

Perspective

Importance of thoughts—how bias derails smart choices

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The clinicians have two important tasks at hand. Arriving at a diagnosis is the most challenging and stimulating task to provide pain relief to suffering patients. When a symptomatic patient interacts with a clinician, a working hypothesis of a differential diagnosis is arrived at to investigate the patient for a definitive diagnosis.¹ The other task of the clinician is to answer a query once it remains unsolved by conducting a series of research studies to generate evidence. The researcher conceptualizes and designs a study, collects, analyses, and interprets data and compares it with available evidence. This systematic approach, if unbiased, may provide a new solution to the clinical puzzle of arriving at a credible diagnosis and effective treatment.

Bias is described as an error which may occur in clinical settings to arrive at a diagnosis and treat a patient. The bias may occur in the conception or design of a study or in the collection, analysis, interpretation, and reporting of research outcomes, which leads to conclusions that are systematically different from truth. The bias could be cognitive bias or publication bias.

COGNITIVE BIAS

It is described as systematic errors in thinking occurring due to limited human processing/inappropriate mental models.² Humans have two types of thinking to make decisions: the analytical thinking takes time and is slow but concise, while intuitive thinking is fast and practical. A balance is required to make appropriate decisions; however, when intuitive thinking predominates over analytical thinking, cognitive errors occur.²

The clinical judgment guided by an intuitive understanding of probabilities combined with cognitive processes is called heuristics.³ Heuristics means rules of thumb, educated guesses, or mental shortcuts, which usually involve pattern

recognition occurring due to subconscious integration of somewhat haphazardly gathered patient data and with prior experience. This may lead to several types of unconscious (cognitive) errors.

When we identify a set of clinical signs/symptoms representing a common disease based on rapid mental processing, taking cues from memory stores and intuition, it is called pattern recognition.

EFFECT OF BIASES ON HEALTH CARE DECISIONS

To err is human. Mistakes can occur in every field. In medicine, the diagnostic errors can have dire consequences. The strategies to prevent diagnostic errors lead us to a path of diagnostic excellence. Rebecca *et al.*, after a systematic review in psychology (N-149 studies), concluded that the quality, consistency, and accuracy of decision-making in allied health practice can be seriously impacted by biases.⁴ The need to conduct further research in other disciplines to assess the impact of bias in healthcare decisions in real life was reiterated. Six to seventeen percent of diagnostic errors are reported in hospitals, out of which 70% occur due to cognitive biases, while knowledge deficit accounts for very few diagnostic errors.^{5,6}

The biased approach is fast, intuitive, and irrational and may occur due to mental shortcuts, social influences, emotional motivation, and cognitive predisposition, ending in clinical decision bias/publication bias. Bias in clinical practice may affect clinical decision-making while publication bias of various kinds may lead to flawed research outcomes. The debiasing strategies need to be adopted, which may be a part of the education system, training, or motivation, or by making a memory checklist or decision algorithm to develop an unbiased approach which is analytical, slow, and rational.⁷

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Various cognitive biases are:

- a) **Aggregate bias:** Here, the physician disregards the clinical practice guidelines, believing that aggregate data do not apply to individual patients. Their belief that their patients are atypical or exceptional may lead to an error of commission. Tuberculosis (TB) gold does not help in making a diagnosis of TB according to various guidelines, while the clinicians continue to get the test done in their clinical practice. The fluoroquinolone as first-line antituberculosis (ATT) is continued to be prescribed despite the guidelines against its use. The TB spine lesions continued to be evaluated by monthly follow-up magnetic resonance imaging (MRI) after starting ATT when available evidence did not support it.
- b) **Anchoring Bias:** The tendency to stick to one probable suspected diagnosis based on early symptoms/signs despite getting new clinical information about the patient is described as anchoring bias.
- c) **Confirmation bias:** Here, there is a tendency to look for evidence to support an initial diagnosis and not try to look for evidence against it.⁶ It means physicians are trying to look to see something that they want to see. It leads to a mistaken diagnosis and is passed on to other colleagues without questioning the validity.
- d) **Congruence bias:** Once a hypothesis/tentative clinical diagnosis is made, the clinician continues to conduct direct testing to prove it and does not consider other indirect tests to refute it without considering it, and it seems we do wish to consider alternative diagnoses.
- e) **Gambler fallacy:** Instead of relying on the patient's clinical symptoms/signs, one is relying on personal belief. When a clinician faces a situation and believes that since the last few clinical patients belong to one condition, hence will not get another patient with similar diagnoses next time. Here, pretest probability is influenced by the preceding event despite it being independent.
- f) **Overconfidence bias:** When the clinical decision is based on overconfidence, then that personal knowledge of oneself is more than others. Hence the decision is taken based on incompletely gathered evidence of signs/symptoms/investigations and on intuition/hunches rather than on carefully collected details of physical signs and investigations.
- g) **Premature closure:** This bias is one of the most powerful biases and is the reason for a high proportion of missed diagnoses. Here, one tends to apply premature closure to decision-making and accept a diagnosis before it is verified; hence, we tend to stop further investigation. It is a common human tendency “to stop thinking when diagnosis is made.”
- h) **Base-rate neglect:** This is described as a tendency to ignore the true prevalence of the disease. Sometimes, uncommon/rare diagnoses are suggested, disregarding the common condition. The clinician may tend to inflate knowingly or unknowingly the uncommon diagnosis on the pretext of “ruling out the worst case scenario” or avoiding a rare diagnosis. In clinical situations, it is important to keep differentials based on gathered evidence in history/physical findings/imaging/laboratory findings and also consider the true prevalence of the disease.⁵
- i) **Zebra retreat:** Contrary to base rate neglect, here, even if there is a possibility of a rare diagnosis based on gathered evidence, the clinician tries to retreat because of various reasons. This may be because of self-consciousness or low confidence. The clinician may not be keen to entertain a rare/remote possibility and does not want to be the first to investigate costly/special tests, given the inertia of the system. The clinician may be scared of being seen as esoteric or unrealistic, a person wasting resources. The clinician may not like to be seen as someone underestimating or overestimating a remote or unusual diagnosis. The clinician may be too busy to spend the required time to pursue a rare diagnosis or other team members may have diluted his convictions and insisted on not pursuing a rare possibility. Rarely does unfamiliarity with the diagnosis force the person not to pursue an unfamiliar road.

