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Avaliation of Clinical Reasoning in the Medical Course in Portugal

Clinical Reasoning Assessment in Portuguese Medical Schools

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Abstract: *Introduction:* Clinical reasoning is a fulcral competence for medical practice. Your endorsement plays an important role in preventing medical error; Therefore, it should be based on the best international practices. Given the lack of knowledge about the assessment of clinical reasoning in Portuguese medical schools, this research aims to deepen this knowledge, analyzing the prevalence of application of various assessment methods and identifying the main associated obstacles. *Materials and Methods:* A questionnaire was applied between May and July 2023 to all teachers responsible for curricular units of the 4th year or 6th year of the Integrated Master in Medicine in Portugal. Refer to the SPSS® software, version 28.0 for Microsoft Windows®. The data are predominantly analyzed by means of descriptive statistics. *Results:* Foram collected 75 responses from 8 Medical schools in Portugal, representing approximately the entire population. Most of the teachers have more than 30 years of experience in assessment. Multiple screening questions constitute the most applied assessment method. The methods applied in a simulated and clinical context, by direct observation, are in the curriculum. Among the main obstacles identified, the lack of time and human resources stands out. *Conclusions:* A greater implementation of methods in a simulated context and in a clinical setting is necessary, allowing a more complete and authentic evaluation of clinical reasoning. In this sense, it is essential to increase investment in human resources, increasing the hiring of professionals and promoting training in methodologies for the evaluation of clinical reasoning.

Keywords: Clinical Reasoning, Avaliação

Abstract: *Introduction:* Clinical reasoning is essential for medical practice. Assessing this competency in undergraduate education plays a vital role in preventing medical error; Hence, it should be conducted based on the best international practices. However, knowledge regarding the assessment of clinical reasoning in Portuguese medical schools is currently limited. This study aims to deepen the current understanding of clinical reasoning assessment in Portugal by analyzing the prevalence of various common assessment methods and identifying their main associated barriers. *Materials and Methods* : A survey was administered between May to July 2023 to all faculty members responsible for curricular units in the senior years of the Medical Integrated Master's degree in Portugal. The SPSS® software, version 28.0 for Microsoft Windows®, was used. Data was predominantly analyzed through descriptive statistics. *Results* : 75 responses were collected from 8 medical schools in Portugal, representing roughly half of the target population. The majority of faculty members have over 30 years of experience in assessment. Multiple-choice questions is the most used method of assessment. Methods applied in simulated and clinical environments, particularly the direct observation, were perceived to be in considerable deficit in the curricula. The main identified barriers include lack of faculty time and human resources. *Conclusions* : There is a need for an increased implementation of methods in simulated and clinical environments, allowing for a more comprehensive and authentic assessment of clinical reasoning. In order to achieve this, more investment in human resources is pivotal, namely by increasing faculty recruitment and promoting more training courses on clinical reasoning assessment.

Keywords: Clinical Reasoning, Assessment

1. Introduction

Clinical reasoning is a fulcral competence for safe and effective clinical practice (1–3). It encompasses a diverse set of domains, organized in a dynamic and interdependent sequence in which part: collection, interpretation and synthesis of clinical information, or differential diagnosis, generation of an additional investigation plan and development of a management and treatment plan. (1-2, 4). There is a causal relationship between failures in clinical reasoning and the occurrence of medical errors, which, in turn, puts the safety of doctors at risk (1). According to the WHO, diagnostic lapses occur in 20% of all medical consultations, with at least 0.7% of cases being potentially fatal (5). In the United States of America, deficiencies in clinical reasoning contribute to about 10% of mortality among patients (6), involving the deaths of at least 40,000 individuals per year (7). In this sense, several authors argue that an adequate evaluation of clinical reasoning has the potential to considerably reduce the occurrence of medical errors, improving the provision of health care (4-5, 7-9).

As illustrated in Table 1, which summarizes some of the two main methods of clinical reasoning assessment applied internationally, these methods can be differentiated according to the context in which they are applied (2, 8): clinical, they are applied in the context of medical practice. real; non-clinical, on the contrary, forem applied in an academic context without involving or contact with teachers; and simulated, the teaching of competencies and/or involving simulation tools will be required (2).

