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Chapter 15

Role of Chatbot in Patient Counselling

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Introduction

Patient counselling is a key part of the pharmaceutical care activities carried out in patient care. Patient counselling is defined as the provision of information, guidance, and assistance to patients on safe and effective use of medicines. Practical duties of a pharmacist include educating patients about indications, administration, and dosage instructions, side effects, interactions, storage instructions, and medication adherence. Patient counseling is an important aspect of healthcare that promotes the understanding of treatment options and encourages informed decision-making. Patient counselling is not just about giving patient medicines. It involves evaluating patients' understanding of their treatment, recognizing medication problems, resolving concerns, and encouraging healthy behaviors [1-3]. Pharmacists, through counseling, play a major role in improving therapeutic outcomes and patient safety. The importance of patient counselling for medication safety. MRPs are still a significant problem globally and are associated with increased morbidity and mortality, and health care expenditure. Using your medication incorrectly, not taking it as prescribed, not understanding the instructions, or not understanding the side effects of your medicine may hurt your treatment. Patient counseling is an important component to reduce these risks [4]. Counselling leads to better adherence to medication, fewer medication errors, greater satisfaction in taking medications, and better treatment effectiveness [5]. Research has shown that patients who receive proper counseling will be more likely to adhere to their treatment plans, understand side effects, and be able to get medical help when needed. As a result, patient counseling is considered an integral component of patient-centered pharmaceutical care [6].

The development of Digital Health Technologies in healthcare

The world has witnessed the rapid development of information and communication technology, which has significantly changed the healthcare delivery system all over the world. Digital health technologies refer to various tools and systems that facilitate the provision of health care, such as electronic health records, telemedicine, mobile health apps, wearable devices, AI systems, and decision-support tools. Technology enables the exchange of information among health care providers and patients and enhances access to health care services. In recent years, the rise in internet connectivity, mobile smartphone penetration, and the need for telemedicine services have gained much momentum in the adoption of digital health solutions [7].

Emergence of Artificial Intelligence in Healthcare

Artificial intelligence, or AI, is a broad term for computer systems that can learn, reason, solve problems, and understand language, that is, can perform tasks that normally require human intelligence. AI has proven to be one of the most impactful technologies in healthcare today, with the potential to enhance clinical decision making, disease diagnosis, treatment planning, and patient monitoring. AI tools are becoming more common in healthcare to process vast amounts of data, detect trends, and deliver tailored healthcare advice. AI technologies have proven beneficial in areas such as increased efficiency, healthcare cost reduction, and patient outcomes. One such innovation that has caught the limelight is conversational AI, or chatbots, which have the capacity to communicate directly with patients [8, 9].

Chatbots and Conversational Agents

Chatbots and conversational agents are a cornerstone of artificial intelligence. Chatbots and conversational agents are essential components of AI. A Chatbot is a computer program that mimics human conversation with either text or speech. Their rules are predefined, or they use NLP, machine learning algorithms, or a mixture of the technologies to gain insight into the user input and return a suitable answer. Chatbots can be deployed on websites, mobile apps, messaging apps, and social media. In healthcare, chatbots act as virtual assistants that can answer health-related inquiries, offer details about medications, arrange appointments, track symptoms, and aid with disease management. They

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are valuable tools in improving patient engagement and accessibility to healthcare, as they can provide immediate responses and tailored information [10].

Origin of Chatbots

Chatbots were first introduced in the 1960s when ELIZA was developed by Joseph Weizenbaum at the Massachusetts Institute of Technology (MIT). ELIZA was one of the first natural language processing programs and was intended to simulate a psychotherapist by reacting to the user's statements with predetermined conversational patterns. ELIZA, though rather primitive by today's standards, clearly showed the potential of HCI with natural language. Later, more complex programs like PARRY, ALICE (Artificial Linguistic Internet Computer Entity), and other virtual assistants were developed. With the growth of artificial intelligence, machine learning, cloud computing, and natural language processing, chatbots have evolved from basic rote-learning, rule-based systems into smart systems that can comprehend context, learn from conversations, and respond more like a human being [11].

Classification of Chatbots

Various healthcare chatbots can be classified based on their intelligence and functionality. Rule-based chatbots are based on preprogrammed responses and can follow a set of rules. These chatbots can help answer common healthcare-related questions and remind people about their medication. The AI chatbots use natural language processing and machine learning to better understand patients' questions and provide more personalized responses. Voice-assisted chatbots use spoken language that can be of particular benefit to elderly or visually impaired patients. These high-tech systems increase patient engagement and enable efficient healthcare delivery [12].

