KNOWLEDGE, ATTITUDES, AND PRACTICES REGARDING CHATBOTS AMONG HEALTHCARE PROFESSIONALS IN A TERTIARY CARE HOSPITAL

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ABSTRACT

Objective: (1) Primary: Determine healthcare professionals' knowledge, attitudes, and practices (KAP) related to AI Chatbots. (2) Secondary: Assess healthcare professionals' perspectives on using Chatbots as teaching tools and implementing them in the Competency-Based Medical Education curriculum.

Methods: An online questionnaire was distributed to 132 health professionals, including faculty and CRMIs, through Google Forms. Data on artificial intelligence (AI)-related KAP and barriers were collected following IHEC approval. The KAP scores, along with the relationship between categorical variables – such as population type and the use of AI Chatbots – were analyzed using Statistical Package for the Social Sciences software.

Results: The study revealed that participants had a moderate level of knowledge about AI Chatbots. Attitudes were mixed, with some skepticism about AI replacing human teachers but also recognition of its benefits. Most participants infrequently used AI Chatbots in their daily activities. Barriers to usage included lack of knowledge, limited access, time constraints, and curriculum gaps.

Conclusion: This study underscored the need to enhance medical education with AI topics and address existing barriers. It is crucial to better prepare health professionals for AI integration to leverage AI's potential for improving patient care and training.

Keywords: Chatbot, Artificial intelligence, Knowledge, Attitude, Curriculum.

INTRODUCTION

Artificial intelligence (AI) is expected to significantly transform the practice of medicine, influencing everything from medical education to clinical applications across various specialties, ultimately enhancing patient care [1]. AI refers to a broad set of technologies that enable computer systems to simulate human intelligence and achieve performance comparable to human capabilities [2,3]. Chatbots is an AI program and a Human-computer Interaction model [4]. Chatbots useful in the medical profession include Elicit, Consensus, Research Rabbit, etc. Medical Chatbots enhance healthcare delivery by making it more accessible, efficient, and patient-friendly. General-purpose Chatbots, such as Bard, Gemini, Copilot, and Chat GPT can also be adapted for medical applications, further expanding their utility in the healthcare field. The current medical education system lacks AI integration which leaves future healthcare professionals unprepared for advancements in healthcare technology.

Objectives

Primary

Determine healthcare professionals' knowledge, attitudes, and practices (KAP) related to AI Chatbots.

Secondary

Assess healthcare professionals' perspectives on using Chatbots as teaching tools and implementing them in Competency-Based Medical Education (CBME) curriculum.

METHODS

This study used a cross-sectional design with purposive sampling. An English-language questionnaire was created using Google Forms and distributed to CRMIs, residents, and professors at a tertiary care hospital. The survey included sections on KAP, barriers, and Chatbot usage. The total knowledge score was calculated by assigning 1 point for affirmative responses and 0 points for negative responses. Data analysis was performed using Statistical Package for the Social Sciences (SPSS) software with significance set at p<0.05.

An online questionnaire in the English language was constructed using Google Forms, and distributed to health professions including CRMIs, Junior Residents, Senior Residents, Tutors, Assistant Professors, Associate Professors, and Professors of various departments (Fig.1). Ethical approval for the study was granted by the Institutional Review Board (KMC/IHEC/31/2024, dated July 15, 2024). The questionnaire consisted of six sections. The first three sections assessed participants' KAPs related to AI, while the fourth section examined potential barriers that could hinder students from incorporating AI into their daily activities. The fifth section included the list of Chatbots routinely used by the participants and the sixth one gathered other special comments.

The knowledge assessment section comprised of 7 items, while attitudes were evaluated through 10 items, and practices through 7 items. In addition, barriers to AI usage were assessed with 7 items. The total knowledge score was determined by assigning 1 point for each affirmative ("yes") response and 0 points for negative ("no") response. Attitudes and barriers were rated on a 5-point Likert scale, from "strongly disagree" to "strongly agree," while practices were measured on a scale ranging from "always" to "never."

