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Knowledge, Attitude and Practices of Medical Students and interns Towards Artificial Intelligence at a Private Medical College in North Kerala

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ABSTRACT

Background: Artificial Intelligence (AI) is revolutionizing medical education and clinical decision-making. Despite its growing importance, structured training among medical students remains poor. This study aims to assess the knowledge, attitude, and practice (KAP) towards AI among medical students and interns in North Kerala.
Methods: A descriptive cross-sectional study was conducted using an online survey among 390 medical students and interns by Google forms. The questionnaire assessed awareness, perception, and exposure to AI in medicine. Data was analyzed, and statistical tests like unpaired t-test, Chi square test and Pearson's correlation coefficient were done.
Results: Among respondents, 99.5% were aware of AI, but only 37.2% were aware of even the basic subtypes. 28% believed that AI has a role in all aspects of healthcare, right from diagnosis to management, with two thirds recommending introduction of AI into medical curriculum. Majority of students had already used AI, with most respondents giving positive feedback. Higher age-group respondents had significantly higher usage of AI compared to the lower age-group. Knowledge levels had no correlation with practice.
Conclusion: While students showed high enthusiasm for AI, especially for its practical use, knowledge gaps and ethical concerns persist. Incorporation of structured AI training into medical curriculum is essential to provide quality healthcare and avoid the harmful effects of modern technology in the hands of incompetent professionals. It must augment but not replace the role of the physician.

Keywords: Artificial intelligence, KAP, Medical students

INTRODUCTION

Artificial intelligence is the capability of computational systems to perform tasks typically associated with human intelligence such as learning, reasoning, problem solving, perception, and decision making.[1] Of late various applications of AI have been developed in the field of healthcare to analyze and understand complex medical and healthcare data. In some cases, AI can exceed or augment human capabilities by providing better or faster ways to diagnose, treat, or prevent disease.[2,3]

Evaluating the knowledge, attitude, and practices (KAP) of healthcare professionals toward AI is essential. By understanding these elements, trainers and decision makers can direct training programs, refine

implementation strategies, and ensure that AI is integrated into healthcare practice according to professionals' skills and patient needs.[4]

There are limited global studies examining the attitudes or knowledge of doctors and medical students regarding AI. Across these studies, there is a common theme of a lack of knowledge but a generally positive perception of AI.[5,6] However, in India very few studies regarding AI have been done among medical students. This study was aimed at exploring the depth of awareness and perceptions of medical students about AI and its application.

MATERIALS & METHODS

The study was conducted at KMCT medical college, which is a private medical college in North Kerala. After clearance by the institutional ethical committee, (IEC Ref No. IECKMCT/277/2026) informed consent was taken from the students, and those who were willing were included. Data was collected using an online questionnaire adapted from a previous study among medical professionals, with some modifications. The questionnaire included sections on demographics, knowledge of AI, attitudes towards AI, and practices involving AI in medical field. The sample size was calculated using Cochran's formula with a 95% confidence interval, a 5% margin of error, and an estimated population proportion of 0.5, leading to a required sample size of 385.

Knowledge of AI

The knowledge section had 5 questions. For statistical purposes, 'Yes' was rated as one, and 'No' was rated as zero. A total score of three or greater was taken as 'good knowledge'.

Attitude toward AI

In this part, questions regarding attitude were asked based on a Likert scale. For purposes of statistical analysis, the options rated as Neutral, Disagree, or Strongly Disagree on the Likert scale were taken as zero; and Agree or Strongly Agree as one. A score of four or above was taken as a positive attitude toward AI.

Practice regarding AI

This part included five questions regarding the active use of AI in practice. For statistical purposes, responses were rated as Yes = one; No, Never Applied or Maybe = zero. A score of three or greater was deemed to be 'good' for practice. For one question about usage of AI in medical exams, responses of always, often and sometimes were taken as one, and rarely and never as zero.

Statistical Analysis

Statistical analysis was done using SPSS 16 version. Numerical data were presented as the mean and standard deviation (SD). Data was presented as the frequency and percentage and analyzed using the Chi-square test and unpaired t test. Pearson's correlation coefficient was calculated to estimate the degree of correlation between two quantitative variables.

RESULT

A combined total of 390 students and interns responded to our survey. 79% of respondents were females, while the rest were males. The age range was from 18 to 26, with the mean age being 22.3 years.

Table 1: Demographic data

Item	n=390
Male Female	82 (21%) 308(79%)
Age <22 >22	 193 (49.4%) 197 (50.6%)
Qualification: First year student Second year student Third year student Fourth year student Intern	 69 (17.7%) 58(14.9%) 74(19%) 154(39.4) 35(9%)

While almost all the students (99.5%) were aware of artificial intelligence, only 37.2% knew about the subtypes of AI, namely machine learning and deep learning. Only 23.6% of students had got an exposure about AI during their medical school training.

