
**CLINICIAN'S TOUCH VERSUS ROBOT'S CARES FOR BETTER HEALING:
LET'S FEEL THE DIFFERENCE -IN INDIAN PERSPECTIVE**

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Abstract

Background: The golden words in the medical profession for successful patient care are knowledge and experience. However, this concept of experience and knowledge being a part of implications of artificial intelligence (AI) in medicine, is still debatable. Artificial Intelligence is a general term that includes robotic-surgeries, medical statistics etc. Though different methods of

artificial intelligence have supported in early diagnoses and referral management of various ailments, health care professionals are still apprehensive about its use in proper diagnosis of several disease conditions. As AI struggles to provide comfort, reassurance, and motivation to patients in this world of telemedicine, it cannot be ruled out that Clinician's touch has its own healing powers. **Objective:** This review was undertaken to understand if doctor's touch develops trust, an essential component of the patient's welfare or artificial intelligence alone can serve the purpose in all aspects of doctor-patient relationship. **Methodology:** A broad systematic exploration on studies was steered by means of electronic database (PubMed/Scopus, Google Scholar) and was limited to articles published in English using words like "AI", "Human Intelligence", "Patient's satisfaction", "Decision making", "Emotional intelligence", "Doctor patient relation", etc. between 2013 to 2023. **Results:** The articles concerning to artificial intelligence were identified first. But after applying preset inclusion and exclusion criteria, 53 relevant articles have been included. The findings indicated that our greatest fear is that artificial intelligence (AI) would advance to a point where it will outsmart human intelligence and eventually take over our life. The application of AI will, however, benefit society if we are successful in establishing moral guidelines, formulating success and efficacy metrics, and making AI tools accessible to public as well as medical facilities. This will be achieved by making AI tools easily accessible, user-friendly, and open source, with demonstrated clinical applications. **Conclusion:** Studies reveal that AI in medicine mainly considers medical devices and sophisticated robots. In India, reaching out to the population, especially in rural areas with these sophisticated devices might increase the cost of treatment. But a combination of human touch with AI will improve the patient care but technology alone cannot be a replacement for human empathy.

Keywords: artificial intelligence, human intelligence, decision making, emotional intelligence

Introduction

Both the population and the need for healthcare personnel are rising in nations like India. Because of this, there is a lot of work to be done, and medical facilities in wealthy nations face growing financial strain and delays. In light of this, new technologies have the potential to boost productivity and, eventually, quality of care. Artificial intelligence (AI) is frequently mentioned as a potential remedy for the problems that healthcare systems are now facing. This involves enabling doctor-patient connections that are person-centered and freeing up time for medical professionals. Nevertheless, because artificial intelligence tools are still relatively new, there is a dearth of hard data regarding how they affect patient-physician relationships or how best to use them to support person-centered care (1). It is envisaged that the time AI may save would be put to better use by strengthening and humanizing doctor-patient relationships (2). It is known that the key element in the Health Literacy Instructional Model is the support system of the patient with addressing the emotional state of the person, being the most important of all. It is well known that the patient's support network, which attends to their emotional state above all else, is the most crucial component of the Health Literacy Instructional Model (3)(4) (5)

Health Literacy Model (Dunn-Conard)	Knowledge
	Numeracy
	Navigation
	Communication
	Decision making

Table 1 Domains of health literacy Instructional System (3)(6)

The gold standard for doctor-patient partnerships is thought to be care that prioritizes individuals (7) (8) . Person-centered care is based on the principle of empathy, but this approach is also said to enhance health outcomes, decrease malpractice, and increase employee retention rates (9) (10) (11). It is asserted that AI has the capacity to grant time, which would enable the patient and the physician to have more in-depth conversations about treatment (12) (13) (14). Hence, AI systems should be developed with value diversity in mind, which includes the capacity to consider the priorities and preferences of various patients (15) (16) .

