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Faculdade de Ciências Farmacêuticas da UNIFAL-MG

Programa de Pós-Graduação em Ciências Farmacêuticas

UNIVERSIDADE FEDERAL DE ALFENAS
UNIFAL-MG

I WORKSHOP INTERNACIONAL DE PESQUISA FARMACÊUTICA DA UNIFAL-MG

IX Simpósio Internacional do Cuidado Farmacêutico da UNIFAL-MG
I International Workshop on Pharmaceutical Research
48ª Semana Farmacêutica

Resumos

CRFMG | Conselho Regional de Farmácia do Estado de Minas Gerais

APRESENTAÇÃO

Prezados leitores e colaboradores,

Cumprindo com seu papel de promover, além do Ensino e da Extensão, a Pesquisa, no ano de 2024 a Faculdade de Ciências Farmacêuticas da Universidade Federal de Alfenas (UNIFAL-MG) teve a honra de sediar três importantes eventos na área da Farmácia.

O **IX Simpósio Internacional do Cuidado Farmacêutico** da UNIFAL-MG ocorreu entre os dias 23 e 25 de maio de 2024 no campus sede (Alfenas-MG), em formato online, por iniciativa do Núcleo de Cuidado Farmacêutico da UNIFAL-MG (NAFAU). O evento foi coordenado pela Profa. Dra. Luciene Alves Moreira Marques e pelo Prof. Dr. Tiago Marques dos Reis. A comissão de organizadores contou com a participação de membros da NAFAU e discentes vinculados ao Programa de Pós-Graduação em Assistência Farmacêutica

Por sua vez, o ***I International Workshop on Pharmaceutical Research of* UNIFAL-MG** e a **48ª Semana Farmacêutica** da UNIFAL-MG ocorreram entre os dias 19 a 22 de agosto de 2024, também no campus sede da Insituição, por iniciativa do Programa de Pós-Graduação em Ciências Farmacêuticas e da Graduação em Farmácia. O evento foi coordenado pelos professores: Dr. Ricardo Radighieri Rascado, Dr. Masaharu Ikegaki e Drª Maria Betânia de Freitas Marques. A comissão de organizadores contou com a participação das Ligas Acadêmicas do curso de Farmácia desta Universidade, aqui representadas pelos discentes Julia Magalhães Sellarin, Gabriele Gomes Fenício, João Victor Plácido e Isabella Winck Bassan.

Com as minhas cordiais saudações cumprimento a todos os organizadores dos eventos supracitados e a todos que contribuíram para a divulgação do conhecimento científico de qualidade para a prática farmacêutica.

Alfenas, 20 de dezembro de 2024

Profª. Dra. Maria Rita Rodrigues

Diretora da Faculdade de Ciências Farmacêuticas
Universidade Federal de Alfenas

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Brazilian Journal of HEALTH AND PHARMACY

IX SIMPÓSIO INTERNACIONAL DO CUIDADO FARMACÊUTICO

EQUIPE EDITORIAL

Brazilian Journal of HEALTH AND PHARMACY

I INTERNATIONAL WORKSHOP ON PHARMACEUTICAL RESEARCH OF UNIFAL-MG E 48ª SEMANA FARMACÊUTICA

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EDITORIAL

O Simpósio Internacional do Cuidado Farmacêutica da UNIFAL-MG teve seu início na cidade de Alfenas, Brasil, em 2009, com a preocupação constante de formar profissionais qualificados e preparados para o mercado de trabalho com qualidade e conhecimento científico. Contribuindo uma vez mais para o Cuidado Farmacêutico, o evento promoveu um cenário fundamental para a discussão e o avanço do Cuidado Farmacêutico em um mundo em constante mudança. Esse evento não só reuniu profissionais farmacêuticos, estudantes de Pós-Graduação e Graduação relacionados com o Cuidado Farmacêutico, como também permitiu o intercâmbio de ideias inovadoras que puderam transformar a prática farmacêutica.

Nesse mesmo cenário de busca de inovação e transformação, pela primeira vez na história da Faculdade de Ciências Farmacêuticas da UNIFAL-MG a Graduação e a Pós-Graduação se uniram para realizar um outro evento técnico-científico-cultural: a 48ª Semana Farmacêutica e o *I International Workshop on Pharmaceutical Research of* UNIFAL-MG. Esses eventos tiveram um objetivo comum: empoderar o ensino, a pesquisa e a extensão em Farmácia, práticas indissociáveis para a formação de um profissional de excelência. Com essa motivação, a 48ª Semana Farmacêutica e o *I International Workshop on Pharmaceutical Research of* UNIFAL-MG foram organizados pelas ligas acadêmicas do curso de Farmácia e pelo Programa de Pós-Graduação em Ciências Farmacêuticas, cujo tema central foi "Desafios e inovações emergentes na prática farmacêutica".

Os resumos que integram estes anais refletem a diversidade e riqueza de enfoques no âmbito das Ciências Farmacêuticas, contribuindo para o conhecimento que é fundamental à melhora contínua de nossas práticas. Os trabalhos são um testemunho do compromisso e paixão dos investigadores e profissionais, que buscaram não somente responder perguntas relevantes, mas também formular novas questões que poderão levar a melhores resultados em saúde, elevando o padrão da prática farmacêutica e propiciando mudanças significativas na atenção à saúde. Nesse contexto, vale destacar que ao enfrentarmos desafios globais significativos como o envelhecimento da população, o aumento de enfermidades crônicas e a necessidade de personalizar tratamentos, é imperativo realmente buscarmos estratégias inovadoras e promover o cuidado centrado no paciente, integrando, ao mesmo tempo, a tecnologia e a inovação.

Em nome do Comitê Organizador dos eventos citados, agradecemos a dedicação de todos os autores que contribuíram com suas pesquisas e experiências, assim como o apoio dos organizadores e colaboradores que voluntariamente se dedicaram à realiza-los. Esperamos que estes eventos lhes tenham motivado para novas ideias e colaborações.

Alexis Ramón Morales Ortiz
Universidad de Los Andes

Maria Betânia Freitas Marques
Universidade Federal de Alfenas

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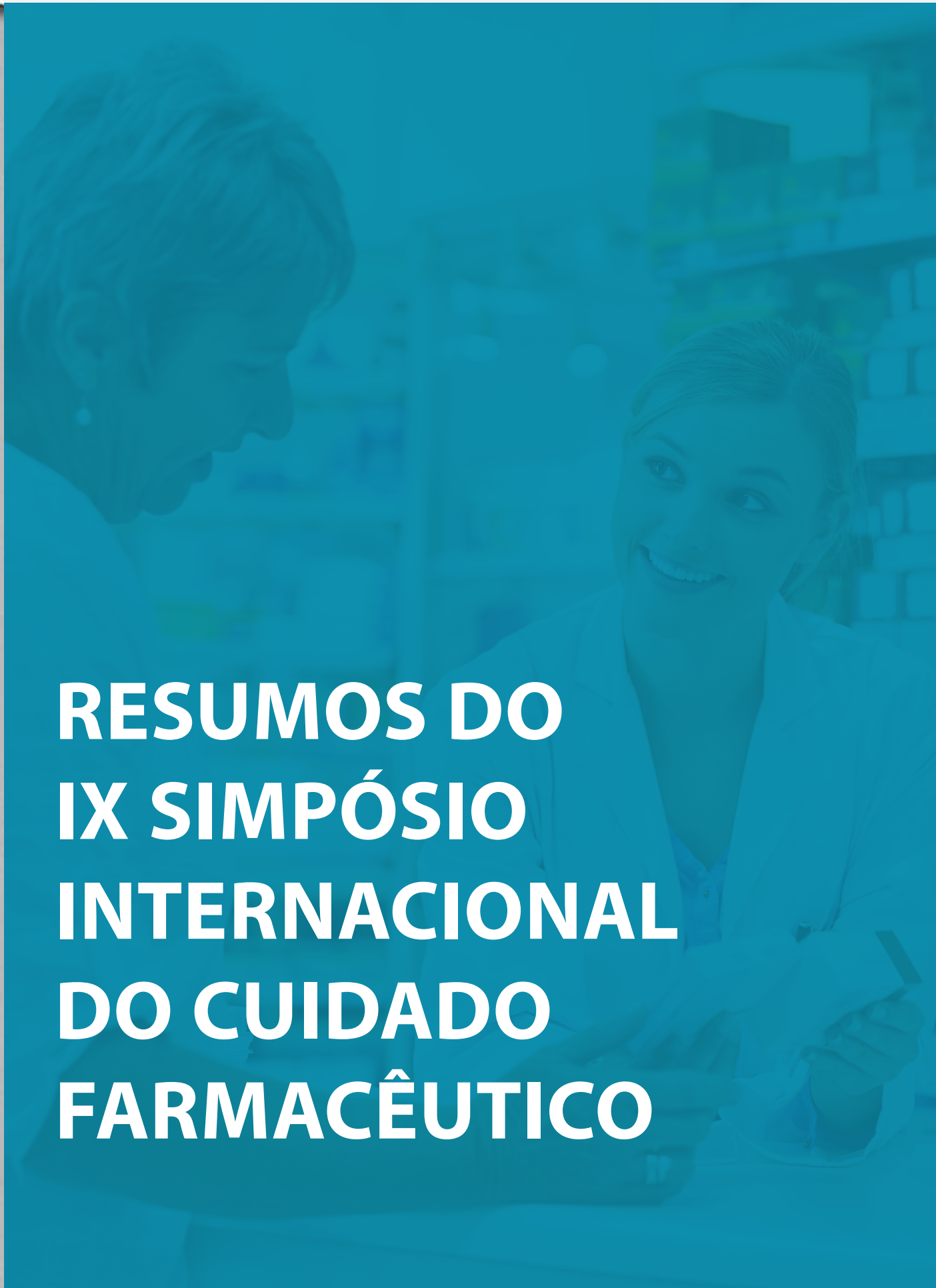

RESUMOS DO IX SIMPÓSIO INTERNACIONAL DO CUIDADO FARMACÊUTICO

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The importance of simulated patient in pharmaceutical care education: an experience report

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The use of simulated patients in the training of health professionals has proven to be an effective strategy to promote the development of clinical and interpersonal skills. In this experience report, we describe our participation in a simulation activity in the subjects of Pharmaceutical Assistance I and II (AF1 and AF2) in the Pharmacy course at the Federal University of Espírito Santo. These are subjects with the aim of developing skills for efficient communication with medication users and health professionals; provide skills for the provision of pharmaceutical services in health problems, knowing how to recognize the need to use medicines exempt from medical prescription and non-pharmacological measures. Among the assessment methodologies for these disciplines, simulations of managing health problems were carried out. In the AF1 discipline, the simulation was focused on providing the dispensing service, where students followed a script that contained suggested questions; reasoning of the Dispensation process; and, suggestions for guidelines and other conduct. While in AF2 the focus would be on solving self-limited health problems, in this case, we conducted a pharmaceutical anamnesis, taking into account the patient's main complaints and the information obtained through targeted questioning. Based on this data, we created a care plan that included both pharmacological and non-pharmacological interventions. In cases that required referral to another professional or health service, we also took the necessary measures. As simulated patients, we were instructed to play the role of a patient with a specific complaint whether or not related to medication use. The activity was conducted in a simulated environment, with the presence of students and teachers, and followed a pre-established script. During the simulation activities, we observed several nuances in communication and service provided. We identified gaps in the students' pharmaceutical approach, such as a lack of empathy, a lack of active listening and insufficient communication about the correct use of medications. This occurs due to the lack of additional questions for a more complete anamnesis and the lack of adaptation of technical terms to a simpler and more objective language. Furthermore, we highlight the importance of the patient's role as an active agent in caring for their health, highlighting the need for a patient-centered approach in pharmaceutical practice. Participating as simulated patients provided a unique perspective on interactions between patients and healthcare professionals in pharmaceutical care. The results of this experience highlight the importance of reflective practice and the development of communicative and interpersonal skills to ensure quality in the provision of pharmaceutical services. It is recommended that simulation activities be included as an integral part of the Pharmacy training curriculum, aiming to improve the competence of future professionals in providing patient-centered care.

Keywords: Simulated Patient; Pharmaceutical Care; Clinical Skills; Patient-Centered Care; Pharmacy Education.

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Evaluation of pharmacy students' knowledge about HIV at a public university in southeast Brazil

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The care provided to people living with HIV (PLHIV) requires that pharmacy students have satisfactory knowledge about the topic. However, in Brazil, there are few studies investigating this knowledge. Therefore, the aim of this study was to evaluate the knowledge of pharmacy students about HIV at a public university in Espírito Santo. A cross-sectional study was carried out, between June and July 2023, through an anonymous, voluntary and self-administered survey. The population consisted of undergraduate pharmacy students from the Federal University of Espírito Santo, Brazil, at the Maruípe and Alegre campuses, aged 18 years or older. Students were invited to answer a questionnaire comprising two sections: the first section contained items related to participants' sociodemographic information, and the second section contained the Brazilian version of the validated instrument "Short-Form Measures of the HIV/AIDS Knowledge Assessment Tool". This instrument assesses knowledge about HIV/AIDS through 12 items answered as "true," "false," or "don't know". Correct answers score one point, while incorrect answers or "don't know" responses do not score, on what higher scores indicate greater knowledge. Based on the percentage values, knowledge is classified as low (<25%), medium (25%-75%), and high (>75%). The data were presented through descriptive statistics. Participated in the study 215 Pharmacy students, with the majority being cisgender women (69.8%, n=150), heterosexuals (66.5%, n=143), and white (57.7%, n=124). The majority of students were up to 22 years old (63,25%, n=136), had up to 3 years of course (62,32%, n=134), and reported not having a family member or acquaintance living with HIV (84,18%, n=181). The proportion of correct responses to the items on the scale ranged from 51.2% to 99.1%. Pharmacy students' knowledge scores on HIV/AIDS ranged from 3 to 12 points, with a mean of 10 ± 1.54 points. Almost half of the students obtained a high (43.7%) level of knowledge. From the findings, it is observed that knowledge about HIV/AIDS was considered high for almost half of the pharmacy students. The gaps in knowledge identified can be useful to educators in planning educational interventions that meet the training needs of pharmacy students, so that in the future they can provide more effective care to PLHIV.

Keywords: HIV; AIDS; People living with HIV; Pharmacy students; Pharmacy education.

Ethics Committee approval protocol: This study was approved by the Ethics Committee of the Federal University of Espírito Santo (Protocol Nº. 5,995,451)

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Brazilian Journal of
HEALTH AND PHARMACY

Health education for the promotion of rational use of psychoactive drugs: a university extension experience

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Health education aims to strengthen individuals' autonomy and responsibility concerning their well-being. After the covid-19 pandemic, there was a significant increase in demand for mental health services, reflected in a substantial growth in the use of psychoactive drugs within healthcare systems. The low level of knowledge about mental health disorders and medications is one of the main causes of non-adherence to treatment, highlighting the need to produce information on these topics. This study aimed to report the experience of students who work on an extension project focused on producing information on mental health and the use of psychoactive drugs for social media. This is a student experience report from the extension project "Health Education for the Promotion of Rational Use of Psychoactive Drugs," carried out at the Federal University of Espírito Santo since August 2023. The project has 20 members, including undergraduate and graduate students in the health field, pharmacists, and psychologists. The production of publications involves the following steps: 1) definition of the theme and search in the scientific literature; 2) elaboration of the material in the form of short-duration images or videos; 3) review of the material produced by graduate students and project coordinators; 4) publication of the materials produced on Instagram (@ativamente.ufes). The project's Instagram profile has 30 publications: four videos, and 26 photo posts, covering mental health disorders, the use of psychoactive drugs, and psychotherapy. Currently, the project has three publication styles: "Fact or Fake"; "Knowing mental disorders" and "Did you know." In addition to acquiring technical knowledge, the production process has allowed group members to develop communication, clinical reasoning, and teamwork skills, as well as creative and editing skills. The discussions held throughout the workflow allow knowledge exchange between students and professionals, contributing to academic improvement and professional training. Furthermore, extensionists need to translate technical knowledge into accessible and simplified language since content production is intended to reach the general community, which is an important skill for professional practice. The reported experience highlights that participation in the extension project contributes to the acquisition of technical knowledge and the development of essential skills for clinical practice and effective communication with the community.

Keywords: Health education; Rational use of medicines; Mental health.

Ethics Committee approval protocol: Not applicable

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Factors associated with knowledge of people living with HIV attended at a dispensing facility in the southeast of Brazil

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The knowledge of people living with HIV (PLHIV) about the virus is crucial for managing their health condition. Good knowledge can lead to better adherence to treatment, resulting in the reduction of viral load to undetectable levels and decreasing the transmission of the virus. However, in Brazil, little is known about the levels of knowledge among this population. Therefore, this study aimed to evaluate the factors associated with the knowledge of PLHIV attending a medication dispensing facility in the southeast of Brazil. For this purpose, a cross-sectional study was conducted from December 2022 to April 2023, involving PLHIV attending a Medication Dispensing Facility at a teaching hospital in the southeast of Brazil. PLHIV who met the eligibility criteria were invited to respond to a questionnaire containing two sections: the first section included items related to sociodemographic data, and the second section contained the Brazilian version of the validated HIV Knowledge Questionnaire (HIV-K-Q). This instrument comprises 45 items, answered as "true," "false," or "don't know," where correct answers score 1 point, while incorrect answers or "don't know" do not score. A higher score indicates greater knowledge. The Statistical Package for Social Sciences (SPSS) software was used for data analysis. The T-test was used to compare the mean scores according to sociodemographic variables. A confidence interval of 95% was adopted, and differences were considered statistically significant when the p-value was ≤ 0.05. A total of 104 patients participated in the study, with the majority being male (59.2%, n = 61), over 45 years of age (n=64, 62%), and a significant portion having a higher education (40.38%, n=42). The items composing the HIV Knowledge Questionnaire were correctly answered by the majority of participants, resulting in an overall average of 79.3% correct answers. Female participants scored higher knowledge values than males, with 32.83 ± 6.34% (p=0.04), as did individuals with higher education, with 36.57 ± 2.00% (p = 0.001). No significant difference was observed between knowledge and the following variables: sexual orientation (p=0.08), race (p=0.31), and residing in the Grande Vitória area or rural areas (p=0.74). Study participants answered most items of the HIV-K-Q correctly, showing overall high levels of knowledge about HIV. Being female and having higher education are associated with better levels of HIV knowledge. These results are favorable to the care provided to these individuals at the hospital in question and the widespread dissemination of information about HIV in recent years.

Keywords: Knowledge; HIV; People living with HIV; Selfcare.

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Outcomes beyond infection management in comprehensive medication management services for people living with HIV

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HIV infection (human immunodeficiency virus) is still a global public health problem. Antiretroviral therapy (ART), which is considered one of the major advances in the control of HIV infection, consists of the combination of antiretroviral drugs (ARVs) to suppress the virus and stop the progression of the disease. Due to all these advances, PLHIV is undergoing an aging process, and, therefore, the health demands are growing, involving not only the management of HIV infection, but also of other chronic noncommunicable diseases, increasing the complexity of their pharmacotherapy. Given this scenario, the practice of Pharmaceutical Care can contribute considerably to the therapeutic success of ART and control of other health problems of PLHIV. Thus, the objective of this study was to assess the clinical outcomes of comprehensive medication management (CMM) services offered to people living with HIV (PLHIV) at a Brazilian Antiretroviral Medication Dispensing Unit. The study was divided into a cross-sectional stage (stage I), to evaluate associated factor with the identification of two or more drug therapy problems (DTP) in the initial assessment; and a quasi-experimental stage (stage II), conducted with a single group of PLHIV to evaluate clinical outcomes. A total of 52 PLHIV, with 60±11.3 years of age were followed up. In stage I, the presence of dyslipidemia (OR=5.38; 95%CI=1.61-17.97) and the use of seven or more medications (OR=4.28; 95% CI=1.32-13.88) were factors associated with the identification of DTP. In stage II, a significant difference was demonstrated between the initial and final values of systolic blood pressure, triglycerides, HIV viral load and CD4+T-cells count (p<0,05). In conclusion, the present study indicates that the CMM services favored the optimization of pharmacotherapy, assisting in obtaining positive clinical outcomes.

Keywords: Medication therapy management; Pharmaceutical services; HIV; Patient outcome assessment.

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Project-based learning in teaching in epidemiology: the perspective of two postgraduate students

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Project-based learning has proven to be an interesting approach to teaching epidemiology, focusing on solving real-world problems and applying knowledge in practical contexts. For teachers in training, the experience of taking a subject using this approach can prove to be an ally in developing desirable skills, such as content mastery, communication skills and classroom management skills. Therefore, this study aims to explore the use of project-based learning in teaching Epidemiology from the perspective of two postgraduate students. To this end, the experience reports of the two master's students (LCR and LGMGS) who followed the Epidemiology course offered by the Pharmacy and Nutrition Department of a Federal University in the second semester of 2023 were considered. The course, instructed by the advisor for master's students (GASJ), utilized a project-based learning approach. The students were divided into six groups and each group was randomly assigned a study design to explore. Each master's student was responsible for guiding three groups. At the end of the course, the master's students discussed with each other and the supervisor in order to understand the experience, the benefits and challenges of the methodology in question, and the contribution of the approach to teacher training. The students shared their perceptions of the general experience, highlighting positive aspects and indicating that the methodological strategies adopted offered new possibilities compared to traditional methods. As stated by LGMGS, *"It was positive [...] participating, as a teacher, in a discipline with this approach. It was an experience that opened my eyes to teaching possibilities"*. Benefits observed for students using this approach included promoting student protagonism. Regarding this, LCR noted, *"[...] the students carried out their projects under guidance, but had the freedom to make choices they considered relevant"*; while LGMGS concluded, *"Following the student's evolution, having them find the answers organically, was something new"*. Furthermore, the students demonstrated active participation in knowledge construction, as exemplified by LGMGS, *"I followed a group that sought information from professionals in their area [...] without me having asked for it"*. However, challenges were noted when guiding groups, with the main one being resistance from some students to the guidance offered. LCR commented, *"[...] they didn't seem to understand that the guidelines aimed to improve the work, and were not personal in nature,"* and LGMGS reported, *"they demonstrated resistance [...] they acted as if I had not provided adequate follow-up"*. The approach contributed to developing teaching-related skills, proving valuable in the learning process for master's students, as stated by LGMGS, *"It made me see that it is possible to teach complex subjects innovatively"*. These perspectives highlight both the benefits and challenges associated with implementing project-based learning in epidemiology, contributing to a more comprehensive understanding of its effectiveness compared to traditional approaches, and emphasizing the promotion of more participatory and meaningful learning for both students and teachers.

Keywords: Professional Training; Project-Based Learning; Epidemiology.

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Development and validation of educational materials on HIV

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Despite advances in diagnosis and treatment, HIV (Human Immunodeficiency Virus) is still considered a public health issue. In this scenario, pharmacists contribute to addressing this health condition both in pharmacotherapy management and prevention actions. The use of educational materials can facilitate the process of pharmaceutical counseling and assist in HIV prevention efforts. This study aimed to develop educational materials on the topic of HIV. A methodological development study was conducted from July to November 2023, consisting of three stages. In the first stage, prototypes of educational materials were developed based on clinical protocols and therapeutic guidelines related to HIV. In the second stage, a panel of experts evaluated the materials using the Suitability Assessment of Materials (SAM) instrument, with agreement measured by the Content Validity Index (IVC), considered satisfactory when equal to or greater than 0.80. In the third stage, the educational materials were assessed by the target audience, users of a university hospital, according to the following criteria: organization of material, writing style, appearance, clarity, and ease of understanding. The project received approval from the Research Ethics Committee of the Federal University of Espírito Santo (CAAE: 66774723.7.0000.5060). The results included the development of three educational materials related to HIV: the first focused on "Combined Prevention," the second on "Diagnosis, Transmission, and Prevention of HIV," and the third on "Pre-Exposure Prophylaxis (PrEP) and Post-Exposure Prophylaxis to HIV (PEP)". Four specialists participated in the content validation of the educational materials. The average age was 45 years, with the majority being female (75%; n=3) and holding a Pharmacy degree (75%; n=3). The overall SAM scores were 70.39%, 66.67%, and 61.90% for Materials 1, 2, and 3, respectively, deemed suitable. All materials achieved a global IVC value equal to or greater than 0.90. Out of the suggestions proposed by the experts, only three were not accepted, due to lack of space, term repetition, and sense confusion. Regarding the evaluation by the population, 10 individuals participated, with 50% (n=5) being female, with an average age of 41 years, and seven individuals without an HIV diagnosis. All considered the materials suitable for all criteria. In conclusion, three educational materials on HIV were developed, which were validated by experts and received approval during evaluation by the target audience. It is believed that these resources will be valuable for both students and healthcare professionals, providing support in disseminating information about HIV, its treatment, and prevention methods. Additionally, this study may serve as an example for the development of future educational materials, contributing to the dissemination of knowledge and empowering individuals to play an active role in HIV prevention and health promotion.

Keywords: HIV; AIDS; Health Education; Validation Study; Pharmacy.

Ethics Committee approval protocol: CAAE: 66774723.7.0000.5060

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Project-based learning in teaching in epidemiology: the perspective of a pharmacy graduate

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The active methodology occurs when the student becomes the protagonist of their own learning process in the classroom, engaging in practical, collaborative, and reflective activities. The role of the teacher is that of a mentor, focusing on students' self-development. In this context, project-based learning is an educational approach where students learn by solving real problems through the development of projects. They apply knowledge and skills to solve practical challenges. Therefore, this work aims to explore the perspective of a Pharmacy student on project-based learning in epidemiology teaching. Between August and December 2023, the student enrolled in the epidemiology discipline, offered by the Department of Pharmacy and Nutrition, of a Federal University, taught by a professor (GASJ) and two master's students (LCR and LGMGS). At the beginning of the course, several article discussions took place every week, totaling seven in total. This represented a novelty, as these discussions took place in the classroom, where students needed to express themselves to give their opinions and discuss the content of the articles, in addition to writing reviews about them. The students were organized in a circle with chairs to get each other's views, and each one contributed their own perspectives on the topic, creating a friendly and relaxed environment. The course evaluation method consisted of a 15-minute presentation related to the randomly selected study design, with a topic chosen by the group. Study designs were divided into 6 groups, including cross-sectional study, case-control, cohort, clinical trial, scoping review, and qualitative studies. The student group in question was made up of three students and was responsible for developing a scoping review. The group collectively decided to work on the topic of syphilis. This choice was motivated by the high prevalence of syphilis in our community. The title of our work was "What are the educational strategies for people with syphilis?". The idea of implementing an educational strategy was related to bringing a vision of preventing and reducing the transmission of syphilis in my city, which resulted in some challenges, such as understanding the study design and applying it in practice. However, it was a challenge that provided more dynamic and interesting teaching than traditional classes, resulting in greater learning through this practice. Furthermore, we received guidance from a master's student (LGMGS), who scheduled meetings to clarify doubts and also provide guidance regarding the oral presentation. The evaluation was carried out by two external evaluators. The group obtained a score of 8.98. Thus, it is concluded that this methodology allowed contact with epidemiological study designs in an innovative way. The presence of master's students and discussions during the course allowed students to engage and provided adequate learning. Finally, it should be noted that the experience was enriching, as the students had an active participation in their own education, addressing social issues and promoting the improvement of critical thinking and problem-solving abilities.

Keywords: Project-Based Learning; Epidemiology; Epidemiologic Studies; Pharmacy Education.

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Childcare in new immigrant health units: care strategy for iron deficiency anemia

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Iron deficiency anemia, or iron deficiency, is characterized by a decrease in the level of hemoglobin present in the body's red blood cells, causing several health problems, due to its risk factor, causing problems in the clinical condition of children. Its objective was to report the importance of adherence to iron supplementation in children up to two years of age with the intention of presenting positive results for childcare assistance in primary care and improving the health outcomes of children in the municipality. This clinical childcare protocol presents descriptive research, providing a theoretical basis in the scientific platforms Scielo, Pubmed and Lilacs and in the databases of the Ministry of Health and ANVISA, and using questions (PICOs) for elaboration. The following descriptors were used: Childcare; Treatment; Diagnosis; Anemia. However, 18 scientific studies were used, where the inclusion criteria were children up to 24 months of age, iron deficiency anemia and recent studies in Portuguese and English were included. As an exclusion criterion, articles were eliminated if the topic did not consist of iron deficiency anemia and patients who had some hypersensitivity to the iron formulation recommended in the protocol. However, the protocol presented clinical and laboratory diagnostic methods, drug and non-drug treatment, and prevention and care strategies for children under 2 years of age. We provide an attached service flowchart and food consumption markers form. The present study analyzed childcare carried out by health professionals in basic health units in Venda Nova do Imigrante. Based on the studies analyzed, it is essential that professionals monitor the child's growth and development to prevent the development of iron deficiency anemia in children up to 2 years of age. Such assistance is extremely important for the promotion, prevention and rehabilitation of children's health. In view of the above, the protocol makes it possible to instruct adherence to iron supplementation in children up to 2 years old, working to promote health, prevent injuries and the ability of teams and managers to organize their work process.

Keywords: Childcare; Treatment; Diagnosis; Anemia.

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Insta-pharma: leveraging instagram for science communication and pharmaceutical care

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In the scope of Pharmaceutical Care, the dissemination of scientific information plays an important role in the spread and promotion of public health, whether for guidance to professionals in the field, the academic community, or for the benefit of society. Among the various dissemination platforms, Instagram® stands out as an effective and widely adopted tool. Its versatility, influence, and instant sharing capability allow relevant information to reach a diverse audience. Thus, the objective of this work is to describe the use of Instagram® to popularize the activities developed by a research group focused on pharmaceutical care. To do so, the content produced by the profile of a research group in the year 2023 was considered, when a new management was established. The content is produced by a team consisting of a Pharmacy student (BBM), two master's students (LCR and LGMGS), and the professor responsible for the group (GASJ). Themes are planned monthly with the aid of Trello® and include subjects related to research lines, as well as topics of social interest. Engagement strategies with followers include interactive stories, participation in trends, and regular posting. For this work, the metrics considered were: number of followers; follower locations; account reach numbers (from the last year); number of posts; types of posts; and most liked posts. After analyzing all insights made and received on the research group's profile on Instagram® since 2023, remarkable results were noticed in the journey of scientific dissemination and audience engagement. The profile has a solid base of 2,616 followers, with a significant representation of 75.9% (n=1,985) being female. Regarding geographic location, the cities of Alegre 7,6% (n=198), Vitória 5% (n=130), and Aracaju 4,9% (n=128) represented the majority of followers. The regional diversity highlights the reach of our activities in various communities. Furthermore, in the last 30 days, the profile reached around 1,9 thousand accounts. Regarding scientific publications, the profile highlights some popular posts among followers, such as "Do you know what subjective experience with medication use is?" composed of 70 likes, 11 shares, and 475 accounts reached, and "Do you know what a scoping review is?" with 55 likes and 395 accounts reached. As for the published Reels, the most relevant and far-reaching one concerns a trend developed by group members called "I am from Care", a trend that is addressed the areas of activity by members of the research group, which garnered 12,8 thousand views and reached 3,834 accounts. In light of the above, efforts to diversify and innovate dissemination strategies, including the use of different content formats like Reels, have proven successful, resulting in a significant increase in reach and social interaction. These results represent a strategy in raising awareness and disseminating scientific knowledge on health and medication-related topics, highlighting the role played in promoting health education.

Keywords: Social Media; Pharmaceutical Care; Scientific Dissemination.

Ethics Committee approval protocol: Not applicable.

Supported by: Not applicable.

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Case report: suspected hepatocellular damage caused by quetiapine, identified during pharmacotherapeutic follow-up

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The term Drug-Induced Liver Injury (DILI) covers all kinds of DILI, such as prescribed and non-prescribed medication and herbal medicine. It can be asymptomatic and cause acute liver failure. These are the parameters for evaluation: alanine aminotransferase (ALT), aspartate aminotransferase (AST), alkaline phosphatase (ALP) and Gamma-glutamyl transferase (GGT). There's a method to distinguish the liver injury pattern, obtained by R value that uses upper limits of normal (ULN) divided by ALP and ALT levels. R value=(ALT/ULN)/(ALP/ULN). When R>5 the patient presents hepatocellular damage, 2>R<5 is mixed damage, R<2 is cholestatic damage. The aim of this study was report the possibility of quetiapine-induced liver injury and the importance of pharmacotherapeutic monitoring during this process. The patient is 42 years old, female, white, work from home and have a clinical history of panic attack, anxiety, phobia and insomnia. She received assistance at the Pharmacotherapeutic Clinic at Alfenas-MG, by the pharmacist in charge. She didn't use alcohol, cigarettes and illicit drugs, and she didn't have a history of liver issues. She was on: alprazolam 2 mg 0-0-1; quetiapine 200 mg 0-0-1; paroxetine 20 mg 1-0-2; losartan 50 mg + hydrochlorothiazide 25 mg 1-0-0; levothyroxine 25 mcg 1-0-0; ferrous sulfate 40 mg 2-0-0; clomipramine 25 mg 0-0-1. At one of the appointments the patient reported feeling stomach pain, hand tremors and fatigue. It was prescribed dry extract of Espinheira Santa 860 mg 0-1-1 during 3 months for the stomach pain. Two months after the first appointment, the patient reported reflux, xerostomia and bad taste in the mouth, hand tremors, talking while sleeping and forgetfulness. She was referred to the prescribing physician with a letter about the patient's condition and the hand tremors, since it might be caused by quetiapine, but there wasn't a response from the doctor. On the fourth month of pharmaceutical follow-up, the patient presented the following blood tests: AST: 215 U/L (ULN: 40 U/L); ALP: 90 U/L (ULN: 105 U/L); ALT: 272 U/L; GGT: 130 U/L. There was a suspicion of DILI, so the app eDILI was used to evaluate the possibility, patient's information was used along with medication information and the result was "possible". The R value was calculated to determine the type of injury: R=(272/40)/(90/105)= 7,9. The R value was higher than 5, therefore it's hepatocellular damage. The prescribing physician refused to consult the patient, so she decided to go to another doctor, who withdrew the causing medication, which was the quetiapine. After one month since the quetiapine withdrawal the tests showed a better result: AST: 68,2 U/L; ALP: 60,0 U/L; ALT: 72,3 U/L; GGT: 73,0 U/L. The other drugs used by the patient were analyzed and it showed non or rare cases of liver damage. In this case was able to reverse the patient situation and after one month of withdrawal, the patient's tests were closer to the ULN, and that was the expected. It was possible to conclude that quetiapine has influence on liver enzymes and can cause liver alterations. It's up to pharmacists to pay attention to the patient's symptoms and blood tests to detect DILI and to notify the drug that induced the liver injury. DILI caused by quetiapine is rare, so it's necessary a more in depth study and pharmacovigilance notification.

Keywords: Drug-Induced Liver Injury; Quetiapine Fumarate; Case Reports; Evidence-Based Pharmacy Practice; Antipsychotic Agents.

Ethics Committee approval protocol: 78106023.7.0000.5142

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Assessment of the risks associated with the misuse of proton pump inhibitors

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Proton Pump Inhibitors (PPIs) are indispensable in the management of gastric conditions; however, their recurrent utilization without appropriate medical oversight is associated with significant adverse effects. These effects include, but are not limited to, flatulence, pneumonia, bone fractures, and vitamin B12 deficiency. PPIs function by inhibiting the H+/K+-ATPase enzyme, which plays a crucial role in suppressing acid secretion in the gastric mucous membranes. The current study undertakes a comprehensive review of the existing literature on the rational use of PPIs by assessing the adverse effects resulting from their inappropriate and unnecessary application. This bibliographic review employed databases such as SciELO, PubMed, and Cochrane Library, selecting studies published within the last decade that address the rational use of PPIs and their adverse effects, thus ensuring the relevance and timeliness of the information discussed. The inappropriate use of PPIs is frequently a consequence of self-medication or extended prescriptions without subsequent reassessment, leading to substantial health risks. These medications are often used inappropriately, and such excessive use may result in severe health complications for patients, including the risk of cardiovascular events or the development of gastric neoplasms. Initially, the studies included in this review emphasize the prevalence of adverse effects associated with the indiscriminate use of PPIs. Consequently, it is recommended to implement more stringent clinical guidelines and initiate educational campaigns targeted at both health professionals and patients. These initiatives aim to promote a more informed and judicious use of PPIs, aligning medical practices with the most current scientific evidence to mitigate the associated risks. This approach is essential for enhancing patient safety and optimizing treatment outcomes.

Keywords: Self-medication; Proton Pump Inhibitors; Adverse effects; Drug Utilization

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Epidemiological profile of medication poisoning in the northern region of Brazil in 2023

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Medication poisoning is an increasing public health problem, affecting people of all ages, especially children and the elderly. It can be caused by various factors such as accidental or intentional ingestion of excessive doses, inappropriate use of prescribed medications, drug interactions, and medical errors, with consequences ranging from mild symptoms to death. The use of medications, particularly with suicidal intent, are the main agents. Therefore, this study aims to outline the epidemiological profile of medication poisonings in the Northern Region of Brazil in the year 2023. This is a descriptive, exploratory epidemiological study, based on data recorded on medication poisoning notifications in the database of the Notification Severity Information System (SINAN), in the Northern Region of Brazil in the year 2023. There were 2,347 cases of exogenous medication poisoning reported in the Northern Region in 2023. The predominant profile of the poisonings was represented by females (75.8%), aged between 20-29 years (24.2%), mixed race (80.8%), and residents of the state of Tocantins (17.8%). The clinical variables show the main circumstance as attempted suicide (69.3%), predominantly evolving to recovery without sequelae (69.8%). About 93% of the cases occur within the family environment. It is evident the importance of improving and implementing public health policies aimed at prevention and awareness about the storage and indiscriminate use of medications. The extensive variety of medications, the lack of knowledge about their use, easy access, and their uncontrolled use can cause serious health damage, including deaths, representing a significant challenge for health services. Therefore, this study aims to contribute to the improvement of public health policies focused on prevention, guidance, and the adoption of measures that minimize this situation, with special attention to the young adult and female population who are the main responsible for the notifications of medication poisoning in the Northern Region of Brazil.

Keywords: Epidemiological profile; Intoxication; Medications.

Ethics Committee approval protocol: Not applicable.

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Caspase-3 activation, apoptosis effector protein, in sh-sy5y cells exposed by association between ketamine and ethanol occurs immediately after exposure

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In the last years, there has been a significant growth in the use of drugs of abuse, mainly the club drugs. Among these, ketamine, a analgesic and anesthetic drug very common in veterinary medicine, draws a lot of attention from young people due to expressive hallucinogenic effects. When used with ethanol, it may result in permanent damage to the central nervous system of the users. According to the results obtained by our research group, a combination of ketamine 1 mM (K1) and ethanol 100 mM (ET100) resulted in a synergistic toxic effect. Furthermore, our research group revealed a reduction in reduced glutathione, an increase in caspase-8 expression (extrinsic pathway of apoptosis) and Bax (intrinsic pathway of apoptosis) for association group (K1E100) in periods before cell death. The clarifying of the effects caused by the concomitant use of ethanol and ketamine is very important for further clinical management. The objective of the work was to assess effector enzyme activity, caspase-3, in neuroblastoma cells SH-SY5Y exposed to K1, E100, e K1E100 in periods before cell death - 3 and 6h. The caspase-3 activity was analyzed by a colorimetric kit E-CK-A383 from Elabscience®. The caspase-3 activity was analyzed by a colorimetric kit E-CK-A383 from Elabscience®. Briefly, after each exposed period, the cells were removed and washed with PBS for subsequent incubation with the Ac-DEVD-pNA substrate and absorbance reading at 405 nm. When the substrate is cut by Caspase 3, the yellow group pNA is dissociated and pNA has an absorption peak at 405 nm, making it possible to quantify its activity according to the absorbance obtained in the reading window of 3 to 6 hours. After 3h of incubation with the substances of interest, it was possible to notice a significant increase in caspase-3 activity in the K1E100 association when compared to control and E100. This probably occurred due to the activation of caspase-8 in the same period, suggesting that the pathway extrinsic is involved in apoptosis. However, after 6 hours of incubation, no there was a statistical difference between the groups. The K1E100 association proves to be more neurotoxic than the isolated compounds, activating the apoptotic pathway early. Finally, it is possible that other mechanisms independent of the activation of the caspase pathway occur after 6 hours of exposure, which may explain the lack of detection of its activity in this period.

Keywords: Ketamine; Alcohol; Interation; Neuroblastoma; Neurotoxicity.