Analysis of the data collected was done using SPSS software. A p<0.05 was deemed statistically significant, with a confidence interval of 95%.
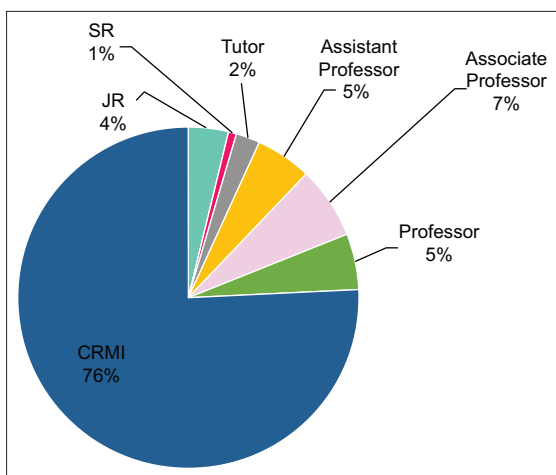
Fig. 1: Population-based on designation, n=132
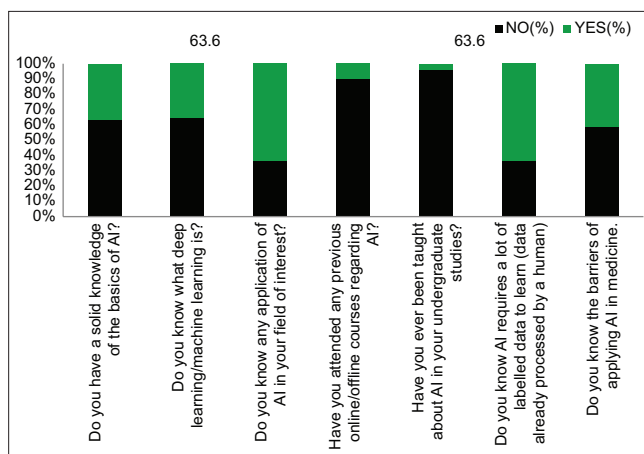

Fig. 2: Frequencies of participants' responses to knowledge items

RESULTS

Knowledge
The item most frequently answered in the knowledge section with a "Yes" response was, for "AI requires a lot of labeled data to learn and "knowing application of AI in your field of interest" (63.6%) (Fig. 2). Cronbach's alpha (0.663) indicated acceptable internal consistency.

Conversely, the items with the lowest percentage of "yes" responses were "Have you ever received AI instruction during your undergraduate studies?" and "Have you participated in any online/offline courses on AI?" with yes response rates of 3.8% and 9.8%, respectively.

Attitude
Fig. 3 displays the response for attitude items.

The most frequent disagree responses were provided for the "Clinical AI will be more accurate than physicians" (38.6%) followed by, the item "I think human teachers will be replaced in the near future" (27.3%) while the least frequent disagree/strongly disagree responses were provided for items "Healthcare students should learn the basics of AI," "AI will be a highly required tool in my field," "Ethical implications of AI need to be comprehended by various healthcare professionals" and "AI is expected to transform the educational system" (0.8–0%).
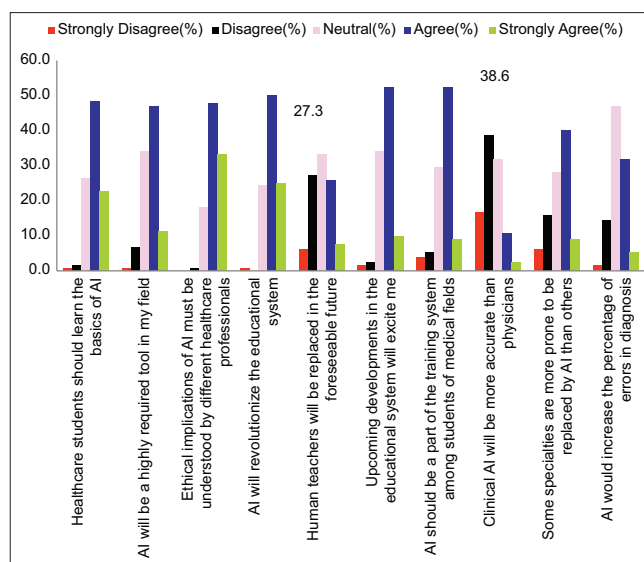
Practices
The most frequently reported practices (Fig. 4) (answered with "always") were "using AI for spelling and grammar checking" (3.79%), and "never" for "by using AI to prepare for exams" (46.21%). Cronbach's alpha of 0.862 indicated good internal consistency.

Barriers
(Fig. 5) highlights the obstacles preventing AI adoption. The findings reveal that the most reported challenges were "limited integration into the educational curriculum" and "a lack of knowledge and expertise" (52.27%) followed by "lack of teaching centers and hands-on applications," "ethical and privacy concerns," "lack of access and technical equipment," "lack of time educational burden work overload" and "complexity of AI" (50.76%,50%,48.48%,46.97%, 40.91%), respectively. Cronbach's alpha of 0.825 indicated good internal consistency.

