PERSPECTIVES OF ARTIFICIAL INTELLIGENCE IN HEALTHCARE: A SYSTEMATIC REVIEW OF THE HEALTHCARE PROFESSIONALS

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ABSTRACT

Today's technology has reshaped the future of medicine through the advancement in Artificial Intelligence (AI). AI could revolutionize healthcare delivery, improve patient outcomes, and enhance the capabilities of healthcare professionals. This review was conducted to explore the perspectives of AI in healthcare among healthcare professionals. The electronic databases MEDLINE, CINAHL, and manual searches were used to identify relevant articles published between 2013 and April 2023. The keywords used were "artificial intelligence", "healthcare", and "perspectives". Overall, healthcare professionals generally recognize the potential and benefits of AI in healthcare practice. However, some concerns such as lack of familiarity, higher costs for the patient, and ethical and legal problems have been raised. Besides, healthcare professionals also worried that AI may replace their tasks, and impact job security. Despite the positive perspectives towards AI, however, it is also found that healthcare professionals had a lack full understanding of AI due to some concerns that are hindering them. The limited studies that have been conducted in this area have also highlighted the need for further exploration of the level of knowledge among different healthcare professionals. Exploring knowledge of AI in healthcare among healthcare professionals is crucial to identifying gaps, planning educational modules, and promoting responsible AI use.

***Keywords**: Artificial Intelligence, Healthcare, Perspective, Healthcare Professionals*

1.0 INTRODUCTION

AI is a phrase used to define a wide and expanding variety of computer operations, classifications, terminologies, and types. The definition of AI is classified into four categories, which are thinking humanly, thinking rationally, acting humanly, and acting rationally. Creating AI systems that mimic human behavior and cognitive processes involves imitating

human actions, while thinking humanly entails emulating cognitive processes to simulate human problem-solving, decision-making, and thinking within software models. Acting rationally is about building AI systems that act rationally to achieve their goals while thinking rationally is about formal logical reasoning [1]. The term "Artificial Intelligence" (AI) is used to describe the integration of human-level intellect into technology systems [2]. In the twenty-first century, the potential of artificial intelligence in the medical field resides in its capacity to evaluate unstructured data, identify abnormalities, give correlations, automate jobs, and assist human workers [3].

AI is gradually taking over the healthcare sector. Not only is artificial intelligence useful in the field of image processing and diagnostics, but it also has applications in healthcare products, prognosis, treatment, patient monitoring, and the monitoring of patients [4],[5],[6]. AI has the capacity to analyze unstructured data, spot anomalies, provide correlations, automate tasks, and support human workers in the medical industry [7]. AI also does away with the manual system in favor of an automatic one, freeing staff members from the drudgery of doing banal activities related to the administration of patients and medical resources [8].

Additionally, the utilization of a robot as a shielding layer, which serves to physically separate the healthcare professional from the patient, is a powerful instrument that can be used to combat the ever-present concern of pathogen contamination and maintain surgical volumes during a pandemic. This can be accomplished by using a robot to physically separate the healthcare professional from the patient [9]. This approach helps to ensure the safety of both patients and healthcare providers. The adoption of AI technology in healthcare has the potential to completely transform the industry by better patient outcomes, streamlining workflows, and improving diagnostic accuracy. This trend shows that the marketplace for instruments or machines with AI is rapidly growing with many companies have developed various applications and abilities of these AI systems.

Therefore, exploring the perspectives of AI in healthcare among healthcare professionals is crucial for several reasons. Healthcare professionals play a vital role in the implementation and adoption of AI technologies in healthcare. Healthcare professionals' resistance to using AI despite its proven benefits for patients will lead to serious problems, especially since it will be widely used in the future [10], [11]. It is essential to identify the factors that may hinder the adoption of these technologies. Moreover, it helps to identify the knowledge gaps and educational needs related to AI. AI literacy may influence the readiness of healthcare professionals in order to integrate AI technology into healthcare. By filling these gaps and needs, healthcare professionals can be prepared to adopt AI in healthcare, and patient outcomes would be improved [12], [13]. Therefore, a systematic review was conducted in order to explore the perspectives of AI in healthcare among healthcare professionals.

