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LECTURES

Cognitive Errors and Debiasing

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ABSTRACT:

Audience: Although this lecture was given to first-year residents, it is also appropriate for upper-level residents, medical students, fellows, and faculty.

Introduction: Medical errors are largely due to errors of cognition rather than lack of knowledge.[1] The cognitive processes that underlie these errors are often explained using Dual Process Theory, which posits that we engage in either fast, intuitive, low-effort System 1 thinking or slow, analytical, high-effort System 2 thinking. Although System 1 thinking is crucial for efficient emergency medicine practice, it is susceptible to the biases that cause cognitive errors. Research to date is mixed regarding the effect of educational interventions aimed at reducing cognitive bias but tends to show a benefit to cognitive bias training over a variety of outcome measures.[2] Many experts therefore believe that physicians should be taught about cognitive biases and debiasing strategies in an effort to reduce medical errors.[3,4]

Educational Objectives: By the end of this lecture, learners should be able to, 1) Define dual process theory, 2) identify common cognitive biases, 3) recognize high-risk situations for cognitive errors, and 3) discuss debiasing strategies and integrate one strategy into your workflow.

Educational Methods: This interactive lecture was created in PowerPoint and delivered in-person to 14 first-year residents during their "Intern Curriculum," a monthly meeting separate from the residency-wide conference. The lecture took 30 minutes to deliver.

Research Methods: Residents responded to pre- and post-lecture Likert scale surveys regarding their knowledge of cognitive biases and debiasing strategies, as well as a post-lecture survey regarding the quality of the lecture, the relevance of the content, and the likelihood of making changes to their practice based on the lecture.

Results: A total of 14 residents responded to the survey, and all residents completed both the pre-lecture and post-lecture questions. In the pre-lecture survey, 35.7% (5) of participants reported that they had good or extensive knowledge of cognitive biases, and 7.1% (1) of participants reported that they had good or

extensive knowledge of debiasing strategies. In the post-lecture survey, 85.7% (12) of participants reported that they had good or extensive knowledge of cognitive biases, and 78.6% (11) of participants reported that they had good or extensive knowledge of debiasing strategies. All (14) participants felt the lecture was of good or excellent quality, 92.9% (13) felt it was very or extremely relevant to them as emergency medicine physicians, and 100% (14) reported they were likely to make changes to their practice based on this lecture.

Discussion: The results of the survey show that residents perceived increased knowledge of both cognitive errors and debiasing strategies after attending this lecture. The lecture was rated highly, was found to be relevant to practice, and was likely to change practice going forward for most learners. These results suggest that an interactive lecture may have an important role in introducing residents to the concepts of cognitive errors and debiasing.

Topics: Cognitive bias, bias, debiasing, errors.

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Learner Audience:
Medical Students, Interns, Junior Residents, Senior Residents, Fellows, Faculty

Time Required for Implementation: 30 minutes

Recommended number of learners per instructor:
In order to allow for audience interaction with each other and with the presenter, this lecture works best with 6-16 learners.

Topics:
Cognitive bias, bias, debiasing, errors.

Objectives:
By the end of this lecture, learners should be able to:

1. Define dual process theory.
2. Identify common cognitive biases.
3. Recognize high-risk situations for cognitive errors.
4. Discuss debiasing strategies and integrate one strategy into your workflow.

Linked objectives and methods:
Objective 1 is achieved by participating in the matching activity, in which a case is presented and learners identify the cognitive biases at play. Objective 2 is achieved through the think-pair-share activity, in which learners and their neighbors come up with high-risk situations for cognitive errors and share them with the group. Objective 3 is achieved through the final discussion regarding debiasing strategies that the learners currently use or plan to try. The lecture format was chosen for ease of implementation into the existing didactic curriculum but avoids common pitfalls of traditional lectures by incorporating case-based and interactive elements, which capitalize on problem-based learning, active learning theory, and collaborative learning theory.

