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# Healthcare Professionals' Attitudes, Knowledge, and Practices Concerning AI in Relation to Their Clinical Opinions and Decision-Making

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## ABSTRACT

**Aim of the Study:** Artificial Intelligence (AI) assimilation into the field of medicine has the potential to considerably increase the accuracy, efficiency, and overall quality of patient care.

**Methodology:** This cross-sectional mixed method study (QUAN-qual) investigates the attitudes, knowledge, and practices concerning AI among healthcare professionals and its impact on their clinical opinions and decision-making. For this purpose, (n=146) healthcare professionals were selected through stratified random sampling.

**Findings:** The study findings reveal that the majority of healthcare professionals hold a positive attitude toward the utilization of AI in healthcare. A significant portion lacks adequate awareness of AI tools and related applications, though the utilization of AI is moderately prevalent in clinical practices. The majority of healthcare professionals admitted that AI has many benefits in the healthcare field from improving diagnostic accuracy, observing patient's progress, and handling treatment plans. Nonetheless, they also stressed considerable challenges including lack of expertise in accessing technical equipment, ethical-concerns, and data privacy, with a major fear of their own job displacement. Furthermore, study found a significant positive correlation between attitude, knowledge, and practices of AI among healthcare professionals.

**Conclusion:** There is still a need for targeted training programs and improvement in policies that can support professionals to understand AI and its utilization in their field. A significant collaboration is required among technologists, healthcare providers, and ethicists to develop and implement AI solutions. However, its successful implementation depends on overcoming significant challenges in the medical field related to knowledge, attitude, and ethical concerns.

**Keywords:** Artificial Intelligence (AI), Clinical Practices, Healthcare Professionals, Attitude, Knowledge, Decision-making

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## 1. INTRODUCTION

Recently, the healthcare landscape has undergone a significant transformative revolution with the integration of Artificial Intelligence (AI) in healthcare field. This innovative shift signifies how healthcare is delivered, monitored, managed, and improved through AI applications. Though, this transformation introduces unique possibilities with the potential to effectively enhance the accuracy, efficiency, and patient healthcare through assistance in diagnosis, provide personalized treatment, monitor health progress, and further healthcare recommendations. It becomes crucial to understand the knowledge, attitudes, clinical practices and perception of healthcare professionals regarding the utilization of AI in the healthcare field as healthcare professionals traverse this swiftly changing landscape.

Today, AI has been observed incredible development in all scientific discipline including computer sciences, engineering, biology, physics, chemistry, psychology, and neurosciences (Khang, 2024). It comprises the development of advance sophisticated Deep Learning (DL), Natural Language Processing (NLP), and Machine Learning (ML) algorithms that represented by Google's AlphaGo defeating a Chinese Go Master and Auto ML creating smarter AI (Chen et al., 2024; Pietikäinen & Silvén, 2023). Multiple AI models has been generated for daily life hacks, aiming to support humans by eliminating the need to pay attention to the roads while traveling (Babaniyazovich, 2023) such as construction of AI driven self-driving cars has emerged as a burgeoning industry. Furthermore, rapid AI advancement has led to the creation of humanoid robots that offer companionship to humans and serve as a replacement of human resource in many industries (Ojedokun et al., 2024; Şenocak et al., 2023; Zhang et al., 2023).

In the field of healthcare, the potential of AI in revolutionizing clinical workflows is significant such as analysis of medical images, assist surgeons, development of diagnostic tools, personalized treatment plans, and provide companionship within hospitals (Gillner, 2024: Alowais et al., 2023; Catalina et al., 2023; Mumtaz et al., 2023). However, the effective integration of AI into clinical practice hinges on the understanding and acceptance of healthcare professionals (Weidener & Fischer, 2024). AI is transforming disease diagnosis through its ML and DL. Different studies has shown that AI improved accuracy in diagnosing of diabetic retinopathy, cardiovascular diseases, pneumonia, breast & skin cancer, appendicitis (Allam et al., 2023; Amber et al., 2023; Burns et al., 2023; Mousavi et al., 2023), predict treatment responses such as chemotherapy outcomes and other antidepressant responses (Mukherjee et al., 2024; Obuchowicz et al., 2024). Furthermore, different studies illustrated that the utilization of AI tools in the diagnosis of different diseases can save time, be cost effective, lead better outcomes, and minimize human errors by efficient decision-making (Gunathilaka et al., 2024; Hua et al., 2024). Similarly, in clinical laboratories, AI revolutionized clinical testing with accuracy and efficiency especially in blood cultures, susceptibility testing, and molecular platforms (Cadamuro et al., 2023; Mushtaq et al., 2024). Additionally, its ML system designed to use for antibiotic susceptibility testing, microorganism identification, and malaria detection (Burns et al., 2023).

