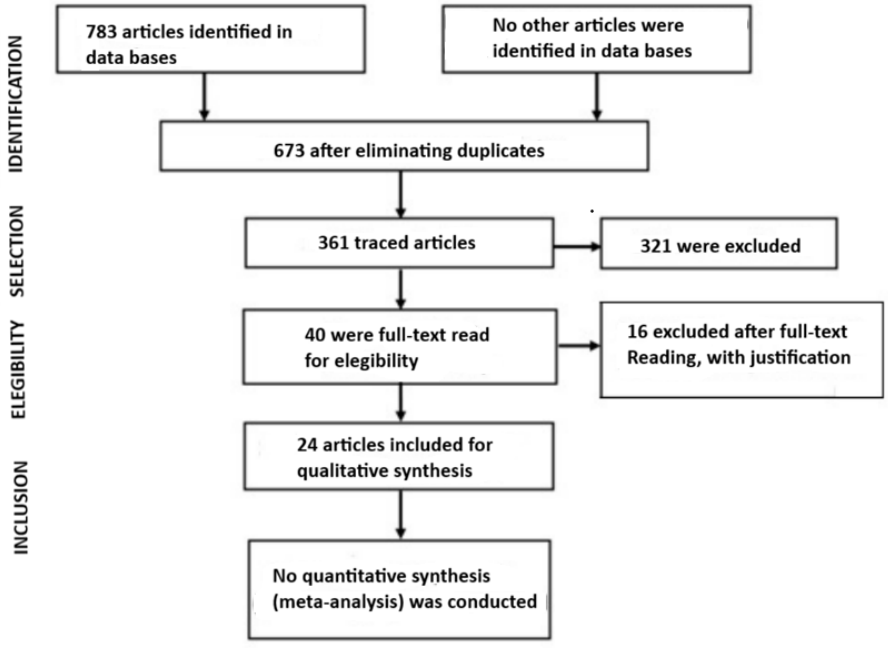

Figure 1. Article search and selection diagram

Park et al. (2017)[10] employed checklists in a multicentric research involving seven different authors and evaluated three main components of the clinical encounter: history taking, physical exam, and clinical register (medical chart). In a similar way, Yudkowsky et al. (2009)[11] utilized a structured questionnaire and pair assessment, measuring five distinct categories of performance (interview and anamnesis, patient management, problem-solving, behavior, and physician-patient relationship).

Taking a step further, Williams and Lamen (2012)[12] developed the Diagnostic Justification Ability (DXJ) method for assessing students, in which students had to defend their clinical reasoning and diagnosis to their examiners. Their scores were compared to their self-assessment of performance during interactions with simulated patients. The authors concluded that it is harder to use the DXJ method than the traditional method.

Nevertheless, it became evident that some factors were pre-determinants of students' performance during a simulated patient encounter. Williams et al. (2017)[13] conducted a retrospective observational study assessing OSCE scores comparing undergraduate students who had rotated previously in clinical clerkships and those who did not. They concluded that students who participated in a clinical rotation before had a better performance.

In a similar manner, Steiner et al. (1998)[14] submitted students to a low back pain patient simulated station and assessed if the training environment influences students' performance during the simulated examination. It revealed that students who had engaged with real patients performed better in the physical exam during the simulated scenario.

For students who underperformed in OSCE, Moon (2019)[15] evaluated the application of a refinement skills program. The 4-week long program showed positive results, as the students who participated improved their performances during the examination.

Aiming to determine if a subjective parameter concerning students' perception could predict their performances in OSCE, Graves et al. (2017)[16] compared the objective score (OSCE) and the self-assessment made by the students. Firstly, one self-assessment was conducted before and another after the OSCE. These two evaluations were compared with the actual performance in OSCE. The study found limited evidence that students could predict their performance and adjust their competencies only according to their own perception.

The integration of technology into performance and assessment was also examined. Chan et al. (2014)[17] compared the use of remote examiners, monitoring exam sessions through cameras, and in-person examiners for OSCEs. The performance of the two groups was assessed through checklists, and both approaches presented similar results.

A recording method was also employed. Witheridge et al. (2019)[18] filmed 21 simulated sessions in a PHC setting. The sessions were further evaluated through checklists, and the trainees reflected on their respective performances by watching the videos. The authors concluded that this method could be used to assess the diagnostic ability of their students.

Coyne et al. (2021)[19], through an integrative review, analyzed simulated virtual models for the acquisition of clinical skills. Overall, the revised results indicate an improvement in students' knowledge, confidence, and clinical performance.