Table 1. Brief considerations about two endorsement methods, grouped by application context.

Method	Grades
Non-clinical context	
Oral exam	It requires verbal answers to a set of spontaneous and/or standardized questions based on clinical vignettes; This assessment can be conducted by one or more teachers.
Multiple search questions (PEMs)	São constructed from clinical vignettes and we can find 5 response alternatives; The most common answer format is the *single best answer.*
Open response questions (PRAs)	It consists of clinical vignettes that raise questions whose answers are required at length; The size of the answers is variable.
Simulated context	
Objective structured clinical examination (OSCE)	It is composed of a set of standardized and timed stations that validate the quality of the execution of various clinical data.
Simulation with resort to simulator (MR)	It involves interaction with a device (eg, plastic models or highly reliable mannequins) to evaluate the quality of clinical care delivery; It may involve computer use (eg, computerized interactive exams) or the integration of virtual reality technologies.
Clinical context	
Direct observation	It is up to an examiner to observe, passively, the interaction of a student with a real teacher in a clinical context (eg through tools such as the clinical mini-exam); It must include the provision of feedback from the examiner.
Medical record	It involves the writing of a structured text that must include a summary, a list of problems and differential diagnosis related to a clinical case of a patient with whom the examiner has been involved. It may be other than oral presentation and discussion with experienced teachers.

Overall appreciation of staging (AGE)	Baseia-se on a global perception of clinical reasoning demonstrated over a certain period of time in the clinical period; The classification can be attributed tending to the evaluations of multiple clinical agents.

Adapted from (2).

At the international level, OSCE type endorsement is the most commonly applied method in medical schools, and is also the method to which the most relevance is attributed to teachers. Written exams are only administered near the goals of medical schools. However, the application of methods in a clinical context is in difficulty due to the high relevance that is attributed to teachers (1). The knowledge regarding the evaluation of clinical reasoning in Portuguese medical schools is evidently scarce. Starting from the appeal made by Daniel *et al.* in need of more studies about the prevalence of the application of assessment methods (2), we try to hurry up and analyze how clinical reasoning is validated by the Integrated Master in Medicine, MIM, em Portugal, from the perspective of two responsible teachers curriculum construction.

2. Methods

2.1. Population and Sample

In Portugal, the MIM has a duration of 6 years, being constituted by two learning cycles: either the basic cycle (1st, 2nd and 3rd year) or the clinical cycle (4th, 5th and 6th year). To date of this study, there are only 8 Portuguese medical schools that provide medical training corresponding to the clinical cycle. The population of interest was constituted by all teachers responsible for curricular units, UCs, of this training cycle, in the 2022/2023 school year. The teachers responsible for the first years of the curriculum are excluded. Furthermore, we also do not consider those responsible for UCs whose contents do not include, in essence, the competence of clinical reasoning and the regents of optional UCs, medical research and final master's projects.

Thus, the population defined for this study was 158 individuals. The questionnaire obtained 75 responses (47.5% of the population), thus constituting a demonstration of this study. Taking into account this sample size and considering a confidence level of 95%, we can affirm that we are making an estimation error of less than 9% (8.23%).

2.2. Data Collection and Analysis

A questionnaire was applied according to international guidelines for research in medical education (10). The answers to the questionnaire are collected over 8 weeks, from May 15 to July 10, 2023, by the Google Forms ® application. The questionnaire was sent individually to each senior professor belonging to the population of this study, through two of their electronic contacts available online. The teachers are informed that their anonymity would be respected, as well as it would not be possible to identify the institutions to which they would be affiliated, without making comparisons between them. Participants will also be informed of the authors, objectives and methodology of the study before voluntarily responding to the questionnaire. Based on dice, created for the treatment of collected answers, no identification, direct or indirect, is allowed, two individuals involved. The authors of this investigation barely had access to this database. The data analysis was carried out through the *Statistical Package for the Social Sciences*® (SPSS®) software, version 28.0 for *Microsoft Windows* ®. A descriptive analysis of the data is done through relative and absolute frequencies to vary in the study. Recorreu-se ainda a procedures da inferential statistics. Once the contingency table presented in this article shows cells with an expected frequency less than 1, the *Fisher-Freeman-Halton exact test was used* , an extension of the Fisher exact test for the case of tables with a size greater than 2×2 . By way of quantifying the degree of association between the variables, *Cramer* 's V coefficient is used , in which the classification criterion adopted was the following: if $V < 0.1$, the association very fails; se $0.1 \leq V < 0.3$, association failure; se $0.3 \leq V < 0.5$, moderate association; and if $V \geq 0.5$, strong association (11). In all cases, a significance level of 5% was considered (p-value < 0.05).

