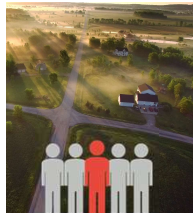


AI-Enhanced Health Literacy: Transforming Chronic Disease Management in American Rural Areas

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Background

Nearly half of all Americans, amounting to 133 million individuals, are battling chronic illnesses, impacting every facet of their lives. This challenge hits harder in rural areas, where 1 in 5 residents face not only the higher risks of chronic diseases but also significant obstacles in accessing quality healthcare.



Key issues include:

- A pronounced disparity in health outcomes, with rural residents more likely to suffer severe consequences from chronic illnesses compared to their urban counterparts.
- A critical gap in health literacy, exacerbated by health materials not meeting the comprehension needs of the rural populace, hindering effective care and treatment adherence.
- Socioeconomic factors, such as lower income levels and reduced access to nutritious food and exercise opportunities, further escalate the risk of chronic conditions in these communities.

Leveraging Artificial Intelligence (AI) to devise customized health literacy plans represents a promising avenue to bridge the health literacy gap, offering a beacon of hope for enhancing healthcare delivery and outcomes in rural America.

Project Aim

Project aims to

- create an AI-driven solution for customizing health literacy for rural populations with chronic illnesses like Heart Disease, Cancer and Diabetes
- assess how these tailored plans improve patient engagement, understanding, and self-care. Focused on overcoming barriers such as low health literacy and limited healthcare access, our goal is to enhance health outcomes and reduce disparities in these underserved communities.

Understanding Health Literacy

Empirical data bolsters the adoption of health literacy strategies to enhance the dissemination of health information to patients and their families, revealing:

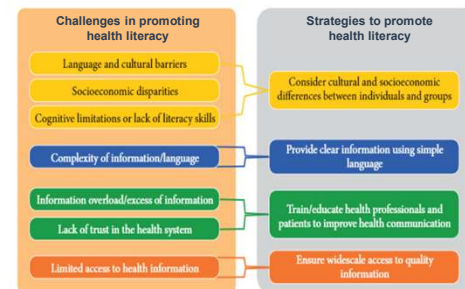
- Enhanced patient/family understanding
- Enhanced involvement in treatment
- Improved self-management and decision-making
- Increased safety, quality, and experience of care
- Better health outcomes; and decreased health inequalities

The AI Solution

Range of studies explored the potential of AI-driven approached in health literacy research.

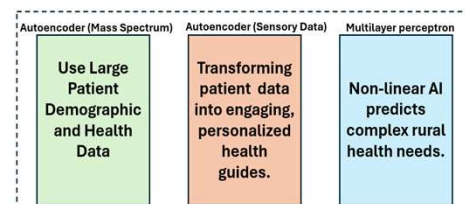
- AI Augmented lifelong learning.
- AI-assisted translation, simplification and summarization
- AI-based content filtering
- AI in prompting digital health literacy.

Figure 1 : Main challenges in prompting rural area health literacy by AI - Natural Language Processing (NLP) and strategies to address each challenge. Source : Author



Practice Innovation

By analyzing patient data—including race, income, education, and language proficiency—we have designed predictive models which will identify specific communication needs and improve ability to provide timely and customized education plan.

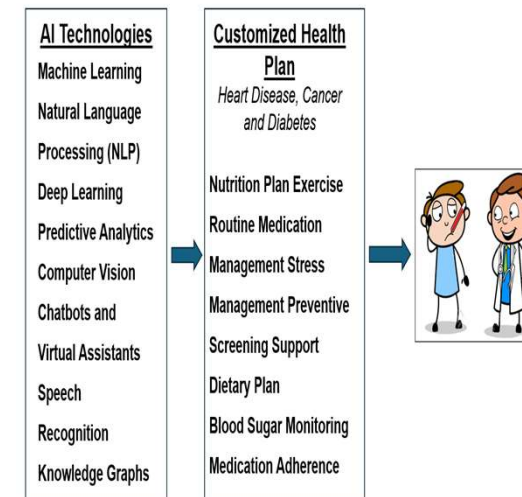


9-Layer predictive model

Complex Analysis	Aligns health literacy with patient profiles.
Data Reduction	Clarifies health data complexity.
Customization	Tailors information to patient needs.
Complexity Handling	Manages intricate rural health data.
Precision Training	Enhances AI for health literacy accuracy.
Generalization	Adapts AI across rural demographics.
Advanced Analysis	Gains deeper health literacy insights.
Accuracy	Improves health intervention precision.
Adaptability	Refines methods for rural health challenges.

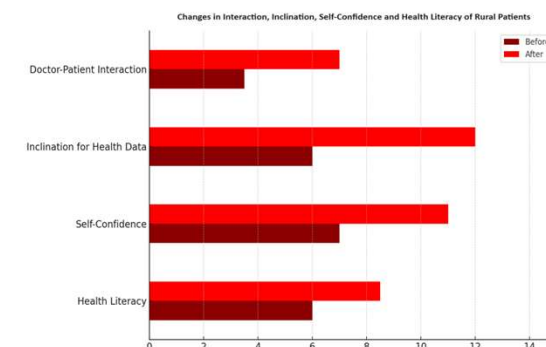
This illustration conveys the potential of AI-driven predictive models to tailor health literacy programs for rural communities, harnessing complex data to deliver personalized and accessible health education. Through innovative techniques like autoencoding and multilayer perceptron algorithms, such models promise to transform vast patient data into actionable insights, fostering better health outcomes in traditionally underserved areas.

Figure 2 : Use of AI Technologies to create customized patient health plan Source : Author



Data Analysis

Survey conducted with patients with implementation of few pilot AI enhanced health literacy method has shown significant improvement in the result.



Based on preliminary data collection, patients experience :

- Self-reported understanding of health topics improved by 35%.
- A boost in health self-management confidence by 10%.
- Enhanced doctor-patient communication and rapport.
- Heightened patient engagement in seeking out health information.

Conclusion

- Achieved a 35% increase in patient health literacy, bolstering individual empowerment in managing chronic conditions.
- Fostered stronger doctor-patient relationships, leading to more proactive health information-seeking behavior.
- Set the stage for sustainable health literacy improvements in rural America through continuous AI-driven innovation.
- As we advance, these milestones pave the way for a health-literate rural America, where empowered patients and informed providers drive a future of equitable healthcare access and improved quality of life.

Sources

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