



Awareness of Para Medical Students about the Role of Artificial Intelligence in Tirunelveli Medical College - A Survey Based Cross Sectional Study

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Abstract

Background: Artificial intelligence (AI) refers to the simulation of human intelligence processes by machines, especially by computers. AI is set to shape the future of medical practice. The perspective and understanding of medical students are critical for guiding the development of educational curricula and training. In the recent past, the utility of AI has been tested and proven in many fields like health care, education, finance, defence, etc. AI has received so much attention these days and is described as the new electricity and the fourth industrial revolution. Paramedical graduates need to update their knowledge and keep pace with new developments in technology. Given this, our study was designed to evaluate paramedical students' awareness and perceptions of basic AI concepts and their implications in health care. **Objective:** To assess the knowledge and perceptions of paramedical students about AI in a tertiary care teaching hospital. **Methodology:** The study was a questionnaire-based, cross-sectional study. A pre-validated, self-made questionnaire was distributed to 286 paramedical students of all courses through Google Forms by WhatsApp. The student's knowledge, opinions, and perceptions of AI were evaluated. The analysis of the collected data was done with an Excel sheet and using descriptive statistical measures such as mean and percentages. **Result:** A total of 286 paramedical students have participated in the study. The majority of participants were from the B.Sc. AHS students, who constituted around 42% of the total students. Among the study participants, 84.2% were females and 15.8% were males. The majority of students, 90.2%, belonged to the 17-20 age group. 85.3% of the students revealed that AI aids doctors in making accurate decisions in the diagnosis and treatment of different conditions 50.4% of students said yes to the question that AI has a role in decreasing errors in clinical laboratory. Around 40.2% of the students said that AI guides the patient to choose the right medical care. 29.3% of the students thought that AI hampers the relationship between patient and doctor by breaking trust between them. Around 54.6% of the students responded positively when we asked a question regarding the incorporation of basic concepts of AI in the academic curriculum, and 61.5% were of the opinion that training in AI during medical school would improve their job opportunities in the future. Around 66.1% of the students agreed with the statement that AI has an important role in scientific research related to laboratory medicine. 50.5% of the students think that medication errors in hospitals can be minimised and prevented by AI. Around 60.8% of the students think that training is needed to prevent and solve ethical issues that may arise with AI applications. Less than half of the students think that AI would affect the employment of doctors and other healthcare workers. **Conclusion:** Our study concluded that paramedical students at Tirunelveli Medical College, Tirunelveli, have positive perceptions and good awareness about AI and its use in healthcare practice, but they still need a better understanding of AI.

Keywords: Artificial Intelligence, Health Care, Knowledge, Perceptions

1. Introduction

Artificial Intelligence (AI) refers to the simulation of human intelligence processes by machines, especially

intelligent computer programs. In our journey through the 21st century, AI has seamlessly integrated into our daily lives, reshaping how we live, work and interact¹. In the recent past, the utility of AI has been

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tested and proven in many fields such as health care, education, finance, and defence². AI has received so much attention these days and is described as the new electricity and the fourth industrial revolution³. Much progress has already been achieved, and it is still going on in developed countries like the USA, UK, and Canada, but developing countries like India are still lagging in research and application of AI in various fields, especially in the healthcare industry⁴.

2. Aim and Objectives

To assess the knowledge and perceptions of paramedical students about AI in a tertiary care teaching hospital.