Attitude of students towards AI was mainly assessed through questions that used a Likert scale for response. It was found that most respondents (>50%) agreed or 'strongly agreed' that AI had a definite role to play in the medical field and could lead to early diagnosis of illnesses. Significantly, 28.8% agreed that it would be useful in all aspects of the case diagnosis and management The majority also felt that in this scenario, it would be wise to integrate AI into the medical curriculum. However, a similar proportion of respondents also agreed that AI could paradoxically prove to be a burden for physicians, while also contributing to errors in diagnosis. More than two thirds of the students concurred on the fact that the physician had a crucial role to play while using AI.

Table 2: Attitude of medical students towards the role of AI in medical field. n=390

	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
Do you believe AI is essential in medical field	1 0.2%	8 2.1%	175 44.9%	175 44.9 %	31 7.9%
Do you think AI should be included in curriculum in medical school	6 1.5%	14 3.6%	114 29.2%	205 52.6%	51 13.1%
Do you think that AI aids practitioner in early diagnosis and assessment of severity of diseases?	5 1.3%	24 6.2%	134 34.4%	189 48.4%	38 9.7%
Do you believe AI would be a burden for practitioners?	15 3.8%	106 27.2%	156 40%	115 29.4%	18 4.6%
Do you believe AI would increase the percentage of errors in diagnosis?	6 1.5%	63 16.2	172 44.1%	130 33.3%	19 4.9%
Do you think physician role is important in application and evaluation of AI in medical field?	3 0.8%	7 1.8%	116 29.7%	166 42.6%	98 25.1%

Table 3: Perceived scope of AI in the medical field. n=390

Scope of AI in medicine	Yes	No
Making a diagnosis	248 (63.6%)	142 (36.4%)
Assessing a diagnosis	320 (82%)	70 (18%)
Assessing management	283 (72.5%)	107 (27.5%)
Providing management	165 (42.3%)	225 (57.7%)

Table 4: Respondents' practice regarding artificial intelligence. n =390

	Yes	No
Have you ever applied AI technology in any field?	Yes No	199(51%) 191 (49%)
Was it easy for you to apply AI in the medical field?	Yes No Not applicable	221(56.7%) 36(9.2%) 133(34.1%)
Did AI make your task easy?	Yes No	96.3% 2.7%
Have you attended any online/offline course that teaches you AI?	Yes No	33(8.5%) 357(91.5%)
How frequently do you use AI for preparing for MBBS exams	Always Often Sometimes Rarely Never	73(18.7%) 171(43.8%) 118(30.3%) 23(5.9%) 5(1.3%)

Regarding practice towards AI, it was found that the majority of students were already using AI in their day-to-day life, and almost 90% of those individuals felt that AI was easy to use, with an even higher percentage agreeing that it made their task easier. When probed whether

they use AI while preparing for medical exams, only 7.2 % of students replied with a 'never' or 'rarely' answer. However, only less than 10% of respondents had ever received formal training in the use of AI in any field.

Pearson correlation analysis for knowledge vs attitude and practice did not show any significant correlation, with the Pearson coefficient values being-0.05 and +0.03 respectively.

Table 5: Mean KAP scores and percentages. n=390

Item	Category	Frequency n=390	Percentage	Mean score	Std. deviation
Knowledge	Good	172	44.1	3.35	0.59
	Poor	218	55.9	1.69	0.46
Attitude	Good	202	51.8	4.56	0.81
	Poor	188	48.2	2	1.03
Practice	Good	230	59	3.58	0.61
	Poor	160	41	1.26	0.78

Regarding knowledge about AI, females logged lesser scores (mean 2.57±1.3) compared to males (2.7±1), and the result was statistically significant when checked by unpaired T test. (P=0.004) Attitude and practice scores were comparable, with no statistical association.

Association of gender with knowledge, practice and attitude was done by a chi square test. On comparing knowledge levels, males showed significantly better scores compared to females. (P<0.001). Males also showed higher scores for attitude, though it was not statistically significant. (P=0.06). However, when it came to practice, both genders showed similar values, and there was no statistical association. (P=0.2)

Table 6: Association between gender and knowledge, attitude and practice of AI. n=390

Item	Category	Good	Poor	P value
Knowledge	Female	122(39.6%)	186(60.4%)	<0.0001
	Male	50(61%)	32(39%)	
Attitude	Female	153(49.7%)	155(50.3%)	0.06
	Male	49(59.8%)	33(40.2%)	
Practice	Female	178(57.8%)	130(42.2%)	0.21
	Male	52(63.4%)	30(36.6%)	

Pearson's correlation analysis did not show any relation between increasing age and knowledge levels. (P= -0.1)

Table 7: Association of age with knowledge, attitude and practice of AI. n=390

Item	Age	Good	Poor	P value
Knowledge	<22 years	93 (48.2%)	100(51.8%)	0.06
	≥22 years	79(40.1%)	118(59.9%)	
Attitude	<22	96(49.7%)	97(50.3%)	0.24
	≥22	106(53.8%)	91(46.2%)	
Practice	<22	102(52.8%)	91(47.2%)	0.01
	≥22	128(65%)	69(35%)	