Methodology

We reviewed the literature to find arguments in favor of and against the potential effects of AI on the doctor-patient interaction. Searches were conducted in between October and December 2023 in PubMed database. We included broad search terms like “Artificial Intelligence”, “Human Intelligence”, “Decision Making”, “Emotional Intelligence”, “Doctor-Patient Relationship”, “Health Care”, “Trust”, “Empathy”, etc., to include relevant papers. Search results included 60 relevant articles. The search strategy of PubMed includes: (((artificial intelligence) AND (human intelligence)) AND (decision making)) AND (emotional intelligence)). The search strategy of Google Scholar includes: (((artificial intelligence) AND (human intelligence)) AND (decision making)) AND (emotional intelligence)) AND (Trust)) AND (Empathy)) AND (Doctor patient relationship)) AND (Health)). We chose English-language publications, and we combined and interpreted the data collaboratively amongst all writers in an iterative method. In order to determine the true values from the literature, we narrowed down the selection criteria. This made it possible for us to pinpoint the primary concerns raised in the literature and to come up with practical solutions to guarantee that the healthcare system benefits from the usage of AI tools.

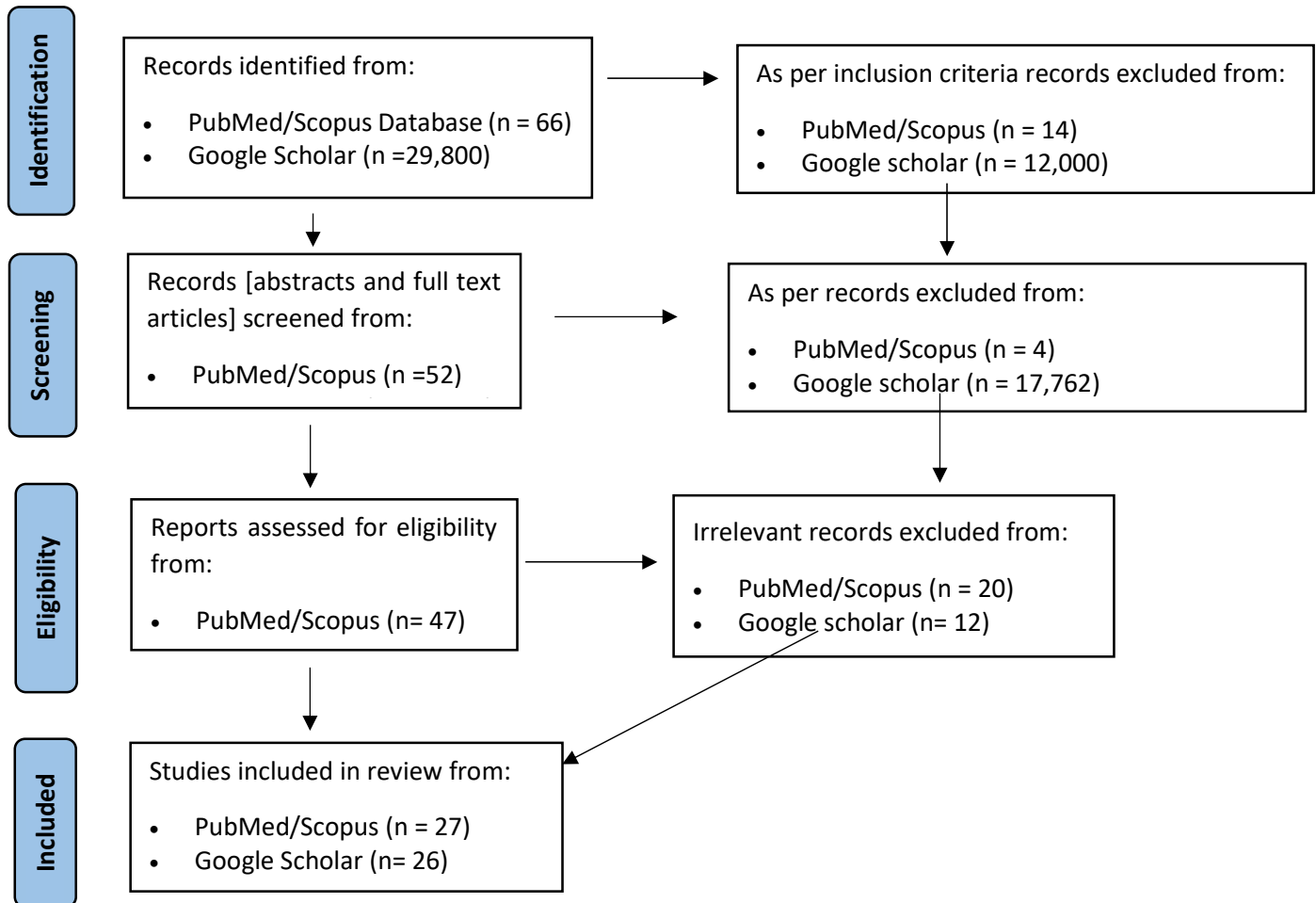


Figure 1 Results of Search Strategy

AI: Why, When, and Where?