3. Review of Literature

Artificial Intelligence (AI) is the combination of machine learning and deep learning, the application of which results in successful outcomes. AI has proven to be beneficial in different aspects of the healthcare industry, right from making the correct diagnosis of a condition to treating it successfully. It has multiple roles in hospitals, such as patient recordkeeping, surgical assistance (robotic surgeries), prevention of medication-related errors, *etc.* Multiple studies revealed that AI would change the landscape of the medical industry soon. It is ultimately going to strengthen health care by promoting information access for both patients and health-care professionals. It improves decision-making in the diagnosis of a condition as well as its treatment. AI has a tremendous role in different branches of medicine, such as radiology, neurosurgical imaging, dermatology, pathology, and pharmacology. It has a significant role in the diagnosis and treatment of different conditions like cancer, COVID-19, neurodegenerative diseases such as Parkinson's disease, and Alzheimer's disease, as well as in drug discovery, precision medicine, *etc.*^{2,5}. There are multiple studies reported that AI has a significant impact on the healthcare industry. A few developed countries have started using AI in health care, and there is buzz that AI will affect jobs in the health-care industry because of automation. Even medical communities in different countries are ready to undergo training in the basic concepts of AI that will further improve patient care and future perspectives. Medical students from different countries acknowledged the importance of

the emerging role of AI in health care, and they are optimistic about the incorporation of basic AI concepts in medical curricula². There is a growing consensus that medical education and paramedical education must play a key role in providing basic knowledge about AI and its role in health care. Indian medical education should adopt and incorporate the necessary competencies into the medical curricula to prepare our para-medical graduates on par with medical graduates to improve health care in India.

It is anticipated that AI's role will be crucial and imminent soon in different fields, including the health sector. Paramedical graduates need to update their knowledge and keep pace with the new developments in technology. Hence, healthcare professionals should be ready to embrace this technology, which will ultimately improve patient care and job opportunities.

There are multiple studies about the awareness of AI in the medical field among healthcare professionals and paramedical students from different countries, but there are very few studies from developing countries like India, so there is an urgent need to increase the awareness of AI in healthcare among the paramedical community. It is also important to generate data that reflects the scenario in the Indian context; thus, our study was planned to evaluate the knowledge and perception of para-medical students regarding AI and its implications in health care.

4. Materials and Methods

The study was a questionnaire-based, cross-sectional study. A pre-validated, self-made questionnaire was distributed to paramedical students of all courses through Google Forms via WhatsApp. Out of 300 students, 286 students' responses were complete and satisfactory in answering all questions. Hence, we had to take 286 responses as our sample size remaining participants' data were excluded from the study. The questionnaire comprised different questions that evaluated the students' awareness and perceptions of AI in health care. The first segment included demographic details like age, gender, and year of study in medical school. The next segment included questions that evaluated the awareness of the students about basic terms related to AI and its role in health care. The third segment of the questionnaire assesses the students'

perception of AI in health care. Finally, the last segment was students' opinions on AI. All the questionnaires were assessed based on the responses given by the students in terms of yes, no, and I don't know options. The analysis of the collected data was done with an Excel sheet and using descriptive statistical measures such as mean and percentages.

5. Results (Including Observations)

A total of 286 para medical students have participated in the study. Para medical Students of B.Sc. MLT (1st, 2nd, 3rd and Internship), DMLT (1st, 2nd year) and B.Sc. AHS (Allied Health Science 1st year) has been included in the study. The majority of participants were from the B.Sc. AHS students, which constituted around 42% of the total students; the remaining 20.9% (DMLT 1st year), 18.1% (DMLT 2nd year), 6.9% (B.Sc. MLT 1st year), 5.2% (B.Sc. MLT 2nd year), 4.8% (B.Sc. MLT Internship) and 2.1% (B.Sc. MLT 3rd year), respectively. Among the study participants, 84.2% were females and 15.8% were males. The majority of students, 90.2%, belonged to the 17-20 age group in the figure 1 and 2, table 1.

When we assessed students' knowledge of basic terms related to AI, the majority of students were aware of terms such as AI and machine learning, Chat GPT, Gemini, Meta and HMIS, but only a few participants knew about deep learning and neural networks (Table 2).

