

Can ChatGPT Generate Personalized Diabetes Education Materials from Simulated Clinical Notes at the Point of Diagnosis?



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Introduction

- Personalized diabetes education is essential but time-consuming to create in clinical settings.
- LLM (Large language models) may provide an efficient solution by directly using EMR-style notes.

Study Design

- Pilot study using simulated clinical notes.
- Sample: 4 patient scenarios varying in age, race/ethnicity, comorbidities, and social determinants of health.
- LLM Models Used:
 - Gemini 2.5: patient note generation
 - ChatGPT-4o: health education content and rubric
 - Claude Sonnet 4: rubric-based evaluation

Evaluation of Materials

- Readability*:
 - Flesch-Kincaid Grade Level scale
- Cultural Relevance*:
 - Language and cultural relevance
- Medical Accuracy*:
 - Alignment with American Diabetes Association recommendations
- Actionability*:
 - Patient Education Material Assessment Tool (excluding visual aid)

*assessed on 1-5 scale



'Sarah Chen'
(Note #1)

- 42 y/o Asian female
- Reports polydipsia, polyuria, and unexplained weight loss.
- BMI: 24.5 kg/msq
- A1c: 7.8%



'David Miller'
(Note #2)

- 67 y/o White male
- Reports persistent fatigue, blurry vision, and peripheral neuropathy in both feet
- BMI: 32.1 kg/msq
- A1c: 10.8%



'Aisha Jackson'
(Note #3)

