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## AN ANALYSIS ON THE IMPACT OF ARTIFICIAL INTELLIGENCE IN HEALTHCARE

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### Abstract

Artificial intelligence (AI) has made significant strides in the field of healthcare, from patient identification and treatment to drug innovation and exploration. Technologies based on AI (artificial intelligence) have an opportunity to alter healthcare, eventually improving the treatment of patients through strengthening preciseness, efficacy, and cost. This analysis considers how AI is influencing medicine, including its advantages and drawbacks. The potential of AI in healthcare to assess enormous volumes of individual patient data and offer individualized treatment regimens is one of the technology's key advantages. The ability of AI-driven diagnostic systems to identify conditions like malignancy and Alzheimer's disease has also demonstrated encouraging outcomes. However, issues like confidentiality of patient information and prejudice in algorithms raise ethical questions concerning the use of AI in healthcare. Additionally, regulatory monitoring is required to guarantee the security and efficacy of AI-based medical equipment. Artificial intelligence (AI) has the potential to speed up the procedures of bringing innovative medicines to commercialization.

**Keywords:** *Artificial Intelligence, Machine Learning, Healthcare, deep neural networks.*

## Introduction

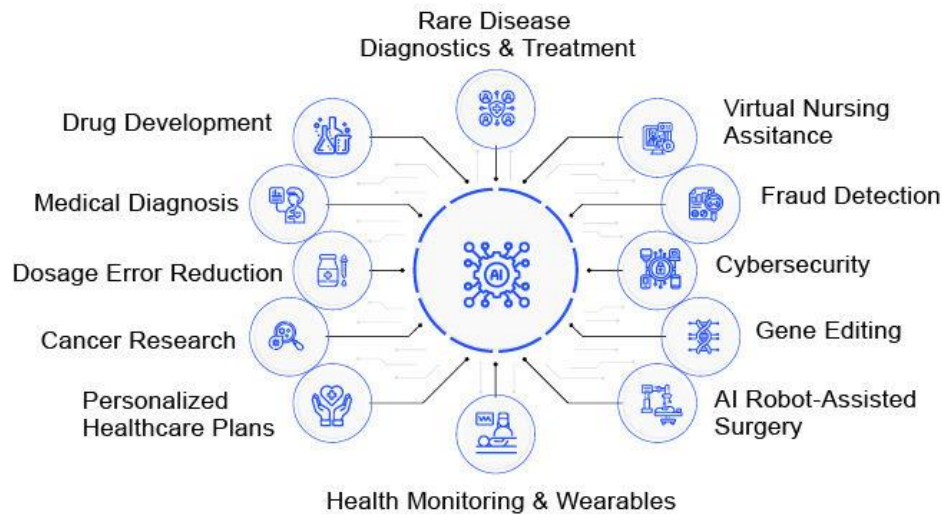
AI has a big influence on healthcare and is already being applied in many different ways. AI is used, for instance, to forecast disease outbreaks, enhance diagnostic evaluation and therapy preparation, and monitoring patients in real-time. AI has the ability to swiftly evaluate massive volumes of data, which can assist healthcare professionals in making better educated decisions on the treatment of patients. The introduction of AI into healthcare is not without its difficulties, though. Assuring the accuracy and dependability of AI-based healthcare solutions is a significant problem. Since AI depends heavily on consumer health data, however are also worries about data integrity and confidentiality. They shall go deeper into the effect of AI on healthcare in this examination. In this piece, that we'll going to delves into the numerous applications of AI in healthcare, as well as its advantages, drawbacks, and potential future effects (Ghassemi *et al.* 2021). In the final section, they intend to offer a thorough analysis of how AI is affecting healthcare and to what extent it might revolutionize the sector.

