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Bias at the Bedside:

How Anchoring, Framing, and Confirmation Biases Affect Patient Care

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Bias at the Bedside:

How Anchoring, Framing, and Confirmation Biases Affect Patient Care

INTRODUCTION

In his best-selling book *How Doctors Think*, Jerome Groopman, MD, discusses a classic study of 100 misdiagnosed cases. The study concluded that inadequate medical knowledge caused the errors in only four instances.¹ That left 96% of those misdiagnoses due to something other than insufficient medical knowledge. Where did they go wrong? Dr. Groopman concluded that “[t]he doctors didn’t stumble because of their ignorance of clinical facts; rather, they missed diagnoses because they fell into cognitive traps.”¹ These traps are types of cognitive bias. When physicians fall into them, their critical thinking is restricted. Correcting the bias helps the physician step outside the trap and think of other possibilities that were not previously considered.²

We are all susceptible to cognitive bias. Humans make decisions through analytical or intuitive thinking. Analytical thinking is thorough but slow and deliberate. Not all decisions need to be made analytically. In fact, we would not have enough time in our day to analyze every decision we make. By necessity, we primarily operate in an intuitive thinking mode.³ With intuitive thinking, we are processing information quickly and relying on mental shortcuts to make decisions. While our ability to think intuitively is incredibly helpful, our mental shortcuts can expose us to making mistakes. “Because we all mostly operate in the mode of intuitive thinking, we are all subject to various cognitive biases in variable degrees.”³

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There are many types of cognitive biases that have been researched over the years. Some of those that affect medical liability cases are generally defined as follows:

Anchoring bias involves fixating on initial diagnostic information despite later evidence. It occurs when a physician settles on a diagnosis early in the work-up and then downplays symptoms or data that do not fit within the chosen diagnosis. This is also known as premature closure.^{3,4,5,6,7}

Framing effect occurs when diagnostic thinking is shaped by how information is presented. The manner in which information is presented to the physician can distort how much weight the physician gives to that information.^{3,5}

Confirmation bias uses new information to corroborate current beliefs. This causes a physician to look for confirming evidence to support their initial impression. Once they see the validation, they stop searching and overlook or ignore contrary information.^{3,4}

Availability bias overrates a diagnosis because it comes to mind easily. It can include a tendency to focus on a diagnosis that was recently made in another case. When a diagnosis quickly comes to mind, the physician focuses on it, neglecting other possibilities.^{8,9} This has occurred during flu season when common symptoms lead to a diagnosis of influenza and other diagnoses are not investigated.⁷

Hindsight bias occurs when someone views an outcome as obvious after the fact. This is also referred to as “Monday morning quarterbacking.” After an event has occurred, it is extremely difficult for the human mind to set aside knowledge of the outcome when analyzing if the result should have been anticipated. Hindsight bias can cause physicians to be unfairly critical of themselves, their colleagues, or their staff.^{6,7}

“At the intersection of medical practice and ethics, we are confronted with some compelling questions that warrant careful consideration from a behavioral psychology perspective: Do we understand the choices we are making and why we are making them?”¹⁰ While we are all susceptible to cognitive bias, we can reduce the risk of its negative impact on our decision-making. By increasing our awareness of cognitive bias and employing risk reduction strategies, we can help enhance patient safety and reduce the likelihood of professional liability claims. The following case studies demonstrate the significant impact that cognitive bias can have on a physician’s diagnosis and treatment plan.



CASE ONE:

Anchoring Bias and Framing Effect

Anchoring bias is considered one of “the most common cognitive biases affecting physician decision-making.”⁵ It is similar to the effect of a first impression. Anchoring bias in medicine occurs when physicians *anchor* or focus on one piece of information when forming a diagnosis; they then fail to adjust the diagnosis after receiving additional information. Often, the information focused on is the initial information used to reach the diagnosis. Research has shown that information presented first tends to have a larger impact than information presented later.⁶

Anchoring bias can be accompanied by another form of cognitive bias: the framing effect. When the framing effect is engaged, the way a problem is presented to the physician can influence their thinking. Once a problem is framed in a particular way, it can influence a physician to “see what they expect to see.”⁵

As you read through the facts of this case, look for areas where the physician may have been affected by anchoring or framing.