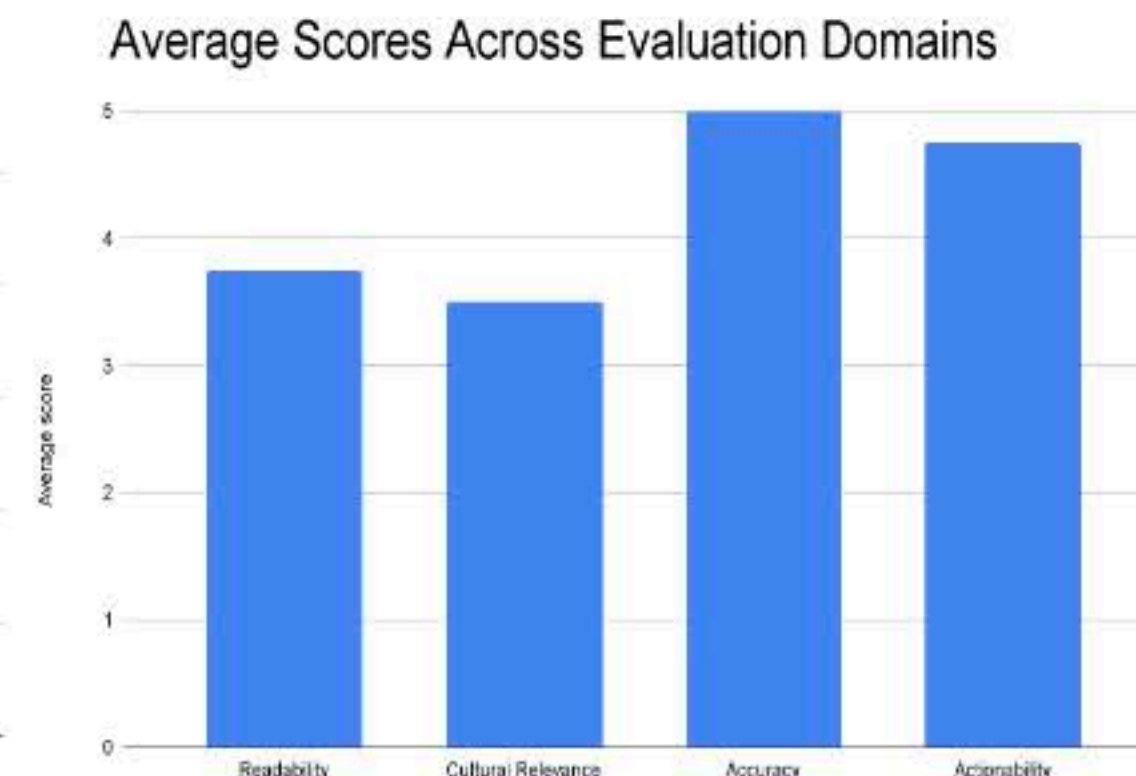
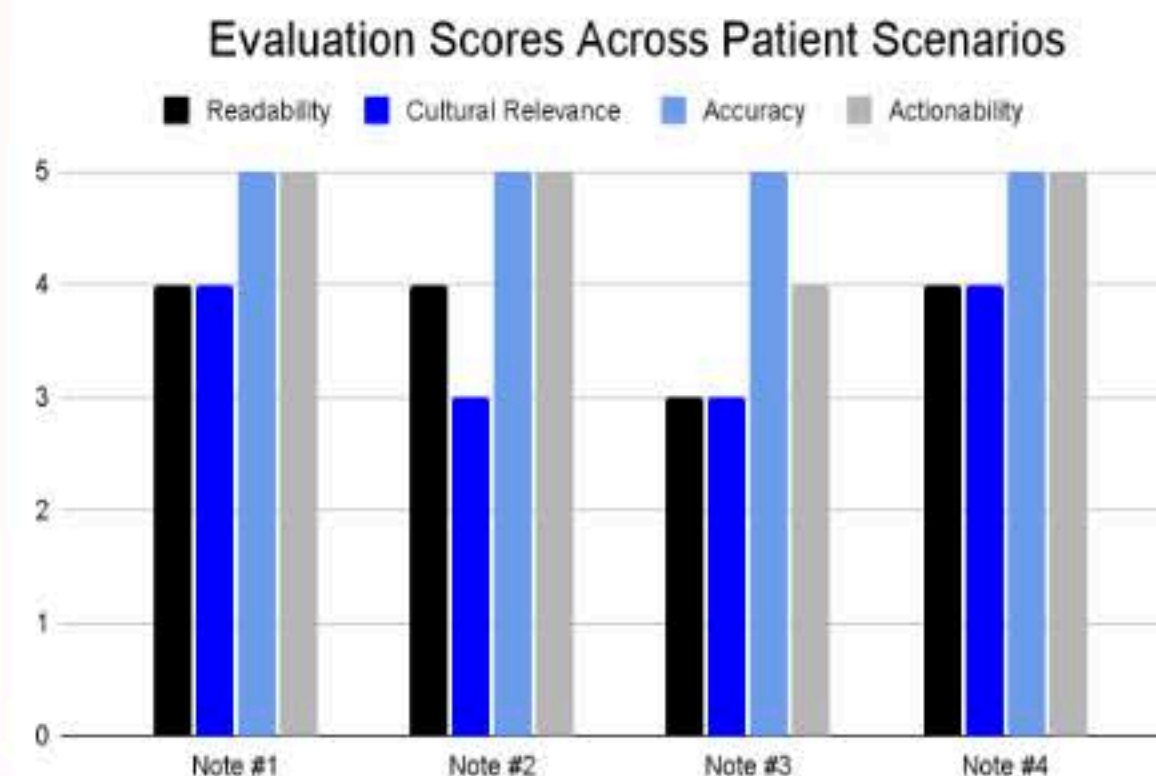
- 55 y/o African American female.
- Elevated blood glucose
- No symptoms of polyuria, polydipsia, or weight loss.
- BMI: 31.8 kg/msq
- A1c: 6.9%



'Juan Garcia'
(Note #4)

- 32 y/o Hispanic male
- Sought care to due to non-healing foot wound and blurred vision
- BMI: 28.9 kg/msq
- A1c: 8.9%

Results



Conclusions

- ChatGPT created patient-specific diabetes education materials with strong performance in accuracy and actionability.
- Readability and cultural relevance across different patient notes were heterogeneous.
- LLMs show potential to enhance patient education by saving time and improving personalization in clinical care.

Limitations

- Small sample size could lead to potential generalization.
- Potential Claude model-specific scoring bias.
- Culturally specific recommendations were limited or not expanded on in detail.

Implications & Future Directions

- LLMs may streamline cost-efficient, personalized patient education in time-constrained clinical workflows.
- Future studies should explore
 - HIPAA-compliant LLMs using real-life patient notes at the time of diagnosis.
 - Accuracy comparison between LLMs and clinicians using the measured domains.
 - Broader spectrum of cultural, language, and chronic conditions.