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Interprofessional collaboration from the perspective of healthcare professionals participating in therapeutic pharmacy committees

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Collaborative practice occurs when different professional categories provide services in an integrated manner to meet the health needs of the population. The Pharmacy and Therapeutics Committee (PTC) consists of a multiprofessional committee responsible for the incorporation of health technologies aimed at promoting rational drug use. Therefore, collaborative action within a PTC can contribute to optimizing the service provided. This study aimed to understand the work process and the role of health professionals from three PTCs located in a municipality in the eastern region of Minas Gerais from the perspective of interprofessional collaboration. This is a quantitative-qualitative study in which the PTC of Governador Valadares, the PTC of the Municipal Hospital of the city, and the PTC of the Special Indigenous Health District, from the states of Minas Gerais and Espírito Santo (DSEI-MG/ES), were studied. Data collection took place between January and April of 2024, through semi-structured individual interviews via Google Meet®, which were recorded and later transcribed. Transcriptions were considered through thematic content analysis. The study was approved by the Research Ethics Committee of the Federal University of Juiz de Fora under CAAE number 59202022.2.0000.5147. The research is ongoing, and so far, 11 professionals have participated in the interviews, including one (9.1%) dentist, one (9.1%) nurse, six (54.5%) pharmacists, one (9.1%) physician, one (9.1%) nutritionist, and one (9.1%) psychologist. It can be evidenced that PTCs are a potent scenario for the implementation of interprofessional collaborative practice, as the development of collaborative competencies such as interprofessional communication and conflict resolution has been reported. However, some barriers were identified, such as the need for professional qualification and training, assertive selection of members, and planning of work processes. Furthermore, professional overload was identified as a difficulty in PTC operation. Specifically, members of the DSEI MG/GV PTC pointed out territorial coverage as a difficulty, resulting in a high health demand to be met, in addition to the low frequency of meetings due to the need for financial resources for face-to-face meetings, since professionals from this PTC do not reside in a single municipality. The study has demonstrated PTCs as scenarios of potential and barriers to the implementation of interprofessional collaborative practice. As a future perspective, the results of this study can help to reformulate team work processes and encourage the improvement of interprofessional performance in PTCs, in addition to providing support to elucidate strategies for implementing collaborative practice.

Keywords: Drug Evaluation Commission; Pharmaceutical Services; Interprofessional Relations; Patient Care Team.

Ethics Committee approval protocol: CAAE 59202022.2.0000.5147

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Sharing knowledge about functional health literacy and diabetes mellitus: experience report in a study group

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Study groups are communities formed by people with common goals, aimed at developing skills and producing knowledge on a specific theme. These groups are essential for interaction and collaboration among students and healthcare professionals. Therefore, the objective of this work was to report the student experience in a study group aimed at understanding Functional Health Literacy (FHL) and care for people with Diabetes Mellitus (DM).This is an experiential report by graduate students participating in the "Study Group on FHL and Care for People with DM," created in January 2024. The group, composed of professors, graduate and undergraduate students from the Research Group on Implementation and Integration of Pharmaceutical Care in the Brazilian Health System and the Laboratory of Innovation for Health Care (LINC) at the Federal University of Espírito Santo, aims to deepen understanding of FHL and its influence on the care of people with DM. Meetings take place once a week during the academic term. During the group meetings from January to May 2024, participants discussed topics related to FHL (concept, assessment tools, influence of FHL on healthcare) and DM (types, pathophysiology, diagnosis, management and insulin therapy). Presentations were given by the students, followed by feedback to encourage preparation and improvement of presentation skills and critical analysis of scientific evidence. FHL is a relatively underexplored topic in Brazil, highlighting the importance of expanding understanding of these concepts and their relevance in the care of people with DM. Additionally, besides contributing to theoretical knowledge, the discussions allowed participants to develop skills in scientific presentation, argumentation, and critical thinking. In light of the above, the student experience with the Study Group proved to be an contributory approach for learning and skill development, as well as for promoting autonomy in the care of people with DM, from the perspective of FHL.

Keywords: Health literacy; Diabetes mellitus; Study groups.

Ethics Committee approval protocol: Not applicable

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Dimethyltryptamine and harmine, components of ayahuasca, isolated and in combination, decreased cocaine-induced apoptosis in shsy-5y cells

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Ayahuasca is a psychoactive tea used by indigenous people of the Amazon in shamanic rituals as well as by religious groups such as Santo Daime and União do Vegetal. This tea is traditionally made by infusing *Psychotria viridis* and *Banisteriopsis caapi*. While *Psychotria viridis* contains N,N-dimethyltryptamine (DMT), which is biotransformed by intestinal monoamine oxidase (MAO), *Banisteriopsis caapi* contains the beta-carbolines harmine, harmaline, and tetrahydroharmine, which inhibit MAO activity. This allows DMT to interact with serotonin receptors in the central nervous system, thus causing the psychedelic effects of tea. Several studies have investigated the pharmacological potential of ayahuasca in different scenarios, but the scientific literature lacks information about its toxicity and its neuroprotective role. This study aims to evaluate the neurotoxicity of different preparations of ayahuasca and its isolated active compounds (DMT and harmine) in SH-SY5Y human neuroblastoma cell culture, as well as to evaluate their possible neuroprotective effects in the same SH-SY5Y cells exposed to the lethal concentration 50 (LC50) of cocaine. Briefly, SH-SY5Y cells were exposed for 48 hours to different concentrations of cocaine, DMT and harmine (isolated and in combination) to determine the concentration response curves (CRCs). The non toxic concentrations (NOAEL) of the tea's substances were then incubated with cocaine LC50. All the CRCs were determined through the MTT cell viability assay, whereas the neuroprotective potential of the tea's substances was evaluated by the MTT assay and flow cytometry with annexin V and propidium iodide staining. The one way analysis of variance (one-way ANOVA) was used followed by Bonferroni's post test, and the differences between the groups were considered significant for $p<0,05$. The NOAEL of DMT, harmine and DMT:harmine was 10 µM, 10 µM and 10:20 µM, respectively. Cocaine LC50 was 2.5 mM. On the MTT assay, ayahuasca's substances showed neuroprotective effect, with the percentage of viable cells for DMT+cocaine, harmine+cocaine, DMT+harmine+cocaine groups equal to 69.73%, 74.04%, and 67,98% respectively, vs 51.40% for the cocaine group in relation to control. For the flow cytometry, the number of viable cells in the DMT+cocaine, harmine+cocaine, DMT+harmine+cocaine and cocaine groups were 87.33%, 86.97%, 74.37% and 69.90%, respectively. The number of cells undergoing apoptosis in these groups were 2.37%, 2.53, 4.52% and 14.93%, respectively. For late apoptosis, the percentage of cells were 10.13%, 10.43%, 21.03% and 14.23% in each group, respectively. And the number of cells in necrosis were 0.18%, 0.1%, 0.06% and 0.93% in each group, respectively. In conclusion, the components of ayahuasca partially prevents the cells from cocaine-induced toxicity under these conditions, reducing the number of cells undergoing apoptosis.

Keywords: DMT; Harmine; Ayahuasca; Cocaine; Neurotoxicity.

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University pharmacy: contributions to the promotion of the rational use of medicines

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The University Pharmacy (FU) is a space for collaboration between the university and the community that aims to strengthen pharmaceutical assistance by promoting the rational use of medicines (URM). As a space for training and service to the community, the FU is an important strategy for promoting actions aimed at promoting health and well-being with actions that articulate the technical, health, economic, symbolic and political dimensions of medicine. This work aims to report the actions that induce the rational use of medicines developed at the University Pharmacy of the State University of Feira de Santana (UEFS). FU has its own structure on the university campus and three university extension programs have been developed there since April 2022. Medicines from the Basic Component of Pharmaceutical Assistance are made available through an agreement with the City Hall and the team is made up of 6 teachers, 1 technician university and 18 students. Pharmaceutical services and procedures are carried out in accordance with health and professional regulations; and the public covered by the services are the UEFS internal and external community. All permanent and consumable materials used to carry out the services were obtained with resources from the institution and all resources for care and clinical activities are developed by the team itself. The dissemination of technical information occurs through social networks and on-site dissemination, through various events. There is a partnership with the Municipal Health Department, pro-rectors and other extension programs, enabling the expansion of the capillarity of the actions carried out. This report corresponds to the actions carried out in the period from February to April 2024. As activities that induce rational use, in the mentioned period, 27,054 units of medicines were dispensed rationally and 92 pharmaceutical consultations were carried out, which produced medicine prescriptions, according to IN 120/2022 or non-drug guidelines. Furthermore, from the perspective that pharmaceutical services enable better use of medications, a total of 251 blood pressure measurements and 74 blood glucose measurements were taken, ensuring better monitoring of patients with hypertension and diabetes. FU collects and properly manages medicine waste from households, having discarded, in the mentioned period, a total of 23.76 kg of medicines, thus preserving the ecosystem and minimizing damage resulting from the misuse of medicines. It also uses medicines through the Farmácia Solidária program, already having 227 registered patients, 127 donors and distributing 939 units of medicines. The creation of devices to promote therapeutic adherence (dosage calendar, medication organizing boxes, communication with prescribers), medication fractionation, guidance on access to medication within the scope of the Unified Health System (SUS) and the Popular Pharmacy Program are also activities that strengthen the URM. The results obtained are relevant, with a positive impact on people's quality of life and health condition, highlighting the potential contribution of FU to promoting rational use and also professional training aimed at more effective and resolute assistance, based on the teaching-service-community articulation.

Keywords: Pharmacy; pharmacy education; drug utilization.

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Algorithms for clinical practice in university pharmacy: strategy to promote the proper use of medicinal plants and herbal medicines

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Clinical practice algorithms represent valuable tools in the field of pharmaceutical care, providing guidance for both health professionals and users, aiming at the safe and rational use of therapies, including medicinal plants. These algorithms outline a flow of procedures to be followed in the management of minor disorders, taking into account the patient's particularities, the signs and symptoms presented, the available therapeutic options, and the possible expected outcomes. In this context, the present work aims to report the development of clinical algorithms that encompass medicinal plants as therapeutic resources in the context of pharmaceutical care. Initially, clinical practice algorithms recommended by the Federal Council of Pharmacy were adapted to the needs of the public (external and internal community of the institution) assisted by the University Pharmacy (FU). In this sense, based on the records of pharmaceutical consultations performed at the FU, the main minor disorders were chosen, on which the algorithms would be elaborated. With regard to herbal medicines, medicinal plants and forms of use chosen for each situation, we considered those provided for in Normative Instruction 120/2022, which defines over-the-counter medicines, and also those common and accessible in the semi-arid region of Bahia, considering that this demand came from the community itself. The algorithms were developed electronically, using the Canva program, and were discussed in meetings with the team to better adapt to the FU practice, especially during consultations. Four clinical practice algorithms were created to provide guidance on the treatment of sore throat, headache, dysmenorrhea, and diarrhea, each providing specific guidance and options for medicinal plants, in addition to allopathic prescription pharmaceutical medications. In general, the algorithms are structured in three stages: reception, evaluation and counseling. The algorithm for sore throat emphasizes therapeutic features with antimicrobial, anti-inflammatory, and analgesic properties. The algorithm for dysmenorrhea, on the other hand, offers options of plants and herbal medicines with analgesic and antispasmodic properties to relieve menstrual pain. For headaches, aspects such as frequency, intensity, and triggering factors are considered, recommending analgesic and relaxing plants. In turn, the algorithm for diarrhea addresses intestinal discomfort by indicating resources with astringent and anti-inflammatory properties. These algorithms serve as valuable pharmaceutical guidance tools, providing clear and evidence-based guidelines for the safe and effective use of medicinal plants and herbal medicines in the treatment of these conditions. Especially in the University Pharmacy, where different audiences are served, these algorithms not only qualify consultations, but also encourage the proper use of medicinal plants and herbal medicines. The application of algorithms in clinical practice, especially focused on the use of these therapeutic resources, stands out as an integrative strategy in pharmaceutical care, promoting the dissemination of accurate information and facilitating the correct use of these therapeutic strategies.

Keywords: Pharmacy; Complementary Therapies; Medicinal Plants; Community-institution Relations

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Production of health education videos for deaf people: a bibliometric study

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The deaf community faces major problems with communication and access to health information. Among the technological resources, videos in sign language have been an effective tool for transmitting health information to deaf people. However, despite its importance, few studies have investigated the profile of scientific publications on the production of health education materials for deaf people. In this context, this study aimed to map the publication profile of original articles on the production of videos in sign language for health education for deaf people. To this end, a bibliometric review was carried out, with searches performed in January 2023, across the databases Pubmed/Medline, Scielo, Scopus, Embase and Lilacs, using descriptors related to deafness, Hard of Hearing Person and Education of Patients. Original studies were included, published in Portuguese, English or Spanish, which described the process of developing health education material in video format for deaf people. Two reviewers read titles, abstracts and full texts according to the eligibility criteria and extracted the following data from the included articles: year of publication, country, themes produced, journals, impact factor/qualis, mother area of publication of the journals. The initial search resulted in 1809 publications, of which 16 publications met the inclusion criteria. The articles were published between the years 2009-2023 and were carried out in the United States of America (n=7; 43.75%), Brazil (n= 5; 31.25%), Portugal (n= 1; 6, 25%), Iran (n= 1; 6.25%), Ecuador (n=1; 6.25%) and Romania (n=1; 6.25%). The educational videos covered the following topics: Breast cancer (n=3; 18.75%); Sexual and reproductive education (n=3; 18.75%); Oral hygiene (n:2; 12.50%); Smoking (n:1; 6.25%); HIV/AIDS (n:1; 6.25%); Ovarian cancer (n=1; 6.25%); Cancer genetics (n=1; 6.25%); Cardiopulmonary resuscitation (n=1; 6.25%); Health education(n=1; 6.25%); Covid-19(n=1; 6.25%); Dengue and Tuberculosis (n=1; 6.25%). The majority of publications were carried out in journals with a considerable impact factor, the majority of which were from Qualis A (n=10; 62.5%), with Nursing as the predominant main area (n=5; 31.25%). This bibliometric review indicated a significant participation of Nursing in the development of health education videos for the deaf population, especially about breast cancer and sexual and reproductive education. Furthermore, the results of this work highlight the need for the involvement of other health professionals, including pharmacists, who can produce health education materials on the safe and effective use of medicines.

Keywords: Deafness; Hard of Hearing Person; Education of Patients; Health education; Technology.

Ethics Committee approval protocol: Not applicable

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Literacy for self-care and self-medication in solving self-limiting problems for community health agents (cha) in the municipality of Araraquara-SP

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According to the World Health Organization, self-care is a crucial approach for individuals and communities to promote their own health, and self-medication is one aspect of this practice. Responsible self-medication involves treating self-limiting health problems (SHP), without a medical prescription, with over-the-counter medicines and/or herbal products (HP), when used as directed. Ancestral and popular knowledge about the use of medicinal plants and their derivatives (e.g. teas, syrups, tinctures, extracts, essential oils, etc.) in the management of physical, mental and spiritual health problems is well-documented. In this context, the objective was to provide a space the exchange of knowledge about evidence-based health and popular knowledge of the use of HB with the community health agents (CHA) for recognition and management of SHP with HP. The extension curricular activities were planned in collaboration with the Municipal Health Secretary, inviting the participation of at least one CHA from each of 28 basic health units (BHU) of the municipality in the "Phytovigilance: Popular knowledge for self-care and effective and safe use of herbal products" workshop. This workshop was conducted in three stages: a) assessing the CHAs' existing knowledge about the use of HP in healthcare; b) Enhancing health literacy by covering topics such as recognizing signs and symptoms of SHP, conditions unsuitable for self-medication, non-pharmacological management strategies, and practical guidance on using HP (preparation methods, reliable sources, cultivation, purchasing options, as well as evidence-based effectiveness and safety); and c) hands on practice sessions for preparing infusions, decoctions, tinctures, creams, and syrups from medicinal plants with evidence in resolving SHP. A total of 35 CHA participated in the workshop, all of whom expressed satisfaction with the practical content and its relevance. Students reported acquiring valuable skills in healthcare management, along with a positive experience of being closely involved with health services. The extension curricular activities provided an environment of collaboration and integration between service-community-university; and interprofessionality among graduates in pharmacy, social sciences, and pedagogy. They facilitated the interdisciplinarity of the contents of pharmaceutical assistance, pharmaceutical care, pharmacognosy, pharmacobotany, and collective health. In addition to the appreciation and recognition of popular knowledge on safe and effective self-medication with HP and the literacy of the community internal and external to the university.

Keywords: Self-Care; Self-medication; Herbal Products; Community health agents.

Ethics Committee approval protocol:

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Factors associated with self-reported depression disorders among teachers in Espírito Santo

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Depression is a mental disorder characterized by behavioral and mood changes, directly affecting the patient's functional capabilities. Teachers are among the workers with a high prevalence of depressive disorders, but little is known about the associated factors. In this context, this study aimed to evaluate the factors associated with the diagnosis of self-reported depression disorder by teachers in the state school system of Espírito Santo. A cross-sectional, quantitative and descriptive study was carried out in the Regional Superintendence of Education (RSE) Carapina in Espírito Santo. The sampling of the schools was carried out by cluster in a single stage, and 20 schools were randomly selected. Teachers linked to RSE Carapina schools were included, and teachers who were absent from their teaching duties or away from work were excluded. Data collection was carried out between January and February 2024, in person, during the Pedagogical Planning Journey. The self-administered questionnaire contained sociodemographic variables and questions related to the previous diagnosis of depression disorder. The chi-square test was used to evaluate the association between the diagnosis of depression disorders and sociodemographic variables. The t-test was used to verify whether there is a difference between the weekly workload and the teaching time according to the presence or absence of a previous diagnosis of depressive disorders. The results were considered statistically significant when $p \leq 0,05$. A total of 453 teachers participated in the study, and 14,8% (n=67) reported having a previous diagnosis of depression. Having a diagnosis of depression disorders was statistically significantly associated with having an occupation other than teaching ($X^2 = 6,206$; df 1; $p < 0,05$). No statistical relationship was found between diagnosis of depression disorders and gender identity ($p = 0,232$), sexual orientation (p=0,065), ethnicity/skin color (p = 0,92), having a partner (p = 0,163), income (p = 0,708), school location (p = 0,077), type of employment relationship (p = 0,539) and work shift (p = 0,672). Weekly workload (p = 0,178) and time working in teaching (p = 0,079) did not show statistically significant differences between teachers with and without a diagnosis of depression disorder. The data from this study suggests that having an occupation other than teaching may be related to a higher risk of developing depression. Most of the sociodemographic and professional variables did not show a statistically significant association with the occurrence of depression disorders among teachers, indicating the existence of factors of another nature that impact on the development of the disorder.

Keywords: Depression; Teacher; Mental health; Epidemiology.

Ethics Committee approval protocol: 6.326.702

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Factors associated with the stigma of people living with HIV attended at a university hospital in southeast Brazil

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In recent years, there have been significant advances in the diagnosis and treatment of the Human Immunodeficiency Virus (HIV), which has transformed this infection into a chronic health condition. However, studies show that stigma remains a major obstacle to prevention, treatment, and care for people living with HIV (PLHIV). Therefore, the aim of this study was to understand the factors associated with stigma in PLHIV. A cross-sectional study was conducted from December 2022 to April 2023 at a Medication Dispensing Unit located in a university hospital in Southeast Brazil. PLHIV who met the eligibility criteria were invited to complete a questionnaire consisting of two sections. The first section included items related to sociodemographic data, while the second contained the Brazilian version of the Short HIV Stigma Scale. This scale consists of 12 items divided into four domains: personalized stigma, disclosure concerns, concerns with public attitudes and negative self-image. Items are rated on a 4-point Likert scale, with the scale score calculated by summing the items (subscale range: 3–12). Higher scores indicate higher levels of stigma. Pearson's correlation test was used to assess the correlation between sociodemographic data and stigma. The study was approved by the Research Ethics Committee (CAAE: 59769022.0.0000.5060). The study involved 104 patients. The participants were predominantly male (n=61, X%), aged over 49 years (n=X), self-identified as mixed-race (n=49). They had completed higher education (n=26), considered themselves heterosexual (n=62), had been diagnosed for more than 5 years (n=87) and were residents of the Greater Vitória region (n=76). The highest levels of stigma were found in the domains 'disclosure concerns' (12±0) and 'concerns with public attitudes' (11±0.57). Regarding the analysis of items, the majority (88.46%; n=92) agreed/strongly agreed that 'I make an effort to keep secret that I have HIV', and (78.84%; n=82) agreed/strongly agreed that 'People with HIV are marginalized'. Individuals living in rural areas showed higher levels of stigma in the 'disclosure concerns' domain ($p=0.01$) compared to those living in the capital. Women exhibited higher levels of stigma in the 'concerns with public attitudes' domain compared to men ($p=0.05$). The study demonstrated a high level of stigma present in the interviewed patients, especially in women and people living in rural areas. The highest levels of stigma among the participants in this study were found in the 'disclosure concerns' domain. This finding raises concerns that stigma may be negatively impacting the lives of PLHIV. Therefore, further studies are needed to better understand stigma as well as proposed strategies to combat it.

Keywords: HIV; AIDS; Stigma; Atitudes e Prática em Saúde.

Ethics Committee approval protocol: CAAE: 59769022.0.0000.5060

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Project-based learning: a strategy for teaching epidemiology and solving real-world problems

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Epidemiology serves to understand diseases, promote health, and facilitate evidence-based decision-making. In this scenario, project-based learning is an active methodology approach that allows students to deeply engage with real-world issues and develop desirable skills. Thus, the objective of this work is to describe the use of project-based learning in the discipline of Epidemiology. Between August and December 2023, a class enrolled in an Epidemiology course offered by the Pharmacy department of a Federal Institution, instructed by Professor GASJ and two master's students (LCR and LGMGS), was divided into groups and tasked with developing projects to tackle real-world problems as part of their course requirements. Various study designs were randomly assigned to groups, including cross-sectional studies, case-control studies, cohorts, clinical trials, scoping reviews, and qualitative studies. The projects followed a structured sequence of steps, comprising (1) defining the theme, design, and objectives; (2) introduction; and (3) methodology. Throughout this process, students articulated project objectives and received guidance from the master's students (LCR and LGMGS) assisting with the course. At the course's culmination, the groups underwent evaluation by the instructor and an examining board comprising two external master's students. The participants in the Epidemiology course included 7 (41.2%) Nutrition students and 10 (58.8%) Pharmacy students, forming six groups with two or three members each. The chosen project themes were diverse, ranging from accessibility for people with disabilities at the university to the incidence of glaucoma in black individuals. Students' prior experiences notably influenced their areas of interest, and they independently sought information on the topics, primarily reaching out to postgraduate students for assistance with scientific writing and study design. For the presentation to the evaluation panel, students prepared 15-minute PowerPoint presentations, followed by discussions. The average project score was 8.55 (SD = 0.7). The master's students observed significant learning progression among the students during project development and presentation. In conclusion, employing projects can serve as an effective strategy for comprehending study designs and addressing real-world problems through research in Epidemiology classes, thereby enhancing student engagement throughout the course.

Keywords: Project-Based Learning; Epidemiology; Epidemiologic Studies.

Ethics Committee approval protocol: Not applicable

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Analysis of the profile of drug-drug interactions identified in neonates under intensive care

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Neonates in intensive care have complex clinical conditions, which often require the use of several medications simultaneously and can be aggravated by the physiological immaturity associated with this age group. Polypharmacy can be considered a risk factor for the occurrence of drug-drug interactions (DDI). This study aimed to analyze the profile of DDIs identified in neonates admitted to the Neonatal Intensive Care Unit (NICU). Conducted prospectively from april/23 to february/24, the study included 300 newborns admitted to the NICU of a high-risk maternity hospital. Patients with a hospital stay of ≥ 24 hours and who used two or more medications simultaneously were included and readmissions to the sector were excluded. DDIs were detected by active search in each patient's electronic medical record, being evaluated and classified by *UpToDate*® according to severity in C (monitor therapy), D (consider therapeutic change) and X (avoid drug combination). The study was approved by the institution's Research Ethics Committee (protocol No. 5867920), as determined by Resolution No. 466/12 of the National Health Council. Among the 2,261 analyzed prescriptions, 789 DDIs were observed, distributed between 118 pairs of drugs. Of these, type C severity interactions comprise the majority, totaling 88.9% (702/789), while 10.6% (84/789) involve type D, and only 0.4% (3/789) are of type X. The interaction Ampicillin — Gentamicin (n=155) stood out among those of type C, Fentanyl — Phenobarbital (n=24) among those of type D, and Amikacin — Polymyxin B (n=2) among those of type X. This analysis highlights that most DDIs do not require interruption of drug therapy, but rather careful monitoring of clinical parameters related to risk factors for the occurrence of potential adverse reactions to these DDIs. The more severe the DDI classification, the greater the risk of adverse reactions to medications that require medical interventions and the suspension or change of treatment based on risk-benefit.

Keywords: Drug-Drug Interaction; Neonates; Intensive Care

Ethics Committee approval protocol: 5867920.

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Integration of pharmacology, clinical pharmacy and pharmaceutical care in the multidisciplinary approach to thrombosis

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Academics Leagues are composed by students and professional mentors with the aim of promoting knowledge, education and research in the health area, complementing the nacional curricular guideline. The students of UNIFAL-MG created the League of Pharmacology (LAFAR) and the League of Clinic Pharmacy and Hospital (LAFaCH) where they develop a special work: offering opportunities of enhancing the knowledge on specifics subjects; in addition, they also cooperate with their mentors, specifically in challenging themes such as thrombosis. With the objective of straightening the knowledge of the multidisciplinary treatment of thrombosis the event "Integration of pharmacology, clinic pharmacy and pharmaceutical attention with the multidisciplinary approach" was created. The event has had diversified activities such as one lecture in conversation format; discussions about the theme and relating it with the subjects as: clinic hematology, hospital pharmacy and pharmaceutical assistance. In addition, the organization of the event sent to the students a video about the professionals' experience on the topic involving clinical and hospital pharmacy.The event's closure was marked by the holding of a symposium open to the entire academic community, which featured the participation of four specialized professors from each area. Throughout the event, there were 128 attendees, mostly Unifal students. A significant interaction between speakers and participants stood out, resulting in broad awareness of the relevance of multidisciplinary collaboration in pharmacy, especially in thrombosis treatment. The collaboration between Academic Leagues to organize this event enriched the participants' knowledge, strengthened their professional skills, and prepared them to tackle the intricate challenges associated with the treatment of thrombotic diseases.

Keywords: Thrombosis; Pharmaceutical Care; Clinical Pharmacy; Pharmacology; Hospital Pharmacy.

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Clinical teleconsultations to support primary health care pharmacists

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Undergraduate degrees in pharmacy in Brazil are being restructured, aligning themselves with the social demands of the community. To improve the training of future pharmacists, in addition to changes in the curriculum, with 50% of classes focused on health care, it is necessary to integrate the university with the population. To simultaneously contribute to the professional lifelong learning of pharmacists, already integrated into the health system and promote positive results for the community, an extension project was developed, entitled Teaching-Service-Community Integration, coordinated by two professors from the Faculty of Pharmacy of the Federal University of Minas Gerais. The aim of the project is to offer clinical support to pharmacists who provide care to patients in the Belo Horizonte municipal health system. The methodology used was problematization with the Magarez Arc Method, following the steps: - observation of reality; - elaboration of key points; - theorization and - proposition of solution hypotheses based on critical reflections to apply them to the demands in primary health care services. The current clinical support team is made up of a pharmacy professor, two postgraduate pharmaceutical students, one doctorate and one master's degree, this being a fellow and four volunteers and an undergraduate pharmacy fellow. This team offers teleconsultations to assist pharmacists working in managing patients' clinical cases based on the theoretical-methodological framework of Pharmaceutical Care. To collect information, the university team meets with the pharmacist to get relevant information about the patient, their health problems and treatments. Data such as past clinical history, health conditions, medications in use and their respective monitoring parameters, medication experience, eating habits and physical activity are used to evaluate the patient's pharmacotherapy. As feedback, individual care plans are drawn up, considering the patient's clinical and social complexity, based on clinical protocols and therapeutic guidelines. These feedbacks improve the clinical reasoning of pharmacists, benefiting patients and meeting the needs of the community.

Keywords: Pharmacists Lifelong Learning; Pharmaceutical Care; Extension Project.

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Successful experience of implementing pharmaceutical consultations at the doctor Plinio Prado Coutinho outpatient of Alfenas-MG

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The clinical pharmacist is trained to work in several areas, including monitoring, health education, and pharmacotherapeutic monitoring. These services can be offered in municipal outpatient clinics and in pharmacy consultations that promote the rational use of medications, monitoring of clinical evolution, and guidance on pharmacological and non-pharmacological measures to enhance patients' quality of life. Therefore, the objective of this work was to analyze the profiles of patients attending pharmaceutical consultations held at the Doutor Plínio Prado Coutinho outpatient clinic in Alfenas-MG (Minas Gerais) and measure the results obtained. The work was conducted using data collected from an analysis spanning from May 2022 to January 2023. The target audience comprised individuals over 18 years of age who underwent outpatient screening, participated in health screenings, and/or received pharmaceutical consultations. This service is provided twice a week by the Federal University of Alfenas (UNIFAL-MG) and is attended by employees and students of the pharmacy course. In total, 642 health screenings and 46 pharmaceutical consultations were conducted during this period. It was observed that the majority of patients utilizing both services were female, aged between 60 and 79 years old, and either retired or housewives. During the screenings, it was found that 47.35% of patients had altered clinical parameters and were subsequently invited to participate in a pharmaceutical consultation. During these consultations, various medication-related issues were identified, including incorrect administration times and inconsistent doses and prescriptions. The most predominant comorbidities were Systemic Arterial Hypertension and Type 2 Diabetes Mellitus. Consequently, several individualized interventions were carried out, including dose adjustments, organizing medications in handmade boxes with administration schedules, prescribing herbal medicines, ordering laboratory tests, and providing guidance on non-pharmacological measures. In summary, this work contributed to a concise analysis of pharmaceutical services and the establishment of pharmaceutical clinics within the Unified Health System. Additionally, it was observed that over 50% of patients undergoing screening and pharmaceutical monitoring experienced an improvement in their health condition, underscoring the essential role of this service in promoting, protecting, and restoring population health.

Keywords: Pharmaceutical Services; Health Education; Drug Therapy; Ambulatory Care Facilities.

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Hormone therapy for breast cancer and concomitant use of medications: a lived experience of ambiguity

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Breast cancer represents a group of heterogeneous diseases caused by the progressive accumulation of mutations that originate in breast tissue. The disease is a global public health problem and is currently the most commonly diagnosed type of tumor among women. In this context, hormone therapy plays a fundamental role in its pharmacological treatment, as it is considered responsible for reducing the risk of recurrence and mortality associated with the disease in patients whose tumor is of the hormone-dependent type. Medicines, in addition to their material concreteness, are configured as a social phenomenon because they are expressed as personal, symbolic, social and cultural entities, processes and representations, in order to embrace ethical, political-legal, advertising, generational and gender dimensions. The current study aimed to reveal the subjective experience of breast cancer patients using hormone therapy with the daily use of medications. To carry out the investigation, phenomenology in the light of Max van Manen was established as a methodological path, whose operationalization covers six research activities: (i) turning to the nature of the lived experience; (ii) investigate the experience as we live it and not as we conceptualize it; (iii) reflect on the essential themes that characterize the phenomenon; (iv) describe the phenomenon through the art of writing and rewriting; (v) maintain a strong and oriented relationship with the phenomenon; and (vi) balance the research context considering the parts and the whole. Research participants were restricted to people over eighteen years of age; (ii) female; (iii) diagnosed with breast cancer; (iv) who were using hormone therapy for this condition; (v) for a period equal to and/or greater than one year; and (vi) who were undergoing one or more pharmacological treatments concomitant with oncological therapy. Individuals who were undergoing treatment with intravenous chemotherapy were not invited. The methodological instruments used were individual interviews, which were recorded and later transcribed; notes in a field diary during and after the interviews; and observation. The analysis of the collected material included three instances: phenomenological description, reduction and understanding, which occurred simultaneously with the data collection phase. As a result, three main themes emerged from the interviews. The first is called "The lived experience's structures with hormone therapy in the treatment of breast cancer", which branched into three subthemes: (i) "The lived experience of corporeality"; (ii) "The lived experience of sociability"; and (iii) "The lived experience of temporality". The second theme is titled "Routines: managing therapy and life", followed by the third theme, "Hormone therapy and concomitant use of medications: a comparative relationship". In this sense, ambiguity constituted the essence of a participant's lived experience, in which contradictory attitudes and/or feelings in relation to hormone therapy expressed their daily lives. The medication lived experience, therefore, constitutes a complex and multifactorial phenomenon, which involves an interrelationship between personal, social and structural factors, in which the burden assigned to each of the components, hormone therapy and non-oncological medicines is not uniform. This situation puts into focus both the availability of time necessary to comply with medication regimens and the requirement for multiple efforts in a continuous movement and under constant review, affecting the quality of life of these women. It is expected, therefore, to contribute to the improvement of oncological health care, and that the data obtained will provide support that translates into greater effectiveness of interventions and an increase in the quality of life of individuals.

Keywords: Breast cancer; Hormone therapy; Medication lived experience; Phenomenology.

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Towards an embodied health education

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The construction of an embodied health education proposes a transgressive education, an anti-fatphobic, anti-racist, anti-lgbtqphobic and anti-ableism education, which affects bodies with respect, acceptance and dignity. In the second semester of 2022, a subject called Corporeality and Health was offered as part of the master's degree (Teaching Internship), together with my supervisor. Drawing an interface between corporeality and health is a challenge within Pharmacy, for which the body is, during the learning process, a mere object of study of biomedical knowledge. The body as a symbolic construction goes beyond the perception of the physical body, and the Anthropology of the Body and Anthropology of Pain was used as a theoretical framework to outline the discipline. Proposing a discipline and an embodied health education is to guide possibilities of experiences, to guide possibilities of new discourses, with my body and the body of others and the construction of more empathetic formations, respecting differences and giving voices to patients. The flipped classroom methodology and dialogical classes were used for the subject, with discussions between students and teachers, based on the previous readings indicated. Reflective writings regarding the contents discussed in the classroom were requested and evaluated, as well as artistic creation exercises (drawing, painting, collage, photography and video), as a reflective teaching-learning process. Finally, Seminars on the Anthropology of Pain were proposed as a final work, encouraging students to think about other discussion methodologies, beyond the hierarchy of the classroom. The class, made up of 23 students from different periods, presented the themes in the format of conversation circles and board games, correlating their intimate narratives and intersections with pharmaceutical care and the social field. The offer of disciplines in the field of humanities applied to health is of utmost importance for students, contributing to humanistic training in person-centered care.

Keywords: Health Education; Anthropology; Pharmaceutical Care.

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Provision of health education service to promote prevention and management of chronic diseases

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Health education promotes prevention and better outcomes for chronic non-communicable diseases (NCDs), since the dissemination of technical-scientific knowledge and empowerment of patients allow for better management of pharmacotherapy, in line with healthy eating and lifestyle habits. In this sense, one of the pharmaceutical care services offered by *Atenção Farmacêutica Estudantil Permanente* (AFEP, UNESP) is health education, especially in the field of healthy eating and the control of physiological and biochemical parameters. The aim was therefore to provide a health education service to promote the prevention and management of NCDs. To this end, workshops with a multidisciplinary and interprofessional approach were held with the participation of undergraduate students, postgraduates, and professors of pharmacy and nutrition. These workshops were carried out in a Family Health Unit in Araraquara through monthly meetings over three months. Discussions were conducted on NCDs and their prevention, with topics on food care, such as glycemic indices and food loads, good food handling and hygiene practices, healthy habits, food labeling, and food environments, as well as the rational use of pharmacotherapy. The workshops consisted of two round tables and a health fair, with playful interactions of food labels for interpretation, discussion of dietary difficulties for people living with NCDs, foods and preparations to replace routinely consumed ultra-processed foods. In order to teach participants how to interpret food labels, they were shown packages of foods high in sodium and sugar were presented, such as soft drinks, biscuits, and ready-made seasonings, as well as healthier alternatives. Besides, participants were taught about the most appropriate way to store food in the fridge, as well as the correct way to sanitize vegetables and fruit, with the support of mock-ups and educational toys. Information leaflets were handed out to support the awareness of participants regarding the choice of healthy foods. At the end of the meetings, the participants were advised of the importance of frequent monitoring of blood glucose and blood pressure parameters. In total, 77 participants attended the encounters (16, 35 and 26, respectively) and the main questions were related to the use of lard in food preparation, why ready-made spices are unhealthy, and how to identify whole foods by analyzing a food's list of ingredients. After identification of the pharmacotherapy in use, the participants were instructed to to take their oral medication on an empty stomach or after meals and to always administer it with a glass of water. A third of the participants reported that their glycaemic and blood pressure levels were not within normal reference values, highlighting the need for better guidance and monitoring of these parameters. Six of these participants were invited to the pharmacotherapeutic follow-up service. Thus, the provision of health education services focusing on eating habits, especially for people living with NCDs, can support awareness of healthy habits and the management of these diseases, as well as preventing them and promoting the health of the population.

Keywords: Healthy Eating; Health Promotion; Pharmaceutical Care

Ethics Committee approval protocol: Not applicable.

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Revealing power relations in interprofessional education

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Considering the need to share decisions between professionals in the healthcare practice, it is essential to promote initiatives of interprofessional education (IPE). In this educational approach, students from two or more professions learn together, with the aim of developing collaborative skills. Therefore, the aim is to train professionals who are more capable of working in teams. Despite this, the incorporation of IPE in the training process of health professionals in Brazil is still timid. Taking this into consideration, the authors designed an interprofessional curricular academic activity entitled "Interprofessional Education for Decision Making in Health", with a workload of 30 class hours divided into 15 weekly meetings. It was offered in the 2nd semester of 2022 by the Faculty of Pharmacy of the Federal University of Minas Gerais. Twenty students from five courses participated: Nursing (n = 5), Pharmacy (n = 6), Medicine (n = 2), Psychology (n = 4) and Dentistry (n = 3). The first two authors acted as tutors for this activity. Among the active teaching-learning approaches used, interprofessional clinical simulation stands out, planned with a focus on primary healthcare in the context of the public Brazilian health system - "Sistema Único de Saúde". The objective of this study was to examine the power dynamics between the professions participating in this IPE initiative, involving the perspective of students and tutors. This is a qualitative research based on the methodology of autoethnography. Multiple methods were used, which allowed exploring the phenomenon from different lenses: (1) documentary analysis of the 20 reflective portfolios delivered by students at the end of the activity; (2) focus group held at the last meeting with the participation of 14 students; (3) in-depth individual interviews with 8 students from the five courses; (4) participant observation throughout the semester, with reflective records in a field diary; (5) observation of the interprofessional clinical simulation by the two tutor researchers, who later met for debate. The focus group, the interviews and the meeting between the tutors were recorded and transcribed. Along with the portfolios and field diary records, all material was attached and analyzed in the Nvivo software (version 11), corresponding to more than 400 pages of material. Partial results of this research are presented here. The students, when asked directly in the interviews about their perceptions of possible conflicts between the different courses during IPE, reported that they did not identify; the manifestations of these hierarchies were often naturalized and implicit in speech, behavior and attitudes. The following themes were identified: (1) "Medical centrality: responsibility for the user and assumption of leadership in team clinical decisions"; (2) "Interprofessional education as a form of (uni)professional validation"; and (3) "Interprofessional education: breaking or reinforcing stereotypes?". The data reveal how the sense of authority and medical leadership was legitimized by students from different courses based on the idea that "Medicine knows best" and legal aspects (such as legislative prescription standards). In response, students with less power may desire it, seeking validation for themselves and their professional category. In this sense, students seemed to be more concerned with reinforcing their own roles and responsibilities than thinking about their roles and responsibilities as a healthcare team. The data show that this initiative, paradoxically, reinforced certain conventional stereotypes between professions, as pointed out by a medical student during an interview: "that was something I noticed during this class, you know? (...) I think it was a place that was a little constructed and that I saw it happening there, in the classroom: which unfortunately the doctor continues to be the center of care". In conclusion, future IPE initiatives must be aware of the asymmetries that exist between the healthcare professions, including the debate about power explicitly in teaching programs.

