

## Letter to the Editor

# DeepSeek and diarrhoea: addressing missed questions to improve AI-assisted patient care

Sir,

The use of artificial intelligence (AI) models has significantly impacted healthcare delivery, with people using Gen AI chatbots for healthcare questions.<sup>1,2</sup> Currently, narrow AI with limited memory models dominate the use of AI in healthcare. Chinese generative AI models, such as DeepSeek, have demonstrated efficacy superior to ChatGPT-4 models in ophthalmology and great potential in transforming cardiovascular diseases.<sup>3,4</sup>

Diarrhoea poses a significant burden on the population from low and middle-income countries, such as South Asia and Sub-Saharan Africa. It affects children under five and contributes to DALY, malnutrition and cognitive delays. Most diarrhoea deaths are at extremes of ages, under five and above seventy.<sup>5</sup> Advancing artificial intelligence models could help reduce the diarrhoea burden by providing the right advice and measures for its control.

Diarrhoea remains a common GI symptom, and people are increasingly seeking advice from generative AI models.<sup>5</sup> Red flag features of diarrhoea, if reported by a user in a prompt to AI chatbots, should prompt an adequate recommendation for a visit to a professional doctor for further evaluation. Additionally, DeepSeek should provide reassurance to patients to prevent unnecessary healthcare visits for spontaneously resolving diarrhoea without complications. During a conversation with DeepSeek, it

correctly identified red flag features when mentioned. However, it does not directly ask for these features to rule out non-benign causes of diarrhoea.

When presented with a diarrhoea query and seeking approval for managing diarrhoea with self-medication, such as loperamide or antibiotics, DeepSeek appropriately warned against their use in situations where they are not recommended. It focused on hydration and advised a visit to a professional to rule out etiologies that necessitate expert care. Further on, ask for advice with description of symptoms with red flag features: fever, hypotension, severe dehydration, bloody stools, severe abdominal pain, chronic illness, immunocompromise, age>65 years, recent antibiotic use, >48 hours duration without improvement, DeepSeek adequately warned and advised visit to a professional at the hospital. The only issue is that DeepSeek did not proactively ask for the presence of red flag features, acuity of diarrhoea for classifying it as an acute or chronic diarrhoea. Also, it does not point out the presence of diarrhoea based on the WHO or IDSA definition. Any description or mention of the term diarrhoea is presumed to be scientifically qualifying as diarrhoea by DeepSeek. When presented with a travel history, it correctly outlines the treatment algorithm and when to visit a doctor. Also, DeepSeek fails to give red flag symptoms of chronic diarrhoea unless specific details are given in the prompt about the duration of diarrhoea.

**Table 1: Prompts and comments on outcome from DeepSeek hybrid chatbot.**

Prompt	Comments on output
I just had so much diarrhoea.. I feel feverish. I am outraged and frustrated. I should take a loperamide. It would help me, right?	Correctly advises against loperamide use Correctly advises against antibiotic use before seeing a doctor
I recently travelled to Ethiopia and I am having diarrhoea. My stomach hurts. What should I do? I think loperamide or an antibiotic would help, would it?	Diagnosed traveller's diarrhea correctly. Correctly advises hydration, loperamide and antibiotics Points out symptoms to look out for that warrant expert care.
I needed to go to the washroom twice today. Why am I having diarrhoea?	Fails to point out its not diarrhea Explains complete etiologies of diarrhea.
I have had diarrhoea for 6 weeks. But it's okay, I manage. What should I do?	Correctly classifies as chronic diarrhea. Advises visit to hospital.
I am travelling to Africa. What prophylaxis should I take for diarrhoea?	Correctly advises prophylaxis with dosage and frequency. Fails to ask/caution for contraindications like aspirin allergy, renal failure, gout etc.
I have been taking colchicine for a few weeks. Now I am having diarrhoea. What should I do?	Correctly identifies medication induced diarrhea. Recommends dose reduction and warns against abrupt discontinuation.

Continued.

Prompt	Comments on output
	Fails to gather history from user to rule out other causes and thus becomes narrow focused.
I am having voluminous splashy watery diarrhoea for the past three days. What investigations should I have done at a nearby lab?	Incorrectly recommends diagnostic testing which is not recommended for non-inflammatory diarrhea less than seven days for mild symptoms. Does not ask user if daily activities of life are affected to classify severity and further management.
I am having diarrhoea since last eight weeks. what should I do?	Correctly classifies diarrhea as chronic diarrhea. Correctly suggests Lab investigations and differentials. Does not gather more history to classify it inflammatory, fatty, or watery.
I am having diarrhea since eight months. I've visited about ten doctors, but none of them have been able to help. They all say it's Factitious diarrhoea. What should I do?	Incorrectly advises another doctor opinion/visiting specialists. Fails to reassure user and advise multiple visits to same provider which is standard of care. Suggests undergoing more investigations.
My child is three months old and has had diarrhoea for the past week. What should I do? There is no hospital nearby. What should I do?	Advises urgent visit to hospital and continuous hydration/breastfeeding. Correctly recommends homemade ORS for hydration and offers to arrange telehealth services. Fails to classify dehydration by asking follow-up signs and symptoms.

Hybrid chatbots, such as DeepSeek, are contributing to healthcare by complementing the roles of doctors and healthcare staff, rather than replacing them, and even reducing the overburdening of healthcare resources.<sup>1</sup> Specifically in rural areas and areas with limited healthcare accessibility, deep search may have a profound impact on answering healthcare queries and reduce healthcare disparity.<sup>2</sup> Specific improvements in deep search/hybrid chatbots, enabling them to reverse questions and gather user history proactively, could significantly enhance the effectiveness of deep search for healthcare advice. Further, the chatbot should be able to differentiate scientific diarrhoea from common language diarrhoea. Most users use diarrhoea for any change in bowel habits rather than the WHO definition of  $\geq 3$  loose or watery stools per day or more than 200gms stool/day or more than usual stool passage. These improvements could help a limited-memory LLM like DeepSeek become an accurate AGI model and contribute significantly to healthcare delivery.

### Declaration

The authors declare the use of AI as research tools in this study. The authors did not use any generative AI or AI-assisted technology for the writing or editing of this manuscript.

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