A 45-year-old male presented to the ED with complaints of constipation. He denied any nausea, vomiting, or pain. He had been using an over-the-counter stool softener but still was unable to have a bowel movement for nearly three weeks. Vital signs revealed the following: temperature 98.6, pulse 98, respirations 18, SpO2 97%, BP 148/120. The abdominal examination was normal. The abdominal x-ray showed fecal material, but there was no obstruction, dilatation, or free air. Laboratory results were within normal limits. A milk-and-molasses enema was administered, but no bowel movement occurred. The physician reevaluated the patient, whose abdominal examination remained normal and who was not experiencing pain or nausea. The patient was discharged home with a prescription for a laxative and a stool softener, and he was instructed to return to the ED if his condition worsened.

Five weeks later, the patient returned to the ED with complaints of continued constipation. He had completed the prescribed laxatives and taken additional over-the-counter stool softeners, but he was still unable to have a bowel movement. He denied any nausea, vomiting, or pain. Vital signs revealed the following: temperature 98.2, pulse 100, respirations 20, SpO2 100%, BP 160/99. The abdominal examination was normal, and laboratory results were within normal limits. A rectal examination was performed, and he had normal tone. While in the ED, a soapsuds enema and a mineral oil enema were administered, but no bowel movement occurred. A manual disimpaction was unsuccessful. The patient was in the ED for more than nine hours. Becoming frustrated, he asked to go home because he had to work the next day. Upon reexamination, the patient's abdomen was normal, he denied any pain and was discharged home with a prescription for a laxative and a stool softener. The physician instructed him to return to the ED if he did not have a bowel movement or if his condition worsened.

One week later, the patient returned to the ED with complaints of back pain, which started the previous day. He was in visible pain and moaning. After reviewing the patient's earlier admissions, the ED physician asked him about his constipation. The patient told him he had a bowel movement the prior day and was there for his excruciating back pain, not constipation.

The patient denied recent injury, abdominal pain, tingling, or weakness. He had some pain radiating down his legs prior to arrival, but that had subsided. Vital signs revealed the following: temperature 98.4, pulse 88, respirations 22, SpO2 99%, BP 99/50. On examination, the physician attempted to evaluate his abdomen, but the patient pushed the physician's hand away and again told the physician he was there for back pain. The physician noticed the patient was incontinent of urine and suspected cord compression. Along with initial labs and pain medication, he ordered an MRI of the lumbar spine with contrast.

Over the next two hours, there was difficulty gaining IV access requiring the assistance from multiple staff members. Eventually with the assistance of ultrasound, they were able to get access but unable to draw blood. While attempting to start a femoral line, the patient yelled in pain and lost consciousness. The team called a code blue but could not resuscitate the patient.

The cause of death was a ruptured sigmoid colon. The patient's family sued the hospital and the ED physician for wrongful death.



DISCUSSION

This case could have been affected by multiple cognitive biases, including anchoring and framing. Because anchoring bias gives disproportionate weight to the first information presented, it may have prevented the ED physician from considering an alternative diagnosis after receiving additional information. On initial presentation, the patient was adamant that he had severe back pain and was no longer constipated. However, the patient's vital signs and poor vein quality should have raised the suspicion of dehydration. This, coupled with the severe and recent constipation, suggested other potential causes for his pain.

The physician was so focused on the patient's initial presentation of severe back pain with urinary incontinence that he did not pursue other diagnoses after receiving additional information. The experts in the case opined that a clinical picture of severe dehydration combined with urinary incontinence and the patient's history of severe constipation should have caused the physician to consider an emergent bowel pathology. They also opined that he should have inquired further about the patient's most recent bowel movement to better assess whether the constipation resolved. Patients with constipation can often mistake a small bowel movement or liquid stool around an impaction as resolving their condition. Last, they were critical of his documentation regarding the patient's refusal of the abdominal exam. In this case, a thorough abdominal and rectal exam would have revealed crucial information necessary to guide his diagnostic reasoning. Thus, further efforts to obtain the patient's consent should have been made and well documented. The physician may also have been influenced by the framing effect, which is how the information was presented to him. Because the patient was described as uncooperative and demanding, the physician may have been influenced by the patient's insistence instead of considering objective factors.

The experts understood the physician's concern for cord compression. However, they felt it was a breach of the standard of care to focus solely on a spinal process. The physician should have kept complications related to constipation in his differential and pursued other diagnostics simultaneously. There were inconsistencies in the presentation that should have prompted STAT abdominal imaging and avoided the two-hour delay spent attempting IV access. It was likely that the patient's condition could have been diagnosed before the rupture occurred.



