

**FACTORS AFFECTING
THE DEVELOPMENT OF
UNDERGRADUATE MEDICAL
STUDENTS'
CLINICAL REASONING ABILITY**

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THESIS ABSTRACT

It is important for doctors to be clinically competent and this clinical competence is influenced by their clinical reasoning ability. Most research in this area has focussed on clinical reasoning ability measured in a problem-solving context. For this study, clinical reasoning is described as the process of working through a clinical problem which is distinct from a clinical problem solving approach that focuses more on the outcome of a correct diagnosis. Although the research literature into clinical problem solving and clinical reasoning is extensive, little is known about how undergraduate medical students develop their clinical reasoning ability. Evidence to support the validity of existing measures of undergraduate medical student clinical reasoning is limited. In order better to train medical students to become competent doctors, further investigation into the development of clinical reasoning and its measurement is necessary. Therefore, this study explored the development of medical students' clinical reasoning ability as they progressed through the first two years of a student-directed undergraduate problem-based learning (PBL) program. The relationships between clinical reasoning, knowledge base, critical thinking ability and learning approach were also explored.

Instruments to measure clinical reasoning and critical thinking ability were developed, validated and used to collect data. This study used both qualitative and quantitative approaches to investigate the development of students' clinical reasoning ability over the first two years of the undergraduate medical program, and the factors that may impact upon this process. 113 students participated in this two-year study and a subset sample ($N = 5$) was investigated intensively as part of the longitudinal qualitative research.

The clinical reasoning instrument had good internal consistency (Cronbach alpha coefficient 0.94 for $N = 145$), inter-rater reliability ($r = 0.84$, $p < 0.05$), and intra-rater reliability ($r = 0.81$, $p < 0.01$) when used with undergraduate medical students. When the instrument designed to measure critical thinking ability was tested with two consecutive first year medical student cohorts ($N = 129$, $N = 104$) and one first year science student cohort ($N = 92$), the Cronbach Alpha coefficient was 0.23, 0.45 and 0.67 respectively.

Students' scores for clinical reasoning ability on the instrument designed as part of this research were consistent with the qualitative data reported in the case studies. The relationships between clinical reasoning, critical thinking ability, and approach to learning as measured through the instruments were unable to be defined. However, knowledge level and the ability to apply this knowledge did correlate with clinical reasoning ability. Five student-related factors extrapolated from the case study data that influenced the development of clinical reasoning were (1) reflecting upon the modeling of clinical reasoning, (2) practising clinical reasoning, (3) critical thinking about clinical reasoning, (4) acquiring knowledge for clinical reasoning and (5) the approach to learning for clinical reasoning.

This study explored students' clinical reasoning development over only the first two years of medical school. Using the clinical reasoning instrument with students in later years of the medical program could validate this instrument further. The tool used to measure students' critical thinking ability had some psychometric weaknesses and more work is needed to develop and validate a critical thinking instrument for the medical program context. This study has identified factors contributing to clinical reasoning ability development, but further investigation is necessary to explore how and to what extent factors identified in this study and other qualities impact on the development of reasoning, and the implications this has for medical training.

CERTIFICATION OF THE THESIS ORIGINALITY

This thesis includes no material that has been awarded a degree or diploma from any institution and, to the best of my knowledge, includes no material published or written by anyone else, except where due reference has been documented.

I give consent for this copy of my work, when put in the University Library, to be made available in all forms of media.

Signature: Date.....

Kirsty Anderson

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