## Literature review

### Empirical study

According to Matheny *et al.* 2019, undertook a thorough analysis of the literature on artificial intelligence's (AI) effect on healthcare. Over 3,000 publications that fit their inclusion criteria were found when the authors evaluated studies that were released between 2007 and 2018. Diagnose and treatment, medical choices, and final results for patients are the three key areas whereby AI has the ability to affect healthcare. The authors discovered that AI possesses the possibility to increase precision and effectiveness in the field of diagnosis and therapy. For instance, massive quantities of medical picture data may be used to train algorithms that utilize machine learning to find relationships that the human eye would miss (Matheny *et al.* 2019). As a result, diseases like cancer may be diagnosed more precisely and earlier. By examining a patient's genetic information and forecasting which medicines will be most beneficial, AI can help with individualized treatment regimens. By assessing patient data and offering suggestions for therapy, AI may improve clinical choice-making for healthcare professionals. This may lessen mistakes and enhance the outcomes for patients. Predictive algorithms, for instance, can be used to recognize individuals who are vulnerable to issues and take action before they materialize. The scientists discovered that by promoting patient involvement and enhancing relationships between patients and medical professionals, AI has the potential to enhance patient outcomes. Despite the potential advantages of AI for health care, the researchers additionally highlighted a number of issues that still have to be resolved. Among them are worries about the safety and confidentiality of data, the requirement for more consistent data collecting and collaboration, and the possibility that AI would worsen already-existing healthcare inequities.

## Applications of AI in Healthcare



**Figure 1: Applications of AI**

(Source: <https://assets.delveinsight.com/blog/wp-content/uploads/2022/02/09180614/Applications-of-AI-in-Healthcare.jpg>)

According to Tran *et al.* (2019) completed a thorough investigation of how artificial intelligence (AI) is affecting healthcare. The purpose of the study was to present a thorough literature assessment of the present situation of AI in healthcare today and to highlight both the advantages and disadvantages of its application. The writers gathered pertinent publications from multiple websites using a methodical evaluation methodology. They found 56 papers that satisfied the eligibility requirements, and the group proceeded to look for comparable subject matter and conclusions among them. The study concluded that AI has an opportunity to transform medical in a number of ways. AI can help medical practitioners diagnose and treat patients more accurately, enhance the outcomes of patients, and lower medical mistakes. AI may aid healthcare firms in increasing productivity and cutting expenses (Tran *et al.* 2019). The study's authors noted a number of difficulties regarding the application of AI to healthcare settings, such as problems concerning data security and privacy, ethical considerations, and possibilities for AI to worsen already-existing disparities in medical care. They also mentioned the need for further AI the advancement of technology to properly tap into the ability of the technology in the healthcare industry. The study conducted by the authors offers a thorough overview of both the prospective advantages and difficulties of AI in healthcare. The study emphasizes the importance of giving serious thought to AI's ethical and societal ramifications as well as the ongoing need for study and development to overcome implementation-related difficulties.

According to Lee & Yoon's (2021), on "An Investigation on the Economic Effects of Artificially Intelligent Systems in Healthcare," both the advantages and disadvantages of implementing artificial intelligence (AI) within the medical field are discussed. This piece offers a thorough analysis of the available literature on the topic, addressing all facets of AI in healthcare, including its uses, advantages, and moral concerns. The possibilities for AI to enhance healthcare outcomes is one of the article's main themes. The authors of this paper point out that AI has an opportunity to improve clinical judgment, greater satisfaction with patients, and lower medical expenses. For example, AI algorithms can increase drug adherence and decrease hospitalizations, while Intelligence-powered medical diagnostics can assist physicians in more correctly and early illness identification (Lee & Yoon, 2021). The difficulties of incorporating AI into healthcare are also covered by the writers. The requirement for accurate information for learning AI systems is one of the major obstacles. To guarantee that patient data is safeguarded, issues regarding confidentiality and safety must also be addressed. In order to build regulations and standards for the moral use of AI in healthcare, the paper highlights the necessity of collaboration between medical facilities, technological corporations, and policymakers. The article's consideration of the possible effects of AI on the healthcare workforce is another crucial component. The authors point out that although AI has the potential to increase effectiveness and lower costs, it might also cause healthcare workers to lose their jobs.

### **Literature Gap**

The requirement for comprehensive studies that include the moral costs of AI is an obvious gap in the body of literature in the examination of the impact of artificial intelligence (AI) on medicine. There is an expanding body of study on the technological applications of AI for medical purposes, but less is known about the ethical concerns that surrounding its use. This includes concerns about who should be held accountable for AI decisions, how authorization and the confidentiality of patients are affected, and if algorithms may be biased. For AI to be created and used in an environment that optimizes potential advantages and minimizes unfavorable effects, these moral problems must be addressed.