RISK REDUCTION STRATEGIES

Consider the following risk reduction strategies to mitigate anchoring bias and framing effect:

- When patients describe their problem using diagnostic labels, restate it in terms of signs and symptoms to avoid the cognitive trap of adopting their self-diagnosis.
- Utilize cognitive aids such as algorithms, mnemonics, and tools in the electronic medical record (EMR) to decrease reliance on memory and free up your mental bandwidth. Physicians are under heavy cognitive loads. Using aids to relieve some of this pressure can shift a mental budget away from memory tasks and toward critical thinking.
- Evaluate your current health habits. Are you fatigued or irritable? Chronic sleep deprivation and poor health can dull cognitive functioning. Improving health habits can sharpen analytical thinking abilities.



CASE TWO: **Confirmation Bias**

Confirmation bias, also known as congruence bias, occurs when new information is used to corroborate or support our current beliefs. Many of us tend to ignore or minimize information inconsistent with our prior experiences or opinions. “In a diagnostic setting, such a mechanism could lead to closing the exploratory phase prematurely; accepting a diagnosis before it has been fully verified or neglecting plausible alternatives.”⁶

A MOTHER'S NEAR MISS: CONFIRMATION BIAS INTERRUPTED

"Yes, just as I suspected," the nurse exclaimed as he grabbed his phone. My mother was in the hospital for vertigo, extreme hypertension, and suspicion of stroke. The nurse was getting ready to call the physician and tell him the hydralazine didn't work.

Two hours prior, the nurse had been unhappy about the physician's medication choice since it had not worked for his patients in the past. When he saw the monitor still showing 180/93, he nodded with vindication as he reached for his phone. A call would be made to ask the physician to order a beta-blocker, a medication the nurse originally wanted to give her. I stepped toward the monitor to get a closer look. That number—180/93—sounded eerily similar to me. I asked the nurse if the reading was recent, since it sounded like the exact same blood pressure when the hydralazine was given two hours ago.

To his surprise, the nurse realized he had unplugged the cuff during the last repositioning. He took a new reading, and my mother's blood pressure was exactly where the physician wanted it. With a sigh of relief, the nurse put down the phone.

It is easy to slide into confirmation bias. When your suspicions are confirmed, you feel vindicated, comforted, or relieved that you can quickly move to the next step. Not all instances of confirmation bias are caught early.

The error in this next case might seem obvious in hindsight but consider how confirmation bias impacted the physician's assessment and plan.

A 57-year-old woman presented to her primary care physician (PCP) for an annual examination. She had a history of hyperlipidemia, depression, Crohn's disease, and hysterectomy. The patient had a BMI of 28, was a half-pack per day smoker, and reported drinking 2-3 glasses of wine daily. For her Crohn's disease, she was being treated by a gastroenterologist and taking mesalamine. However, she was recently having a recurrence of loose stool three times per day, along with abdominal pain and cramping. She asked her physician about starting a biologic infusion because her friend was taking one with favorable results. Her PCP told her to discuss this medication change with her gastroenterologist. In the meantime, her PCP planned to order an Magnetic Resonance Enterography (MRE) since it can take some time to get those scheduled. On examination, the patient's abdomen was soft and nontender, with normal bowel sounds. There was no guarding, rebound, rigidity, or palpable mass. The patient received an order for laboratory studies and an MRE. Her PCP also told her to schedule a follow-up appointment with her gastroenterologist, stop smoking, and reduce her alcohol intake.

The patient was scheduled for an MRE within two months. The radiologist's impression was: (1) no abscess or obvious fistula, (2) concentric wall thickening consistent with chronic Crohn's disease, (3) no significant edema or abnormal bowel dilatation to suggest exacerbation of Crohn's disease, (4) abdominal aortic aneurysm measuring 6.2 cm, further imaging recommended, and (5) multiple pancreatic pseudocysts suggesting pancreatitis. The report was faxed to the PCP. It was not sent electronically because the facility where the MRE was taken and the PCP's office used different EMRs. Upon receipt of the report, the PCP charted that she reviewed it, confirmed active Crohn's disease, and planned to send a copy to the patient's gastroenterologist. She also noted that she would schedule the patient for a follow-up visit in two weeks.

Four days later, the patient presented to the ED with complaints of severe pain in her right lower abdomen. During triage, she reported severe pain in her groin, difficulty breathing, and became unresponsive. A code blue was called, but resuscitation was unsuccessful. The cause of death was a ruptured abdominal aortic aneurysm.