One of the biggest revolution of AI in healthcare sector was its implication in the emergency departments where AI algorithms assist healthcare professionals in early detection of life threatening diseases, reduction of misdiagnoses, and especially helpful in assessing or diagnosis of the triaging patients and provide real-time recommendations (Alowais et al., 2023). Similarly, AI and genotype analysis offered promise in disease investigation and identify genetic markers associated with diseases and predict phenotypes (Allam et al., 2023; Catalina et al., 2023). Study by Cadamuro et al. (2023) exposed that Al based applications are helpful in predicting interaction between drugs and identify patients at high risk of adverse drug reactions. Thus the utilization of AI applications, Chatbots, and interfaces, offered personalized patient care such as assist in triaging patients, providing medical advice, monitoring vital signs, improve healthcare accessibility, reduce provider workload, enhance patient engagement, diet recommendations, smoking cessation, and further offer early detection, diagnosis, and tailored treatment for mental health conditions (Mu et al., 2024; Obuchowicz et al., 2024; Younis et al., 2024; Mousavi et al., 2023; Tian et al., 2023).

### *1.1 Rationale*

As AI technologies become increasingly sophisticated, healthcare professionals find themselves at the intersection of tradition and innovation. Exploring their attitudes towards AI, their level of knowledge, and the practical implications of incorporating these technologies into daily clinical routines is essential for several reasons. Understanding the factors that influence healthcare professionals' acceptance of AI can inform educational initiatives, policy development, and the creation of user-friendly AI tools that align with the needs and expectations of the healthcare workforce. So, it was crucial to recognize the starring role of healthcare professionals in the successful AI integration in medical field and what are their perspectives and willingness toward the AI in their clinical decision-making. The current study will be worthwhile for investors, policy makers, and healthcare organizations to nurture a supportive learning environment and provide practical exposure for the immersion of AI in the medical field.

### *1.2 Research Objectives*

1. To reconnoiter the attitude, knowledge, and clinical practices of AI among healthcare professionals.
2. To analyze the correlation between attitudes, knowledge, and clinical practices of AI among healthcare professionals.
3. To examine challenges faced by healthcare professionals in utilization of AI in clinical practices.
4. To reconnoiter healthcare professionals' perceptions regarding the integration of AI in clinical decision-making.

### *1.3 Significance of the Study*

The implication of this current study lies in its potential to cultivate the acceptance of AI in the medical field by healthcare professionals. Thus, it is crucial to notify the development of policies, educational programs, and related advanced AI tools to bring into line with current demands and needs of the healthcare landscape. The study further guides effort to improve AI addition in clinical setups by determining the research gap in the attitude and knowledge of healthcare professionals towards AI integration that can eventually lead to more proficient healthcare delivery and better patient outcomes. The study insights can aid in the development of targeted training programs, provide guidelines for the implementation of AI in medical field, and strategies to foster a collaborative association between professionals and AI systems. Moreover, understanding the impact of AI on clinical opinions and decision-making processes can contribute to the ethical and responsible integration of these technologies into healthcare settings. The study further support stakeholders in creating a supportive environment for AI adoption, make sure that the benefits of AI are entirely recognized in the medical field.

## 2. METHODOLOGY

This cross-sectional study adopts mixed method approach (QUAN-qual) to comprehensively explore the attitudes, knowledge, and practices concerning AI among healthcare professionals in relation to their clinical opinions and decision-making.

### 2.1 *Participants*

The study involved healthcare professionals, including doctors, nurses, and allied health professionals, working in diverse healthcare settings. For this purpose, teaching hospitals in Karachi city were selected because these teaching hospitals are responsible to provide quality education and clinical services to their students in this current age of AI advancement. These were 11 main teaching hospitals in Karachi, which have professors, consultants, and a wide range of faculty with current knowledge and vision which foster their students with broad understanding in the medical field. These hospitals encompass the major

institutions where medical students receive clinical education and training. However, each institution has its own affiliated hospital or healthcare facility to provide medical education and training with clinical exposure to students.

Thus, for the selection of sample, a stratified random sampling was employed on the basis of profession to ensure representation across different specialties, experience levels, and healthcare institutions. Sample size was based on 150 healthcare professionals, without any gender and age related biasness (see Table 1). However, four participants were unable to give all answers from the questionnaire, so their data has been excluded to avoid errors.

