Unlocking the Potential of Artificial Intelligence in Democratizing Health Information: A Scholarly Synthesis

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Abstract.

This study looks at how Artificial Intelligence (AI) can help make health information more accessible to everyone. By using artificial intelligence, medical information can be made easier to understand and more available to everyone. The study uses a literature review method. It carefully chooses articles published from 2020 to 2024 from trusted academic databases like EBSCO, ScienceDirect, and ProQuest. The articles were chosen based on how relevant they were and the latest developments in using AI for sharing health information. The results show that AI can effectively translate complex medical words, offer personalized health information, and overcome language barriers using advanced language technology. Also, AI can help disadvantaged communities by making it easier for them to get health information and by reducing the spread of false information using fact-checking programs. The study highlights how important interactive AI tools are for getting users involved and shows how these tools can be used for data-driven public health projects. This study shows that AI can play a big role in creating a fairer and better-informed society. In conclusion, the study highlights how important it is to think about ethics and to share fair and accurate information.

Keywords: *Health Communication; Health Literacy; Artificial Intelligence and Democratization of Information.*

I. INTRODUCTION

In the last ten years, the rapid growth of AI has greatly affected many areas, including finance [1], transportation [2], healthcare [3], and education [4]. One important use of AI is making health information more accessible to everyone. Due to ongoing problems in global health systems, especially with access, transparency, and fairness, there is a strong need for new ideas that help doctors connect better with the general public [5], [6]. Access to health information is very important for public health. It helps people learn and make better choices about their health and well-being. One of the biggest problems in healthcare is that medical terms are complicated, making it hard for people who aren't experts to understand them [7]. Also, differences in access to health education, often made worse by language problems and economic inequality, seriously hinder people's ability to get clear and useful health information.AI, known for its ability to handle data well and create complex computer programs, has great potential to help solve these problems. This is done by making medical information easier to understand by changing complex medical terms into simpler words. It can also tailor health education to fit what each person needs and help with language differences. This is possible because of the use of advanced technology, namely natural language processing (NLP) and machine translation technologies [8] that help computers understand and translate language. Furthermore, tools powered by AI can improve public health education by providing interactive platforms that offer customized health information to users. These technologies can make information easier to understand and help check facts in real time, which reduces the spread of false health information.The role of AI in health information is important and has many different aspects.

From a community viewpoint, AI can help people, especially those from underserved groups, by giving them access to important health information that was previously inaccessible due to barriers such as language, educational disparities, and socioeconomic status [9], [10], [11]. Additionally, AI can change public health plans by helping create health programs based on data. These efforts help to better focus on groups of people who need help. Also, AI helps improve communication between health leaders and the public, making public health efforts more effective. However, even though AI boasts a lot of potential, using it in health information raises significant ethical considerations [12], [13]. Therefore, it's important to look into how accurate the information produced by AI is, to check for any hidden biases, and to have strong systems in place to ensure these technologies are used ethically.The study aims to examine recent

advancements and emerging trends, with a particular emphasis on the application of AI in the democratization of health communication and the delivery of personalized health education. Through the synthesis of findings from various sources, the study elaborates another perspective in understanding of the role of AI in the dissemination of public health information.

II. METHODS

The study uses a review of existing literatures to look into the current state of AI usage in health information dissemination. The literature review was done by carefully choosing articles from trusted academic databases, making sure that both the quality and reliability of the sources were high. The completeness and quality of the data. The databases used for the study are EBSCOhost, ScienceDirect, and ProQuest. They all have a wide range of academic articles that have been reviewed by experts, focusing on health communication, artificial intelligence, and public health. These databases were chosen because they are well-known and provide a lot of information on different fields of study, which is important for this study. The rules for including articles were set based on different factors to make sure the topics are important, and the quality of the material is good.

