



# Towards Conversational Assistants for Health Applications: using ChatGPT to Generate Conversations about Heart Failure



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## A. Introduction

- **Goal:** Explore ChatGPT potential to simulate self-care conversations for African American (AA) Heart Failure (HF) patients
- **AA:** face worse outcomes, need self-care
- **Self-care:** managing salt intake, exercise, adhering to medications [1]

- **Vision:** develop culturally sensitive agent to support self-care
- **Computational Need:** Limited representative datasets
- **Conversations:** Simulated between patient and patient educator (PE)

## B. Generating Based on Self-Care Aspects

Okay, but what kind of foods should I be eating or avoiding?

**PE:** Great question! In general, you should aim to eat more fruits, vegetables, whole grains, and lean protein. These provide heart-beneficial nutrients. Limit salt, **sugar, unhealthy fats**, and alcohol intake as they can worsen heart conditions.

How about beverages? Can I still drink things like sweet-natured tea or alcohol?

**PE:** Sweet tea and alcohol can **add extra calories and sugar to your diet**, which can lead to weight gain and can strain your heart. **Try drinking more water** or unsweetened beverages, and limit alcohol intake.

Conversation about limiting salt and sugar and increasing water intake

## C. Generating Based on African American Vernacular English (AAVE)

- **AAVE Language:** Way to introduce cultural compatibility [2]
- **Educators should respect AAVE**, should not initiate, adopt it themselves

Got it, 1.5 to 2 liters. Does that include stuff like juice and soup?

**PE:** Yup, it sure does. Juice and soup count, too. Just remember to spread 'em out during the day so you ain't **guzzlin'** too much at once.

What 'bout coffee and tea? I love my **mornin'** coffee.

Conversation where both patient and educator are speaking AAVE

## D. Generating Based on Social Determinants of Health (SDOH)

- **SDOH:** Influence health outcomes [3], shape healthcare experience
- Explored if ChatGPT can adapt to specific patient characteristics

But, my neighborhood is not safe for walking, what can I do?

**PE:** I understand. **What about a stationary bike or a treadmill at home?**

I can't afford to buy exercise equipment. Is there anything else I can do?

**PE:** Sure! You can do chair exercises or household chores which can also help to keep you active.

Exercise domain: Generated conversation for patient {gender: female, age: elderly, neighborhood: unsafe, socio-economic condition: below poverty line }

## E. Generating Based on SDOH-informed Reasoning

- **Idea:** Reasoning Enhances Large Language Model (LLM) capabilities [4]
- First generate reasoning given SDOH features
- **Reasoning:** Premise, Reasoning, Solution, Anticipate Barrier, Solve Barrier, Educate

What exercises can I do at home to help with my heart failure?

**PE:** You can start with walking, using household items as weights, or following online workout videos.

I'm worried about safety in my neighborhood.

**PE:** Try walking in a **safe area** or look for community centers with affordable exercise options.

Generated conversation given reasoning, SDOH features.

## F. Research Findings

- **Do generated conversations adhere to convention of human conversation?**  
Did not engage in 2-way conversation, PE dominates conversation
- **Were generated conversations appropriate?**  
Only generated positive examples without contextualising
- **Can ChatGPT express empathy towards patients?**  
Only in positive situations ("That's fantastic!"), tone-deaf conversations in negative situations

- **Can ChatGPT personalize conversations based on SDOH features of patients?**  
Overlooks patient struggles/ ignore potential barriers involved.
- **Is generating reasoning before conversations more effective than directly generating conversations?**  
Incorporating reasoning improves dialogue quality

## G. Conclusions and Future Work

- Critical role of prompt design
- Incorporating SDOH, reasoning improves dialogue quality
- Address lack of empathy and engagement
- Run systematic evaluation

## H. Acknowledgements

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## I. References

[1] I Gupta, B Di Eugenio, D Salunke, A Boyd, P A Meares, C Dickens, O Garcia. 2020. Heart failure education of African American and Hispanic/Latino patients: Data collection and analysis. In Proceedings of the First Workshop on Natural Language Processing for Medical Conversations, ACL

[2] J McWhorter. 2016. Talking back, talking black: Truths about America's Lingua Franca.

[3] M Marmot, R Wilkinson. 2005. Social determinants of health.

[4] J Wei, X Wang, D Schuurmans, M Bosma, F Xia, E Chi, Q V Le, D Zhou, 2022. Chain-of-thought prompting elicits reasoning in large language models. Advances in NeurIPS