Recommended pre-reading for instructor:

- Croskerry P, Singhal G, Mamede S. Cognitive debiasing 1: origins of bias and theory of debiasing. *BMJ Qual Saf*. 2013;22 Suppl 2(Suppl 2):ii58-ii64. doi:10.1136/bmjqs-2012-001712
- Croskerry P, Singhal G, Mamede S. Cognitive debiasing 2: impediments to and strategies for change. *BMJ Qual Saf*. 2013;22 Suppl 2(Suppl 2):ii65-ii72. doi:10.1136/bmjqs-2012-001713
- Morganstern J. Cognitive errors in medicine: The common errors. First10EM.com. https://first10em.com/cognitive-errors/

Learner responsible content (LRC, optional):

- Prior to this lecture, learners should review the single page summary of some of the more common cognitive biases (attached).

Results and tips for successful implementation:
This lecture is best delivered in an in-person lecture environment that is conducive to pairing of learners and subsequent discussion. In our implementation, residents were arranged in a semicircle around the presenter, with the PowerPoint projected behind the presenter. This allowed for residents to easily view the lecture material, pair up in groups of two, and share the results of their discussions with the entire group.

Prior to the lecture, residents answered two Likert scale survey questions regarding their knowledge of cognitive biases and debiasing strategies. Immediately after the lecture, residents answered those same two questions in addition to three questions regarding the quality of the lecture, the relevance of the content, and the likelihood of making changes to their practice based on the lecture. All 14 residents completed both the pre-lecture and post-lecture questions. In the pre-lecture survey, 35.7% (5) of participants reported that they had good or extensive knowledge of cognitive biases, and 7.1% (1) of participants reported that they had good or extensive knowledge of debiasing strategies. In the post-lecture survey, 85.7% (12) of participants reported that they had good or extensive knowledge of cognitive biases, and 78.6% (11) of participants reported that they had good or extensive knowledge of debiasing strategies. All (14) participants felt the lecture was of good or excellent quality, 92.9% (13) felt it was very or extremely relevant to them as emergency medicine physicians, and 100% (14) reported they were likely to make changes to their practice based on this lecture.

Assessment (optional):
This lecture includes a matching component, in which learners are asked to identify out loud the cognitive bias at play in 14 brief cases of cognitive errors.

Technology necessary:
Lecturers will need a computer that can run PowerPoint and a projector to display the content.