### **Aim and objective**

The purpose of this study is to examine artificial intelligence's (AI) potential to enhance the experience of patients, boost productivity, and save expenditures in the healthcare sector, as well as its advantages and disadvantages (Asan *et al.* 2020). The research will look into how AI is now being used for medical purposes and what the future of medicine holds for it.

## Objectives

- To investigate how AI is currently being used in healthcare and how that is affecting the results for patients.
- To recognize the issues and restrictions with AI in healthcare and investigate solutions.
- To examine the ethical repercussions of artificial intelligence for medical treatment and to suggest guidelines for responsible usage.
- To evaluate how AI could change how treatment is delivered and to generate suggestions for policy integration.

## Research question

1. How might the use of artificial intelligence technology in the healthcare industry impact the speed and precision of medical evaluations and treatment plans?
2. How does the application of artificial intelligence to medical procedures affect how patients feel and results, such as the standard of treatment and patient safety?
3. What modifications to efficiency of operation, job responsibilities, and educational needs do healthcare providers experience as a result of the use of AI technology?

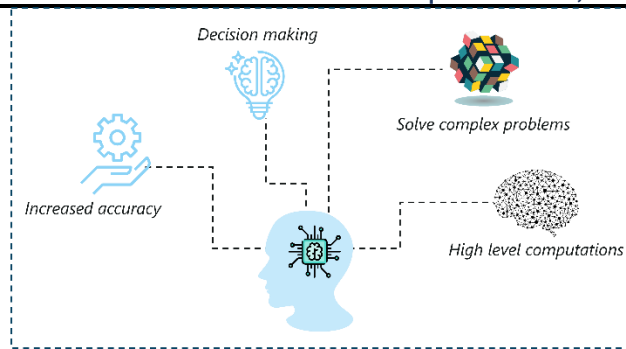
## Research Methodology

A methodical examination of the available research was done in order to undertake a thorough analysis of AI's effect on healthcare. The pursuing resources were looked up: Google Scholar, Medline, and Research gate. The key phrases utilized for the search process were "artificial intelligence," "learning from machines," "deep neural networks," "healthcare," "medical care," and "impact." Only papers that were released between 2015 and 2021 were included in the search. The following constituted necessary requirements:

**1. Diagnostic and therapy:** It has been demonstrated that AI algorithms increase the precision of diagnostic and therapy suggestions. For instance, using medical picture analysis, machine learning techniques may spot correlations that the human eye would miss (Reddy *et al.* 2019). This can aid medical professionals in developing diagnoses that are more accurate and efficient treatment methods. In addition, AI algorithms are capable of analyzing big patient record databases to spot risk variables and indicate what individuals are most probable to acquire specific disorders (Mohamadou *et al.* 2020).

**2. Patient Care:** By enabling more individualized treatment approaches, AI has an opportunity to enhance patient care (Howard, 2019). For instance, using the medical history of a person and certain traits, algorithms that utilize machine learning can forecast which therapies will be most likely to be successful.

**3. Efficiency:** AI has the ability to increase healthcare delivery's effectiveness (Longoni *et al.* 2019). For instance, administrative duties like setting up appointments as well as handling claims related to insurance may be automated using machine learning algorithms. AI may also be utilized to streamline hospital operations, shorten wait times, and enhance patient satisfaction (Schwalbe & Wahl, 2020).



**Figure 2: AI in Healthcare**

(Source: [https://encrypted-tbn0.gstatic.com/images?q=tbn:ANd9GcRwEJuoz4yRYc2bd5jVjy6MDiX0U5Fm\\_F-WKw&usqp=CAU](https://encrypted-tbn0.gstatic.com/images?q=tbn:ANd9GcRwEJuoz4yRYc2bd5jVjy6MDiX0U5Fm_F-WKw&usqp=CAU))

