ORIGINAL RESEARCH PAPER

Volume-7 | Issue-3 | March-2018 | PRINT ISSN No 2277 - 8179

INTERNATIONAL JOURNAL OF SCIENTIFIC RESEARCH

CLINICAL REASONING – MAN VERSUS MACHINE ON RACE

Anatomy

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ABSTRACT

Knowledge of clinical reasoning processes is crucial for teaching and assessment of clinical reasoning in the clinical settings. Decision making is one of the important paradigms for research on clinical reasoning, each with its own assumptions and methods. Yet most of the medical educators are seldom aware of the importance of this topic. Clinical reasoning failures may result due to inadequate data gathering or processing of patient information which can culminate in cognitive errors. Unless we promote the development of expert clinical reasoning in a learner, artificial intelligence analogues and processors can potentially replace the role of physician in day to day clinical practice. Teaching clinical reasoning is important and feasible. This article throws light on the fact that teaching clinical reasoning is quintessential for tomorrow's physicians and this might help learners to improve their diagnostic accuracy and treatment choices.

KEYWORDS

clinical reasoning, medical education, artificial intelligence, decision making

Sir,

Decision making in patient management mandates considering various pieces of knowledge gained from different sources. A practitioner requires to bank on his or her own biomedical knowledge in order to relate the clinical manifestations, arriving at a provisional diagnosis, ordering appropriate investigations and to prescribe medications keeping in mind the existing indications and contraindications. The unique characteristic of a physician i.e. diagnostic reasoning is eventually a *pattern recognition algorithm* (Castaneda et al., 2015). They develop an 'encapsulated' knowledge of relevant clinical concepts after repeated and extensive encounters with clinical manifestations of a particular disease (Schmidt et al., 1993). But when the physician goes back and forth between recognition of clinical manifestations stored in his memory and hypothesis generated via clinical information, diagnostic errors tend to occur. It has been stated that cognitive fallacies in the clinical reasoning process were involved in approximately 75% of diagnostic errors in clinical practice (Graber et al. 2005).

Secondly, cognitive errors tend to occur owing to lack of adequacy in knowledge or jumping into premature conclusions owing to intuitive heuristics. Graduate medical education curriculum seldom provide room for the students to understand the components of clinical reasoning. Large body of existing knowledge and inadequate training in clinical reasoning leaves the student inapt in solving clinical problems, owing to the "dispersed knowledge", which neither can be linked with the clinical manifestations nor can be compiled as 'encapsulated' higher order knowledge structure (Schmidt et al., 1993). This may leave the "to-be" physicians unable to recall the necessary information from memory, which may lead to cognitive errors. In short, inability of students to adopt an organized and logical approach in resolving a complex case might decrease the much required diagnostic accuracy.

On the other hand, the errors in pattern recognition algorithm is found to be reduced when task-specific artificial intelligence (AI) adjuncts are used to improve critical gaps in the human knowledge domain. Past decade has witnessed the development of diagnostic algorithms based on artificial intelligence which might aid the practitioners in performing diagnosis and making treatment decisions. In contrary to humans, who rely upon memories encoded from practical experience, devised algorithms can scan millions of reports, patient records, journals and guidelines to devise management plans. The main errors in reasoning such as failure to generate correct hypothesis, missing or misinterpreting evidences aiding in diagnosis, heuristics and biases interrupting the analysis could also be circumvented.

By considering clinical reasoning as a quintessential skill to be learnt by medical students, a structured framework should be implemented and be actively taught as they progress through their medical studies (Linn et al., 2012). Even as early as first year, students can be trained to apply their anatomical knowledge to generate differential diagnosis (e.g.: location of pain and anatomical structure involved) (Gay et al. 2013). I wish to bring to your kind notice that, in the era where Artificial intelligence can outperform the cognitive tasks done by a doctor to reach the diagnostic process, it is important that both the curriculum developers and students should be aware about the salience of 'analytical reasoning strategies'. It not only helps in improving the diagnostic accuracy, but also 'preserves' the role of doctor in the changing era. Attempts to re-conceptualise the expertise of medical students in this area is essential, taking into account the rapid growth of AI in the health care delivery services.

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