Cognitive Bias and Clinical Decision Making Educational Strategies

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Learning Objectives:

• By the end of the session, the participant should be able to:
  • Describe the common types and prevalence of cognitive biases found in medicine.
  • Discuss different consequences of utilizing cognitive biases.
  • Describe how to recognize and detect cognitive self-biases.
  • Explain effective approaches and specific strategies to deal with cognitive bias and instruction.
  • Discuss educational intervention on cognitive biases and debiasing strategies to improve the ability of physician assistant students to make clinical decisions.
  • Recognize the importance of willingness to be innovative and collaborative to create new methodologies to incorporate into curriculum.
This presentation will use audience response system (ARS) by Poll Everywhere

• When Poll is active, please go to PollEv.com/
- Or

• Text to 37607 once to join
Cognitive Bias

• Defined as an error in judgment, memory, decision-making, evaluation, or other cognitive process, usually happening by retaining personal beliefs and preferences in the presence of differing evidence.

What cognitive biases exist in medicine?

• There are over 100 types of cognitive bias identified in the general literature, and at least 38 in the medical literature

• 19 identified in one systematic review

Most common cognitive biases in medicine

• Anchoring
  • Anchoring bias is compounded by confirmation bias

• Availability

• Overconfidence

• Low Tolerance to Risk

What is the problem?

• Cognitive bias in clinical decision making contributes up to 28 percent of diagnostic errors in medicine.

• Post-mortem study found:
  • 8% Class 1 errors
  • 28% of all cases had ≥ 1 diagnostic error


What is the other problem?

• A literature search describing strategies and methods to educate students and clinicians about biases in medical education reveals very little results.

• Diagnostic safety is not sufficiently promoted and taught in graduate medical programs.


What is the *solution*?

• There is a need to start a deliberation of evidence-based methods and strategies to be incorporated into medical education to recognize and respond to specific cognitive biases.
Critical Thinking and Clinical Decision Making
Critical Thinking

• Dictionary definition:
  • The objective analysis and evaluation of an issue in order to form a judgment.

• The Foundation for Critical Thinking:
  • Critical thinking is the intellectually disciplined process of actively and skillfully conceptualizing, applying, analyzing, synthesizing, and/or evaluating information gathered from, or generated by, observation, experience, reflection, reasoning, or communication, as a guide to belief and action.

Dictionary.com definition https://www.dictionary.com/browse/critical-thinking?s=t
https://www.criticalthinking.org/pages/defining-critical-thinking/766
Clinical Decision Making

• Skill that health care providers use every day
  • Mastery of this ability is honed over time

• Developing in students
  • Not routinely and commonly formalized in the medical education literature
  • Hidden curriculum

Dual Process Theory
Dual Process Theory

- Cognitive psychology
  - Decision-making process
- Two types of pathways
- Well-known and frequently used model for diagnostic reasoning and clinical decision making

Dual Process Theory Pathways

• Type 1
  • Intuitive, fast, effortless with automaticity and are based on associations of similar actions in memory
  • Implicit or intuitive processes

• Type 2
  • Deliberate, slow, non-programmed, conscious and occur with analysis, effort and logic
  • Explicit processes


Pathway examples

• Type 1

Pathway examples

• Type 2

412 x 8 = ____________

Pathway example questions

• What is your diagnosis?
Pathway example questions

• How quickly did you come up with an answer?
  • Type 1 mode?
  • Type 2 mode?

https://commons.wikimedia.org/wiki/File:Herpes_zoster_3days_passed.jpg
Pathway example questions

• What is your diagnosis?
Pathway example questions

• How quickly did you come up with an answer?
  • Type 1 mode?
  • Type 2 mode?

https://commons.wikimedia.org/wiki/File:Chest_radiograph_in_influenza_and_H_influenzae,_posteroanterior.jpg
Poll Everywhere Question

• Type 1 or Type 2
Multi-Level Processing

• Alternating between Type 1 and Type 2
  • Override of faster Type 1 with uncertainty

• Gained Knowledge, experience & time
  • Type 1 more dominant
  • Collection of pattern recognitions
    • Trigger switch from Type 1 to Type 2

Types of Cognitive Biases

Most common cognitive biases

- Anchoring
  - Anchoring bias is compounded by confirmation bias
- Availability
- Overconfidence
- Low Tolerance to Risk
Anchoring Bias

• The tendency of locking on to a diagnosis early on and failure to adjust with new information

• Example:
  • Diagnosing and treating for GABHS with sore throat, fever and tonsillar exudate. Patient had cough, no LAD, and was 20 y/o
Confirmation Bias (as commonly tied to Anchoring)

• The tendency to search for evidence to support a diagnosis rather than to disprove it

• Example:
  • Same patient that was diagnosed and treated for GABHS. RAST negative, Culture negative
Availability Bias

• The tendency to choose a diagnosis if easily comes to mind with frequently occurring

• Example:
  • 3 previous patients with similar symptoms
Overconfidence Bias

• The tendency to over evaluate one’s own knowledge, judgement, skills

• Example:
  • Medically treating a choledocholithiasis without surgeon referral
Low Tolerance to Risk or Ambiguity Bias

• The avoidance of decisions when probability (knowledge or ability to obtain) is unknown

