

# Perception about Artificial Intelligence in Medical Education

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## ABSTRACT

**Background:** There is increasing interest regarding the role of artificial intelligence and machine learning in medical education and the studies revealed about existing gap in knowledge and application of artificial intelligence. The aim of current study was to find out the perception of medical faculty members about artificial intelligence in medical education and the level of awareness regarding the basic concepts of artificial intelligence.

**Methods:** A qualitative exploratory approach was conducted. A self-designed, self-explanatory questionnaire was used. The questionnaire was disseminated using google form. The link of the questionnaire was emailed to the chosen faculty members and appointment for the telephonic interview was taken. On the given date and time, they were called for the telephonic interviews and the calls were recorded. After recording all the calls, the data was transcribed from each recorded phone call. After transcription the data was coded and themes were identified for final analysis.

**Results:** Majority of participants explained artificial intelligence as an advance data calculator while some were not aware of practical applications of artificial intelligence in the field of medicine. Majority of participants recommended that medical curriculum should be revised with incorporation of basic concepts of artificial intelligence based-medical education and computer education along with it. Workshops and seminars, CME on artificial intelligence to be conducted as a part of regular faculty development programs. Many participants predicted that healthcare professionals will be replaced with the artificial intelligence based computer programs for the diagnosis of diseases in the future.

**Conclusion:** Current study made an important observation that there was the lack of conceptual knowledge about artificial intelligence and its applications, it could be due to the fact that the healthcare providers are more focused towards their own subject specialties, that leaves them with less time in exploring the computer based technologies.

**Keywords:** Artificial intelligence, Healthcare system, Medical education

## INTRODUCTION

Defining AI is mostly synonymous with defining the intelligence. Natural intelligence is specialized to solve problems in the physical world or the world we live in; artificial intelligence deals with the problems described by the programmers. Both instances can be placed somewhere along a realm of generality, as defined by an agent's capability to handle variety, complexity, and novelty" (1, 2). The field of Artificial Intelligence was first described by John McCarthy as: "To find how to make machines use language, form abstractions and concepts, solve kinds of problems now reserved for humans, and improve themselves. For the present purpose the artificial intelligence problem is taken to be that of making a machine behave in ways that would be called intelligent if a human were so behaving" (1, 3)

The main achievements in the last many years have been advances in search algorithms, machine learning algorithms, and integrating statistical analysis into understanding the world at large. However most of the breakthroughs in AI aren't noticeable to most people. Rather than talking machines used to pilot space ships to Jupiter, AI is used in subtler ways such as examining purchase histories and influence marketing decisions and making medical diagnosis (4). Field of medicine like many other fields have incorporated AI in many different domains. Artificial intelligence (AI) in healthcare is the use of complex algorithms and software to emulate human cognition in the analysis of complicated medical data (5). In medicine or healthcare specifically, AI is the ability of computer algorithms to approximate conclusions without direct human input. Many brilliant AI based programs are being used in the area of computer vision, where expert machines trained to diagnose melanoma have displayed superior diagnostic accuracy as compared to a team of expert medical practitioners (6).

Even though there is increasing interest from concerned bodies regarding the role of artificial intelligence and machine learning in medical education, gaps exist. A study in NPJ Digital Medicine in September 2018 observing the number of publications in PubMed with terms such as "machine learning" and "medical

education" found that although the number of machine learning publications has increased many folds since 2010, a combined search for "machine learning" and "medical education" only brought up sixteen results. Upon further investigation, none of those sixteen publications were focused on education around machine learning for medical professionals (7). The aim of current study was to find out the perception of medical faculty members about artificial intelligence in medical education and the level of awareness regarding the basic concepts of artificial intelligence.

## MATERIAL AND METHODS

A qualitative exploratory approach was conducted and twentieth medical faculty members, who involved in teaching the undergraduate medical students and training the postgraduate trainees in the attached hospitals of the medical colleges, were enrolled in the study. A self-designed, self-explanatory questionnaire was used. The questionnaire was disseminated using google form. The link of the questionnaire was emailed to the chosen faculty members and appointment for the telephonic interview was taken. An informed consent was also taken prior to the study. On the given date and time, they were called for the telephonic interviews and the calls were recorded. All interviews lasted for an average of 20 to 30 minutes. After recording all the calls, the data was transcribed from each recorded phone call. After transcription the data was coded and themes were identified for final analysis.