Table 1: *Demographic Characteristics of the participant (N = 146)*

| | N | % | M | SD |
|---|---|---|---|---|
| **Gender** | | | 1.33 | .471 |
| Male | 48 | 32.9 | | |
| Female | 98 | 67.1 | | |
| **Age** | | | 4.66 | 1.756 |
| 23-26 | 32 | 21.9 | | |
| 27-30 | 6 | 4.1 | | |
| 31-34 | 23 | 15.8 | | |
| 35-38 | 28 | 19.2 | | |
| 39-42 | 33 | 22.6 | | |
| 43 & above | 24 | 16.4 | | |
| **Profession** | | | 2.19 | 1.478 |
| Clinical Doctors | 61 | 41.8 | | |
| Lecturer / Ass. Prof (Medical Institutes) | 44 | 30.1 | | |
| Pharmacists | 20 | 13.7 | | |
| Nurses | 13 | 8.9 | | |
| Dentists | 6 | 4.1 | | |
| Therapists | 2 | 1.4 | | |

## 2.2 *Instrument*

For this study, self-structured questionnaire was developed to assess healthcare professionals' attitudes, knowledge, & practices regarding AI, and further challenges related to AI in medical field. There were 44 items in the questionnaire, based on 5 sections including demographic sections (3-items), attitude (based on 9-items), knowledge section (based on 7-items), practice part (9-items), and challenges faced by the professionals in using AI in practices (16-items). Attitude, knowledge, and practices items were based on 5-point Likert-scale from strongly disagree to strongly agree. Though, the items included for the challenges were based on 3-point Likert-scale including yes, no, and to some extent. However, the overall tool reliability was observed .784, on pilot testing of 30 healthcare professionals (see Table 2).

Table 2: *Tools Reliability*

| | Attitude | Knowledge | Practices | Challenges | Tool Reliability |
|---|---|---|---|---|---|
| Cronbach's Alpha | .674 | .543 | .808 | .890 | .784 |

## 2.3 *Data Collection*

*Quantitative Phase*: Participants were invited to complete the online survey through professional healthcare networks, associations, and institutions. Descriptive and inferential statistics (ANOVA and Correlation) were employed to examine the relationships between variables.

*Qualitative Phase*: A subset of participants (N=12) was selected for in-depth interviews to gain deeper insights into their experiences, perceptions, and challenges related to AI in clinical decision-making.

# 3. FINDINGS

### *3.1 To reconnoiter the attitude, knowledge, and clinical practices of AI among healthcare professionals.*

Table 3: *Descriptive Statistics of Attitude toward AI among Healthcare Professionals*

| | SD | D | N | A | SA | M | SD |
|---|---|---|---|---|---|---|---|
| AI improves my overall life | 0 | 0 | 50 (34.2%) | 96 (65.8%) | 0 | 3.66 | .476 |
| AI is improving my work | 0 | 0 | 27 (18.5%) | 106 (72.6%) | 13 (8.9%) | 3.90 | .516 |
| AI is mostly very positive for humanity | 0 | 13 (8.9%) | 72 (49.3%) | 52 (35.6%) | 9 (6.2%) | 3.39 | .737 |
| AI will be a highly required in my field | 0 | 33 (22.6%) | 51 (34.9%) | 62 (42.5%) | 0 | 3.20 | .785 |
| AI should be a part of medical training system | 0 | 9 (6.2%) | 34 (23.3%) | 96 (65.8%) | 7 (4.8%) | 3.69 | .660 |
| AI in clinical setups will be more accurate than physicians | 9 (6.2%) | 108 (74%) | 15 (10.3%) | 14 (9.6%) | 0 | 2.23 | .705 |
| Some specialties are more prone to be replaced by AI | 15 (10.3%) | 44 (30.1%) | 46 (31.5%) | 41 (28.1%) | 0 | 2.77 | .974 |
| In future, AI has the potential to replace human resources | 9 (6.2%) | 43 (29.5%) | 27 (18.5%) | 67 (45.9%) | 0 | 3.04 | 1.003 |
| I think AI can be replaced by my teachers in future | 22 (15.1%) | 63 (43.2%) | 29 (19.9%) | 32 (21.9%) | 0 | 2.49 | .998 |
| Total | 77 (5.76%) | 313 (23.24%) | 251 (26.27%) | 566 (42.36%) | 29 (2.16%) | 28.38 | 3.716 |

Table 3 represents the descriptive statistics of attitude regarding AI among healthcare professional. Findings show that majority of the participants (44.52%) showed positive attitude toward AI in the medical field (A=42.36% and SA=2.16%), with the mean score of 28.38 (SD=3.71). Among the participants (N=146), majority participants (119, 81.5%) were agreed that 'AI is improving their work. However, 117 (80.2%) participants disagreed with the statement that 'AI in clinical setups will be more accurate than physicians'.

