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Diagnosing and Remediating Clinical Reasoning Difficulties: A Faculty Development Workshop

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Abstract

Introduction: Clinical reasoning is a complex cognitive process that involves multiple steps. Diagnosing and remediating clinical reasoning difficulties requires faculty to have an understanding of the cognitive theory behind clinical reasoning, familiarity with terminology, and a framework to identify different domains of struggle in their learners. Published resources on faculty development to diagnose and remediate clinical reasoning difficulties are limited. We created and implemented a workshop to assist faculty in developing these skills based on the five-domain framework described by Audétat, Laurin, and Sanche. This workshop provides all the materials needed to replicate this training with faculty at other institutions. **Methods:** The workshop consists of a didactic component and case-based active learning in small groups. Each case focuses on different domains of clinical reasoning difficulties and targets different learner levels (preclinical medical students through residents). The workshop was given in multiple venues in 2016 and 2017. **Results:** Participants reported the session was valuable (4.71/5.0), the facilitators were effective (4.5/5.0), and the objectives were met (4.28/5.0). They highlighted the strengths of the interactive format, the framework to diagnose and remediate clinical reasoning difficulties, and the excellent take-home resources. They suggested more time for the workshop, revision of cases to better highlight difficulties, and refinement of instructions to approach the cases. These suggestions were incorporated into the current iteration of the workshop. **Discussion:** We successfully implemented a workshop for diagnosing and remediating clinical reasoning difficulties in multiple venues. The sessions were diverse in terms of faculty participants and learner groups addressed.

Keywords

Faculty Development, Clinical Reasoning, Illness Script, Problem Representation, Semantic Qualifiers

Educational Objectives

By the end of this activity, learners will be able to:

1. Describe the cognitive theory behind clinical reasoning.
2. Define clinical reasoning terms including illness script, problem representation, summary statement, and semantic qualifiers.
3. Identify common cognitive biases.
4. Recognize the five domains of clinical reasoning difficulties among learners.
5. Demonstrate strategies to help diagnose and correct clinical reasoning gaps through case examples of clinical reasoning errors.

Introduction

Clinical reasoning is a complex cognitive process that involves data gathering, hypothesis generation, hypothesis testing and refinement, the development of a differential diagnosis, the selection of a working diagnosis, and the implementation of a management plan. Learners may struggle with any or all of these steps, and thus faculty need to be facile at diagnosing and remediating different types of clinical reasoning difficulties.

Appendices

A. Diagnosing and Remediating Clinical Reasoning Difficulties.ppt
B. Clinical Reasoning Difficulties Pocket Card.pdf
C. Clinical Reasoning Teaching Tools Handout .pdf
D. Clinical Reasoning Participant Cases.pdf
E. Clinical Reasoning Facilitator Cases.pdf
F. Workshop Assessment Instrument.pdf
G. Participant Self-Assessment Instrument.pdf

All appendices are peer reviewed as integral parts of the Original Publication.

Despite many excellent updates on clinical reasoning, many clinicians are unfamiliar with the cognitive theory behind clinical reasoning (i.e., dual processing theory[1-3]); the basic terminology used to describe reasoning (i.e., illness scripts, problem representations, summary statements, and semantic qualifiers[4-7]); and common cognitive biases (i.e., premature closure, anchoring, and availability[8-12]) that can influence reasoning. There have been educational resources published to introduce learners to the process and theory behind clinical reasoning, and to help learners and practicing physicians better understand and reflect on their cognitive biases and diagnostic errors in the care of patients.[13-16] However, a framework to help clinicians in educator roles deconstruct clinical reasoning problems when they encounter them in their learners is needed. This resource was created to provide faculty development to clinical educators to assist them in the diagnosis and remediation of clinical reasoning difficulties in their learners.

This workshop synthesizes the existing literature on clinical reasoning theory, terminology, and bias. Using the five-domain framework described by Audétat, Laurin, and Sanche, it helps medical educators identify cues to clinical reasoning difficulties, encourage questions to elicit reasoning, hypothesize about the root causes of difficulties, and suggest tailored remediation strategies.[17-19] Our approach, initially targeted for teachers involved in the education of early clinical learners, has been expanded to provide faculty development for those teaching clinical reasoning to a wide range of learners, from early medical students to senior residents.

