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CE - CLINICAL NOTES

Understanding and improving decisions in clinical medicine (IV): prospects and challenges of nudging in healthcare

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Key Points

- The cognitive science of human decision making suggests a novel kind of approach to modifying people's behavior: *nudging*.
- A nudge intervention implies a non-coercive and typically small change of the choice context that exploits inherent tendencies of agents in order to promote beneficial outcomes.
- Studies show that—if properly motivated, devised, and tested—nudges can improve practice in internal and emergency medicine facilities.
- Nudge interventions are not meant to displace more traditional tools to promote beneficial behavior (training, regulations), but to combine with them.

How to modify people's behavior

According to what we have called the logic-plus-error view [1], human reasoning typically consists in the application of sound logical principles to prior beliefs and preferences, providing coherent inferences and choices, except for the possible intrusion of other forces (like emotions).

If one sees decision making in this traditional perspective, then one will identify three main kinds of intervention to recommend to modify people's behavior in some desired way. First, an agent may be induced to change behavior because of new information that altered beliefs (e.g., by education or training). Second, behavioral change can happen through a modification of relevant incentives (rewards and penalties) such that different courses of action now better serve the agent's goals. Or, third, it can happen because consequential choices were previously hindered by some disturbing factor (e.g., stress or fatigue) that has been reduced or removed (for instance, by some organizational or technological amelioration).

Given the crucial flaws of the logic-plus-error view, however, one should not be surprised to see that this approach can face spectacular failures in important cases, including the healthcare domain. Even in apparently convenient conditions of information and incentive, people may still fail to behave appropriately. In fact, choices do not usually arise as the logical consequences of stable preferences and beliefs; they are largely driven by heuristic processes, instead, which can be systematically biased and highly context-sensitive. This is not necessarily bad news, though: insights into the quirks and limitations of human rationality can help us improve decision outcomes by the design of suitable *nudges*.

What is a nudge: the cash machine paradigm

The simple basic idea of nudge theory is that in human behavior details can matter a lot. Let us start with a few illustrations from common experience. In early ATMs (automated teller machines), for instance, it was a relatively frequent inconvenience for users to walk away with the cash requested while inadvertently leaving their card in the card slot. The pending operation of collecting the card was easily missed once the user's main goal to get the money was completed. The solution adopted is that the machine just does not dispense cash until the card has been taken back. Surely ATM users always wanted to withdraw both their cash *and* card before leaving, and they did in principle have all relevant information to do so. Nevertheless, the apparently immaterial procedural variation of retrieving one or the other first was key to reducing the risk of a predictable mistake from significant to virtually null.

A more recent episode further clarifies the potential of nudges. For a long time, in the vicinity of ATMs one would

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usually find a waste bin filled with paper receipts thrown away by users. In the past 15 years or so, this has drastically changed (many ATMs do not even have their waste bin attached anymore). Why? We posed this question to a variety of audiences in training settings about decision making in healthcare and beyond, and almost invariably got the same answer, namely: because the choice of not getting a receipt was not available earlier on. This idea sounds natural but is factually mistaken, and a sign of how difficult it is to imbibe a realistic view of the determinants of our own behavior. Indeed, the question "do you want a receipt?" was always present, even in earlier ATM devices. Only, the right button on the screen then read "yes", with "no" on the left side. In today's ATMs, instead, one will often find "no receipt" *on the right* (and "yes" on the left). With this arrangement, since all default keys are placed on the right side of the screen during the operation ("yes, confirm"), a user is unlikely to ask for, and be dispensed with, a printed receipt unless there is a clear and strong motivation to get one and keep it.

In these examples, a minor design modification at virtually no cost yields a clear improvement in the outcome. An intervention of this kind exploits what Economics Nobel laureate 2017 Richard Thaler has labelled a SIF, a "supposedly irrelevant factor". A non-exhaustive list of SIFs include matters of procedure (e.g., sequence of steps or mode of response), arrangement (how elements are laid out in time or space in the choice environment), representation (e.g., probabilities vs. frequencies, or gains vs. losses), and emphasis (like perceptual hints or salient comparisons).

If cognition were driven by the application of logical rules, all these variations "should" not matter for decision-making outcomes, but the heuristic decision processes of humans can be highly sensitive to such contextual niceties. A nudge intervention relies precisely on this: it implies a non-coercive change of the choice context that exploits inherent tendencies of agents to promote beneficial outcomes. Might nudges improve healthcare, too?

Nudging in internal and emergency medicine

One important kind of nudge is intentionally setting a convenient default option, an event or condition that will obtain unless an alternative is actively chosen. A default setting does not restrict choice, but it can affect decisions substantially. People have a strong inclination to stick to a default option that is sustained by common psychological forces like loss aversion and omission bias. Importantly, default settings are ubiquitous in medical practice, and they are often employed inadvertently. This implies important opportunities for improvement.

Consider an 80-year-old patient admitted to an internal medicine ward for COPD (chronic obstructive pulmonary disease) exacerbation with a urinary catheter placed in the emergency department 3 days before. Should catheterization be prolonged by default unless a physician or nurse identifies reasons to do otherwise? Or should instead catheterization be discontinued, as long as no contrary indications explicitly arise? Adopting the latter guideline has proven an effective nudge-based approach to reducing unnecessary catheterization and catheter-associated urinary tract infections in hospital services [2]. In intensive care, an important nudge-based study involves low tidal volume ventilation, a beneficial measure that is often underutilized in actual practice. Simply changing the default levels of the equipment from the factory setting to those appropriate for low tidal volume ventilation improves compliance with evidence-based treatment in a significant and durable manner [3].

Hand hygiene in the hospital is yet another area where various effective interventions investigated are best understood as nudges. A recent experiment relied on the principle that gain-framed messages are generally more effective than loss-framed messages in fostering prevention behaviors. In one condition, hand washing was reliably increased by visible posters displayed close to alcohol-based hand rub dispensers and reading "40% increase in hand hygiene, 40% decrease in hospital-acquired infections" [4].

Conclusion

Estimates indicate that bad individual decisions are the main cause of death nowadays [5]. Apparently, material and technological advances have amplified the relative burden of mistaken choices as compared to other threats to our life and well-being. When it comes to healthcare professionals, too, promoting patterns of behavior that are beneficial but neglected (like flu vaccination) and reducing those that are harmful and yet widespread (like inappropriate antibiotic prescriptions) is a strong priority. Nudges are mild interventions relying on behavioral insights to promote better choices. Nudging should not be implemented uncritically. Ideally, it requires both testing and monitoring to ensure safety, effectiveness, and sustainability over time. In certain circumstances, it can raise ethical issues concerning the autonomy of the individuals involved or the strength of the case in favor of the behavior being promoted. However, a decision environment entirely free from nudging factors can hardly ever exist, or have existed in healthcare. For this reason, explicit and careful consideration of how such factors can eventually affect clinical outcomes is a cost-effective opportunity for improvement disclosed by the study of human decision making.

Compliance with ethical standards

Conflict of interest The authors declare that they have no conflict of interest.

Statement of human and animal rights This article does not contain any studies with human and animals performed by any of the authors.

Informed consent None.

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