The study looks at articles published between January 2020 and August 2024. The period was chosen to understand how AI technologies are developing, especially because they are changing dynamically in healthcare. To be included, articles had to focus on how AI and health information are connected. This focus was mainly on public health. Talking, custom health learning, and making health information available to everyone. To keep the analysis clear and consistent, the study only looked at articles published in English. The search was done using a detailed plan that looked through specific databases. We used a mix of special words and symbols to find accurate and relevant information. The search included these words: “Health Communication”, “Artificial Intelligence”, “Democratization”, “Personalized Health Education”, “Public Health”, and “Health Information Dissemination”. To make the results more accurate and trustworthy, the study only selected articles from peer-reviewed journals to ensure reliable and high-quality sources in the analysis.

III. RESULT AND DISCUSSION

The first step in the study was to search in ProQuest, which produced a first set of 61,650 articles. Because there were so many results, filters were used to narrow down the dataset, making it easier to analyze the number of articles. The filtering rules included the type of document, the language, and where the document came from. This made sure that only peer-reviewed articles published in English were kept. Also, some topics that are not directly related to the study, like climate change, political science, ethnicity, economics, and business administration, were purposely left out of the search results. The initial filtering reduced the number of articles found on ProQuest to 100. After searching the ProQuest database, a similar method was used on the ScienceDirect platform, which led to finding 7,298 articles at first. Like the previous database, filters were also used to narrow down the choice to the most relevant articles. The criteria for choosing articles included the type of article, the subject, the language, and how the information can be accessed. This helped to make sure that only studies relevant to sharing health information and using AI were included. Using this filtering method, it is found 318 articles are found that are important. The ScienceDirect database was very helpful for finding research articles about new technology in AI and how it is used in health communication. This resource provided important information that helped the overall study. The last database used for the study was EBSCOhost, which first produced 213 articles. The way EBSCOhost filters information is also strict. It looks at where the documents come from, the language used, and how relevant the articles are to the study's keywords.

After applying these filters, the number of relevant articles was reduced to 18. This database provided a variety of research from different fields, especially studies that look at how AI and public health communication relate to each other. These studies are important for the goals of this study. The results from the three databases added up to 436 articles. At this stage, the articles were reviewed again to make sure they matched the study's keywords and main topics. The extra refinement phase involved a thorough review of the

article titles, summaries, and, when needed, the full texts. This assessment aimed to find out how well the content answered questions about the role of AI in health communication, making health information accessible to everyone, and supporting personalized health education. Articles that were hard to access or didn't meet the required importance standards were removed from the final sets of data. In summary, after carefully reviewing many articles, it came to ten articles that are most useful for to this study goals. The articles provide a clear and thorough way to look at how AI can help improve public health communication and sharing of information. They focus especially on making communication more professional and accessible to everyone. The studies selected cover a variety of topics within the study area to make sure the overall information is complete and relevant to the study goals.

Table 1. Articles on the Potential of AI in Democratizing Health Information

No	Authors	Titles	Year	Summary
1	Bala, S., Keniston, A., & Burden, M.	Patient Perception of Plain-Language Medical Notes Generated Using Artificial Intelligence Software: Pilot Mixed-Methods Study.	2020	AI software can change medical notes into easy-to-understand words, which most patients find helpful. The limits of this study are that it had a small number of participants, only looked at people in the hospital, and might have other factors that could affect the results. Bigger studies are needed to understand things better. What we learn from patients during guided interviews can help shape the future of this technology.
2	Bajwa, J., Munir, U., Nori, A., & Williams, B	Artificial intelligence in healthcare: transforming the practice of medicine.	2021	AI is an important area in computer science that can greatly change how medicine is practiced and how healthcare services are managed. In this review article, the authors explain recent progress in using AI in healthcare. They offer a clear plan for creating effective, trustworthy, and safe AI systems, and also look into possible future paths for healthcare systems that use AI.
3	Sharma, M., et al.	Artificial Intelligence Applications in Health Care Practice: Scoping Review.	2022	The article highlights that simple AI systems that can do some tasks by themselves, along with other ways to handle information, to gain useful knowledge. It is also needed to study more about how to use advanced AI systems in regular healthcare. It's important to pay attention to certain healthcare problems, like building trust, clearly explaining how AI is used, creating simple solutions, and handling privacy and data protection issues. This effort will help make a simple and reliable plan for using AI in healthcare.
4	Momenaei, B., et al.	Appropriateness and Readability of ChatGPT-4-Generated Responses for Surgical Treatment of Retinal Diseases.	2023	Most of the answers given by ChatGPT-4 were usually in a very good quality. At present, ChatGPT and similar language models may not provide accurate or trustworthy information. Improving how trustworthy and easy to read answers are, especially in medicine, is an important topic for study. It's important for patients, healthcare workers, and the public to understand what these tools can and can't do when it comes to advice about eye health and overall health.
5	Li, H., et al.	Decoding radiology reports: Potential application of OpenAI ChatGPT to enhance patient understanding	2023	This study shows that ChatGPT can successfully make radiology reports easier to understand for the average person in the U. S An adult is a grown-up person. They note big improvements in FRES, FKRL, and the