PUBLICATION BIAS

The publication bias leads to delay in the acceptance of key research or dissemination of distorted truth or delay in effective therapies and suboptimal outcomes.² It has far-reaching consequences. It distorts the conclusions and becomes the basis of future flawed hypotheses. The publication biases are of various types:²

- a) **Affinity bias:** This occurs when one relies on the study based on a high-ranked institution/researcher/organization and not based on evidence drawn in the article.
- b) **Positive outcome bias:** The tendency to rely on/prefer literature with positive outcomes is described as positive outcome bias.
- c) **Status quo bias:** This occurs when one favors the opinion in support of current thoughts and does not consider evidence in support of a change.
- d) **Self-serving bias** denotes support for the opinion expressed by reviewers or colleagues. Academic publication bias is where we favor studies which benefit personal institutions and peers.

CLINICAL DECISION-MAKING

While making a clinical decision, a hypothesis (differential diagnosis) is generated based on history and clinical examination. The differential diagnosis is tested by various investigations to arrive at a probable/final diagnosis. The probability of diagnosis with the investigation undertaken as well as probability estimation for the treatment suggested, is undertaken. In the presence of some uncertainty about the diagnosis, the treatment may be instituted considering the benefit of treating a sick person against the risk of erroneous treatment to a person with some other ailment.

The cognitive predisposition, mental shortcuts, social influences, and emotional motivation in clinical settings lead to intuitive, fast, and irrationally biased clinical approaches. Publication biases lead to delays in the acceptance of key research, dissemination of distorted truth, and delay in effective therapies. We need to undertake debiasing strategies to make it an unbiased, analytical, slow, and rational approach.

STEPS TO DECREASE BIAS

Reducing cognitive errors may be a challenge in healthcare facilities. Cognitive errors may be reduced by multi pronged strategies, which include increasing awareness about cognitive biases. The working conditions are improved to detect, protect, and recover from cognitive errors and associated risks.

The knowledge and awareness of cognitive biases can be imparted by discussing clinical cases to expose biases and raise awareness about their occurrences and also by providing simulation and training highlighting biased thinking.

TRAINING

We have to train students for metacognition. We have to inculcate among trainees the habit of asking questions to themselves: “Could it be explained by anything else?” We need to develop the systematic methods of reasoning, critical thinking, and presenting. The experience can be increased by the use of simulation methods. We should learn to tolerate feedback regarding diagnostic decision-making so that insight is developed into our reasoning and is recalibrated.⁷

Enhance work system conditions and workflow design that affect cognition

Working conditions should promote/facilitate perception/recognition/decision-making and should limit cognitive loading to produce task saturation/fatigue. Adequate time is available to collect data, review it, and discuss it. We should allow access to clarity of information. Health information

technology should be available and accessible to incorporate into the system. We should aim to facilitate real-time decisions and memory reliance will be reduced. Teamwork is developed to verify assumptions, interpretations, and conclusions. The system at the workplace should be resilient so as to help in detecting/recovering from cognitive biases.

Promote an organizational culture that supports the decision-making process

The organization should be developed and strengthened with all the tools for a successful journey. We should support a safe, non punitive reporting culture to learn from near misses and incidents. We should consider including cognitive bias in patient safety incident analysis to enhance understanding of how it contributes and can be mitigated. We should encourage people working to speak up. The patients and families should be engaged and empowered to partner in their care so that they understand diagnosis and can ask questions and speak up.

STEPS TO REDUCE OUR BIAS

We need to be aware of our own bias, which, in turn, enhances our clinical decision-making and improves patient care as also to improve future research. A small step that can reduce cognitive errors and improve clinical decision-making is slowing down to give adequate time for rational clinical diagnosis. While proposing differential diagnosis, we need to keep the base rate in mind. We should consider only relevant data (history/physical findings/investigations). We should actively seek alternative diagnoses. We should not forget to ask ourselves a question to disprove our diagnosis. Always remember that you may be wrong and consider the implication of cognitive error/wrong diagnosis. We should have a checklist/protocol so that cognitive errors, if occurring, can be corrected and damage avoided.⁶

While making a clinical decision, various factors influence clinical knowledge, including clinical epidemiology, heuristics, evidenced-based medicine, inductive reasoning, Bayesian reasoning, and hypothesis deductive reasoning. With the interplay of metacognition, one can reach sound clinical reasoning. In the end, “How you think and what we think makes a difference.”

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