When we inquired about the perceptions and opinions of students about AI, the following results

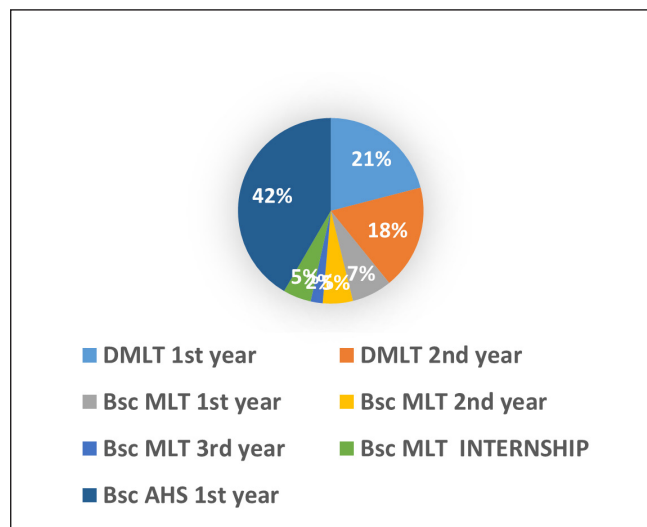
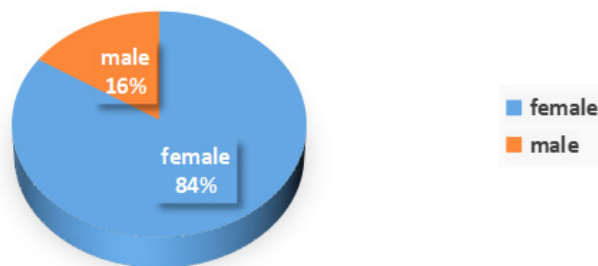


Figure 1. Educational status of students.

Gender distribution



Students-Agewise distribution

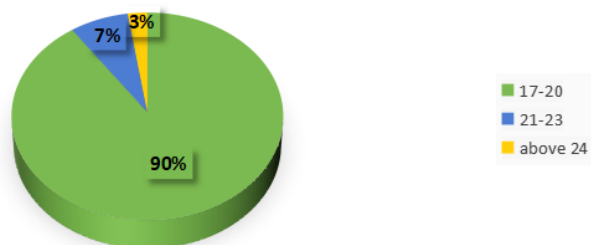


Figure 2. Demographic profile of students.

Table 1. Demographic profile of the study participants

Variables	Number	Percentage
Gender distribution of students		
Female	239	84.2%
Male	45	15.8%
Age distribution of students		
17-20 years	258	90.2%
21-23 years	21	7.3%
24 and above	7	2.4%
Number of students from each year		
DMLT 1 st year	60	20.9%
DMLT 2 nd year	52	18.1%
B.Sc. MLT 1 st year	20	6.9%
B.Sc. MLT 2 nd year	15	5.2%
B.Sc. MLT 3 rd year	6	2.1%
B.Sc. MLT Internship	14	4.8%
B.Sc. AHS 1 st year	119	42%

were observed. 85.3% of the students revealed that AI aids doctors in making accurate decisions in the diagnosis and treatment of different conditions 50.4% of students said yes to the question that AI has a role in decreasing errors in clinical laboratory. Around 40.2%

Table 2. Knowledge of students about artificial intelligence and related terms

Do you know about the following terms	Yes (%)	No (%)
Artificial Intelligence	241(85.5)	41 (14.5%)
Machine Learning	226(79%)	60(21%)
Deep Learning	48(16.7%)	238(83.3%)
Neural network	41(14.3%)	245(85.7%)
Chat GPT, Gemini, Meta	254(88.8%)	32(11.2%)
HMIS	228(79.7%)	58(20.3%)

Table 3. Student’s perceptions of AI

Variable (Question)	Yes (%)	No (%)	I don’t know (%)
Do you think AI helps in making doctors make more accurate decisions?	244(85.3%)	42(14.7%)	0
Do you think AI decreases errors in the clinical laboratory?	144(50.4%)	93(32.5%)	49(17.1%)
Do you think AI guides the patient to choose the right medical care?	115(40.2%)	100(34.9%)	71(24.9%)
Do you think AI hamper the relationship between the patient, the doctor and the lab technicians by breaking trust between them	84(29.3%)	168(58.7)	34(11.8%)

of the students said that AI guides the patient to choose the right medical care. 29.3% of the students thought that AI hampers the relationship between patient and doctor by breaking trust between them (Table 3).