Evolution of chatbot in healthcare

The creation of healthcare chatbots can be broken down into multiple stages. The main purpose of using a healthcare chatbot in the initial stages was to provide answers to common questions with pre-made answers. Such systems were highly dependent upon the structured decision tree and were able to process only commands or keywords. The advent of NLP technology paved the way for a greater degree of functionality in chatbots, allowing systems to grasp the user's intent and comprehend human conversation. With the advancement of AI models, chatbots started processing vast amounts of data, identifying patterns, and refining their responses after receiving feedback from past interactions [13]. As AI models continued to develop, chatbots began to process massive amounts of data, identify patterns, and learn from previous interactions. With the introduction of Artificial Intelligence, healthcare chatbots are making another leap, as demonstrated in Figure 1. Today's AI-driven chatbots can be used to conduct complex tasks, including Symptom triage, Medication counseling, Chronic disease management, Mental health support, and Personalized patient education. Healthcare chatbots have benefitted from recent developments in large language models and generative AI, which have enriched their functions. These form the basis of enabling chatbots to participate in more natural conversations, deliver contextually appropriate responses, and help in clinical decision-making processes. Therefore, chatbots are becoming an increasingly valuable tool in the field of healthcare and, in particular, pharmacy practice and patient counseling [14].

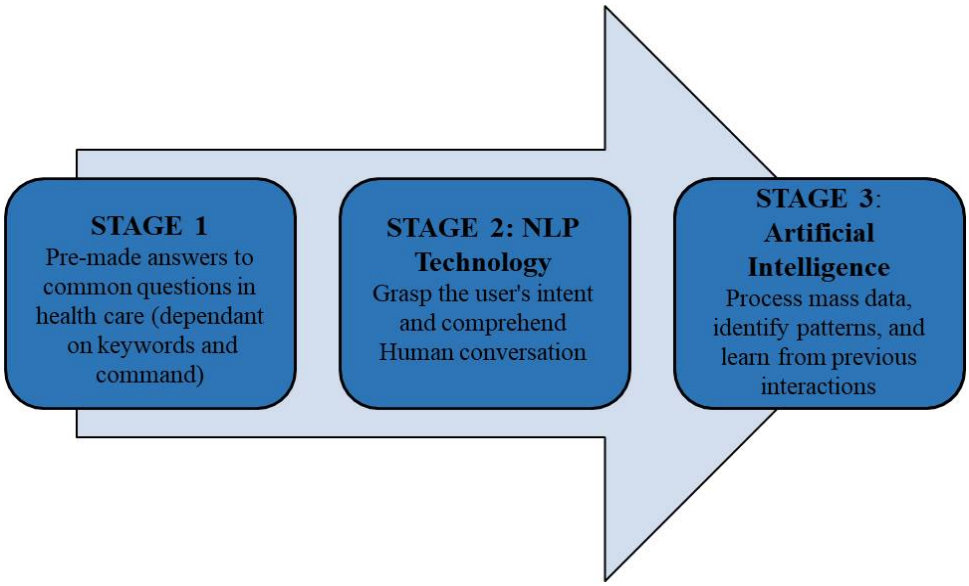

Figure 1: Stage of Chatbot Evolution

Need for Chatbots in Modern Pharmacy Practice

Medication therapy has become increasingly complex, patient populations are larger, and health care resources are limited, leading to challenges for pharmacists to deliver comprehensive counseling services. While there are times when face-to-face counselling is the only appropriate way to meet patients' ongoing informational needs, there are others when it is not. Chatbots are a promising solution as they serve to provide access to med information and counselling support on a 24/7 basis. They can help to educate patients and guide them in understanding the instructions for taking medications, remind them to take their medications, answer common questions, and reinforce the pharmacist's educational messages. Chatbots can handle repetitive tasks, enabling pharmacists to focus on more complicated clinical

tasks while still providing timely assistance to patients. In addition, the use of chatbots can be expanded to telepharmacy and mobile health applications to reach populations of people who live in remote and less-served areas. They provide scalable, cost-effective, patient-centered services, making them an important innovation in modern-day pharmacy practice [15, 16].

Current Trends in Healthcare Chatbot Development

Several trends are influencing the healthcare chatbot space in the future. The biggest trend is the use of chatbots in EHRs to provide personalized healthcare suggestions based on patient-specific data [17]. Another emerging trend is the integration of wearable technology and remote monitoring devices, enabling chatbots to monitor health parameters in real-time. Voice assistive capabilities of chatbots are becoming more popular because of the convenience and reach to all, including elderly patients and those with limited literacy skills. Bridging language barriers is also becoming an enterprise of the language, and multilingual Chatbots to provide health services more accessible to those who speak different languages. The other giant piece of new stuff is generative AI and Large Language Models. The technologies can also help chatbots to communicate more naturally and appropriately, in addition to being able to manage more complex healthcare discussions. Digital health tools such as chatbots will soon be part of the routine of both patients and chemists and will be more sophisticated and more personalized in the future [18].

Role of Chatbots in Patient Counseling

Pharmacist counselling of patients is a core function to ensure the safe, effective, and rational use of medicines. This involves education on drugs, patient self-management, the ability to identify problems with a drug, and helping patients to achieve maximum therapeutic benefit, as shown in Figure 2. In routine practice, however, there are several factors that restrict the depth and uniformity of counselling, including time constraints, a growing number of patients, and a shortage of health workers. Chatbots are now an innovative digital tool that can help and enhance patient counseling. They can act as a virtual assistant and be able to deliver patients evidence-based information, standard, and instant. It is not a chatbot that is meant to replace pharmacists, especially in the field of pharmacy practice, but rather meant to assist pharmacists' counseling ability with support outside the clinic. They work particularly well for repetitive counseling situations, such as answering questions about medications, doses, and reminders. By managing repetitive messages, chatbots can free up pharmacists' time, allowing them to focus on more complex clinical decisions and deliver personalized patient care. Give pharmacists more time for more complex clinical decisions and personalized patient care [19, 20].