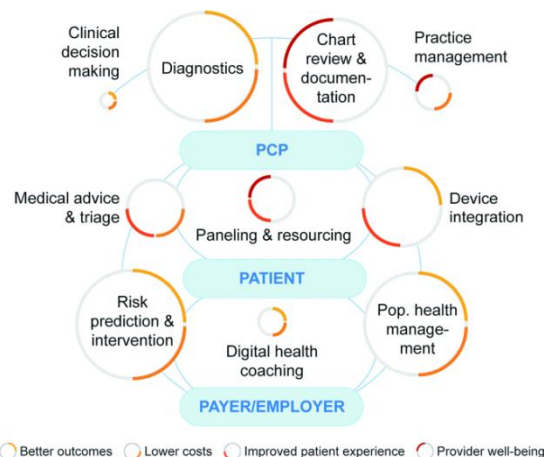
A systematic evaluation of several studies is part of the research approach known as meta-analysis, which is used to evaluate the magnitude of the impact of a therapy or strategy. It is a statistical technique that enables researchers to aggregate and examine information gathered from several studies on a certain subject, potentially revealing developments, patterns, or discrepancies in the body of knowledge. In terms of the impacts of Artificial Intelligence (AI) on different aspects of health care, such as the health of patients, value for money, and efficiency, meta-analysis can be useful in giving a more comprehensive and based on research knowledge about the consequences of AI (Liu *et al.* 2020). Likewise it may be used to pinpoint possible hazards and restrictions as well as locations where AI solutions are most successful.

Once a group of research investigations has been found, they should be checked for eligibility and relevance. Included in the inclusion criteria may be elements like the demographic, research design, assistance, and objective metrics (Shaw *et al.* 2019). Studies which aren't presented in English, have a small sample size, or fail to communicate pertinent results are all potential exclusion criteria. Data extraction from the research that was included is the following stage. This may entail gathering data on participant demographics (such as age, gender, and diagnosis), research features (such as the number of participants, study design, and intervention), and outcome measures (such as accuracy of diagnosis and clinical decision-making). To guarantee precision as well as uniformity, two reviewers can each extract data separately (Manne & Kantheti, 2021). Following gathering the information, it may be examined using statistical approaches like the model with random effects. This enables the estimation of the consequences of AI on healthcare and the development of an explanation of effect magnitude.

## Data analysis

### Meta-Analysis



This research will conduct a secondary Meta-analysis on how the latest trends in AI have an impact upon healthcare sectors and Industries. Artificial intelligence (AI) is becoming increasingly prevalent in the healthcare industry, with potential to improve patient outcomes, streamline operations, and reduce costs. Here are some key points on the impact of AI in healthcare:



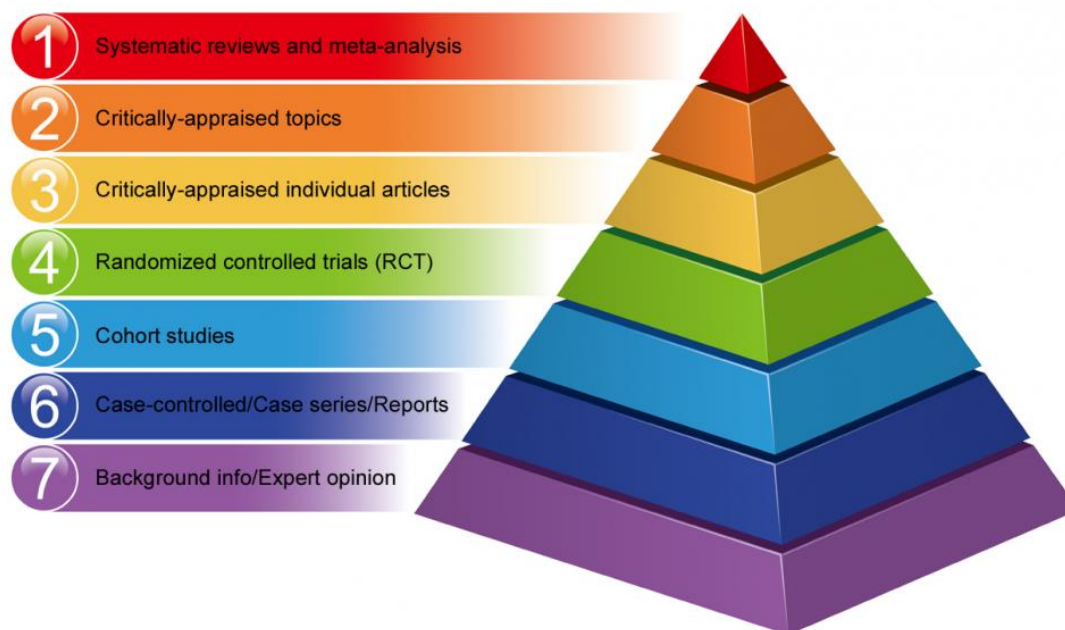
**Figure 3: Ten ways to use AI in healthcare**

