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Opinion of Health Care Professionals (HCPs) Towards Potential Roles and Impact of AIML (Artificial Intelligence and Machine Learning) in Healthcare: A Questionnaire-Based Survey

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A B S T R A C T

Healthcare professionals generally view AI as a valuable tool that can enhance efficiency, improve diagnostics, and personalize patient care. Many see AI as a complement to human expertise for analyze large datasets, identify patterns, and support clinical decision-making helping in medical imaging and diagnostics, medical research and drug discovery and other administrative applications. However, there are concerns about the ethical implications, data privacy, and the potential for AI to replace human jobs. In the present survey conducted in 100 health care professionals it was observed that 52% of HCPs are skeptical towards possibility of AI replacing physicians, 93% believe that CDSS tool will improve in clinical decision making, 62% expressed confidence in AI's capability in preventive health care, 66% believed that AI has potential to play a monitoring role in healthcare services.

Keywords:AIML (Artificial Intelligence and Machine Learning), HCPs, CDSS,

INTRODUCTION

Post the global pandemic there is a huge change adopting digitalisation in healthcare. Healthcare systems need to use digital technology for innovative solutions to improve healthcare diagnosis, interpretation, and clinical decision-making support system. Clinical Decision Support Systems (CDSS) are essential tools in contemporary healthcare, enhancing clinicians' decisions and patient outcomes. The integration of artificial intelligence (AI) is now revolutionizing CDSS even further [1].

The digital transformation of healthcare includes changes related to the internet, digital technologies, and their relation to new therapies and best practices for better health management procedures[2].Artificial intelligence in healthcare is the application of artificial intelligence (AI) to copy human cognition in the analysis, presentation, and

understanding of complex medical and health care data. It can also augment and exceed human capabilities by providing faster or new ways to diagnose, treat, or prevent disease. Using AI in healthcare has the potential improve predicting, diagnosing and treating diseases. Through machine learning algorithms and deep learning, AI can analyse large sets of clinical data and electronic health records and can help to diagnose the disease more quickly and precisely [3].

ML in healthcare is now seen as a critical tool that can analyse vast amounts of data far beyond human capability, identifying patterns and predicting outcomes with remarkable accuracy. This ability has led to the development of medical machine learning applications that can diagnose diseases from imaging scans, predict patient outcomes, and even suggest treatment options.

Machine learning in healthcare is a growing field of research in precision medicine with many potential applications. As patient data becomes more readily available, machine learning in healthcare will become increasingly important to healthcare professionals and health systems for extracting meaning from medical information. For the healthcare industry, machine learning algorithms are particularly valuable because they can help us make sense of the massive amounts of healthcare data that is generated every day within electronic health records [4].

Artificial intelligence (AI) is a powerful and disruptive area of computer science, with the potential to fundamentally transform the practice of medicine and the delivery of healthcare. Aim of this research is to analyse theopinion of health care professionals in the application of AI in healthcare, its impact and the possible future direction of AI augmented healthcare systems.

Materials & Methods

This questionnaire-based studywas conducted practicing health care professional (HCPs) from various hospitals and clinics from Mumbai and Navi Mumbai. A pretested and validated questionnaire shared with the study population as google form. The questionnaire includes various sections pertaining to potential roles and impact of AIML (Artificial Intelligence and Machine Learning) in healthcare. The study was initiated after taking ethics committee approval from June 2024 – August 2024.

Statistical Analysis

The data was entered in Microsoft excel 365 and analyzed by using SPSS software version 29, 2022. Descriptive statistics such as percentages, numbers, bars and charts are used to analyze and present the data.

RESULTS & DISCUSSION

The questionnaire was shared in google form to 155 health care professionals (HCP). Amongst them only 135 were responded and only 100 of them wereincluded in the analysis as 35 were incomplete forms.