3. Results

This research involves professionals affiliated with all medical schools of interest to this study. Table 2 characterizes it according to its distribution by gender, number of years of experience in endorsement, and also by curricular year of the UCs that are responsible.

Table 2. Sociodemographic characteristics of the sample.

Gender (n = 74)	**% (n)**
Feminine	21.6 (16)
Male	78.4 (58)
Years of experience (n = 75)	
<10 years	4.0 (3)
10-19 years	18.7 (14)
20-30 years	25.3 (19)
>30 years	52.0 (39)
Curricular year (n = 60)	
4th year and/or 5th year	85.0 (51)
6th year	15.0 (9)

A majority of two regent professors (78.4%, n = 58) identify as male. Not that it respects years of experience, more than two teachers have more than 30 years of experience in assessment (52.0%, n = 39), while only 4.0% show (n = 3) less than 10 years of experience. Most of the teachers (85%, n = 51) are responsible exclusively for UCs of the 4th and/or 5th year, while 15.0% of these teachers (n = 9) are strictly responsible for the UCs of the 6th year.

Table 3 shows the frequency of application of various methods of clinical reasoning assessment in Portugal and the relevance attributed to the teachers themselves.

The multi-school questions, PEMs, are prominently the assessment method most applied in Portuguese medical schools, being used very frequently by 78.4% of teachers (n = 58). Conversely, open response questions, PRAs, constitute a method that is applied less frequently in medical schools. Most of the teachers do not apply this method at all (48.6%, n = 36), or it also happens as the exams orais in a non-clinical context (41.3%, n = 31), as an *objective structured clinical examination* , OSCE, (48.6%, n = 35) and with a simulation using a simulator, SRS, (55.4%, n = 41) in a simulated context.

All methods applied in a clinical context – direct observation (eg. mini-clinical examinations), clinical history and global assessment of status, AGE, – are applied very frequently by the majority of teachers (42.3%, 64.8% and 60.9%, respectively). However, in relation to direct observation, the percentage of teachers who apply this method very frequently (42.3%, n = 30) is similar to the percentage of teachers who do not apply it at all (36.6%, n = 26).

Table 3. Frequency of application of two methods of evaluation of clinical reasoning and perceptions about their relevance.

	Frequency of application			Perception of relevance			
Method	**Not applied of all % (n)**	**Applied with some frequency % (n)**	**Applied frequently % (n)**	**Nothing or little relevant % (n)**	**Moderately relevant % (n)**	**Very or extremely relevant % (n)**	**Difference %**
PEMs (n = 74)	14.9 (11)	6.8 (5)	**78.4 (58)**	9.5 (7)	43.2 (32)	**47.3 (35)**	-31.1
PRAs (n = 74)	**48.6 (36)**	39.2 (29)	12,2 (9)	24.3 (18)	**37.8 (28)**	**37.8 (28)**	25.6
Oral examination (n = 75)	**41.3 (31)**	29.3 (22)	29.3 (22)	12.0 (9)	37.3 (28)	**50.7 (38)**	21.4
OSCE (n = 72)	**48.6 (35)**	20.8 (15)	30.6 (22)	8.3 (6)	29.2 (21)	**62.5 (45)**	31.9
SRS (n = 74)	**55.4 (41)**	21.6 (16)	23.0 (17)	12,2 (9)	36.5 (27)	**51.4 (38)**	28.4
Direct observation (n = 71)	36.6 (26)	21,1 (15)	**42.3 (30)**	1,4 (1)	18.3 (13)	**80.3 (57)**	38.0
Medical history (n = 71)	12.7 (9)	22.5 (16)	**64.8 (46)**	1,4 (1)	18.3 (13)	**80.3 (57)**	15.5
AGE (n = 69)	20.3 (14)	18.8 (13)	**60.9 (42)**	11.6 (8)	21.7 (15)	**66.7 (46)**	5.8

The most frequent responses are highlighted in bold; The values that appear in the column entitled "Difference" result from the arithmetic difference between the percentage of teachers who consider a given assessment method to be very or extremely relevant and the percentage of those who apply this method very frequently. Abbreviations: PEMs, multiple search questions; PRAs, open response questions; OSCE, objective structured clinical examination; SRS, simulation using a simulator; AGE, global appreciation of status.