The patient's family filed a wrongful death lawsuit against the PCP and gastroenterologist for failing to emergently follow up on the abdominal aortic aneurysm reported in the MRE. They also sued the radiologist for failing to directly communicate the abdominal aortic aneurysm finding to the ordering physician.



DISCUSSION

The PCP acknowledged that she reviewed the report as documented in her chart. When she received the lawsuit, she was shocked that she had not urgently addressed the aneurysm with the patient. During a difficult deposition, she admitted that she had overlooked the aneurysm. If she had appreciated this incidental finding, she would have notified the patient and referred her for further evaluation. In hindsight, the physician testified that her best explanation for this oversight was that the aneurysm was listed midway through the report's many impressions. Because the report was faxed, the critical finding was not highlighted or typed in red. She acknowledged that while it would have been helpful to receive a call from the radiologist, she had a duty to carefully review the report and treat her patient accordingly.

The physician believed that she must have had confirmation bias after seeing that the radiologist's findings verified active Crohn's disease. She had suspected the patient's abdominal pain was caused by Crohn's disease, and when she saw this in the report, her suspicion was confirmed.

The physician was deeply affected by the loss of this patient and never imagined making a mistake like this. She never thought something like this would happen to her, but it did. Her patient died and she had no explanation for her care. Expert witnesses agreed that while the abdominal aortic aneurysm finding was incidental, it required urgent referral of the patient to a specialist. The case could not be defended at trial and had to be resolved.



RISK REDUCTION STRATEGIES

Consider the following risk reduction strategies to mitigate confirmation bias:

- Adopt habits that are methodical and thorough. Creating a thorough review method and following it consistently reduces the risk of missing critical information.
- Resist the temptation to rely solely on alerts and notifications in the EMR to highlight critical results from a lab or radiology.
- Recognize that stress and time limitations can interfere with cognitive reasoning. Seek out advice from colleagues on how to be more efficient.
- Engage artificial intelligence to help with some routine tasks and relieve time pressure. Learn how to use these technological advances appropriately to increase efficiency.



CASE THREE:

Availability Bias and Hindsight Bias

Availability bias is the tendency to overestimate “the likelihood of a diagnosis based on the ease with which it comes to mind.”⁹ When this cognitive error occurs, physicians can be influenced by recent experiences to diagnose in a similar manner.

A study involving over 7,000 emergency medicine physicians confirmed that availability bias may play a role in complex medical decision-making. The study looked at over 400,000 patients who presented to the ED with shortness of breath. Physicians who had made a recent pulmonary embolism diagnosis subsequently tested for pulmonary embolisms 15% more often than their colleagues did.¹¹ These results were consistent with availability bias.

Hindsight bias occurs when knowledge of an outcome changes people’s perceptions, so the event feels more likely than it really was in foresight. Several studies have established that being told answers to a test or the outcome of an event leads people to believe the answers or outcome were obvious and should have been anticipated.¹² It is a well-researched phenomenon that has earned the popular phrase, “hindsight is 20/20.”

As you read the next case study and discussion, consider how availability bias and hindsight bias affected the outcome.

A 31-year-old patient presented to labor and delivery (L&D) with contractions every 15 minutes. She was 39 weeks gestation, G1P1, and had a history of delivery by cesarean section. Her contractions had been occurring for 24 hours. The patient reported seeing her obstetrician (OB) two days prior and that her preference was to attempt a vaginal birth. She was examined by the on-call OB. The fetal heart rate (FHR) was normal, her cervix was 0 cm dilated, and the patient was kept for observation. After two hours, she was reexamined. Her cervix remained undilated, FHR was normal, and the contractions had subsided. The on-call OB sent her home with instructions to return if her condition changed.

Four hours later, the patient returned reporting contractions which were averaging every ten minutes, although they were inconsistent. She was not fully cooperative in the examination and reported extreme pain. The on-call OB confirmed that FHR was normal and her cervix was undilated. Shortly after the examination, the patient was observed resting in bed and falling asleep. FHR stayed in the 140s. The on-call OB notified the patient's outpatient OB by text message. He stated that the patient had a second presentation to the hospital and was being monitored. The outpatient OB did not respond or call the hospital. Three hours later, the on-call OB reexamined the patient. Her cervix remained undilated with irregular contractions occurring every 8 to 15 minutes. The patient was discharged home with instructions to return if her condition changed.