A. Opinion of Healthcare professionals on impact of AI tools on health care scenarios

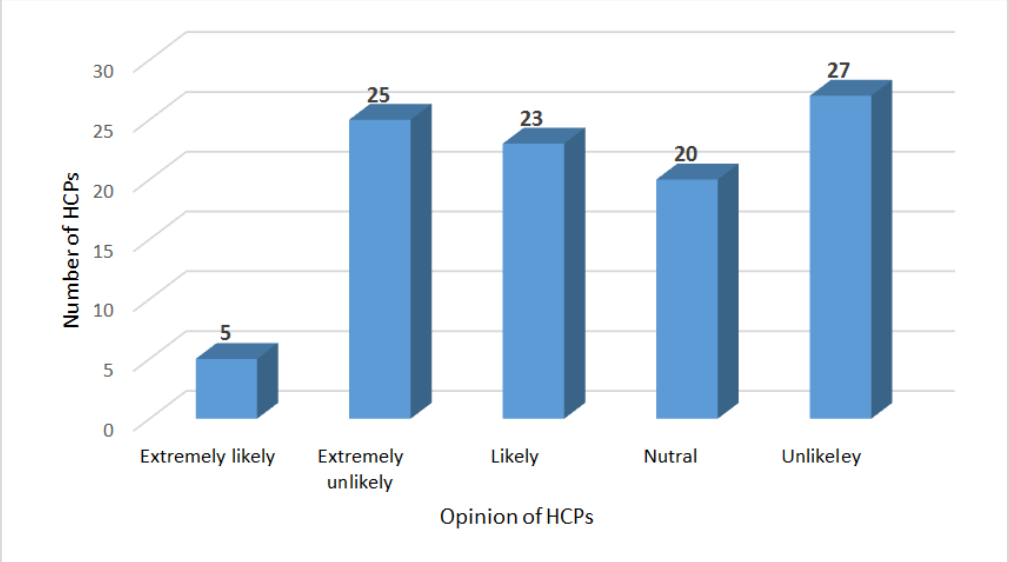

Fig 1: Could AI replace Physicians?

As shown in Fig 1 the survey data provides insights into perception regarding the potential of AI replacing physicians. With 28% responders have opinion of indicating its likely and 20% have neutral while majority, 52% expresses scepticism towards AI fully replacing physicians.

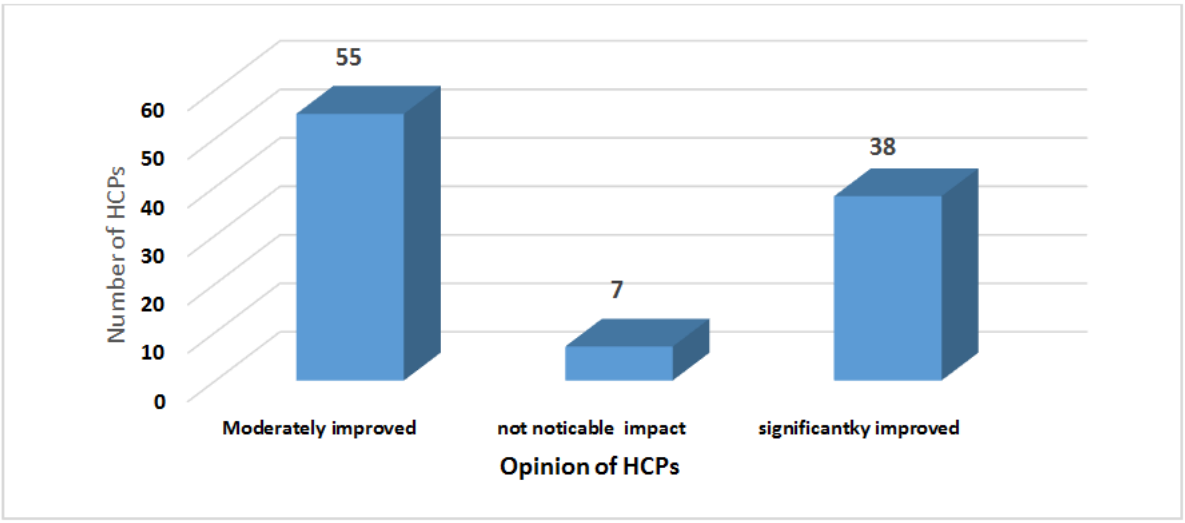

Fig 2: How CDSS tool impact their ability to find answer to their clinical queries