Table 4: *Descriptive Statistics of Knowledge regarding AI among Healthcare Professionals*

| | SD | D | N | A | SA | M | SD |
|---|---|---|---|---|---|---|---|
| I have basic knowledge of AI | 0 | 0 | 35 (24%) | 97 (66.4%) | 14 (9.6%) | 3.86 | .563 |
| I know about deep learning / machine learning | 0 | 81 (55.5%) | 25 (17.1%) | 33 (22.6%) | 7 (4.8%) | 2.77 | .962 |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| I know some applications of AI in my field of interest | 0 | 24 (16.4%) | 11 (7.5%) | 111 (76%) | 0 | 3.60 | .757 |
| I have attended some AI related courses (online/offline) | 8 (5.5%) | 81 (55.5%) | 39 (26.7%) | 15 (10.3%) | 3 (2.1%) | 2.48 | .832 |
| I have been taught about AI in my undergraduate studies | 54 (37%) | 58 (39.7%) | 20 (13.7%) | 14 (9.6%) | 0 | 1.96 | .946 |
| I understand the barriers of employing AI in my field | 0 | 38 (26%) | 48 (32.9%) | 60 (41.1%) | 0 | 3.15 | .808 |
| I am up-to-date with the latest trends & advancements in AI technology within my field | 9 (6.2%) | 62 (42.5%) | 46 (31.5%) | 29 (19.9%) | 0 | 2.65 | .868 |
| Total | 71 (6.94%) | 344 (33.65%) | 224 (21.91%) | 359 (35.12%) | 24 (2.34%) | 20.46 | 3.337 |

When the participants were asked for their knowledge level regarding the utilization of AI in their field, approximately 40.59% of the participants reported a lack of sufficient knowledge regarding AI. While 37.46% indicated awareness of AI applications in medical field (see Table 4).

Table 5: *Descriptive Statistics of Utilization of AI in Clinical Practices by Healthcare Professionals*

| | **SD** | **D** | **N** | **A** | **SA** | **M** | **SD** |
|---|---|---|---|---|---|---|---|
| I have use AI so many times in my field | 9 (6.2%) | 27 (18.5%) | 57 (39%) | 53 (36.3%) | 0 | 3.05 | .893 |
| AI is easy to use | 0 | 0 | 44 (30.1%) | 95 (65.1%) | 7 (4.8%) | 3.75 | .536 |
| AI is easy to accessible | 0 | 26 (17.8%) | 15 (10.3%) | 98 (67.1%) | 7 (4.8%) | 3.59 | .836 |
| AI make my different task easy, in the field | 0 | 9 (6.2%) | 48 (32.9%) | 89 (61%) | 0 | 3.55 | .611 |
| I think the role of physician is important in application/evaluation of AI in medical practices | 0 | 0 | 15 (10.3%) | 117 (80.1%) | 14 (9.6%) | 3.99 | .447 |
| I would like to take help and work on AI in future | 0 | 0 | 27 (18.5%) | 119 (81.5%) | 0 | 3.82 | .390 |
| I frequently use AI in my teaching and medical practices | 0 | 57 (39%) | 24 (16.4%) | 65 (44.5%) | 0 | 3.05 | .916 |
| I frequently use AI for generating ideas and brainstorming, especially for research work | 0 | 15 (10.3%) | 33 (22.6%) | 91 (62.3%) | 7 (4.8%) | 3.62 | .736 |
| I frequently use AI for guidance & information in my clinical practices | 0 | 21 (14.4%) | 6 (4.1%) | 112 (76.7%) | 7 (4.8%) | 3.72 | .768 |
| Total | 9 (0.68%) | 155 (11.79%) | 269 (20.47%) | 839 (63.85%) | 42 (3.19%) | 32.14 | 3.989 |

Table 5 describes the descriptive statistics of utilization of AI in clinical practices by healthcare professionals. The results indicate that the majority of participants (67.04%) expressed agreement with the use of AI in the medical field. However, the mean score for this agreement was observed 32.14 with SD=3.989.

