ORIGINAL ARTICLE

Knowledge, Attitudes, and Perceptions Regarding the Future of Artificial Intelligence among Health-care Professionals

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Abstract

Aim: Artificial intelligence (AI) systems have been extensively employed in a variety of fields including medicine. The present study aimed to describe Saudi Arabian health-care professionals' knowledge, attitudes, and perceptions of the future of AI. **Materials and Methods:** The present study was a cross-sectional study that was carried out in November 2022 and included an online survey to describe Saudi Arabian health-care professionals' knowledge, attitudes, and perceptions of the future of AI. **Results:** The survey was filled out by 174 health-care workers. About 87.9% of health-care professionals said they are familiar with AI and its uses. About 89.7% said that they would like to use a software/program that can be helpful in disease diagnosis and treatment. More than 97% of health-care workers agreed that AI has a future in the medical field and 93.1% of them agreed that AI will help them in making decisions. **Conclusion:** Health-care professionals are concerned about the possible effects of its widespread application in clinical practice. Attending lectures, conferences, and workshops is essential for enhancing health-care professionals' knowledge and attitude regarding AI and reducing their conflict.

Key words: Artificial intelligence, attitudes, knowledge, perceptions

INTRODUCTION

Simply described, artificial intelligence (AI) is the development of intelligence by computers or other machines to carry out tasks that would typically need human intelligence.[1,2] Speech recognition, decision-making, and medical diagnosis are a few examples of such activities. Machine learning, a branch of AI, can be used to train computers and machines to analyze particular types of data using different techniques.[3] AI systems have been extensively employed in a variety of industries, including manufacturing, the stock market, medicine, and meteorology. AI programs have been created to analyze data gathered from a broad variety of sources.[1,2]

Recently, the change from research to application in a number of industries has increased.[4] High-income nations have generously funded AI research, particularly in the realm of medicine. There are no significant plans to use AI in low-income nations, and there is also a dearth of research in these nations.[5] The World Health Organization predicts that there will be a global shortage of almost 12.9 million health-care professionals by 2035. Previous studies informed that AI has advanced significantly during the past 60 years. However, the adoption of machine learning in low-resource nations has remained relatively modest.[6,7]

The implementation of AI in the health sector faces a number of difficulties, such as provider resistance, financial constraints, a lack of qualified medical professionals to create

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the diagnostic protocols that serve as the foundation for algorithms, a lack of information on how the general public feels about AI and its implications, physician replacement anxiety, social barriers, confidentiality concerns, and medicolegal ramifications.[8-10]

The use of technology to provide health-care services is increasing in Saudi Arabia, but it is still relatively low. The primary obstacles were identified to include inadequate infrastructure, a lack of understanding of the significance of these technologies, a lack of specialists, a lack of an information management plan, a lack of a national framework for the interchange of medical data, and a lack of a national regulator. While several global publications evaluated the awareness and perspective of health-care professionals regarding the use of AI. Saudi Arabia lacks research on its people's attitudes and knowledge about AI.[11] Therefore, the current study sought to describe health-care professionals in Saudi Arabia's knowledge, attitudes, and perceptions of the future of AI.

MATERIALS AND METHODS

The current cross-sectional study was carried out in November 2022 to describe Saudi Arabian health-care professionals' knowledge, attitudes, and perceptions of the future of AI.

The survey was adapted from an earlier study.[12] The survey was developed as an online survey using Google Forms and after that, it was sent to be filled out by the health-care practitioners in Saudi Arabia. The survey was completed by the interested individuals after providing some basic information about themselves.

The survey had four sections. The first section contained the respondents' personal information, the second section contained four questions about health-care professionals' knowledge of AI, the third section contained four questions about professionals' attitudes toward AI, and the fourth section contained five questions about the future of AI. Numbers and percentages were used to represent the data.

RESULTS

The survey was filled out by 174 health-care workers. The age of 69.6% of the respondents was between 21 and 30 years. About 51.1% of the respondents were males and 85% of them had a bachelor's degree. About 49% of the respondents were pharmacists or doctors [Table 1].

About 87.9% of health-care professionals said that they are familiar with the concept of AI and its uses. More than 94% of them agreed that AI has useful applications in the medical field and 60.3% of them reported that they have an idea of how AI can be incorporated into medical practice [Table 2].

Table 1: Baseline characteristics of the study population

Variable	Category	Number	Percentage
Age (years)	18–20	43	24.7
	21–30	121	69.6
	31–40	6	3.4
	41–50	3	1.7
	51–60	1	0.6
Gender	Male	89	51.1
	Female	85	48.9
Education	Bachelor	148	85.0
	Diploma	21	12.1
	Post-graduate	5	2.9
Specialty	Medicine	46	26.4
	Pharmacy	39	22.4
	Nursing	30	17.2
	Dental	8	4.6
	Others	51	29.3

Table 3 shows the attitude toward AI among health-care professionals. About 89.7% said that they would like to use a software/program that can be helpful in disease diagnosis and treatment. Contrarily, only 37.9% of the respondents agreed that the diagnostic ability of AI is better than the clinical experience of a human doctor and only 10.9% of them said that if their medical judgment and AI's judgments differ, they will follow the AI's opinion [Table 3].

