The Use of Artificial Intelligence (AI) is Customer Service Process in the Pharmaceutical Industry: A Case Study in Public Laboratories

Alba Lucia Silva do Nascimento[1*], Johnderson Nogueira de Carvalho[1], Josiane Machado Vieira Mattoso[1], Josiane Dantas Viana Barbosa[2], Roberto José da Silva Badaró[2], Erick Giovani Sperandio Nascimento[2], Felipe Rodrigues da Silva[1], Jeancarlo Pereira dos Anjos[2], Leticia de Alencar Pereira Rodrigues[2], Marcelo Luiz Lima Brandão[1]

[1]Oswaldo Cruz Foundation FIOCRUZ Rio de Janeiro, Rio de Janeiro; [2]SENAI/CIMATEC University Center, Salvador, Bahia, Brazil

The Consumer Service (SAC) is an important communication and relationship channel with the customer. This study sought automated data collection and analysis techniques to trace profiles and strategies that are part of the SAC 4.0 model in official laboratories A and B. The method consisted of document analysis of standardized procedures and database research using the keywords SAC, artificial intelligence, and pharmaceutical industry. The results showed that laboratories A and B use the SAC 2.0 model and do not apply AI techniques. Evidence shows that pharmaceutical industries in Brazil use the SAC 4.0 model. It is concluded that the AI tools in the SAC contribute to improvements and efficiency in the process.

Keywords: SAC. Artificial Intelligence. Pharmaceutical Industry. Public Laboratory.

Introduction

Brazil has the Strategic Component of Pharmaceutical Assistance (CESAF) through its National Medicines Policy [1], which guarantees equitable access to medicines and supplies financed and acquired by the Ministry of Health (MS) in its strategic programs of the Unified Health System (SUS) [2].

Brazil has two large official laboratories located in Rio de Janeiro, which, for the purposes of this study, we called A and B. In addition to drug manufacturers, these laboratories are instruments for promoting scientific and technological development and innovation in health, acting through research activities and development of new medicines [3].

In the pharmaceutical industry, the leading players in the pharmacovigilance systems of the Consumer Service (SAC) are responsible for collecting relevant data on the safety of medicines available on the consumer market. The information provided by SAC helps to increase patient safety, prevent business problems, and reduce costs for new drug treatment options [4]. Customer service can be carried out through several integrated channels of regulated service providers in order to deal with consumer demands, such as information, doubts, complaints, disputes, suspension, or cancellation of contracts and services [5]. SAC emerged with Law No. 8.078 of September 11, 1990, of the Consumer Protection Code, but was only regulated with guidelines and standards on April 5, 2022, by Decree No. 11.034. Over time, the functionality of the SAC increased, and today, it works in the form of e-mail, online chat, and self-service [5,6]. In addition to being an important communication channel and improving customer relationships, the SAC helps companies to organize and optimize time for increase their results [6].

Laboratory B replaced the term "consumer" in the acronym SAC with "citizen," as the drugs supplied are from MS and are distributed free of charge to the population, and the term consumer is associated with a commercial relationship of products, which does not exist in the SUS. In laboratory A, the terms "consumer" and "customer" are used in the SAC, even without having a commercial relationship with the products. Despite the peculiarities, the rules applied in the public laboratory are the same for a private one.

Received on 10 September 2023; revised 18 November 2023.
Address for correspondence: Alba Lucia Silva do Nascimento. Rua da Divina Misericórdia 20 aptº 602 Bairro: Vila Valqueire - CEP: 21321-580 - Rio de Janeiro.. E-mail:alba.nascimento@fiocruz.br.

J Bioeng. Tech. Health 2023;6(4):290-295

Official laboratories A and B use a SAC 2.0 model without applying advanced AI techniques and are completely manual; processes are rigid and prioritize the "dialogue with the customer". There is also SAC 3.0, which provides personalized service via omnichannel and works with integration between the various service channels. With the Industrial Revolution 4.0, where automation and data are used for decision-making, several technologies have been used to achieve the same result, as in the SAC 4.0 model [7]. Among these technologies, Artificial Intelligence (AI) [8] stands out, which came to optimize processes through algorithms and predictive tools such as Neural Networks through Machine Learning and Deep Learning.