Methods

Variations of this workshop were implemented in multiple settings in 2016 and 2017, including the Society of Academic Emergency Medicine (SAEM) Annual Meeting, the Directors of Clinical Skills Courses (DOCS) Annual Meeting, and the annual Educator's Symposium and Ob/Gyn and Pediatric Department faculty development retreats at the Geisel School of Medicine at Dartmouth. At SAEM and Dartmouth, the workshop was used to directly train clinical faculty. At DOCS, a train-the-trainer format was employed to teach clinical skills course directors to implement the workshop for faculty at their home institutions.

The workshop began with a brief didactic that reviews clinical reasoning theory, terminology, and cognitive biases. The didactic further outlined the five prototypical domains of clinical reasoning difficulty: (1) difficulties generating hypotheses and directing data gathering, (2) premature closure, (3) difficulties prioritizing, (4) challenges with synthesis and seeing the big picture, and (5) difficulties with formulating a management plan. Cues to diagnosing each type of clinical reasoning difficulty were described, as were strategies to address them.

Participants then broke into small groups to apply the concepts just presented to several case examples. The cases were presented in either video format to simulate direct observation, or paper format to simulate a learner's delivery of an oral presentation or written documentation. For each case, participants worked together in small groups guided by a workshop facilitator to diagnose the learner's domains of clinical reasoning difficulty. Participants then developed remediation strategies for that learner. Small groups typically completed three to four cases during the workshop that covered different clinical reasoning challenges. The cases were used to target different learner levels (early medical students, clerkship students, or residents) depending on the audience. The session closed with a report out from each small group, and discussion of what was learned.

A single classroom or meeting room was reserved with sufficient numbers of tables for faculty participants to attend with an ideal of six to eight faculty participants per table. An alternative arrangement could include a large group room with several small breakout rooms. The classroom was equipped with a projector and a microphone if there were a large number of participants (more than five to six tables). A single facilitator or multiple facilitators prepared and delivered the didactic presentation (Appendix A). Each participant was provided with a 6 x 8 inch laminated copy of the pocket card (Appendix B), paper or electronic copies of the teaching tools handout (Appendix C), and a certain number and combination of the participant cases (Appendix D). The cases were selected according to the participants' target learners.

The workshop was most often delivered in 90 minutes, but it may be delivered in 60 minutes if modified (e.g., if facilitators shortened the opening presentation or used fewer cases). Ninety minutes to 2 hours is recommended to give sufficient time to work on the sample cases in small groups. The workshop was typically run based on the following timeline:

1. Didactic presentation: 30-45 minutes.
2. Small group work (about 10-15 minutes per case): 45-60 minutes.
3. Large-group debrief and wrap-up: 15 minutes.

For the first implementation, all workshop facilitators reviewed the literature in the references and were prepared to discuss both the domains of clinical reasoning difficulty and the remediation strategies for each case selected. The average prep time for small-group facilitators was 3-5 hours depending on prior education and training in clinical reasoning.

For the small-group work, each table had a facilitator who helped to guide the discussion. The facilitator had a copy of the participant cases (Appendix D) and the facilitator cases (Appendix E). Cases were selected by the facilitators based on the intended audience. If the faculty at the session taught learners from preclinical students through residents, then all three versions of a single sample case (e.g., Cough) were used. On the other hand, if the faculty in attendance all taught specific levels of learners, like residents, then the resident-level cases were chosen from each case set. In the facilitator cases, a "diagnosis" of the learner and suggested remediation strategies appeared after each case. Participants were expected to actively discuss each case, diagnose the domains of clinical reasoning difficulty, and plan teaching and remediation strategies. The facilitator drew attention to key points if they were not identified by the workshop attendees. They also guided participants to use the pocket card and teaching tools handout during the discussion. The facilitator ensured their table had a scribe taking notes to report out to the large group during the subsequent debrief.

The workshop was evaluated by participating educators using anonymous survey instruments after the session that included both quantitative and qualitative components. The assessment instruments varied according to the meeting evaluation standards where the session was delivered. A sample assessment tool used after the DOCS meeting is provided (Appendix F). A participant self-assessment is provided (Appendix G) for faculty to share how this workshop has informed their future approach to learners with clinical reasoning difficulties.