Keywords: Interprofessional Education; Social Hierarchy; Qualitative Research

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Evaluation of adverse drug reactions in the oncology sector of Santa de Alfenas-MG

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Pharmacovigilance consists of activities related to the detection, assessment, understanding, and prevention of ADRs (Adverse Drug Reactions) or any other medication-related problems. Given that adverse reactions increase morbidity and mortality in the population, pharmacovigilance is extremely important. In oncology, chemotherapy treatments require attention to ADRs due to the level of complexity, cytotoxicity, use of high doses, and the narrow therapeutic window of these medications. This study aimed to report different ADRs to ANVISA (Brazilian Health Regulatory Agency), as well as to develop informative materials emphasizing the importance of voluntary reporting by patients and healthcare professionals.Training was provided to professionals at the Santa Casa de Alfenas-MG (Minas Gerais), emphasizing the importance of pharmacovigilance, key concepts, and the process of reporting different ADRs. After the patients signed the IC (Informed Consent) form and the oncology professionals detected ADRs (Adverse Drug Reactions), these adverse reactions were analyzed by the researchers. Subsequently, the patients were contacted to provide relevant information for the notification, conducted by the students of CEFAL (Pharmacovigilance Center of Unifal-MG). Finally, the incidence and classification of ADRs were described, comparing them with those described in package inserts. From August 2022 to March 2024, 42 notifications involving the drugs Paclitaxel, Docetaxel, Oxaliplatin, Cytarabine, and Carboplatin were collected. Regarding ADRs not listed in package inserts, five were detected, all of which were mild and Type A. Among the presented ADRs, tremors, hyperemia, irritation in the nose and eyes, facial flushing, skin peeling, itching, hypotension, and low oxygen saturation were highlighted. An increase in the number of notifications and improvement in patients' quality of life were observed through necessary medical interventions with the Hospital Pharmacovigilance Committee.

Keywords: Pharmacovigilance; Reporting; Oncology.

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Symptoms of insomnia among school teachers in Espírito Santo: a cross-sectional study

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Insomnia is characterized by difficulty initiating or maintaining sleep. Teachers constitute a professional category whose demands may predispose them to sleep difficulties, yet few studies have investigated this issue. In this context, this study aimed to assess the severity of insomnia among teachers in the state education system of Espírito Santo. To this end, a cross-sectional, quantitative, and descriptive study was conducted in state schools of the Regional Superintendent of Education (RSE) Carapina in Espírito Santo. The school sampling was conducted by conglomerate in a single stage, with 20 schools being randomly selected. Teachers affiliated with the schools of RSE Carapina were included, while teachers deviating from teaching duties or on leave from work were excluded. Data collection took place between January and February 2024, in person, during the Pedagogical Planning Journey, following all ethical protocols. The self-administered questionnaire contained sociodemographic variables, questions related to the previous diagnosis of mental health disorders, and the Insomnia Severity Index (ISI-3) scale. The ISI-3 comprises 3 items, which were assessed using a 5-point Likert scale, with a total score ranging from 0 to 12. ISI-3 scores ≥ 7 are considered indicative of clinical insomnia. The chi-square test was used to assess the association between insomnia and sociodemographic variables. The t-test was used to determine if there was a difference in the workload between teachers with insomnia and those without clinical insomnia. Results were considered statistically significant when $p \leq 0.05$. A total of 448 teachers participated in the study, with 17% presenting clinical insomnia (n = 76). There was a statistically significant association between clinical insomnia and the previous diagnosis of anxiety disorders ($X^2 = 22.791$; df 1; $p < 0.01$) and the previous diagnosis of depression disorder ($X^2 = 30.526$; df 1; $p < 0.01$). Teachers with clinical insomnia had a higher weekly workload compared to teachers without clinical insomnia (40.21 ± 10.55 Vs 37.39 ± 7.88; $p < 0.05$). No statistically significant associations were observed between clinical insomnia and gender identity ($p = 0.300$), sexual orientation ($p = 0.145$), ethnicity/race ($p = 0.318$), marital status ($p = 0.836$), employment status ($p = 0.478$), and professional working shift ($p = 0.380$). The results of this study indicate that the diagnosis of anxiety and depression disorders is associated with clinical insomnia in teachers in the state education system of Espírito Santo. Furthermore, the higher weekly workload in teachers with insomnia suggests a possible relationship between work demands and sleep quality. These findings reinforce the importance of worker health policies that consider interventions focused on reducing workload and managing mental disorders.

Keywords: Insomnia; Teacher; Mental health; Epidemiology.

Ethics Committee approval protocol: 6.326.702

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Drug facilitated crime: a bibliographical review

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The use of psychoactive substances to facilitate sexual advances or theft without resistance or victim's consent has been described since ancient times. These acts constitute drug-facilitated crimes (DFCs), where most victims are women, and most criminals are men. Violence against women is considered by the World Health Organization a serious public health problem. Thus, widening the understanding of such topic is relevant for health professionals, such as pharmacists. This study aimed to perform a narrative review of DFCs to describe: the profile of criminals; the main drugs and their mechanisms of action; the difficulties in identifying these drugs; and the usefulness of analytical toxicology in these cases. With that end, bibliographical research was performed in the Pubmed database using the following keywords: "Drug Facilitated Crime", "Drug Facilitated Sexual Assault" and "Drug Facilitated Rape". Of the 194 articles collected, only 41 met the inclusion criteria and therefore were analyzed in this study. The inclusion criteria consisted of articles (bibliographic reviews, case studies or surveys), published in or after 2001 that described one or more chemical substances. *In vivo* and *in vitro* studies were excluded from the research. The analysis found that the main drugs that can be used as facilitators of crime were analgesics, antidepressants, antihistamines, and some antipsychotics whereas the most prevalent substances were benzodiazepines, ketamine, ethanol (the most used) and gamma-hydroxybutyric acid. Unknown people or victims' friends usually use some psychoactive substances for sexual assault, whereas (ex-)husband, (ex-)boyfriends or related do not. The presence of such substances in victim's bodies can be determined by means of toxicological analysis in biological matrices such as urine (most common), blood, oral fluids, and hair. However, these analyses are difficult due to the nature of the crime, which causes considerable psychological damage to the victims, making reports impossible or delaying it and consequently making it harder for detecting/quantifying the substances. This study verified the importance of the toxicological analysis for detecting psychoactive substances as a proof of the crime. Besides, it is important to implement victim assistance protocols and ways to avoid DFCs, for which purpose, a pharmaceutical care could be helpful.

Keywords: Drug facilitated crime; Sexual abuse; Violence against women.

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Adverse drug events involving older people reported in official reporting systems: an integrative review

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The occurrence of adverse drug events (ADE) is one of the possible negative consequences resulting from the use of medications, especially in older people. This is because older people undergo several physiological and pathological changes that have the potential to significantly modify the pharmacokinetic and pharmacodynamic profile of the medications used, and, consequently, their effectiveness and safety profile. Although older adults are vulnerable to ADEs, they are often excluded from clinical trials, raising safety concerns. Hence, post-marketing surveillance provides an opportunity to analyze ADEs on this population. In this context, this review aimed to bring together studies that describe suspected ADE involving older people reported in the official notifications systems worldwide. For this, an integrative review was carried out in the electronic database MEDLINE (PubMed), using a combination of the following descriptors and their synonyms: "Drug-Related Side Effects and Adverse Reactions", "Aged", "Frail Elderly", "Adverse Drug Reaction Reporting Systems" and "Pharmacovigilance". The following filters were applied during the bibliographic search: articles published in the last 5 years, available in English, Portuguese or Spanish, and, covering individuals with 65 and over. Data collection and analysis was carried out by two independent reviewers and disagreements were resolved by a third reviewer. A total of 347 publications were found, including ten studies. Among the studies included, two evaluated data reported in the Japanese Adverse Drug Event Report, two from the Korea Adverse Event Reporting System (KAERS), two from the Portuguese Pharmacovigilance System, one from the Food and Drug Administration's Adverse Event Reporting System (FAERS), one from the German Federal Institute for Drugs and Medical Devices, one from the Italian Medicines Agency Database, and one evaluated data from two notification systems (KAERS and FAERS). Three studies evaluated the medications used by older people in general, finding that the drug classes most frequently involved in reports were antithrombotics, antineoplastics, anti-inflammatory and antirheumatic drugs, analgesics and antimicrobials. A study evaluated adverse events focusing on risk of bleeding associated with fluoxetine, suggesting that fluoxetine use seems to be associated with an increased risk of total bleeding, major bleeding, and brain hemorrhage. A study that specifically evaluated reports of EAD involving headache in the older people found that the medications most frequently associated with this ADE were antivirals, antidepressants, antidyslipidemic agents and analgesics. A study that evaluated suspected ADEs in older patients with diabetes mellitus found that the majority of reports were considered serious (n=439; 58.5%), and in 19 of them the patients died. Three studies evaluated some specific medications, in the study that evaluated reports involving opioids, the following safety signs were detected in older patients: respiratory depression, somnolence, hallucinations, akathisia and opioid-induced neurotoxicity. In the study that analyzes reports involving solifenacin, it was identified that solifenacin appears to be associated with a greater risk for "altered state of consciousness". And, in the study that evaluated the use of memantine in combination with some specific medications, such as amantadine or dextromethorphan, it was found that there was no statistical evidence that prohibits the co-administration of these medications. Only one study evaluated reports involving potentially inappropriate medications by Beers Criteria, finding significant Reporting Odds Ratio (ROR) values were noted for clonazepam (drowsiness), nortriptyline (sleepiness), and zolpidem (amnesia, somnambulism , agitation, dependence, nightmare, and dysgeusia).The results of the pharmacovigilance studies included demonstrated the relevance of ADE reports involving older people, reinforcing the need to rigorously monitor post-marketing safety data for this portion of the population. Furthermore, the results of this review are relevant to outline the scenario of notifications involving older people, allowing comparability between findings involving different ADE notification systems.

Keywords: Drug-Related Side Effects and Adverse Reactions; Adverse Drug Reaction Reporting Systems; Aged

Ethics Committee approval protocol: The study does not contain clinical studies or patient data.

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Evaluation of the neuroprotective effect of dimethyltryptamine and harmine, components of Ayahuasca, isolated and in combination, against ethanol-induced neurotoxicity

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Ethanol abuse is a major concern worldwide and can lead to alcohol use disorder (AUD). Among the mechanisms of ethanol-induced neurotoxicity, neuronal apoptosis stands out. Ayahuasca is an indigenous psychoactive tea used in religious rituals and which contains substances such as N,N-dimethyltryptamine (DMT) and harmine (HRM) with neuroprotective potential. In vivo studies have shown that the tea was able to block behavioral sensitization to ethanol, indicating that ayahuasca components may be an important therapeutic intervention for the treatment of AUD. Therefore, it is essential to study the potential neuroprotective effect of DMT and HRM against ethanol-induced neurotoxicity. The objective is to evaluate the in vitro neuroprotective effect of DMT and HRM, isolated and in combination, against ethanol-induced neurotoxicity. First the SH-SY5Y human neuroblastoma cells were incubated with varying concentrations of the compounds (DMT, HRM and DMT/HRM, ET) in 12-well plates (8x105 cells per well) for 48 hours. After washing with PBS and removing the cells with trypsin, the contents were placed in eppendorfs, centrifuged at 500g for 5 minutes, washed twice with ice-cold PBS and stained with annexin and propidium iodide for 20 minutes at room temperature and protected from light. Finally, the analyses were performed by flow cytometry (FACSCablibur) and compared using one-way analysis of variance (ANOVA) and Bonferroni's multiple comparisons test. Based on the concentrations of each substance, DMT and HRM 10 µM, the combination DMT+HRM (10 µM + 20 µM) and ethanol (250 mM), the amount of viable cells present in the control, vehicle, ethanol, DMT, HRM, DMT+HRM, DMT+ethanol, HRM+ethanol and DMT+HRM+ethanol groups was, respectively: 98%, 92%, 67%, 97%, 99%, 87%, 95%, 97% and 90%; for cells in late apoptosis, the percentage of each group was, respectively: 5.9%, 1.2%, 27.5%, 2.1%, 0.4%, 10.0%, 3.7%, 1.6% and 7.1%; for apoptosis, the percentage was, respectively: 1.7%, 0.9%, 5.3%, 0.9%, 0.2%, 2.7%, 1.5%, 1.4% and 1.5%; and for necrosis, the percentage of cells was, respectively: 0.14%, 0.02%, 0.23%, 0.04%, 0.04%, 0.64%, 0.09%, 0.01% and 1.12%. Thus, it can be concluded that HRM and DMT, isolated or in combination, prevented ethanol-induced neurotoxicity, reducing the number of cells in late apoptosis.

Keywords: Harmine; Dimethyltryptamine; Alcohol; Neurotoxicity; Pharmaceutical Care.

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Interventions in patients served in a pharmaceutical office in a university pharmacy in the south of Minas Gerais

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The multidisciplinary team for health promotion and comprehensive patient care at all levels of health care. Collaboration between members of the multidisciplinary team not only improves the quality of care provided, but also promotes efficiency in the use of healthcare resources. The pharmacist is a fundamental professional in the development of pharmacotherapy and safety in the use of medicines. Pharmaceutical care is a patient-centered practice that aims to optimize outcomes related to medication use. This approach goes beyond simply dispensing medications and includes activities such as reviewing pharmacotherapy, monitoring adverse events, educating patients about their medications, promoting treatment adherence, intervening in medication-related problems, and collaborating with other healthcare professionals in management. of patient care. Several factors may be associated with negative results from the misuse of medications and include adverse events, treatment ineffectiveness, drug interactions, safety problems and inadequate treatment adherence. These situations can lead to the development of a plan and pharmacotherapeutic interventions during the consultation that contribute to improving the patient's treatment and quality of life. This study aimed to estimate the number of interventions carried out by the pharmaceutical office of the University Pharmacy of the Federal University of Alfenas–MG, in the year 2023. 429 consultations were carried out in the year 2023, totaling 1052 pharmaceutical intentions. The most common interventions were health guidance/education (37.26%), followed by prescription of herbal medicines (30.22%), and requests for laboratory tests (10.45%). The prescription of synthetic medications was the fourth most prevalent intervention (5.13%). The least prevalent interventions were a letter to the doctor (0.38%), followed by medical referral (2.18%) and referral to other health professionals (2.75%). Therefore, the present work presented important results and contributed to the rational use of medicines. Therefore, it meets the needs of society, in order to help patients obtain better results from treatment.

Keywords: Prescription drug monitoring programs; Information systems in clinical pharmacy; Evidence-based pharmaceutical care; Pharmaceutical attention.

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Impact of genetic variants in cytochrome p450 enzymes on the response to clozapine in refractory schizophrenia

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Clozapine is the first-line of treatment for refractory schizophrenia, a mental health problem with a high social and economic burden. Clozapine acts on positive and negative symptoms, as well as on cognitive dysfunction, and has a good effectiveness and safety profile. However, it has been observed that around 30% of patients do not respond well to clozapine and the factors that may impact on its effectiveness are being discussed. In this regard, genetic factors seem to play a crucial role in the variability of responses to the use of some medicines, especially variants that impact drug metabolism. Therefore, it was intended to identify genetic variants in cytochrome P450 (CYP450) enzymes associated with clozapine response in people living with refractory schizophrenia. For this purpose, we conducted a non-systematic review guided by the question "*What are the genetic variants in CYP450 enzymes associated with the response to clozapine*?". The search for studies was carried out in the PubMed database (April 2024) combining the following keywords "schizophrenia""resistant","refractory","response","clozapine", "gene", "genetic variants" and "genetic polymorphisms". Clinical trials that enrolled participants with refractory schizophrenia taking clozapine and evaluated variants in CYP450 enzymes and their impact on the response to this drug were included. The selection of studies was carried out (screening and eligibility) and the following variables were extracted: study design, year, country, number of participants, gene and variants assessed, and outcomes associated with clozapine metabolism. A total of 374 studies were identified and 11 were included. The studies were published between 2002 and 2024, totaling 3,757 participants. Most of the studies were clinical trials (n= 7) and conducted in Europe (n= 7), with three carried out in Brazil. Variants in the *CYP1A1*, *CYP1A2*, *CYP3A4*, *CYP3A5* e *CYP2D6* and *CYP2C19* genes were evaluated, with the most evaluated gene being *CYP1A1* (n = 7). *CYP1A2-163C>A*, *CY1A2*1F/*1F*, *CYP3A5*1* and *CYP2C19*17* were associated with ultra-rapid metabolism of clozapine. Participants carrying the alleles 2, 3, 4, 5, or up to 13 copies of the functional *CYP2D6* gene, also showed an increased rate of clozapine metabolism. In contrast, rs2472297, located between *CYP1A1* and *CYP1A2* genes, and *CYP2C19*2* were associated with a reduction in the plasma concentration of clozapine. Additionally, *CYP3A4-392A>G* and *CYP3A5 *3/*3* were reported as predictors of refractoriness. Considering that the pharmacological management of refractory schizophrenia is still limited, looking at genetic variants that may compromise the metabolism of clozapine and, consequently, its effectiveness, is relevant for the individualization of treatment. Further, genetic data should be incorporated into the holistic process of patient-centered care, taking into account other factors that can also impact on the response to pharmacotherapy.

Keywords: Pharmacogenetics; Single Nucleotide Polymorphism; Refractory Schizophrenia

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Results of pharmaceutical activities in the management of pain in oncological patients: integrative review

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Oncologic pain is a common and debilitating manifestation in cancer patients, resulting from factors such as tumor invasion. Studies indicate that approximately 17 million people worldwide experience oncologic pain, with a prevalence reaching up to 90% in patients in advanced stages of cancer. In the management of oncologic pain, pharmaceutical services play an important role, thus contributing to the improvement of quality of life. The objective of this research is to analyze the impact of pharmaceutical services on the clinical management of oncologic pain in hospital institutions. For this purpose, an integrative review was conducted in the MEDLINE (PubMed) database. In addition, additional searches were carried out through the analysis of the references of the included studies and in grey literature, as of 11/15/2023. A total of 37 studies were retrieved and after applying eligibility criteria, seven studies were included. The following pharmaceutical activities related to the management of oncologic pain were identified: information on pharmacotherapy for the healthcare team and patients; adjustment of analgesic pharmacotherapy and management of adverse reactions. According to the results, it was demonstrated that prescribers gained greater confidence in prescribing certain opioid analgesic medications after the implementation of clinical pharmaceutical service aimed at adjusting analgesic doses. Additionally, it was noticed that this collaborative interaction contributes to the distribution of responsibilities in patient care, reducing the workload of healthcare professionals. Moreover, patients benefited from an improvement in pain symptoms, with the pharmacist providing differentiated guidance in disseminating relevant information, indicating patient engagement as an educational role. Lastly, the management of adverse reactions played a preventive role, ensuring they do not compromise the patient's quality of life. In light of the presented results, it was found that in all analyzed studies there was an improvement in pain, totaling 100% favorable outcomes among participating patients. Furthermore, it is possible to confirm the beneficial impact of clinical pharmaceutical services on enhancing pain management in hospitalized oncologic patients.

Keywords: Cancer pain; Pain management; Pharmaceutical services.

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Characterization of the medication profile contained in the 2023 beers criteria update in a public high complexity hospital

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Brazil is experiencing an accelerated phenomenon of population aging. According to data from the 2022 Census, the country had a 56% increase in its elderly population compared to that recorded in 2010. Aging is a biological process that leads to psychological, social, functional and structural changes, which can influence significantly in the pharmacotherapy of elderly people. Therefore, knowing potentially inappropriate medications (PIM) in hospitalized elderly people and the precautions regarding their use is essential for patient safety. The present study aimed to characterize the profile of PIMs prescribed in a highly complex hospital. Medication data were extracted from the AGHUX computerized system and tabulated using Excel® software. Next, a list of medications that are included in the Beers criteria updated in 2023 was drawn up. The MPIs were arranged by presentation and pharmacological class, with stratification being carried out based on tables 2 (potentially inappropriate medications in the elderly), 3 (interaction drug-disease or drug-syndrome), 4 (medicines to be used with caution) and 5 (significant interactions to be avoided in the elderly) of the Beers criteria. Of a total of 443 different medications drug presentations available, 108 (24%) were included in the update of the Beers criteria, where 60% of these MPI were included in table 2, 55% in table 3, 21% in table 4 and 17% in table 5. Among the pharmacological classes, the most representative were: benzodiazepines (13%), opioids (10%), anticholinergics (7%) and antipsychotics (6%). Therefore, the high prevalence of medications that are potentially inappropriate for older adults in this hospital is notable. This scenario highlights the high risk of adverse reactions and problems related to pharmacotherapy. Therefore, the pharmacist stands out as an essential professional in the evaluation of pharmacotherapy and in managing the need, effectiveness and safety of the use of PIM. The results obtained highlight the need for new studies correlating the pharmacist's clinic contributions to the use of PIM by hospitalized elderly people.

Keywords: MPI; Beers list, Elderly

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Pharmacotherapeutic follow-up of patients with type 2 diabetes mellitus in primary health care

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Chronic non-communicable diseases, such as Arterial Hypertension and Type 2 Diabetes Mellitus (T2DM), are becoming increasingly prevalent, especially among the elderly, generating a significant socio-economic impact. T2DM affects the production and utilization of insulin, resulting in a decrease in the quality and life expectancy of patients. Pharmaceutical care plays a crucial role in managing these conditions, requiring close collaboration between healthcare professionals and pharmacists to ensure appropriate and safe use of medications. This study aims to perform pharmacotherapeutic follow-up of elderly patients with diabetes, registered at a Family Health Unit in a municipality in Minas Gerais. Lasting for one year, the study is conducted through biweekly home visits. Pharmacotherapeutic follow-up, initiated in February 2023 based on the Dáder method, included an initial interview to characterize social, demographic, comorbidities, and biochemical parameters such as fasting blood glucose, glycosylated hemoglobin, and blood pressure. The Berbés Questionnaire was also used to assess disease knowledge and the Diabetes 21 Instrument to assess quality of life. These parameters and questionnaires will be repeated at the final visit to monitor the patient's progress. Thirteen initially selected patients agreed to participate in the study; however, four of them did not continue. The age range of the patients consists of 55.6% between 70-80 years, 33.3% between 80-90 years, and 11.1% between 90-95 years; with a predominance of females (66%). Regarding comorbidities, 88.88% of patients have hypertension, in addition to other comorbidities such as dyslipidemia, glaucoma, heart failure, and insomnia. As for medications used, 55.56% are on Insulin therapy, and 77.78% use Metformin alone or in combination with other oral antidiabetics. After analyzing the case and prescriptions, care plans were developed. The main problems related to pharmacotherapy were adherence and safety. So far, some interventions have been implemented, including adjusting medication dosages, providing guidance on the correct storage and administration of insulin, partnering with the medical team to discuss therapies, and implementing health education strategies. In this way, it was possible to solve some problems encountered, and it is expected that by the end of the study, more problems will be identified, solved, and also prevented.

Keywords: Diabetes; Pharmaceutical care; Pharmacotherapeutic monitoring

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Mental disorders in obese patients treated in public health services

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There is a link between obesity and a higher risk of mental health issues. Obesity and mental health have a complicated and multidimensional interaction. Studies have indicated that people with high Body Mass Index (BMI) are linked to a higher chance of getting anxiety and depression. It's unclear, though, if these problems are caused by obesity or vice versa. The Obesity and Bariatric Surgery Service (SOCB) at the Hospital Universitário do Oeste do Paraná (HUOP), serves severely obese patients, coming from the public health service, in the process of being evaluated for bariatric surgery. The aim of this research was to investigate the prevalence of mental anxiety disorder in patients with morbid obesity treated by SOCB at HUOP. The study was carried out with 47 morbidly obese patients, of both sexes, who met the Brazilian Ministry of Health's criteria for indication for bariatric surgery. SOCB provides collective care to patients, and operates in an interprofessional way, through monthly meetings, over a period of one year. Patients receive guidance and support in physical and mental health. The assessment is carried out with the application of the anamnesis form instrument that presents, among others, data that explores psychological aspects of patients, such as anxiety. The findings revealed that the prevalence of anxiety-related symptoms was 76,6% (36 patients) in the preoperative period. Of these patients, 36,1% (13 patients) attribute their obesity to anxiety. Among those who self-report anxiety symptoms, 33,3% (12 patients) are taking medication, primarily fluoxetine (50%; 6 patients) and sertraline (41,6%; 5 patients). Thus, anxiety levels were elevated during this period. The interaction between obesity and mental health is not solely determined by body weight. Other factors, such as genetics, environment, and lifestyle, also play a role. This complex relationship emphasizes how important it is to treat obesity and mental health problems holistically. It also emphasizes how important it is to do more study in order to completely comprehend these intricate relationships. Regular follow-ups with healthcare specialists, like pharmacologists, can assist to properly monitor and manage these diseases.

Keywords: Obesity; Mental Illness; Anxiety

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The multiple violences experienced by pharmacists in the workplace

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The insertion of women in the labor market is an achievement with a complex historical construction. The inequality between genders, as well as situations of violence are present in the workplace of female pharmacists and are related to the sexual division of labor. In the pharmaceutical area, the majority of women and insertion in multiple scenarios, involving contact with public and differentiated professional partnerships, enhance exposure to violence. The objective of this study was to analyze situations of violence experienced by female pharmacists in the workplace. This study is a qualitative research, using content analysis of Bardin (2011) method, of an online survey answered by pharmacists registered in Conselho Regional de Farmácia de Minas Gerais (CRFMG) in 2021. The data was analyzed in the NVivo software, where the themes that emerged from the answers were categorized. The pharmaceutical respondents (n=381) had an average age of 35.6 years. The majority had some postgraduate degree (67.9%), worked in the metropolitan region (52.4%) and in private pharmacies (35.4%) or public pharmacies (24.4%). As a result, four categories were identified: 'Living with disrespect, threats and vulnerability,' 'Sexism and structural chauvinism that shuts down, diminishes and torments,' 'Discrimination against women as an obstacle to equity' and 'Sexual harassment and objectification of women.' Several expressions of violence in the labor environment emerged from multiple aggressors. Pharmacists recognized professional impairment and little recognition for technical capacity. We concluded that the reports exposed the lack of protection of pharmaceutical integrity in the workplace. It is expected that these results bring to light the gender inequality in pharmaceutical work, with emphasis on situations of violence, expanding the discussion and providing evolution of this mostly female profession.

Keywords: Pharmacists; Working women; Violence at work; Violence against women; Gender violence

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Detection of adverse drug events in the older population through the application of trigger tools: aspects for their incorporation into clinical practice

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The prevalence of adverse drug events (ADEs) in older people may be considered underestimated due to under-detection and under-reporting. In this regard, although the application of trigger tools can be useful in detecting and quantifying ADEs, there is a lack of evidence on the practical aspects of incorporating these tools into clinical practice. Therefore, it was proposed to identify how trigger tools have been applied to detect ADEs in the older population. To this end, a systematic review was conducted in the PubMed, Lilacs, and Scopus databases and included interventional and observational studies that applied trigger tools to detect ADEs in older people (age ≥ 60) (January 2024). The screening, eligibility, and data extraction steps were conducted independently by two researchers. Characteristics of the studies, trigger tools, and their method of application were extracted. 1,884 studies were identified, of which 20 studies (21 publications) were included. The studies were published between 2009 and 2023 (69,182 participants). Most of the studies were cross-sectional (n = 19), included inpatients (n = 18), and were conducted in Spain (n = 5), Brazil (n = 3), and China (n = 3). Twelve trigger tools were identified, six of which were developed specifically for the older population. Screening of triggers was carried out by pharmacists, nurses, and physicians, and most of them considered the data collected retrospectively (n = 18). In nine studies, trigger tools were modified considering the characteristics of the older person (e.g. physiological changes) and the health service (e.g. laboratory tests standardized). The quantity and quality of medical records was a factor that influenced the application of trigger tools. In this light, it was found that the incorporation of trigger tools requires looking at aspects related to the tool and the health service. The trigger tool should contain easy-to-understand triggers that can be adapted to the reality and nosological profile of healthcare settings, without additional costs and considering laboratory tests or medicines that are already standardized in the service. Meanwhile, the health service needs a multiprofessional team and medical records with enough data to incorporate trigger tools, allowing for the proper screening and imputability of ADEs. In short, the integration of trigger tools into pharmaceutical practice, considering intrinsic aspects related to the tools and the health service, can support the detection of signals in pharmacovigilance, as well as supporting the development and implementation of clinical protocols aimed at the safety of the older population.

Keywords: Aged; Healthcare quality indicator; Patient safety

Ethics Committee approval protocol: Not applicable

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Ensuring the effectiveness of warfarin treatment: a case report

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Anticoagulant therapy with warfarin is recommended after thrombotic events or for prophylaxis of clot formation in high-risk patients. The effectiveness of the drug's use is assessed using the International Normalized Ratio (INR) and its therapeutic monitoring is essential due to its narrow therapeutic index. Besides, factors such as drug and/or food interactions and genetic polymorphisms can affect the drug's dose-response relationship. Thus, the aim of this study was to report a case of lack of monitoring this pharmacotherapy and its clinical implications. This is a case report, in which the data were collected from interviews carried out between March and April 2024. A female patient, 69 years old, with indication for warfarin after pulmonary thromboembolism, was referred to the health condition management service offered at the university pharmacy of a public university in the south of Minas Gerais, Brazil. The patient had been using warfarin since April 2019, with a weekly dose of 35 mg (5 mg/day) and the therapeutic range for INR, considering her clinical condition, was 2.0-3.0. The patient used polypharmacy (13 drugs), including diclofenac sodium 50 mg (obtained via unassisted self-medication) for chronic back pain. The patient did not consume foods rich in vitamin K, due to advice received. The following tests were applied at the first appointment with the pharmacist: Short Assessment of Health Literacy for Portuguese-speaking Adults - SAHLPA-18 (to assess health literacy), Measure Adherence to Treatment - MAT (to assess adherence to warfarin treatment) and Oral Anticoagulation Knowledge - OAK (to assess knowledge of anticoagulation). It was found that the patient had only one INR result (2.73), taken in November 2021, and was unaware of the need for this test and what her target therapeutic range was. The patient had low health literacy (12 points), high adherence to warfarin treatment (6 points) and average knowledge about anticoagulation (11 points). The drug treatment showed potential drug interactions between warfarin and non-steroidal anti-inflammatory drugs. Regarding the safety of anticoagulant therapy, no adverse reactions were identified, such as spontaneous bleeding and bruising, prior to follow-up (12 months before the first visit) or during follow-up. The pharmacist advised the patient on these interactions, as well as on warfarin treatment and the constant consumption of vitamin K-rich foods. In addition, the patient was instructed on the necessary precautions to avoid falls and injuries, observation of bleeding, and situations in which she should seek urgent/emergency care. During the study period, six INR tests were carried out (results: 1.72; 2.31; 1.52; 2.34; 1.85 and 2.14), three of which were outside the therapeutic range and two of which required intervention (dose adjustment or additional anticoagulant therapy). The last warfarin prescription recorded in the study, reflecting the adjustments made based on the management of the health condition, was 42.5 mg/week, different from the fixed dose of 35 mg/week used almost five years ago. This report allows us to conclude that monitoring anticoagulant therapy with warfarin, through the INR test, especially when carried out within the scope of Pharmaceutical Care, can rationalize its use, avoiding subtherapeutic or supratherapeutic doses and thus minimizing the risk of thromboembolic or hemorrhagic events.

Keywords: Anticoagulant; International Normalized Ratio; Health Condition Management.

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Interculturality in health as a proposal for developing values and ethics in pharmaceutical care: a teaching internship experience

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Health systems, services and professionals are strongly affected by cultural, historical, social, political and economic processes, which can contribute to and generate violence in health care. Given this understanding, Interculturality in Health (IH) emerges as a concept and interdisciplinary dialog necessary for the theoretical-practical construction that it is not possible to exercise health care without relating it to other elements involved beyond the biological, such as historical, social, political, economic, religious, cultural, and others. This postgraduate teaching experience report aims to discuss and share the application of the concept of IH as a formative concept for the development of values and ethics for a re-signified pharmaceutical care in a biopsychosociocultural health care model. The didactic and teaching experience shared took place during a meeting in an undergraduate course at the Faculty of Pharmacy at the Federal University of Minas Gerais focused on the area of pharmaceutical care, based on the development of a teaching internship for a postgraduate student. To build the class, a lesson plan was drawn up based on the teaching-learning objective proposed by the subject, with the inclusion of non-traditional teaching methodologies. Three moments were structured for the didactic construction of the class: presentation and interaction between the community with the web dynamic; reading and sharing of real and/or fictional case reports of patients' experiences with health professionals and services; construction of a panel of ideas based on the guiding question "what values, beliefs and culture do we want and need in pharmaceutical care?". The dynamic realization of the web with the presentations and sharing of how the participants perceive themselves in the world made it possible to build recognition of the classroom community as a place where there is a culture under construction of pharmacists and future pharmacists in pharmaceutical care. As well as helping to reduce the professor-student hierarchy of a traditional classroom. From the readings and discussions of the selected experience reports, it was possible to identify and size up the structures of oppression and violence that permeate the subjective and cognitive formations of the current social context. They discussed actions and forms of symbolic, material and real oppression in racist, sexist, aporophobia, LGBTQIAPN+phobic, fatphobic and cosmophobic situations in healthcare contexts. It was building up a chain of ideas with the values, actions and ethics that guide a practice of care that does not reproduce violence and that takes into account the entire plural context of the patient. The values, actions and development of a culture of care suggested for the philosophy of practice and ethics of pharmaceutical care in the classroom were aligned with the perspective of IH. For the construction of a biopsychosociocultural health care model, IH is an important concept, dialog and practice for the development of competencies, skills, attitudes, values and ethics for pharmaceutical care.

Keywords: Interculturality in health; Pharmaceutical care; Pharmaceutical teaching.

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Characterization and clinical impact of the drug-drug interaction methyldopa/ferrous sulfate in hospitalized high-risk pregnant women

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High-risk pregnancy is associated with a higher occurrence of drug-drug interactions (DDIs) due to clinical conditions that require complex pharmacological management. However, studies characterizing and investigating the clinical impact of DDIs in pregnant women, especially when hospitalized, are scarce. Therefore, we sought to characterize the interaction between the antihypertensive methyldopa and the iron supplement ferrous sulfate in hospitalized pregnant women, investigating possible associated clinical outcomes. For this purpose, a prospective cohort study was conducted with 571 hospitalized pregnant women at a maternity hospital in Natal, Brazil, between September 2019 and June 2022. Prior to commencing data collection, the study was submitted to and approved by the Institutional Research Ethics Committee. Clinical data of the patients were obtained through electronic medical records analyzed throughout the entire hospitalization period. DDIs were characterized using Lexicomp® and clinical parameters related to their mechanisms of action were monitored. Multivariate logistic regression models adjusted for risk factors associated with the occurrence of DDIs were used to evaluate the influence of DDIs on clinical parameters. Out of the 571 participants, 203 of them (35.6%) exhibited one or more serious DDIs. Among these, 23.8% involved the methyldopa/ferrous sulfate pair, which is categorized as a type of pharmacokinetic interaction. Statistically, the average duration of this DDI was 5 days, with an incidence rate of 78.1 per 1000 patient-days. Additionally, specific factors such as lower gestational age (AOR: 0.958; 95% CI: 0.932-0.984), diagnosis of hypertension (AOR: 3.997; 95% CI: 2.493-6.409), increased number of medications used (AOR: 1.088; 95% CI: 1.031-1.148), and longer duration of treatment (AOR: 1.184; 95% CI: 1.116-1.257) contributed to its occurrence. Regarding the mechanism of action, the association between methyldopa and ferrous sulfate could potentially result in blood pressure instability due to the chelating action of iron on methyldopa, interfering with its antihypertensive activity. However, in this study, there were no outcomes related to blood pressure control resulting from the methyldopa/ferrous sulfate interaction. This is likely attributed to the timing of administration of these medications, as they should not be administered together due to the pharmacokinetic interference caused by iron. Additionally, no fetal outcomes were identified. From the obtained results, we found that the exposure of pregnant women to drug interactions considered serious is not necessarily associated with significant maternal-fetal outcomes. The association between methyldopa and ferrous sulfate, for example, did not show clinically relevant impact, although it was the most prevalent among pregnant women. Thus, this study prompts a discussion about the criteria used by databases to classify drug-drug interactions as serious, as many of them do not have substantial relevance in clinical practice.

Keywords**:** Clinical impact; Drug-drug interaction; High-risk pregnant women

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Clinical impact of drug-drug interactions involving scopolamine in hospitalized high-risk pregnant women

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Hospitalized high-risk pregnant women are more vulnerable to serious drug-drug interactions (DDIs) due to polypharmacy. In this context, for example, the use of scopolamine, an antiemetic, is common in conjunction with other medications such as levomepromazine and tramadol. However, there are no studies investigating the interaction between these medications in hospitalized high-risk pregnant women. Therefore, we sought to evaluate the clinical impact of scopolamine/levomepromazine and scopolamine/tramadol interactions in this population. For this purpose, a prospective cohort study involving 571 hospitalized pregnant women at a maternity hospital in Natal, Brazil, between September 2019 and June 2022, was designed and conducted. Clinical data were collected through electronic medical records with authorization from the institution's Research Ethics Committee protocol: 3.483.151/2019. DDIs were characterized using Lexicomp® and clinical parameters related to their mechanisms of action were monitored. To evaluate the influence of DDIs on these parameters, multivariate logistic regression models adjusted for risk factors associated with the occurrence of DDIs were used. A total of 203 pregnant women with one or more serious DDIs (35.6%) were identified, among which 2.6% involved the scopolamine/levomepromazine pair and 1.4% involved the scopolamine/tramadol pair. Risk factors for their occurrence were associated with gestational age (AOR: 0.958; 95% CI: 0.932-0.984), diagnosis of hypertension (AOR: 3.997; 95% CI: 2.493-6.409), number of medications (AOR: 1.088; 95% CI: 1.031-1.148), and duration of treatment (AOR: 1.184; 95% CI: 1.116-1.257). Clinically, the concurrent use of scopolamine and levomepromazine resulted in increased drowsiness (AOR: 5.375; 95% CI: 1.660-17.398) and a slight increase in temperature (AOR: 5.956; 95% CI: 1.226-28.982), while the association between scopolamine and tramadol did not lead to measurable outcomes in this study. Therefore, we observed that hospitalized pregnant women are exposed to serious drug-drug interactions. The interaction between scopolamine and levomepromazine resulted in mild anticholinergic effects that, although statistically relevant, did not impact maternal and fetal clinical outcomes. This understanding also applies to the scopolamine/tramadol interaction, which did not have associated outcomes. Thus, this study contributes to a reflection on the criteria used by databases in categorizing drug interactions as serious, despite some of them not presenting significant clinical relevance.

Keywords**:** Clinical impact; Drug-drug interaction; High-risk pregnant women

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Clinical case discussion between resident pharmacist and preceptory during pharmaceutical consultation in a tertiary teaching hospital

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Pharmaceutical care aims to promote the rational use of medicines and health education focused on the individual. Thus, pharmaceutical consultation seeks to establish a relationship of trust between the professional and the patient in order to achieve pharmacotherapy goals and improve health status. Residency provides pharmacists with in-service learning, linking acquired knowledge from undergraduate to practical application. In addition to acquiring new knowledge, under the supervision of a preceptor pharmacist, residents develop clinical reasoning and skills necessary for activities within pharmaceutical care. The aim of this work is to describe how clinical case discussions take place during pharmaceutical consultation by residents in a tertiary teaching hospital in São Paulo. Consultations can be conducted in person or by teleconsultation, with patients being referred by doctors from the outpatient clinics for internal medicine, geriatrics, pulmonology and gastroenterology. Consultations can be conducted in person or by teleconsultation, with patients being referred by doctors from the outpatient clinics for internal medicine, geriatrics, pulmonology and gastroenterology. After greeting the patient and taking a pharmaceutical history, the case is discussed with the preceptor. Subsequently, the patient is presented with proposed care plans and recommendations for resolving drug-related problems (DRPs). The case discussion script is structured so that the resident begins by presenting the preceptor with information from the pharmaceutical anamnesis, access to medications, reason for referral, health problems and identification of DRP. The conduct is then defined (definition of the pharmacotherapeutic plan, monitoring strategies, interventions to be carried out with the healthcare team and the patient) and the goals, attention points, clinical situation and dates for the next consultation if the patient is not discharged from the pharmaceutical service, ending the discussion of the clinical case. The advantages of these discussions during a consultation are that they provide the resident with active learning, encourage them to seek scientific evidence to support their conduct and help them build clinical reasoning. As disadvantages we can mention the length of discussions, which can end up becoming extensive, requiring the patient to wait to complete the consultation. Furthermore, the preceptor must be careful not to create an environment with little space for the resident to act actively in decision-making. Even so, since the implementation of this strategy in October 2022, it has been well evaluated by residents as a strong point related to the modules that involve Pharmaceutical Care activities. It is concluded that improving the discussion of the clinical case during the pharmaceutical consultation in a teaching hospital has contributed to structuring the monitoring of cases, improving the organization of clinical reasoning and stimulating the resident's critical thinking.