Notwithstanding the relevance attributed to the different assessment methods, most teachers consider that, in general, all methods in the study are very or extremely relevant. The methods applied in the clinical context are considered to be the most relevant for the evaluation of clinical reasoning. Direct observation of the clinical history was considered less relevant by more than 80% of two teachers (n = 57). Among the most relevant methods, OSCE stands out, being considered the least relevant by 62.5% of two teachers (n = 45). As PRAs constitute the least relevant method for the evaluation of clinical reasoning, in comparison with the other methods.

AGE is the method that brings together the most agreement between its frequency of application and the relevance that it is attributed, having a difference of barely 5.8% between the percentage of teachers who consider AGE to be less relevant and the percentage of those who apply this very frequent method. On the contrary, direct observation shows a difference of 38.0% between these percentages, assuming that the method whose application is most deficient would be undesirable. This deficiency also extends to both methods used in a simulated context. On the contrary, the PEMs are applied excessively to the relevance that they are conferred, since the percentage of teachers who apply this method very frequently exceeds by 31.1% the percentage of those who consider the PEMs very or extremely relevant.

An attempt is made to relate the curricular years of UCs to those whose teachers are responsible for the frequency of application of the two assessment methods presented. The following table illustrates the only situations in which significant relationships will be identified.

Table 4. Relation between the curricular years of the UCs and the frequency of application of PEMs and AGE

	Curricular Years				
Method	**4th or 5th year % (n)**	**6th year % (n)**	**Total**	***p-value*** *	**V Cramer**
PEMs (n = 59)					
Not applied at all	8.0 (4)	66.7 (6)	16.9 (10)	<0.001	0.565
Applied with some frequency	10.0 (5)	0.0 (0)	8.5 (5)		
Applied very frequently	82.0 (41)	33.3 (3)	74.6 (44)		
Total	100.0 (50)	100.0 (9)	100.0 (59)		
AGE (n = 54)					
Not applied at all	29.8 (14)	0.0 (0)	25.9 (14)	0.023	0.372
Applied with some frequency	25.5 (12)	0.0 (0)	22.2 (12)		
Applied very frequently	44.7 (21)	100.0 (7)	51.9 (28)		
Total	100.0 (47)	100.0 (7)	100.0 (54)		

* - Exact *Fisher-Freeman-Halton* test . Abbreviations: PEMs, multiple search questions; AGE, global appreciation of status.

It is verified that the frequencies of application of PEMs ($p < 0.001$) and AGE ($p = 0.023 < 0.05$) depend on two curricular years on which UCs are taught and for which the teachers are responsible. From the analysis of the table, it is concluded that the PEMs are applied at a higher frequency in the 4th and/or 5th year UCs and that, conversely, AGE is applied at a higher frequency in the 6th year UCs. With the value of *Cramer 's V* , it is concluded that the variables present a strong ($V \geq 0.5$) and moderate ($0.3 \leq V < 0.5$) association (11), respectively.

Figure 1. Obstacles to the application of two methods of evaluation of clinical reasoning by context