2.0 METHODOLOGY

2.1 Study Design

This systematic review was conducted according to Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) [14]. This study used PRISMA guidelines to ensure a structured, transparent, and comprehensive approach in conducting this systematic review.

Adhering to PRISMA guidelines reduces bias, as the relevant studies were reviewed thoroughly and considered if meet the eligibility criteria based on the perspectives of artificial intelligence in healthcare among healthcare professionals.

2.2 Strategic Search

The literature search was conducted using the databases MEDLINE and CINAHL. A flow diagram of literature search strategy is shown in Figure 1. The review began from the identification phase, which the authors will used the keywords and terms of "artificial intelligence", "healthcare", and "perspectives" to search for relevant studies in the databases. Out of the 833 studies identified through database searches and manual internet searches, 45 duplicate studies were excluded. Subsequently, the studies will undergo a screening process based on the title and abstract to identify relevant studies. A total of 47 studies, which are both relevant to the specified keywords and possess full-text articles, were chosen. Lastly, the research will pass final steps of screening where the studies that the population was not healthcare professionals, systematic review and meta-analysis, commentary, and scoping review were removed from this study.

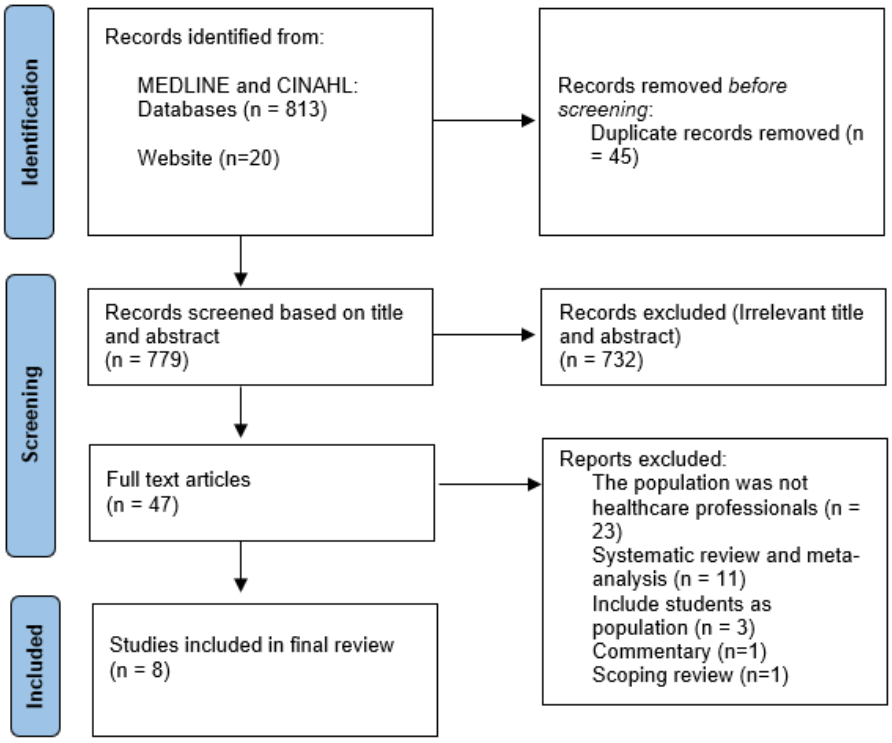

Figure 1: Searching strategy according to PRISMA guideline

2.3 Eligibility Criteria

The inclusion criteria for this review were studies others than case study, review studies, meta-analysis and commentary. The studies included are only the studies that examined the perspectives regarding AI in healthcare. In contrast, articles whose intended audience was not

healthcare professionals or include other populations, for which the full text was unavailable, and those written in a language other than English were omitted.