No	Authors	Titles	Year	Summary
		of diagnostic reports.		number of words used; the last one needs the right context for different types of communication.
6	Wang, H., Wu, W., Dou, Z., He, L., & Yang, L.	Performance and exploration of ChatGPT in medical examination, records and education in Chinese: Pave the way for medical AI.	2023	ChatGPT, which uses GPT-4, is similar to doctors in China who have passed the CNMLE test and meets the usual requirements for medical graduate programs in China. GPT-4 can help summarize discharge papers and improve group learning. Its good speaking ability makes it easier for people to interact with computers. GPT-4 works much better than GPT-3. 5 in many ways and makes fewer mistakes. It especially does a great job understanding Chinese medical tasks. AI systems can make mistakes, have legal problems, and raise moral questions. The authors discovered that ChatGPT can help improve healthcare as part of a digital health system, which makes Medical AI important.
7	Gou, F., Liu, J., Xiao, C., & Wu, J.	Research on Artificial-Intelligence-Assisted Medicine: A Survey on Medical Artificial Intelligence.	2024	AI is being used in many areas of medicine and is becoming more popular. This study looks at AI research in six main areas: genetics, drugs development, medical imaging, electronic health records, health management, and medical robots. It talks about the history of AI in medicine and its current use, and it explores both the benefits and challenges of AI in healthcare. Even though AI has many problems to solve in medicine, it has a lot of potential to grow. AI helps people. It helps doctors, but it doesn't take their place. AI is mainly a simple and common tool that labs and scientists use repeatedly for their research.
8	Araujo, S. M., & Cruz-Correia, R.	Incorporating ChatGPT in Medical Informatics Education: Mixed Methods Study on Student Perceptions and Experiential Integration Proposals.	2024	The study provides useful information about what medical students think and how to use ChatGPT in teaching. This can help professors improve their lessons on medical informatics. The research looks into what ChatGPT can do, highlights the importance of working together in schools, points out subjects that can benefit from it, and shows how it can lead to new and exciting ways of learning. The proposed ideas aim to help future health care workers succeed in the fast-changing world of digital health care.
9	Sacoransky, E., Kwan, B. Y. M., & Soboleski, D.	ChatGPT and assistive AI in structured radiology reporting: A systematic review.	2024	ChatGPT and helpful AI can greatly improve radiology reports, making them more accurate and consistent while using healthcare resources more efficiently. In the future, we might combine quick question-asking, ChatGPT, and Retrieval Augmented Generation (RAG) into the process of diagnosing problems. Ongoing research, development, and watching over ethical practices are very important to make the most of AI in radiology.

No	Authors	Titles	Year	Summary
10	Tepe, M., & Emekli, E.	Decoding medical jargon: The use of AI language models (ChatGPT-4, BARD, microsoft copilot) in radiology reports.	2024	AI language models can make radiology reports easier to understand, which may help patients better understand their health and get more involved in their health choices. But their ability to judge how urgent medical conditions are based on X-ray or scan reports shows that improvements are needed.