Keywords**:** Resident pharmacist; Pharmaceutical consultation; Clinical case discus

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Experience in caring for the older people with dementia in the home environment: a qualitative synthesis of evidence

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Dementia is a chronic and progressive disease which constitutes one of the main causes of dependency among older people and can be considered a destructive disease that takes away an individual's autonomy, increasing the complexity of geriatric care. In front of this, the family continues to be the foundation of care for the older people with dementia around the world. The gradual and prolonged progression, and the scarcity of treatments that cure or considerably modify the course of the clinical condition, make caring for an individual with dementia a burden that can last for several years. In this context, the burden caused by caregiving is significant and negatively influences the caregiver's quality of life. Understanding this experience is relevant to foster empathy and the adoption of actions that help family members in the provision of care. Thus, the objective of this study is to understand the experience of family caregivers in caring for older people with dementia in the home environment. For this, a systematic literature review was carried out by consulting the MEDLINE, Cochrane, and Lilacs databases. The search process included manual search and examining grey literature. Two reviewers selected the studies independently, and discrepancies were sorted out by a third reviewer. The Critical Appraisal Skills Programme (CASP) was used to evaluate the methodological quality of the included studies. The maximum score of this checklist is 10 points, and the higher the score, the higher the quality of the studies. The thematic analysis was applied to synthesize the results. The analytical themes addressed in the synthesis were developed by means of the researchers' interpretations and new constructs. Nine studies were included and they had at least eight points in the assessment of methodological quality. The included studies brought together 184 caregivers from 14 countries and the majority of caregivers were spouses of the individual with dementia who was receiving care. From the thematic analysis, four analytical themes emerged. Recognizing dementia and unraveling care; "You are alone"; Limitations and lack of knowledge in caring for dementia; "It's a last resort [full institutionalization nursing home]." The lack of knowledge about dementia compromised the planning of adequate care and intensified the caregivers' burden. In parallel, feelings of grief and tension emerged revealing a lonely and distressing caregiving. However, feelings of pride and loyalty also emerged along with resistance to the institutionalization of the older people. This duality of feelings indicates the complexity of caring for family members with dementia. It is important to highlight that temporary care was perceived as a solution to the need for help, however, institutionalization was approached as a last alternative. Therefore, the results obtained are important to provide support for the creation of more humanized public policies that consider comprehensive care, assist health professionals in providing care to older people with dementia and their families.

Keywords**:** Integrality in health; Caregivers; Cognitive dysfunction

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Proposal for analysis of pharmacotherapy and management in a long-term care institution: an experience report

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Long-term care institutions have emerged as protagonists in response to the demands imposed by the aging population pyramid inversion, assuming a crucial role in fully addressing society's needs by providing specialized care to the older people. Given that this population is complex and is often polymedicated and at a greater risk of adverse drug events, the presence of a pharmacist becomes indispensable in the daily operations of these institutions, seeking to promote the effectiveness and safety of pharmacotherapy. In this sense, it was intended to propose a pilot operational procedure for pharmacotherapy analysis and monitoring in a long-term care institution in the municipality of Araraquara. Additionally, a personalized and autonomous system for pharmacy financial management was implemented, aiming to optimize staff time. The institution has 150 beds, and the multidisciplinary team is composed of nurses, pharmacists, physicians, nutritionists, and physiotherapists. Considering the high demands of the healthcare team, a proposal was formulated to analyze the pharmacotherapy of older people with complaints and manifested adverse drug events. Using a holistic approach, a flowchart was outlined for analyzing the older person, considering gender, age, complaints, comorbidities, current pharmacotherapy, and lifestyle habits. To efficiently analyze pharmacotherapy, a pharmaceutical anamnesis was proposed, including an assessment of the indication, dosage, administration schedule, duration of use, and possible adverse events and drug interactions (drug-drug, drug-disease, and drug-food interactions). Based on the identification of drug-related problems, it was proposed to identify potential pharmacotherapeutic managements, such as dose adjustment and therapeutic equivalents. Digital tools from the Drugs and Drugsbank websites should be used to support the analysis of pharmacotherapy. The proposed analysis flowchart was presented and discussed with the multi-professional team. The prescriber and the team approved the proposal, and a pilot was carried out with 10 residents of the institution. Additionally, a pharmacy software was developed using HTML, VBA, and Python programming languages. This software aimed to mitigate discrepancies found in the previous spreadsheet, such as incorrect quantities and expiration dates, while also reducing the time spent by professionals when everything was done manually. Furthermore, it assists professionals in forecasting the items that need to be ordered in the upcoming month. After the software implementation, the pharmacy team was trained to utilize it. The automation of the financial management of the pharmacy can reduce human errors and saves staff time, which is then invested in the analysis of the pharmacotherapy of the institution's residents. This experience report highlights the fundamental role of the pharmacist in the healthcare team of long-term care institutions, demonstrating the high added value of this professional, who has a comprehensive understanding of patient-centered care. Therefore, the proposed flowchart can promote the effectiveness of pharmacotherapy and patient safety, and the software developed can promote the sustainable management of available pharmacotherapeutic resources.
Keywords**:** Long-term care institutions; older people; polymedicated

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Participation of a pharmaceutical residence in the interdisciplinary home visit

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Population aging is related to an increase in life expectancy and, together with this, the number of chronic diseases increases, elevating the demand for health services. With the aim of enabling the users' deinstitutionalization and avoiding unnecessary hospitalizations, home care emerges, providing adequate and humanized reception, expanding access for users who are restricted to their homes. This present work was written with the aim of describing the experiences acquired and activities carried out by a pharmaceutical resident during participation in an interdisciplinary home visiting service in a tertiary public hospital, with a mostly elderly population. Home visits are a set of actions aimed at promoting, preventing and treating diseases, ensuring continuity of care. The purpose of carrying out visits by a pharmaceutical professional is to identify the needs and particularities of each patient, in addition to providing pharmaceutical guidance to their caregivers. The topics covered in each visit are strictly related to the needs of each patient. The resident pharmacist can carry out interventions with the patient and the medical team. In the intervention carried out with the patient, the resident pharmacist can provide guidance on the packaging of medications, treatment adherence failure, guidance on the correct use of medications and identification of possible adverse reactions. And according to the problems observed, propose personalized strategies, such as to facilitate adherence, using organizing boxes, alarm programming or guidance tables containing the names of medications, time between doses and quantities. In the intervention carried out with the medical team, the resident pharmacist can verify the need or effectiveness of a proposed pharmacotherapy, identify drug interactions or contraindications, suggest medication substitutions and advice on medications that can be administered via nasoenteral or gastrostomy tube. During home visits, it was possible to apply in practice much knowledge that hospital experience does not allow, in addition to dealing with situations that required psychosocial support. With this, it can be concluded that home care not only adds practical knowledge specific to the pharmaceutical area, but also encompasses social support for patients and their caregivers, strengthening the bond between pharmacists, caregivers and patients.

Keywords**:** Pharmaceutical residence; Interdisciplinary; Home visit

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Pharmacists' role in vulvovaginal candidiasis care in Minas Gerais

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Vulvovaginal candidiasis (VVC) is a dysbiosis that mainly affects women of childbearing age and causes considerable discomfort for them. Given its high incidence and relevance to public health issues, it is essential to understand the role of pharmacists who guide this condition. The objective of this study is to investigate the profile of pharmaceutical involvement in guiding VVC and their knowledge about this infection. A cross-sectional study was conducted using electronic forms containing questions about practices and guidance related to VVC, directed at pharmaceutical professionals registered with the *Conselho Regional de Farmácia de Minas Gerais (CRF-MG)*. Among 455 respondents, a majority were female (n=381; 83.7%), white (n=275; 60.4%), single (n=250; 55.0%), with a median age of 34 (IQR=11). Most respondents stated that they guide the treatment of vaginal candidiasis (n=279; 61.3%), with an average of 2.5 ± 3.3 weekly consultations, focusing on dosage and usage of medications for VVC (n=231; 18.4%), non-pharmacological measures for VVC prevention (n=210; 16.7%), and therapeutic indications of medications (n=201; 16.0%). When asked whether VVC is a sexually transmitted infection (STI), the majority of respondents stated that candidiasis is not an STI (n=262; 57.6%). However, 42.2% stated that candidiasis is an STI (n=187; 41.1%) or were unsure how to respond (n=6; 1.3%). There was no statistically significant difference in the proportions of positive responses to this question according to gender (p=0.20), age (p=0.50), skin color (p=0.28), marital status (p=0.34), education (p=0.99), city of work (p=0.28), year of graduation (p=0.42), or whether guidance on VVC was provided (p=0.36). During analysis, it was also observed that among pharmacists who believed that VVC is an STI or were unsure, the majority provided guidance on the infection (n=123; 63.73%). To the authors' knowledge, this is an unprecedented study that investigates the pharmacist's role in managing VVC. This study shows that the pharmacist provides several types of guidance about CVV, that are important for the management of the infection. However, the data also suggests that training on the subject is necessary for professionals to guide women appropriately. Although the study has limitations, it is encouraging for further investigation into the role of the pharmacist, not only related to VVC but also to women's health in general.

Keywords: Pharmacists; Pharmacy; Pharmaceutical services; Vulvovaginal candidiasis; Women's health.

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Pharmaceutical Consultants in the SUS of Alfenas

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The clinical pharmacist plays a fundamental role in the Unified Health System (SUS), assisting patients in receiving necessary, safe, and effective drug therapy. Pharmaceutical professionals are qualified to assess each patient's needs, identify possible drug interactions, and collaborate with the multidisciplinary team to optimize treatment. The objective of this study is to report the experience of academics in SUS pharmaceutical offices. In 2020 and 2022, respectively, the Regional Pharmacy Council of Minas Gerais and the Federal Pharmacy Council regulated the opening of pharmaceutical offices, granting greater autonomy and training to pharmacists across the country. Therefore, there are currently six SUS offices in the city of Alfenas-MG. During pharmaceutical consultations, which occur from 7 am to 5 pm, Monday to Friday, academics who are members of an extension project, and guided by responsible professors, carry out pharmacotherapeutic monitoring, application of auriculotherapy as a non-pharmacological therapeutic measure, and health education and tracking. Since the implementation of this service in the municipality, approximately 800 consultations and 900 health screenings have been conducted. The results obtained through these services include the identification of problems related to pharmacotherapy and necessary interventions to resolve them, reduction of adverse drug effects, and greater adherence to treatments. In short, the Pharmaceutical Consultancies project at SUS in Alfenas offers academic experiences that are important for professional training and for developing a clinical perspective on the patient, not just for pharmacotherapy, in addition to providing opportunities to put into practice all the knowledge acquired from subjects during graduation. Furthermore, the project contributes significantly to the provision of clinical pharmaceutical services to the community, as pharmaceutical care in primary care is a challenge to be faced in Brazil.

Keywords: pharmacotherapeutic monitoring; clinical pharmacy; pharmaceutical offices;

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Instruments to measure patient satisfaction with comprehensive medication management services: a scoping review

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Comprehensive Medication Management (CMM) is the service offered within the clinical practice of Pharmaceutical Care, which has the objective to optimize pharmacotherapeutic outcomes. Patient satisfaction is a multidimensional construct that points to the quality of the health services offered and the degree to which patients' expectations and needs are met. The evaluation of the level of patient satisfaction is a key indicator to support decisions and to improve the quality of the service provided. In this context, the present study aimed to map the instruments to measure patient satisfaction with Comprehensive Medication Management (CMM) services and to compare them according to their development characteristics and applicability of patient-reported outcome measures (PRO) measures. For this, a scoping review was conducted using the methodology proposed by the Joanna Briggs Institute and the PRISMA Extension for Scoping Reviews (PRISMA-ScR). It included studies that had developed or applied an instrument to measure patient satisfaction with the CMM service, published from 1990 onwards, in any setting, language, or geographic region. The search strategy was previously validated and applied in MEDLINE, Latin American and Caribbean Health Sciences Literature (LILACS), EMBASE, Cochrane, Scopus, Cinahl, and Web of Science databases, in addition to gray literature search and manual search. Comparative analysis of the instruments was performed using an 18-item checklist developed to systematically assess patient-reported outcome measures. A total of 28 studies were selected; in most (17), the applied instruments had been developed by the authors, nine of which were validated. Most of the instruments used open-ended and closed questions in self-administered printed instruments. In the comparative analysis, the best qualified instrument reached 11 of the 18 requirements evaluated. In general, the weaknesses of the instruments involve the difficulty to define the construct "satisfaction", the uncertainty of the target audience, the absence of tests to evaluate sensitivity to change, the lack of clarity to interpret the score and to manage incomplete answers, besides the absence of tests to define the required literacy level. Therefore, the findings of this scoping review made it possible to identify the instruments available for measuring patient satisfaction with CMM services, an important humanistic indicator. It was also able to comparatively highlight the characteristics and psychometric properties of the originally validated instruments and point out those that most frequently met the desirable criteria for this type of instrument (PRO measure).

Keywords**:** Scoping review; Pharmaceutical care; Comprehensive medication management; Patient satisfaction

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Adverse drug events involving antineoplastic medicines reported on the brazilian health surveillance notification system (VigiMed)

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Antineoplastics have a complex safety profile and clinical studies in the area of oncology are especially fragile. Therefore, the continuous assessment of the safety profile of antineoplastic medicines through pharmacovigilance studies, especially those based on national reporting systems, is of particular relevance. In view of this, the present study aimed to describe suspected adverse drug events (ADE) involving antineoplastics reported on the Brazilian Health Surveillance Notification System, called VigiMed. To this end, a descriptive study was conducted regarding suspected ADEs reported in the VigiMed involving antineoplastic medicines between January 2019 and March 2023. The suspected ADE reports involving antineoplastics identified during the study period were described according to the following characteristics: total number of reports; type of report; and, type of report entry. The reports were also described according to sex and age group of the patients involved. The medicines involved in the reports were described according to their frequency and its route of administration (parenteral versus non-parenteral). Reactions/symptoms classified at the SOC level as "Injuries, poisonings and procedural complications" and HLGT level (high level group terms) as "Medication errors and other errors and problems in using the product" were described, allowing visibility of the types of errors involving antineoplastics based on their HLT (high level terms) classification. Additionally, a disproportionality analysis was carried out comparing reactions related to medication errors involving antineoplastics versus other products. To this end, the Reporting Odds Ratio (ROR) measure was adopted with its respective 95% confidence interval (95%CI). A total of 29,656 reports involving antineoplastics were identified, with increasing frequency throughout the analyzed period. The majority of them came from spontaneous reports (85.5%) and health services (59.0%). Adults (48.1%) and females (63.0%) were the patients most involved in suspected ADEs, with a large number of missing data on age and sex. The most common antineoplastic drugs were paclitaxel (10.4%) and oxaliplatin (7.6%), with emphasis on parenteral presentations (45.1%). A small number of medication errors involving antineoplastics were identified (1.3%) and the Reporting Odds Ratio (0,22; IC95% 0,21-0,23) demonstrated that these were less frequent for this class than for other products. Therefore, reports of ADE involving antineoplastics are frequent and increasing in Brazil, and it is important to improve safety barriers and monitor cancer patients. In relation to VigiMed, there is a trend towards an increase in registered notifications, although it is still necessary to carry out initiatives to educate and engage notifiers to improve the quality of notification.

Keywords**:** Antineoplastic agents; Adverse drug reaction reporting systems; Pharmacovigilance.

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Training on the implementation of the hospital infection control committee in the hospital environment

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The world faces increasing challenges related to antibiotic-resistant pathogens and the constant threat of epidemics. Healthcare-Associated Infections (HAIs) represent one of the main adverse events in care delivery and significantly impact morbidity, mortality, quality of life, and hospital costs. The greatest difficulty in controlling hospital infections is related to the need for behavior change among professionals and patients, through prevention measures that include new habits. In this scenario, effective control of hospital infections is more vital than ever. It is up to the Hospital Infection Control Committees (HICCs) to improve the quality of care and patient biosafety, both for external and internal patients. HICCs and proper hand hygiene are crucial in preventing and controlling these infections. This training aimed to guide and empower members of the Southern Minas Eye Hospital, academics, and other professionals in the field on the implementation of HICC, its stages, activities, and importance within the hospital environment, as well as to provide training on the correct way to wash hands. The training was offered by the Clinical and Hospital Pharmacy Academic League (LAFACH) of UNIFAL-MG and was carried out through a mini-course, which was made available in 4 modules on the UNIFAL-MG Moodle Community platform. The mini-course was registered in the Extension and Culture Pro-Rectorate (PROEC) of UNIFAL. The connecting academics recorded video lessons on topics such as the introduction of HICC and how to implement it, hand hygiene in healthcare, and HICC in practice. As a learning assessment system, during the modules, mini-course students participated in available forums and left their possible doubts, criticisms, and suggestions. In addition, questionnaires were made available at the end of each module to be answered in 4 attempts, and to progress in the mini-course, it was necessary to achieve at least 60% approval in the questions. At the end of the mini-course, participants' grades were assigned. Those who completed the course received a certificate from UNIFAL's PROEC. The mini-course had 54 registered participants, of which 16 were active, meaning 29.6% of those registered completed the course and obtained the necessary score to advance in the learning modules. Thus, those who had satisfactory performance in the mini-course and developed their knowledge about HICC are better prepared to implement it in the workplace, as well as to improve the handwashing process, ensuring patient safety. The mini-course conducted for the Southern Minas Eye Hospital, and other professionals and academics, increased awareness of essential preventive measures and empowered those involved to implement such practices in the hospital environment, contributing to improving the quality of care provided and reducing the risks of hospital infections.

Keywords: Hospital pharmacy; Hospital infections; Patient safety

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Discussion of scientific articles in centro de estudos do medicamento (CEMED): a teaching experience report

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Centro de Estudos do Medicamento (Cemed) serves as an academic organization within the *Departamento de Farmácia Social* of *Faculdade de Farmácia - Universidade Federal de Minas Gerais (UFMG)*, dedicated to advancing knowledge and promoting safe medication use. Established in 1991, its mission encompasses teaching, research, and community outreach in the fields of Drug Utilization Studies, Pharmacoepidemiology, and Pharmacovigilance. Structurally, *Cemed* operates through three core interests: dissemination of scientifically grounded, unbiased medication information; professional development in pharmacotherapy; and conducting research in the aforementioned areas. This multifaceted approach allows *Cemed* to cater to the needs of the university community, healthcare professionals, and the public at large, fostering a culture of informed medication use and patient safety. The construction of academic knowledge takes place in an environment where teaching, research and extension combine themselves to stimulate the constitution of critical awareness in students. For that, *Cemed* has an important role to the education of students when it allows them to read and discuss scientific articles, exploring new topics that may generate further insights into medications to be disseminated. These explorations aim to assess the risk-benefit relationship of specific medications, while also serving as a platform for learning about clinical study designs and reviewing concepts in epidemiology and pharmacoepidemiology. Utilizing a *Prescrire* review on drugs to avoid in 2024 as a guide, our objective was to find and examine clinical studies that supported the safety warnings on drugs listed on *Prescrire*'s article. We accessed Anvisa's (Brazilian Health Regulatory Agency) website to delimitate our investigations on drugs that were registered in Brazil. Pubmed was used as a database for the exploration of articles on clinical research that assessed the drugs listed. Out of 106 drugs cited on Precrire's review, 80 were found to have an Anvisa register. Aliskiren, a blood pressure-lowering renin inhibitor, was selected to be the first drug listed to be assessed in *Cemed*'s meetings. Through a presentation of a systematic review and meta-analysis on effects of aliskiren, students were able to participate in critical discussions and also deepen their understanding of how epidemiological principles and clinical research methodologies intersect within the scope of safety assessment and effectiveness of medicines. Such activities are extremely important for building the scientific reasoning of undergraduate students and encourage continuing education, which represents an essential tool for providing reliable technical-scientific information about health and reliable medicines.

Keywords: Centro de estudos do medicamento (Cemed), Technical-scientific information, Health education.

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Clinical results of patentes with type 2 diabetes mellitus followed by the comprehensive medication management service in primary health care

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Diabetes mellitus (DM) is a chronic metabolic disorder characterized by chronic hyperglycemia resulting from changes in glucose metabolism. High glycemic rates are associated with the development of microvascular and macrovascular complications and increased morbidity and mortality, consequently generating greater healthcare costs. However, achieving therapeutic targets is a challenge in the treatment of DM, as it depends on psychological, social and economic factors. In this way, the integrated work of a multidisciplinary team inserted in Primary Health Care (PHC) can improve the therapeutic results and prognosis of these patients. In this context, offering the Comprehensive Medication Management (CMM) service is an interesting strategy to optimize pharmacotherapy for these patients. In this service, the clinical pharmacist takes responsibility for the patient's pharmacotherapeutic needs by identifying, preventing and solving drug therapy problems (DTP) to achieve positive health outcomes. Therefore, this study aimed to assess the clinical impact of CMM services provided to patients with type 2 DM seen in the PHC of Belo Horizonte, Minas Gerais, Brazil. A quasi-experimental study was carried out with patients followed by the CMM service offered in PHC (n = 40). The following data were collected directly from the medical records of the CMM service: gender; age (years completed on the date of the first consultation); physical activity (yes or no); nutritional guidance (yes or no); number of medications used (prescribed and non-prescribed) at the first consultation; number of DTP identified and resolved in all consultations and their specific categories; glycated hemoglobin (HbA1c) and body mass index (BMI) measured at the first and last CMM consultations. The clinical impact of the service was evaluated by comparing the initial and final parameters of HbA1c and BMI. The majority of patients were female (60.0%), did not perform physical activity (62.5%), had nutritional guidance (57.5%) and mean age of 61.1 years. At the initial assessment, patients used a total of 226 medications, with an average of 5.8±2.4 medications per patient (minimum of 1; maximum of 11). Of the total medications, 34.1% were oral antidiabetics (n=77) and the majority of patients used two medications from this class (n=34; 87.2%). During the consultations, a total of 71 DTPs related to diabetes were identified, with an average of 1.8±1.4 DTPs per patient (minimum of 0 DTPs; maximum of 7 DTPs) and the most frequent type of DTP was related to low dose (n=18; 25.4%), followed by non-adherence (n=16; 22.5%) and adverse reaction to the medication (n=14; 19.7%). The majority of DTPs were resolved (n=62; 87.3%), of which 38.7% were resolved directly with the assisted patient. A reduction of 2.02±2.0% in the values of HbA1c ($p<0.001$) and a reduction of 0.82±1.9 in the BMI ($p=0.048$) were identified. This study indicates that the CMM service positively impacted the resolution of DTP, improving the parameters of patients with DM.

Keywords: Diabetes mellitus; Pharmaceutical care; Primary health care

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Medicine Study Center (CEMED): from information request to the promotion of rational use of medicines

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Drug Information Centers (DIC) was developed in Brazil in 1979, based on initiatives by educational institutions and health services. The objectives of DIC are to answer requests on medicine use and disseminate information based on scientific evidence to promote the rational use of drugs. From this perspective, the *Centro de Estudos do Medicamento (Cemed)*, an extension project of the *Faculdade de Farmácia* of *Universidade Federal de Minas Gerais (FAFAR-UFMG)*, receives questions from both health professionals and the non-specialized individuals regarding the use of medications. The objective of this study was to describe the profile of questions received by Cemed. Therefore, requests for information received through the project's communication channel, "Ask Cemed", from October 2017 to April 2024, were collected and classified according to Medication Therapy Problems (MTP), based on the Pharmacist's Workup of Drug Therapy (PWDT) method. Requests could contain more than one question and thus receive more than one rating. A total of 159 requests were obtained, of which 66.7% (n=106) were sent by the non-specialized individuals and 33.3% (n=53) by health professionals, with 81.1% (n= 43) carried out by pharmacists. The received questions (n=179) were classified into five groups, 32.4% (n=58) of them were defined as "other" in relation to other pharmaceutical areas, such as: pharmaceutical legislation, health policies, registration and access to medicines. Of the remaining questions (n=121; 67.6%), the classified MTP presented the following proportion: safety (n=47; 38.8%), indication (n=42; 34.7%), effectiveness (n=28; 23.1%) and convenience (n=4; 3.3%). Therefore, it was found that the main inquiries received by Cemed were related to the safe medication use, highlighting the relevance of the DIC in providing information based on scientific evidence.

Keywords: Rational Use of Medicines; *Centro de Estudos do Medicamento* (CEMED); Pharmacist's Workup of Drug Therapy (PWDT); Health education

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Patient as educator in the training of pharmaceutical professionals: a relevant teaching approach?

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Patients are generally passive collaborators in the training of health professionals. The active role of the patient, as an educator in the teaching process, began to be considered at the beginning of the 20th century and is currently gaining increasing social interest. The strategy proves to be interesting because the patient masters knowledge about their illness and medications that teachers do not have to share with students. Gaps in knowledge were observed, referring to the lack of research on the topic in Brazil, mainly in the pharmaceutical area, in addition to the lack of development of a theoretical foundation for the approach. Thus, the objective is to identify and analyze scientific articles in which patients act as educators in health training, especially in Pharmacy. Furthermore, it is intended to use the person-centered clinical method and activity theory as theoretical references to demonstrate the relevance of this practice. This is a narrative review of the literature, with two notable bibliographic reviews on the topic selected. Subsequently, a search was carried out and four articles were found on patient involvement in undergraduate Pharmacy education. Regarding the theoretical framework, the person-centered clinical method can be applied by any health professional, replacing the traditional biomedical model. It aims to understand the personal and subjective needs of patients, which need to be satisfied in a service for it to be successful. Activity theory addresses individual and collective activities, using important concepts to explain how activity generates consciousness in human beings. This is capable of changing reality, transforming human beings and the nature around them. The literature reviews showed how the patient-as-educator strategy is relevant for the training of health students. The theoretical review presented the importance of social psychology theories to understand why the approach works. Analyzing the pharmaceutical articles, it is clear that the majority are recent (2005-2022), coming from European universities, in England (n = 2) and France (n = 2). In French studies, the educational strategy used was the workshop, in English it was classroom meetings. Focus was placed on pharmaceutical care and the person-centered clinical method. Through activity theory, it is clear that human learning is linked to the social and cultural aspect, as occurs when patient, student and teacher interact to learn about health in a holistic way. The involvement of the patient educator was promising and more activities using this approach were desired by the graduates. It is concluded that this practice is still little explored, despite proving to be a valuable educational tool in all articles used. The works defend the presence of the patient teacher in Pharmacy teaching from the beginning of the course, as it contextualizes learning, integrating theory and practice. The development of clinical skills is a recurring topic in the articles used, reporting improved communication and confidence among students who have had contact with this approach.

Keywords: Pharmacy education; Patient-centered care; Review

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Prolife of antimicrobials use for management pharyngotonsillitis among pharmacy students

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Pharyngotonsillitis has great social relevance due to its high prevalence affecting the productivity of the sick, in addition to standing out for being the main cause of rheumatic fever and rheumatic heart diseases, responsible for morbidity and mortality that have a financial impact on the Brazilian health system. Given this context, this study aimed to describe the prevalence of pharyngotonsillitis among university pharmacy students at the Federal University of Minas Gerais, as well as the profile of antimicrobial use for pharyngotonsillitis in this population. To this end, a cross-sectional pharmacoepidemiological study was carried out with the participation of university pharmacy students. Data collection was carried out through the application of electronic forms on the Google® Forms platform between the months of September and December 2019. Data were collected regarding the research participant's sociodemographic characteristics, the frequency of pharyngotonsillitis in the last year and the profile of medications used for management pharyngotonsillitis. A total of 235 respondents were included in this study, the majority being female (79.2%; n = 186) with a mean age of 23.2 ± 4.4 (min = 18; max = 54). In addition, 62.6% (n = 147) of respondents had not attended any of the antimicrobial pharmacotherapy courses mentioned in the questionnaire and 47.2% (n = 111) had frequent contact with school-age children aged five to 15 years. The prevalence of pharyngotonsillitis was 44.7% (n = 105), with 30.6% (n = 72) having more than one episode in the 12 months preceding the interview. The profile of antimicrobial use was constructed based on the responses of 66 (28,1%) participants who reported having used antimicrobials to manage pharyngotonsillitis, and in most cases it was considered the use of these medications inadequate (65,2%; n = 43). The adherence to the first choice antimicrobial treatments was 34,9%. Participants had access to antimicrobials mainly through purchase with a medical prescription (72,7%; n = 48). The data obtained in this study reinforce the need to optimize conducts and adherence to guidelines, since inadequate conducts were identified on the part of patients and health professionals.

Keywords: Pharmacy students; Pharyngotonsillitis; Antimicrobials

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HEALTH AND PHARMACY

Pharmaceutical care aimed at the user of radiopharmaceuticals: a integrative review

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Radiopharmaceuticals, compounds that combine radioactive isotopes with non-radioactive molecules, are essential in cancer therapy and in the treatment of certain comorbidities. To ensure adequate management and administration of radiopharmaceuticals, the National Health Surveillance Agency (Anvisa) determined in 2009 the need for the pharmacist to be responsible for the production and quality control of radiopharmaceuticals. However, the pharmacist working in radiopharmacy, besides assuming responsibilities regarding aspects related to the product (radiopharmaceuticals), must also be responsible for the care of radiopharmaceutical users, due to the particularities of this type of medicines. In view of the potential for the pharmacist to perform clinical activities in the context of radiopharmacy, the present study aims to identify in the literature studies describing the pharmaceutical care services offered to users of radiopharmaceuticals. For this, an integrative review was carried out in the electronic databases MEDLINE (PubMed), EMBASE and Latin American and Caribbean Literature in Health Sciences (LILACS). The search was performed without time or language restrictions using a combination of the following descriptors and their synonyms: ("Radiopharmaceuticals" OR "Radiopharmacy") AND ("Pharmaceutical Services" [Mesh] OR "Medication Therapy Management" [Mesh] OR "Pharmaceutical Care" OR "Clinical pharmacy" OR "pharmacist"). Two reviewers selected the studies independently, and discrepancies were sorted out by a third reviewer. This review included only one study describing the clinical pharmaceutical service offered to patients using combined therapy for non-Hodgkin's lymphoma. In this service, the pharmacist not only participated in all the usual part of dose preparation, calculations and administration, but also offered the clinical service to patients. Through this review, it was possible to observe that studies covering clinical pharmaceutical services offered to radiopharmacy users are still incipient, despite the fact that both services are highly customized and individualized. Although only one study was included in this review, its results demonstrate that clinical pharmaceutical services have the potential to bring clinical benefits to users of radioactive drugs, especially with regard to monitoring adverse reactions. In addition, the pharmaceutical care service was well received by both the health team and patients.

Keywords: Pharmaceutical care; Pharmaceutical attention; Radiopharmaceuticals

Ethics committee approval protocol**:** The study does not contain clinical studies or patient data.

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Violence against women pharmacists: a descriptive study

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Female pharmacists, the majority in the professional class, work in different settings, being exposed to various forms of violence in both the workplace and at home. However, studies assessing the violence experienced by female pharmacists are not available in the literature, making it an important fact to discuss the health and well-being of female pharmacists in the environments in which they are embedded. In this context, the objective of this study was to describe the profile of incidents violence involving female pharmacists in the workplace at home. This is a cross-sectional study based on a survey administered to pharmacists registered with the *Conselho Regional de Farmácia de Minas Gerais (CRF/MG)*in 2021. A description of the frequencies of socio demographic and occupational data and responses about the violence experience was conducted. Additionally, the proportions of positive responses regarding violence were compared according to the respondents' profile in the workplace environment using Pearson's chi-square test at a statistical significance level of 5%. In total, 455 pharmacists responded to the questionnaire, with a majority being female (n=381; 83.7%), white (n=275; 60.4%), in a stable union (n=225; 49.5%), and with additional education beyond graduation(n=305; 67.0%). Regarding Occupational data, 60.4% (n=275) worked in public or private community pharmacies, 50.1% (n=228) worked outside the metropolitan region, and 64.2% (n=292) earned three or more minimum wages. Violence Involving a female pharmacist colleague in the workplace was identified by 20.4% (n=93) of respondents. Amongfemalepharmacists, 23.1% (n=88) reported experiencing violence at work, with incidents involving patients or clients being highlighted (n=43; 53.1%). Regarding sexual harassment, 22.6% (n=86) reported experiencing some episode, with cases involving coworkers being prominent (n=31; 36.0%), and positive responses were more frequent among pharmacists with education beyond graduation (p=0.008; OR=2.15; 95% CI=1.21-3.81), those working outside private community pharmacies (p=0.003; OR=2.29; 95% CI=1.30-4.00), and in the metropolitan region of Belo Horizonte (p<0.001; OR=3.18; 95% CI=1.87-5.40).Approximately 13% offemale pharmacis ts reported experiencing domestic violence, with the partnerorex-partner being the main aggressor (n=34; 66.7%). Furthermore, 25.2% (n=96) female pharmacists do not know hatto do if they were victims of violence. The cases of violence experienced by female pharmacists in their workplace and domestic environments are frequent, requiring actions for combat and preventions that they can have health and well-being in the places where they are embedded.

Keywords: Pharmacists; Women working; Workplace violence; Violence against women; Gender-based violence

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Pharmaceutical guidance on women's comprehensive health: who provides it?

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Pharmaceutical professionals are present in various important healthcare settings, yet it is still necessary to understand their role in providing comprehensive guidance on women's health, as well as the gaps in providing care to this group. In this context, the present study aimed to describe the provision of pharmaceutical guidance on women's health and the associated factors. This was a cross-sectional study, based on the responses of pharmaceutical professionals registered with the *Conselho Regional de Farmácia de Minas Gerais (CRF/MG)*, through an electronic questionnaire administered in 2021. The sociodemographic profile of the professionals, their workplace, issues related to the provision of guidance on women's health, and the professionals' doubts on the topic were described. Factors associated with the provision of pharmaceutical guidance were evaluated through univariate and multivariate analyses, considering statistically significant associations with p-values less than 0.05. A total of 455 respondents participated, with the majority identifying as female (n=380; 83.6%), white (n=275; 60.4%), and working in private or public pharmacies (n=163; 60.2%). Regarding the location by Mesoregion of Minas Gerais, 58.3% (n=264) were located in the Metropolitan Region of Belo Horizonte. Additionally, 52.3% (n=238) reported the absence of an office or private room for pharmaceutical consultations. In total, 329 (72.3%) participants guided women at an average frequency of 3.4 ± 6.9 consultations per week (minimum = 0; maximum = 80). When evaluating the factors associated with the provision of comprehensive women's health guidance, it was observed that having a pharmacy office at the workplace (OR=3.26; 95% CI=2.06-5.15; p<0.001) and working in the metropolitan region (OR=2.03; 95% CI=1.29-3.20; p=0.002) independently increased the likelihood of provision. The most commonly addressed topics in pharmaceutical guidance and clinical care were, respectively, the use of contraceptive methods (n=286; 24.1%), medication use and/or care for lactating or pregnant women (n=209; 17.6%), and sexually transmitted infections (n=186; 15.7%). The most frequent doubts among professionals were related to medication use during pregnancy, childbirth, postpartum, lactation, and maternal health (n=104; 18.3%), followed by doubts related to the use of continuous-use contraceptives, emergency contraceptives, and reproductive health (n=46; 8.1%). Approximately 15% of respondents had no doubts about the subject or were unsure how to respond (n=87). Furthermore, 88.6% (n=403) of study participants expressed interest in attending courses focused on comprehensive women's health. The identified scenario indicates a significant involvement of pharmacists in guiding women's health but also highlights areas that should be strengthened based on doubts and associated factors, to further narrow the gap between pharmaceutical involvement and comprehensive healthcare for women.

Keywords: Pharmacists; Pharmacy; Pharmaceutical services; Pharmacy research; Women's health.

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Use of opioids associated with laxants in palliative care: a case report

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In palliative care, most medication errors occur due to the use of opioids in pain management. It is known that pain is one of the most common symptoms in patients under such conditions, requiring a combination of appropriate therapeutic interventions to alleviate suffering and improve quality of life. In this context, the use of opioids is common. However, the use of this pharmacological class has constipation as one of its main adverse effects, which is why the Potentially Inappropriate Prescribing in Older Adults with Cancer Receiving Palliative Care (PIP-CPC) recommends that opioids should be prescribed in palliative care associated with laxatives. . According to this list, an opioid unaccompanied by a laxative is a potentially inappropriate medication in palliative care. Therefore, this study aims to analyze cases of patients using opioids and laxatives in a reference hospital in the south of Minas Gerais. This is a case report that is part of a study on pharmacotherapy of patients in palliative care, approved by the UNIFAL-MG Research Ethics Committee. Patients under palliative care admitted to the Casa de Caridade Nossa Senhora do Perpétuo Socorro (Santa Casa de Alfenas) were monitored during the hospitalization period. Data collection was carried out from January 2024 to April 2024. During this period, 28 hospitalized patients were monitored, of which 27 (96%) used opioids. The most frequently prescribed opioid, from hospital admission to discharge or death, was morphine sulfate (n=24), followed by tramadol hydrochloride (n=19). Among patients using opioids, 10 (36%) reported constipation. It was found that 4 (14%) patients were prescribed a laxative after the manifestation of constipation and that for 2 (7%) the laxatives were prescribed together with the opioid, as recommended by the PIP-CPC. Furthermore, it was found that 4 (14%) patients did not receive laxative treatment even with the adverse effect. Thus, by analyzing the cases cited, it was observed that the prescription of laxatives can be reserved for cases of patients who manifest constipation, instead of being automatically included in the pharmacotherapy of palliative care through the inclusion of an opioid aimed at managing pain. Although more robust studies are needed to confirm this hypothesis, it is believed that this approach could minimize preventable risks in relation to the use of medications in patients under such care. Furthermore, considering the principles of palliative care, the patient needs to be properly monitored in relation to the emergence of constipation due to the negative impact of this adverse effect on the patient's quality of life, which may require the definition of pharmacological and non-pharmacological interventions by the healthcare team.

Keywords: Palliative Care; Pain Management; Analgesics, Opioid; Laxatives; Opioid-Induced Constipation.

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Adverse drug events involving biological medicines used to treat rheumatoid arthritis reported in official reporting systems: an integrative review

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Rheumatoid arthritis (RA) is a chronic autoimmune inflammatory disease that affects approximately 1% of the world's population. Currently, biological disease-modifying anti-rheumatic drugs (bDMARDs) have been widely used in the treatment of RA due to their satisfactory results in achieving disease remission. Therefore, the expansion of the use of bDMARDs requires investigations that provide better knowledge about the occurrence of adverse drug events (ADE) involving bDMARDs in the context of post-market use. In front of, this review aimed to bring together studies that describe suspect ADE involving bDMARDs used in the treatment of RA reported in the official notifications systems worldwide. For this, an integrative review was carried out in the electronic databases MEDLINE (PubMed) and Latin American and Caribbean Literature in Health Sciences (LILACS), using a combination of the following descriptors and their synonyms: "Drug-Related Side Effects and Adverse Reactions", "Biological Therapy", "Biological Products", "Biosimilar Pharmaceuticals", "Adverse Drug Reaction Reporting Systems" and "Pharmacovigilance". Data collection and analysis was carried out by two independent reviewers and disagreements were resolved by a third reviewer. A total of 905 publications were found, 41 of which were selected for full reading. Ten studies were included in this review because they described suspect ADE involving bDMARDs used in the treatment of RA reported in the official notifications systems worldwide. Among the studies included, three evaluated data reported in the World Health Organization (WHO) reporting system, VigiBase, two from the Food and Drug Administration's Adverse Event Reporting System (FAERS), one from the Japanese Adverse Drug Event Report, one from the Italian Medicines Agency Database, one from the National Coordination Centre-Pharmacovigilance Program of India, one from the Slovakia State Institute for Drug Control Database, and one evaluated data from two notification systems (VigiBase and FAERS). Eight studies evaluated spontaneous notification data, one analyzed the spontaneous reporting and study reporting dataset and one did not describe the source of the data used. Only one study specifically evaluated bDMARDs used in the treatment of RA, finding that the bDMARDs most frequently involved in reports were etanercept, adalimumab and infliximab. This study also found that almost half of the reports (n=177,031; 43.1%) involved serious reactions, the most frequent serious outcomes were important medical events and hospitalization or prolongation hospitalization. A study evaluated adverse events focusing on infection associated with infliximab originator and biosimilar, revealing that signals were detected for pneumonia, interstitial lung disease, tuberculosis, and sepsis with both infliximab originator and its biosimilar, whereas there was no signal for infection with the biosimilar. The other studies evaluated a set of biological medicines and among them were bDMARDs. A study that specifically evaluated the occurrence of sarcoidosis-like reactions found that the majority of medications that related adverse sarcoidosis reactions were tumor necrosis factor inhibitors (TNFi). Still regarding the use of TNFi, another study identified that all biologics evaluated were positively associated with bacterial skin infections, herpes simplex, and herpes zoster, compared with all other drugs in the WHO database for which individual case safety reports were collected. The findings of the included pharmacovigilance studies demonstrated the relevance of bDMARDs in ADE reports, reinforcing the need to rigorously monitor the post-marketing safety data of these medicines. Furthermore, the results of this review are relevant to outline the scenario of notifications involving bDMARDs, allowing comparability between findings involving different ADE notification systems.