2.4 Data Extraction and Synthesis

The evaluated sample of study on population, aims, and outcomes were well specified and assessed using several methodological aspects. The quality of the study was not evaluated using a scoring method because the authors reached a consensus on the quality of the studies, such as the study design of the studies, the sample population, and the studies that addressed the perspectives of AI in healthcare. The duplicate articles were removed and eligible titles and abstracts were screened. The complete texts were then retrieved and evaluated by researchers based on eligibility requirements. The data extraction was done using PICOS technique where it breaks down the data from the selected studies into the a few elements focused to answer on the perspectives of AI in healthcare among healthcare professionals. The data such as name of the author, year of publication, objectives, study design, population, statistical analysis used, and outcomes were tabulated in Table 1.

3.0 RESULTS AND DISCUSSION

Table 1: Data from Previous Study

No	Author	Year	Objective	Study Design	Population	Statistical Analysis	Outcomes
1.	Antwi et al. [15]	2021	To explore the perception of radiographers relating to integration of AI in medical imaging practice in Africa	Qualitative study	Radiographers working within Africa (n=475)	Data analyzed and interpret by researchers	AI improved clinical quality, diagnosis, radiation dose reduction, and research. However, participants expressed concerns about job security, and loss of essential skills and functions due to this AI adoption. In addition, issues related to AI equipment maintenance, lack of awareness, and the need for education and training were noted as significant concerns.
2.	Coppola et al. [16]	2021	To report the results of a nationwide online survey on artificial intelligence (AI) among radiologist members of Italian Society of Medical and Interventional Radiology (SIRM)	Not stated	Radiologist (n=1032)	Chi-square test, Spearman rank test	Participants view AI as helpful in daily work. However, the participants have concerns about the decrease in professional reputation, learning opportunities, and salaries. Participants also worried that computers may replace them in reporting exam results. Nonetheless, they participants acknowledge advantages to using AI in radiology, including lower error rates, optimized work, and access to additional information for therapy and treatment

						prediction. Many respondents suggest the need for policies to guide AI in radiology.
3.	Horsfall et al. [17]	2021	To evaluate the attitudes of surgeons and the wider surgical team toward the role of AI in neurosurgery	Cross-sectional study	Surgeons, anaesthetists, nurses, and operating room practitioners (n=33)	Thematic analysis and descriptive analysis	AI aids in diagnosis, surgical planning, and early detection of complications, improving patient care and reducing errors. However, AI brings complexity, potential loss of the human touch, overreliance on AI, reliability of software and data input, loss of surgical skill, ethical issues, and cost worries. While many are comfortable with the use of AI in healthcare, most are cautious about its role in postoperative patient care.
4.	Shin et al. [18]	2022	To assess experience with and perceptions of clinical application of artificial intelligence to chest radiographs among doctors in a single hospital	Cross-sectional study	Clinicians or radiologists in Yongin Severance Hospital who worked during 2020 or 2021. (n=194)	SAS software version 9.4. Data presented as means, SD, medians, two-sample t-test or Fishers' exact test, Paired t-test.	Most clinicians and radiologists with no previous experience with AI had a high level of trust in AI. The clinicians and radiologists believed that AI could help in detecting lesions, discriminating between normal and abnormal lesions, shortening decision times, providing differential diagnosis of lesions, and selecting triage of reading. The clinicians and radiologists also thought that AI could reduce reading times and the number of reading requests for chest radiographs while improving diagnostic

							accuracy. They held positive views about the future usage of AI in healthcare.
5.	Ibrahim et al. [19]	2022	To evaluate the perceptions of the impact of AI on the health professional's decision-making process and the quality of patient care from the perspective of ophthalmologists and dentists.	Descriptive study	Ophthalmologists and dentists (n=18)	Data were analyzed and coded manually using Word and Excel	AI in healthcare offers benefits such as improved diagnostic accuracy, reduced examination time, increased patient comfort, greater reliability, and enhanced telemedicine capabilities. It also enhances data security and increases time for doctor-patient conversations. However, challenges include the high cost for patients and AI's inability to replace clinical evaluations for accurate diagnosis.
6.	Scanzera et al. [20]	2022	To describe current optometric perspective of AI in eye care	Cross-sectional study	Members of the American of Optometry (n=400)	Descriptive analysis, Chi-square test or Fisher's exact test	Respondents expressed concern that AI will replace providers and negatively impact the doctor-patient relationship due to unfamiliarity. However, they believe that AI can improve the practice of optometry, and believing that it should be integrated into education programs. Respondents perceive that AI can improve accuracy, efficiency, disease monitoring, normative databases, and expand care to underserved populations while easing the burden of documentation. However, there are concerns about overreliance, cost, altered