Two hours later, the patient returned by ambulance due to extreme abdominal pain and inability to stand. The patient was taken for an emergency cesarean section. She had suffered a complete uterine rupture. The infant required resuscitation and was ultimately diagnosed with severe hypoxic ischemic encephalopathy. The mother endured a difficult surgery, significant blood loss, and a hysterectomy. The infant's parents sued the on-call OB and the hospital for birth trauma and lifetime medical support for their child. Due to the hysterectomy, the parents also included a claim for their inability to have more children.



DISCUSSION

While uterine rupture can be difficult to predict, the decision of the on-call OB to discharge the patient may have been impacted by availability bias. This bias can influence a physician to diagnose a patient in a similar manner, which in this case led to the conclusion of early labor. The on-call OB was likely influenced by the recent decision to discharge the patient with instructions to return if her contractions increased. Upon her second presentation, the patient was still not dilated, she desired to have a vaginal delivery, and the fetal heart rate remained stable. With the recent discharge and safe return of the patient to L&D at the top of his mind, the diagnostic process was prematurely closed and led to the second discharge. The failure to closely consider a prior cesarean section, irregular contractions, and instances of extreme pain led to an adverse outcome.

During the discovery phase of the lawsuit, the outpatient OB produced text messages from his cellphone relating to this patient. Those text messages showed that the on-call OB had sent one to him in the middle of the night. It referred to the patient's second presentation, "[patient] is back at L&D with irregular contractions avg. 10 min. Cervix still closed and will recheck in a couple hrs."

The phone records showed there was no response to the text message. During his deposition, the outpatient OB testified that he did not see the text message until the next morning. He further testified that if he had been called in the night, he would not have discharged the patient. Instead, he would have taken her for an urgent cesarean section. This testimony compromised the defensibility of the case for the on-call OB and hospital, and it overestimated the outpatient OB's ability to predict and prevent the outcome.

This is an example of hindsight bias. After learning the patient had an adverse outcome, the outpatient OB believed the outcome was obvious after the second presentation. The reality is that physicians do not treat patients in hindsight. Rather, patients are treated on a prospective basis, using all the information available in real time.

Hindsight bias can be detrimental if it inappropriately places blame. In this lawsuit, the outpatient OB's bias may have wrongly attributed blame to the on-call OB. This type of bias can also be harmful in quality improvement forums. When hindsight bias is present during a peer review meeting or a root cause analysis, it can skew the results and inhibit necessary improvements.

In addition to the applicable cognitive biases, this case illustrates a communication breakdown frequently seen in medical malpractice lawsuits. It highlights the importance of ensuring communication is received by the recipient. The on-call OB sent a text message regarding the patient but did not receive a response. He assumed his message had been received, and the outpatient OB agreed with the plan. As we saw from the outpatient OB's testimony, this was not the case. A better approach is to make a direct phone call or, if sending a text message, ask the recipient to respond and to confirm they received it. If no response is received, follow up with the recipient again or use a different method until the communication is acknowledged.



RISK REDUCTION STRATEGIES

Consider the following strategies:

- Practice taking brief but reflective “time outs” to reevaluate your plan and consider alternatives.
- Enlist group decision-making and seek opinions from colleagues. Cognitive bias operates in our subconscious, so we can be unaware of its effect. However, it can be easy for us to recognize errors in other people's thinking. Using a group approach or asking colleagues' opinions can help you identify and address these failures in reasoning.
- Strive to restore foresight perspective before assessing blame or being critical of another provider. A proper perspective requires meticulous reconstruction of the entire patient picture, considering only the information available at the time of treatment.¹²



Bias at the Bedside:

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CONCLUSION

Cognitive bias can affect all aspects of our lives. In the practice of medicine, it can negatively impact patient care. Sometimes cognitive bias can give physicians false comfort when they see what they expected. Other times, its influence makes it extremely difficult for physicians to appreciate new or different symptoms. The reality is, whether a physician is aware of it or not, cognitive bias plays a vital role in everyday decision-making.¹⁰

Seek out resources to learn more about cognitive bias types and how they can affect critical thinking. This is a widely researched topic with various books, quizzes, and tutoring options available. “[I]ncreasing physicians’ familiarity with the many types of cognitive biases—and how to avoid them—may be one of the best strategies to decrease bias-related errors.”⁷

ENDNOTES

The documents referenced in this article, along with many other risk management resource documents and past editions of *Claims Rx*, are available on the [ProAssurance website](#), by calling Risk Management at 844-223-9648, or by email at RiskAdvisor@ProAssurance.com.

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