In a literature review by Patricio et al. (2013)[20], aspects related to OSCE application, such as cost, resources required, and necessary infrastructure were assessed. The conclusion was that, despite being cost-intensive, OSCE must be utilized due to the possibility of achieving a range of objectives, some of which are unattainable with other examination types.

Conversely, 12 articles evaluated methods utilizing real patients. It is noteworthy that despite their primary objective of assessing clinical skills in a real-world environment, these studies employed various approaches to achieve this goal.

Bosner et al. (2017)[21], Oswald (1993)[22], and McKinley et al. (2000)[23] proposed using direct observation as the cornerstone of the assessment method. The presence of a mentor during the session facilitated the assessment of specific skills, such as professional behavior and communication. According to Bosner et al. (2017)[21], the session also allowed undergraduate students to receive feedback (90% happened during the patient encounter). Oswald (1993)[22] argues that direct observation is viable and crucial for clinical skills teaching improvement and refinement.

The use of checklists is widely adopted to predeterminate the parameters for assessment. McKinley et al. (2000)[23] used a modified version of the Leicester Assessment Package, that evaluates six performance axes. According to the authors, this version is feasible and valid for students' formative assessment, and it is well-received by academics, due to its perceived fairness as an evaluation tool.

Fabiola Stollar et al. (2020)[24] assessed students in pediatric consults using the Structured Rea-patient Examination (SRPE). Different competencies were evaluated (history taking, physical exam, problem-solving, and professional attitude). As a starting point, Stollar et al. (2020)[24] required students to complete a Computer Based Written Examination (CBWE), allowing them to derive greater benefit from the patient encounter after solidifying their theoretical knowledge. Lastly, Levy et al. (2005)[25] argued that checklists yield more meaningful and significant results during rural rotations.

In contrast, Allan e McAller (2021)[26] utilized the Parallel Consulting Method, which consists of independent patient management by the student before discussing it with preceptors. The quantitative analysis evidenced the development of students' autonomy and refinement of clinical skills without the presence of preceptors as observers.

When the observer is not present, the case must be discussed with the preceptor. Wolpaw et al. (2009)[27] suggests the SNAPPS method as an alternative to increase students'

expression and autonomy, exercising their clinical reasoning and showing their insecurities about the cases.

There have been studies that focused on online instruments to assist in consultations. Taylor et al. (2006)[28] suggest the Personal Digital Assistant, a digital tool in which undergraduate students can organize data sheets during the consultation, as well as the most common affections and their epidemiology. Another instrument is the online portfolio by Maria Ângela Reis Antonio[29], which structures evaluation criteria through checklists, with the purpose of measuring clinical reasoning, problem identification, discussion of diagnostic hypotheses, and differential diagnosis. Additionally, it allows self-assessment and reflexive

Lastly, Ivar Aaraas et al. (2007)[30] provides an additional finding from his study on the implementation of an assessment model with outpatients: patient feedback. In this study, the majority of patients reported not perceiving any difference in stress levels between consultations conducted by students and consultations with generalist physicians.

Discussion

Clinical skills training in medicine with real or simulated patients is discussed in medical literature[8,31,32], and gained importance during the COVID-19 pandemic when several practical training fields with real patients were suspended or reduced the number of trainees due to the potential risk of contamination and mortality[32-34]. In order to train clinical skills in a protected environment, simulated training sessions were developed and expanded. However, evidence shows that clinical performance improved through simulation after gaining clinical experience in real consults[36].

The advantage of evaluating clinical skills using real patients is that it assesses the trainee within the work reality. The ways in which illnesses are presented by real patients are singular and involve particular ways of speaking, culture, and education. The real patient brings the unexpected, few can predict how the patient will react, and their demands are revealed in real time, potentially leading to a comprehensive biopsychosocial diagnosis that requires multifaceted approaches and complex treatment plans[8,23].

The analysis of the articles using real-life both differences and similarities in the direct observation of students during consultations, especially regarding the value of feedback to pupils. The use of checklists was highlighted in three articles, which presented specific and descriptive tools for evaluation[24,26,36]. The study described other assessment methods that used SNAPPS as a case presentation method and digital tools used during and after consultations, such as online portfolios and electronic register.[27] The disadvantages related to the assessment of real-life patient encounters stem from the difficulty of replicating the same patient presentation for all students, which may lead to disparities, particularly in terms of difficulty levels and the skills required to handle different situations.