This research becomes relevant as it aims to contribute to improvements in the SAC processes of the pharmaceutical industries, allowing the analysis of data and responses to citizens to be faster and more effective. In this work, automated data collection and analysis techniques were addressed, and the information results outline profiles and strategies that are part of the SAC 4.0 model in official laboratories A and B.

Materials and Methods

This work is based on a case study in two public pharmaceutical laboratories. One of them, called A, was founded in 1976 and currently has 41.722 m² of built area in total. However, a new campus is being built in Rio de Janeiro, on an area of 580.000 m², and will have the capacity for 120 million vials of vaccines and biopharmaceuticals per year. Laboratory B, also founded in 1976, occupies a strategic position as the most recognized official pharmaceutical laboratory linked to the MS, with an installed production capacity of more than 2,5 billion medication units per year. It is an observational, exploratory, and descriptive documentary study, where the applied methodology was divided into document analysis of the Standard Operating Procedures (SOP) used in the SAC of laboratories A and B, and qualitative research in the databases of the CAPES journal portal, Scopus, WOS and cases found on Google's open platform, using the keywords: SAC, artificial intelligence and pharmaceutical industry.

Analysis of SOP from laboratories A and B, available in PDF format and accessed through the query drive, to which only authorized employees have access, was performed. The SAC procedure consists of registering the contact received in the software of each laboratory for planning and execution of actions until final analysis and response to the citizen (Figure 1).

Finally, qualitative research was carried out in the journal portal databases of CAPES, Scopus, WOS, and Google through the keywords SAC, artificial intelligence, and pharmaceutical industry to search for AI tools and cases of pharmaceutical industries to apply AI in their companies' SAC.

