

ENHANCING REFERENCE AND INFORMATION SERVICES IN MEDICAL LIBRARIES THROUGH THE USE OF CHATBOTS AND VIRTUAL ASSISTANTS

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Abstract :

The swift advancement of Artificial Intelligence (AI) is revolutionizing how libraries deliver information and reference services. Specifically, medical libraries function within an environment where students, faculty, clinicians, and researchers depend on information that is accurate, timely, and reliable. Chatbots and virtual assistants are emerging as valuable AI-driven tools that offer conversational support, answer common questions, direct users to library resources, and facilitate information discovery outside of traditional operating hours. This study investigates how chatbots and virtual assistants might enhance reference and information services within medical libraries. It covers their primary applications, advantages, constraints, ethical considerations, and implementation needs. Special focus is placed on e-resource discovery, database support, library orientation, FAQs, research assistance, citation help, and referrals to human librarians. The paper also highlights the significance of human oversight, given that AI systems can generate responses that are inaccurate, incomplete, or misleading. Recent studies show that while academic library chatbots can handle routine service queries effectively, tackling more complex information and recommendation tasks demands enhanced semantic capabilities and the involvement of librarians. In medical-library settings, ethical concerns such as privacy, transparency, bias, copyright, data security, and accountability are of particular importance. The paper concludes that chatbots should not be seen as substitutes for medical librarians, but rather as complementary tools that can expand the reach and efficiency of professional reference services. A chatbot that is meticulously planned, user-centered, and ethically governed can help foster the development of responsive, accessible, and technology-enhanced medical libraries.

Keywords : Artificial Intelligence, Chatbots, Virtual.



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Introduction :

Libraries have consistently adjusted their services to keep pace with advancements in information and communication technologies. The shift from conventional print collections to electronic resources, online catalogs, digital libraries, discovery systems, and remote access has profoundly transformed the user-library relationship. Artificial Intelligence (AI) marks another significant phase in this transformation. Libraries are increasingly exploring AI technologies to enhance information discovery, knowledge organization, recommendations, reference assistance, research support, and user engagement. The International Federation of Library Associations and Institutions (IFLA) acknowledges that while AI presents opportunities for libraries, it also raises significant questions regarding privacy, equity, transparency, accountability, and professional values. Chatbots and virtual assistants are among the most prominent applications of AI. A chatbot is a software application designed to interact with users via a conversational interface. It can accept a natural language query and generate an automated response. Depending on its design, a chatbot may rely on predefined rules, natural-language processing, machine learning, retrieval systems, or generative AI. Medical libraries are especially well-suited settings for investigating these technologies. Medical students, educators, physicians, nurses, researchers, and other healthcare professionals often need quick access to reliable information. They might require help with library resources, databases, electronic journals, systematic literature reviews, citation management, and research-related information.

A chatbot can serve as the initial point of contact between the user and the library. Rather than waiting for a librarian to become available, users may receive immediate assistance with routine questions. More complex inquiries can then be referred to a professional librarian. Recent studies on academic-library chatbots indicate that while these systems are increasingly utilized for reference support, their adoption remains relatively limited and their functionality varies significantly. A 2026 study of 31 publicly available academic library chatbots revealed that most were AI-driven or hybrid systems, which handled basic service inquiries reliably but struggled with more complex semantic and recommendation tasks. Consequently, the critical issue is not whether chatbots ought to supplant librarians, but rather how they can be responsibly incorporated into professional library services.

Concept of Chatbots and Virtual Assistants :

1. Chatbots :

A chatbot is a software application engineered to interact with users via text or voice. In libraries, chatbots can handle routine inquiries regarding opening hours, membership, borrowing policies, databases, electronic resources, and other standard services. Traditional chatbots typically rely on a set of predefined questions and answers. Modern AI-driven chatbots can interpret natural language queries with greater flexibility, often leveraging machine learning, natural language processing, and retrieval technologies. For example, a medical student might ask: How can I access PubMed when I am off-campus? A library



chatbot can offer the appropriate authentication steps, remote-access and a hyperlink to the library's database portal.

