FARMAPA: DIGITAL TECHNOLOGY WITH ARTIFICIAL INTELLIGENCE IN PHARMACEUTICAL CARE TO PROMOTE HEALTHY AGING AND RATIONAL MEDICINE USE

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Abstract

Background: The accelerated aging process of the Brazilian population is a significant challenge for the healthcare system, demanding innovative strategies to ensure pharmacotherapeutic safety and quality of life for individuals aged 50 and above. The considerable increase in chronic diseases and polypharmacy, often associated with multimorbidity in this population, raises the risks of drug interactions and inappropriate medication use, reinforcing the need for effective educational interventions. In this context, the development of accessible digital technologies emerges as a promising strategy to enhance pharmacological knowledge when adapted to the specific needs of older adults. WhatsApp stands out as a strategic platform for implementing innovative digital health solutions, especially for this target audience. Purpose: To develop a prototype of a virtual pharmaceutical assistant (FARMAPA) based on artificial intelligence, accessible via WhatsApp, capable of providing automated and reliable guidance on the rational use of medicines (RUM), enhancing therapeutic safety, identifying medication availability within Brazil's Unified Health System (SUS), and promoting autonomy among older patients. Methods: This is an applied technological development project, conducted in six sequential stages:(1) Pharmacological database review – systematic consultation of official sources (ANVISA, Electronic Drug Label, National Therapeutic Formulary) for validated information compilation;(2) Needs mapping – identification of the main medication-related doubts through literature analysis;(3) Knowledge base development – creation of standardized responses in plain language, adapted for various health literacy levels;(4) Technological integration – implementation of a natural language processing algorithm compatible with the WhatsApp Business API;(5) Technical testing – internal system evaluation, including response accuracy and processing time;(6) Prototype development – finalization of a conversational interface with inclusive and responsive design. Results: FARMAPA was developed as a functional prototype capable of automatically screening pharmaceutical queries, providing information on indications, contraindications, and drug interactions, locating health units that offer medications via SUS, and delivering guidance in a language adapted to older adults through an intuitive and accessible mobile interface. Conclusion: FARMAPA represents a promising tool for promoting the rational use of medicines among older individuals, demonstrating the potential of conversational

technologies in enhancing patient-centered pharmaceutical care. Future developments include expanding the knowledge base and assessing its impact in real-world settings. Implications: FARMAPA can be implemented as an educational and support tool in Primary Health Care, contributing to therapeutic safety, promoting patient autonomy, and optimizing the pharmacist's role in community care. Its implementation represents a significant step toward democratizing access to qualified pharmaceutical information, offering key advantages such as accessibility via a widely used platform among the target population, efficiency, reducing response time to medication-related questions, accuracy based on up-to-date scientific evidence, and inclusiveness, with adapted language for varying education levels.

Keywords: Digital Health; Gerontology; Clinical Pharmacology; Artificial Intelligence; Health Education.