As shown in Fig 2, while 55% thinks such tool will improve their ability to find answers to their queries underscoring the role of AI in clinical decision making, 38% thinks this will have significant impact. This indicates current satisfaction with available process or skepticisms of such machine-driven tools in integrating the data and clinical experience.

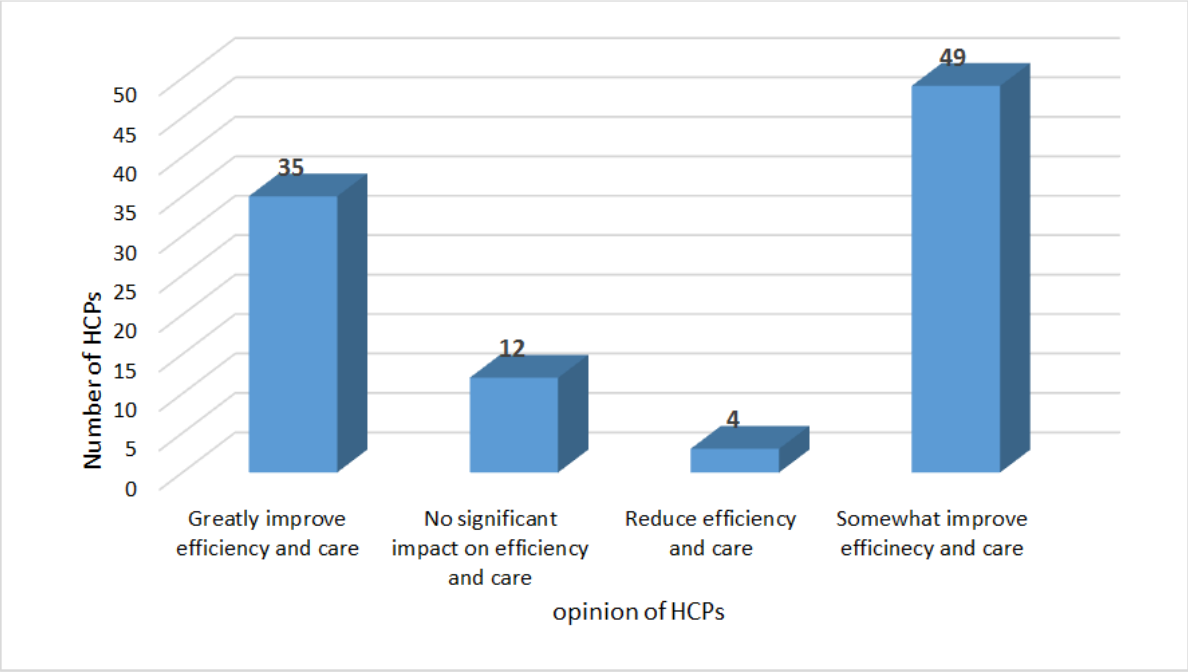

Fig 3: How would a CDSS tool affect the efficiency and quality of care you provide to the patients?

As shown in Fig 3, the survey results indicate generally positive expectations regarding the impact of CDSS tools on healthcare efficiency and quality of care. A significant 74% responders believe such tools willimprove both efficiency and quality of care. Expected benefits are quicker access to relevant clinical information. A smaller portion (12%) perceives no significant improvement with CDSS toolwhile 4% thinks such tool reduces efficiency and care. This minority has reservations regarding the reliance of technology over clinical judgement.