Keywords: Drug-related side effects and adverse reactions; Adverse drug reaction reporting systems; Rheumatoid arthritis

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Identifiability and traceability of biological medicines used in the treatment of rheumatoid arthritis in suspected adverse drug reported in VigiMed

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Biological disease-modifying anti-rheumatic drugs (bDMARDs) represent a significant advancement in the management of rheumatoid arthritis (RA) and other autoimmune rheumatic diseases. This class of medications proves particularly beneficial as RA progresses, facilitating enhanced disease control in more advanced stages while maintaining an overall adequate safety profile when compared to other options, such as targeted synthetic disease-modifying anti-rheumatic drugs (tsDMARDs). However, biological medicines are more complex than small molecules. Therefore, they are more susceptible to structural variability due to their production methods, and they have potential to induce an immune response. Consequently, pharmacovigilance emerges as a cornerstone in monitoring post-marketing safety profiles. Due the intricate nature of the production processes and substantial variability among bDMARDs, it becomes imperative that reports contain detailed information enabling precise identification and traceability of each product involved in the suspected adverse drug events (ADEs). The aim of this study was to describe traceability and identifiability of suspected ADE involving bDMARDs used in the treatment of RA reported in VigiMed, the Brazilian notification system. This is a descriptive study regarding suspected ADE involving bDMARDs used in the treatment of RA reported in VigiMed between January 1, 2019, and March 31, 2023. The suspected ADE reports involving bDMARDs used to treat RA identified during the study period were described according to the number of reports involving at least one serious reaction/event and sex and age group of the patients involved. The medicines involved in the reports were described according to their frequency, present or absent of the commercial medicine name and/or specific manufacturer and present or absent of the data of batch and frequency of concomitant availability of data regarding to the batch number and the commercial name of biological medicines and/or the specific manufacturer. 3,037 suspected ADEs involving bDMARDs were reported in the referred period, with the greater part of reports presenting at least one serious reaction/event. The majority of suspected ADEs involved female (n=1,979; 65.2%) and adult (n=2,404; 79.2%) patients. The bDMARD most frequently involved in suspected ADEs was infliximab (n=2,604, 75.4%) followed by rituximab (n=562; 16.2%) and adalimumab (n=108; 3.1%). Data about the commercial name and/or the name of the manufacturer was registered in 805 (23.3%) of the reports. In addition, for 653 (18.9%) of the reports the batch number (traceability) was informed. Both sets of data were available for only 431 (12.5%) of the ADEs reports involving bDMARDs. Almost all reports evaluated in the present study did not present information that allowed the identification and traceability of each biological medicine involved in the suspected ADE. These results are particularly worrying in the context of pharmacovigilance, because the presence of this information makes it possible to accurately identify the medicine involved in the ADE report, allowing to detect and evaluate emerging safety and immunogenicity problems specific to each product.

Keywords**:** Drug-related side effects and adverse reactions; Adverse drug reaction reporting systems; Rheumatoid arthritis

Ethics committee approval protocol**:** The study does not contain clinical studies or patient data.

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Rational use of medicines: training of community health agents

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The Community Health Agent (CHA) has a key role in promoting the Rational drug use (RDU), since these workers enable the link between the health service and the community. The CHA can clarify doubts to users about the RUM and assist in treatment adherence when trained. Thus, the study aimed to train the CHA for the promotion of the RUM. This is a cross-sectional study, carried out in 2019. Data collection took place through questionnaires after consent and signature of the Free and Informed Consent Term, addressing socio-demographic aspects, training and knowledge about medicines. The data were computed in an Excel spreadsheet and analyzed in the Biostat 5.3 program. A questionnaire was answered by the CHA before and after the training to verify the level of knowledge about the RDU. Most of the participants, 71.40% (n=35), were female, and 42.86% (n=21) aged between 31 and 40 years. The level of education of 69.40% (n=34) was complete high school and 53.06% (n=26) had up to five years of service. As for the training on medicines, 57.14% (n=28) of the CHA said they never participated and 87.76% (n=43) felt the need to perform it. Asked about having enough knowledge to give information about medicines, 63.27% (n=31) did not consider themselves able to inform users. The questionnaire had 20 questions related to the RDU, applied before the training, and 48.78% (n=20) got between 14 and 18 questions right, demonstrating a good level of knowledge about RUM. After the training, 92.68% (n=38) of the CHA got between 14 and 20 questions right. All questions obtained their assertive rates increased after training. The CHA involved directly with users is an instrument for the promotion of the rational use of medicines, provided that it is properly trained. The results were positive in the level of knowledge of the CHA, and may also show that the presence of the Pharmacist benefits all those involved.

Keywords**:** Rational use of medicine; Community health agents; Pharmacist

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Incidents of violence against women from the perspective of pharmacist: a descriptive study

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Violence against women historically and indiscriminately violates women's rights. In this context, health professionals have a lot to contribute to combating violence and guaranteeing women's comprehensive health, with pharmacists and their work environments being highlighted, due to the capillarity and accessibility of these locations. However, it is necessary that these professionals are able to recognize the multiple forms of violence to which women are exposed and know how to act to guarantee the patient's individual rights, offering adequate assistance. The objective of this work was to investigate the profile of pharmacists' experience on gender issues in their professional environment. This is a descriptive study that sought to evaluate the experience of pharmacists in the context of full access to women's health, carried out among professionals registered with the Minas Gerais Regional Pharmacy Council. A descriptive analysis was carried out on pharmaceutical actions in the face of violence suffered by patients and how these professionals can act in this context. 455 responses were obtained for the survey and 128 descriptive reports about situations of violence experienced by pharmacists in their workplace, 51.8% of which are in offices. Among the violence experienced, those that drew the most attention from professionals in the care of women in situations of violence were, respectively, psychological violence (n=69; 47.6%), physical violence (n=33; 22.8%), sexual (n=24; 16.6%), patrimonial (n=14; 9.6%) and moral (n=5; 3.4%). The evaluation of sociodemographic characteristics demonstrated that there is no significant difference in cases of violence against women in urban or rural areas, and that the pharmacy is a place of common access for all patients, therefore, a place of welcome. Open responses about violence against women were grouped according to content similarity, forming categories that were also subject to descriptive analysis. In the cases analyzed, the predominance of the word's "fear", "psychological", "partner", "husband" and "shame" was observed, which reflect the characteristics of the situations experienced by women. In the narratives, the mentioned characteristics were reinforced, as well as the observation that there is a need for training pharmaceutical professionals, which can have a positive impact on the social and political process of confronting violence against women. This work demonstrated the positive impact that the work of pharmacists can have on the work environment, which shows that these professionals and their workplace need to be valued, as this is a great opportunity for achievement for the provision of services in primary care. However, it also reflects the current lack of preparation to be more than a listener/observer of cases of violence.

Keywords**:** violence against women, pharmacists' actions, confronting violence.

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Aspects involved in the sustainability of the comprehensive medication management services

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The professional practice of pharmaceutical care involves three components - philosophy of practice, patient care process, and a practice management system - and is materialized in society through the comprehensive medication management (CMM) service. In this service, the pharmacist assumes responsibility for the pharmacotherapeutic needs of patients by trying to identify, prevent, and solve so-called drug therapy problems (DTPs), within a line of care centered on the patient and based on building a therapeutic relationship. CMM services produce positive clinical, humanistic and economic results in several scenarios, and studies have already elucidated the components necessary for its implementation. Despite this, most initiatives are still unsuccessful in maintaining the long-term provision of the service. Thus, this study aimed to understand the elements that contribute to the consolidation and continuation of the CMM service. For this, a qualitative study was conducted using Grounded Theory as a methodology. In the period from May 2019 to February 2020, semi-structured interviews were conducted with eight pharmacists and four managers who experienced the offering of CMM in various scenarios of public and private healthcare in Belo Horizonte and the metropolitan region. Records in the first author's field diaries and document analysis were also used. After systematic data analysis, as recommended by the grounded theory methodology, three determinant categories were identified in the CMM sustainability process. The first one, called "Collaborative care is essential: You can't think of CMM just like the pharmacist and patient dyad", which addresses the essentiality of professional partnerships to strengthen the service. The second category, "Negotiating the sustainability of the CMM", evaluates important elements associated with service management, such as: the manager's understanding of the CMM service, the formalization of the service in health systems and the management of service quality indicators. And the third, "Who will pay for the service?", analyzes the possibilities of financial resources in health systems. The results revealed that the consolidation of CMM services is a strategic process, which requires careful planning that begins with the implementation of the service. Both (implementation and sustainability) must be planned and measured simultaneously, as this procedure makes it possible to identify barriers and facilitators that impact the success of the service. The long-term success of the service is a reflection of this implementation, which was well conducted and structured. The skills and abilities of the professional providing the service must be taken into account; conducting work in partnership with the prescriber and other health professionals; establishing dialogue with managers, agreeing goals and responsibilities; and analysis of how the service will maintain itself financially.

Keywords: Comprehensive medication management; Pharmaceutical care; Sustainability

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Adverse drug events involving opioids reported on the brazilian health surveillance notification system (VigiMed)

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Opioids medications, despite being an important class of analgesics, should only be prescribed if their benefits outweigh their risks. These medications are classified as high-alert medications, because they can lead to occurrence of serious adverse drug events (ADEs) that should be reported to national authorities. Taking this into consideration, this study aimed to describe suspected adverse drug events (ADEs) involving opioids reported in the Brazilian Reporting System, called VigiMed. For this, a descriptive study based on suspected ADEs involving at least one opioid medication was conducted. All data for the period from 2018 to 2023 was collected in the VigiMed primary database publicly available. Reports of suspected ADEs were described according to the month of notification, type of entry and characteristics of the involved patient. For each VigiMed report, there may be more than one reaction/event related, and these were also described according to the type of reaction/event, and type of opioids involved. A total of 9,532 suspected ADEs involving opioids were reported in the period evaluated, which represented almost 6% of all ADE reports in Brazil. An average of 183.3 reports per month and a growing monthly rate was observed. Three out of every four reports came from health services (n=7,103; 74.5%). The majority of suspected ADEs involved female (61.6%; n=5,866) and adult (52.5%; n=5,004) patients. A total of 17,738 reactions/events involving opioids were reported and a predominance of these were related to cutaneous and subcutaneous tissue disorders (12.2%). Regarding the opioids class representatives, morphine, tramadol and fentanyl were most frequently involved in ADE reports. From this study, it was possible to note a considerable and increasing frequency of ADEs reports. This demonstrates that use must be properly monitored in the national context, preventing inappropriate use of this class.

Keywords**:** Drug-related side effects and adverse reactions; Adverse drug reaction reporting systems; Opioids

Ethics committee approval protocol**:** The study does not contain clinical studies or patient data.

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Adverse drug events among older adults in Brazil before and after the onset of the COVID-19 pandemic

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Drug-related harm is among the most common in the world. Thus, it is essential to identify the adverse drug events (ADE) for the adoption of preventive and corrective measures that can avoid these harms and improve the quality of care provided to patients. In this scenario, monitoring the safety profile of medications used by older people is important, since the older often do not have adequate representation in clinical trials and, furthermore, they undergo physiological changes associated with aging that alter pharmacokinetic responses and pharmacodynamics of medications. In parallel, the emergence of COVID-19 disease and its high incidence among older adults, as well as frequent use of off-label medications have reinforced the importance of monitoring ADE in this population. In this context, it is imperative to develop studies that provide information about the safety of drug use for the geriatric population, including the pandemic context. Thus, the present study aimed to describe the suspicion of ADE related to older adults notified to Brazilian National Health Surveillance Agency (Anvisa) before and after the beginning of the COVID-19 pandemic in Brazil. For this, a descriptive study of suspected ADEs reported in the VigiMed between January 1, 2019, and June 30 was carried out involving older adults aged 65 or over. Suspected ADEs were also described according to the reporting period according to the pandemic context: before the pandemic – January 2019 to March 2020 – and after the beginning of the pandemic – April 2020 to June 2021. The difference between the proportion of serious ADE in the pre-pandemic and post-pandemic period was evaluated using Pearson's chi-square test. A total of 57,167 reports of suspected ADE were registered in VigiMed, of which 12,695 (22.2%) involved older adults. Among the reports covering older adults, most involved females (n = 6,986; 55.0%). In the pre-pandemic period, 2,924 suspected ADEs were reported (44.2% were serious ADEs), especially those involving antineoplastic, antimicrobial, and anticoagulant drugs. In the post-pandemic period, 9,771 suspected ADEs were reported (57.5% serious), especially related to hydroxychloroquine and vaccines against COVID-19. The difference in the proportion of serious suspected ADE reported for the older adults between the periods evaluated was statistically significant ($p < 0.001$). These results highlight how the off-label use of medicines during the COVID-19 pandemic was relevant and reinforce the importance of ADE reports to pharmacovigilance systems, aiming at the implementation of practices that promote the rational use of medicines and reduce the occurrence of serious ADE. In addition, studies that assess ADE in the geriatric population are essential to provide information regarding pharmacotherapy, risks and prioritization of harm reduction among older patients, considering the incipience of clinical studies that include this population.

Keywords**:** Aged; Adverse drug reaction reporting systems; COVID-19

Ethics committee approval protocol**:** The study does not contain clinical studies or patient data.

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Antimicrobials and antiparasitics self-medication by university students during the COVID-19 pandemic: a scoping review

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During the Covid-19 pandemic, the spread of misinformation, coupled with fear and limited access to healthcare services, has driven the practice of self-medication. Self-medication is becoming increasingly common, considered a serious global public health issue, and is affecting university populations. The irrational use of medication compromises health, increases treatment costs, raises hospitalization rates and mortality levels. Given this context, the aim of this study was to assess self-medication linked to the use of antimicrobials and antiparasitic drugs among university students during the Covid-19 pandemic. To achieve this, a scoping review was conducted analyzing studies from databases including Scielo, PubMed, Embase, EBSCOhost, Web of Science, Scopus, Virtual Health Library, Google Scholar, and CAPES journals, using descriptors related to self-medication, university students, and the Covid-19 pandemic. The scoping review followed PRISMA-ScR and JBI Institute recommendations. Two authors independently evaluated titles, abstracts, and full texts according to eligibility criteria and performed data extraction. Any discrepancies were resolved through consensus. Data related to the self-medication use of antimicrobials and antiparasitic drugs by university students during the Covid-19 pandemic, as well as the reasons leading to self-medication, were extracted. Thirty-five studies were included in the review based on eligibility criteria. The analyzed studies involved university students from various professional fields from four different continents, including America (n=16; 45.7%), Asia (n=14; 40.0%), Africa (n=3; 8.57%), and Europe (n=2; 5.7%). The publication period of the studies ranged from March 2020 to April 2022. The self-medication use of antimicrobials by university students during the Covid-19 pandemic was reported in 21 studies (60.0%), with the main antimicrobials consumed being azithromycin (n=9; 42.8%) and amoxicillin (n=3; 14.2%). Additionally, the use of other antimicrobials was mentioned in the studies, including clarithromycin (n=1; 4.7%), erythromycin (n=1; 4.7%), penicillin (n=1; 4.7%), and doxycycline (n=1; 4.7%). In seven studies (20.0%), the consumption of antiparasitic drugs was described, including ivermectin (n=7; 100%) and the antimalarials chloroquine and hydroxychloroquine (n=3; 42.8%). The reasons associated with self-medication were indicated in 31 studies (88.6%), focusing on the use of antimicrobials, antiparasitic drugs, and other medications. Among these, eight studies explicitly mentioned Covid-19 prevention (25.8%), and three studies indicated symptom relief related to Covid-19 (9.6%). Eight studies (25.8%) described reasons why students did not seek medical attention, including difficulty accessing healthcare services, lack of time to visit a doctor, and considering it unnecessary. Another four studies (12.9%) addressed the practice of self-medication due to some knowledge of medications among students, primarily related to pharmacology knowledge. The data demonstrate the irrational use of medications during the Covid-19 pandemic by university students. Azithromycin and ivermectin were the main medications used through self-medication by university students during the Covid-19 pandemic. The identified reasons for self-medication deviate from technical criteria associated with rational medication use. These findings underscore the importance of raising awareness about the consequences of irrational medication use, as well as the need for guidance on rational medication use during self-medication practices, especially supported by evidence-based practices.

Keywords: Students; Self medication; COVID-19; Drug utilization; Evidence-based pharmaceutical practice.

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Qualifying the medication system in a long-term care facility for older adults: a hybrid effectiveness-implementation study

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The rapid aging process has changed the morbidity and mortality profile, leading to an increase in the prevalence of chronic non-communicable diseases, presence of functional limitations and an increase in the demand for long-term care facilities (LTCF). In these institutions, it is common for residents to use multiple medications, which increases the complexity of care and the risk of medication errors. Therefore, qualifying the medication systems in LTCF is of great importance. However, studies on the subject in Brazil are still scarce. Thus, the objective of this study was to describe the implementation of qualification of the medication system of a large philanthropic LTCF for the older people and evaluate its effectiveness. To this end, a type 2 hybrid effectiveness-implementation longitudinal study was carried out. Initially, a situational diagnosis and mapping of the LTCF's medication system was carried out through field work, in addition to the application of a questionnaire to the LTCF's professionals. Then, an individualized distribution system with unit dose was implemented and the medication system flow was adjusted to the local reality. The effectiveness of the qualification was assessed by comparing the following pre- and post-qualification factors: 1) time spent on the steps of the medication system; 2) strengths and flaws observed. The diagnosis demonstrated multiple failures in the medication system. However, the answers from LTCF's professionals recorded in the questionnaire did not reveal such a scenario, signaling a lack of knowledge about patient safety. Qualification allowed the following improvements in the medication system: 1) reduction in the number of prescription transcriptions; 2) reduction of medication shortages; 3) improvement of organization, dynamics and traceability in distribution, preparation and administration. A reduction of an average of 3 hours and 57 minutes in the time spent distributing, preparing and administering medications was also identified. Therefore, the qualification of the medication system was effective, increased the availability of professionals' time and improved the safety of medication practices in the LTCF.

Keywords**:** Homes for the aged; Medication systems; Medication errors

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Patients' experience with pharmacological treatment of rheumatoid arthritis: a qualitative synthesis of evidence

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Rheumatoid arthritis (RA) is an inflammatory, chronic, autoimmune disease, characterized by pain and stiffness in the joints. Without adequate treatment, this disease can progress to functional disability, worsening quality of life and premature death. Therefore, it is recommended that drug therapy begins right after confirmation of the diagnosis, as early pharmacological intervention can positively alter the prognosis of the disease. For the pharmacological management of RA, complex pharmacotherapy is used with high-cost medications, called disease-modifying anti-rheumatic drugs (DMARDs), in addition to symptomatic control. Therefore, understanding the patient's experience in relation to the use of these medications is fundamental during the provision of health care. In this context, the objective of the present study was to develop the synthesis of qualitative evidence on the patients' experience with the pharmacological treatment of RA. For this purpose, a qualitative synthesis of evidence was carried out in the electronic databases MEDLINE (PubMed), Latin American and Caribbean Literature in Health Sciences (LILACS) and PsycINFO®. The search was performed without time or language restrictions using a combination of the following descriptors and their synonyms: "Arthritis, Rheumatoid"; "Antirheumatic Agents"; "Biological Therapy"; "Patient Medication Knowledge"; "Patient Preference"; "Patient- Centered Care"; "Qualitative Research"; "Sentiment Analysis"; "Narrative Medicine"; "Personal Narratives as Topic"; "Medication Adherence"; "Medication Therapy Management"; "Treatment Adherence and Compliance"; "Patient Compliance". Additionally, a manual search was carried out in the list of references of the included articles. Two reviewers selected the studies independently, and discrepancies were sorted out by a third reviewer. The thematic analysis was applied to synthesize the results. The analytical themes addressed in the synthesis were developed through researchers' interpretations and new constructs. The study adhered to Enhancing Transparency in Reporting the Synthesis of Qualitative Research guidelines. Ten studies were included in the synthesis. In the studies included, patients with RA reported that having knowledge about the disease and the therapeutic options available to treat it was essential for them to start using DMARDs. Furthermore, they reported experiencing ambiguity in the pharmacological treatment RA. On the one hand, they expected to experience an improvement in their quality of life and the hope that the treatment would reduce the manifestations of physical symptoms of RA, which could bring "normality to their lives". On the other hand, they were very concerned about the adverse effects related to medications, as well as the treatment not being effective in controlling the seriousness of symptoms and, as a result, the disease leading to functional disability. These findings indicate that it is important to ensure that patients with RA have knowledge about RA pharmacotherapy and that all their expectations and concerns regarding treatment are adjusted. Being aware of the risks and benefits of the treatment will directly affect their behavior, leading them to adhere to pharmacotherapy or not. Furthermore, it is important for patients to become partners with healthcare professionals, as they can signal whether the therapeutic objectives expected by the treatment are being achieved, as well as whether possible adverse effects have manifested. Therefore, it is imperative that patients with RA engage in their self-care effectively, including getting involved in decisions related to pharmacotherapy.

Keywords: Qualitative research; Medication experience; Rheumatoid arthritis

Ethics committee approval protocol**:** The study does not contain clinical studies or patient data.

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Education in pharmacovigilance as a tool in consolidation of the knowledge of health professionals

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Pharmacovigilance (PV) works to detect, evaluate and prevent different adverse drug events. One of the mechanisms for identifying risks and updating the safety profile of medicines is notification. PV systems have the main limitation of underreporting, which compromises the correct identification of signals. Many cases of underreporting are related to the insecurity of reporting an adverse event due to the lack of knowledge on the part of health professionals. This work aimed to evaluate the impact of training in PV on the perception and skills of health professionals in a philanthropic hospital in Brazil. This study was approved by the Research Ethics Committee of the Federal University of Alfenas, Brazil (CEP), under protocol (CAAE 51321921.1.0000.5142). Immediately before and after the training, the participant answered a questionnaire, containing 12 essay questions that presented Gold Standard answers used to assess knowledge in PV. Each response was between 0 and 100%, accounting for the acquisition of knowledge after the educational intervention. 157 professionals participated in the training, of which 129 (82.2%) agreed to participate in the research, 97 (75.2%) nursing technicians, 2 (1.5%) nursing assistants and 30 (23.3%) nurses. The majority were female and aged 25 to 49. Before the training, all participants had some knowledge of PV and none had a satisfactory and complete understanding; 93% revealed unsatisfactory understanding and 7% average. After training, 30.2% had an unsatisfactory understanding; 56.6% median; 12.4% satisfactory and 0.8% total. The training was effective with an increase in the number of spontaneous notifications. However, continuing education is necessary, with the support of the university, so that these professionals are always able to report and be up to date in PV.

Keywords: Pharmacovigilance. Adverse reactions. Medication Monitoring. Education.

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Palliative care: profile of patients served at Santa Casa de Alfenas-MG

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In 2002, in a definition revised by the World Health Organization (WHO), palliative care was defined as an approach that seeks improvements in the quality of life of patients and their respective families in cases of potentially threatening illness, through prevention and relief of suffering on physical, psychosocial and spiritual levels. Patients under palliative care are often considered polymedicated, which may favor the occurrence of adverse drug events. Understanding individual and clinical characteristics of patients under this demand can contribute to ensuring that established pharmacotherapy is as appropriate and safe as possible, therefore, we sought to analyze the sociodemographic and clinical profile of hospitalized patients requiring palliative care at Santa Casa de Alfenas. This is a cross-sectional study. Patients were selected to participate in the research according to the following criteria: aged 18 years or older and hospitalized in the palliative care sector for 48 hours or more. Variables related to the patients' sociodemographic and clinical characteristics were collected. Data on prescribed pharmacotherapy were also collected. The information was obtained through checking medical records and interviews conducted directly with the patient, or with a companion. The study was approved by the UNIFAL-MG Research Ethics Committee under number 6,606,201. From January to April 2024, 24 patients were interviewed. Of these, the majority were men (n=13) and the predominant age group was 70-80 years old (n=9). Among the education levels, complete primary education predominated (n=14). Regarding marital status, 14 patients were married, seven were widowed, two were single and one was divorced. Most lived with other people (n=20). The main reason for hospitalization was neoplasia (n=23), predominantly malignant neoplasm of the colon (n=5), followed by malignant neoplasm of the bronchi and lungs (n=4). Nine patients reported drinking alcohol and 13 reported using tobacco According to the hospital's prescription profile, the most frequently used medications fell into the following classes: J01 (antimicrobials for systemic use, representing n=6) (cefepime, piperacillin, clarithromycin, tazobactam, ceftriaxone and amikacin); N02 (analgesics, whose n=5) (morphine, pregabalin, paracetamol, metamizole sodium, tramadol); N05 (psycholeptics, with n=4) (haloperidol, diazepam, midazolam, quetiapine); and A03 (drugs for functional gastrointestinal disorders, n=4) (scopolamine, metoclopramide, bromopride, simethicone). Analgesics were present in the prescriptions of 21 hospitalized patients to control pain, a symptom with the highest rate of reporting upon admission. Weakness, prostration and vomiting were also frequently reported by almost all of those assisted. It is possible to verify that the hospitalization of patients requiring palliative care at Santa Casa de Alfenas was mainly due to complications associated with diagnosed neoplasms, with those in the older age group being those who required the most care. It is hoped that the study will allow us to understand the characteristics of patients in palliative care and the pharmacotherapy used in this segment, so that the patient has safety and quality of life at this delicate time.

Keywords**:** Palliative care; Polypharmacy; Pharmacotherapy

Ethics committee approval protocol**:** 6,606,201.

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Problems related to medications in chronic patients consulting in a family health unit

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Drug-related problems (DRP) are events that can affect the health of people who consume drugs for therapeutic, diagnostic or prophylactic purposes. They can cause therapeutic failure or even trigger new medical problems. The goal was to quantify medication-related problems, according to Strand et al. The study was a descriptive observational, cross-sectional study carried out in chronic adult patients who attended a Family Health Unit in the city of Luque, during May to June 2021. Non-probabilistic sampling for convenience. The information was obtained through home visits, using a structured questionnaire that included sociodemographic data, use of medications, and questions from the modified Morisky-Green test. 50 people participated, 80% were women, the average age was 63.04±11.39 years. All had high blood pressure, and 38% also had type 2 diabetes. 59 problems related to medications were found in 43 patients, with an average of 1.37±0.54 problems per patient. Of the total DRPs quantified, it was detected that 40 patients did not comply with the prescribed treatment, 10 were at risk of a possible drug interaction and 9 used a medication that they did not need. The problems related to medications were mostly due to therapeutic non-compliance, so educational strategies will be aimed at improving and reinforcing treatment knowledge, in order to achieve better use of medications, achieving patient adherence.

Keywords**:** Hypertension; Mellitus diabetes; rational use of medications

Ethics committee approval protocol: CEI 716/2021

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Characterization of medicines with suspected adverse reactions used in inpatients in a public hospital in Paraguay

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Pharmacovigilance is dedicated to identifying unknown adverse drug reactions and has its origin in the problems caused by the use of thalidomide. These toxic consequences generate concern among patients, prescribing physicians, dispensers and regulatory authorities, since adverse reactions are an important cause not only of medical consultation but also of hospital admission, and, in more critical situations, even the death of the patient. The World Health Organization has promoted the development of an international drug surveillance program, which is coordinated by the Uppsala Surveillance Center and which includes more than 127 countries. It is essential to have mechanisms to evaluate and control the level of safety offered by the clinical use of medicines, which in practice means having a well-organized pharmacovigilance system in place. The objective was to quantify the medications administered to hospitalized patients, using a descriptive, observational, cross-sectional method, non-probabilistic sampling, for convenience, with the implementation of the adverse reaction notification form prepared by the hospital's pharmacovigilance committee for hospitalized patients. During the months of June to November 2021, the information was then corroborated through the clinical record of each patient. 321 patients admitted to various hospital services participated. The prescribed medications totaled 2063, corresponding to 129 types of active ingredients. Considering the international Anatomical Therapeutic Chemical classification, it was observed that they correspond to 13 anatomical groups (First level). Of the 129 types of active ingredients, the most frequent were those corresponding to group A (18,6%), followed by Group J (11,6%) and Group N (10,9%). The active ingredients with suspected adverse drug reactions were 48 types, of which the most frequent were Vancomycin 1g (11,8%) and Omeprazole 20mg (7,6%), corresponding to group A, followed by Ketorolac 30mg (8,2%) belonging to Group S. The participation of all health professionals is important to improve Pharmacovigilance systems and thus prevent risks and minimize costs caused by unwanted effects, collaborating with the pharmacotherapy of patients.

Keywords: Pharmacovigilance; Adverse reactions to medications; Notification sheet

Ethics committee approval protocol**:** FCQ Research Ethics Committee with code 7010/2021.

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Application of a self-assessment questionnaire on the management of medication information as a key factor for patient safety in two public health care centers in Paraguay

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Patient safety culture represents the individual and collective behavioral patterns that determine commitment, as well as style and competence with management in healthcare. In this sense, unmet or incomplete medication information needs can contribute to medication misuse and patient harm. The purpose of this study was to evaluate the system of use of medicines related to information, in two Public Health Care Centers in Paraguay, from the pharmacy services, through the application of the Self-assessment Questionnaire of the safety of the system of use of medicines in hospitals Spanish version II (2018), adaptation of the ISMP-Medication Safety Self-Assessment® for Hospitals, by the ISMP-Spain. Section II corresponds to the key element "Medication Information", which describes the need for access to updated information and the importance of having a Pharmacotherapeutic Guide or list of essential medications in healthcare establishments. The application of the questionnaire was carried out in 2022, after authorization and training of the participants. Of the 25 criteria that evaluate the degree of implementation of this section, 56% marked option B (This item has been debated for its possible implementation, but has not been implemented), followed by 22% of option D (This item has been completely implemented in some areas, patients, medications or professionals of the institution), with 16% option C (This item has been partially implemented in some or all areas, patients, medications or professionals of the institution.). Although the number of participating Healthcare Centers was limited for the evaluation of the criteria and variable results, the use of standardized questionnaires as a proactive tool towards a culture of Positive safety is effective in improving patient safety through the implementation of improvement actions.

Keywords: Medication information, Patient safety, Rational use of medications

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Utilization of the structured objective clinical examination in a vaccination course within the pharmacy undergraduate program: an experience report

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The Structured Objective Clinical Examination (SOCE) is a standardized assessment technique that simulates real clinical situations, promoting a safe and controlled learning environment. Through the implementation of SOCE, it is possible to systematically evaluate students' clinical competencies, contributing to the training of professionals who are qualified and prepared to practice pharmacy in patient care. The aim of this study is to describe the experience of the instructor in using the SOCE technique in a course on vaccination services within the pharmacy undergraduate program. The SOCE assessment was organized into the following stages: hand hygiene, gowning, preparation of the vaccine dose to be administered, subcutaneous (SC) and intramuscular (IM) administration, disposal of the syringe and needle assembly, gowning, and hand hygiene. Subsequently, a descriptive study, in the form of an experience report, was conducted based on the individual records of the instructor responsible for the course. Seventeen students completed the course, and after analyzing the instructor's records, it was found that the average performance was 81.0%, with the three most common errors being: I) 71.0% of students performed the skin pinch for SC administration in an inappropriate location, which is a serious error that could lead to complications related to changes in drug bioavailability in the body, resulting in therapeutic failure; II) 53.0% of students did not wash their hands at the end of the vaccination process, which represents a moderate severity error that should not be overlooked as it could result in the transmission of pathogenic microorganisms, leading to infections; and III) 53.0% of students did not lubricate the syringe plunger before aspirating the vaccine, which is a less severe error, but its omission hinders the aspiration process of the vaccine volume to be administered. Thus, it is concluded that the use of SOCE has provided insights into stimulating the development and assessing the clinical competencies of pharmacy students who completed the vaccination services course

Keywords: Pedagogical experience; Problem-based learning; Vaccination.

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Development and content validation of an instrument for active search of suspected adverse drug reaction

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Pharmacovigilance is a science and set of activities related to the early detection and prevention of events associated with the use of medicines, such as Adverse Drug Reactions (ADRs). Active surveillance methods, such as those using triggers, have been increasingly used to detect ADRs. Although the use of triggers is recommended, tools for actively searching for suspected ADRs are scarce in the literature. In this context, the aim of this study was to develop a tool for identifying and characterizing suspected ADRs that occurred during the hospitalization of patients at the Cassiano Antônio de Moraes University Hospital (Hucam). To this end, a methodological development study was carried out, divided into two stages: i) a literature review to support the list of triggers and serve as the basis for the first version of the instrument; ii) content validation of the instrument using the Delphi technique. Hucam professionals involved in Pharmacovigilance and Patient Safety participated in this stage. The instrument's sessions were considered valid when they had a Content Validity Index (CVI) ≥ 0.80. The instrument was developed on the Google Forms platform and was divided into three sessions: review of the medical record, patient and hospitalization data and characterization of the suspected ADR. The final version contains 28 questions, 16 of which are objective and 12 subjective. The material was evaluated by seven experts in two Delphi rounds and the total CVI reached 1. Thus, this instrument was considered valid in terms of its objective, structure, presentation, relevance, appearance and content, making it an ally of the spontaneous notification method. It can be used by professionals from different health backgrounds and is easily adaptable to the reality of other institutions. It is hoped that it will be possible to encourage early detection and prevention of the occurrence of these events, as well as subsidizing future training and interventions with the healthcare team, thus contributing to the construction of safe patient care.

Keywords: Pharmacovigilance; Drug-related side effects and adverse reactions; Patient safety.

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Use of medicinal plants by elderly during the COVID-19 pandemic

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Medicines and therapeutic products, including Integrative and Complementary Health Practices (PICS), are essential for preventing, treating and recovering health conditions, and are crucial in the care of the elderly. Among the PICS currently available, medicinal plants and herbal medicines stand out as the most popular among the population. Plants contain a wide range of chemical substances, both organic and inorganic, that have different potential for human use. They are often used as a therapeutic complement to conventional treatments, either due to ancient cultural traditions or a recommendation passed down through several generations. Currently, there is a significant increase in the prescription and guidance of health professionals, as well as in the consumption of medicinal plants. This trend is driven by government policy stimuli and social media influences. Therefore, this study aims to identify the prevalence and profile of use of medicinal plants and herbal medicines by the elderly population of Alegre, Espírito Santo, as well as the factors associated with their use. An epidemiological study with a cross-sectional design was conducted, through a household survey, in the municipality of Alegre, from November to December 2021. The study population was composed of individuals residing in the municipality of Alegre, including headquarters and districts, aged 60 or over, and who agreed to participate in the research by signing the Free and Informed Consent Form (TCLE). The use of medicinal plants was investigated in the last 15 days of the interview, with this variable obtained from the following question: "Did you drink any tea or use medicinal plants in the last 15 days?". The name, portion used and indication for use of each medicinal plant were identified. The identification of the medicinal plants used and their respective indications for use was based on the interviewee's self-report, without interference from the researchers. Descriptive data analysis was performed using frequency distribution for categorical variables and median and interquartile range for continuous variables. The factors associated with the use of medicinal plants were analyzed using Poisson regression with robust variance, which estimated the prevalence ratio for the use of medicinal plants. 299 elderly people were interviewed, with a median age of 69 years (Interquartile Range = 65,0 – 76,0). The majority of respondents were female (56,5%), white (56,1%), married (40,7%), catholic (57,5%) and with incomplete primary education (57,5%). Furthermore, 41,8% of these considered their health status to be good or very good, 81,1% had medical consultations in the last year, 67,2% did not practice physical activity, 10,6% smoked and 12,0% they used alcoholic beverages. Around 74,0% did not have private health insurance, 29,3% were taking five or more medications, 61,4% were self-medicating and 56,5% reported having two or more diseases. Among the elderly interviewed, 128 (42,8%) reported using medicinal plants. In total, 50 different plants were mentioned by the elderly, among the most used were: boldo (32,8%), lemon balm (28,9%), mint (21,1%), fennel (14,8 %), chamomile (14,1%), macaé (13,3%), rosemary (10,9%) and plantain (7,8%). The most reported indication for use by elderly people for boldo and macaé was to treat stomach problems. Rosemary, lemon balm, mint, fennel and chamomile were used as tranquilizers to help with symptoms suggestive of anxiety, while plantain was used to treat infections. The factors associated with the use of medicinal plants were: gender (female), race (black) and having gastroesophageal reflux disease. The results of this study make it possible to develop strategies to guide and improve the use of medicinal plants by the local community, aiming to promote a better quality of life and preserve the rich cultural tradition related to the use of medicinal plants.

Keywords: Medicinal plants, Elderly, Epidemiology

Ethics committee approval protocol**:** The study was approved by the Research Ethics Committee of the Federal University of Espírito Santo, Alegre campus, under opinion 4.732.878.

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Factors associated with non-adherence to pharmacotherapy in residents of the south region of Espírito Santo

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Prescribing medications plays a fundamental role in treating and preventing health problems. Failure to use these medications can lead to worsening illnesses. In this sense, adherence represents agreement between patient and healthcare professional regarding treatment guidelines. It concerns the extent to which the patient using drug therapy participates in and understands the indicated pharmacological option. However, lack of adherence to medication treatment can be influenced by several factors, such as the patient's social and economic conditions, the support offered by health services and professionals, the characteristics of the treatment and the disease and aspects linked to perception of the impact of the disease. Thus, identifying the elements that affect adherence enables interventions and improvement of combined strategies. Therefore, this study aimed to identify the prevalence and factors associated with non-adherence to pharmacotherapy in residents of the city of Alegre, Espírito Santo, during the Covid-19 pandemic. An epidemiological study with a cross-sectional design was carried out, through a household survey, between the months of November and December 2021. The study population was composed of individuals residing in urban areas of the city's headquarters and districts, aged equal to or greater than 18 years old and who agreed to participate in the research by signing the Free and Informed Consent Form (TCLE). The prevalence of adherence was assessed using the question: "Have you stopped taking your medications, for any reason, in the last 15 days?". Descriptive data analysis was performed using frequency distribution for categorical variables and mean and standard deviation (SD) for continuous variables. Factors associated with non-adherence to pharmacotherapy were analyzed using bivariate and multivariate logistic regression. 635 individuals were interviewed in the city of Alegre, of which 25,8% reported having problems adhering to treatment. The average age of those interviewed was 54 years old (SD = 18,7), with the majority being female (73,2%), self-declared white (48,2%), residing in the municipality (69,6%), married (43,7%) and catholic (50,9%). Furthermore, 47,7% had completed high school and 44,8% received up to the minimum wage. Of the total number of respondents, 50,4% considered their health status to be very good or good and had an average quality of life of 0,858 (SD = 0,175). Additionally, 80,3% had medical consultations in the last year, 23,3% had a private health plan, 53,9% used the municipality's basic pharmacy and 89,1% used a private pharmacy in the last year. Approximately 36,0% practiced physical activities regularly, 24,3% used alcoholic beverages, 13,1% smoked, 90,1% reported using medication on their own, 21,7% were on polypharmacy (use of 5 or more medications) and 40,6% reported using medicinal plants. The main comorbidities mentioned by interviewees were anxiety, high blood pressure and depression. The factors associated with lack of adherence to pharmacotherapy were: white or mixed race or color, living in the municipality, being single or having a marital status other than married, lower income, worse quality of life, having used private pharmacies in the last year, practice self-medication, have depression, gastroesophageal reflux disease and heart disease. The high prevalence of non-adherence to pharmacotherapy in the Brazilian population is a reality. Given this scenario, it is necessary to implement health interventions that address the care of individuals in a comprehensive manner, promote health in a comprehensive manner, encouraging the appropriate use of medications and ensuring adherence to pharmacotherapy.