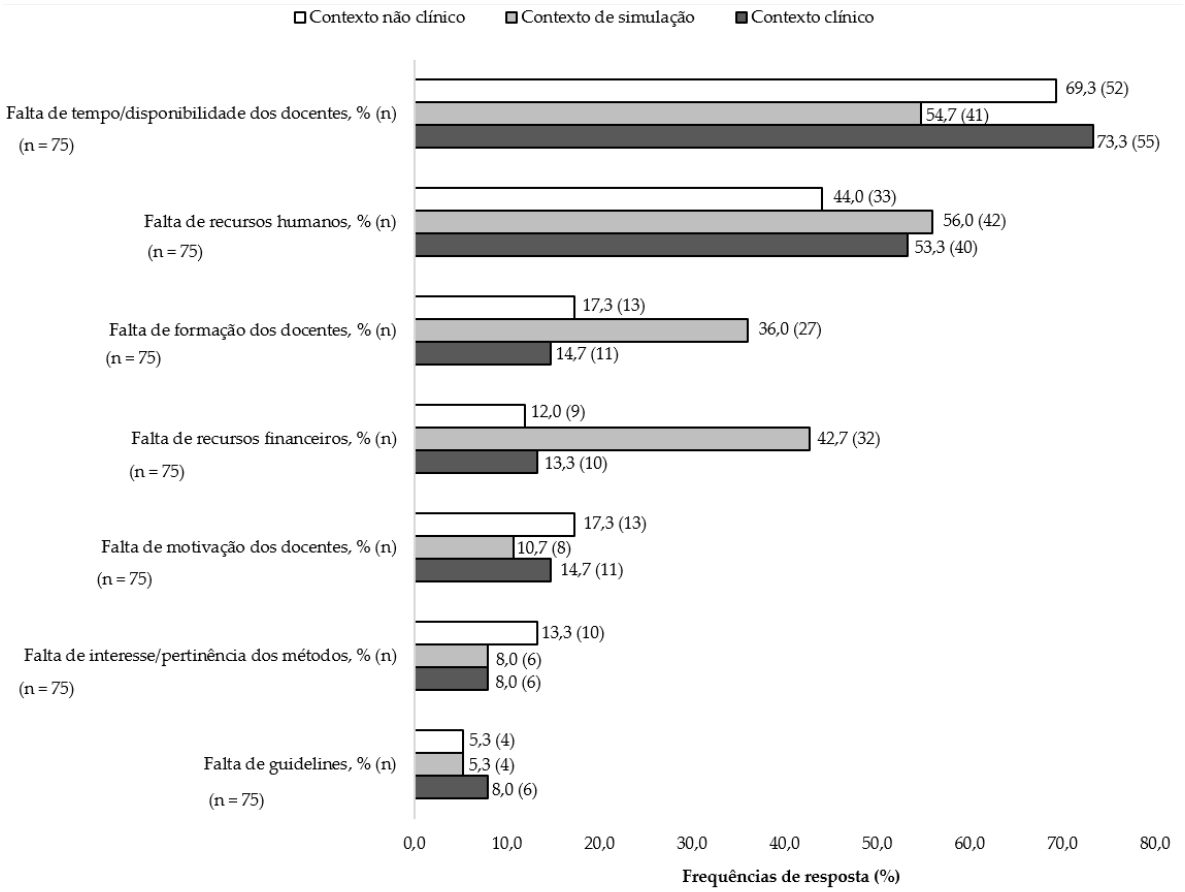

Figure 1 shows in descending order the main obstacles faced by teachers to the application of assessment methods in the second or context in which they are applied (non-clinical, simulated and clinical). Lack of time and/or availability of two teachers constituted the main obstacle to the application of assessment methods in a clinical context (73.3%, n = 55), in a non-clinical context (69.3%, n = 52). Lack of human resources is the second biggest obstacle (53.3% and 44.0%, respectively). Not that it concerns the simulation context, the lack of human resources is assumed to be a major barrier (56.0%, n = 42). The lack of financial resources (42.7%, n = 32) and the lack of training for teachers (36.0%, n = 27) also stand out as obstacles to the application of assessment methods in a simulated context.

4. Discussion

To guarantee adequate coverage of clinical reasoning, it is necessary to open all of your domains, also guaranteeing adequate coverage of general medical content. According to the evidence, no method applied exclusively is capable of effectively validating clinical reasoning. Throughout the training process in Medicine, multiple assessment methods must be applied, with high frequency and in different contexts, increasing the possible number of cases and clinical situations (2).

This study clarifies in an unprecedented way how clinical reasoning is validated in the Medicine course in Portugal, from the point of view of two teachers responsible for the curricular construction in clinical years. The methods applied in a clinical context are considered the most relevant by Portuguese teachers (Table 3), and are aligned with the importance that is conferred by the evidence (2). However, the assessment method most applied to Portuguese teachers is as PEMs (Table 3), in higher frequency in the 4th and 5th year curricula (Table 4). The PEMs are applied in Portugal in a proportion markedly higher than what happens at the international level (1). De facto, I tend to take into account the results presented, there is

an evident excess of PEMs in the Medicine curricula, which are considered adequate for Portuguese teachers (Table 3).