B. Opinion of Healthcare professionals on potential role of AI tools on health care scenarios

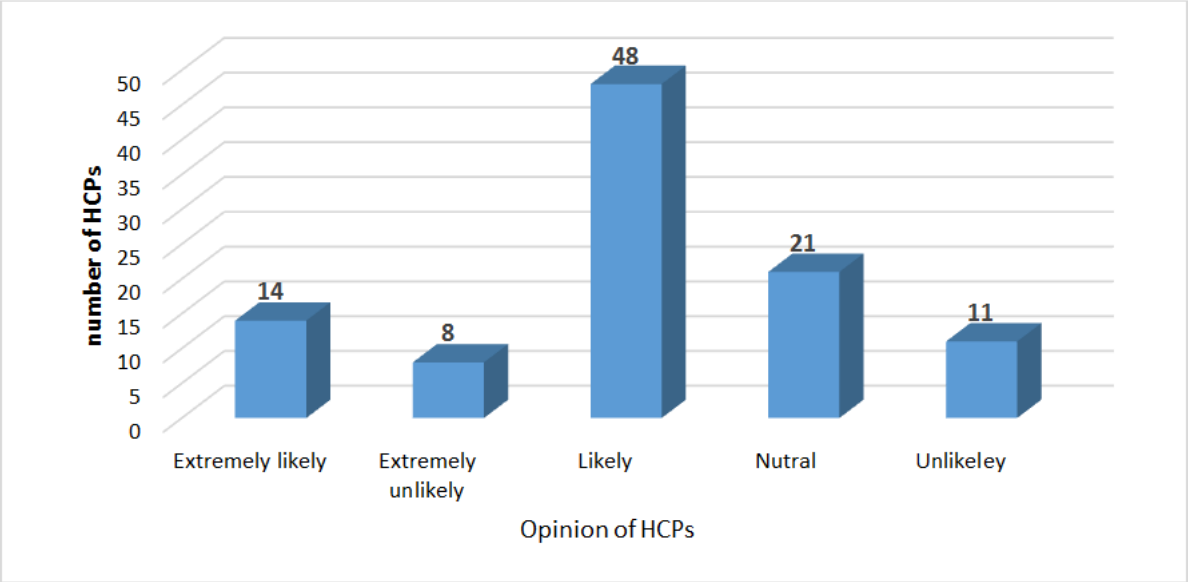

Fig 4: Will AI provide patients with preventive well-being recommendation.

As shown in Fig 4, the survey data highlights strong optimism towards AI's role in providing preventive well-being recommendation. A notable 62% (14% + 48%) express confidence in AI's capability in this area, citing potential benefits in proactive healthcare management and personalised recommendations.