Keywords: Adherence to treatment; Associated factors; Epidemiological study

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Impact of prolonged use of phenobarbital on the biomechanics of rats femurs

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Clinical and experimental observations highlight the negative influence of anticonvulsants on bone tissue, as well as on its repair process. Both adults and children undergoing prolonged treatment with anticonvulsants have a reduction in bone mineral density and trabecular volume, leading to conditions such as osteoporosis, osteopenia and osteomalacia. These drugs increase the risk of fractures and make bone healing after injuries difficult. Studies indicate that anticonvulsants disturb the balance of calcium in the body, making it essential to monitor bone health in patients on prolonged therapy with these drugs. The present study aimed to investigate the effects on the biomechanics of femurs of rats subjected to prolonged use of phenobarbital. Twelve rats were divided into two groups (n=06): control (CT) and phenobarbital (FE). The FE group received daily doses of phenobarbital 0.035 ml/kg intramuscularly for 60 days. The CT group received the same dose and route of administration of 0.9% saline solution. After 60 days, the animals were euthanized by anesthetic overdose and the right femurs were dissected and subjected to a mechanical test in a three-point flexion module. Throughout the experiment, all animals gained weight and consumed a solid and liquid diet within the ideal standards for rodents, and the biomechanical findings were directly related to the effects of the use of the drug and not influenced by malnutrition or dehydration of the animals. The biomechanical assay showed that the maximum force required for the complete rupture of the femurs of the animals of the FE group (84,015,10) was less than the force required to rupture the bones of the CT group (119,02,07). Biomechanical analysis also showed a lower external stiffness of the femurs of the FE group (62.00÷3,10) when compared to TC (86,205,10), suggesting that the bones are more susceptible to fractures. In the present experimental model, the prolonged use of phenobarbital negatively interferes with the material properties of the femurs, making them less rigid and withstanding less force for a bone fracture to occur.

Keywords:Femurs; Phenobarbital; Biomechanics

Ethics committee approval protocol**:** :approved by the Research Ethics Committee of José do Rosário University Vellano (UNIFENAS) Protocol No. 22A/09.

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SUMÁRIO

RESUMOS DO I INTERNATIONAL WORKSHOP ON PHARMACEUTICAL RESEARCH OF UNIFAL-MG E 48ª SEMANA FARMACÊUTICA DA UNIFAL-MG

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Analogues and Derivatives of Cannabidiol: Pharmacological Insights and Recent Efforts in the Search for Novel Drug Candidates for Inflammation and Pain – a Brief Review Over the Past 3 Decades

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Cannabidiol is a metabolite present in *Cannabis* with several pharmacological properties, including neuroprotection, anti-convulsive, antimicrobial, antinociceptive, and anti-inflammatory. Although these activities are promising for drug development and clinical uses, the neuroprotective action is the most investigated, while the anti-inflammatory and antinociceptive mechanisms are not fully known. Therefore, this brief review aims to report the knowledge advances over the last 3 decades regarding the anti-inflammatory and anti-nociceptive/analgesic properties of cannabidiol and its derivatives or analogues designed as novel drug candidates. Recent studies of the mechanisms of action underlying the anti-inflammatory effects of cannabidiol have revealed its interaction with different inflammatory mediators, including cannabinoid receptor 1 and cyclooxygenase 2, among others. On the other hand, there is a lack of information related to the analgesic activity of Cannabidiol, with some reports pointing out the involvement only of transient receptor potential vanilloid receptors. In addition, several cannabidiol derivatives and structural analogues with anti-inflammatory and antinociceptive activities have been described, but their mechanisms of action have not yet been fully elucidated. Therefore, greater efforts are still needed to unravel the mechanisms involved in such activities of great interest in drug discovery.

Keywords: Cannabidiol; Anti-inflammatory activity; Analgesic activity; Cannabinoids

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Evaluation of the activity and mechanism of action of triazole derivatives in Leishmania amazonenses

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Leishmaniases are parasitic diseases caused by flagellated protozoa belonging to the genus Leishmania. Despite research efforts, there is still no effective vaccine against Leishmania infection, and the treatment is limited by the high toxicity, cost of drugs, and hospitalization associated with the existing medications for treatment. Therefore, this study focuses on a new series of triazole derivatives, aiming to significantly improve leishmanicidal activity and reduce the toxicity of the main molecule (GSR303) under analysis. This study analyzes the activity of triazole-derived compounds in L. (L.) amazonensis, determining the mechanism of action in an in vitro context. The compounds tested in this project are triazole derivatives, and SWISS mice are used to obtain peritoneal macrophages for cytotoxicity assays and evaluation of leishmanicidal activity in amastigote forms. For the evaluation of leishmanicidal activity in vitro (promastigote and amastigote), colorimetric methods were used, in addition to counting the number of amastigotes on slides. To study potential mechanisms of action, mitochondrial bioenergetics will be assessed by evaluating the mitochondrial membrane potential (ΔΨ) and ATP production, as well as hydrogen peroxide production. The new series of triazole derivatives aims to enhance leishmanicidal activity and reduce the toxicity of the main molecule. Consequently, the development of this research project may highlight new compounds as potential drugs against Leishmania, in addition to investigating their mechanism of action using biochemical tools.

Keywords: Leishmaniasis; Parasitic Disease; Biological treatment.

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Galactosides as an anti-fungal biofilm agent

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Fungi are one of the main causes of disease in humans. Biofilm formation provides a suitable growth environment for many microorganisms, as it is a strong and dynamic structure that confers a wide range of advantages to its members such as low energy demand, including oxygen. That said, metronidazole is a prodrug that is activated by the reduction of the nitro group in low [O_2] environments, within the target microorganism it can generate toxic radical intermediates. And to help metronidazole enter the biofilm, carbohydrates play a crucial role, in addition to complementing the pharmacokinetics and dynamics of the structured compound. We obtained a new structural pattern containing a galactose unit connected to a metronidazole unit, and for comparative purposes, glycotriazoles were also synthesized using a galactose unit and an alcohol unit, all obtained by non-classical glycosylation, as new anti-biofilm compounds. fungal. For the synthesis of the 4 glycosides obtained, the azido carbohydrate was synthesized using NaN3, and in parallel the terminal alkyne intermediate was obtained through a reaction with NaH and propargyl bromide solubilized in DMF and finally for the coupling of these two series of substances, the click chemistry reaction was used, which includes $CuSO_4$, sodium ascorbate in THF for 30 minutes and thus the final compounds were acquired. And for glycotriazoles, galactose azido coupled with propargyl alcohol was synthesized using the click methodology as well. For the compounds, good parameters of in vitro activity against fungal biofilm and also for activity against planktonic cells of the fungus were obtained, in addition, a satisfactory margin of cytotoxicity. Four compounds were synthesized and characterized and tested against fungal biofilms and isolated cells of *Candida albicans, C. krusi, C. glabrata,* in addition to the cytotoxicity test

KEYWORDS: Glyco-compounds; Fungal biofilm; Carbohydrates;

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Hybrid metronidazole-5-nitro-dihydroeugenol as an anti-T. cruzi compound: in vivo parasitism reduction, cardiac risk mitigation, and enhancement of efficacy with benznidazole

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For more than 40 years the only drugs approved for anti-*Trypanosoma cruzi* treatment were benznidazole (Bz) and nifurtimox, and both have efficacy directly related to the time of infection, which means that their uses have low chances of cure at a more advanced stage of the disease (chronic phase) or against resistant strains. Current treatments for patients with Chagas Disease (CD) are challenging because they cause low tolerance due to their high toxicities, which often results in discontinuation of therapy. This highlights the urgency of developing new therapeutic options with less toxicity and greater efficacy, covering both the chronic phase and the resistant strains. Among the different ways of approaching the problem is the planning and development of new bioactive compounds, being one of the strategies of medicinal chemistry that has been increasingly explored is molecular hybridization, which basically consists of two bioactive pharmacophoric units, whether it is part or the totality of a compound or drug, in a single compound called a hybrid. Through this strategy we seek to increase the affinity and effectiveness of the compounds, when compared to the use of both non-hybridized. In this work, we selected a derivative of a series of sixteen hybrids previously reported in a work of synthesis and evaluation of their trypanocidal properties against the evolutionary forms epimastigote and trypomastigote. The best result obtained in this study was from the AD08 derivative, a hybrid that contains metronidazole coupled to the 5-nitro-dihydroeugenol nucleus. These units were chosen because metronidazole is a reference drug for other parasitic diseases caused by protozoa and eugenol and analogues have antiparasitic action. Although they are promising compounds, their isolated use does not surpass the reference drug: benznidazole. However, molecular hybridization can generate less toxic compounds, with improved selectivity and with relevant antiparasitic activity. An *in vivo* model study was then carried out of AD08 compared to Bz as a reference drug and also combined therapy at different concentrations (AD08 + Bz), using positive (infected and untreated) and negative (uninfected) control groups. Parasitological, immunological, histopathological and behavioral changes were evaluated. Through those results, we can highlight the AD08 compound against *T. cruzi*, since reduced mortality, toxic effects, myocarditis and pro-inflammatory cytokines.This hybrid, despite not inducing therapeutic cure, allowed the survival of all animals that received its administration, prevented inflammatory infiltrates and damage to the heart, induced reducedproduction of pro-inflammatory cytokines and potentiated the trypanocidal effect of Bz. These results indicate that the AD08 hybrid is a relevant potential candidate for new effective and safe chemotherapy regimens for the treatment of *T. cruzi* infections, as well as a prototype for new studies in medicinal chemistry.

Keywords: Benznidazole; Combined therapy; Eugenol analogues; Molecular hybridization.

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In vitro studies of licarin A derivatives as trywanocidal agents

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Chagas disease, caused by the protozoan *Trypanosoma cruzi*, is considered a neglected infection endemic in Latin America, causing a major health and economic problem. The only medications available on the market, benznidazole and nifurtimox, have a series of side effects that hinder their use, in addition to being used for long periods. Natural products are an excellent source of bioactive substances, either due to the great diversity of structural patterns they have, or due to the different mechanisms of action in which they can act. Licarin A is a neolignan with a dihydrobenzofuran structure found in numerous medicinal and edible species (e.g., nutmeg). This neolignan may be obtained semi-synthetically by the oxidative dimerisation of the phenylpropanoid isoeugenol. Several biological activities of this substance have been reported in the literature, including as a trypanocidal agent. Therefore, licarin A is a promising candidate for structural modification studies in order to obtain new anti-*T.cruzi* drug candidates. Therefore, the objective of the work was to synthesize a group of licarin A derivatives and evaluate the in vitro trypanocidal activity of these substances. Lycarin A was obtained through a biosynthetic method, using coconut water (*Cocos nucifera* L.), hydrogen peroxide and isoeugenol. The modifications carried out in the phenolic hydroxyl occurred through classic etherification reactions, leading to a 4-chloro-benzylated derivative which, in turn, had its propenyl chain altered by an oxidation reaction with 2,3-dichloro-5,6-dicyano-*p*-benzoquinone with formation of a derivative containing an aldehyde group. The aldehyde derivative underwent classic oxidation reactions, with the formation of a carboxylated derivative, and reduction, with the formation of a hydroxylated derivative. The proposed derivatives were obtained in sufficient yields to carry out the experiments and had their structures confirmed by conventional spectrometric techniques. The substances were evaluated for their trypanocidal potential against epimastigote forms, with this form of the parasite being used as screening for other studies. Only the precursor, licarin A, and the carboxylate derivative obtained good IC50 results in this first test, 11 and 46µg.mL^{-1} respectively. In the studies on the trypomastigote forms, licarin A still obtained greater activity even at lower concentrations, where it obtained 100% mortality at 5µg.mL^{-1} compared to 40% mortality for the carboxylated derivative at the same concentration. However, when evaluating cytotoxicity, licarin A generates a greater cytotoxic effect than the carboxylate derivative. Results showed that, even though the prototype was more active than the carboxylate derivative, it can still be modified to improve its trypanocidal potential since its cytotoxic effect on healthy cells is considerably lower.

Keywords: Licarin A; neolignan; Chagas disease; *Trypanosoma cruzi*.

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Molecular docking of hybrids between eugenol derivatives and azoles against T. cruzi target enzymes

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Chagas disease, caused by the protozoan *Trypanosoma cruzi*, is widely distributed in Latin America, with high morbimortality. Its therapy is carried out by drugs with limited activity, prolonged therapeutic regimens and low adherence due to serious adverse effects. Among the main targets evaluated for its treatment are the enzyme TcCYP51, responsible for the biosynthesis of ergosterol essential for the replication of intracellular amastigote form, and the enzyme cruzain, involved with several mechanisms in the life cycle of *T. cruzi*. A series of eighteen new hybrids, designed as potential inhibitors of ergosterol biosynthesis from the union of pharmacophoric subunits of azoles and phenylpropanoids, were inactive against amastigote forms up to 50 µmol.L^{-1}. Interestingly, one of them was potentially active against trypomastigote forms, with an EC50 of 20 µmol.L^{-1}. We hypothesize that hybrids may act through another mechanism, such as by inhibiting the enzyme cruzain. We aimed to validate this hypothesis through *in silico* molecular docking studies involving hybrids and the main target enzymes of the parasite, which may contribute to the identification of a new target for eugenol derivatives against *T. cruzi*. Molecular docking calculations were performed using the GOLD 5.1 software, defining the binding site by a 6 Å sphere around the position of the cocrystallized inhibitor to the PDB 2WX2 (TcCYP51) and 3KKU (Cruzain) enzymes. The results indicate the possibility of interaction of benzylated hybrids with residues commonly related to the inhibition of TcCYP51, however *in vitro* results confront these findings. Despite this, the same benzylated hybrids found potential interaction with relevant residues involved in the inhibition of the cruzain enzyme, corroborating the activity against trypomastigote forms. Thus, it should be noted that the planning of hybrids between eugenol derivatives and azoles was a successful strategy with hybrid identification 25 times more active than its precursor. Furthermore, the possibility of action through a new mechanism, involved with the cruzain enzyme, brings the relevant importance of this development.

Keywords: Chagas disease; Hybridization; CYP51 enzyme; Cruzain enzyme.

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Search of synthesis conditions of aurones from eugenol and dihydroeugenol, hybrids potentially active as antifungals and trypanocides

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Aurones are natural compounds that exhibit a variety of biological properties, including antifungal, antiparasitic, and antibacterial activities. Recently, there has been growing interest in these compounds due to their diverse bioactivities and notable pharmaceutical relevance. Eugenol is a natural product with recognized antimicrobial activities against a wide range of microorganisms, including both Gram-positive and Gram-negative bacteria, as well as various fungi. This study explores the concept of molecular hybridization to create compounds with enhanced biological activity from distinct structural patterns. The focus of the research is the synthesis of novel aurones containing structural residues from the phenylpropanoids eugenol and dihydroeugenol, aiming to explore the antifungal and trypanocidal potential of these hybrid compounds. In this context, the objective is also to identify the optimal reaction conditions for the synthesis of these aurones. The synthesis process involves transforming phenylpropanoids into carboxylated intermediates through *O*-alkylation with chloroacetic acid, followed by intramolecular acylation to form the respective benzofuranone. This intermediate, when condensed with various aldehydes, can lead to the desired aurones. Alternatively, the benzofuranone intermediate could be obtained through the cyclization of alpha-haloketonic intermediates of phenylpropanoids. The authors highlight the challenges encountered and addressed during the synthesis stages. The main challenge was the cyclization of the benzofuranone, for which more than eight different methodologies were tested using the *O*-acetylated intermediate with chloroacetic acid, but without success. However, for dihydroeugenol, this challenge was overcome by using an alternative synthetic route that employed bromination to create a good leaving group. This alternative route provided an effective solution and brought relief to the researchers. Currently, the work is in the cyclization phase for eugenol and the condensation phase with aldehydes for dihydroeugenol. The project has successfully progressed through the initial stages, and in this presentation, the limitations and alternatives encountered in the execution of the synthetic plan will be cited and discussed, offering a comprehensive overview of the methods and challenges faced during the research.

Keywords: Antimicrobial agents; Organic synthesis; Molecular hybridization; Biological activity; Phenylpropanoids.

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Synthesis and antifungal evaluation of O-sulfonylated derivatives obtained from eugenol and dihydroeugenol Mannich bases

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The growing of multiple drug-resistant fungal infections is a worrying situation in recent years that affects many people, mainly immunocompromised ones. In this context, the main pathogenic fungi includes *Candida* spp. and *Cryptococcus* spp. Some naturals products like eugenol and its analogues showed promising results as antifungals, situation that occurred with Mannich bases derivatives from those products as well. In this context, this research focuses on the synthesis of new potential antifungal drugs in form of sulfonate esters derivates from previously synthetized eugenol and dihydroeugenol Mannich bases with morpholine. Our rational was that sulfonate esters could enhance antifungal activity, based on works described elsewhere. The products synthetized by reaction with tosyl chloride presented the best results, with MIC100 values in the range 192-771 µmol/L against *Candida krusei* and *Cryptococcus neoformans*. Comparing to the MIC values for eugenol and dihydroeugenol, which oscillated from 962 µmol/L to 1948 µmol/L, it could be noted an improvement of 5 to 10 times in antifungal activity for the newly synthetized tosylated products. Considering the results obtained, it is possible to see an interesting potential on the antifungal activity of eugenol and dihydroeugenol, improved via sulfonylation of their Mannich bases derivates.

Keywords: tosyl derivatives; antifungal activity; Mannich bases; drug resistance; natural products; sulfonylation

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Synthesis and biological evaluation of derivatives O-acylated of Mannich bases from dihydroeugenol and eugenol as potentially antifungal agents

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The search for new antifungal drugs has become a subject of interest today. The low number of available medications and the rising number of resistant strains to first-line treatments highlight the need for new studies in this area. Natural compounds such as eugenol, a phenylpropanoid found in essential oils of clove, sassafras, and cinnamon, and its derivative dihydroeugenol, suggest promising bioactivities. Synthetic strategies aiming to discover new drug candidate compounds keep emerging. Between these, the preparation of Mannich bases, condensation products formed from aldehydes, amines, and at least one reactive hydrogen, stand out. These compounds demonstrate significant effects regarding antimicrobial and antifungal activities. Thus, we aim in this work, the synthesis and the evaluation of new Mannich bases from dihydroeugenol/eugenol and piperazine, likewise a set of yours aromatic esters as potential antifungal agents. Therefore, dihydroeugenol/eugenol was subjected to Mannich reaction with phenylpiperazine in ethanol under acid catalysis and reflux. The Mannich bases obtained were purified by recrystallization with ethanol/water. Then, they were esterified with different aromatic carboxylic acids using EDAC e DMAP, the esters were purified with preparative chromatography on silica gel plates. Among the obtained products, six went through *in vitro* evaluation against species of *Candida spp.* And *Cryptococcus spp.* The MIC90 of the compounds was determined in the evaluation, using fluconazole and amphotericin B as a drug control group, as well as eugenol and dihydroeugenol for comparison. The values of MIC90 ranged from 159.79 to 723.10 µmol/L. The most promising results of derivatives of eugenol were achieved against *Candida krusei* (180,77 µmol/L), *Candida glabrata* (160,43 µmol/L) e *Cryptococcus neoformans* (160,43 µmol/L). On the other hand, the most promising derivatives of dihydroeugenol acted Against *Candida krusei* (159,79 µmol/L) e *Candida glabrata* (174,45 µmol/L). The highlighted substances were proven to be more active than the precursor phenylpropanoids and your action against relevant pathological species highlight these substances as interesting candidates for future optimizations.

Keywords: Mannich reaction; phenylpropanoid; antimicrobials; natural products.

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Synthesis and biological evaluation of potentially bioactive benzofuranic compounds: contribution to the discovery of new compounds to combat malaria, leishmaniasis and trypanosomiasis

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The parasitic diseases are a group of illnesses that have afflicted humans and other animals since ancient times, creating serious problems for health systems, especially in developing countries, Where there is a shortage of financial resources, resulting in less medical and drug assistance. The emergence of drug-resistant strains of parasites means that researchers in the field of pharmacy have to look for practical, more effective and safer solutions. It is from this perspective that this project arises, whose main hypothesis is that compounds obtained by molecular hybridization involving aurones and phenylpropanoids may be active against protozoan species involved in the etiology of the infectious diseases malaria, leishmaniasis and trypanosomiasis. Aurones are natural products of the 2benzylidenobenzofuran-3(2H)-one type that are frequently found in plant species and which have a wide range of biological activities, including antimicrobial and antiparasitic activities. Phenylpropanoids, such as eugenol, are a family of secondary metabolites made up of a phenolic ring linked to a three-carbon alkyl chain, and there may be substituents linked to the phenolic ring. Several biological activities have been reported for eugenol, including antibacterial, antifungal, antimalarial, antiviral, anti-inflammatory, analgesic, antioxidant, anticancer and antidiabetic. For this reason, the synthetic aurones of interest will necessarily have residues of eugenol and/or dihydroeugenol in their constitution, in order to verify the effect of incorporating residues of these phenylpropanoids into aurones. The aurone series will be planned using software to predict physicochemical and biopharmaceutical properties in order to rationally direct the choice of substituent groups. The synthesis of these products will a priori follow traditional methods for obtaining aurones. The products obtained will be characterized by recording the retention factor by TLC, determining the melting temperature by the capillary method, analysis by IR spectroscopy, analysis by 1H and 13C NMR and analysis by mass spectrometry. The compounds will then be evaluated in vitro to determine their antiplasmodic, leishmanicidal and trypanosomic potential, as well as their toxicity profile Against mammalian cells to determine their selectivity index.

Keywords: aurones; phenylpropanoids; parasitic diseases; natural products.

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Synthesis of n-glyco-metronidazole as a new agent against fungal biofilms

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The importance of carbohydrates as a source of energy and as a structural component of the cell wall in various organisms is widely recognized. More than just that, they are also found as constituents of various proteins (glycoproteins) and lipids (glycolipids), present in both intra and extracellular environments. These compounds are referred to as glycoconjugates. The involvement of glycoconjugates in cell recognition and adhesion processes is highly relevant in various physiological and pathological conditions, such as tissue integrity maintenance, leukocyte rolling in inflammatory processes, metastasis, and infections. Different enzymes and transporter proteins are involved in the biosynthesis and processing of oligo- and polysaccharides. Interference with the function of these enzymes and transporters profoundly influences the biology of affected organisms, with implications that may be therapeutically significant. One way to interfere with this process is through the use of enzymatic or transporter inhibitors. In this regard, the synthesis and evaluation of carbohydrate derivatives as enzymatic inhibitors or carbohydrate transport inhibitors have been widely explored in recent decades. Thus, this project aimed to explore the chemistry of carbohydrates by synthesizing a novel N-glycoside, obtained by coupling metronidazole with N-acetylglucosamine, and evaluating its effectiveness against planktonic cells and inhibition of fungal biofilm. Considering that the mechanism of action of nitroimidazoles involves selective bioreduction in microaerophilic or anaerobic environments, metronidazole, which originally lacks activity against fungi, showed promising results in the presence of the studied glycoside, demonstrating the bioactive potential of this novel glycoside.

Keywords: Biofilm; N-acetylglucosamine; nitroimidazole.

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Synthetic viability to obtain fexinidazole-eugenol hybrids

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Chagas disease, a neglected tropical disease, affects mainly Latin America and is caused by the flagellate protozoan *Trypanosoma cruzi*, which lives and reproduces in different cells and tissues. The signs and symptoms of this disease are quite variable, being characterized by having an acute phase and a chronic phase, the latter related to the most serious effects of the disease, leading to serious complications and often death. Drugs for the treatment of the disease are scarce, with benznidazole being the one of choice, which acts mainly in the acute phase and has significant adverse effects. Recently, fexinidazole became a candidate for trypanosomicide in a more advanced clinical stage, standing out as an excellent candidate for antichagasic therapy. However, it depends on a high dose, which leads to toxic effects. Using fexinidazole for molecular modification to optimize your profile is an important work proposal, whether due to the scarcity of efficient drugs against the disease or the impact it has in Brazil. Eugenol, a natural product, has a wide range of pharmacological effects, including anti- inflammatory effects. It is frequently used in planning projects for new bioactive agents. The objective was to synthesize and evaluate toxicity and trypanocidal action of molecular hybrids formed from pharmacophoric subunits of fexinidazole and eugenol, with a view to more potent trypanosomicides with concomitant anti-inflammatory action, important in reducing side effects. To obtain the proposed derivatives, the synthetic route began with the imidazole nitration reaction, with the classic methodology using sulfuric acid and nitric acid. This was followed by the methylation reaction, using iodomethane and potassium carbonate or *p*- toluenesulfonic acid and methanol, to obtain 4-nitro-methylimidazole or 5-nitro- methylimidazole, respectively. The synthetic route is followed by the hydroxymethylation reaction of the carbon in position 2, using paraformaldehyde in a sealed tube, at 140°C. This reaction occurred only for the intermediate 5-nitro-methylimidazole, the expected product not being formed when the nitro group was in position 4 of the imidazole ring. Furthermore, the yields obtained for the methylation and hydroxymethylation reactions were considerably lower than those described in the literature, making it unfeasible to continue the synthetic route. In view of the above, there is a need to optimize the reactions to obtain methylated and hydroxymethylated intermediates, a key point for the synthesis of the proposed hybrids.

Keywords: Eugenol; imidazole; fexinidazole; Chagas disease; *Trypanosoma cruzi*.

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The use of Herbal medicines for weight loss assistance and obesity treatment

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The Brazilian Association for the Study of Obesity and Metabolic Syndrome (Abeso) estimates that 2.3 billion adults around the world will be overweight by 2025 and 700 million people will be obese (BMI of 30 kg/m2 or greater). In Brazil, this chronic disease has increased by 72% in the last thirteen years, from 11.8% in 2006 to 20.3% in 2019. Allied with dietary reeducation and exercises, medicinal plants can play an important role as adjuvants in the treatment of obesity. The aim of this study was to verify the scientific evidence on the use of medicinal plants present in the Brazilian Pharmacopeia (6th Edition, 2019), in the Herbal Medicines National Formulary (2nd Edition, 2021) and in the Herbal Medicines Memento (1st Edition, 2016) for the use as adjuvants for weight loss assistance and obesity treatment. The systematic review of the literature was organized following the PICO framework and PRISMA guidelines, utilizing Medical Subject Headings (MeSH) including "Obesity," "Phytotherapy," "Clinical Trial," and "Cholesterol". Data collection was conducted using descriptors combined with the Boolean operator AND, along with specific inclusion criteria: clinical trials published between 2012 and 2022 and available in English or Portuguese. To focus on the quality control and ease of acquisition of raw material to herbal medicines production, the exclusion criteria eliminated medicinal plants not listed in the Official Brazilian Phytotherapy Compendia. After a thorough filtering process, eight articles were included in this review, sourced from the following databases: MEDLINE, Web of Science, Scopus, and EMBASE. The selected studies presented garlic (*Allium sativum*), turmeric (*Curcuma longa*), cinnamon (*Cinnamomum verum*), artichoke (*Cynara scolymus*) and pomegranate (*Punica granatum*) as herbal medicines that were able to cause beneficial changes in serum HDL-c levels, significant decreases in serum levels of total cholesterol and triglycerides and changes in the patients' anthropometric measurements.

Keywords: Phytotherapy; Cholesterol; Clinical Trial; Medicinal Plants; Triglycerides; Systematic Review.

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Antibiotic susceptibility profile of multidrug-resistant Pseudomonas aeruginosa and host range testing of lytic bacteriophages

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Pseudomonas aeruginosa is an opportunistic, multidrug-resistant pathogen responsible for a wide range of acute and chronic infections. Bacteriophages are among the used strategies as a possible replacement or adjuvant to antibiotics. The use of phage cocktails can increase the spectrum of antimicrobial activity and decrease the potential for development of resistance to infection. Bacteriophages able to infect *P. aeruginosa* were isolated using wastewater samples from several cities from Brazil and the host bacterial strain PA14, resulting in a collection of bacteriophages (n=19).

Host range analyses were performed using five multi-drug resistance (MDR) strains of *P. aeruginosa*. The MDR phenotype was confirmed using Kirby-Bauer disk diffusion test, to assess the susceptibility of these strains to antibacterials (Meropenem, Ceftazidime, Piperacillin + Tazobactam, Imipenem, Amikacin, Ciprofloxacin, Cefepime, Aztreonam, and Polymyxin B). The MDR strains (PA SPM 37121 and PA 37117) demonstrated resistance to all tested antibiotics while the other strains proved

to be resistant or sensitive with increased exposure to antibiotics. PA strains PASPM37166 and PA37117were not infected with any of all bacteriophages tested infect. The remaining three strains displayed susceptibility, with sensitivities to 13 (PA KPC 37174), 12 (PA 37090), and 1 bacteriophage (PA KPC 37121) respectively. Phage-resistant bacteria remain susceptible to infection by Other phages and, furthermore, one way to increase potential therapeutic is through synergism. The use of two or more phages in cocktail form increases the effectiveness of the treatment. Therefore, phage therapy emerges as a strategy to combat antibacterial resistance in *Pseudomonas aeruginosa*.

Keywords: Antimicrobial; bacterial resistance; phage therapy.

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Bacteriophage-loaded bovine serum albumin nanoparticles increase viral infection rate against *Pseudomonas aeruginosa*

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Nanoparticles are used as antimicrobial drug delivery systems for multidrug-resistant bacteria since they can increase their efficacy and reduce potential adverse effects. In this study, we developed bovine serum albumin nanoparticles loaded with bacteriophages that are able to infect *Pseudomonas aeruginosa* PA14 (NPF) and evaluated their effects on planktonic and biofilm cultures of this bacterium. Empty nanoparticles (NPV) were produced as a control. The morphological characteristics of both nanoparticles were analyzed by dynamic light scattering and scanning electron microscopy. NPF or NPV were incubated with P. aeruginosa cultures for 48 h and absorbance was analyzed at 0, 24 and 48 h. Viral titers were determined by double agar method at the same intervals. NPF or NPV were administered on *P. aerugisosa* PA14 biofilms adhered to 96-well microplates. The inhibition efficiency of NPs on the biofilm was evaluated by crystal violet assay. The cytotoxicity of the nanoparticles on eukaryotic cells was evaluated by the MTT method. The viral nanoparticles presented irregular contours and homogeneous sizes. The empty nanoparticles resembled smooth spheres of varied sizes. NPF had smaller sizes than NPV, 220.3 ± 3.6 nm and 403.2 nm ± 23.2 nm, respectively. The zeta potential of both NPs was -10 ± 0.9 mV. Bacterial population density was significantly reduced in NPF-treated cultures and this reduction are more markedly compared to non-encapsulated phage. Viral titers in NPF treated cells increased by 5 to 2 logs at 24 and 48 h intervals, respectively, when compared to non-encapsulated phage. NPs were not able to eliminate or reduce biofilms compared to the untreated control. However, viral titers (109 - 1010 PFU/mL) were detetec in NPF treated *P. aeruginosa* biofilms, which represents a massive production of viral particles. The same effects were observed with VAC 1.1 phage in its free form. NPF or NPV did not show cytotoxic effects in treated cell cultures. In conclusion, phageloaded bovine serum albumin nanoparticles increase the rate of viral infectivity and can control the population density of planktonic *P. aeruginosa* more efficiently than free phages. In contrast, NPF does not appear to reduce microbial density in mature biofilms, despite the massive production of viral particles. Future assays will elucidate whether NPF is capable of preventing biofilm attachment on microplates and catheter fragments.

Keywords: Virology; Microbiology; Phagotherapy.

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Biochemical Evaluation of the Mechanisms of Action of Pentamidine Derivatives on Leishmania amazonenses

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Biochemical parameters are fundamental to understanding the mechanism of action of compounds with leishmanicidal activity. Leishmaniasis, a disease caused by the *Leishmania* parasite, requires specific treatments that affect the protozoan without harming the host cells. Mitochondria have emerged as a potential therapeutic target, given their involvement in various important cellular processes. Pentamidine derivatives have stood out as promising molecules for this purpose. Thus, understanding how these derivatives interact with parasite cells and the mechanisms underlying their activity is vital to developing more effective and less toxic therapies to treat leishmaniasis. To understand the mechanism of action of pentamidine derivatives (PQM 250, PQM 254, PQM 261) in *L. (L.) amazonensis*, the hydrogen peroxide (H_2O_2) production, mitochondrial membrane potential (ΔΨ), ATP concentration and apoptosis were assessed. The Amplex Red kit, JC-10 probe, ATP Colorimetric/Fluorometric Assay Kit and annexin V were used to carry out these assays, respectively. In relation to the ΔΨ assay, PQM 254 and pentamidine reduced ATP the potential by 10.4 and 10.9%, respectively; while PQM 261 increased it by 13.6% and PQM 250 did not lead to changes compared to the control. ATP production with PQM 250 and PQM 254 was unchanged, while PQM 261 and pentamidine increased by 32 and 95%, respectively. H2O2 production was reduced by 41.7, 4.6 and 37.9% with PQM 254, PQM 261 and pentamidine, respectively.

Keywords: Leishmaniasis; Mechanism of action; *L. (L.) amazonensis*.

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Determination of MIC and assessment of CAP1 and CNB1 gene overexpression in sessile cells within biofilm from clinical samples

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Healthcare-associated infections (HAIs) caused by species of the genus *Candida* spp. currently represent a global concern. In this scenario, it is vital to deepen our understanding of factors associated with virulence, such as biofilms, and the inefficacy related to antifungal use. The determination of the minimum inhibitory concentration (MIC) in planktonic cells of clinical isolates is a common practice. However, MIC values for sessile cells are not yet established in routine laboratory procedures, which is concerning, considering that approximately 80% of infectious processes occur with biofilm formation. Therefore, the comparison of minimum inhibitory concentration (MIC) of clinical isolates in planktonic and sessile (biofilm) states is essential to understand potential causes of increased MIC in sessile cells. It's important to note that a discrepancy between MIC values in planktonic cells compared to sessile cells can indicate a potential condition for therapeutic failure in the use of antifungals. In addition to biofilm formation, another virulence factor that can influence the antifungal response is the antioxidative mechanisms and the central response to oxidative burst. In this context, the genes *CAP1* (Adenylate Cyclase-Associated Protein) and *CNB1* (Calcineurin B) stand out, responsible for restoring redox homeostasis and regulating other genes that control stress response and virulence, respectively. Specifically, the investigate whether there is an overexpression, in sessile cells compared to planktonic cells, of the *CAP1* and calcineurin *CNB1* genes, related to increased MIC for Amphotericin B, Anidulafungin and Fluconazole in sessile cells. The research involves a determining of the MIC's through of the antifungal susceptibility testing will be conducted using broth microdilution methodology, with serial dilutions of antifungals in 96-well plates, for planktonic and sessile cells of 39 clinical isolates, and 3 reference strains from ATCC®, *C. albicans* (62548), *Candida krusei* (6258), and *C. parapsilosis* (22019). Isolates showing MIC discrepancies between the two cellular presentations will be selected for CAP1 and CNB1 gene expression analysis (planktonic and sessile).

By the end of this research, we aim to achieve a better understanding of the high level of tolerance exhibited by sessile cells of *Candida albicans* and other non-albicans *Candida* spp. within biofilms. This understanding will be crucial for advancing our knowledge of fungal growth control mechanisms, both in planktonic and biofilm states, and will contribute to the development of innovative therapeutic strategies for the eradication and/or more effective control of *Candida* spp. infections.

Keywords: Biofilms; Minimum Inhibitory Concentration; Gene Expression.

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Development of experimental model for chronic infection by *Toxoplasma gondii*

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Toxoplasma gondii is toxoplasmosis' etiological agent and a protozoa of the apicomplexan phylum, first described in 1908. It's known that all warm-blooded animals can act as the parasite's intermediate host, human beings included, and at least a third of the world's population is infected. Still, there is no approved treatment for the infection's chronic phase and are limited in terms of toxicity and long-term administration. Even though a large part of infected people manifest no symptoms or light and short termed symptoms, once the parasite is established on its host, it's latente for a long time and can still be reactivated in cases of immunosuppression, and it's also been linked to neurological disturbances. Because of that, the research for new compounds that are capable of eliminating the parasite is essential, and for that, the standardization of a testing protocol and analysis is indispensable. For that, we constructed a standard curve relating tachyzoites number to qPCR Cycle Threshold (CT) and established an experimental treatment model of chronic toxoplasmosis in mice. It was concluded that the chronic infection that developed best was the one in which 10 brain cysts of *T. gondii* were injected intraperitoneally into 4-week-old C57-Black mice, and monitored for 50 days after infection. The standard curve of *T. gondii* tachyzoites consistency was maintained regarding RNA extraction efficiency, which was satisfactory for comparison between groups with the tested kit.

Keywords: Toxoplasmosis, RT-qPCR, *in vivo*.

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Development of nanobiotechnological strategies aimed at increasing the immunogenicity of attenuated poxvirus vacines

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Poxviruses are large, enveloped DNA viruses that replicate in the cytoplasm of host cells from animal hosts, both vertebrates and invertebrates. Poxviruses of major public health importance include variola virus, cowpox virus, vaccinia virus, and monkeypox virus. Modified Vaccinia Ankara (MVA) is a highly attenuated isolate of vaccinia virus considered safe and effective as a vaccine. However, challenges remain regarding MVA vaccination, particularly in populations that may respond inadequately to the vaccine, such as elderly and immunocompromised individuals. Therefore, the search for new adjuvants capable of enhancing MVA immunogenicity becomes crucial to optimize vaccine efficacy based on this viral vector. Nanoparticles containing BSA associated with poly(I:C) (NPPI) in their formulation have been shown to possess adjuvant and immunostimulatory properties, thereby representing promising vaccine options. Poly (I:C) (polyinosinic-polycytidylic acid) is a synthetic double-stranded RNA used experimentally as a model for viral infections *in vivo* and has been extensively studied in combination with other compounds and proteins for its adjuvant potential. This study aims to develop adjuvant platforms based on pathogen-mimicking nanoparticles and evaluate whether these nanoparticles influence the anti-vaccinia immune response induced by MVA. To achieve this, BSA based nanoparticles will be produced using the coacervation method, incorporating poly (I:C) into their matrix. Subsequently, C57Bl/6 mice will be immunized with nanoparticles (100 µg/dose) via intramuscular injection on days 1 and 14, in the presence of 1 x 107 focus-forming units (FFU) of MVA. Mice injected with PBS will be used as a negative control, and another group will receive only nanoparticles, while a positive control group will receive MVA alone (1 x 107 FFU). Blood samples will be collected from the animals 14 days after the final dose. Serum will be used for quantification of anti-vaccinia IgG antibodies using ELISA and plaque reduction neutralization test. It is expected that animals immunized with NPPI in the presence of MVA will exhibit a superior anti-vaccinia immune response compared to those immunized with MVA alone.

Keywords: Nanoparticles; Adjuvants; Modified Vaccinia Ankara.

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Differential Analysis of Antifungal Response by Candida albicans and Non-albicans Candida Species in Biotrophic Interaction with Lactobacillus spp. and Their Metabolites

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Species of the *Candida* spp. genus, considered commensals of humans, can become opportunistic when there is an imbalance in the immune system response, leading to superficial and/or systemic infections. This study aims to perform a differential analysis of the antifungal sensitivity of planktonic cells and biofilms of *Candida albicans* and non-*albicans Candida* spp. to the antifungal agent Fluconazole and in biotrophic interaction with *Lactobacillus* spp. and their metabolites (sodium lactate and hydrogen peroxide). Standard isolates of *Candida* spp. were selected for the study: *C. albicans* SC5314, C. *tropicalis* ATCC 750, *C. krusei* ATCC 6258, *C. glabrata* ATCC 90030, and *C. parapsilosis* ATCC 22019, *Lactobacillus casei*, *Lactobacillus reuteri*, and *Lactobacillus rhamnosus*, along with 20 clinical isolates of *Candida* spp. (protocol 077685/2020 of the Ethics Committee in Research – UNIFAL/MG). For the interaction between *Candida* spp. and Lactobacillus spp., dilutions of the two microorganisms were added to 96-well polystyrene plates, which were incubated at 37ºC for 24 hours. Readings were taken using a spectrophotometer at 530 nm. Serial dilutions of sodium lactate (5000 µg/mL to 4,8 µg/mL) or hydrogen peroxide (1750 µg/mL to 3 µg/mL), with and without association to fluconazole (64 µg/mL to 1 µg/mL), were added to the wells of 96-well polystyrene plates, followed by the addition of *Candida* spp. suspensions. The plates were incubated for 24 hours at 37ºC, and readings were taken using a spectrophotometer at 530 nm. For the evaluation of antifungal activity of the interaction between sodium lactate or hydrogen peroxide and fluconazole, 96-well polystyrene plates were prepared with six serial dilutions of fluconazole interspersed with nine dilutions of sodium lactate or hydrogen peroxide. *Candida* spp. suspensions were added to the wells. The plates were incubated in an oven for 24 hours at 37ºC, and absorbance readings were taken at 530 nm. Results: Sodium lactate and hydrogen peroxide had a positive impact on the inhibition of planktonic cell growth in the 20 clinical isolates. *Candida glabrata* and *Candida parapsilosis* showed reduced sensitivity to Fluconazole. Conclusion: Lactobacillus spp. reduce the metabolic activity of *Candida* spp.; *Candida glabrata* and *Candida parapsilosis* showed resistance to lower doses of fluconazole and sensitivity to higher doses; Sodium lactate and hydrogen peroxide impact the reduction of planktonic cell growth in the 20 clinical isolates studied; The results are promising as future therapeutic possibilities for fungal infections associated with *Candida* spp.