In 1950, Alan Turing presented the concept of employing computers (17) (18) to replicate critical thinking and intelligent behavior and six years later John McCarthy defined artificial intelligence (AI) as the science and engineering of creating intelligent robots (19) (20) (21). In recent times the development of machine learning led to the development of deep learning which is composed of algorithms to create an artificial neural network with the capacity to learn and make decisions on its own, much like the human brain (22) (23) (24) (25).

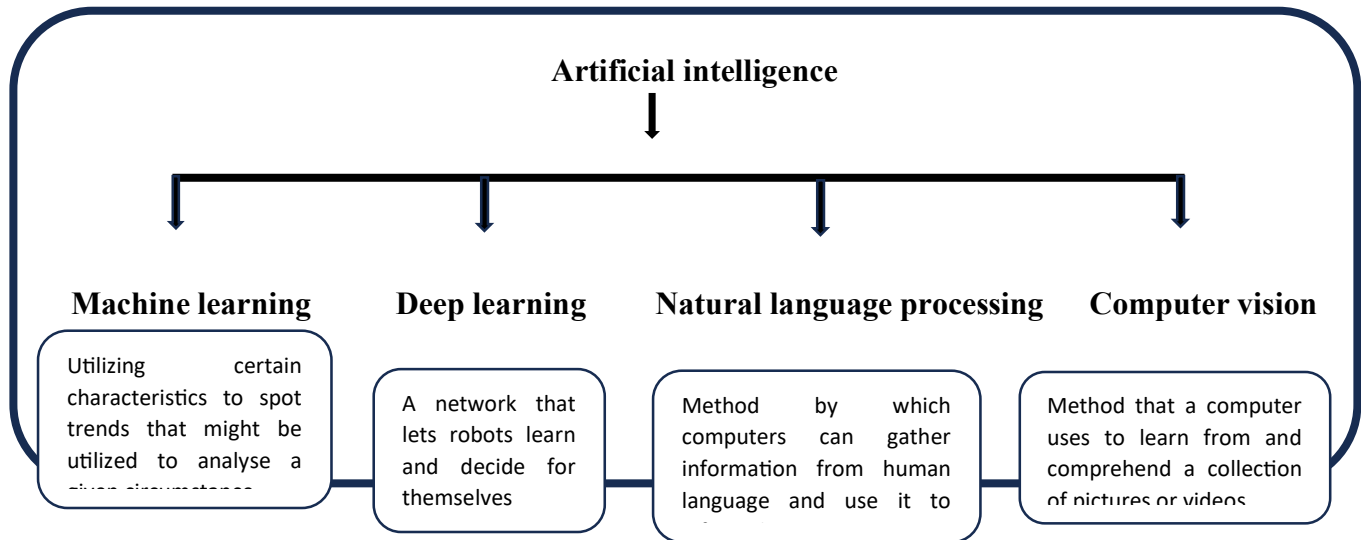


Figure 2 Components of Artificial intelligence (26) (27) (28) (29)