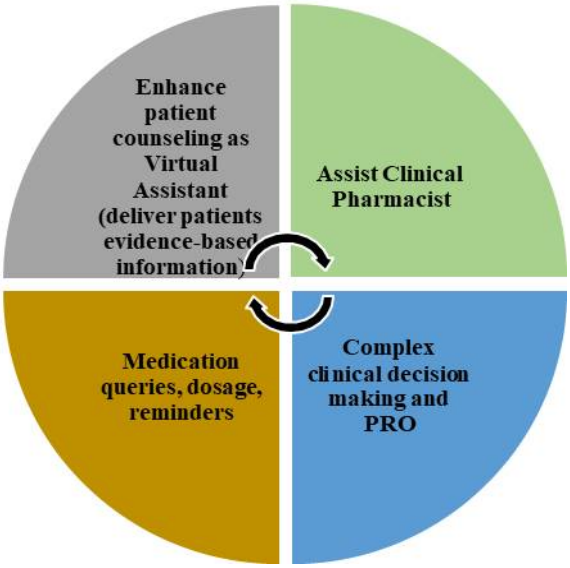

Figure 2: Chatbots in Patient Counselling

Importance of Chatbots in Patient Counselling

There is no doubt about the importance of Chatbots in patient counselling. The role of chatbots in counselling patients is very important, no doubt. Chatbots are very important in healthcare due to the increase in patient population, the limited number of healthcare professionals, and the growing demand to provide healthcare services. These systems will be available 24 hours a day, so patients will be able to get health care information whenever they need it. Chatbots can help to ease the burden on healthcare providers by handling routine patient queries and administrative tasks. They also promote patient engagement by allowing patients to take an active role in managing healthcare. Using chatbots to keep a dialogue and track can help improve patient adherence, lower healthcare costs, and generally improve patient satisfaction [19].

Advantages of Chatbots in Patient Counselling

There are a lot of benefits to consider when it comes to chatbots in the healthcare and patient services industry. This is one of their biggest advantages, because they can be available day in and day out. They are cost-effective and practical resources that are beneficial to health care

providers and reduce the consumption of resources. Chatbots powered by AI can offer counselling that is personalized to the data and health care needs of each patient. They have an interactive mode of communication that helps in engaging and involving patients in treatment plans. Chatbots also allow for quick answers to common health questions, reducing waiting times and improving the efficiency of healthcare delivery [21, 22].

Future Perspective of Chatbots in Patient Counselling

The future of chatbots in health care is promising, with more opportunities for advancement of AI, machine learning, and digital health technologies. Soon, the healthcare world will see even smarter, more personalized, and efficient chatbots that will be able to better counsel patients. The EHR and wearable monitoring integration could enable real-time health monitoring and personalized treatment recommendations, improving patient care. These chatbots can integrate with Electronic Health Records (EHR) and wearable tracking devices, enabling users to receive instant health monitoring and customized treatment advice, thereby enhancing patient health. Such Chatbots can be integrated with the EHR and wearable monitoring systems to provide real-time health monitoring and personalized treatment recommendations. The virtual assistants will also be expected to perform better with voice recognition, emotional analysis, and multilingual communication. As telepharmacy and telemedicine continue to develop, chatbots will certainly be an important component in providing patient-focused healthcare [23].

Future Challenges of Chatbots in Patient Counselling

Chatbots are beneficial, there are some drawbacks when they are used in healthcare practice. It is devoid of the human touch and empathy, which can work against it when communicating with patients with emotional and/or psychological issues. Also, they may give wrong or outdated information if the bots' databases are not updated frequently enough. Patient data security and privacy also remain a major concern as the patient data needs to be safeguarded from unauthorized access. Moreover, chatbots are not capable of making clinical decisions and cannot replace human medical staff for the treatment of complex medical problems. Also, patients, especially elderly or non-tech-savvy people, may have some challenges in the effective use of chatbot technologies [24].

Ethical Considerations

Chatbots can prove valuable in healthcare; they also have significant ethical and legal implications, particularly concerning patient privacy, confidentiality, and the quality of medical information. Healthcare organizations need to ensure that the use of a chatbot system is compliant with healthcare regulations and is secure to handle patient information. It's also important to be transparent about the capabilities of a chatbot system to avoid misinformation and guarantee patient safety. To ensure the reliability and effectiveness of healthcare chatbots, it is essential to monitor their performance and provide regular updates [25].

Conclusion

Chatbots are changing patient counselling by improving healthcare access, patient education, medication adherence, and chronic disease management. Such digital tools offer affordable and continuous help to patients and ease the burden on healthcare professionals. Chatbots are not a replacement for chemists, physicians, or other healthcare providers, but they are valuable supportive tools in modern healthcare systems. With continuous technological advancement, the role of chatbots is expected to become more important in future pharmacy practice and patient-centered healthcare.

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