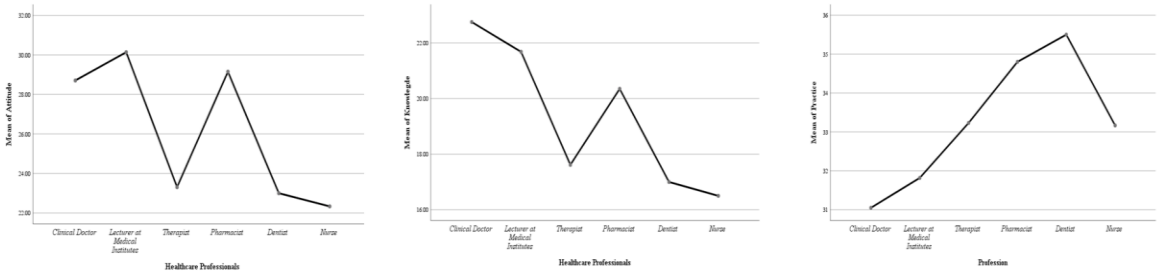
*3.1.1 Research Hypothesis 1: There is a significant variations in the attitude, knowledge, and current practices of AI among healthcare professionals.*

Table 5: *One Way Analysis of Variance of the Attitude, Knowledge, and Clinical Practice of AI among Healthcare Professionals*

| | | Sum of Squares | df | Mean Square | F | Sig. |
|---|---|---|---|---|---|---|
| Practice | Between Groups | 263.021 | 5 | 52.604 | 3.603 | .004 |
| | Within Groups | 2044.239 | 140 | 14.602 | | |
| | Total | 2307.260 | 145 | | | |
| Attitude | Between Groups | 765.758 | 5 | 153.152 | 17.340 | .000 |
| | Within Groups | 1236.523 | 140 | 8.832 | | |
| | Total | 2002.281 | 145 | | | |
| Knowledge | Between Groups | 293.319 | 5 | 58.664 | 6.218 | .000 |
| | Within Groups | 1320.935 | 140 | 9.435 | | |
| | Total | 1614.253 | 145 | | | |

ANOVA test reveals that there are significant differences in the variables; attitude, knowledge, and practices of AI among healthcare professionals across different groups (see table 5). Results indicates that certain groups may have distinct level of knowledge, AI practices, and attitude toward AI in the context of healthcare, as sig values were observed less than .05 ($p$=.00) for all variables. Figure 1 illustrates the mean plot of knowledge, attitude, and practice of AI among healthcare professionals.

Figure 1: *Mean plots of attitude, knowledge, and practices toward AI among healthcare professionals*




### *3.2 To analyze the correlation between attitudes, knowledge, and clinical practices of AI among healthcare professionals.*

*3.2.1 Research Hypothesis: There is a significant correlation exist between attitudes, knowledge, and clinical practices of AI among healthcare professionals.*

Table 6: *Correlation Analysis between Attitude, Knowledge, & clinical Practices of AI among Healthcare Professionals*

| | | Attitude | Practice | knowledge |
|---|---|---|---|---|
| Attitude | Pearson Correlation | 1 | | |
| | Sig. (2-tailed) | | | |
| | N | 146 | | |
| Practice | Pearson Correlation | .206* | 1 | |
| | Sig. (2-tailed) | .013 | | |
| | N | 146 | 146 | |
| knowledge | Pearson Correlation | .692** | .238** | 1 |
| | Sig. (2-tailed) | .000 | .004 | |

| | | | |
|---|---|---|---|
| N | 146 | 146 | 146 |

*. Correlation is significant at (2-tailed) 0.05 level
**. Correlation is significant at (2-tailed) 0.01 level

The correlation coefficient between attitude and practice indicates a weak positive relation (0.206) but statistically significant at the 0.05 level (p = 0.013). It suggests that there is a modest association between attitude and practice regarding AI among healthcare professionals. Similarly, there is a strong positive correlation found between attitude and knowledge (0.692) which is significant at 0.01 level, showed a robust association between variables (see table 6). On the other hand, there is a moderate positive correlation found between practice and knowledge (0.238), suggesting meaningful association between these two. Results suggest that the healthcare professionals who have positive attitude toward the utilization of AI in their field tend to demonstrate higher level of knowledge and engagement in AI related practices.