AI in Medicine

The first industrial robot arm (Unimate; Unimation, Danbury, Conn., USA) was brought to the assembly line by General Motors in 1961 in order to perform automated die casting (30) (31) (32). "The first electronic person" named Shakey a mobile robot was the first to comprehend commands (33)(34)(35). It developed at Stanford Research Institute in 1966. Using the CASNET concept, a glaucoma consultation program was developed, which showed that applying AI to medicine was feasible, which was one of the first prototypes. Three distinct programs make up the CASNET model, a causal–associational network: model construction, consultation, and a database that the collaborators created and are now maintaining. By applying knowledge about a specific condition to individual patients, this algorithm may be able to give physicians advice on how best to care for their patients (36)(37)(38). A decision assistance system (DXplain) which gives a differential diagnosis based on symptoms entered was produced by the University of Massachusetts in 1986. Pharmabot was a chatbot that was introduced in 2015 to educate parents and young patients about pharmaceuticals and Mandy was developed in 2017 as an automated patient intake process for a primary care clinic (39)(40) (41)(42)(43)(44). US Food and Drug Administration approved Arterys in 2017, making it the first clinical cloud-based deep learning application in the healthcare industry. The first product from Arterys, the Cardio AI could swiftly determine details like the ventricular ejection fraction by analyzing cardiac magnetic resonance images. Subsequently, its use has expanded to include non-contrast head CT scans, x-rays of the musculoskeletal system, liver, and lungs (45). The usage of AI in gastroenterology has also significantly increased within the last ten years. Colonoscopy can benefit from the use of computer-assisted diagnostics to better identify and distinguish between benign and malignant colon polyps.⁵¹ AI has been used to help distinguish pancreatic cancer from chronic pancreatitis using the EUS platform, a typical clinical difficulty (46). The application of AI in endoscopic

practice is still developing and has profited from the recent technological advancements . A key component of person-centred care is patient participation in decision-making (47). Encouraging patients to participate in decision-making processes can enhance their autonomy and effectively challenge the antiquated paternalistic approach to healthcare (48). Certain artificial intelligence tools could potentially boost patient autonomy, which would in turn encourage the use of collaborative decision-making. In the best-case scenario, patients' use of smartphone apps for self-monitoring (collecting any kind of health data) would increase patient autonomy and shift the doctor-patient relationship towards more of a customer-service model, in which both sides have an equal say in decision-making and a fair distribution of rights and responsibilities (49). How an algorithm could consider the preferences of various individuals (e.g., with relation to treatment goals) is unknown (50). This might lead to the emergence of a new kind of paternalism in which AI decides for medical professionals and patients. The definition of empathy is the capacity to comprehend another person's perspective and their experience of illness and, through this cognitive resonance, feel motivated to help them (51). Therefore, developing empathy takes time. AI appears to have the potential to save doctors' time, based on available data. According to Printz, the AI tool Watson for Oncology requires forty seconds to gather, analyse, and produce therapy suggestions based on the data that is already accessible. In contrast, manually gathering and processing the data takes an average of 20 minutes; as oncologists gain experience with patients, this time drops to 12 minutes. Whether this extra time will be put to better use in improving the doctor-patient connection is unknown, though.

Trust in Human-AI Collaboration

As healthcare professionals rely more and more on AI, a strong trust relationship—also referred to as calibrated trust—becomes essential for making informed judgements. One of the key elements influencing the growth of user trust in a rule-based software system is its deterministic and reasonably predictable nature. A deterministic system's initial state and inputs define all of its subsequent behavior. But because AI is unpredictable and might demonstrate diverse behaviors for the same input in future iterations, the concept of trust might have new meanings. An overview of several key elements affecting trust in AI for healthcare, potential solutions to strengthen trust, and their effects on trust for healthcare applications are shown in Figure 3. At the moment, a major barrier to the use of AI in healthcare is a lack of confidence in the systems. Trust in AI can be impacted by an array of human factors, such as user education, past experiences, biases, and views towards automation, as well as by features of the AI system, such as controllability, transparency, and model complexity, as well as related risks. Mechanisms that will create and preserve an appropriately balanced, ideal degree of user and AI system trust that is commensurate with the system's capabilities must be incorporated into the development of AI.

