Interactive chatbots as a tool to teach history taking in medical students – A scoping review

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INTRODUCTION

- History taking and communication are core clinical competencies in undergraduate healthcare education.
- Traditional teaching (simulated patients, role-play) is effective but resource-intensive and difficult to scale.
- Advances in artificial intelligence (AI), especially large language model (LLM) chatbots, offer:
  - On-demand practice
  - Standardised cases
  - Potential for automated feedback
- However, their educational role remains unclear.

AIM

To map the existing literature on chatbot-based approaches for teaching:

- History taking
- Communication skills

in undergraduate healthcare students.

METHODS

- *Design:* Scoping review (Arksey & O'Malley framework)
- *Databases:* PubMed, MEDLINE, Embase, Web of Science, Cochrane
- *Timeframe:* 2000–2025
- *Inclusion:*
  1. Chatbot interventions
  2. Undergraduate healthcare students
  3. Communication/history-taking outcomes
- *Screening Results:* 294 records identified
- Reported according to PRISMA-ScR

RESULTS

1) Study Characteristics

- 294 records identified → 16 studies (Figure 1) between 2021-2024
- Majority from high-income countries (Figure 2)
- Primarily involved medical students (13/16)
- Rapid growth following emergence of LLM-based chatbots

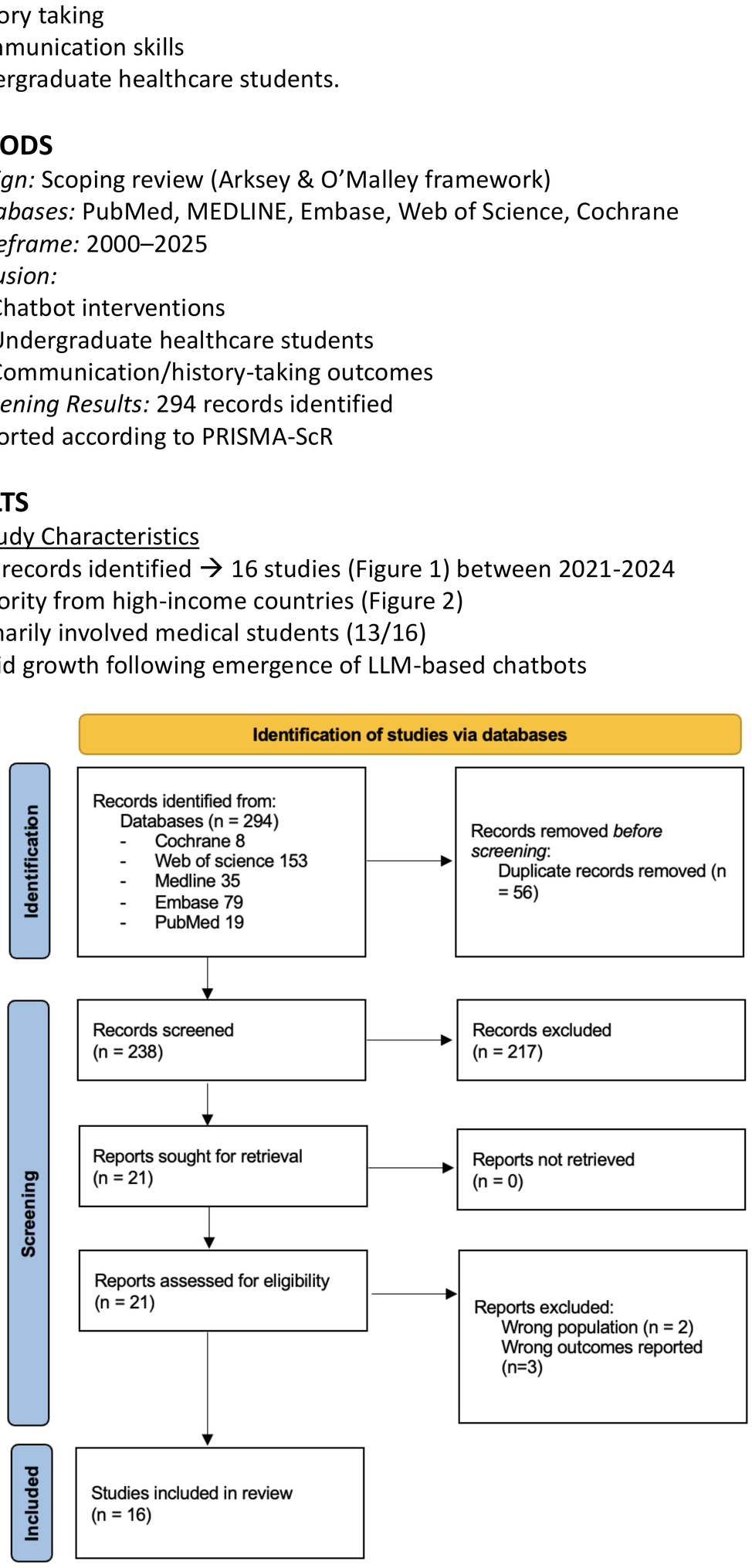

Fig 1. PRISMA Flow Diagram

2) Chatbot Design & Implementation

- Majority used text-based chatbots, with some incorporating voice interaction
- Increasing use of LLMs (e.g. ChatGPT) enabling more dynamic conversations
- Considerable variation in:
  - Case design (fixed vs AI-generated)
  - Feedback provision (present in ~60%)
  - Educational settings (primary vs secondary care)