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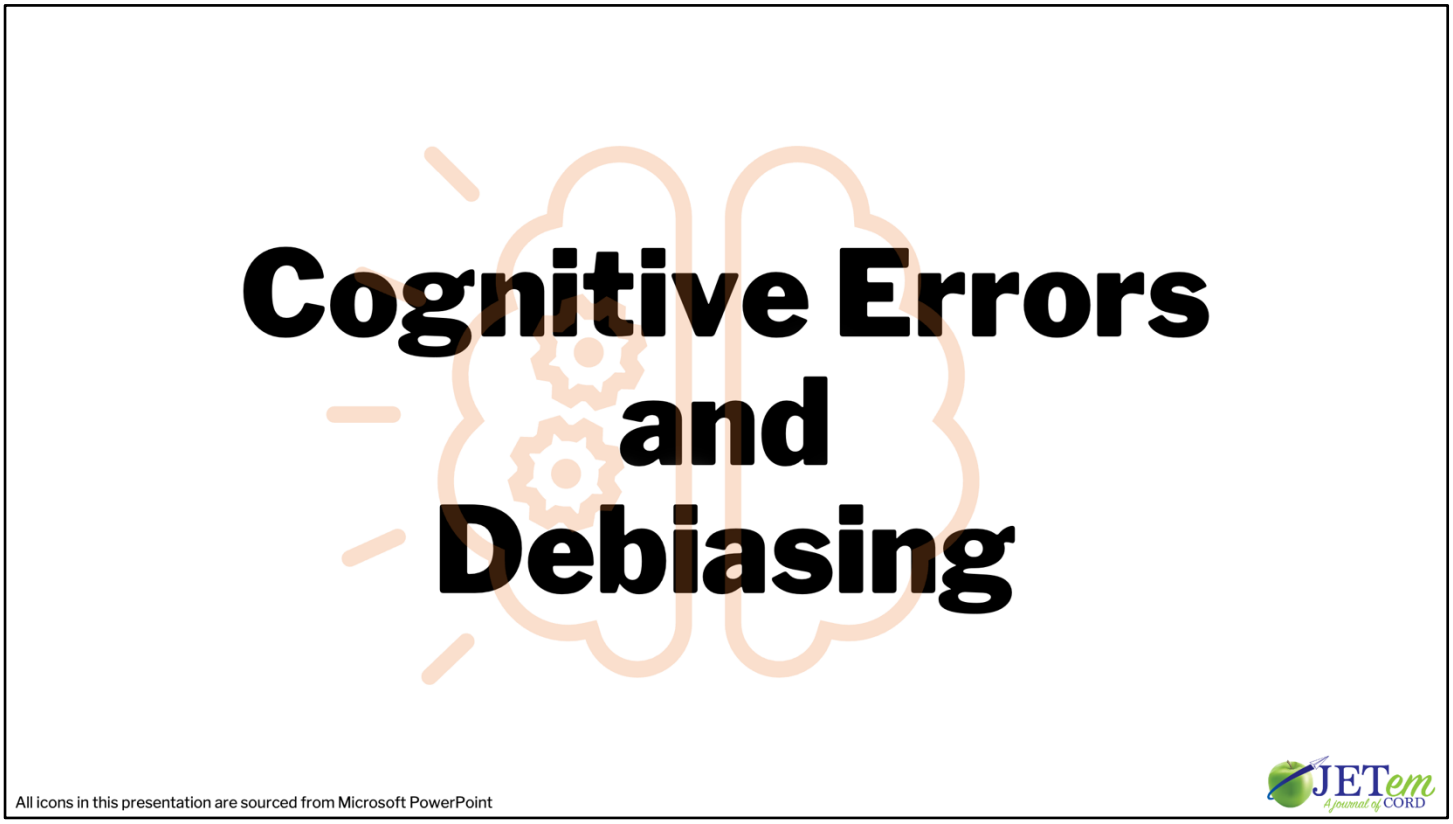
References/further readings:

1. Graber ML, Franklin N, Gordon R. Diagnostic error in internal medicine. *Arch Intern Med*. 2005;165(13):1493-1499. doi:10.1001/archinte.165.13.1493
2. Croskerry P. Clinical cognition and diagnostic error: applications of a dual process model of reasoning. *Adv Health Sci Educ Theory Pract*. 2009;14(1):27-35. doi:10.1007/s10459-009-9182-2
3. Thompson J, Bujalka H, McKeever S, et al. Educational strategies in the health professions to mitigate cognitive and implicit bias impact on decision making: a scoping review. *BMC Med Educ*. 2023;23(1):455. doi:10.1186/s12909-023-04371-5
4. Bhatti A. Cognitive bias in clinical practice - nurturing healthy skepticism among medical students. *Adv Med Educ Pract*. 2018;9:235-237. doi:10.2147/AMEP.S149558
5. Doherty TS, Carroll AE. Believing in overcoming cognitive biases. AMA J Ethics. 2020;22(9):E773-E778. doi:10.1001/amajethics.2020.773

USER GUIDE

Cognitive Errors and Debiasing Lecture



Please see associated PowerPoint file

USER GUIDE

Cognitive Errors and Debiasing Handout

Anchoring Bias:
Fixation on initial impressions

Gamblers Fallacy:
Past events affect the probability of future events

Base Rate Neglect:
Failure to consider prevalence of disease

Triage Cueing:
Geography is destiny

Blind Spot Bias:
I am less susceptible to bias than others

Premature Closure:
When the diagnosis is made the thinking stops

Search Satisfying:
Call off the search once something is found

Zebra Retreat:
Backing away from diagnosis because it is rare

Blind Obedience:
Undue importance given to opinion or test results

Fundamental Attribution Error:
Blaming patients for their illness

Yin Yang Bias:
Perception that everything that can be done has been done

AVAILABLE NOW!

Availability Bias:
What most readily comes to mind is most relevant

Feedback Sanction:
Diagnostic error carries no immediate consequences

Diagnosis Momentum:
Previous diagnosis is assumed to be definite