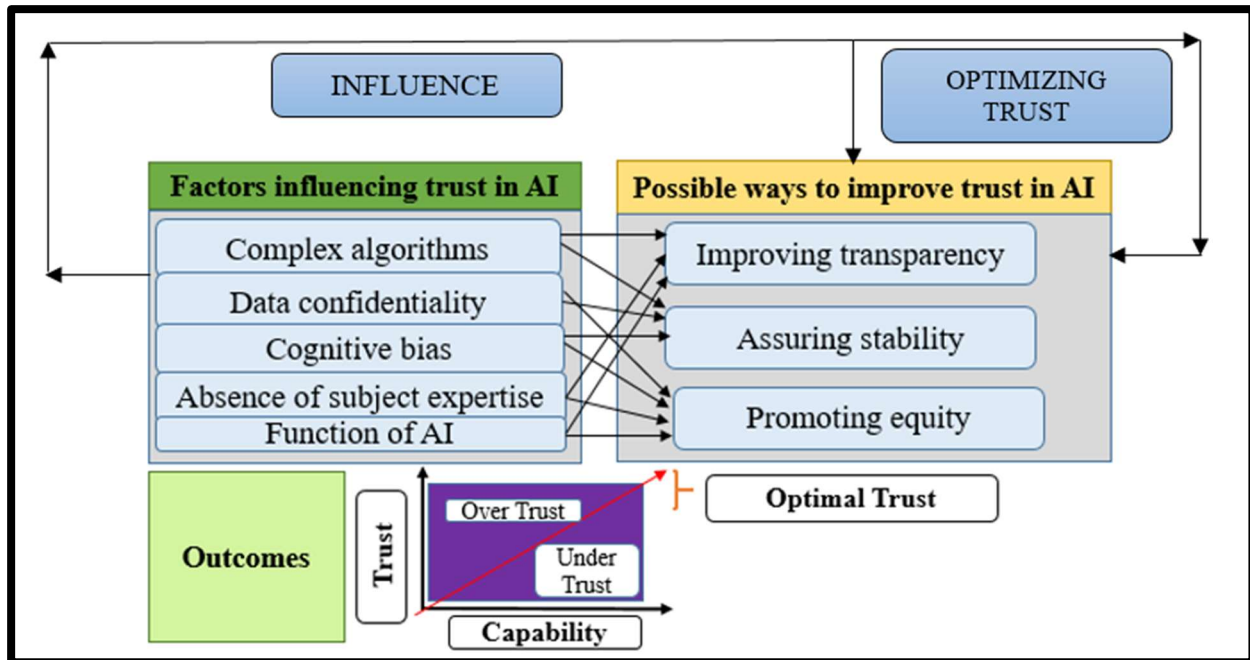


Figure 3 Human factors and trust in artificial intelligence

The costs and obstacles associated with using AI in medicine: An overview

It seems good on paper that the introduction of AI to healthcare might help address persistent problems that prevent patient-centered care from being provided, like shortage of time. Some contend that by enhancing decision-making transparency, explainable AIs could lead to more fruitful doctor-patient interactions. The idea that AI can only improve openness, communication, and prevent possible problems in interpersonal interactions in an assisting position between a doctor and patient is supported by a number of researches in the field of mental health. However, it is unknown and impossible to foresee how the widespread use of AI would affect the doctor-patient interaction. Some who disagree with AI claim that it could further dehumanize medical practice. AI tools that don't respect diversity could promote a return to paternalism, but this time the AI would be the one enforcing it rather than a human practitioner. AI won't be utilized to improve person-centered care; instead, it will be used to move more patients through the system. In the behavioral experiment, they found that participants were more willing to accept AI recommendations if the AI could have personalized interactions, even though they were more likely to claim they preferred guidance from human doctors (52).

Future Research Directions: The Conclusion

Further research and validation will be necessary for AI algorithms and their applications, though. To further prove its effectiveness, worth, and influence on patient treatment and result, further clinical data will be required. To allow doctors, clinics, and hospitals to integrate AI, we must lastly provide affordable AI models and technologies. AI in regular clinical practice. In an effort to significantly enhance clinical outcomes for patients with GI diseases, doctors should see this as

a partnership rather than as "human versus machine"(53) .AI has the potential to significantly disrupt the healthcare system, so it is important to consider where and how it fits into the larger healthcare system in order to make sure that its use improves the doctor-patient relationship. In conclusion, there is conflicting evidence in the growing body of literature regarding whether AI would strengthen the bond between a physician and patient by promoting shared decision-making via greater patient autonomy or whether it will foster a new kind of paternalism by impeding value pluralism (52)(53). It's widely acknowledged that the way AI is used in clinical settings whether to support or replace human practitioners - will probably determine how it affects patient-centered care.

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