### *3.3 To examine challenges faced by healthcare professionals in utilization of AI in clinical practices.*

Table 7: *Descriptive Statistics of Challenges faced by Healthcare Professional in Utilization of AI*

| | **Yes** | **No** | **To Some Extent** | **M** | **SD** |
|---|---|---|---|---|---|
| Lack of expertise | 86 (58.9%) | 32 (21.9%) | 28 (19.2%) | 1.60 | .792 |
| Lack of awareness & knowledge | 71 (48.6%) | 31 (21.2%) | 44 (30.1%) | 1.82 | .871 |
| Lack of access/technical equipment | 84 (57.5%) | 30 (20.5%) | 32 (21.9%) | 1.64 | .820 |
| Ethical and privacy concerns | 72 (49.3%) | 27 (18.5%) | 47 (32.2%) | 1.83 | .889 |
| Lack of time due to work/educational burden | 62 (42.5%) | 32 (21.9%) | 52 (35.6%) | 1.93 | .884 |
| Complexity of AI | 44 (30.1%) | 52 (35.6%) | 50 (34.2%) | 2.04 | .804 |
| Limited integration in educational curricula | 96 (65.8%) | 9 (6.2%) | 41 (28.1%) | 1.62 | .896 |
| Lack of teaching centers/hands-on applications | 96 (65.8%) | 0 | 50 (34.2%) | 1.68 | .952 |
| Limited financial resources for AI operation | 66 (45.2%) | 9 (6.2%) | 71 (48.6%) | 2.03 | .971 |
| Uncertainty of AI tools reliability & accuracy | 54 (37%) | 6 (4.1%) | 86 (58.9%) | 2.22 | .958 |
| Insufficient regulatory guidelines and standards for AI in healthcare | 89 (61%) | 12 (8.2%) | 45 (30.8%) | 1.70 | .913 |
| Data security concerns | 52 (35.6%) | 6 (4.1%) | 88 (60.3%) | 2.25 | .951 |
| Lack of interoperability with existing healthcare systems | 90 (61.6%) | 6 (4.1%) | 50 (34.2%) | 1.73 | .943 |
| Challenges in obtaining patient consent for AI-driven interventions | 89 (61%) | 12 (8.2%) | 45 (30.8%) | 1.70 | .913 |
| Limited awareness of the potential benefits of AI in clinical practice | 65 (44.5%) | 12 (8.2%) | 69 (47.3) | 2.03 | .961 |
| Fear of technology malfunction leading to errors in patient care | 88 (60.3%) | 21 (14.4%) | 37 (25.3%) | 1.65 | .860 |
| **Total** | **1204 (51.54%)** | **297 (12.71%)** | **835 (35.74%)** | **29.47** | **8.854** |

Table 7 describes the descriptive statistics regarding the challenges faced in the utilization of AI in medical field by the healthcare professionals. Majority of the healthcare professionals (51.54%) faced multiple challenges in the utilization of AI in their field, ranging from knowledge gaps and access issues

to ethical concerns and resource limitations. However, 35.74% participants perceived to some extent they faced challenges in the utilization of AI in their field.

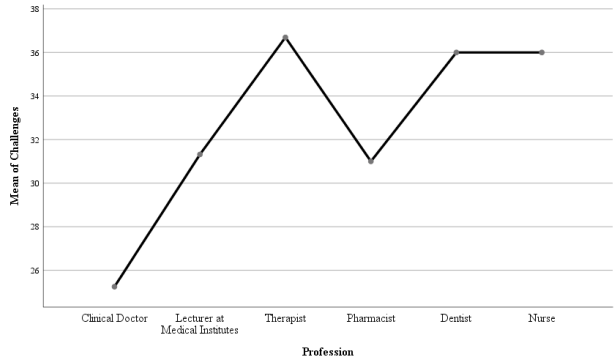
### *3.3.1 Research Hypothesis: Majority of the healthcare professionals faced significant challenges in the utilization of AI in their clinical practice.*

Table 8: *One Way Analysis of Variance of challenges faced in the utilization of AI by healthcare professionals*

| | Sum of Squares | df | Mean Square | F | Sig. |
|---|---|---|---|---|---|
| Between Groups | 2304.764 | 5 | 460.953 | 7.122 | .000 |
| Within Groups | 9061.626 | 140 | 64.726 | | |
| Total | 11366.390 | 145 | | | |

ANOVA test findings reveal that there are significant differences in the challenges faced by different healthcare professionals in the utilization of AI in their field. To explore which specific groups significantly differ from each other, using the Bonferroni post-hoc test was performed. Multiple comparison indicates that there is a significant mean difference ($p$ = .003) found in the group of clinical doctors and lecturers. Similarly, significant mean difference observed between therapist and clinical doctors ($p$ = .001), nurses & clinical doctors ($p$=.033), and therapist & nurses ($p$ = .033). Clinical doctors reported lower mean scores as compared to lecturers, therapist, and nurses. Though, dentists and pharmacists didn't show significant mean differences in challenges faced as compared to other professions. Figure 2 illustrates the mean plot of challenges faced by the healthcare professionals.