Results

A total of about 100 faculty attended the workshop between the five venues. Participant faculty at the SAEM national meeting largely taught emergency medicine residents. The attendees at DOCS were medical school clinical skills course directors, many of whom were seeking to incorporate more clinical reasoning instruction into their courses, whose target learners were predominately first- and second-year medical students. The participants at the Geisel School of Medicine at Dartmouth were clinical teachers engaged in the instruction of an array of learner levels from early medical students to senior residents.

Formal feedback from the SAEM meeting was not available, but feedback from both DOCS participants and attendees at Dartmouth were favorable. At DOCS, 19 out of 30 attendees completed the workshop evaluation. Participants marked on a 5-point Likert scale (1 = *strongly disagree*, 5 = *strongly agree*) the extent to which they agreed with the following statements: the session was valuable (4.71), the facilitators were effective (4.50), and the objectives of the session were met (4.28).

In response to the question "What were the strongest aspects of this session?" participants highlighted:

- The interactive format.
- The five-domain approach to diagnosing and remediating clinical reasoning difficulties.
- The "excellent" resources ready for dissemination to their own faculty.

One participant contacted us after the workshop to express how useful the pocket card was during clinical interactions with learners.

In response to the question "What suggestions would you give to improve this session?" participants suggested:

- More time for the case discussions and debrief.
- Revision of the cases to better highlight particular deficits.
- Refinement of instructions to approach the cases.
- If possible, conduct the small groups in breakout rooms rather than at tables within the same room to better accommodate "enthusiastic" discussions.

The Dartmouth participants were asked to "Provide one example of how you will apply what you learned to your professional role or work." Participant responses included:

- Assisting students with their critical thinking in their notes.
- Creating a "teaching the teacher" workshop in their department, focusing on tools for residents responsible for peer and medical student teaching.

The Dartmouth participants were also asked "What aspects of this session were especially valuable, interesting, or new?" Participants appreciated:

- Going through the cases in small groups.
- Applying what they just learned.
- The practical approach to learning and teaching clinical reasoning.
- The format of critiquing different levels of learner notes.
- The thinking process by which they could further break down the clinical reasoning difficulties.

Discussion

Faculty development is essential to help clinical teachers improve their skills in diagnosing and remediating deficiencies in clinical reasoning in learners. Given the inherent complexity of clinical reasoning, training faculty to use a common conceptual framework and taxonomy to address this skill set helps them move beyond generic identification of a problem learner, and towards identifying specific domains of difficulty. This in turn allows them to deploy targeted remediation strategies. To our knowledge, a workshop that focuses on diagnosing and remediating clinical reasoning difficulties has not been heretofore described.

We successfully implemented a workshop for diagnosing and remediating clinical reasoning difficulties in multiple venues. This workshop can be delivered in a short, 60-minute session as evidenced by one of the sessions at Dartmouth. However, this time frame limited the small group work, and participant feedback suggested more time for group discussion on the learner cases would improve its effectiveness. Therefore, we recommend allotting a minimum of 90 minutes, if not 2 hours, to facilitate additional case discussions and a robust debrief.

Video or paper cases can be effectively utilized for small-group discussions and they are easy to create. The written cases provided may be easily transitioned to video modules, and they may also be modified to be more specialty- and learner level-specific depending on the audience.

Participant feedback and initial limitations of our resource highlighted the importance of tailoring the cases as much as possible to the audience's needs. In many venues, the audience will be made up a diverse group of medical educators who practice in different clinical fields and educate at different learner levels. To make this workshop more broadly applicable to medical educators, we expanded the array of paper cases to better target different learner levels across the educational continuum. Additionally, we refined each case to better highlight particular domains of difficulties. Lastly, we enhanced the small-group breakout instructions and facilitator guides to better align with Audétat, Laurin, and Sanche's approach, in particular focusing on hypotheses about the root cause of the difficulty, as well as remediation strategies.[17-18]

Limitations of our evaluation approach relate to the need to vary our evaluation according to the requirements of the meeting's evaluation standards. Additionally, these evaluations focused on participant perception of the workshop and did not assess the participant's ability or skill to approach a found clinical reasoning deficit in a learner. Therefore, though we have not yet used the participant self-assessment instrument, we have created it to better assess what participants learned and how participants plan to use the skills practiced in the workshop in their future educational endeavors.

Future work will include assessing whether and how participants are implementing these new clinical reasoning teaching skills at their home institutions. Additional next steps will be to determine the effectiveness of this training on faculty's ability to diagnose and remediate learners with clinical reasoning deficiencies.

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