The evaluation of clinical reasoning should not depend exclusively on the application of PEMs. However, it is advantageous to include it in clinical reasoning assessment programs since it is associated with other assessment methods. As PEMs allow us to evaluate in a standardized, representative way (at the level of contents) and in a timely manner decisive stages of clinical reasoning, as a guide to a more proven diagnosis. Preferably, PEMs could be explained in part by their obvious advantages at the level of time management, human and financial resources, as well as other methods (2). However, the results of this investigation highlight that the lack of time on the part of the teachers, which can be associated with the also notable lack of human resources, remains a major obstacle to the application of methods in a non-clinical context (Fig. 1).

In any case, PEMs do not allow us to foresee the quality of clinical reasoning in an authentic clinical manner, since it constitutes only a partial method, that is, it does not guarantee the entire two domains of clinical reasoning in an integrated manner; ao conversely, pá-lo in a fragmented way (2). It is limited to endorsing medical evidence, without considering the cognitive process underlying each response (2). Also, as PEMs have a reduced validity that concerns the evaluation of stages such as the collection, synthesis of clinical data and generation of diagnostic hypotheses (2). In contrast, the methods used in a clinical and simulated context are global methods, which allow the evaluation of all domains of clinical reasoning at the moment of evaluation (2): from the collection and synthesis of clinical information to the elaboration of a patient management plan. , opening up competitions such as Professionalism in communication is essential for work in equipment and contact with teachers (12,13). The assessment methods that best assess these stages are OSCE and direct observation in clinical context (2): the methods that present, precisely, the greatest application gap in Portugal, which would be undesirable (Table 3).

The OSCE is the most internationally applied method (1). In Portugal, however, there is an obvious lack in its application for what is considered adequate for Portuguese teachers, for evidence (2). Quase goal of two teachers does not apply to OSCE at all, despite considering it to be of high relevance (Table 3). The OSCE makes possible an approximation of what is done in the clinical context, being, at the same time, a method of standardized application and, consequently, more objective than the generality of two methods applied in the clinical context (2), or that, from a purely psychometric perspective, can confer greater security to a guarantor. Also, similar to what happens with PEMs, this method presents various limitations at the level of incorporation of uncertainty, not least at the diagnostic level, or that it subtracts plausibility from real medical practice (14).

The greater the number of simulated clinical situations, the more confident our results become. It is, therefore, essential to its validity in preparing a large number of stations, diverse and well organized, allocating an adequate duration to carry them out. In this way, OSCE necessarily requires a considerable investment in human resources, not least at the level of its training, also involving important tasks both in its implementation and in its long-term maintenance (2). These requirements also extend to SRS, which is in line with the main obstacles faced by Portuguese teachers in the application of these methods: the need for teacher training and the lack of financial resources, together with the lack of time and human resources (Fig. 1).

Only evaluation in the clinical context with recourse to real teachers allows the evaluation of clinical reasoning in its greatest authenticity (2), incorporating the specificity of the circumstances of each clinical situation and the demands of the real clinical context, based on a cognitive and technical point of view. , communicational and professional. The results of this study highlight that the global appreciation of stages is only applied more frequently in the 6th year (Table 4), or that it can be explained by the predominance of professionalizing clinical stages during this curricular year in comparison with the rest. This method is, to a certain extent, vague in its definition, not being able to specifically highlight which criteria, aspects or tools are used to base the classifications attributed to final two stages. However, there is a problem related to the

application of direct observations in the clinical setting (Table 3), which is relevant to the evidence (2), or which also occurs internationally (1). Thus, it can be inferred that the privileged contact with the clinic provided in Portuguese curricula currently constitutes a neglected opportunity to apply concrete methods of assessment of clinical reasoning such as clinical mini-exams. These and other tools involved in direct observations are, in general, relatively simple to implement (2). However, each moment of assessment implies individualized attention and the provision of feedback, demanding considerable availability on the part of two doctors. The specificity of two contents evaluated in each clinical situation and the subjectivity that is associated with them implies high frequencies of application, preferably carried out by multiple examiners (2,12,15). These requirements are in line with the main obstacles reported by Portuguese teachers (Fig. 1), which, in turn, are related to the obstacles raised at the international level (1).