Table 4 shows the opinion of health-care professionals on implementing AI in the future. Most health-care workers agreed that they may use AI for the diagnosis of different diseases or for treatment planning in the future. More than 97% of health-care workers agreed that AI has a future in the medical field and 93.1% of them agreed that AI will help them in making decisions.

DISCUSSION

The present study showed that the knowledge of health-care providers is good regarding AI and that they are interested in using it to diagnose and treat different diseases. Nonetheless, they are worried about its implementation and most of them agreed that the decision based on the clinical experience of a human doctor is better than AI's opinion. Medical students demonstrated an excellent awareness of the uses of AI in clinical medicine as well as in AI ethics, according to Ejaz *et al*., study.[13] According to Mehta *et al*., medical students are generally optimistic about the potential of AI to do a range of health-care tasks, from clinical to administrative, although they have some concerns about particular work categories, such as personal counseling and compassionate care. They contend that AI

Table 2: The knowledge of artificial intelligence among health-care professionals

Variable	Category	Number	Percentage
Are you familiar with the concept of artificial intelligence and its uses?	Yes	153	87.9
	No	21	12.1
Do you agree that artificial intelligence has useful applications in the medical field?	Yes	165	94.8
	No	9	5.2
Do you have any idea of how artificial intelligence can be incorporated into medical practice?	Yes	105	60.3
	No	69	39.7
The advantages of using artificial intelligence	It speeds up processes in health care and reduces medical errors	32	18.4
	It delivers vast amounts of clinically relevant high-quality data	37	21.3
	Has no emotional exhaustion or physical limitation	8	4.6
	All of the above	97	55.7

Table 3: The attitude of artificial intelligence among health-care professionals

Variable	Category	Number	Percentage
Would you like to use a software/program that can be helpful in disease diagnosis and treatment?	Yes	156	89.7
	No	18	10.3
Do you agree that the diagnostic ability of artificial intelligence is better than the clinical experience of a human doctor?	Yes	66	37.9
	No	108	62.1
If your medical judgment and artificial intelligence's judgments differ, which will you follow?	My own opinion	85	48.9
	Artificial intelligence's opinion	19	10.9
	Not Sure	70	40.2
Will you recommend fellow practitioners implement artificial intelligence in their clinical practice?	Yes	152	87.4
	No	22	12.6

Table 4: The future of artificial intelligence

Variable	Category	Number	Percentage
Do you agree that you may use artificial intelligence while doing medical diagnoses in the future?	Yes	158	90.8
	No	16	9.2
Do you agree that you may use artificial intelligence for treatment planning in the future?	Yes	154	88.5
	No	20	11.5
In which field do you think artificial intelligence will be most useful?	Making a diagnosis	126	72.4
	Making treatment decisions	48	27.6
Do you think artificial intelligence has a future in the medical field?	Yes	169	97.1
	No	5	2.9
Do you think artificial intelligence will help health-care providers in diagnosis and decision-making?	Yes	162	93.1
	No	12	6.9

will present fresh moral and social issues.[14] According to Ahmed *et al*., 74% of the doctors and 68.8% of the medical students had a basic understanding of AI, but only 27.3% of the doctors and 19.4% of the students were aware of its applications in medicine. Regarding attitudes, more than half of the respondents agreed that the implementation of AI is in the fields of pathology, radiology, and the COVID-19 pandemic.[15] They came to the conclusion that while most physicians and medical students lacked information about AI and its applications, they had a favorable opinion of AI in the field of medicine and were eager to use it.[15]

According to Civaner *et al*., the majority of medical students in their study said that AI could help doctors to obtain information (85.8%), provide patients with treatment (76.7%), and reduce errors (70.5%). They also stated that over half of the participants (44.7%) thought that employing AI applications would allow them to maintain their professional confidence, whilst 16.1% thought that using AI in medicine may compromise professional confidentiality.[16] Castagno and Khalifa reported that although most health-care experts acknowledge the value of AI in the medical area, many are concerned about the possible negative effects of its extensive usage in clinical practice.[17] Jindal and Bansal reported that 66.6% of medical students agreed that using AI in medicine will decrease diagnostic errors, and the majority of them had positive attitudes about the use of AI in health care.[18]

Numerous studies discuss the understanding and attitudes of medical professionals and students about AI. Several studies also describe the public's understanding of and attitudes toward the usage of AI. More than 90% of the patients had read or heard of AI, but just 24% claimed to have a strong or expert understanding, according to Fritsch *et al*. The application of AI in medicine was regarded positively or extremely positively by around 53.18% of the respondents, according to their report.[19] Ahmed *et al*. reported that more than 55% of research participants stated they had heard of AI in medicine, but just 3.17% said they knew everything there was to know about it. In addition, they noted that regarding diagnosis, more than 89% of respondents claimed they preferred taking advice from real doctors.[20] Ahmed *et al*. reported that a significant portion of the public distrusts the deployment of AI because they believe it could make deadly mistakes.[20]

CONCLUSION

Health-care professionals have good knowledge of AI, and they are interested in employing it to identify and cure various ailments. However, they are concerned about the possible effects of its widespread application in clinical practice. Attending lectures, conferences, and workshops is essential for enhancing health-care professionals' knowledge and attitude regarding AI and reducing their conflict.

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