							patient-provider relationships, and the need for professional adaptability.
7.	Pecqueux et al. [21]	2022	To provide an overview of the current state of knowledge and acceptance of AI applications among surgeons in Germany	Cross-sectional study	Surgeons from German university hospitals, academic teaching hospitals and private practices (n=147)	Chi-square test of Fisher's exact test	Most respondents were familiar with AI in medicine, but most had no experience, had low awareness of AI, and had an average knowledge of AI. Most respondents did not anticipate that AI would result in a change in the number of staff needed in the field. Respondents generally felt the workplaces were unprepared for AI adoption and desired more education on its potential in hospitals. Respondents believed that AI could improve diagnostic accuracy, reduce the time spent on monotonous tasks, and provide more precise and minimally invasive surgical techniques. However, the respondents expressed concerns about ethical and legal problems, liability, applicability to controversial issues, and the low ability to empathize with patients' emotions.
8.	Sabra et al. [22]	2023	To assess nurses' perspective and attitude toward utilization of artificial intelligence in health care	Descriptive correlational	Nurses who are on duty and had at least one year of experience (n=200)	Numbers, percentages, averages, and standard deviations and chi square test.	Most respondents had a moderate perception level on using AI in healthcare. They believed AI could benefit people, destroy people, aid nurses to feel happier and feel creative, cause many job loses, but majority of respondents also had positive attitudes towards AI.

Artificial Intelligence has the potential to revolutionize the healthcare industry by improving diagnosis, treatment, and patient outcomes. However, the adoption of AI in healthcare had varying perspectives among healthcare professionals regarding its potential benefits and concerns. Overall, the findings of this review provide valuable insights into perspectives of AI in healthcare across various domains, including radiology, optometry, and general medicine. The positive impact of AI in healthcare is widely acknowledged, however, most have limited experience with using AI. Despite this, the majority of healthcare professionals agreed that AI is a useful tool for their practices and improves diagnosis. A study conducted by Shin et al. [18] among clinicians or radiologists found that the majority of the respondents had no experience with AI however the respondents had high trust in AI. Besides, majority-rated AI enables lesions detection, and shortening reading times. Another study among ophthalmologists and dentists reported that the majority agreed that AI complements the diagnosis [19]

These findings are also consistent with the other studies [16], [20]. The technology already provides physicians with assistance in improving the surgical outcomes achieved in AI-assisted robotic surgery [23]. AI is purportedly being used by physicians to make earlier diagnoses of diseases, particularly chronic conditions such as cancer [7]. Furthermore, with the assistance of AI, radiologists reduce the respondents' false positive rates and the number of specimens requested while maintaining the same sensitivity [24]. This demonstrates despite a lack of experience in using AI in clinical practices, healthcare professionals acknowledged the potential of Artificial Intelligence to improve the precision, consistency, and efficacy of AI in the healthcare professionals daily practice of clinical work.

Besides, AI can also help healthcare professionals develop accurate treatment plans for patients. By analyzing large amounts of patient data, AI algorithms can identify patterns and correlations that would be difficult for humans to detect. In one of the studies, the majority of clinicians and radiologists agreed that AI can discriminate between normal and abnormal lesions in chest radiographs [18]. The surgeons, anaesthetists, nurses, and operating room practitioners also agree that AI is also able to assist in surgical planning and surgical risk assessment, and it is able to predict and improve outcomes [17]. In previous studies, AI successfully predicts the sensitivity of anticancer drugs for patients with cancers. Thus, it concludes that the creation of cancer treatments could be sped up significantly if artificial intelligence were used to hasten the process of finding novel materials [25]. This suggests that AI can play a pivotal role in improving healthcare access and quality in specialized fields.