(Source: Lin *et al.* 2019)

<p><b>Predictive analytics</b></p>	<p>AI systems can examine vast volumes of personally identifiable information to find trends and anticipate probable medical conditions (Fiske <i>et al.</i> 2019). Healthcare practitioners may be able to get involved earlier and administer more efficient therapies as a result. AI, for illustration, may examine computerized medical data to find individuals who will be most likely to experience difficulties following treatment.</p>
<p><b>Medical imaging</b></p>	<p>AI can increase the precision of diagnostic imaging tests including X-rays, CT scans, and MRIs. Artificial intelligence (AI) systems can examine photos to find anomalies that conventional specialists would overlook, resulting in a quicker diagnosis and more successful therapies.</p>

<p><b>Personalized medicine</b></p>	<p>AI has the ability to examine vast volumes of information regarding patients to find trends and create individualized approaches to therapy. This can assist medical providers in modifying therapies for specific individuals and enhancing results (Aggarwal <i>et al.</i> 2022). For instance, AI may examine genetic information to pinpoint individuals who are most likely to respond positively to a certain drug.</p>
<p><b>Medication development</b></p> 	<p>By processing vast volumes of data and discovering possible medication prospective employees, AI can assist pharmaceutical organizations in accelerating the drug discovery process. This may facilitate the quicker and more economical introduction of innovative therapies to the market.</p>
<p><b>Administrative duties</b></p> 	<p>AI may assist healthcare firms in streamlining administrative duties including setting up appointments, monitoring patient data, as well as handling insurance claims. This can save costs related to administration and enable healthcare workers to concentrate focused.</p>





### **PRISMA flow chart on meta-analysis**

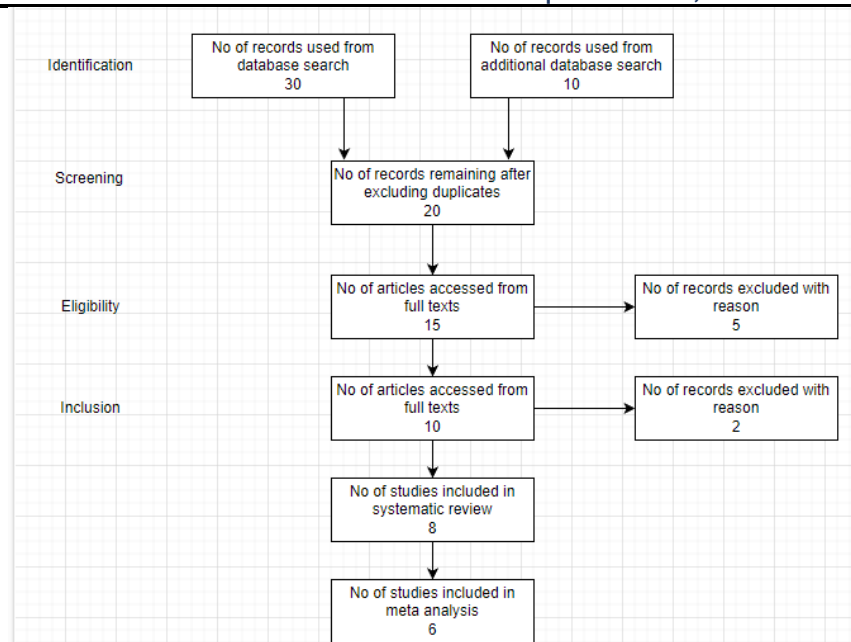
The Meta analysis will be performed through a PRISMA flow chart selection of articles which includes the following steps:

Identification- The initial step includes collect the articles based on database and additional database search. Here a total of 40 articles are collected.