Healthcare atmosphere is also changing due to technological advances of AI. One of its emerging impacts is the production of enhanced communication process between medical personnels and their patients. This is due to AI's capabilities to overcome existing language constraints, for example, interpreting complicated medical vocabularies into perceptible words for non-medical public. According to Bajwa et al [14], prior to AI existence, the inability to comprehend complicated medical terms had significantly affect patients and also their caregivers' decisions in adhering medical treatments. These include patients' compliance to prescribed medicine and caregivers' acceptance to doctor's suggestion and recommendation. By converting sophisticated terminologies into more understandable texts, AI promotes better understanding of the non-medical public to health and medical conditions, which in turn, elevates their engagement related to their healthcare.Research conducted by Bala et al. [15]) are also supported similar results. According to Bala et al, medical reports presented to patients, in apparent texts produced by AI, are proven to be more comprehensible and favored by them. In adherence to that, patients' reception to their medical condition and treatment is also improving. Tepe and Emekli [16] further reinforce these findings, highlighting that generative AI like ChatGPT-4 and Bard can break down sophisticated radiology records into simplified information that can be interpreted by wider public. This is also futher supported by Sacoransky, et al [17]This means, democratic atmosphere in accessing health information can be produced by inducing patients' autonomy in understanding their medical conditions without worrying the language barrier.Besides making language easier to understand, AI can also provide personalized health education in which also strengthen its role in democratizing health information.

This is an important improvement that helps make health information accessible to everyone . Personalizing health information for each patient makes sure that it meets different needs, reading abilities, and cultural backgrounds. Momenaei et al. [18] research highlighted that AI can help patients understand complex surgical procedures related to retinal treatments. This ability does more than just give basic information; it makes learning engaging for patients. The patients get explanations that relate directly to their unique medical history, treatment choices, and what to expect in the future. These tailored educational programs are especially helpful for patients with long-term illnesses because they need ongoing, updated information. AI's flexible programs help it improve the information it gives based on how patients interact with it. This creates a more helpful and supportive learning environment. This ongoing feedback helps patients learn more and feel more confident, allowing them to play a part in their long-term healthcare.Another important aspect of AI's potential in democratizing health information is its ability to help break down language barriers that enable people whose first language is not English from getting the healthcare services they need. Language differences can lead to miscommunication, confusion about diagnoses and treatments, and worse health results. Recent advancements in the comprehension of language and the facilitation of instant translation have rendered AI a formidable resource for enhancing interpersonal connections. A study by Wang et al [19]shown that AI can translate and summarize complicated medical records into Chinese. This facilitates comprehension for patients who do not speak English.

AI facilitates the instantaneous translation of health-related advice, medical documentation, and patient education materials. This technological advancement ensures equitable access to healthcare for individuals regardless of the language they speak. These skills are very important in societies with different cultures, health projects around the world, and emergencies, where clear communication can be a matter of life or death. In the future, AI will be able to speak many languages better, making sure that no patient is left out because of language problems. This means everyone will be provided with the opportunity to receive equal treatment around the world.In public health domain, AI is democratizing health information by

changing how we create and use data-based solutions. By looking at big and different sets of data, AI can find hidden patterns and predict new health trends. This helps create focused public health campaigns that aim to prevent problems. Araujo and Cruz-Correia [20] proposed that AI-based platforms can improve how people get involved by providing customized and engaging health information through digital tools. In a time when social media and online platforms are the main ways people get information, it's important for AI to create personalized health campaigns to connect with young people and those who often lack proper support. Also, using AI for outreach—like chatbots for education, personalized vaccination reminders, and specific health alerts—can greatly help people follow preventive health measures, lower the number of diseases, and create healthier communities.

Coherent to that, the ability of AI to make health information accessible to everyone is becoming clearer in both medical settings and community health programs. Besides helping with communication and learning, AI is changing the way patients and providers interact by making it easier for them to make decisions together. Sharma et al [21] noted that most AI systems today help people make decisions instead of acting on their own. This careful way of using AI ensures that it responsibly and effectively supports human skills. These tools help doctors make better choices, leading to safer and more efficient care while still keeping human control. Research shows that when doctors and patients make decisions together, patients are happier, follow treatment better, and have better health results. As AI gets better, it will help improve care that focuses on patients. This will lead to a change in how healthcare is done, making it more open and cooperative.On a larger level, Gou et al [22] pinpointed that AI is greatly helping healthcare systems by making diagnoses better, streamlining work processes, and tailoring health information to fit different groups of people. This is especially important in places where people speak different languages and there aren't many trained health workers available. AI tools like health apps help people find accurate and timely medical advice easily, without being held back by distance, language, or cost. AI tools help patients see how their health might change and how different treatment options could affect them. hey do this by using predictions, showing risks, and providing personalized treatment options. This helps patients work closely with their doctors to create care plans that match what they want, their values, and their life goals.