Figure 2: *Mean plot of challenges faced by healthcare professionals*




## *3.4 To reconnoiter healthcare professionals' perceptions regarding the integration of AI in clinical decision-making.*

### *3.4.1 AI in Clinical Decision-Making: Thematic Analysis*

To explore the healthcare professionals' perceptions regarding the integration of AI in clinical decision-making, responses were recorded. The majority of the healthcare professionals perceived AI as an effective tool for the medical field where doctors have limited time to examine patients and were unable to record patient histories and updates. In this context, AI helps record data and further assist medical treatments. A few participants mentioned that they don't have professional training to use these tools effectively in our OPD although we have access to these tools. Very few participants highlighted that they had heard about the advancements of AI in medical field but they do not have access to these tools in their hospitals. A few responses of the participants are given below;

Respondent 1:

*'We live in the era of technology, so I think AI is a valuable tool in medical field for enhancing diagnostic accuracy, treatment planning, and overall patient care.'*

Respondent 2:

'*It's a good initiative in the field of medical that can less doctor's workload. But there is a concern about job displacement, as many of us will be job less because market requirement will be the machines (AI technology) not us. Furthermore, who will take guarantee of ethical implications and the reliability of AI systems in clinical decision-making'.*

Respondent 3:

*'AI in the medical field is a good idea in terms of assistance only, totally rely on AI is not recommended. Its mean you are challenging human skills. Human made this machine, it can be wrong! So, relying on AI for clinical decision-making is not recommended... But yes we can take guidance or assistance where we need it'.*

Respondent 4:

*'Yes, I am using some application in my field and it's going great. I believe that AI can augment rather than replace human expertise in healthcare'.*

Respondent 5:

*'AI is helpful tool for the guidance or assistance. But now it's very helpful in the field of medicine that help o improve diagnostic accuracy by identifying subtle patterns and anomalies in patient data, and obviously outcomes are effective'.*

Respondent 6:

*'It's very effective tool that can help tailor treatment plans based on patient-specific information, leading to more personalized and effective care'.*

Respondent 7:

*'I am not using any kind of AI related tools, as I am a consultant and I know my skills. Why should I use it in my field? But yes i heard one of my colleague he is using it in patient management and monitoring. According to him, it is very helpful in monitoring of disease progression, early detection of complications, and patient care management'.*

Respondent 8:

*'Yes, I heard about some AI tools that are using in medical field. But if we (doctors) need, its mean it's our failure. Technology is effective for the diagnosis part only such as in lab assessments, but not will be good for decision-making. If it happen, then everyone will approach AI related tools or application to diagnose himself and plan care management for himself. I think, in future, patients will not rely on human doctors, they will want robots for their treatment and diagnosis. Already we live in between machines not human'.*

Respondent 9:

*'I think we are not trained to use AI in our medical field, there is no proper guidance and assistance of utilization of AI in the field. First, we need trainings of AI related application then we should apply it in the field. Because it can be*

*injustice with our field and patient too. We cannot play with the lives of our patients'.*

Respondent 10:

*'It's very challenging time right now to deal with technology around us instead of focusing on your skills. We already going to be fully dependent on technologies, through AI we will not rely on our own capability. AI in upcoming days, will be more powerful then human. Its mean we are going to lose our skills & abilities in terms of decision-making and problem-solving. Because we will require AI for any decision. In short we are going to lose our all powers and self-esteems'.*

## 4. DISCUSSION

This study highlights the complex landscape of integrating AI in healthcare settings that not only emphasizes enthusiasm but also apprehensions of healthcare professionals. Regardless of many promising advancements AI offers, its full potential remains untouched due to several barriers as identified in this study.

Generally, healthcare professionals exhibit a positive attitude toward AI in their field, recognizing its potential impact to improve patient care and work efficiency. The current findings are supported by the previous scholar Babaniyazovich (2023) that AI is enhancing the work quality of healthcare professionals. Findings further propose that AI should be included in the medical training system for students. But there is hesitation among healthcare professionals regarding the utilization of AI in the medical field and its ability to surpass human physicians in clinical precisions. This suggest that there is a need for further demonstration concerning the effectiveness and reliability of AI in clinical practices.