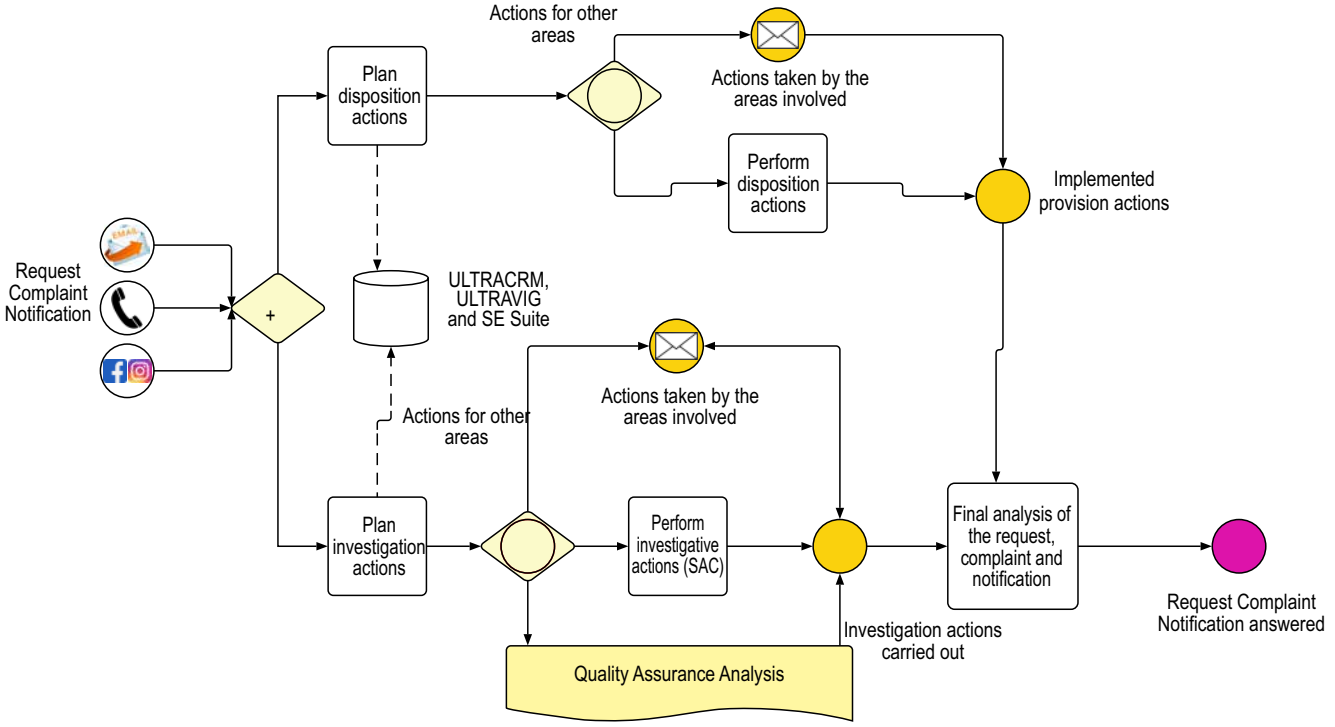
Results and Discussion

The SAC of laboratories A and B aims to answer all citizens' contacts in a coherent and standardized way in its internal procedures in order to clarify doubts about all products and activities of the laboratories. Contact with the SAC of laboratories A and B can be made by e-mail or phone from Monday to Friday, from 8 am to 5 pm, in addition to the Facebook or Instagram channels for laboratory A. The SAC service of these laboratories is carried out by a pharmacist, who must ensure a database with as much information as possible at the time of his service so that all areas involved in the industry can plan their actions, making the service possible for citizen demands. In this way, all doubts/complaints or suspected adverse events received by the SAC of laboratory A are registered in the ULTRACRM and ULTRAVIG Systems, respectively, and those of laboratory B are registered in the SoftExpert Excellence Suite (SE Suite) software, to be later carefully investigated.

Service and Occurrence Registration in the Software

The SAC attendant must identify the reason for the contact as: "Information," "Request,"

Figure 1. Mapped SAC process of official laboratories A and B.



"Compliment," "Thank you," "Suggestion," "Complaint," "Suspected Adverse Event," or "Other." In case of doubt/complaint, the attendant must classify it according to the software options of each laboratory, such as failure in the packaging, different appearance/coloring/flavor of the product, lack of package leaflet, adverse events, and so on, always collecting the highest number of possible data on the object of doubt/complaint, such as product name, concentration, suspected deviation, storage conditions, batch number, manufacturing date, expiration date, notifier's full name, complete address, telephone number DDD, among other information.

Action Planning and Research

The SAC pharmacist must define and plan the actions in the software, such as communicating the areas involved, informing what happened and requesting measures, contacting the citizen to request additional information, or identifying possible adverse events and forwarding them to the Pharmacovigilance area that will the investigation in this case. The SAC professional must define which investigation action(s) should be adopted and manage the deadlines for these actions, which are defined in an internal procedure. Upon completion of the investigation, the SAC professional must approve the conclusion of the actions and perform a causal analysis of the doubt/complaint in the software.

Satisfaction Survey and Reporting

At the end of the service, the SAC professional asks the citizen to respond to the Satisfaction Survey, where the data will be used to prepare technical reports. From the detailing of the SAC processes of laboratories A and B, we observed that these laboratories only use manual techniques such as those of SAC 2.0 in assisting citizens with their products.

Number of Calls from the SAC

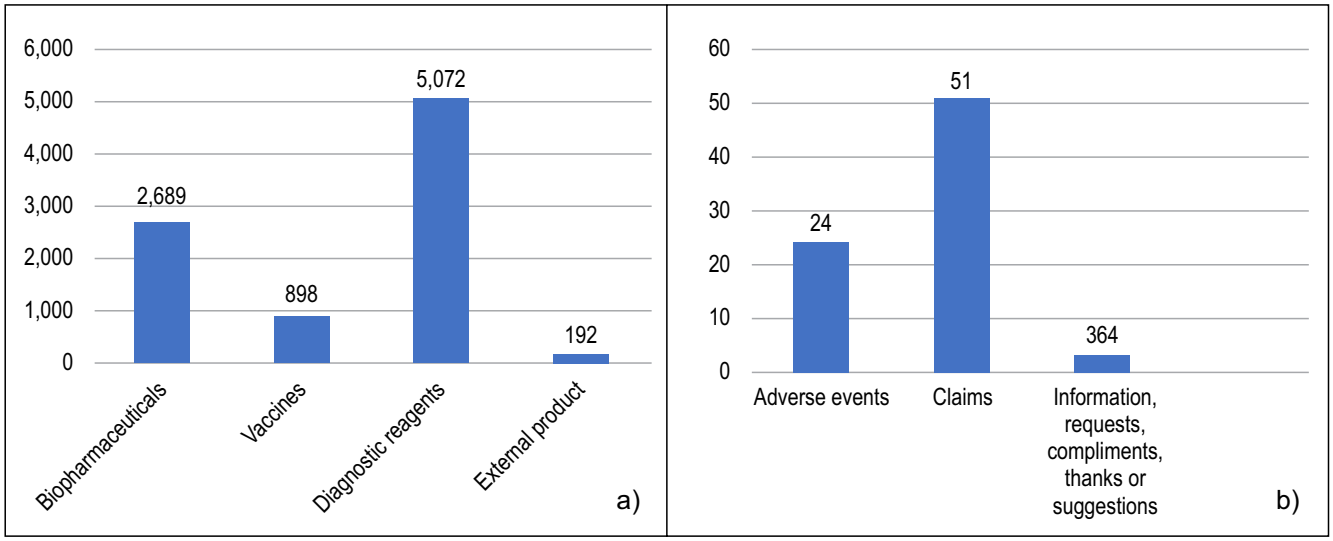
In 2020, laboratory A's SAC carried out 8.851 calls, 2.036 of which were through customer calls and e-mails, where records were distributed