Keywords: Sodium lactate; Fluconazole; Hydrogen peroxide; Lactobacillus spp.; Antifungal.

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Effect of nanoparticles in the treatment of schistosomiasis using praziquantel as a reference: a systematic review of preclinical evidence

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Schistosomiasis is one the several neglected tropical diseases caused by *Schistosoma sp*. The treatment recommended by WHO is conducted with the drug praziquantel. This drug has low solubility and is quickly metabolized into a less active compound. On the other hand, nanoparticles have been studied to improve bioavailability of poorly soluble drugs. In this sense, the objective of this work was to perform a systematic review of *in vivo* studies, using the PRISMA 2020 methodology. We compared experimental treatments using nanostructured praziquantel (NE-PZQ) and the reference drug, free praziquantel (F-PZQ), to verify whether there was higher effectiveness in the treatment of schistosomiasis. The search was carried out in PubMed, Embase, Scopus and Web of Science databases. From 1186 articles analysed, 12 were included in this review, which evaluated praziquantel-loaded nanoparticles of liposome type, nanoliposome functionalized with antibody, niosome, clay and silica nanocarrier, lipid nanocapsule, solid lipid nanoparticle, nanostructured lipid carrier and nanocrystals. Parasitological, histopathological, pharmacokinetic and toxicological parameters were evaluated. In the general context, NE-PZQ provided greater efficacy than L-PZQ, significantly reducing both worm and tissue egg load. Treatment with NE-PZQ also demonstrate a change in oogram profile, with an increase in dead eggs and a decrease in immature and mature eggs. NE-PZQ reduced number and diameter of granulomas when compared with F-PZQ. Additionally, NE-PZQ has greater bioavailability and lower toxicity than F-PZQ. Therefore, the reviewed articles demonstrated the possibility of improving PZQ activity using nanoparticles, as well as showing that the type of nanoparticle charge can influence the outcome of the analysed parameters. The improvement in therapeutic efficacy was reaffirmed by pharmacokinetic factors, resulting in greater bioavailability and a lower toxicity profile, even with the prolongation of the time spent in systemic circulation.

Keywords: *Schistosoma* infection; Therapeutic effect; Nanoparticle drug delivery systems.

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Evaluation of the combined action of lactate and hydrogen peroxide on the response, to fluconazole, of planktonic cells and biofilms of Candida tropicalis and Candida glabrata

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Fungal infections caused by yeasts of the genus Candida spp., known as candidiasis, are characterized by a wide range of clinical syndromes ranging from local lesions to systemic infections. Species of the genus Candida spp. are commonly found at mucosal surfaces and organs of healthy individuals but under favorable conditions may lead to fungal infections. The ability to form biofilms besides other virulence factors complicates the treatment of these infections, potentially worsening the patient's clinical condition. Lactobacillus spp. are predominant lactic acid bacteria in the human microbiota under balanced conditions and have been shown in previous studies to have negative impacts on the formation and progression of C. albicans biofilms. However, the mechanisms involved in this interaction have not been fully elucidated. It is believed that the production of hydrogen peroxide by these bacterial species may cause damage and impair yeast development. In addition to hydrogen peroxide, it is known that among the metabolites of Lactobacillus spp., lactate is synthesized, which is characterized as a substance capable of inhibiting fungal enzymes. When these enzymes are inhibited, it not only alters fungal morphogenesis but also decreases the adherence of C. albicans to the host epithelium, compromising biofilm formation and development. Objective: Considering the action of antifungals, lactate, and hydrogen peroxide against yeast, the objective is to assess the impacts of in vitro addition of lactate and hydrogen peroxide on the response to antifungal agents in biofilms and planktonic cells of *Candida tropicalis* and *Candida glabrata* species. Expected results: Therefore, we expect to evaluate the hypothesis of biofilm development inhibition and damage to planktonic cells, alongside a possible additive or synergistic effect with the antifungal fluconazole. If proven, these findings could be highly relevant for the medical and therapeutic field due to the high incidence of candidiasis involving biofilms that contribute to resistance to antifungal treatment.

Keywords: Biofilms; Fluconazole; Lactate; Hydrogen peroxide; *Candida glabrata*; *Candida tropicalis*

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Evaluation of the immunomodulatory activity of Fluconazole on murine polymorphonuclear cells infected with *Paracoccidioides* spp.

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Paracoccidioidomycosis (PCM) is a systemic mycosis caused by fungi of the *Paracoccidioides* spp. Fluconazole (FluZ) is antifungal from the triazole class, used to treat PCM when there is a contraindication to traditionally used drugs or neurological impairment. Therefore, the objective of the present study is to verify whether FluZ improves the activation state of polymorphonuclear cells (PMNs). For this, female Swiss mice (Animal Ethics Committee Protocol 0029/2023) were infected subcutaneously with *P. brasiliensis* (Pb18) and *P. lutzii* (Pl). After 5 days of infection, treatments were carried out with 1 mg/mL and 2 mg/mL of FluZ for 3 days. On the 8th day of infection, PMNs present in the air pouch were collected and the following parameters were analyzed: absolute number of viable cells, mitochondrial activity, ROS production, production of total proteins and catalase. The concentration of 1 mg/mL of FluZ was able to reduce the influx of cells in relation to controls infected with Pl and Pb18. Mitochondrial activity was significantly higher in the group treated with 2 mg/mL compared to the control group infected with Pl and the group infected and treated with 1 mg/mL. In the groups infected with Pb18 there was no difference in mitochondrial activity in the treated group. There was an increase in protein production in the groups treated with FluZ and infected with Pl, compared to the untreated control, but there was no difference in the groups infected with Pb18. The 2 mg/mL dose stimulated catalase production in Pl infection at all time points. In groups infected with Pb18, the dose of 1 mg/mL was more effective compared to the control. In ROS production, the dose of 2 mg/mL also showed greater stimulation in Pl-infected groups, and 1 mg/mL demonstrated greater stimulation for Pb18, compared to controls. The results suggest that different dosages of FluZ stimulate PMNs in different ways in the presence of Pl and Pb18. Despite this, the drug is capable of stimulating PMNs, with a consequent fight against fungi, demonstrating its effectiveness in experimental paracoccidioidomycosis.

Keywords: Neutrophil Infiltration; Triazoles; Invasive Fungal Infections

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Evaluation of the sensitivity profile of C. albicans biofilm against fluconazole, associated and not associated with hydrogen peroxide

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Candida albicans is a commensal, dimorphic fungus that appears in the yeast and filamentous form and colonizes the mouth, gastrointestinal tract and urogenital region. However, in the presence of factors such as fungal infections such as candidiasis, they can cause candisiases. Factors associated with virulence, such as the ability to form biofilms may dificult the, treatment of fungal infections, further aggravating the patient's clinical condition. Candidiasis is usually treated with azole antifungals, mainly fluconazole. Candidiasis or vulvovaginal candidiasis can affects 75% of women at least once a year and 50% of them will develop a second episode. Resistance to fluconazole has increased in recent years. The mutation and overexpression of the *ERG 11* gene, making it difficult for the drug to bind to the active site; the over expression of the *MDR1* and *CDR1* may alter the functioning of the efflux pump, expelling the drug out of the cell. These both mechanisms, can be related to resistance to fluconazole, as well as the easy access to fluconazole and self-medication may result in erroneous treatment, not eliminating the fungus. Some *Lactobacillus* have probiotic activity. Hydrogen peroxide is a metabolite produced by these bacteria, with highly oxidizing action, which can have a biostatic and biocidal effect on fungal cells. Aims**:** This research evaluated the suscepibility profile of the strain *C. albicans* ATCC 90028 to hydrogen peroxide, associated and not associated with fluconazole. The method involved culturing the strains in RPMI 1640 medium, followed by orbital shaking incubation at 36°C and 875 g. Fungal cells were subjected to different concentrations of H2O2 (1750 µg/mL to 3 µg/mL) and Fluconazole (2048 to 4 µg/mL) during the biofilm adhesion phases: before cell adhesion, 90 minutes after adhesion cells and 24 hours after cell adhesion. The results demonstrated that after treatment with H2O2, before cell adhesion there was lower metabolic activity when compared to treatment after 90 minutes and 24 hours after cell adhesion with the same compound. However, when H2O2 was associated with fluconazole simultaneously demonstrated lower metabolic activity of fungal cells at the three times studied and, after alternately combined treatments, samples in which fluconazole was added first demonstrated 90% inhibition of fungal growth. These results emphasize the need for in-depth studies into therapeutic combinations that act to inhibit the formation and destruction of the *C. albicans* biofilm, helping to reduce ineffective treatment with the antifungal fluconazole, as well as alternative treatment for groups of patients restricted to the use the same.

Keywords: Hydrogen peroxide; Fluconazole; *Candida albicans*; biofilms; human microbiome; combined therapy.

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Impact of Fluconazole treatment on antibody production in experimental paracoccidioidomycosis

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Fungi belonging to the genus *Paracoccidioides* spp. are responsible for causing a systemic mycosis called paracoccidioidomycosis (PCM). PCM treatment is generally complex and long. Fluconazole (FluZ) is a triazole antifungal, used to treat PCM when there is a contraindication to traditionally used drugs. In the present study, we sought to observe the systemic effect of Fluconazole through the production of antibodies. For this, female Swiss mice (Animal Ethics Committee Protocol 0029/2023) were infected intraperitoneally with *P. brasiliensis* (Pb18). The mice were treated with FluZ 2mg/mL every other day orally (gavage). On the 7th and 15th days of infection, the mice were weighed and blood was collected to separate the serum, where the isotype-specific antibodies were measured: IgM, IgG, IgG1a, IgG2a and IgG2b. Furthermore, to evaluate delayed-type hypersensitivity (DTH), paracoccoidin was applied to the left paw of the mice, which was measured after 48 hours. To measure the level of antibodies in the serum, the direct ELISA technique was used. The IgM content of the group treated with FluZ 2 mg/mL was lower compared to the only infected group, equal to the healthy group. Total IgG production was greater in the treated group compared to the infected group on the 7th day of infection, however, within 15 days production was greater in the single infected group. Likewise, there was lower production of the IgG1a and IgG2b subclasses in mice treated with FluZ 2mg/mL. The concentration of IgG2a was lower in the treated group on the 7th day, however, at 15 days there was no difference between the treated group and the single infected group, both being higher than the healthy group. There was no significant difference between the weight of the mice on the days of infection evaluated. On the 7th day of infection there was no difference between the DTH of infected and treated mice, on the other hand, on the 15th day the measurement of treated mice was higher than that of the only infected group. Knowing that high antibody titers are associated with the severe form of PCM, their reduction in the groups treated with FluZ may indicate effectiveness of the treatment. Despite this, it is necessary to evaluate these parameters in the future over a longer period of infection, to check the behavior of FluZ in the chronic phase of PCM.

Keywords: antibodies; triazoles; systemic fungal infection; delayed-type hypersensitivity

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Impacts of the combination of doxycycline and gentamicin with praziquantel in the treatment of BALB/c mice infected by Schistosoma mansoni in the acute phase of schistosomiasis

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Introduction and objectives: Schistosomiasis occurs in acute and chronic forms, differing in pathogenesis and host immune response, with the impact of drugs on disease outcome. This study evaluated the effects of praziquantel (PZQ) in combination with doxycycline (DOX) and gentamicin (GEN) in the treatment of BALB/c mice infected with *Schistosoma mansoni* in the acute phase of schistosomiasis. Methods: The formation of hepatic granulomas was evaluated by histopathological analysis, quantification of parasite load in liver tissue (real-time PCR and egg count) and biochemical parameters: ALT, AST, ALP and albumin. Main findings: In the group infected and treated with the PZQ+DOX combination, granulomas with larger diameter and accumulation of eosinophils around *S. mansoni* eggs, characteristic of the necrotic-exudative type, were observed. In the infected group treated with PZQ + GEN, it was observed that the granulomas were smaller in size, with a greater quantity of giant cells around the eggs in a process of digestion of the parasitic remains. The groups treated with PZQ demonstrated statistically significant changes in the percentage distribution of the evolutionary phases of the granulomatous lesions ($p<0.001$), indicating that treatment with PZQ is effective in reducing the formation of new granulomas and that the infection moves towards the evolution of the immunomodulation of the disease. There was a higher percentage of granulomas in the exudative-productive phase, with the group treated with the combination PZQ + GEN presenting the highest percentage of exudative-productive granulomas in relation to the group treated only with PZQ ($p<0.05$). All treatments caused a reduction in the area of the granulomas ($p<0.05$), as well as a significant decrease in the reduction in the number of eggs in the liver ($p<0.001$). It was observed, by real-time PCR, that the number of *S. mansoni* genetic material per mg of liver tissue decreased considerably ($p<0.05$) between the infected group and the groups treated with Praziquantel and its combinations. The combination of PZQ + DOX potentiated the inflammatory damage associated with liver granulomas, as also observed in higher levels of ALT ($p<0.05$), indicating greater damage to the liver tissue, and also causing disorganization in the collagenization structure. In the animals treated with PZQ+GEN, there was a significant increase ($p<0.05$) in AST levels, which corroborated the histopathological findings, indicating an accelerated modulation towards the chronic phase. Conclusion: The combination of PZQ with DOX and GEN was able to alter the modulation of the granulomatous process, with DOX aggravating the inflammation associated with the granulomatous process and GEN accelerating the resolution of schistosomiasis in an experimental model of acute infection by *S. mansoni*.

Keywords: Schistosomiasis mansoni; Granulomas; Praziquantel; Antibiotics; Histology.

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Metronidazole-nitroeugenol-like hybrids as a trypanocidal compounds

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This project involved the scaling synthesis and evaluation of trypanocidal properties of two hybrids of metronidazole-nitro-eugenol like compounds. These substances contained a metronidazole unit coupled with an nitro-eugenol-like unit. These compounds were previously selected by an *in vitro* assay of sixteen hybrids against evolutive *T. cruzi* forms studies. The primary objective was to investigate their bioactive properties, with a special emphasis on trypanocidal properties, due to the promising results observed against the amastigote, epimastigote, and trypomastigote evolutionary forms of *T. cruzi*. All compounds were characterized by thin-layer chromatography (Rf), melting point, infrared spectroscopy, nuclear magnetic resonance spectroscopy and mass spectrums. These two compounds (AD06 and AD07) were tested with non-infected and T. cruzi-infected H9c2 cardiomyocytes aiming for a comprehensive comparison with untreated and benznidazole (Bz)-treated mice. Various assays were evaluated, including parasitological, pro-oxidant, antioxidant, microstructural, immunological, and liver function markers. This study revealed that AD06 and AD07 compounds, especially AD07, exhibited direct antiparasitic effects on T. cruzi, attenuating cellular parasitism, biosynthesis of reactive species, and oxidative stress in infected cardiomyocytes *in vitro*. The activity of trypanothione reductase in *T. cruzi* was also reduced, increasing the parasite's susceptibility to pro-oxidants. Moreover, the compounds were well-tolerated, showing no suppression of the humoral response, mortality, or hepatotoxicity in mice. Thus, the AD07 compound induced relevant antiparasitic and cardioprotective effects *in vivo* assays, reducing parasitemia, cardiac parasite load, and myocarditis in *T. cruzi*-infected mice. From this perspective, it is concluded that the molecular hybrid AD07 is a potentially relevant candidate for the development of more effective and safer therapeutic regimens for treating *T. cruzi* infection.

Keywords: Nitroimidazoles; Chemical synthesis; Terapeutic use.

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HEALTH AND PHARMACY

Optimization of a UPLC- MS/MS method to quantify benznidazole in preclinical model of Chagas disease

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It is estimated that 6-7 million people are infected by *Trypanosoma cruzi*, the protozoans that cause Chagas disease, primarily in Latin America. The drug available for the treatment of Chagas disease is benznidazole, but its mechanism of action can be cytotoxic to the host, leading to relevant adverse effects, which are responsible for patients discontinuing treatment. Given the scarcity of research on the pharmacokinetic/pharmacodynamic profile and tissue distribution of benznidazole in preclinical models, along with conflicting literature, this study aimed to optimize chromatographic conditions for quantifying the drug in mouse plasma and tissues to conduct a pharmacokinetic preclinical study. For this purpose, Ultra High-Performance Liquid Chromatography (UHPLC) coupled with tandem mass spectrometry (MS/MS) (LC-MS 8030, Shimadzu, Kyoto, Japan) was used. The separation employed a reversed-phase analytical column (C18 Sys Croma 150mm x 4.6mm x 5µm), with a mobile phase composed of acetonitrile (HPLC grade) and ultrapure water (70:30, v/v), a flow rate of 0.2 mL min-1 using a binary gradient, temperature 40°C, and an injection volume of 10 µL. Omeprazole (Sigma®) served as the internal standard. Mass/charge transitions used to quantify benznidazole (LAFEPE) and omeprazole were 261.00>91.00 and 346.00>198.00, respectively. Sample preparation involved protein precipitation with acetonitrile followed by liquid-liquid microextraction using ethyl acetate and ether (50:50 v/v) as extracting solvents. The figures of merit for linearity, precision, and intra-day accuracy were evaluated in accordance with Resolution RDC no. 27/2012 of the National Health Surveillance Agency (ANVISA). Preliminary results showed that the analytical curve from 1 to 100 µg mL^{-1} demonstrated linearity (R = 0.99554), precision (relative standard deviation (RSD) of 19.91% for LIQ (1 µg mL^{-1}) of 10.63% for CQB (2 µg mL^{-1}), 1.58% for CQM (40 µg mL^{-1}), and 9.22% for CQA (80 µg mL^{-1})), and accuracy (relative standard error (RSE)) of 8.12% for LIQ, -12.3% for CQB, 5.76% for CQM, and 0.22% for CQA meeting the limits permitted by current legislation. However, inter-day precision and accuracy were not achieved for LIQ and CQB, possibly due to difficulties in the sample drying step. Since the sample concentrator broke, alternatives needed to be explored. The intended methodology requires multi-user equipment with a rotating schedule. Therefore, the next step of this work is to finalize the validation of the most reliable method, quantify the plasma samples, and define the best pharmacokinetic profile. These studies will contribute to increasing the understanding of drug interaction dynamics in well-established models of preclinical *T. cruzi* infection, reflecting pharmacokinetic profiles of etiological treatment and rationalizing more appropriate therapeutic regimens.

Keywords: Benznidazole; Chagas disease; Pharmacokinetics; Preclinical study.

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Rational selection of NS1 epitopes as templates in the synthesis of a molecularly imprinted polymer-based electrochemical sensor for the differential diagnosis of dengue relative to other viral infections

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Dengue is a reemerging viral disease prevalent in tropical regions and considered endemic in Brazil and similar climates. Despite being eradicated in the 1970s, its resurgence and the recent spike in cases highlight its significance as a public health issue. The disease is transmitted by the mosquito Aedes aegypti, classifying it as an arbovirus. Dengue, along with Zika and Chikungunya, presents a challenge due to their similar symptoms, complicating differential diagnosis. Accurate identification is critical as a misdiagnosis can lead to inappropriate treatment and severe health consequences, particularly in high-risk individuals. Current diagnostic methods rely on serological identification, which has limitations such as pH alterations, low stability, and high costs. The primary objective of this research is to develop a novel diagnostic method for dengue by identifying a common epitope in the NS1 proteins of all four dengue serotypes. This epitope will be used to create a molecularly imprinted polymer (MIP) with high affinity for the NS1 protein, allowing it to selectively detect dengue and differentiate it from other arboviruses. Molecular imprinting is a highly specific process that creates a polymer with unique properties, forming cavities tailored for the target molecule. By synthesizing a polymer around a chosen template molecule through covalent or non-covalent bonding, a highly specific binding site is created, mimicking the natural recognition properties of antibodies and enzymes but at a lower cost. Electrochemical sensors, which use electrodes with biorecognition units, offer a more practical and cost-effective alternative. A significant innovation in this research is the development of the MIP on a printed circuit board (PCB) electrode. PCBs provide a narrow interface that allows the formation of selective "channels" within the polymer for the chosen epitopes. These electrodes, connected to a device emitting electrical signals, facilitate the detection of analytes by emitting a signal inversely proportional to the analyte's adsorption. Preliminary studies have shown that MIPs can effectively differentiate between dengue NS1 and similar proteins from other flaviviruses. These MIPs exhibit high stability and selectivity, making them suitable for clinical diagnostics. The potential of MIPs to provide accurate and cost-effective dengue diagnosis could significantly improve patient care by enabling precise and timely treatment decisions, thus reducing the risk of severe outcomes. By targeting the common epitope in the NS1 protein of all dengue serotypes, this method offers a promising alternative to current diagnostic techniques, aiming to improve clinical outcomes and support healthcare providers in making better-informed decisions. Future work will focus on in vitro validation and further optimization of the MIP-based diagnostic approach.

Keywords: Aedes; epitopes; Molecular Imprinting; Arboviruses.

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Tannin and flavonoid content of Simarouba berteroana Krug & Urb. extracts influence their in vitro anthelmintic activity on third-stage larvae of *Haemonchus contortus*

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Infections caused by gastrointestinal nematodes are the major limiting issue affecting small ruminant production worldwide. Haemonchus contortus (Trichostrongylidae) is the most pathogenic nematode globally and the most prevalent in tropical regions such as Brazil. The impact of H. contortus is so aggressive because of its hematophagous feeding habits, its prolific nature and its ability to develop anthelmintic resistance to commercial drugs. Phytotherapy represents a promising alternative for the control of multi-resistant gastrointestinal nematodes. Simarouba berteroana Krug & Urb. is an endemic tree from the Dominican Republic that, according to its ethnomedicinal use, has antiparasitic properties for the control of various ectoparasites, although pharmacological and phytochemical studies are lacking. Therefore, the aim of the present study was to evaluate the in vitro anthelmintic effect of crude extracts and four fractions on third-stage larvae of a multi-drug resistant isolate of H. contortus. Initially, the fractions were obtained by diluting the crude extract in solvents of decreasing polarity (hexane, ethyl acetate and isobutanol) to separate four fractions. Total tannins in the crude extract and fractions were quantified following the Folin-Denis method and expressed as tannic acid equivalents. Total flavonoids were quantified by spectrophotometry in the visible range, using the aluminium chloride method and expressed as equivalent to quercetin. The in vitro anthelmintic activity of the extracts was evaluated by the Artificial Larval Exsheathment Assay. It was observed that at 300 µg/mL, was inhibited or delayed the exsheathment of H. contortus larvae, at 60 min, especially with the crude extracts and ethyl acetate and isobutanol fractions, being less inhibited or not inhibited with the aqueous and hexane fractions. Quantification of total tannins showed that the isobutanol and ethyl acetate fractions had higher concentrations (517.9 and 500.0 mg/mL, respectively), followed by the crude extract (495.8 mg/mL) without statistical differences ($p<0.05$). However, the aqueous fraction had a significantly lower total tannin content (324.2 mg/mL) and the hexane fraction had the lowest (15.45 mg/mL). Similarly, the crude extracts and their ethyl acetate and isobutanol fractions showed a higher concentration of total flavonoids than the aqueous fraction. On the other hand, it was observed that the addition of polyvinylpolypyrrolidone (tannin inhibitor) at 50 mg/mL, restored the ability of the larvae to exsheathe. Thus, it has been demonstrated that the crude extract of S. berteroana and its isobutanol and ethyl acetate fractions have in vitro anthelmintic activity, causing inhibition of the 3rd stage larvae of H. contortus exsheathe due to their high content of tannins and flavonoids. However, in vivo studies are needed to validate the anthelmintic effect of S. berteroana extracts in controlling gastrointestinal nematodes in small ruminants.

Keywords: Endemic plant; Ethyl acetate; Gastrointestinal nematodes; Multi-drug resistant; Phytotherapy; Small ruminants.

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Virtual screening of natural products targeting Bruton's Tyrosine Kinase for psoriatic symptom modulation

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Bruton's Tyrosine Kinase (BTK) plays a crucial role in B cell receptor (BCR) signaling, being essential for B cell proliferation, differentiation, development, and survival, as well as influencing the action of immune cells such as neutrophils and dendritic cells. BTK inhibitors, such as Ibrutinib, block NF-kB signaling and the activation of protein kinases like PKC. Recent studies, such as those by Harbi et al. (2020), have shown that Ibrutinib reduces inflammatory and oxidative mediators in mouse models of psoriasis, indicating an inhibitory effect on neutrophils, dendritic cells, and pro-inflammatory cytokines. However, the use of this compound can result in side effects such as diarrhea and hypertension. Therefore, the aim of this study was to identify, in silico, new drug candidates with the potential to act on the BTK receptor antagonistically and potentially ameliorate psoriatic symptoms. Initially, a systematic review was conducted to obtain studies presenting virtual screening results of compounds for the BTK protein, as well as to identify crystallographic structures of the protein. Thus, the target deposited in the Protein Data Bank under the code 5P9I was selected. For the ligands, a library of 84,215 compounds derived from natural products from the ZINC20 database was defined, downloaded to a local server, and prepared for use. Redocking analyses were performed for validation, in which the co-crystallized compound of the 5P9I protein was removed and re-docked to the protein using Autodock Vina software. After validation, the molecular docking process for virtual screening of the natural products was carried out, along with predictions of absorption, distribution, metabolism, excretion, and toxicity (ADME-Tox), using the PkCSM server. The redocking results showed a Root Mean Square Deviation of 1.11Å for the Ibrutinib compound (control), as well as a binding energy of -12.5 kcal/mol, thus validating the methodology. In the virtual screening, the compound ZINC04023375 demonstrated a binding energy of -13.5 kcal/mol, higher than the control, and exhibited ideal pharmacokinetic and pharmacodynamic characteristics, with intestinal absorption prediction values of 100%, superior to Ibrutinib's 30%, and no predictions of hepatotoxicity or mutagenesis. In vitro and *in vivo* studies are essential to validate the potential results obtained for the compound ZINC04023375, especially in psoriasis models, as reported by Harbi et al., with the aim of benefiting the population affected by this disease.

Keywords: Psoriasis, Drug Repositioning, Molecular Docking.

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Anxiolytic effect of crude and nanostructured formulation of *Baccharis dracunculifolia* extract in rats

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Abstract: Anxiety disorders affect millions of people around the world, causing significant suffering and impacting quality of life. According to the World Health Organization (WHO), the coronavirus (COVID-19) pandemic triggered a 25% increase in the prevalence of anxiety worldwide in the first year of the pandemic. In 2020, one year later, approximately 76.2 million new cases of anxiety disorders were reported, reflecting a significant impact on global mental health. Although treatments are available, many patients face limitations such as severe adverse effects and dependence. Given this, recent research has explored various medicinal plants and different formulations in search of safe and effective alternatives. Studies show that *Baccharis dracunculifolia*, among other activities, has a neuroprotective action, by reducing the expression of inflammatory and oxidative markers in the hippocampus and, consequently, attenuating oxidative stress, a biological condition present in anxious individuals. Therefore, this study investigated the potential anxiolytic effects of chronic intragastric administration of a crude extract (BD 50) and a nanostructured formulation (NBD 50) containing extract of *B. dracunculifolia* at a dose of 50 mg/kg in Wistar rats through behavioral tests such as open field, elevated T-maze and light-dark transition. The animals received deionized water (BD vehicle), BD 50, fluoxetine at a dose of 10 mg/kg (positive control), nanostructured formulation without extract (NBD vehicle) and NBD 50 orally, once a day, for fourteen days of treatment. Behavioral tests were carried out on the 15th day after the start of treatments. Treatment with BD 50, vehicle NBD and NBD 50 showed an increase in locomotor activity in the number of entries and time in the central area in the open field test, as well as a reduction in avoidance latency in the elevated T-maze compared to the BD vehicle, a result like that of the positive control. No differences among the treatments were observed in the light-dark transition test. In conclusion, BD 50 demonstrated clear anxiolytic effects. However, as both NBD 50 and its vehicle revealed anxiolytic properties, it is difficult to isolate the specific contribution of *B. dracunculifolia* extract in this formulation.

Keywords: *Baccharis dracunculifolia*; anxiety; behavior; mental health; rats.

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Baru oil promotes glycemic control, reduces Kidney injury and regulates renal arginine level diabetic rats

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Diabetic kidney disease (DKD) is a common complication of diabetes and has become the leading cause of end-stage kidney disease. The pathogenesis of DKD involves molecular changes initiated by hyperglycemia, contributing to oxidative stress. Furthermore, changes in arginine levels are correlated with microvascular impairment in diabetes. Good glycemic control is capable of reducing kidney damage. This work aimed to evaluate the action of oil extracted from Baru almond (Dipteryx alata Vog) on arginine levels and oxidative stress in the kidneys of diabetic rats. Baru oil's fatty acids composition analysis was performed in gas chromatography coupled to mass spectrometry. Male Wistar rats (CEUA 0057/2021) were feed with high fat diet for 4 weeks, followed by a 35mg/kg streptozotocin injection. Health and diabetic animals were treated with Baru oil (0,75 g/kg; 1,5 g/kg and 3,0 g/kg), in addition the diabetic animals were treated with metformin, gliclazide and combination of Baru oil with both oral hypoglycemic agents by 90 days. At the end of treatment, glycemic and renal markers were evaluated in the animals' serum and urine. The activities of antioxidant enzymes and the level of malonaldide were determined. Arginine levels was determined by ultra fast liquid chromatography (UFLC) system coupled to an ESI-Ion Trap mass spectrometer. Oleic acid was the major component in baru oil. Baru oil (1.5 g/kg and 3.0 g/kg) reduced fasting blood glucose, fructosamine, urea and serum creatinine ($p<0.001$). Furthermore, it also reduced albuminuria levels ($p<0.001$). Baru oil (1.5 g/kg) increased the activity of superoxide dismutase and glutathione peroxidase, as well as reducing renal MDA levels ($p<0.001$). Arginine was significantly reduced in diabetic animals, and treatment with the baru oil attenuated the reduction of this amino acid. Furthermore, for all the parameters mentioned above, the combination of baru oil and metformin showed better results than the isolated administration of both compounds, just as the association of baru oil with gliclazide showed significant results in the assessment of oxidative stress. Baru oil has a protective effect on DKD, attenuating oxidative stress and microvascular insult by regulating arginine metabolism. This study may open perspectives for the evaluation of baru oil as a possible complementary therapy for diabetes mellitus.

Keywords: Metabolomics, Diabetic nephropathy, Fatty acids, Lipid peroxidation.

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Characterization of biosurfactant/protease inhibitor nanoparticles and study of their effects in an in vitro model of LPS inflammation in glial cells

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The lack of effective therapeutic agents to treat the neurological symptoms of COVID-19 highlights the urgency in researching and developing new therapeutic strategies. The aim of this research was to synthesize and characterize nanoparticles (NPs) of biosurfactant associated with protease inhibitors and to study their effects in an in vitro model of inflammation by LPS in glial cells. The biosurfactant NPs with protease inhibitor nafamostat were synthesized by the W/O/W double microemulsion method. Samples from the purification of the NPs in dialysis bags were subjected to encapsulation efficiency analysis to determine the total concentration of the inhibitor in the NPs and the concentration of the free inhibitor in the dialysis water. The size and polydispersity of the NPs were characterized by dynamic light displacement (DLS). The release assay of the NPs was performed in monobasic/dibasic sodium phosphate buffer for 72 hours. Aliquots of the release assay were collected at time intervals of 1h to 72h and analyzed by HPLC. The cytotoxicity of the compounds was evaluated in primary culture of astrocytes and microglia, through the methyl tetrazolium (MTT) assay. The interaction of the NPs with the supported lipid bilayer membrane (s-BLM) model was analyzed by the cyclic voltammetry technique. The in vitro inflammation assay by LPS in astrocytes received treatment with biosurfactant NPs and biosurfactant NPs with nafamostat. The supernatant of the inflammation assay was quantified for pro-inflammatory and anti-inflammatory factors by Elisa at 630 nm. Immunofluorescence in astrocytes was performed for (GFAP) and (NF-kB) labeling. The relative % of viral infection in vitro in astrocytes was performed with the viral activity model (VSV-SARS-CoV-2-S), quantifying the relative % of mChenrry infection by fluorimetry. The biosurfactant NPs presented approximate sizes of 442.5 ± 34.5 nm and polydispersity (PDI) of 0.393 ± 0.002. While the biosurfactant NPs with protease inhibitor nafamostat presented results of 198.0 ± 16.0 nm and PDI of 0.231 ± 0.015. The encapsulation of the inhibitor in NPs was 85% and the release percentage was between 22 and 47% between 1 and 72 hours. The MTT assay demonstrated cell viability above 70% for NPs, both in astrocytes and microglia. In the cyclic voltammetry assay (S-BLM), the NPs demonstrated time-dependent membrane disruption. In the inflammation assay, LPS did not stimulate a significant inflammatory process. In the model viral assay (VSV-SARS-CoV-2-S), the NPs reduced the relative % of viral infection in vitro in astrocytes. Therefore, biosurfactant NPs with protease inhibitor nafamostat are a promising option due to their size, low polydispersity, slow release rate, pore formation in lipid bilayer membrane (SBLM) and reduction of viral infectivity (VSV-SARS-CoV-2-S).

Keywords: Nanoparticles; Protease inhibitor; SARS-CoV-2; CNS.

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Comparison of genicular nerve denervation by cooled radiofrequency using classic and revised anatomical targets for the management of osteoarthritis pain in the knee

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Osteoarthritis is a chronic and progressive disease characterized by pathological changes in joint tissues, leading to pain and impaired joint function, significantly impacting patients' quality of life. Treatment strategies aim to reduce pain and improve function through non-pharmacological, pharmacological, and surgical approaches, such as total joint replacement. However, for patients who do not respond to conservative treatment and who cannot or do not wish to undergo arthroplasty, options are limited. One alternative is the cooled radiofrequency (CRF) technique, a minimally invasive procedure that reduces pain perception by performing neurotomy through thermal activity. Traditionally, this technique targets the genicular nerves of the knee. However, recent studies suggest that these targets do not provide complete pain relief, proposing new targets such as the recurrent peroneal nerve and the infrapatellar branch of the saphenous nerve. Validation of these revised targets requires further studies. This study aimed to evaluate the effectiveness of the CRF procedure using both classic and revised targets, and to compare pain intensity with pharmacological treatment. The study was approved by CAAE n° 55647722.5.0000.5142, the study was prospective, randomized, and double-blind. Patients with knee osteoarthritis and moderate to severe pain for at least 3 months underwent a block test. Those who achieved at least 50% pain improvement were randomly assigned to one of three groups: CRF with classic targets (CRF-CT), CRF with revised targets (CRF-RT), or a conservative group (CG) receiving pharmacological treatment. All patients received continuous oral analgesic medication (pregabalin 75 mg, 2x/day and duloxetine 60 mg, 1x/day). The CRF groups underwent minimally invasive procedures targeting the respective nerves. Patients were followed for 6 months to assess pain intensity. Out of 180 recruited patients, 22 were eligible to continue in the study. Only 10 met all inclusion criteria and were included in the study; 80% of these were female, with an average age of 70.3 years, and the right knee was most affected (70%). Initially, 60% of the patients reported severe pain on the visual analog scale (VAS), while 40% reported moderate pain. After randomization, 5 patients were assigned to the CRF-RT group, 2 to the CRF-CT group, and 3 to the CG group. Due to lack of patient compliance, a 6-month follow-up was not possible. Results indicated that 2 patients in the CRF-RT group, 1 in the CRF-CT group, and 1 in the CG group showed pain improvement tendency after 1 month. Based on VAS scores, improvement was more pronounced in patients who underwent the CRF procedure, both with classic and revised targets, compared to those in the conservative group. However, the study lacked the statistical power to determine the significance of this pain improvement, indicating the need for further research.

Keywords: Denervation of sensory nerves; Chronic pain; Gonartrose; Interventional pain procedure.

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Effect of cannabidiol (CBD) and its analogues (PQM 302 and 309) in experimental models of epilepsy: in vitro and in vivo approaches

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Epilepsy is a neurological disorder characterized by the occurrence of periodic unpredictable seizures. In one-third of cases, conventional drug treatment is ineffective. Cannabidiol (CBD), the main non-psychotropic compound in the *Cannabis Sativa* plant, has shown potential as an anticonvulsant. It is believed that some of its analogues may be equally effective in alleviating epilepsy symptoms. This study aims to evaluate the effect of CBD and its analogues, PQM 302 and 309, using *in vitro* and *in vivo* models of epilepsy. *In vitro* tests included cell viability assays, quantification of glutamate and glutamine in astrocytes using HPLC, analysis of GFAP expression and evaluation of neuronal electrical activity. *In vivo* experiments utilized a PTZ-induced epilepsy model in P11 Wistar rats and 7dpf Zebrafish larvae. In rats, latency and duration of seizures were assessed. Zebrafish parameters (speed, distance, rotation) were measured using Danio Vision equipment. Additionally, neuronal marker gene c-Fos was quantified in Zebrafish larvae. Experimental groups were compared using One-way ANOVA (Tukey's post hoc test); significance was set at $p < 0.05$. *In vitro*, CBD and analogue 309 (10µM) reversed cell viability loss observed in the glutamate group, consistent with HPLC quantification showing increased intracellular glutamate and glutamine with analogue 309. Neuronal electrical activity analysis indicated that CBD and both analogues normalized neuronal spike activity. For the *in vivo* tests in rats using a concentration of 30mg/kg of CBD and the analogues, no differences were observed in the analyzed parameters. However, in the zebrafish model, using three different concentrations (10, 35, 100µM), both analogues showed reduced speed and distance compared to the PTZ group, with analogue 309 notably reducing rotation behavior. Neuronal activity assessed by c-Fos quantification showed significant reduction with CBD and analogues compared to the PTZ group. These findings suggest that CBD and its analogues 302 and 309 hold promise as potential treatments for epilepsy.

Keywords: Hyperexcitability; Behavioral Analysis; *Cannabis Sativa* L.

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Effect of oral sodium nitrite treatment on kidney damage in Renovascular Hypertension of 2 kidneys, 1 clip (2K1C) in rats

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Renovascular hypertension (RH) is characterized by decreased availability of nitric oxide (NO), resulting in oxidative stress and consequent activation of matrix metalloproteinases (MMPs). Nitrite is a physiologically recycled metabolite that forms NO. Furthermore, treatment with this metabolite has antihypertensive effects mediated by its antioxidant capacity. However, the renal effects of treatment are not known in the 2K1C model. Therefore, this study aims to evaluate the effect of sodium nitrite treatment on kidney damage caused by HR 2R1C. Hypertension was induced by clipping the left renal artery (2K1C) in Wistar rats, and two weeks after surgery the animals were treated with two doses (1 mg/kg/day or 15 mg/kg/day) of sodium nitrite or vehicle for 4 weeks, by gavage. Blood pressure (BP) was checked weekly by tail plethysmography. To assess renal function, plasma urea and creatinine were determined. MMP-2 activity was analyzed using gel zymography. Oxidative stress was evaluated through the activity of catalase (CAT), superoxide dismutase (SOD), levels of reduced glutathione (GSH), lipid peroxidation and O2- levels. Treatment with 15mg/kg/day of sodium nitrite reversed the increase in BP in hypertensive animals ($p<0.05$, C:126.7±3.677; H:170.5±6.542; H15:162.4±6.712) and improved renal function previously impaired by hypertension (urea $p<0.05$; :0.648±0.173). As expected, the activity of MMPs was increased in the hypertensive group, with a decrease after treatment with 1 mg/kg/day of sodium nitrite. As for CAT and GSH, there was a decrease in activity in hypertensive animals, with an improvement in the group treated with nitrite 15mg/kg/day (CAT $p<0.05$, C:0.651±0.255; H:0.2772). ±0.1837; H15: 0.6654 ±0.1440 and GSH: $p<0.05$, C:44.80±10.59; 0.158; C15: 0.361±0.087; H: 0.497±0.113; :3.844±1.598; H1:0.9643±0.2063; H15:0.4431±0.1838). However, treatment at both doses only showed a tendency to decrease enzymatic activity (C:0.05137±0.02790; C15:0.06226±0.02342; H:0.09318±0.04963; H1:0.04224±0.01483). Considering all this, our data suggest that hypertension affected the kidney function of the animals, and treatment with sodium nitrite showed better results in this parameter. These findings appear to be related to the improvement in the renal antioxidant defense of these animals with treatment with sodium nitrite.

