

# Enhancing the Clinical Reasoning Skills of Postgraduate Students in Internal Medicine Through Medical Nonfiction and Nonmedical Fiction Extracurricular Books

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## Abstract

**Objective:** To improve the clinical reasoning skills of postgraduate students in internal medicine through 2 kinds of extracurricular books: medical nonfiction and nonmedical fiction.

**Methods:** Clinical reasoning is difficult to define, understand, observe, teach, and measure. This is an educational innovation under an experimental framework based on a cognitive intervention grounded in constructivist and cognitivist theories. This study was conducted from June 1, 2014, through May 31, 2015. It was a pre-post, randomized, controlled, prospective, mixed-methods, small-group study. The intervention was through medical nonfiction and nonmedical fiction books. The process was structured to ensure that the students would read the material in phases and reflect on them. Clinical reasoning (pretests and posttests) was quantitatively assessed using the Diagnostic Thinking Inventory (DTI) and clinical reasoning exercises (CREs) and their assessment using a rubric. A qualitative design was used, and face-to-face semistructured interviews were conducted.

**Results:** Posttest total scores (DTI=188.92; CREs=53.92) were higher for the study group after the intervention compared with its own pretest scores (DTI=165.25; CREs=41.17) and with the pretest (DTI=159.27; CRE=40.73) and posttest (DTI=166.91; CREs=41.18) scores of the control group. Interviews with the study group confirmed that the intervention was acceptable and useful in daily practice.

**Conclusion:** We introduced, evaluated, and proved an approach to teaching-learning clinical reasoning based on the assumption that the clinical reasoning skills of postgraduate students in internal medicine can be enhanced through 2 kinds of extracurricular books and that fun as well as interest will enhance learning. This study is not only about teaching-learning clinical reasoning but also about the humanities in medical education.

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*na tatra chakShurgachChati na vAggach-  
Chati nO manaHa |*

*na vidmO na vijAnImO yathaitadanush-  
iShyAt ||*

*- kEna upaniShat (1.3)*

*(The eye does not reach there nor does  
speech nor mind*

*We do not know, do not understand, how  
should this be taught)*

The Upanishadic seer, in this beautiful Vedic verse, humbly expresses the predicament of imparting mystic education and experience. Clinical reasoning is akin to mysticism. Clinical reasoning is difficult to define, understand, observe, teach, and measure.

Clinical reasoning is one of the most basic skills in internal medicine. In clinical medicine, neither the procedures nor the

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prescriptions are of paramount importance compared with the clinical judgments in which all other aspects of clinical care are rooted.<sup>1</sup> Any study of clinical reasoning is difficult because it is a cerebral phenomenon that cannot be observed.<sup>1</sup> Doctors usually are not conscious of the cerebral processes involved in their clinical reasoning and cannot explain it to others.<sup>1</sup> It is a tacit, automatic process. Doctors generally diagnose problems, but they do not think about their thinking, and they find it difficult to teach it to clinicians in training.<sup>1</sup> Nowadays, the cognitive processes involved in diagnosis are being unraveled,<sup>2</sup> and the emphasis is on enhancing the clinical reasoning skills of students.<sup>3</sup> This study was only a humble attempt in this regard.

Clinical reasoning involves collecting, collating, and analyzing data (diagnostic reasoning) and deciding the most suitable course of action and treatment for the patient (therapeutic reasoning).<sup>4</sup> The operational definition of clinical reasoning chosen for this study was “clinical diagnostic reasoning.”<sup>5</sup>

The specific objective of this study was to improve the clinical reasoning skills of postgraduate (PG) students in internal medicine through 2 kinds of extracurricular books: medical nonfiction and nonmedical fiction, and we set out with the following hypothesis: The clinical reasoning skills of students can be enhanced through 2 kinds of extracurricular books, and fun as well as interest will enhance learning.<sup>6</sup>

We chose an intervention in the form of 2 kinds of extracurricular books: medical nonfiction (*How Doctors Think* by Jerome Groopman, MD,<sup>7</sup> and *How Doctors Think: Clinical Judgment and the Practice of Medicine* by Kathryn Montgomery<sup>8</sup>) and nonmedical fiction (*Sherlock Holmes* by Sir Arthur Conan Doyle<sup>9</sup>).

Teachers have to promote reading that facilitates understanding of concepts rather than rote learning. Original literature could be used as a learning tool in this regard.<sup>5</sup> Grais<sup>10</sup> says that he has implemented compulsory reading of *Sherlock Holmes*. Formal teaching of clinical reasoning to students is difficult. We have to devise an imaginative method to teach it. Clinical reasoning skills cannot be taught in isolation; they have to be taught in clinical context.<sup>11</sup> We have to find relevant clinical cases to teach and assess clinical reasoning skills.

The *How Doctors Think* books by Groopman and Montgomery are narrative based with real-life examples and, hence, are easily readable. The legendary detective Sherlock Holmes is a fictional character created by Sir Arthur Conan Doyle, a physician himself, based on the legendary observation and deduction abilities of his teacher Professor Joseph Bell,<sup>9</sup> a well-known physician of his times. The use of Sherlock Holmes' stories is to inspire young minds to think because diseases are no less mysterious than Holmesian stories, and the students have to develop as medical detectives to be better diagnosticians. For example, making use of heuristics to diagnose QT prolongation in electrocardiography, a pattern recognition (the QT interval appearing as more than half of the RR interval) in a patient presenting with seizures and in the absence of a medical history or records could make them think of hypocalcemia and search for clues to its etiology, picking up, in the process, an obscure thyroidectomy scar in the neck. Formal teaching of clinical reasoning could be difficult because of the jargon involved. *Sherlock Holmes* would serve as nice bait for the students to read the 2 medical nonfiction books also,<sup>7,8</sup> which could help them learn the concepts of clinical reasoning because these books deal with clinical reasoning with real-life examples sans complicated jargon. A process was devised to prod them to read these books after an introductory lecture. The process was structured to make sure that the students would read the material in phases and reflect on them. Both quantitative and qualitative designs were used for evaluation. This is an educational innovation under an experimental framework based on a cognitive intervention grounded in constructivist and cognitivist theories.

## MEASURES (OUTCOME MEASUREMENT TOOLS)

Quantitative assessment of clinical reasoning was performed using the Diagnostic Thinking Inventory (DTI) and clinical reasoning exercises (CREs) and their assessment using a rubric.

### Diagnostic Thinking Inventory

The plan was to examine the diagnostic reasoning skills of medical students at the

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