• Example:
  • Patient presents with fever and joint pains after a cruise in the Caribbean and you diagnose influenza without checking for Chikungunya
Current Strategies of Debiasing Techniques
Current Strategies of Debiasing Techniques

• Two major strategies
  • Cognitive 41.1%
  • Technological 37.9%

Cognitive Debiasing Techniques

• Two major principles
  • Awareness and recognition
    • Self-evaluation exist?
  • Utilizing Type 2 processes
    • Override Type 1 processes

Technological Debiasing Techniques

• Current
  • Cognitive Tutoring Systems
  • Simulation Training
  • Decision Support Systems

• Other
  • Forcing functions
  • Check lists


Current Debiasing Techniques Effectiveness

- Overall 69%
  - Technological 89.7%
  - Cognitive 50%
  - Teaching students 71.4%
  - Advantageous

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Current Debiasing Technique Challenges

- Cost $$
- Time to learn and master EMR!? 
  - Provider reluctance
  - Deemed unnecessary
    - Hmmmm- what kind of BIAS is that?

Recognizing and Detecting Cognitive Self-Biases
Recognizing and Detecting Cognitive Self-Biases

• How do we recognize bias in our self?
• Recognize in others much easier
• Self-reflection and awareness
  • Metacognition
Recognizing and Detecting Cognitive Self-Biases

- Different techniques
  - Observing known biases (cases/clinical) and giving:
    - Self-reflections
    - Evaluations of self, others
    - Feedback
Recognizing and Detecting Cognitive Self-Biases

• Case Scenarios/Vignettes
  • Two of them
• Will show a case and then have an ARS question to follow
Case #1 follow up question

• Given the information at hand, what are the major concerns about this case?
Case #2 follow up question

• Given the information at hand, what are the major concerns about this case?
Proposed Educational Methodology and Strategy
Putting into curriculum

- Cognitive debiasing
  - Critical thinking techniques and strategies found in literature
  - Earlier introduction to components and methodologies
    - Using the didactic and clinical model

Curriculum content and approaches

• ↑ knowledge base
• Optimize clinical reasoning
• Understand system-related aspects of care
• Engaging patients & members of the diagnostic team
• ↑ perspectives and attitudes

Evaluation and data

• All topics will be assessed for an outcome

• Evaluation tools designed to:
  • Align with the program competency domains
  • Course outcomes
  • Accreditation standards
Curriculum Example of Proposed Educational Methodology and Strategy

• Didactic Year
  • First Semester Didactic
    • Evidence-based medicine course to be delivered early in curriculum. It is imperative for students to be able to acquire and effectively use a relevant knowledge base
    • Introduce concepts of critical thinking and metacognition early in didactic curriculum
Curriculum Example of Proposed Educational Methodology and Strategy

• Didactic Year
  • Second and Third Semester Didactic
    • Introduce the clinical decision making processes in a clinical medicine or problem based learning course with evidence-based medicine clinical reasoning
    • Introduce concept of diagnostic safety
    • Emphasize system-related aspects of care and how they can contribute to errors
Curriculum Example of Proposed Educational Methodology and Strategy

• Didactic Year
  • Fourth Semester Didactic
    • Introduce cognitive biases, how they are tied into diagnostic errors and techniques/strategies to minimize in a clinical medicine or problem based learning course
    • Case vignettes to review and give reflections/evaluations/ and feedbacks
    • Develop objective structured clinical examination (OSCE) cases to assess student’s ability of identification and displaying techniques to avoid
Curriculum Example of Proposed Educational Methodology and Strategy

• Clinical Year
  • End of Rotation callbacks
    • As a part of supervised clinical practice experiences (SCPE) assignments, having to write a reflection essay of biases they have seen, been a part of, and techniques used
Curriculum Example of Proposed Educational Methodology and Strategy

• Clinical Year
  • Summative evaluation
    • As a part of summative evaluation with a two part assessment of competency, the student will have a written examination and an OSCE with common biases to identify and address with de-biasing technique
## Accreditation Standard Mapping from version 5

<table>
<thead>
<tr>
<th>ARC-PA Relevant Standards</th>
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<tr>
<td>B1.07</td>
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The program curriculum must include instruction in risk reduction including:

- **patient safety**, 
- prevention of medical errors, 
- quality improvement, and 
- risk management.
<table>
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<tr>
<td><strong>B4.05</strong></td>
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<tr>
<td>The program must conduct and document a summative evaluation of each student within the final four months of the program to verify that each student meets the program competencies required to enter clinical practice, including:</td>
</tr>
<tr>
<td>a) clinical and technical skills,</td>
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<td>b) <em>clinical reasoning and problem-solving skills</em>,</td>
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<td>c) knowledge,</td>
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<td>d) interpersonal skills, and</td>
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<td>e) professionalism.</td>
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<th>4 PA Organizations Competencies and coding to Domains</th>
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<td><strong>Interpersonal Communication</strong></td>
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<td><strong>System-Based Practice</strong></td>
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<td><strong>Practice Based &amp; Lifelong Learning</strong></td>
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<td><strong>Professionalism</strong></td>
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Conclusion

- Cognitive bias

- Need to be:
  - Cognizant
  - Vigilant

- Educating Students
  - Existence and impact on patient care
  - How to avoid them
Thank you

QUESTIONS?
References


References