In simulated patient clinical assessment, the main advantage is that all students experience the same evaluation scenario. This makes it a valid assessment method. Students can repeat the process many times as needed to develop skills that will help them when facing real clinical situations. It prepares trainees for realistic scenarios and enhances patient safety, as students will become better trained in clinical practice and professional conduct. It allows individuals to experience diverse clinical situations and widens clinical reasoning across different pathologies, comorbidities, and related chronic illnesses. Furthermore, it enables the achievement of objectives that are not typically addressed in other methods, and allows for greater control over different aspects of the consultation[8,15,16,20,31].

The disadvantages of simulated patient assessments include costs, infrastructure, resources, and the possibility to train examiners and actors. Moreover, it should be considered that training students only in simulated scenarios may result in their being unprepared when faced with an unexpected scenario during professional life[8,16,31].

The analysis of articles about simulated patients demonstrated several studies that applied OSCE, its advantages, and disadvantages in history taking, physical exams, and management assessment. The written record includes the student's explanation of how the clinical reasoning was made. Other types of assessment tools were described as filming and direct observation of a simulated consult, using checklists, and consulting virtual models[10,12,13,14,15,19,20,36,37].

Some methods could be applied in both real and simulated patients, such as observed, recorded consult, justified written record, portfolio, checklist, and feedback.

Direct observation is one of the oldest methods used as assessment methods. Currently, technological resources allow the consultation to be filmed and recorded, enabling both the examiner and the student to review it and identify what needs to be improved in a synchrony or asynchrony way. Also, enables assessment by remote teachers or peer-review. The costs and benefits must be considered. Equipment costs, professionals' availability, local infrastructure, lab, and anfiteatro are some impediments to this method. Real patient encounters rely on whether patients are in accordance, in obtaining informed consent, and the possibility of patients withdrawing their consent at any point[18].

The checklist is an evaluation tool often employed. It permits standardized performance assessment during consultation. Developing checklists is a complex task, as it may encompass specific points of a general medical consult or focus on particular diseases. The content varies widely according to the type of medical encounter, whether it is a first-time consultation or a return. It does not always cover all aspects of the medical encounter. The checklist might be designed for all stages of the consultation and for specific pathologies, and it might generally identify aspects that should be improved[8].

There has been a general consensus that feedback should be offered in all examinations. Some basic rules are obtaining the students' consent and setting expectations beforehand between student and mentor. Feedback should

be structured and constructive, highlighting both strengths and weaknesses, along with suggestions for improvement[21].

The main evaluative tools identified by this study were related to clinical abilities of general clinical reasoning that are crucial for clinical practice. On the other hand, despite knowing that clinical reasoning is the cornerstone of clinical practice and must be evaluated, there are other abilities just as important, such as empathy, respect for patients' reactions, communication, and sense of community. These skills should also be examined.

Some articles have studied the validity of internships in PHC settings in rural communities and outpatient PHC clinics compared to internships in hospital units regarding the acquisition of medical skills. They found that these internships provided quality equal or superior to that of hospital internships[37,38].

Indeed, in response to the growing emphasis on primary health care (PHC), medical schools across the country have been adjusting their curricula by expanding or establishing clinical rotations in PHC settings. To ensure that medical students acquire the necessary skills for effective work in PHC, it becomes essential to assess their practical clinical abilities in these settings.

In light of all this, this study had the purpose of identifying the instruments and methodologies employed for clinical skills assessment in the PHC setting, aiming to support the generalist physician, foster reflective education of medical students, and equip them with the necessary skills for their success in Primary Care.

Final Considerations

The evaluative methods employed were diverse, and this study sheds light on the possibilities and fragilities of assessing medical students' clinical skills in the final years of graduation with real or simulated patients. Feedback stood out in all previous research as the guiding and qualifying tool for the learning process.

Despite Brazil is still far from being the protagonist in inserting medical undergraduates into PHC settings, there were few Brazilian papers published on assessment tools regarding the evaluation of skills in PHC. There is an urgent need for financial incentives for the development of research projects in medical schools and for the publication and divulgation of the work, as it serves as a support material for planning and decision-making.

Author's contributions

We describe contributions to the papers using the taxanomy (CRediT) provided above:

Conceptualization, Investigation, Methodology, Visualization & Writing – review & editing: VR Cunha; LHO Bernardino; LCM Ferreira; SA de Souza Filho. *Project administration, Supervision & Writing – original draft*: LCM Ferreira; SA de Souza Filho. *Data curation & Formal Analysis*: PMC Carvalho Junior.

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