Furthermore, not only did AI have positive effects on healthcare professionals, but it also had positive effects on patients, particularly on patient care. According to our findings, the majority of healthcare professionals agreed that the implementation of AI will reduce the time of examination and improve the quality of services, which provide comfort for the patients [19], [21]. A retrospective study found that the median waiting time for AI-assisted groups for outpatient processes by predicting whether a lab test or an imaging examination is 0.38 hours compared to 1.97 hours for conventional groups [26]. In addition, the AI-assisted program named Smart-doctor reduces the median queuing time for the patient due to shorter consulting time compared to the conventional group [27]. This demonstrated that AI is able to simplify

and improve patient satisfaction, besides it can solve the issues of long waiting times for patients due to a shortage number of healthcare staff.

However, despite the optimism about AI's capabilities, some findings have raised concerns about AI implementation in healthcare. Most of the concern is that AI may replace human healthcare professionals, leading to a loss of jobs and a decline in the quality of care. The worry that Artificial Intelligence could result in the automation of occupations and a significant reduction in the workforce has received a lot of attention recently. The radiologists in the study by Coppola et al. [16] worried about their reputations compared to non-radiologists, reducing the chances of recruitment and fear that the positions will be replaced for reporting the examination results. The findings are consistent with the other studies [20], [22]. However, there is also a study that expects that AI will not impact the number of staff [21]. Nonetheless, due to AI's existing limitations, doctors will not be replaced by AI [7], [28].

Artificial Intelligence has shown tremendous potential in healthcare, however, there are some concerns about the limitations of AI such as AI is not completely reliable, the need for clinical evaluations for diagnosis, higher cost for patients, and ethical considerations [17], [19], [21]. AI systems rely on algorithms that learn from large datasets to make predictions or decisions. However, these algorithms may be biased or flawed, leading to inaccurate diagnoses or treatment recommendations. There is a risk that patients may be misdiagnosed or given incorrect treatment, which could lead to serious consequences. Moreover, a system error in a widely used AI could result in a greater number of patient injuries than a limited number of patient injuries caused by a provider's error [29]. Furthermore, even though AI can help healthcare professionals with diagnosis and treatment recommendations, it is unable to replace humans as healthcare professionals were trained to evaluate patients to treat patients based on a wide range of factors, including medical history and physical examinations.

Besides, AI had a low ability to empathize and consider patients' emotions [21]. Care for others requires intentional empathy and it is reliant on our biological conscious and unconscious mental experiences and our attention capacities to select the most prominent and significant information for a patient in care that AI provides. AI can only represent a hypothetical patient and apply it to a concrete data set about a specific patient using a credible algorithm or rule of inference [30]. Thus, this demonstrated that AI is a compliment to ease the healthcare professionals' practices, and it will not replace the healthcare professionals. Additionally, there are concerns about data privacy and security when sensitive health data is collected, analyzed, and stored by AI systems. It is recommended by the previous study, where the respondents suggested developing policies to regulate the implementation of AI [16]. Most of the studies in this review stated that AI education and training should be conducted and taught [20], [21]. This highlights the importance of incorporating AI into medical curricula and providing ongoing training opportunities for healthcare professionals. Therefore, it is essential to ensure that AI systems are designed and used in an ethical and responsible manner, with appropriate safeguards in place to protect patient privacy and prevent bias.

4.0 CONCLUSION

In conclusion, while there are challenges, concerns, limited knowledge, and a lack of full understanding of AI in healthcare among the respondents, the overall perspectives on AI in

healthcare are positive, with the recognition of the significant benefit of AI in healthcare. Hence further studies need to be done to investigate further. Besides, to our knowledge, the previous study related to knowledge of AI was limited to certain healthcare professionals. Therefore, the study should be done on different healthcare professionals to study the level of knowledge and awareness of AI in healthcare, at the same time this is able to raise the level of knowledge towards AI.

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