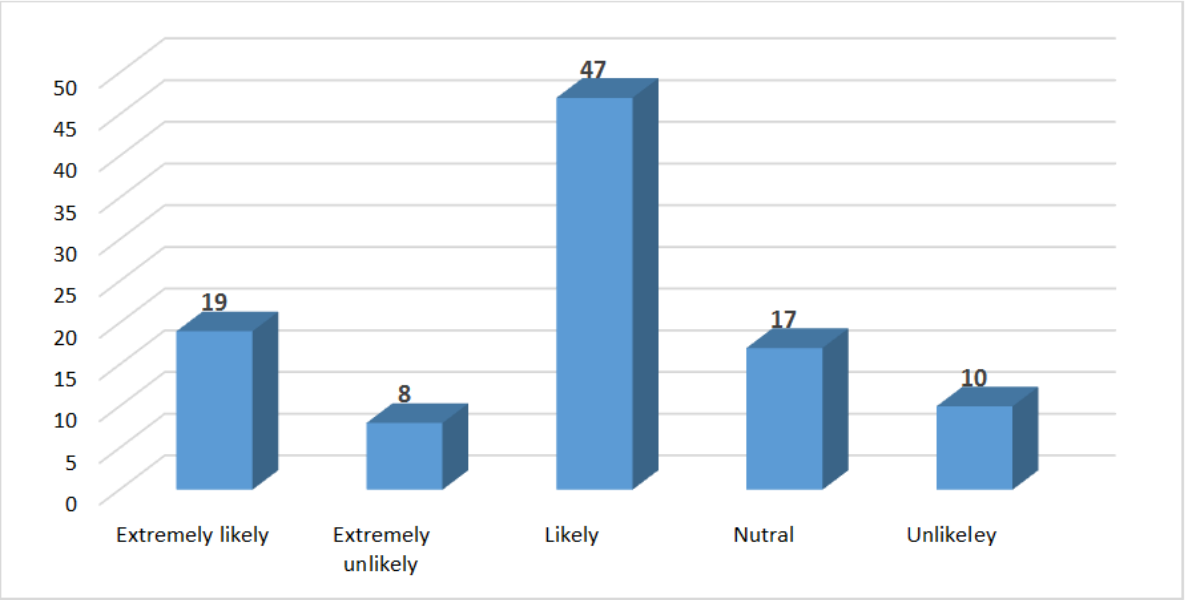

Fig 5: Will AI monitor patient compliance with prescribed medication, exercise and dietary recommendation?

The survey data reveals significant optimism to monitoring patience's compliance with prescribed medications, exercise and dietary recommendation. A combined 68% are confident of AI's potential to play a monitoring role in healthcare, emphasizing its capability to improve adherence and health outcome.

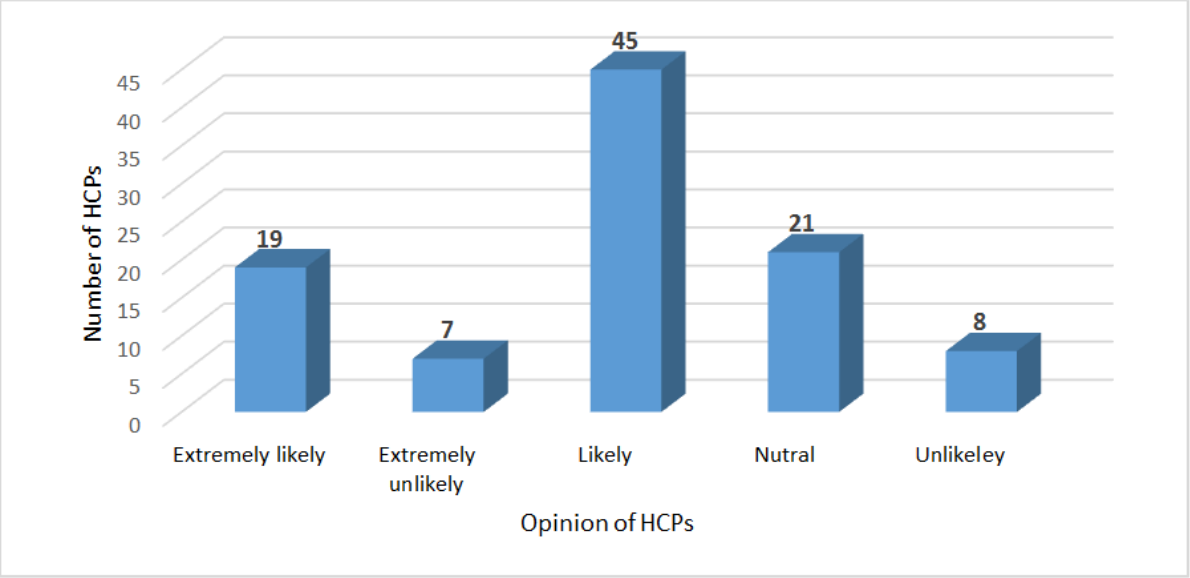

Fig 6: Will AI interpret and read diagnostic imaging?

The survey data suggest strong support for AI's role in interpreting diagnostic interpreting. A significant 64% express confidence in AI's ability to analyse and interpret medical images, highlighting its potential to enhance diagnostic accuracy and efficiency.