Association between different designations and application of AI (Fig. 6)
The chi-Square test result (0.09) suggested there was no statistically significant association between different designations and the application of AI. (X^2 [df 6, n=132]=10.95884, p=0.09).
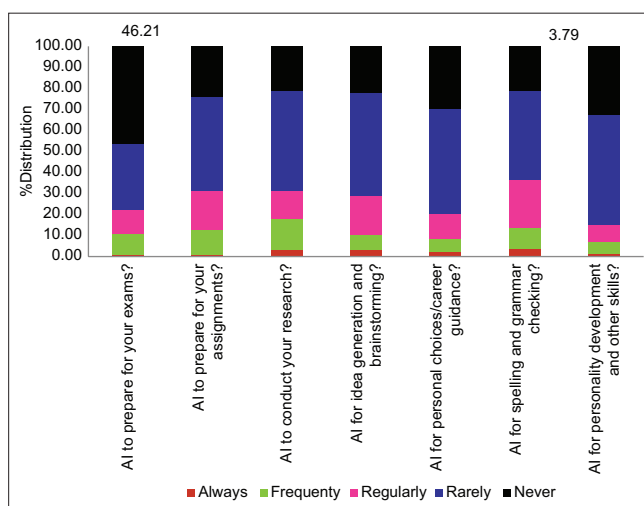
The list of Chatbots used by the participants (Fig. 7) shows that 67% of them use Chat GPT and AI Chatbots excluding Consensus and 32% use AI tools other than Chat GPT or Consensus.

Fig. 3: Frequencies of participants' responses to attitude items

Fig. 4: Frequencies of participants' responses to practice items

In addition, participants also commented that AI integration would be of immense help for the healthy implementation of the vision of the CBME curriculum.
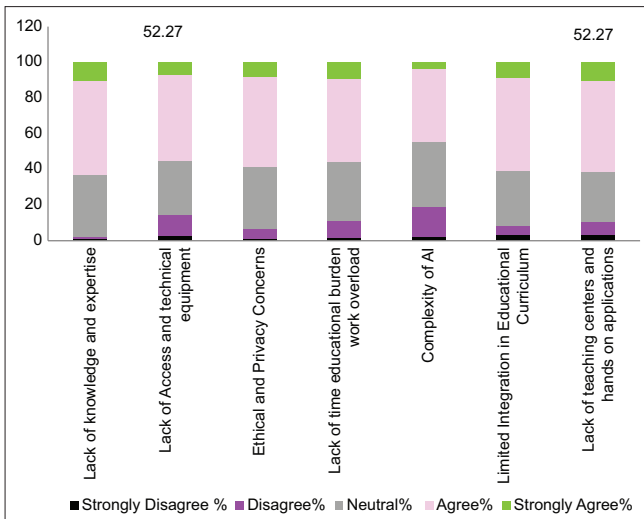
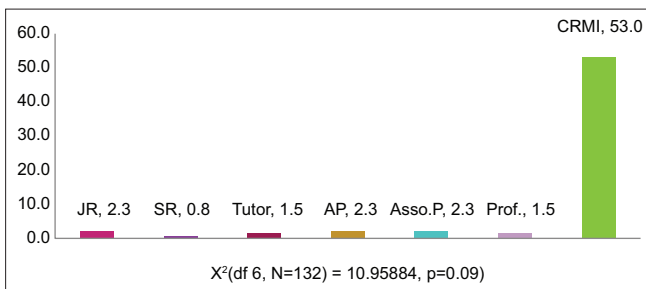**Fig. 5: Barriers hindering the use of artificial intelligence**

$X^2(df\ 6, N=132) = 10.95884, p=0.09$

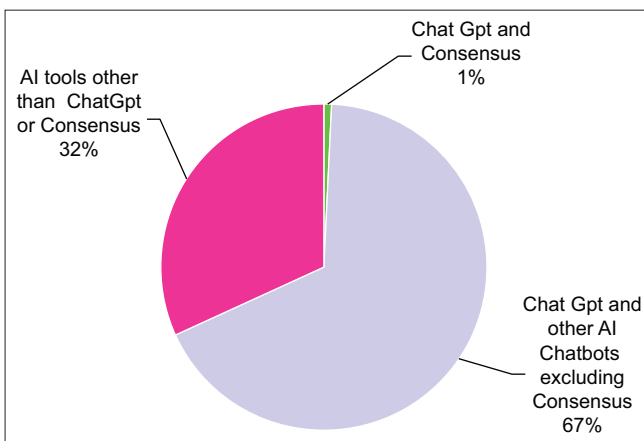**Fig. 6: Designation and application of artificial intelligence (%) n=132**

Fig. 7: Chatbots used by the participants

DISCUSSION

This study aimed to explore the knowledge, attitudes, and practices (KAP) of healthcare professionals regarding AI, with a particular focus on their views, expectations, and concerns related to incorporating AI into medical education. The findings indicated that the professionals surveyed had a moderate level of understanding and awareness of AI. Participants demonstrated a strong grasp of certain AI concepts, such as the significance of labeled data for training AI models and the difficulties involved in applying AI in healthcare settings (Fig. 2). However, a significant proportion of the respondents reported limited exposure to formal AI training during their education. Similar studies have also shown low to moderate

levels of AI knowledge and minimal integration of AI into academic programs.