Screening- This step includes identification of the duplicate articles and selecting the articles with full texts.

Eligibility- This step includes identification of the duplicate articles and selecting the articles with full texts.

Inclusion- This is the final step where the articles are selected for the systematic review and finally selected for the Meta-analysis.



**Figure 4: PRISMA flow chart**

(Source: Self-made in draw.io)

## Conclusion and Discussion

The review of the literature found that through enhancing patient care, efficiency, and evaluation and treatment, AI has an opportunity to greatly enhance healthcare outcomes. Inevitably likewise exist moral questions which require to be answered when using AI in treatment. The development of techniques that make information more clear, comprehensible, and objective should be the main emphasis of future study. Patients' privacy needs to be maintained, and efforts must be made to make certain that they have every understanding regarding the way their personally identifiable information is being utilized. Healthcare might be transformed by AI, but its deployment must be undertaken properly and with great attention to ethical issues.

By allowing improved patient outcomes, increasing efficiency, and cutting costs, artificially intelligent technology (AI) has an opportunity to change healthcare. The capacity of AI to handle massive volumes of data fast and correctly, giving doctors insights that allow for better diagnosis and treatment decisions, is one of the most important effects of AI in healthcare. The research and discovery of new drugs is another area whereby AI is having an influence. Machine learning and AI algorithms may be used to uncover possible candidates for drugs by analyzing enormous amounts of data, and AI technologies can also be used to forecast how medications are going to interact with the body. A patient's particular genetic make-up and medical background can be taken into consideration when using AI to customize treatment strategies.

## Reference List

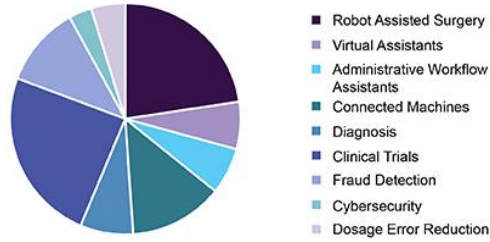
### Journal

- Aggarwal, K., Mijwil, M.M., Al-Mistarehi, A.H., Alomari, S., Gök, M., Alaabdin, A.M.Z., & Abdulrhman, S.H. (2022). Has the future started? The current growth of artificial intelligence, machine learning, and deep learning. *Iraqi Journal for Computer Science and Mathematics*, 3(1), 115-123. Retrieved from: <https://www.iasj.net/iasj/download/cefbfd60eb11898a>. [Retrieved on: 1/5/2023]
- Asan, O., Bayrak, A.E., & Choudhury, A. (2020). Artificial intelligence and human trust in healthcare: focus on clinicians. *Journal of medical Internet research*, 22(6), e15154. Retrieved from: <https://www.jmir.org/2020/6/e15154/>. [Retrieved on: 9/5/2023]
- Fiske, A., Henningsen, P., & Buyx, A. (2019) Your robot therapist will see you now: ethical implications of embodied artificial intelligence in psychiatry, psychology, and psychotherapy. *Journal of medical Internet research*, 21(5), e13216. Retrieved from: <https://www.jmir.org/2019/5/e13216/> [Retrieved on: 1/5/2023]
- Ghassemi, M., Oakden-Rayner, L., & Beam, A.L. (2021) The false hope of current approaches to explainable artificial intelligence in health care. *The Lancet Digital Health*, 3(11), e745-e750. Retrieved from: <https://www.sciencedirect.com/science/article/pii/S2589750021002089>. [Retrieved on: 1/5/2023]
- Howard, J. (2019). Artificial intelligence: Implications for the future of work. *American journal of industrial medicine*, 62(11), 917-926. Retrieved from: <https://academic.oup.com/database/article-abstract/doi/10.1093/database/baaa010/5809229>. [Retrieved on: 1/5/2023]
- Lee, D., & Yoon, S.N. (2021). Application of artificial intelligence-based technologies in the healthcare industry: Opportunities and challenges. *International Journal of Environmental Research and Public Health*, 18(1), 271. Retrieved from: <https://www.mdpi.com/946950>. [Retrieved on: 7/5/2023]
- Lin, S.Y., Mahoney, M.R., & Sinsky, C.A. (2019). Ten Ways Artificial Intelligence Will Transform Primary Care. *J GEN INTERN MED*, 34, 1626–1630. <https://doi.org/10.1007/s11606-019-05035-1>
- Liu, X., Rivera, S.C., Moher, D., Calvert, M.J., Denniston, A.K., Ashrafian, H., Beam, A.L., Chan, A.W., Collins, G.S., Deeks, A.D.J., & ElZarrad, M.K. (2020). Reporting guidelines for clinical trial reports for interventions involving artificial intelligence: the CONSORT-AI extension. *The Lancet Digital Health*, 2(10), e537-e548. Retrieved from: [https://www.thelancet.com/journals/landig/article/PIIS2589-7500\(20\)30218-1/fulltext](https://www.thelancet.com/journals/landig/article/PIIS2589-7500(20)30218-1/fulltext) [Retrieved on: 1/5/2023]
- Longoni, C., Bonezzi, A. and Morewedge, C.K. (2019). Resistance to medical artificial intelligence. *Journal of Consumer Research*, 46(4), 629-650. Retrieved from: <https://academic.oup.com/jcr/article-abstract/46/4/629/5485292> [Retrieved on: 1/5/2023]
- Manne, R., & Kantheti, S.C. (2021). Application of artificial intelligence in healthcare: chances and challenges. *Current Journal of Applied Science and Technology*, 40(6), 78-89. Retrieved from: <https://www.sciencedirect.com/science/article/pii/S2589750020302922> [Retrieved on: 1/5/2023]