among the laboratory's three product lines. The high number of consultations for diagnostic reactions is justified since about 50% of the calls were related to the SARS-CoV-2 test. In the same year, the SAC of laboratory B carried out 439 calls in total, through calls and e-mails from citizens, where the records were distributed according to the classification of the service (Figure 2).

Use of Artificial Intelligence in the SAC of the Pharmaceutical Industries

Online virtual agents increasingly replace human agents in companies' SAC [9,10]. A chatbot is a computer program that uses AI and natural language processing (NLP) to understand customer questions and automate responses, simulating a human conversation. These technologies rely on machine and deep learning to develop an increasingly granular knowledge base of questions and answers based on user interactions [11]. A challenge for companies' SAC is always meeting unpredictable demands and training the team to provide consistent responses. Today, chatbots can manage customer interactions at any time, continuously improving the quality of responses and keeping costs low [12,13]. A chatbot eliminates long wait times for phone, e-mail, chat, and web-based customer support because they are simultaneously immediately available to any number of users [9]. In 2021, the Union of Pharmaceutical Industries of São Paulo (SINDUSFARMA) created a Working Group SAC to discuss using AI and digital marketing tools [15]. In 2022, in Austria, the 26th Congress of the European Association of Hospital Pharmacists took place, with representatives from Brazil, where the main trends for the pharmaceutical market were discussed, with emphasis on chatbots that should revolutionize areas such as the SAC of the pharmaceutical industries [14]. União Química, a national pharmaceutical company, began studies on using bots in its customer service channels. The company has already introduced a QR code [16,17] on its medicine packaging, where it is possible to access an interactive menu with different types of media to read, listen to, access the leaflet, call the SAC, and obtain information on packaging disposal. Another AI tool that is being applied is the voice command instructions within the virtual assistant Alexa [18]. The national pharmaceutical company Libbs joined Omnichannel after integrating all its current service platforms: 0800, e-mail, social networks, and AI-based service via Whatsapp [14,19]. Due to various regulatory requirements, pharmaceutical companies have slowly adopted

Figure 2. Number of calls from the SAC of laboratories A and B in 2020.



digital assistants. Although chatbots have been around for more than two decades, pharmaceutical company Pfizer leads the way with the recent launch of three chatbots worldwide: Medibot in the US, Maibo in Japan, and Fabi in Brazil. MediBot was the first chatbot deployed by Pfizer to help answer specific questions related to the stability of temperature-sensitive biologics and vaccines. Maibo was recently launched in Japan to serve healthcare professionals seeking medical information [20]. Fabi is the first digital assistant in the pharmaceutical industry, answering questions related to the entire portfolio of Pfizer Brasil products. It is a more advanced chatbot with AI abilities, such as natural language processing capabilities, that allow users to enter text and be guided by prompts (commands) to receive a response [20].

Conclusion

AI can empower humans and aid decision-making as it manages data much faster but is not intended to replace humans completely. Information on the use of drugs, vaccines, and biopharmaceuticals will serve in healthcare decision-making; in this way, AI cannot make mistakes and must ensure that systems meet ethical, legal, and regulatory standards. The experience of using AI in the pharmaceutical industry has been positive and a market trend, especially with the case of the chatbot implemented in Pfizer, Brazil. Official laboratories A and B, with their great demands for production and assistance to the population, should invest in AI tools in the SAC in order to seek constant improvement in their processes and meet the needs of the public, as well as other companies in the field pharmacist, especially in emerging countries, where there is a great need for information about medicines.