2. Virtual Assistants :

A virtual agent is a more comprehensive conversational system capable of executing or coordinating multiple tasks. It may answer questions, retrieve information, guide users through procedures, and connect with other systems. In a medical library, a virtual entity could potentially connect with:

- The library management system
- Online public access catalogue
- Discovery services
- Institutional repository
- Electronic journals
- Bibliographic databases
- Frequently Asked Questions database
- Library website
- Research guides
- Authentication systems

The line between chatbots and virtual assistants is not always clear-cut. While both can handle conversational interactions, virtual assistants typically provide a wider array of integrated services.

3. Need for Chatbots in Medical Libraries :

Medical libraries function within an environment characterized by an extremely high volume of information. Medical knowledge evolves quickly, and users frequently require information within a short timeframe. Students might need assistance in finding textbooks and exam materials. Faculty members might require journal articles and supporting evidence for their teaching. Clinicians and researchers may require access to literature searches, systematic reviews, and the latest research findings. While traditional reference services remain essential, they may be constrained by:

- Library working hours
- Staff availability
- High volume of repetitive questions
- Increasing number of electronic resources
- Remote users
- Different levels of information literacy
- Growing expectations for immediate digital services.

A chatbot can help mitigate some of these issues by offering an alternative communication channel. It can serve as a first-level reference tool for managing simple and repetitive queries, thereby enabling librarians to focus on complex research and information



requirements.

4. Applications of Chatbots in Medical Libraries :

1. Frequently Asked Questions :

One of the simplest applications is answering frequently asked questions.

Examples include:

- What are the library timings?
- How can I borrow a book?
- How many books can I issue?
- How can I renew a book?
- How can I access electronic journals?
- What is the procedure for obtaining a library membership?
- How can I contact the librarian?

Automating these questions can reduce repetitive work for library staff.

2. E-Resource Discovery

Medical libraries provide access to numerous electronic resources. Users may find it difficult to identify the most appropriate database or journal.

A chatbot could guide users according to their information need.

For example:

User: "I need articles about diabetes among adolescents."

Chatbot: "You can begin with PubMed. Would you like help developing search terms or applying filters?"

The chatbot can therefore serve as a bridge between the user and the library's electronic resources.

3. Database Assistance :

Medical databases often have specialized search features. A chatbot can provide basic guidance about:

- Search terms
- Boolean operators
- Filters
- Subject headings
- Article types
- Date ranges
- Full-text availability



However, complex systematic-review searches should continue to involve professional librarians.

4. Library Orientation :

New students frequently require information about library facilities and services. A chatbot can provide virtual orientation.

It can explain:

- Library sections
- Digital library services
- Computer facilities
- Remote access
- E-resource portals
- Research support
- Reference services
- Library rules

This can be especially useful at the beginning of an academic year.

5. Reference Services :

Reference service is one of the most important areas for chatbot application.

A chatbot can respond to basic factual and directional questions and determine whether a question requires human intervention.

A useful model is:

User query → Chatbot → Basic response or resource recommendation → Complex query → Human librarian

This creates a collaborative model rather than replacing professional reference service.

6. Research Support :

Researchers may ask about:

- Literature searching
- Citation styles
- Reference-management tools
- Research databases
- Institutional repositories
- Open-access resources
- Research guides

A chatbot can provide preliminary guidance and direct researchers to specialized librarian support.



7. Citation and Referencing Assistance :

A chatbot can explain basic citation requirements and provide guidance about styles such as APA or Vancouver.

However, users should verify automatically generated citations because AI systems can sometimes provide incorrect or incomplete bibliographic information. IFLA specifically identifies fabricated or inaccurate citations and other forms of unreliable output as important concerns with generative AI.

8. Current Awareness Services :

A virtual assistant can potentially help users discover new resources based on selected subjects.

For example, a medical faculty member interested in cardiology might receive information about newly added resources or recently published material, depending on the systems integrated with the assistant.