## RESULTS

About 15 codes were identified which were further categorized into five themes as mentioned in the table 1. Majority of participants explained artificial intelligence as an advance data calculator while some were not aware of practical applications of artificial intelligence in the field of medicine. Majority of participants recommended that medical curriculum should be revised with incorporation of basic concepts of artificial intelligence based-medical education and computer education along with it. Workshops and seminars, CME on artificial intelligence to be

conducted as a part of regular faculty development programs. Many participants predicted that healthcare professionals will be replaced with the artificial intelligence based computer programs for the diagnosis of diseases in the future.

Table 1: Identified codes and themes

| Themes  | Responses   |
|---|---|
| 1. Concepts about artificial intelligence   | <ul style="list-style-type: none"> <li>• Thing we use or call artificial intelligence or what people call it artificial intelligence is not actually artificial intelligence, it is just calculations on a larger scale and answers what you want out of it, but still its data input</li> <li>• No idea about where exactly in medical education and in teaching artificial intelligence stands</li> </ul> |
| 2. Applications of artificial intelligence in different domains of Healthcare and medical education | <ul style="list-style-type: none"> <li>• Experience with real patients is considered more fruitful and pro learning compare to simulations.</li> <li>• Currently use of artificial intelligence in under graduation and post-graduation is really very limited"</li> </ul>  |
| 3. Use of artificial intelligence in Pakistan   | <ul style="list-style-type: none"> <li>• None of the medical college in Pakistan is working on artificial intelligence even not the Agha Khan</li> </ul>  |
| 4. Problems facing artificial intelligence in Medial field  | <ul style="list-style-type: none"> <li>• Privacy of data.</li> <li>• Liability, privacy and control over data and black box phenomena are the real challenges of using artificial intelligence in healthcare system</li> </ul>  |
| 5. Future recommendation  | <ul style="list-style-type: none"> <li>• Need of adaptation</li> <li>• Need to develop things on artificial intelligence</li> <li>• Introduction of certain courses or modules related to computer literacy and basics of artificial intelligence</li> </ul>  |

**DISCUSSION**

It is highly desirable for any scientific application to be perfectly understandable in terms of definition and concepts (8). There is an extensive debate going on the working definition of artificial intelligence amongst the scientists who are currently working in this field. Those who originally coined the term "artificial intelligent" at Dartmouth meeting agreed upon some distinguishing and unique feature which is the backbone of all the progress that has been made in this field, as quoted by Hosny et.al (9), Mccarthy et.al defined artificial intelligence as the ability to solve hard problems (3).

The understanding or interpretation amongst the medical professionals is somewhat similar to what is known as "data science" and not artificial intelligence (10) and it is believe that one of the reasons is lack of understanding and interest in computers, as doctors are known to actively, viscerally and volubly hate their computers (11) but the reality is that almost every technological advancements revolves around computers.

Current study found that majority of the participants perceived the concept of the artificial intelligence as "data organizer and interpreter". They were of the opinion that artificial intelligence-based applications technologies will help them understand and organize the large number of patient and student data in healthcare delivery and medical education respectively.

Many studies in the developed countries have highlighted the adversarial effect of the artificial intelligence related systems, as it is still a developing field. Ethical use of data and its privacy, a concern voiced by doctors and patients is the major reason of disquietude and limitation for the global use of artificial intelligence based applications (12, 13). A study conducted by Murdoch et.al reported that patients were asked about the concerns if they have over their data security, 35% of the respondents expressed their

concern (14). The matter of data security and consent for sharing it should be a top priority for the experts devising artificial intelligence based applications for healthcare sector so that doctors and patients have increased confidence on the technology. This will help both the doctors to use the technology in their practice and also for the patient confidence.

Healthcare system is a multi-dimensional system in which experts and professionals from diverse backgrounds work together unlike other fields like information technology (IT) and computer sciences, where professionals are from computer background (15). To incorporate AI in healthcare we need information technology professionals and computer engineer's assistance with medical professionals (16).

**CONCLUSION**

Current study made an important observation that there was the lack of conceptual knowledge about artificial intelligence and its applications, it could be due to the fact that the healthcare providers are more focused towards their own subject specialties, that leaves them with less time in exploring the computer based technologies.

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