At the mean time, AI has the ability to make health information more available not only to the patients but also for medical professional, by changing how healthcare systems work with patients and doctors. Sharma et all [21]noted that AI technologies are being used more and more in healthcare. They act as tools to help doctors make better decisions instead of taking their place. Using AI smartly helps doctors and nurses make better choices, leading to better results for patients while keeping the important personal touch in care. It's important to note that Sharma et al noticed that AI systems, even if they are not very independent, can improve the way patients and doctors interact. They help doctors make decisions, point out risks, and customize treatments based on current data. These tools work well in busy places. They help doctors think less about details and allow them to communicate with patients in a clearer, more consistent way using data.The discussion shows how AI helps make health information more accessible to everyone. AI is changing how people get healthcare by making medical language easier to understand, providing personalized education that fits different cultures, translating information in real-time, and helping with public health strategies based on data. These new ideas are really useful in areas with many different languages and not many resources, because language issues have often made it difficult to give everyone fair treatment. AI helps doctors and patients communicate better, ensuring that everyone knows what's going on during medical care. As these technologies get better, using them wisely and responsibly can change how we discuss health and help make health opportunities fairer for everyone in the world.

IV. CONCLUSION

Using AI in healthcare is unavoidable, especially as it continues to improve and change the healthcare system. One area that has changed is making health information available to everyone. AI can understand complex medical words, customize health education for different people, and help overcome language and cultural differences. This makes healthcare information easier to access and understand for various groups of people. Also, using it in public health programs helps create specific plans based on facts

to improve preventive care and make better decisions. Right now, most AI technologies help people make decisions. However, more people are recognizing how important they are for teamwork and caring for patients. To use the benefits of AI in the best way, new applications should work on creating fair rules, understanding different cultures, and making sure everyone can access them easily. Through this, AI has the potential to be an accelerator in changing health communication behaviors, thereby facilitating proper, comprehensible, and actionable provision of health information to every section of society.

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REFERENCES

[1] S. Ahmed, M. M. Alshater, A. El Ammari, and ..., "Artificial intelligence and machine learning in finance: A bibliometric review," ... *Business and Finance*, 2022, [Online]. Available: https://www.sciencedirect.com/science/article/pii/S0275531922000344

[2] P. Singh, Z. Elmi, Y. Lau, M. Borowska-Stefańska, and ..., "Blockchain and AI technology convergence: Applications in transportation systems," *Vehicular ...*, 2022, [Online]. Available: https://www.sciencedirect.com/science/article/pii/S2214209622000687

[3] E. Sezgin, "Artificial intelligence in healthcare: complementing, not replacing, doctors and healthcare providers," *Digit Health*, 2023, doi: 10.1177/20552076231186520.

[4] L. Chen, P. Chen, and Z. Lin, "Artificial intelligence in education: A review," *Ieee Access*, 2020, [Online]. Available: https://ieeexplore.ieee.org/abstract/document/9069875/

[5] E. A. Waters, "Testing Explanations for Skepticism of Personalized Risk Information," *Medical Decision Making*, vol. 43, no. 4, pp. 430–444, 2023, doi: 10.1177/0272989X231162824.

[6] A. M. Svensson and F. Jotterand, "Doctor ex machina: A critical assessment of the use of artificial intelligence in health care," ***The Journal of Medicine and*** ..., 2022, [Online]. Available: https://academic.oup.com/jmp/article-abstract/47/1/155/6524316

[7] S. Gilbert, H. Harvey, T. Melvin, E. Vollebregt, and P. Wicks, "Large language model AI chatbots require approval as medical devices," *Nat Med*, 2023, [Online]. Available: https://www.nature.com/articles/s41591-023-02412-6

[8] M. Adegboye, "Impact of artificial intelligence on health information literacy: guidance for healthcare professionals," *Library Hi Tech News*, 2024, doi: 10.1108/lhtn-03-2024-0048.