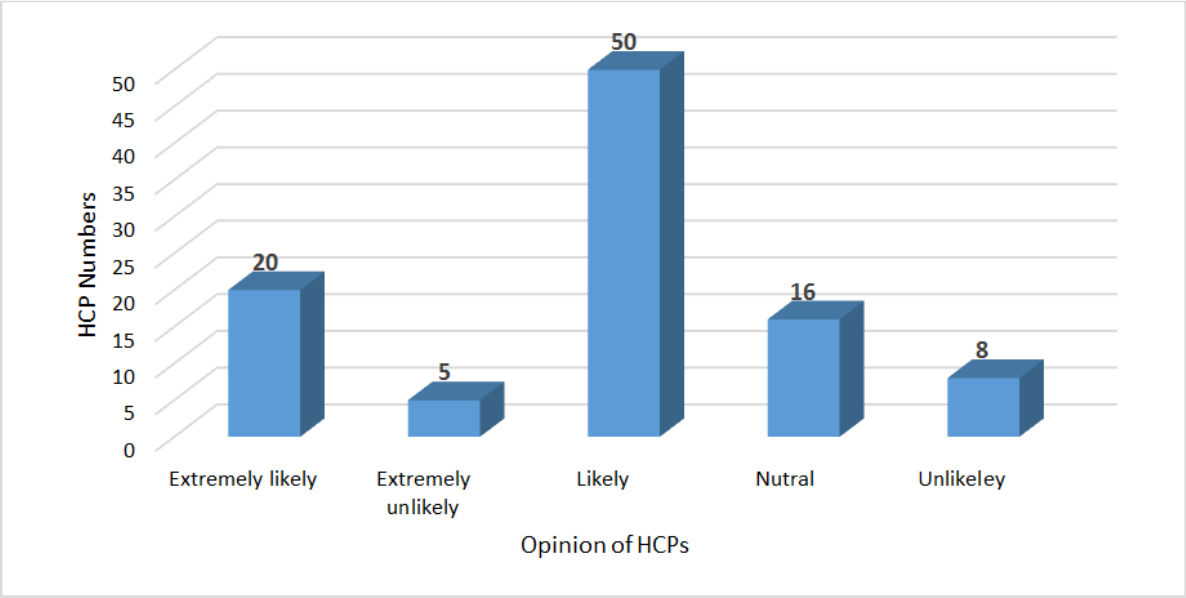

Fig 7: Will AI provide differential diagnosis based on evidence-based database?

The survey data indicates significant support for AI's capability to provide differential diagnoses based on evidence-based databases. A combined 70% expresses confidence in AI's potential to analyse medical data and assist healthcare providers with differential diagnosis, highlighting its role in augmented clinical decision-making.