The study further highlights a knowledge gap regarding AI among healthcare professionals, such as having a rudimentary understanding of AI in the medical field that became a hurdle in the utilization of AI in clinical practices. Which stresses a critical need of amendment in medical curricula as per AI education. Further, interdisciplinary collaboration between technologists and healthcare providers is needed to cultivate suitable training programs concerning AI that are appropriate to clinical setups.

Professionals recognized that AI applications are not widespread, even though it's easy to use and accessible. However, the limited use of AI is partly due to AI-related courses and lack of hands-on training during their medical academic career. AI integration into daily clinical routines is still developing, although it is perceived as a valuable tool for multiple tasks such as generating new ideas and research related guidance. Currently, AI's applications are often limited to specific areas such as diagnostics and imaging, with limited infiltration into broader clinical decision-making processes (Habib et al., 2024; Khang, 2024).

On the other hand, as per research findings healthcare professionals faced several challenges in utilizing AI in their medical field, including insufficient access to technical equipment, a lack of expertise, and ethical/privacy concerns. The findings are supported by previous studies which stated that healthcare professionals faced multiple challenges due to a lack of professional development in the field of advanced technology (Amjad et al., 2024). These challenges further exacerbate by the complexity of AI systems and the limited integration of AI into medical educational curricula. Additionally, concerns related to data security, privacy, reliability of AI tools or applications, and regulatory guidelines also pose substantial hurdles. So, addressing these challenges needs a multifaceted approach of involving policy changes, development of comprehensive training programs, and investment in infrastructure. Moreover, establish a robust framework is critical for data governance and ensure that AI systems in the medical field are explainable and transparent to build trust among healthcare patients and providers.

Impact of AI in clinical decision-making was acknowledge among healthcare professionals, seeing its potential in enhancing diagnostic accuracy, treatment planning, and monitoring. Though, there is a palpable fear of job displacement among healthcare professionals and ethical implications, which reduces the eagerness for AI. So, ensuring that AI serves as an assistive tool rather than a replacement of healthcare professionals. Also, its integration in the medical field provide an opportunity to redefine the role of healthcare professionals, emphasize collaboration between human and AI (Habib et al., 2024; Cadamuro et al., 2023; Rehman et al., 2023). Few previous studies also suggested that the preference of AI in the medical field among healthcare professionals were based on their age, gender, education, cultural background, and experience toward the technology that develop trust, acceptance, and comfort level with AI (Serbaya et al., 2024; Weidener & Fischer, 2024; Zhang et al., 2023).

Similarly, ethical implications of AI in healthcare are multifaceted that require careful consideration such as patient consent, data security, privacy, and the potential for bias in AI algorithms, similar findings observed by Chen & Esmaeilzadeh (2024). In this regards, ethical guidelines, procedures, and regulatory frameworks need to be recognized to confirm that AI tools or applications stick to the utmost standards of patient healthcare, quality, and confidentiality. So, ethicists and legal experts should be involved in the development and at implementation level of AI system.

Besides all of this, societal views on integrating AI in healthcare practices play a crucial role. Regardless of having many potentials of AI, people generally don't trust on it and choose human professionals over AI-powered machines, although AI has ability to enhance diagnostics and provide personalize treatment plans. So, trust related issues to transparency, bias, and cultural aspects contribute to this skepticism.

The current study emphasizes only on the knowledge, attitude, and clinical practices of healthcare professional with the utilization of AI in their field. There is a need to further study to assess the long term impact of AI integration on healthcare efficiency and patient outcome. Such as exploring the sociocultural aspects influence on the acceptance and utilization of AI in healthcare settings, and investigating the effectiveness of diverse AI training models and their impression on healthcare practices.

# 5 CONCLUSION

The integration of AI in medical field holds immense promise. But its successful implementation depends on overcoming significant challenges related to training, knowledge, clinical practices, and ethical considerations. The healthcare sector can harness the full potential of AI to enhance patient quality care and clinical decision-making through infrastructure improvements, targeted education, and policy reforms. Additionally, by adopting a culture of continuous learning and providing professional development opportunities to healthcare professionals, healthcare organizations can navigate the evolving landscape of AI technologies.

## *5.1 Ethical Considerations*

The current study strictly stick to the ethical guidelines; obtained informed consent from the participants, ensured confidentiality, and gave withdrawal opportunities to the participants at any stage of this study.

## *5.2 Limitations*

The study acknowledges potential limitations, such as the self-report nature of survey responses, potential biases in participant selection, and the generalizability of findings beyond the studied population.

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**Conflict of Interest**

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