Role of Medical Librarians in the Chatbot Environment :

Chatbot do not replace the need for librarians, but they can change how librarians work and offer new roles.

Medical librarians can take on roles like:

- 1. Chatbot Content Managers :** Librarians can create and update the information that chatbots use to answer questions.
- 2. Information Quality Controllers :** Since medical information is important, librarians should check the accuracy of chatbot answers regularly.
- 3. AI Literacy Educators :** Librarians can teach users how to use AI responsibly, check if information is correct, and understand its limits.
- 4. Research Consultants :** When a user's question is too complex for a chatbot, librarian can provide expert help.
- 5. Ethical AI Advocates :** Librarians can help ensure that AI tools are used in a way that protects privacy, fairness, transparency, and respect for intellectual freedom. IFLA suggest that libraries should evaluate AI based on professional values and ethics rather than just using the technology for its own sake.

Challenges and Limitations :

Even though chatbots have many benefits, they also have some important issues.

1. Accuracy :

AI chatbots might give wrong answers. In Medical settings, this can be very serious.



A library chatbot should clearly separate different types of information, like:

- Library service information
- Bibliographic information
- General educational information
- Clinical information
- It should not be seen as an expert for medical diagnosis or treatment.

2. Hallucination :

AI that generates answers can sometimes come up with information that is not true or supported by facts. IFLA has listed this as a risk with generative AI. Medical library chatbots should ideally get information from approved sources and trusted databases instead of making up answers.

3. Privacy :

Users might share personal or private details when talking to an AI. This is especially important in healthcare settings. Chatbots should collect only the necessary information and follow the library's privacy and data protection rules.

4. Security :

Library systems often have user accounts, borrowing records, and login information. When using AI with these systems, it's important to have good security measures in place.

5. Bias :

AI can show the same biases that are in the data it was trained on or in the models it uses. Library workers should check if the AI system treats all users fairly.

6. Copyright :

AI tools might work with copyrighted material, databases and licensed resources. Libraries need to make sure they follow the rules for using these resources. The IFLA statements from 2025 on copyright and AI says that copyright issues are very important when AI uses, accesses or creates information.

7. Limited Understanding of Complex Questions :

A chatbot might handle simple questions well but have trouble with harder research tasks that involve many ideas. For instance, a request for a systematic review strategy might need knowledge about databases, special terms, and research methods.

8. Maintenance :

A chatbot isn't one-time project. Library rules, databases, subscription details, website links, and service steps change over time. Because of this, the chatbots knowledge needs to be updated regularly.



Ethical Considerations :

Ethics should be at the center of using chatbots in medical libraries.

- 1. Transparency :** Users should know if they are talking to an AI or a human librarian.
- 2. Human Oversight :** Users should have an easy way to reach a librarian if needed.
- 3. Privacy :** The system should not collect or keep more personal information than necessary.
- 4. Accuracy and Accountability :** Libraries should set up a way to check and fix any incorrect answers the chatbot gives.
- 5. Equity :** The service should be easy for users with different levels of tech skills and different abilities.
- 6. Responsible use of Generative AI :**

Generative AI should not be seen as a reliable source for medical facts. The World Health Organization has stressed the need for control, openness, responsibility, and risk management when using AI in health.

Chatbot and Human Librarian :

A Complementary Relationship

Chatbot/ Virtual Assistant	Medical Librarian
Available all the time	Gives professional advice
Handle simple questions	Deals with complex research questions
Provides standard information	Judge's information carefully
Guides users to resources	Created advanced search plans
Helps with basic orientation	Offers specialized training
Can manage many common queries	Gives expert, personal help
May not understand context will	User's professional judgment and knowledge.

The goal should be to work together, not to replace each other. A well-made chatbot can serve as the first step in helping users, while librarians offer expert information support.

Future Scope :

The future of chatbots in medical libraries is likely to involve more connection with library platforms, discovery tools, and research services.

