

Letter to Editor

Exploring the role of DeepSeek artificial intelligence in patient education and diagnosis for chronic kidney disease: promise and precautions

Sir,

The integration of artificial intelligence (AI) into healthcare is revolutionizing how patients access medical information.

Chronic kidney disease (CKD) is characterized by the presence of kidney damage or an estimated glomerular filtration rate (eGFR) of less than 60 mL/min/1.73 m², persisting for 3 months or more.¹

Patient education is paramount in CKD management, empowering individuals to engage in self-care and informed decision-making.

DeepSeek is an AI company developing large language models (LLMs). In simulated interactions, I evaluated DeepSeek AI's responses to common CKD-related patient questions. The chatbot provided concise, accessible

explanations across several domains, including disease staging, lifestyle modification, treatment options, and prognosis. Such tools are particularly valuable for patients who may have limited access to healthcare professionals or wish to supplement in-clinic advice.

Table 1 summarizes selected queries and DeepSeek's corresponding responses, demonstrating model's ability to convey complex medical concepts in simple language.

AI is also demonstrating transformative potential in the early diagnosis and risk stratification of CKD.

CKD remains underrecognized and underreported, partly owing to a lack of cost-effective screening measures or machine learning-driven algorithms. Integrated with EHRs, especially in primary care settings, AI screening can trigger early nephrology referral and improve outcomes in patients.²

Table 1: Selected queries and DeepSeek's corresponding responses.

Question	Response by DeepSeek AI
What is CKD? What does "chronic" mean in this context?	CKD is a long-term, progressive loss of kidney function (lasting ≥3 months). "Chronic" means persistent and irreversible, unlike acute kidney injury. Key points: Causes: Diabetes, hypertension, and kidney inflammation. Stages: 1-5 (based on kidney function decline). Outcome: Can lead to kidney failure if untreated. Early action is critical-most damage can't be reversed, but progression can be slowed.
What lifestyle changes do I need to make (diet, exercise, smoking, alcohol)?	Diet Protein: Moderate (0.8g/kg early CKD), lower (0.6g/kg late CKD)-choose eggs, fish, lean poultry. Salt: <1,500-2,300 mg/day-avoid processed foods. Potassium/Phosphorus: Limit if high (avoid bananas, soda, processed meats). Fluids: Normal early CKD, may restrict late CKD. Lifestyle Exercise: 150 mins/week (walking, cycling) + strength training. No smoking-worsens kidney damage. Alcohol: ≤1 drink/day (women), ≤2 (men). Key: Slow progression with diet, meds, and healthy habits.
How often will I need to see the doctor or have tests done?	CKD monitoring guide Stages 1-2 (eGFR ≥60): Check-up every 6-12 months Stage 3a (eGFR 45-59): Every 3-6 months Stage 3b (eGFR 30-44): Every 3 months Stage 4 (eGFR 15-29): Every 1-3 months (see nephrologist) Stage 5/Dialysis: Monthly+ (specialist care) Emergency signs: Rapid eGFR drop (>5/year) High potassium (>5.5) Severe swelling/breathing trouble

Continued.

Question	Response by DeepSeek AI
<p>How will CKD affect my quality of life (work, hobbies, family, relationships)?</p>	<p>Living with CKD: Key impacts and solutions Work challenges Fatigue and frequent appointments may reduce productivity Solutions: Request flexible hours, prioritize tasks, and use ADA accommodations Social life adjustments Dietary limits and fatigue affect activities. Solutions: Choose kidney-friendly foods, adapt hobbies, and consider home dialysis relationship changes Caregiving needs and emotional stress may arise Solutions: Open communication, share responsibilities, seek counseling Mental health 40% experience depression/anxiety; Solutions: Support groups, sleep routine, kidney-safe antidepressants Key: Proactive management helps maintain quality of life. Focus on what you can control and seek support early.</p>
<p>What can I do to slow down or stop the progression of CKD?</p>	<p>Control blood pressure Target: <130/80 mmHg Use ACEi/ARBs (kidney-protective) Follow a low-sodium DASH diet, exercise 30 minutes/day Manage blood sugar (If Diabetic) Target HbA1c: <7% Use SGLT2 inhibitors/GLP-1 agonists (slow CKD) Kidney-friendly diet Moderate protein (plant-based preferred) Limit salt (1,500–2,300mg/day), potassium/phosphorus if high Balance fluids Avoid kidney harm No NSAIDs (use acetaminophen) Be cautious with contrast dyes/supplements Monitor regularly Check eGFR every 3-6 months, urine albumin yearly Watch for swelling, fatigue, and urine changes Healthy Lifestyle Quit smoking, limit alcohol Sleep 7-8 hours, exercise 150 mins/week Early action=Better outcomes!</p>

Machine learning algorithms can assess vast amounts of patient data to identify correlations and associations between patient features and treatment responses, resulting in personalized treatment recommendations that could enhance outcomes for CKD patients, ease patient education, and help them achieve long-term care goals.³

Patients should understand, though, that AI is a supplemental tool and should not replace direct consultation with a healthcare professional (nephrologist, dietitian, nurse). Individualized care plans, medication adjustments, and dietary recommendations must come from the medical team.

While AI can provide clear information, it lacks the personalized empathy, understanding, and emotional support of a human healthcare provider.⁴

It also cannot answer follow-up questions in a dynamic, diagnostic way.

Therefore, we need to develop effective research strategies to integrate AI safely among patients and effectively integrate it alongside human healthcare providers.

Declaration

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

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REFERENCES

1. Vaidya SR, Aeddula NR. Chronic Kidney Disease. In: StatPearls. Treasure Island (FL): StatPearls Publishing; 2025.
2. Singh P, Rizvi SA, Bansal A, Saxena A, Jain A, Patel R, et al. Artificial intelligence in nephrology: clinical applications and challenges. *Kidney Med.* 2025;7(1):100927.
3. Krisanapan P, Tangpanithandee S, Thongprayoon C, Pattharanitima P, Cheungpasitporn W. Revolutionizing chronic kidney disease management with machine learning and artificial intelligence. *J Clin Med.* 2023;12(8):3018.
4. Jabeen J, Saji JG. Evaluating AI-Generated Patient Education Guides: A Comparative Study of ChatGPT and Deepseek. *Cureus.* 2025;17(6):e85277.

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