Our study revealed the following opinions of students on AI: Around 54.6% of the students responded positively when we asked a question regarding the incorporation of basic concepts of AI in the academic curriculum, and 61.5% were of the opinion that training in AI during medical school would improve their job opportunities in the future. Around 66.1% of the students agreed with the statement that AI has an important role in scientific research related to laboratory medicine. 50.5% of the students think that medication errors in hospitals can be minimised

Table 4. Students’ opinions on AI

Variable (Question)	Yes (%)	No (%)	I don’t know (%)
Do you think basic concepts of AI should be included in the syllabus?	156(54.6%)	54(18.8%)	76 (26.6%)
Do you think training in AI during graduation would equip students with better knowledge and skills?	176(61.5%)	48(16.8%)	62(21.7%)
Do you think AI has any kind of application in scientific research related to lab medicine?	189(66.1%)	42(14.7%)	55(19.2%)
Do you think AI has any role in the prevention of medication-related errors in hospitals?	144(50.5%)	94(32.7%)	48(16.8%)
Do you think training is needed to prevent AI-related ethical problems in health care?	174(60.8%)	46(16.2%)	66(23%)
Do you think AI would affect the employment of doctors and other healthcare workers	142(49.3%)	45(15.7%)	99(35%)

and prevented by AI. Around 60.8% of the students think that training is needed to prevent and solve ethical issues that may arise with AI applications. Less than half of the students think that AI would affect the employment of doctors and other healthcare workers (Table 4).

6. Discussion

There are very few studies on the awareness and perceptions of paramedical students about AI in the Indian context. The current study would add significant

awareness to other healthcare students and make them embrace the concept of AI in healthcare delivery.

Overall, the study participants have positive perceptions and good awareness about AI and its use in healthcare practice, but they still need a better understanding of AI.

The current study found that the majority of students were well acquainted with terms such as AI and machine learning, but only a few students were aware of deep learning and neural networks. A similar type of result was observed in a study conducted by Sravani *et al.*² from Hyderabad.

Around 54% of the students were under the notion that the basic concepts of AI should be included in the para-medical school syllabus, and it will prove useful in seeking employment in a competitive and challenging world, entrepreneurship, international level career placements. A study by Sravani *et al.*,² revealed that 64% of students think that there is a need for AI to be included and taught in medical schools. Multiple studies from developed countries showed that the majority of students were in the same opinion about incorporating basic concepts of AI into para medical curriculum.

Our study revealed that 50.5% of the students reported that AI decreases errors in clinical practice. Our results are consistent with those of Ahmed *et al.*⁶, where students revealed a positive attitude towards the concept of AI in medicine.

Around 49.3% of the students think that AI would decrease the number of job opportunities for doctors and other healthcare workers. A few studies, like Jha *et al.*⁷ and Ahmed *et al.*⁶, concluded that 75% of the respondents were under the notion that AI would reduce the number of jobs for healthcare professionals and that AI could be like an aid to the physician, but not a replacement.

66.1% students responded positively when we asked whether AI has any role in scientific research related to lab medicine. AI has a tremendous role in research; it plays an important role in biomedical research. AI simplifies and speeds up the Automation process, which ultimately improves patient care.

Though the majority of students have a superficial awareness of AI, an in-depth understanding of its applications in healthcare delivery is not enough. In sync with this, the Government of Tamil Nadu should take initiatives to raise awareness about AI among para-medical students and train them for optimal medical care.

7. Summary and Conclusion

Our study concluded that the para-medical students at Tirunelveli Medical College have positive perceptions and good awareness about AI and its use in healthcare practice, but they still need a better understanding of AI. There is an urgent need to introduce basic concepts of AI in the academic curriculum, and hands-on training, wherever necessary, would be the need of the hour.

8. References

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