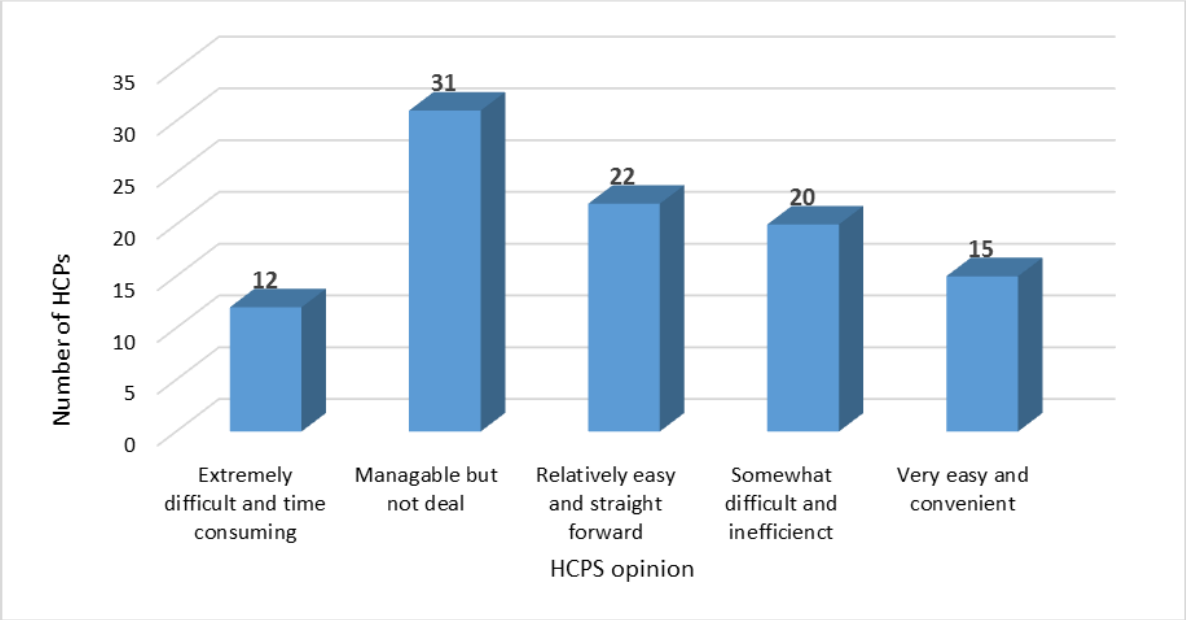

Fig 8: How physician describe accessing relevant medial information and data before accessing CDSS based tool like AIDE

For a minority (10%) the process seems extremely difficult, time consuming and reflects significant hurdles in navigating vast and often fragmented medical literature. This group highlights a significant need for improved accessibility and efficiency in accessing pertinent information. A large segment (33%) finds current method is largely manageable but not ideal, suggesting while feasible it needs substantial time investment and effort. Conversely 39% things its straightforward and easy indicating where resources are easily accessible and efficiently utilised. 19% found it somewhat difficult and inefficient while last 16% think it's very easy possibly due to advance tool and integrated platforms.

DISCUSSIONS

This is a questionnaire-based survey conducted in health care professionals from Mumbai and Navi Mumbai, seeking their opinion on impact and potential role of this new era of artificial intelligence and machine learning in health care scenario.

AI have been introduced to support medical imaging and diagnostic services, fight the pandemic, provide virtual patient care, increase patient engagement and adherence to treatment plans, reduce the administrative burden on healthcare professionals, drive drug and vaccine innovation, monitor the compliance of patients with exercises, and carry out gait analyses used in technology-assisted rehabilitation [5].

AIML have shown great potential for improving healthcare and patient safety as well as reducing unwarranted variation, resource use, and costs. As per the literature review application of AI in healthcare for patient management has various advantages and some drawbacks. Such as increasing availability of clinical data to assist clinicians and patients in a wide variety of situations like providing personalized estimates of clinical outcomes or proposing diagnoses. This application has pit falls such as overfitting to and bias and limitations in the data used to train the AI [6].

In this study the health care professionals (HCWs) have opined about favourable impact on their clinical decision making and efficient patient care. This is in line with *Shuroug Aet al.*, [7].

While related with their opinion on role of AI in health care scenario such as monitoring patient compliance, dietary and exercise, also in diagnostic of radio imaging and differential diagnosis. This is in line with *Akinrinmade, Abidemi O et al*., [8].

CONCLUSIONS

Healthcare professionals generally have a mix of optimism and concern about the role of AI in healthcare. Many see AI as a powerful tool that can enhance patient care by improving diagnostic accuracy, enabling personalized treatment, and streamlining administrative tasks. AI has the potential to reduce human error, speed up decision-making, and provide data-driven insights that can lead to better health outcomes. As a result, many practitioners are optimistic about the ability of AI to augment their work, allowing them to focus more on patient interaction and complex decision-making. Overall, while healthcare professionals recognize the value AI can bring, they emphasize that AI should be used to support and enhance, not replace, the human elements of care. They believe that successful AI integration requires ongoing collaboration between technology and healthcare professionals, with a focus on maintaining the personal touch that is vital to healthcare.

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