Chi square test was used to test the association of age with knowledge, attitude and practice regarding AI. With regards knowledge, the younger age group was found to have higher scores compared to the older age group, but it did not show statistical significance. (P=0.06). Regarding attitude there was not much difference between age group categories. (P=0.2). However, with respect to usage of AI in practice, respondents among the higher age group showed higher usage which was also statistically significant. (P=0.01)

DISCUSSION

In our study we found that awareness about artificial intelligence among medical students and interns was almost universal. This was significantly higher than that in earlier studies. This seemed to correlate with the increasing presence of AI in many activities of our day-to-day life. However, when it came to in-depth knowledge, it was found that there remained a significant gap, with only 37.2% respondents familiar even with the basic subtypes of AI like machine learning and deep learning. In two recent studies from Saudi Arabia and India, the corresponding percentages were 50.5 and 40.5% respectively.[7,8] This pointed to a definite lack of foundational concepts of AI among students in Kerala. Knowledge about AI was shown to be higher in males than females, though when it came to usage; both genders seemed to have taken to it equally. This knowledge deficit could lead to several ethical concerns like mistaken diagnoses, wrong assessments and mismanagement of cases. These ethical concerns were pointed out by the respondents and are issues that must be addressed promptly.

28.7% of respondents replied 'No' to whether they were aware of any application of AI in the medical field, with only 23.5% having been exposed to AI concepts in their curriculum. These findings are also in concurrence with several other studies worldwide. One study done in Syria by Swed *et al*.[9] reported that healthcare providers lacked formal AI training, noting the need for structured AI education. Another study from India by Kalaimani et al.[10] found that many lacked formal education regarding AI applications, despite having high awareness levels. Faroog *et al*.,[6] in a study from Saudi Arabia too highlighted the significance of including AI education into the medical curriculum. They found a limited understanding of AI among medical students, primarily due to the absence of structured AI education in medical training. The findings from our study also emphasize the need to incorporate structured training program regarding AI into the medical curriculum.

Despite the deficiencies in knowledge regarding AI, majority of respondents had a good attitude towards it, with about 52% saying that it would become a vital component in the field of medicine. In fact, majority of students felt that AI had a role in all aspects of the diagnosis. In this scenario, proper training may prove beneficial and time saving too. Further, about two thirds recommended inclusion of AI training in the medical curriculum. This was in concurrence with other recent studies by Pandyan et al[11] (87%) and Faisal et al (75%).[7]

Earlier studies by Jha et al[12] and Paranjpe et al[13] had highlighted the under preparedness of medical graduates when it came to using AI in applications within the medical field. Jha et al had also stressed on the holistic development of doctors with adequate communication and social skills and value-based teaching, with AI only incorporated to augment outcomes for the patient, rather than become a replacement. Similar sentiments were echoed in our study too, with two thirds of the respondents stating that the role of the physician was still very much relevant. Other studies such as those conducted by Bisdas et al[14] in 2021 and Preetha et al[8] in 2024 too made similar conclusions. Ethical concerns about errors in diagnosis as well as additional burden on the physician were flagged by about a third of the students just as in previous studies, and are a matter of serious concern.

In our study we did not find any correlation between knowledge and attitude or practice, unlike in the one by Faisal et al,[7] where there was a significant correlation. This showed that even without formal training and adequate knowledge, the younger generation which formed the bulk of the participants of this study, were ready to embrace the concept of AI and put it into practice. This was reflected in the highest scores for good practice. We also found that with time, most students invariably tend to utilize the services of AI. The higher age

group category was found to have statistically higher scores regarding practice, while knowledge of AI was higher among the lower age group. This could be due to the introduction of AI in school syllabus, which the older respondents may have lacked. However, this trend of using AI without adequate training may have deleterious consequences, and warrants a need for training not only students, but in fact all medical professionals. Incorporation of AI into post graduate curriculum should be seriously considered, while training for the medical fraternity could be done through workshops and seminars.

The main limitation of our study was that it was conducted in only one institution, which could result in a sampling bias, thereby limiting its generalizability. Multicentric studies may have to be done to provide further confirmation of our findings. Response bias, where answers were influenced by current social thought process among their peers could have been present. The cross-sectional nature also fails to detect emerging trends and changing perceptions of students towards AI.

CONCLUSION

Our study confirmed the growing acceptance of AI among medical students and interns. The majority were in favour of incorporating it into medical curriculum despite accepting that there were ethical concerns, and that it was not a replacement to the role of physicians. While many were already using AI in practice, low levels of knowledge were a concern, calling for pre-emptive action by the concerned authorities by incorporating formal training of AI into medical curriculum to augment healthcare outcomes. This would limit the potential damage of sophisticated technology in the hands of incompetent professionals. In any case, medical teaching should always lay emphasis on the importance of humanistic touch in our profession by continuing to devote time to age-old values like social and communicative skills, empathy and compassion.

Declaration by Authors

Ethical Approval: Approved

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