It could be argued that the care pressure to which Portuguese doctors are subject today should be conditional on their availability to evaluate the clinical reasoning of their students, both in a clinical context and in a non-clinical context. Another possible explanation for this reality could be related to the exponential growth of the number of medical students in Portugal in recent decades: it is noted that the number of medical graduates per year increased by nearly 300% in 2022 in the year 2000. (16). Likewise, all OECD countries have recorded a sustained increase in the number of medical graduates per 10,000 inhabitants since the beginning of the 21st century (17). The increase in the number of medical students, not accompanied by a proportional investment in human resources, may be conditioned to the application of assessment methods that require more individualized and time-consuming approaches, as occurs mostly in clinical and simulated contexts.

Considered necessary is a greater implementation of methods used in a simulated context (eg. OSCE and SRS) and direct observation in the clinical setting (eg. mini-clinical examinations). The increase in the prevalence of these methods in medical curricula will allow for a more complete and authentic assessment of clinical reasoning (2), filling current gaps at the level of assessment of fulcrum stages such as collecting and analyzing clinical information and two interdisciplinary aspects of clinical reasoning. , or that will allow better reflection The complexity of clinical practice.

I tend to take into account these considerations and the results obtained in this work and in no sense of improving the evaluation of clinical reasoning in Portugal, it is recommended:

a) the increase in the hiring of teachers and technical professionals, in order to fill the existing gaps at the level of human resources, which are transverse to all contexts of clinical reasoning assessment;
b) the reorganization of pedagogical activities, in order to prioritize or contact two 4th year or 6th year medical students with a clinical curriculum and, subsequently, to evaluate clinical reasoning in this context;
c) a reduction in the number of students under the supervision of each teacher, in order to increase the quantity and quality of the evaluation of clinical reasoning, in particular, through the performance of mini-clinical examinations, which require individualized attention;
d) the promotion of more training courses for teachers and academic technicians on methodologies for the evaluation of clinical reasoning, with particular focus on methods used in simulated and clinical contexts, in accordance with the best international practices;
e) the increase in financial investment in the implementation and innovation of methods used in a simulated context: in the OSCE, for example, through the hiring and training of actors; In SRS, in particular, through the creation of computerized interactive exams based on clinical cases or the integration of virtual reality technologies.

This research is not intended to compare the assessment of clinical reasoning between Portuguese medical schools or to identify the needs of each school specifically. It is suggested, however, that such could serve as an object for future studies, in order to develop concrete action plans adjusted to the particularities of each medical school.

It was not possible through this study to assess the prevalence of application of all assessment methods used internationally, constituting this fact as one of the major limitations of this study. Several highly relevant methods are excluded , such as the *Sript-Concordance Test* , SCT, which incorporates the complexity and uncertainty inherent in most medical decisions in the evaluation of clinical reasoning (2,14). The prevalence of application of these methods in Portugal remains, therefore, unknown.

It would also have provided a collection of obstacles more directed to each specific method. Furthermore, this study also does not extend to the entire two curricular years of the Medicine course, depending on the 4th year or 6th year of the MIM, being uncertain or impacting even the teachers of the first two curricular years on the results obtained.

Finally, this study has as its main focus the evaluation of clinical reasoning in a summative context, and not necessarily formative. It would be pertinent to clarify how clinical reasoning is addressed in medical training in Portugal and what are the main strategies applied in this field.

5. Conclusions

- This study highlights the difficulty in adequately evaluating clinical reasoning in a pre-graduate medical degree in Portugal.
- The multiple-school questions configure the assessment method most applied in Portuguese medical schools.
- OSCE and direct observation in a clinical context configure the methods that present the greatest application difficulties in Portugal, which would be undesirable.
- Lack of teaching time and lack of human resources constitute the main obstacles to the application of clinical reasoning assessment methods in Portugal.
- More investment in human resources is necessary to increase the application of assessment methods in clinical and simulated contexts.

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