



Different Methods To Assess Clinical Reasoning In Undergraduate Medical Students

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Dear editor-in-Chief

Clinical reasoning is a series of actions in which information concerning a clinical problem is mixed with the physicians' knowledge and previous experience and utilized to conduct a given problem. Clinical reasoning is not a direct, straightforward process, but can instead be described as a series or spiral of connected and running clinical encounters.¹ To make students ready for complex clinical conditions and to learn reasoning effectively, the students should learn to understand how to think carefully about signals and how these signals lead to clinical decision making. How we design assessment packages, makes a difference and the chosen designs will affect the students' learning.²

The aim of this study was to investigate different methods of clinical reasoning testing in medical school undergraduates by article review. In the present review article, reputable internet databases were investigated. Studies that considered methods of clinical reasoning assessment in undergraduate medical students were included in this review. The following databases were accessed for the period from 2005 to 2015 for English publications: Google Scholar, PubMed, Scopus and Science Direct. The terms "clinical reasoning" and "medical education" were used. Articles had to meet the following inclusion criteria: focus on clinical reasoning assessment methods and focus on undergraduate medical students. Excluded criteria were a focus on nursing and clinical reasoning, languages besides English and publication before 2005. Ethical features were observed attentively at all stages of study and texts owned by other authors that have been used in any segment of this study have been referenced.

From the literature review and assessment experience, it is clear that there are several types of questions or assessment methods that are utilized to measure clinical reasoning in medical education. Most recent studies suggested using Script Concordance Testing (SCT), which is fairly easy to form and score to assess clinical reasoning. The idea of SCT was originated by Feltovich in 1984, and since then investigations have designed and validated the SCT.³ It consists of a large set of short clinical scenarios. It is unique in its complex scoring system, as responses by a group of faculty experts are used as a reference and as several choices may be accepted as answers. SCT distinguishes clinical reasoning from medical knowledge in the assessment, although the series of actions for idea generation is neither probed nor exposed.⁴

Piovezan and his colleagues demonstrated compelling evidence of the reliability and validity of an SCT designed for use to assess the clinical reasoning skills of undergraduate students in geriatric medicine.⁵ Humbert and his colleagues assessed the performance of medical students, emergency medicine (EM) residents and expert emergency physicians (EPs) on an SCT concerning general EM (SCT-EM) at a major medical school in the United States. The SCT-EM demonstrates the capacity to be a promising test that can examine clinical reasoning skills.⁶

A study in Iran described the use of four clinical reasoning tests in the second National Medical Science Olympiad: key features (KF), script concordance (SCT), clinical reasoning problems (CRP) and comprehensive integrative puzzles (CIP). The combination of tests is a dependable evaluation tool for assessing clinical reasoning skills in promising undergraduate medical students, although these results may not be generalizable to the entire population

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of medical students. The CIP and KF tests exhibited the greatest potential for assessing clinical reasoning skills.⁷

Virtual Patient (VP) involves working through the entire clinical reasoning process until the virtual patient is either cured or dies. Content validity and reliability for this test are low because of the test's lack of representativeness in comparison with the subject matter; a noticeable amount of time is consumed to complete one VP. VPs are also extremely expensive to design, as particular software and hardware are used to implement VPs.⁸

Paul Orrock designed an oral case exam to test clinical reasoning and tested this exam using students in osteopathic clinical training at Southern Cross University and Victoria University in Australia and Unitec in New Zealand. A group of clinical educators designed realistic case scenarios, in addition to a new and different assessment based on existing evidence that was suitable for osteopathic education and performance. Generally, the trial oral exam about clinical reasoning in osteopathy has performed well and could be used among universities as a benchmark series of actions and accreditation aims.⁹

Altogether, the use of a mix of already-existing question types is better than searching for or designing a new method. A combination of different types of questions also increases the validity of the test considering the assessment of the clinical reasoning skills of students. Additionally, the use of static question arrangements will allow teachers to design good questions and boost the construct validity of these exams. Based on the findings in the literature, training teachers in developing a combination of question types is essential and recommended. Further research is needed to ensure that these specific combinations question types produces both valid and reliable assessments and test results.

Limitations

In this study, some databases were not investigated and only studies in the English language were included, which may have led to bias.

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