These varied perspectives highlight the complexity of AI's role in medical education and patient care. Notably, ethical concerns about AI ranked lower in this study suggesting a potential gap in awareness regarding the ethical dimensions of AI in healthcare. This reduced focus on ethics may stem from a limited understanding of AI's ethical challenges, likely due to insufficient training in this area. Bridging these gaps by improving education on AI ethics is essential to equipping healthcare professionals with the skills to effectively manage the ethical challenges posed by AI in clinical practice.

Moreover, immediate concerns, such as the impact of AI on their future roles or the technical aspects of its implementation, may take priority for healthcare professionals. The most cited AI applications were spell-check, grammar correction, and AI-assisted research tools (Fig. 4). In contrast, the use of AI for more clinically oriented or career-driven purposes, such as exam preparation or aiding in personal decision-making, was far less prevalent.

Similar to the findings of this study, a recent systematic review on healthcare students' attitudes, knowledge, and skills related to AI revealed that most participants demonstrated limited proficiency in working with AI [5,6]. This study identified several key barriers to the seamless integration of AI into health professionals' education (Fig. 5). The primary challenges included a lack of sufficient knowledge and expertise, as well as limited access to critical technical resources. In addition, concerns regarding the time pressures of academic responsibilities, the perceived complexity of AI technologies, and the minimal incorporation of AI into existing curricula were highlighted as significant hurdles.

Previous research has explored the obstacles to AI adoption and acceptance among healthcare professionals [7]. The barriers identified in this study further emphasize the need for comprehensive strategies to close the AI knowledge gap and ensure the successful integration of AI into medical education. Addressing these challenges will require targeted efforts, including enhanced training, access to technical resources, and curricular reforms that promote a deeper understanding of AI's role in healthcare.

AI has the potential to assist physicians in various areas, including diagnosis, disease prediction, and personalized treatment plans. However, leveraging these capabilities effectively requires healthcare professionals to possess strong analytical skills and a keen understanding of data quality for conducting data-intensive analyses and managing knowledge-based systems [8]. Ensuring proficiency in these areas is essential for the successful application of AI in clinical practice.

To enhance the integration of AI into the medical field, proactive steps must be taken to incorporate AI into medical school curricula. This can be accomplished by creating specialized AI courses or modules that focus on AI's role in medicine, its practical uses and its impact on patient care. These programs should provide students with a strong foundation in AI algorithms and prepare them to utilize AI tools effectively in their future medical careers. Furthermore, partnerships with AI industry experts and organizations can offer students valuable hands-on experience, enriching their understanding of AI's practical relevance and fostering its adoption in healthcare. This approach would equip medical professionals with a more profound understanding of AI algorithms, enabling them to maximize the benefits of AI tools [9]. Educational institutions should focus on fostering a balanced view of AI's role in healthcare, highlighting how AI complements rather than replaces human expertise.

CONCLUSION

This study provides valuable insights into the KAP of health professionals regarding AI, offering a comprehensive understanding of their familiarity, perceptions, and approaches to AI. The findings can guide curriculum development to better prepare future healthcare professionals for adopting

AI technologies. As AI continues to transform the healthcare industry, the KAP of health professionals will play a pivotal role in influencing its impact on patient care and medical education. In addition, the study revealed varying levels of familiarity and ease of use with Chatbots (Fig. 7). Integrating AI-powered Chatbots into medical education could significantly transform the learning experience and advance research, making it an essential consideration for curriculum enhancement.

Limitations

Duration of the study

The study was brief, which limited the amount of data on KAPs.

Sample diversity

The sample size in this study was limited. Including participants from diverse backgrounds, such as MBBS students and those from other disciplines, could have offered a broader range of opinions and insights. MBBS students, in particular, stand to benefit significantly from the use of AI Chatbots.

Study scope

Restricting the study to a single tertiary care center limited the generalizability of the findings. A multicenter approach could yield more comprehensive data and reveal various barriers and challenges faced by participants across different settings.

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CONFLICTS OF INTEREST

The authors report no conflicts of interest.

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