Possible Development Include:

1. Voice-activated library helpers



2. Services in multiple languages
3. Connecting with discovery systems
4. AI supported literature searches
5. Personalized research help
6. Connecting with institutional repositories
7. Recommending research guides
8. Automated user orientation
9. Connecting with mobile library apps
10. Retrieve-Augmented Generation (RAG) systems using approved library content
RAG-based systems are especially promising because they can pull relevant institutional or curated information before giving a response.

However, just because information is retrieved doesn't mean it is accurate; the sources and system design still need careful checking. The future medical library may become a smart, conversational, and user-friendly environment where AI helps with routine tasks, while librarians are in charge of professional judgement and information quality.

Recommendations :

Based on the discussion the following recommendation are proposed;

1. Medical libraries should start with clearly defined and limited chatbot applications.
2. Chatbots should mainly use trusted library and institutional information.
3. A way for users to move to a human librarian should always be available.
4. User privacy should be protected by proper institutional policies.
5. Chatbot responses should be checked regularly for accuracy.
6. Librarians should get training in AI and chatbot management.
7. Users should learn about the strengths and limitations of Ai.
8. Chatbots should not be used as replacements for professional medical advice.
9. Libraries should check copyright and licensing conditions before using commercial data bases or paid content.
10. Accessibility and support for multiple languages should be considered during system design.
11. Institutions should record how user data is collected, stored, and used.
12. Chatbot performance should be checked regularly using real user questions.
13. Complex research questions should be directed to professional librarians.
14. Libraries should create ethical guidelines for responsible AI use.
15. Collaboration between librarians, IT staff and AI developers should be encouraged.

Conclusion :

Chatbots and virtual assistants offer a major chance to change how information is provided in medical libraries. Their ability to offer fast, conversational help can improve access to routine library information, help users find e-resources, assist with library orientation and extend services beyond regular hours. However, technology alone won't ensure high-quality service medical libraries need special attention to accuracy,



trustworthiness, privacy, ethics and responsibility. AI generated information might be incomplete or wrong, so chatbots shouldn't be seen as independent experts. Chatbots can handle simple questions and give first-level help, while medical librarians continue to offer expert research, information checking, and personalized assistance. The use of chatbots should be seen as a way to strengthen the role of librarians, not replace them. Librarians can become AI teachers, information quality managers, chatbot knowledge creators, research advisors and champions of ethical information use. The future of medical libraries will likely be more digital, intelligent and conversational. If chatbots are introduced carefully, reviewed regularly and guided by professional and ethical standards, they can greatly improve access, responsiveness and user-centered medical library services.

References :

- Chatbots for reference services in academic libraries: Applications and trends. (2026). *The Journal of Academic Librarianship*, 52(1), 103197. <https://doi.org/10.1016/j.acalib.2025.103197>
- International Federation of Library Associations and Institutions. (2020). *IFLA statement on libraries and artificial intelligence*. IFLA.
- International Federation of Library Associations and Institutions. (2025a). *Entry point for libraries and AI*. IFLA.
- International Federation of Library Associations and Institutions. (2025b). *Realizing potential, supporting users: IFLA statement on copyright and artificial intelligence*. IFLA.
- International Federation of Library Associations and Institutions. (n.d.). *Generative AI for library and information professionals*. IFLA.
- Lund, B. D., Khan, D., & Yuvaraj, M. (2024). ChatGPT in medical libraries, possibilities and future directions: An integrative review. *Health Information & Libraries Journal*. <https://doi.org/10.1111/hir.12518>
- New trends in virtual reference library services: An overview of technology-based interventions, challenges and strategies. (2025). *Reference Services Review*, 54(1). <https://doi.org/10.1108/RSR-06-2025-0037>
- World Health Organization. (2024). *Ethics and governance of artificial intelligence for health: Guidance on large multi-modal models*. World Health Organization.
- World Health Organization. (2025). *Ethics and governance of artificial intelligence for health: Guidance on large multi-modal models*. World Health Organization.