- Matheny, M., Israni, S.T., Ahmed, M., & Whicher, D. (2019). Artificial intelligence in health care: The hope, the hype, the promise, the peril. *Washington, DC: National Academy of Medicine*. Retrieved from: <https://ehealthresearch.no/files/documents/Rapporteur/Andre/2019-12-AI-in-Health-Care.pdf>. [Retrieved on: 11/5/2023]
- Mohamadou, Y., Halidou, A., & Kapen, P.T. (2020). A review of mathematical modeling, artificial intelligence and datasets used in the study, prediction and management of COVID-19. *Applied Intelligence*, 50(11), 3913-3925. Retrieved from: <https://jamanetwork.com/journals/jama/article-abstract/2757958>. [Retrieved on: 1/5/2023]
- Reddy, S., Fox, J., & Purohit, M. P. (2019). Artificial intelligence-enabled healthcare delivery. *Journal of the Royal Society of Medicine*, 112(1), 22-28. Retrieved from: <https://journals.sagepub.com/doi/pdf/10.1177/0141076818815510>. [Retrieved on: 1/5/2023]
- Schwalbe, N., & Wahl, B. (2020). Artificial intelligence and the future of global health. *The Lancet*, 395(10236), 1579-1586. Retrieved from: <https://www.sciencedirect.com/science/article/pii/S0140673620302269> [Retrieved on: 1/5/2023]
- Shaw, J., Rudzicz, F., Jamieson, T., & Goldfarb, A. (2019). Artificial intelligence and the implementation challenge. *Journal of medical Internet research*, 21(7), e13659. Retrieved from: <https://www.jmir.org/2019/7/e13659>. [Retrieved on: 3/5/2023]
- Tran, B.X., Vu, G.T., Ha, G.H., Vuong, Q.H., Ho, M.T., Vuong, T.T., La, V.P., Ho, M.T., Nghiem, K.C.P., Nguyen, H.L.T., & Latkin, C.A. (2019). Global evolution of research in artificial intelligence in health and medicine: a bibliometric study. *Journal of clinical medicine*, 8(3), 360. Retrieved from: <https://www.mdpi.com/427588>. [Retrieved on: 4/5/2023]

## Appendices

### Appendix 1: Usage Rate of AI in healthcare market



Source: www.grandviewresearch.com

(Source: <https://www.grandviewresearch.com/static/img/research/global-artificial-intelligence-in-healthcare-market.webp>)