[9] M. Gómez, P. Gill, and J. Fernández, "Barriers to diabetes management: Perspectives of women in Appalachia," ***J Appalach Stud,*** 2019, [Online]. Available: https://consensus.app/papers/diabetes-barriers-influence-women-diabetes-appalachia-abdoli/4bbc9e64ab8559e9aac8bc7e08f19a03/?utm_source=chatgpt

[10] S. Nam, C. Chesla, N. Stotts, L. Kroon, and S. Janson, "Barriers to diabetes management: patient and provider factors.," *Diabetes Res Clin Pract*, 2011, [Online]. Available: https://consensus.app/papers/barriers-diabetes-management-provider-factors-nam/f4916016038159128748f4503cc5376b/?utm_source=chatgpt

[11] B. Muvuka, R. M. Combs, S. D. Ayangeakaa, and ..., "Health literacy in African-American communities: Barriers and strategies," *... : Health Literacy ...*, 2020, doi: 10.3928/24748307-20200617-01.

[12] S. Gerke, T. Minssen, and G. Cohen, "Ethical and legal challenges of artificial intelligence-driven healthcare," *Artificial intelligence in healthcare*, 2020, [Online]. Available: https://www.sciencedirect.com/science/article/pii/B9780128184387000125

[13] A. H. Duin and I. Pedersen, *Augmentation technologies and artificial intelligence in technical communication: Designing ethical futures*. taylorfrancis.com, 2023. doi: 10.4324/9781003288008.

[14] J. Bajwa, U. Munir, A. Nori, and B. Williams, "Artificial intelligence in healthcare: transforming the practice of medicine**," *Future Healthc J,*** vol. 8, no. 2, pp. e188–e194, 2021.

[15] S. Bala, A. Keniston, and M. Burden, "Patient Perception of Plain-Language Medical Notes Generated Using Artificial Intelligence Software: Pilot Mixed-Methods Study," ***JMIR Form Res***, vol. 4, no. 6, p. e16670, Jun. 2020, doi: 10.2196/16670.

[16] M. Tepe and E. Emekli, "Decoding medical jargon: The use of AI language models (ChatGPT-4, BARD, microsoft copilot) in radiology reports," *Patient Educ Couns*, vol. 126, p. 108307, 2024.

[17] E. Sacoransky, B. Y. M. Kwan, and D. Soboleski, "ChatGPT and assistive AI in structured radiology reporting: A systematic review," *Curr Probl Diagn Radiol*, 2024.

[18] B. Momenaei *et al.*, "Appropriateness and readability of ChatGPT-4-generated responses for surgical treatment of retinal diseases," *Ophthalmol Retina*, vol. 7, no. 10, pp. 862–868, 2023.

[19] H. Wang, W. Wu, Z. Dou, L. He, and L. Yang, "Performance and exploration of ChatGPT in medical examination, records and education in Chinese: pave the way for medical AI," ***Int J Med Inform***, vol. 177, p. 105173, 2023.

[20] S. Magalhães Araujo and R. Cruz-Correia, "Incorporating ChatGPT in medical informatics education: mixed methods study on student perceptions and experiential integration proposals," ***JMIR Med Educ***, vol. 10, p. e51151, 2024.

[21] M. Sharma, C. Savage, M. Nair, I. Larsson, P. Svedberg, and J. M. Nygren, "Artificial intelligence applications in health care practice: scoping review," ***J Med Internet Res,*** vol. 24, no. 10, p. e40238, 2022.

[22] F. Gou, J. Liu, C. Xiao, and J. Wu, "Research on artificial-intelligence-assisted medicine: a survey on medical artificial intelligence," *Diagnostics*, vol. 14, no. 14, p. 1472, 2024.