Acknowledgments

We thank the official laboratories A and B professionals for exchanging experiences and providing data, especially to the SAC professionals.

References

1. Ministério da Saúde Informes Técnicos Institucionais - Política Nacional de Medicamentos. Revista de Saúde Pública 2000;34(2):206-209.
2. Ministério da Saúde. Componente Estratégico da Assistência Farmacêutica. Available at: <https://www.gov.br/saude/pt-br/composicao/sectics/daf/cesaf >. Access on July 22, 2023.
3. Neto PTPF, Cunha CR. Produção pública de medicamentos no Brasil no contexto da pandemia da COVID-19. Revista Eletrônica Gestão & Saúde 2020;11(3):296–309.
4. Nascimento JMR, Santos MR, Quintilio MSV. O controle de qualidade nas indústrias farmacêuticas. Revista JRG de Estudos Acadêmicos 2022;5(11).
5. Brasil. Decreto n° 11.034, de 05 de abril de 2022. Regulamenta a Lei nº 8.078, de 11 de setembro de 1990 - Código de Defesa do Consumidor, para estabelecer diretrizes e normas sobre o SAC. Diário Oficial [da] República Federativa do Brasil, Brasília, DF, 06 abr. 2022, p. 1.
6. Omie. Serviço de Atendimento ao Cliente (SAC): entenda o que é e sua importância. Blog da Omie, 2021. Available at: <https://blog.omie.com.br/servico-de-atendimento-ao-cliente-sac-entenda-o-que-e-e-sua-importancia/ >. Access on July 19, 2023.
7. Schwab K. A quarta revolução industrial. Edipro, 1ª edição, 2016.
8. Feibel J. Robótica e Inteligência Artificial. Ebook, 2019.
9. Chintalapati S, Pandey SK. Artificial intelligence in marketing: A systematic literature review. International Journal of Market Research 2022;64(1):38–68.
10. Raj NN et al. Artificial intelligence in e-commerce: A literature review. Business, Management and Economics Engineering 2023;21.
11. International Business Machines (IBM). O que é um chatbot? Available at: <https://www.ibm.com/topics/artificial-intelligence >. Access on August 5, 2023.
12. Ramadhani CN. Chatbots in pharmacy: A boon or a bane for patient care and pharmacy practice? Sciences of Pharmacy. SciPhar 2023;2:1-23.
13. Bharadiya JP, Thomas RK, Ahmed F. Rise of artificial intelligence in business and industry. Journal of Engineering Research and Reports 2023;25:85-103.
14. Sindicato do Comércio Varejista de Produtos Farmacêuticos (SINCOFARMA). Chatgpt: como o farmacêutico pode usar a inteligência artificial a seu favor? São Paulo, 03/04/2023. Available at: <https://sincofarmasp.com.br/2023/04/03/chatgpt/ >. Access on August 6, 2023.
15. Sindicato das Indústrias Farmacêuticas de São Paulo (SINDUSFARMA). GT debate uso do WhatsApp business pela indústria farmacêutica. Notícias, 14/05/2021. Available at: <https://sindusfarma.org.

br/noticias/indice/exibir/15209-gt-debate-uso-do-whatsapp-business-pela-industria-farmaceutica >. Access on August 6, 2023.

16 União Química. União Química lança bulas interativas e aumenta sua frente de acessibilidade às informações de medicamentos. Available at: <https://www.uniaoquimica.com.br/noticias-pt/uniao-quimica-lanca-bulas-interativas/ >. Access on August 6, 2023.

17. Costa CCR, Pontifícia CRPV, Veiga CP. Consumer experience and artificial intelligence: A literature review. Desafio online, Campo Grande 2022;10(3).

18. Consumidor Moderno. SAC humanizado traz insights que melhoram produtos na Libbs, 07/12/2022. Available: at: <https://www.consumidormoderno.com.br/2022/12/07/sac-humanizado-libbs/ >. Access on August 6, 2023.

19. Madeira ACM, Neves BC, Branco DJC. O uso da inteligência artificial aplicada ao marketing digital: exploração das vulnerabilidades do usuário-consumidor. Journal of Digital Media & Interaction 2020;3(8):95-111.

20. Pfizer. Meet the new digital assistants transforming patient medical information. Available at: <https://www.pfizer.com/news/articles/meet_the_new_digital_assistants_transforming_patient_medical_information >. Access on August 6, 2023.