→ **Reflects an early, experimental phase with limited standardisation**

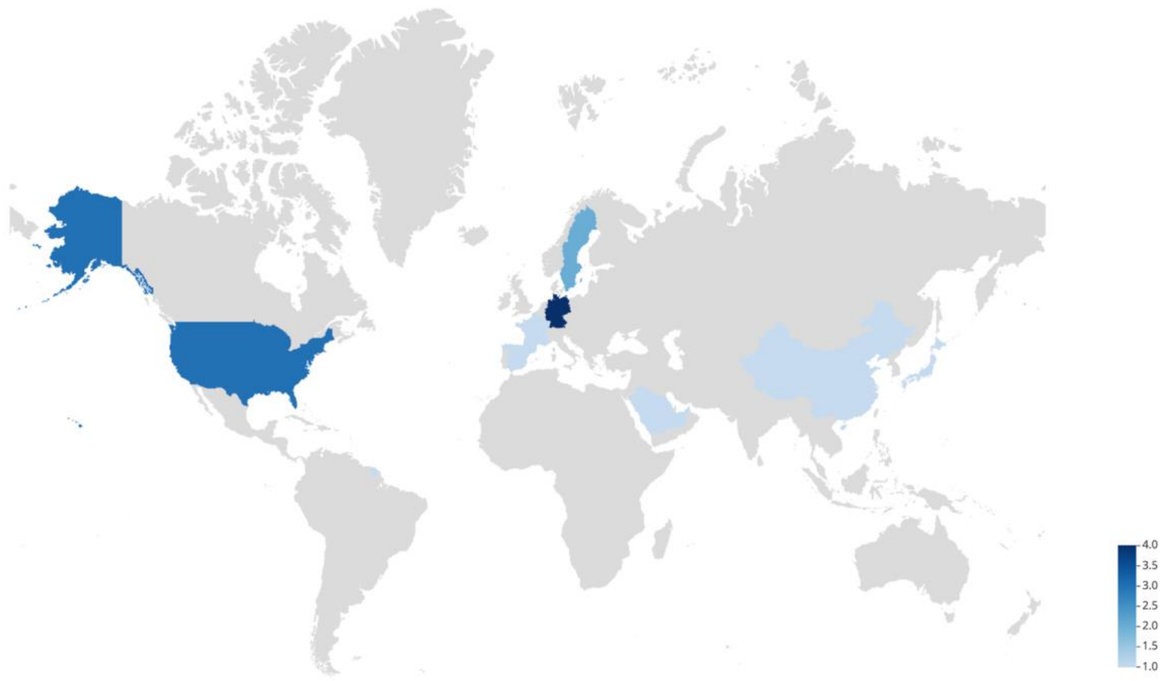

Fig 2. Heatmap demonstrating country of study publications

3) Educational Outcomes

- Evaluations focused on:
  - Kirkpatrick Level 1 (learner satisfaction) – most studies
  - Kirkpatrick Level 2 (knowledge gain) – limited evidence
- No studies assessed:
  - Behaviour change (Level 3)
  - Clinical/patient outcomes (Level 4)

→ **Chatbots are well accepted but lack robust evidence of improving clinical skills**

4) Learner Experience

- Perceived benefits:
  - Safe, low-pressure environment
  - Opportunity for repeated, independent practice
  - Some realism in LLM-based interactions
- Reported limitations:
  - "Mechanical" or unnatural responses
  - Difficulty interpreting nuanced or colloquial language
  - Inconsistent or absent feedback

→ **Learning value appears highly dependent on feedback quality and realism**

5) Practical & Technical Challenges

- Variable accuracy and occasional incoherent responses
- Speech-to-text limitations in voice systems
- Performance affected by AI model updates
- Resource requirements (development, infrastructure)

→ **Challenges may reduce authenticity and scalability in practice**

6) Educational Role

- Chatbots function best as a supplementary tool, not a replacement for:
  - Simulated patients
  - Faculty-led teaching
- They offer:
  - Scalable, on-demand practice
  - Standardised exposure to cases
- But lack:
  - Emotional nuance
  - High-fidelity interpersonal interaction

7) Implications for Education

- Effective use requires:
  - Integration into curricula
  - Structured, meaningful feedback
  - Alignment with learning objectives
- Current use is largely voluntary or adjunct, limiting impact

8) Future Directions

- Need for:
  - Rigorous study designs (RCTs, longitudinal studies)
  - Higher-level outcome evaluation (Kirkpatrick 3–4)
  - Direct comparison with traditional simulation
  - Research into cost, ethics, and equity

CONCLUSION

AI chatbots are promising, scalable tools for communication skills training—but current evidence is limited to learner satisfaction, with insufficient proof of real-world skill improvement.

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