Keywords: Sodium Nitrite, Kidney, Renovascular hypertension, Oxidative Stress.

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Effectiveness and safety of Cimicifuga racemosa and Black mulberry compared to Soy isoflavones for the treatment of climacteric symptoms: a review of systematic reviews

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During menopause, phytotherapy is used as a natural therapeutic option because these are plants with actions similar to estrogen (Hoefel & Sartori, 2022). *Cimicifuga racemosa* (CR) is highlighted as relevant in alleviating symptoms as well as in gynecological disorders (Kenda et al., 2021). The use of *Morus nigra L* (AN) extract, as well as tea made from its leaves, is indicated for menopause disorders and is considered a potential natural medicine (Silva, 2019). *Soy isoflavones* (IS) have shown beneficial evidence during the climacteric period, alleviating symptoms such as hot flashes, sweating, cholesterol control, and osteoporosis prevention (Vieira et al., 2014). Our hypothesis is that CR and AN extracts are more effective and safer compared to IS in controlling climacteric symptoms. This study aims to evaluate this hypothesis through an overview, addressing the following research question: Is the use of *Cimicifuga racemosa* and *Morus nigra L* more effective and safe in treating climacteric symptoms compared to *Soy isoflavones*? The review was registered with PROSPERO, and inclusion and exclusion 2 criteria were established. The PICO acronym was used. The main search was conducted using DeCS/MeSH descriptors in 5 databases: Medline PubMed (n=68), Web of Science (n=80), Cochrane (n=21), Embase (n=341), and Lilacs (n=2). Secondary searches in the gray literature were performed by cross-referencing the terms "Cimicifuga" AND "Isoflavones" on 3 websites: Mednar (n=244), Google Scholar (n=100), and World Wide Science (n=567). The searches were conducted from August to October 2023. No search filters, date, or language limitations were applied. Following the PRISMA flowchart, screening and elimination of duplicates were carried out in EndNote and subsequently in RAYYAN. The studies were selected independently by two authors, calibrated with a KAPPA index of 0.775 (95%). A total of 1,037 studies were included for full-text reading, 21 were eligible for the study, and 6 were included in the overview. AMSTAR 2 was used to assess the quality of these studies. Phytotherapeutics CR and IS are widely used for treating climacteric symptoms, while AN had moderate use. No studies were identified with an exclusive and direct comparison between CR/IS and AN/IS. These results emphasize the importance of developing future studies that can clarify the effectiveness and safety of CR, AN, and IS compared to each other, thus providing more safety and quality of life as alternative treatments for controlling climacteric symptoms.

Keywords: Menopause; Phytotherapeutic Treatment; Complementary Integrative Practices.

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Effectiveness and Safety of Viminol in treatment of pain: a systematic review

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Although viminol is approved and used in practice, there is a lack of recent scientific evidence, as its pharmacological studies date back to the 1970s. Therefore, the objective of this review was to evaluate the effectiveness and safety of viminol to support clinical decision-making. The review was performed according to the following question: "Is the viminol more effective and safer than other analgesics in the treatment of acute or chronic pain?", outlined through the PICOS strategy. The search was performed in five databases. Randomized clinical trials with adult patients with acute or chronic pain were included, with safety and effectiveness as outcomes. In total, 14 articles were included in this review, two of which were eligible through the databases and 12 through manual search. These are old studies and totaling 2,353 patients. Viminol was predominantly administered orally at a dose of 60 to 280 mg/day in a single dose, for a maximum of 40 days of treatment. In some studies, viminol was more effective than placebo, in others, more effective than the reference, but in the vast majority, without significant differences. Overall, it was well tolerated. However, all included studies had a high risk of bias and the certainty of evidence for the outcomes analyzed was very low. Studies on viminol in pain are old and lack methodological rigor to improve the robustness of the evidence generated. Therefore, there is a lack of more recent and complete studies to guide the clinical choice of viminol.

Keywords: Viminol. Dividol. Drug-Related Side Effects and Adverse Reactions. Drug effects.

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Effects of probiotics on markers of oxidative and nitrosative stresses and damage associated to inflammation in non-communicable diseases: a systematic review and meta-analysis of randomized placebo-controlled trials

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Inflammation and oxidative and nitrosative stresses (ONS) are serious complications in some non-communicable diseases (NCDs), including endocrine and metabolic, those of the central nervous system (neurodegenerative diseases and psychiatric disorders), among others. The beneficial probiotic microbes, part of the gut microbiota, such as those belonging to the genus Lactobacillus, Bifidobacterium and Streptococcus, are believed to decrease ONS and inflammation in NCDs. Thus, we conducted this systematic review and meta-analysis of randomized controlled trials (RCTs) to elucidate the effects of probiotics in attenuating the ONS and damage associated with the inflammatory process in NCDs. 15 studies were included. A comprehensive search was carried out in databases such as PubMed, Scopus and EMBASE. Studies were included if they compared probiotics with placebo in patients with NCDs. The quality of the studies was assessed using the Cochrane Risk of Bias (RoB 2) tool. Data were extracted and analyzed using Meta Essentials software, applying a random effects model to calculate the combined effect size. There were positive effects of probiotic in increase total antioxidant capacity (TAC) [overall, SMD(SE) = 0.75 (0.22), 95% confidence interval (CI) 0.28 to 1.23, significant p-value < 0.05, I2 = 87.50%] and malondialdehyde (MDA, overall, SMD(SE) = 1.03 (0.31), CI 0.37 to 1.7, I2 = 93.88%). Glutathione (GSH), nitric oxide (NO), high-sensitivity C-reactive. protein (hsCRP), IL-6, and TNF-α levels were also positively influenced by intervention with probiotic, but with no statistic significance and or wide CI and high heterogeneity (I2 >50%). A low risk of bias (RoB 2) was observed for most studies. Therefore, there is evidence that probiotic can present positive effects in increase TAC and decrease MDA levels to prevent O&NS in NCDs, but the magnitude of these effects as well what is the most effective (which reflects potency) are still unclear.

Keywords: Glutathione Synthase, C-Reactive Protein, Lactobacillus, Bifidobacterium.

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From molecules to care: evidence-based practice in Alzheimer's disease

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Alzheimer's disease (AD) is the most prevalent neurocognitive disorder worldwide, affecting approximately 50 million individuals globally. With projections indicating a threefold increase in this number by 2050, AD has become a major focus of research across various fields, including pathophysiology, cellular models, diagnosis, and treatment. Recent studies have revealed that cellular and biomarker alterations can manifest up to 15 years before the onset of clinical symptoms, supporting the notion of AD as a distinct biological entity rather than simply a form of neurocognitive impairment. Advancements in immunotherapy have also opened up avenues for enhanced clearance of β-amyloid, a central pathological hallmark of AD. The surge in research activity reflects the growing concern of the scientific community regarding this debilitating disease. This comprehensive review on Alzheimer's Disease (AD) employed a narrative review methodology, meticulously synthesizing current knowledge from various sources, including primary research studies, review articles, and books. The aim was to present a cohesive and well-organized account of the current state of understanding on AD, encompassing its cellular mechanisms, pathophysiology, diagnosis, and treatment, incorporating the latest advancements in research. A comprehensive search for relevant literature was conducted using various academic databases, including PubMed, Scopus, Web of Science, and Google Scholar. The search terms included "Alzheimer's Disease," "AD," "cellular mechanisms," "pathophysiology," "diagnosis," "treatment," "biomarkers," "immunotherapy," and "β-amyloid." Additional sources were identified from reference lists of relevant articles and through expert recommendations. The limitations of the review were acknowledged, including potential biases in the selection of literature or the interpretation of findings. Directions for future research were suggested to address these limitations and further advance the understanding of AD. This narrative review provided a comprehensive overview of Alzheimer's Disease, encompassing its cellular mechanisms, pathophysiology, diagnosis, and treatment, incorporating the latest advancements in research. The review highlighted the growing body of knowledge on AD, emphasizing the need for continued research efforts to develop effective preventive measures, diagnostic tools, and therapeutic interventions for this debilitating disease.

Keywords: Aging; Alzheimer's disease; neurocognitive disorder; dementias

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Neuropsychomotor development in children from a municipal autism center and factors associated with suspected NPMD: a case-control study

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Neuropsychomotor developmental delay (NPMD) can have several etiologies, such as prematurity, drug and alcohol use during pregnancy, exposure to prenatal and postnatal smoking, among others. Currently, the literature has emerging evidence that shows the harm of maternal smoking from the gestational period to childhood and how this impacts the health and development of exposed children. Breastfeeding, endorsed by leading health authorities due to its multiple benefits, is recommended even in contexts of maternal smoking. However, there are still gaps in knowledge about the interactions between tobacco exposure, breastfeeding and its concomitant effects on children's neuropsychomotor development. In this perspective, the present study aims to develop a retrospective case-control study, in order to establish the causal relationship between early exposure to smoking and neuropsychomotor development and whether breastfeeding acts as a protective factor, despite exposure to smoking in children. For this, mother-child pairs referred to the Municipal Autism Center (MAC) in the municipality of Alfenas/MG will be evaluated regarding sociodemographic factors and family history, based on a tool developed by the authors. The neuropsychomotor development of the children - between 0 and 6 years of age - will be evaluated using the Denver II scale. In a univariate analysis, the odds ratio (Oddis ratio) and their respective confidence intervals will be calculated in order to evaluate the preliminary association between each independent variable and the suspicion of NPMD. The main confounders will be controlled through logistic regression in a multivariate analysis. At the moment, the work is being forwarded to the institution's Human Research Ethics Committee. Data collection is expected to be completed by the second half of 2025.

Keywords: neuropsychomotor development; smoking; breastfeeding.

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Profile of puerperal women in a city in the south of Minas Gerais

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The characterization of the profile of postpartum women constitutes an instrument for obtaining data that contribute in planning actions to provide improvements in the quality of health care. The aim of this study was to investigate the socio-economic and obstetric profile of puerperae assisted in a public maternity in a city in the South of Minas Gerais. This is a quantitative, cross-sectional, descriptive study. Data were collected through interviews with puerperal women in rooming-in care and home visits up to the 10th day postpartum. The research was approved by the Research Ethics Committee of the Federal University of Alfenas (CAAE:58707922.8.0000.5142). A total of 140 puerperal women aged between 19 and 43 were interviewed. Most puerperal women (92%) live with the baby's father, 57% are married, 28% are in a stable relationship and 15% are single. As for education, all are literate, 28% have completed primary education, 45% have completed secondary education and 21% have completed higher education. 64% of puerperal women perform paid work and 58% of them take maternity leave. Regarding lifestyle habits, 2% smoke, 11% have household contact with a smoker. Regarding obstetric history, 50% are primiparous. All puerperal women underwent prenatal care, 95% started consultations in the first trimester. Among the pathological antecedents, 28% had chronic diseases before pregnancy (anxiety disorder and/or depression, hypothyroidism, obesity and systemic arterial hypertension). Throughout pregnancy, 11% developed pregnancy-specific hypertensive disease and/or gestational diabetes and 10% had a urinary tract infection. All puerperal women want to breastfeed and feel supported and 75% maintain exclusive breastfeeding after 10 days of the baby's life. Puerperal women reported fissures and pain as difficulties in breastfeeding. This study allowed us to outline a profile of puerperal women with informations that can contribute to improve comprehensive maternal-infant care.

Keywords: Postpartum period; breast feeding; health profile.

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Proteomic study on the role of Angiotensin-(1-7) in the modulation of glutamate mediated by astrocytes

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In addition to the well-known glutamatergic pathways in the central nervous system (CNS), peptide neuromodulation systems play a crucial role in regulating neuronal and glial functions. A prominent example is the Renin-Angiotensin System (RAS), which, although traditionally viewed as an endocrine system, is now recognized for its local influences on physiological functions and responses to pathological conditions. Within this system, Angiotensin-(1-7), an active heptapeptide derived from Ang I or Ang II, stands out as it acts through the Mas receptor. This peptide is notable for its promising effects in various conditions, such as epilepsy, a chronic CNS disorder characterized by abnormal brain activity, leading to symptoms like seizures and loss of motor control. Epileptogenesis is linked to an imbalance between excitatory neurotransmitters, like glutamate, and inhibitory ones, such as GABA. Astrocytes play a fundamental role in regulating excess glutamate in synapses by using specific transporters, like GLAST and GLT-1. In this context, Ang-(1-7) has shown promise in providing neurological protection against pathophysiological conditions. This study investigated how Angiotensin-(1-7) affects protein expression and signaling pathways in hippocampal astrocytes subjected to an *in vitro* model of glutamate-induced excitotoxicity. Approximately 15 neonatal Wistar rats, born from breeding pairs at the Experimental Vivarium of the Physiology Laboratory at the Federal University of Alfenas/MG, were used. Two days after birth, male pups were euthanized by decapitation, and their hippocampi were dissected. The procedures adhered to ethical guidelines approved by the Animal Ethics Committee, under the protocol "Effects of Peptide Stimulation on Glutamatergic Signaling in Hypothalamic Astrocytes In Vitro," and a new project was approved under number 0004/2021. Primary hippocampal astrocytes were treated with Ang-(1-7) (1nM), glutamate (1mM), and the Mas receptor antagonist, A779 (10µM). Using MaxQuant software and the Uniprot database for Rattus norvegicus, statistical analyses were performed using Perseus. Proteomic analysis identified 2313 proteins across the three treatment groups: Ang-(1-7), glutamate + Ang-(1-7), and glutamate + Ang-(1-7) + A779, each displaying a unique protein expression profile. Key proteins involved in processes such as intracellular trafficking, glutamate transport, calcium regulation, chaperoning, cell adhesion, proliferation, and oxidative stress were detected. The importance of proteins related to the glutamate-glutamine cycle, essential for CNS homeostasis, was highlighted. Thus, this study not only identifies potential therapeutic targets among the analyzed proteins but also investigates the signaling pathways influenced by Ang-(1-7) in astrocytes, providing valuable insights for the development of new therapeutic strategies aimed at modulating brain function and protecting against pathological conditions associated with glutamate excitotoxicity.

Keywords: proteomic, ang-(1-7), epilepsy, glutamate-glutamine cycle, astrocytes.

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HEALTH AND PHARMACY

Aesthetic challenges in controlling androgenetic alopecia

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Male androgenetic alopecia is a pathology resulting from the stimulation of hair follicles by male hormones, specifically testosterone. In individuals with a genetic predisposition to baldness, testosterone is converted into dihydrotestosterone (DHT) by the enzyme 5-alpha reductase. DHT then affects the hair follicles causing a progressive decrease with each hair growth cycle, which becomes smaller and thinner. The hair cycle consists of three main phases: anagen, with a high rate of proliferation and differentiation, catagen, in which the production of proteins and pigment is suspended and there is controlled involution of the hair follicles, and telogen, in which the hair shaft is detached and removed from the follicle. The treatments available aim to increase the coverage of the scalp and slow down the progression of hair loss. The drugs approved by the regulatory agencies are oral finasteride and topical Minoxidil, both of which are used chronically for satisfactory results, but there is no total restoration of hair loss. It should also be noted that the side effects of these drugs, especially the first choice, finasteride, significantly compromise patient compliance with treatment. The use of non-drug therapies is also present in clinical practice, including microneedling and the use of low-intensity lasers. The presence of herbal medicines capable of acting on androgenetic alopecia should also be considered, since several studies have shown the positive effects of plant extracts in treating the condition in question. Thus, knowledge of the mechanisms of androgenetic alopecia, as well as the structure of 5-alpha reductase type 2, has led to the development of technological products for its control and treatment.

Keywords: Baldness; Androgenetic alopecia; 5-alpha reductase.

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Analysis of mixtures of methotrexate with P407, PEG 6000, and PVP K-30 by X-ray Diffraction

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Methotrexate (MTX) is an active pharmaceutical ingredient (API), immunosuppressant and nucleotide synthesis blocker, that is poorly soluble in aqueous solvents and poorly permeable. These physicochemical limitations result in low bioavailability. Polymers such as Poloxamer P407, polyethylene glycol 6000 (PEG 6000) and polyvinylpyrrolidone (PVP K-30) may be promising pharmaceutical strategies to improve solubility. This research was performed as preformulation study to understand the crystalline state of a potential solid formulation containing MTX with solubilizing polymers. Two physical mixtures were obtained: PM1 (Poloxamer 407:PEG 6000) and PM2 (PEG 6000:PVP K-30), both them containing 0,35% MTX. Powder X-ray diffraction was applied to analyze the mixtures and raw materials, using the following analysis conditions: range from 3° to 35° 2θ, Kα̅ Cu radiation source (λ=1.5406 Å), voltage of 40 kV, current of 30 mA, optical step of 0.02° and goniometer speed of 1°2θ/min. The MTX diffractogram showed several diffraction peaks, with the strongest one at 9.32° 2θ. The PEG 6000 diffractogram showed diffraction peaks at 19.28° and 23.38° 2θ. The P407 diffractogram showed diffractions peaks at 19.14° and 23.32° 2θ. The PVP K-30 diffractogram showed no diffraction due to its amorphous structure. The PM1 diffractogram showed diffraction peaks at 19.24° and 23.34°, and 23,42° 2θ, which probably match the polymers crystalline pattern. Although MTX also exhibited diffraction peak at 19.24° 2θ, its intensity was much lower than in PM1 (537 au and 2536 au, respectively) and no other Bragg peak related to MTX was noted in PM1 diffractogram. The PM2 diffractogram showed diffraction peaks at 19.18° and 23.30° 2θ, which match PEG 6000. The lack of MTX diffraction peaks in PM1 and PM2 diffractograms is not necessarily due API amorphization. Maybe it was no possible to identify MTX crystalline signs in the mixtures because its concentration is too low in relation to the polymers. According to the results, it was concluded that the association between PEG 6000 and Poloxamer 407 or PVP K-30 with 0.35% MTX does not change the polymers crystalline structure, that is to say it was no possible to detect solid state change in the physical mixtures evaluated.

Keywords: Drug development; Methotrexate; Polymers.

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Development and validation of an analytical method for the quantification of domperidone by high-performance liquid chromatography (HPLC)

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Validation is imperative for the application of an analytical method and includes several parameters. This process is regulated in Brazil by RDC 166/2017 of the National Health Surveillance Agency (ANVISA). The established parameters are linearity, selectivity, accuracy, precision, robustness, limit of quantification, and limit of detection. These parameters involve determining a working range where a satisfactory correlation exists between the analytical response and the analyte concentration. Objectives**:** This study aimed to develop and validate an analytical method for the quantification of domperidone in a dissolution test for orodispersible tablets containing three new solid forms of domperidone (L-mandelate of domperidone, saccharinate of domperidone monohydrate, and a cocrystal of domperidone and hydroquinone), obtained by water-assisted mechanochemical synthesis. Methods: For the development and validation of the analytical method, triplicate solutions of domperidone with concentrations of 1, 2, 3, 4, 5, 6, 7, and 8 µg/mL were prepared and analyzed by HPLC in isocratic mode under the following conditions: mobile phase composed of acetonitrile and Milli-Q water acidified with 0.1 % phosphoric acid (30:70 v/v), Altima HP C18 column (250 x 4.6 mm, 5µm particle size), flow rate of 1 mL/min, temperature of 30 degrees, and detection at 210 nm. For validation, all statistical parameters required by RDC 166/2017 were evaluated, including linearity, selectivity, accuracy, precision, robustness, limit of quantification, and limit of detection. Linearity was assessed by curve visualization, linear correlation coefficient (r), significance of the angular coefficient (F-test), analysis of residual dispersion and homoscedasticity. Selectivity was confirmed by the method's ability to measure the analyte without interference from other matrix components. Accuracy and precision were determined through repeated tests, while robustness was verified by analyzing the method's ability to withstand small and deliberate variations in operational parameters. The limit of quantification and the limit of detection were also established. Results: The validation of the method met all parameters required by RDC 166/2017, where the developed chromatographic method showed good chromatographic values for area, capacity factor, theoretical plates, and peak symmetry, ensuring reliability and consistency of the results. Conclusion: The developed analytical method was validated according to the parameters required by RDC 166/2017 of ANVISA, being crucial parameters to ensure the reliability, efficacy, and safety of the results, allowing the identification and quantification of domperidone in the new solid forms obtained by water-assisted mechanochemical synthesis in samples of orodispersible tablets.

Keywords: analytic chemistry; drug development; validation study.

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Development and validation of analytical method by high-performance liquid chromatography for determination of antibiotics in environmental samples

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Domestic sewage is a significant source of antibiotic contamination in water bodies. To address this issue, the National System for the Management of Controlled Products (SNGPC) databases were consulted to identify the five most commonly prescribed antibiotics in the city of Alfenas-MG, Brazil, whose excretion occurs predominantly in an unchanged form, indicating a high potential for water body contamination. Leveraging this data, the main objective of this study was to develop and validate an analytical method using high-performance liquid chromatography (HPLC) for simultaneous determination of key antibiotics: amoxicillin (AMOX), ceftriaxone (CEF), ciprofloxacin (CIP), levofloxacin (LEV), and clarithromycin (CLA) in water samples. The method utilized carbon nanotubes (CNTs) coated with tetraethyl orthosilicate (TEOS) as the concentration phase, which was characterized by DSC, TG, FTIR, and Zeta potential. Furthermore, studies were conducted to optimize the conditions for analyte concentration and elution in the concentration phase. The following variables were analyzed: conditioning pH of the stationary phase, sample pH, sample volume, eluent volume, and adsorbent mass. The observed results were statistically treated using a Pareto chart. For optimization of chromatographic conditions, pharmaceutical standards of the five antibiotics were dissolved at a concentration of 20 µg/mL. The chromatographic parameters were established based on literature and experimental tests varying mobile phase composition, pH of the aqueous phase, mobile phase flow rate, and chromatographic column. Characterization tests of the concentration phase showed differences between CNT and CNT-TEOS consistent with the incorporation of more hydrophilic groups, predominantly silicates. Regarding the concentration steps condition, based on the results observed from the Pareto chart, the elution volume and the adsorbent mass were established. Optimal chromatographic conditions were: UV detection of 223 nm for AMOX, CEF, CIP and LEV, and 205 nm for CLA; mobile phase flow rate at 1.0 mL/min XTerra MS C18 column (4.6 x 150 mm, 3,5 µm) as stationary phase; gradient elution with acetonitrile:phosphoric acid solution, pH 2.0; and 30°C temperature. Future steps include establishing the optimal conditions for the concentration step, using a Doehlert matrix to study the following variables: sample pH, conditioning pH, and sample volume. Furthermore, the method validation and application to environmental samples, and microbial resistance tests of projectrelevant drugs on microorganisms cultured from the samples.

Keywords: water samples; antibacterial drugs, high-performance liquid chromatography, carbon nanotubes.

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Evaluation of the solid-state properties of atorvastatin calcium trihydrate with hydrochlorothiazide for a combined fixed dose formulation: a long-term study

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Atorvastatin calcium trihydrate (ATV) is used to treat hyperlipidemia and may be prescribed in combination with another drug, such as hydrochlorothiazide (HCT), with diuretic action, to treat cardiovascular disorders. Therefore, an association in the combined fixed-dose could be a convenient way of reducing dairy intake, favoring the patient. PXRD, TG, DSC, and FTIR were used to characterize the samples in the long-term study at 0, 3, 6, 12, 18, and 24 months for the ATV+HCT 1:1 (w/w). Hirshfeld surface analysis with electron density projection was applied. XRD characterization was performed using CuKα radiation (λ=1.54056 Å) equipped with polycapillary optics under parallel geometry, coupled to a graphite monochromator, from 5° to 60° (2θ) with a step size of 0.01 °(2θ). Thermogravimetric (TG) curves were obtained using a Shimadzu DTG60H thermobalance with a heating rate of 10°C.min^{-1}, heated to 600 °C in a dynamic nitrogen atmosphere, and a flow rate of 50 mL.min^{-1} in an alumina crucible. The masses (~2.5 mg) were weighed directly on the TG balance. DSC curves were obtained using a Shimadzu DSC60 cell with a heating rate of 10°C.min^{-1}, heated to 400 °C in a dynamic nitrogen atmosphere, and a flow rate of 50 mL.min^{-1} in an aluminum crucible. Infrared (FTIR) analyses were carried out using a Perkin Elmer spectrometer in the range of 650 - 4000 cm^{-1} at room temperature with a resolution of 4 cm^{-1}. In a solid-solid binary mixture of HCT and ATV salt, once under static conditions, there is no external system perturbation; the two components still behave as a stable mixture and are unreactive at zero time. However, we observed a reduction in the number of peaks related to the ATV phase in the system as well as modifications in the reflection planes at 16.3°, 20.7°, 21.3°, and 24.3° (2), suggesting structural changes over time. Changes were also observed when a certain amount of energy was supplied to the system, as observed in the results obtained by the thermal analysis. These results suggest that an interaction between ATV and HCT occurred during the follow-up study as an aging process. Therefore, a combined fixed dose cannot be achieved for this preparation under such conditions.

Keywords: cardiovascular disorders; pharmacotechnical development; stability study.

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Forced degradation study for monixidil base

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Interest in manipulated medicines has grown in recent years due to their use as a valid therapeutic alternative, together with the customisation of dosage and pharmaceutical forms being appropriate for each patient's needs. Androgenic alopecia is a common pathology that affects individuals of both sexes and begins between the ages of 12 and 40, affecting 50% of the population before the age of 50. Minoxidil, a drug with a low therapeutic index, was used in the 1970s as an antihypertensive, administered as an oral tablet, but is currently restricted to refractory cases. One of the adverse effects observed with the use of minoxidil was excessive hair growth, which led the drug to a new therapeutic indication, the treatment of hair loss. In Brazil, there are Anvisa registrations for pharmaceutical solutions containing minoxidil sulphate at 50mg/mL indicated for topical use, however, for oral use, the drug has been manipulated as minoxidil base, in capsule form and with dosages varying from 0.25 to 5mg for the treatment of androgenic alopecia and associated diseases. In the literature, there are very few reports on stability studies for minoxidil base alone and in solid pharmaceutical form (capsules), which makes it difficult to monitor organic impurities resulting from the molecule's synthesis process, as reported in official international codes, and to establish a shelf life for manipulated formulas during the prescribed treatment. The aim of this work is to carry out forced degradation studies under different stress conditions (acid hydrolysis, basic hydrolysis, oxidation, thermolytic degradation, photolytic degradation and degradation by metal ions) for minoxidil base in solid form with a view to developing an analytical method indicating stability by HPLC/DAD, for application in the manipulated drug. The analytical method must meet the requirements of RDC 318/2019 and other stability guidelines, including system suitability, selectivity, linearity, accuracy, precision, limit of detection, limit of quantification and robustness. Forced degradation studies were carried out and all parameters remained within limits. Sensitivity to the drug was demonstrated when treated with HCl, NaOH and peroxide solutions. Degradation occurred gradually over time. Stability studies are an important tool for monitoring manipulated medicines to guarantee storage conditions and shelf life during prescribed use.

Keywords: Minoxidil. Androgenic alopecia. Forced degradation. Analytical validation.

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In silico evaluation of curcuminoids for potential use in androgenetic alopecia

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The presence of healthy hair represents an ideal of health, vitality, and youth, and its absence has a significant impact on people's emotional well-being. Alterations in the hair cycle can result in various conditions, such as androgenetic alopecia (AGA), characterized by the progressive loss of terminal hairs after puberty, which presents significant treatment complexity. Regulatory agencies approve the use of topical minoxidil and oral finasteride, which inhibits 5α-reductase type 2, preventing the formation of dihydrotestosterone (DHT). Finasteride can cause erectile dysfunction, ejaculatory disorders, and decreased libido, with effects that may persist after treatment discontinuation. Authors highlight the limitations of approved drugs in terms of safety and efficacy, leading to interest in plant-based alternatives. *In vitro* studies indicate that *Curcuma longa* L. extract inhibits 5α-reductase more effectively than finasteride, suggesting its potential against AGA. This study aims to evaluate, through *in silico* molecular modeling, the binding energy of the predominant curcuminoids in the extract to the target protein for potential use in formulations aimed at controlling AGA. Molecular modeling, a widely used method for designing computational molecules, elucidates and predicts molecular interactions and binding affinity. For molecular docking studies, the three-dimensional structure of 5α-reductase type 2, the enzyme responsible for converting testosterone to DHT, was obtained from the Protein Data Bank (PDB) and prepared using AutoDockTools. Regarding the ligands, three major components of the extract were used: curcumin, desmethoxycurcumin, and bisdemethoxycurcumin. Their structures were obtained from the PubChem library, where the finasteride molecule, used as a control molecule, was also obtained. Subsequently, all three-dimensional ligand and control molecules were energy minimized and converted to pdbqt format using OpenBabel. Finally, docking studies were performed using AutoDock Vina, and the results were analysed using Pymol and Discovery Studio. To validate the findings, redocking of the original ligand complexed with the crystallographic structure obtained from the PDB was performed. The study revealed a slightly lower binding energy for curcuminoids compared to finasteride, but with satisfactory results. Furthermore, the development of topical products is expected to be more effective in inhibiting the enzyme in the hair bulb and decreasing the adverse effects presented by the reference drug, which hinder treatment adherence, supporting its use for controlling the condition. The redocking calculation validated the molecular modeling with a value of 0.467 Å, demonstrating excellent precision in predicting molecular interaction.

Keywords: curcuminoids; androgenetic alopecia; molecular docking.

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Preformulation and compatibility studies for ibuprofen

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Nonsteroidal anti-inflammatory drugs (NSAIDs) have become the primary mode of therapy for rheumatic and other inflammatory diseases. Ibuprofen was the first of a new generation of NSAIDs, chemically distinct from its precursors; it was the first propionic acid derivative to be used in rheumatic practice. For appropriate development of drug products, it is necessary to understand the physicochemical properties of all pharmaceutical ingredients. To improve the understanding of the system, PXRD, TG, and DSC analyses were conducted for ibuprofen and methylcellulose in the pre-formulation for compatibility studies. Hirshfeld surface analysis with electron density projection was applied. The samples were characterized using X-ray powder diffraction (XRPD) and CuKα radiation (λ=1.54056 Å) equipped with polycapillary optics under parallel geometry, coupled to a graphite monochromator, from 5 °to 60º (2θ) with a step size of 0.01 °(2θ). Thermogravimetric (TG) curves were obtained using a Shimadzu DTG60H thermobalance with a heating rate of 10ºC.min-1, heated to 600 °C in a dynamic nitrogen atmosphere, and a flow rate of 50 mL.min-1 in an alumina crucible. The masses (~2.5 mg) were weighed directly on the TG balance. DSC curves were obtained using a Shimadzu DSC60 cell with a heating rate of 10ºC.min-1, heated to 400 °C in a dynamic nitrogen atmosphere, and a flow rate of 50 mL.min-1 in an aluminum crucible. The proposed formulation was obtained by solid dispersion 1:1 w/w in an aqueous medium via solvent evaporation. The applied techniques allowed the evaluation of solid-state properties, their formulation, and the physical mixture. These results indicate compatibility between ibuprofen and methylcellulose for a possible solid dispersion with satisfactory stability.

Keywords: nonsteroidal anti-inflammatory drugs; pharmacotechnical development; solid-state properties.

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Prospecting technologies containing mandelic acid to hyperchromia control

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Mandelic acid is used in skin care products, acting on epidermal renewal, acne control, and hyperpigmentation disorders. It is considered the safest among the others in the alpha-hydroxy acid family, as it has a higher molecular weight. The objective of this work was to carry out technological research on the use of mandelic acid in pigmentation disorders to verify its application as a depigmenting agent. Patent documents were searched in the European Patent Office (ESPACENET) database, checking the combination of keywords in the title, abstract and claim field. The Keywords used for this search were: mandelic x white*, mandelic x melasma, mandelic x melanin, mandelic x melanogen*, mandelic x dyscrhom* and mandelic x hyperc*. The documents found were spreadsheeted in Microsoft Excel software. The search retrieved 502 documents, however, with the qualitative analysis of the documents, both duplicates and those that did not meet the inclusion criteria were excluded. Thus, 45 documents report products for controlling pigmentation with mandelic acid. Countries such as China and the United States stand out among the main deposit territories. Of the total, 37 patent applications have been filed in the last 10 years, indicating a growing interest in the production of innovative products using mandelic acid. The results of this mapping also show that there are no highlights in the ranking of technology holders, since none of them filed more than two patent application filings and that the International Patent Classification Code that appears the most is A61K8/365, indicating that the main technological domain of cosmetic products or similar preparations for personal hygiene, specifically containing hydrocarboxylic acids and 2 ketocarboxylic acids. Therefore, it is concluded that mandelic acid presents current technological interest for the aesthetic control of hyperchromia, especially in cosmetic products.

Keywords: Mandelic acid; Hyperchromia; Depigmenting; Skin.

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Adsorption studies of carbamazepine on molecularly imprinted polymers

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Carbamazepine is classified as a class II drug (low solubility and high permeability). It is used in the treatment of convulsive disorders, bipolar disorder, epilepsy, mood disorders, among others. These conditions affect more than 50 million people worldwide. Carbamazepine carries a high risk of toxicity due to its low therapeutic index, compromising individual dose regulation. Anticonvulsant drugs block voltage-dependent sodium channels present in neural cells. Therefore, for carbamazepine to reach its binding site, it must cross the blood-brain barrier (BBB). The BBB acts as a mediator for the passage of substances from blood to the central nervous system (CNS), preventing the access of proteins, macromolecules, some amino acids, and various drugs. To overcome the BBB, the use of molecularly imprinted polymers (MIPs) as nanocarriers has shown promising potential in controlled drug delivery systems. MIPs are rigid three-dimensional nanostructures, often referred to as artificial antibodies due to their high selectivity. To utilize MIPs as carriers for carbamazepine, initial adsorption studies (kinetics and isotherms) must be conducted. Objective: Evaluate the drug-polymer interaction through adsorption studies. Compare the results obtained with non-imprinted polymers (NIP) through adsorption studies. Methods: MIP and NIP polymerization will be conducted using the in situ dispersed monomer method. Adsorption and interaction studies will include isotherm and kinetic assays. Results: The Avromi kinetic model best fitted the data from both MIP and NIP. Avrami's model suggests that when adsorbate and adsorbent come into contact, different types of adsorption mechanisms arise, with the adsorption mechanism being able to follow kinetics of multiple orders that change during carbamazepine contact with MIP/NIP. Regarding the isotherm, the Jovanovic model was more suitable for MIP, with qemax = 18.22 mg/g. Conversely, NIP isotherms followed the Langmuir model, with qemax = 15,16 mg/g. The qemax is of paramount importance for controlled release systems, it refers to the maximum capacity of the material to retain particles on its surface. The polymers, therefore, showed good adsorption capacity. This study is important to develop parameters for studies, which will be carried out later, *in vivo* on the release of carbamazepine.

Keywords: study; kinetics; isotherm;

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Analysis of the Impact of Continuing Teacher Education on the Prevention of Alcohol and Other Drugs Use from a Harm Reduction Perspective: The Role of the PREVINA Course

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The continued training of basic education teachers significantly contributes to their role as transformative agents within schools, particularly in raising awareness about preventing alcohol and drug abuse among adolescents. To support this effort, a lato sensu postgraduate course titled "Prevention of the Misuse of Drugs" (PREVINA) was implemented with the support of the Coordination for the Improvement of Higher Education Personnel (CAPES) in partnership with the Federal University of São Paulo (UNIFESP). Although the first edition of the course took place in 2018, there is still no information regarding its effective contributions to teacher development and the impact on the school communities they serve. This information would be valuable for contributing to the process of the course's potential national expansion. Thus, this study, in partnership with CAPES and UNIFESP, aims to analyze the impact of continuing teacher training through the PREVINA course on public school actions related to this topic, from the perspective of harm reduction, and its potential for expansion to other regions of the country. Research participants will be divided into two groups: Group 1 will consist of 150 former students from the 2018 edition of the PREVINA course, while Group 2 will include a pedagogical coordinator from a public school in each state and one from the Federal District. Although these coordinators may be unfamiliar with PREVINA, they will provide data on the realities of the "school floor," the impacts of alcohol and drug use, and what regional characteristics could be integrated into the PREVINA course during its expansion. After receiving approval from the Ethics and Research Committee (CEP, UNIFAL-MG), previously validated questionnaires will be administered to all participants in Groups 1 and 2. Following this, focus groups will be conducted with a sample of 30 participants from Group 1, and semi-structured interviews will be conducted with a sample of 10 participants from Group 2. The results will be analyzed using statistical methods, including Likert scale metrics, as well as document and content analysis based on Bardin's methodology. This study will identify the potentials and barriers in applying the knowledge acquired through continuing teacher education from the PREVINA course. It will also be complemented by the perspectives of pedagogical coordinators on their experiences, providing insights to improve public educational policies and contributing to the national expansion of the PREVINA course.

Keywords: Drugs of Abuse; Harm Reduction; Social Toxicology.

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Chromatographic optimization and spectrometric parameters for analysis of selective serotonin reuptake inhibitors (SSRIs) in environmental effluent samples by LC-MS/MS

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Currently, emerging contaminants (ECs) has gained attention, with a list in which human pharmaceuticals are among the most worrying ones. In particular, selective serotonin reuptake inhibitor (SSRI) antidepressants have been one of the most frequently encountered classes of antidepressants. The increasing use of SSRIs raises concerns about the presence of their residues in the environment, since, after administration. These medications can be excreted as the original compound and/or as a mixture of active and inactive metabolites, which even in small concentrations are capable of producing ecotoxicological effects on microorganisms, flora and fauna, and bioaccumulate throughout the food chain. Considering that the presence of SSRIs in aquatic effluents are not regulated in Brazil and the wastewater treatment plants available are not prepared to remove such drugs, the use of analytical techniques and methodologies capable of separating, identifying and qualifying each of these molecules at trace levels are indispensable. Therefore, this study proposes to optimize the chromatographic and spectrometric parameters for the identification and quantification of Citalopram (Cit), Duloxetine (Dul), Fluoxetine (Fluo), Paroxetine (Paro), Sertraline (Ser) and Venlafaxine (Ven), using MNP-OPP, followed by Liquid Chromatography Tandem Mass Spectrometry (LC-MS/MS). During the optimization, the chromatographic parameters tested, without the use of a chromatographic column, were mobile phase (solvents), mobile phase flow rate and injection volume. While the optimized spectrometric parameters were precursor ions, product ions and energies applied in the triple quadrupole analyzer (first quadrupole, collision chamber and third quadrupole), in MRM mode with negative electrospray ionization (ESI). As results, the optimal chromatographic conditions used a mobile phase of methanol with 1% phosphoric acid (99:01, v/v), flow rate of 0.2 mL/min and injection volume of 10 µL, achieving greater separation and intensity/area. The data obtained in studies present in the literature were took into account. The m/z precursor ions for Cit, Dul, Fluo, Paro, Ser and Ven were 325.20; 298.20; 310.10; 330.20; 306 and 278.20, respectively. Moreover, m/z 234 and 262; 122 and 154; 148 and 163; 109 and 192; 159 and 275; 121 and 147, respectively, were the product ions. Based on the obtained results, the optimized technique is promising for the simultaneous analysis of the aforementioned antidepressants in aquatic samples. In addition to this technique, a method is going to be improved, including the pre-concentration of SSRIs on effluents using the MNP-OPP, followed by analysis, aiming at the monitoring and environmental remediation.

Keywords: Antidepressants; Environmental Pollutants; LC-MS; Water Contamination Control.

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Exposure assessment of triazole fungicides through human biomonitoring and computational toxicology in Brazilian farmworkers

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Brazil is currently the world's largest coffee producer, and this commodity has played a significant role in the history and economy of the nation. The southern region of the state of Minas Gerais stands out as a primary grower of *Coffea arabica*, being responsible for 75.4% of the state's total coffee production. However, high coffee productivity relies on the continued use of pesticides which, while essential for agriculture, pose risks to human health and the environment due to their non-selective mechanisms of action. Triazole fungicides are widely used in agriculture to combat various fungal diseases. In mammals, these fungicides potently inhibit CYP450 and liver microsomal enzymes. Computational toxicology refers to the use of computational tools to support toxicological research and chemical safety assessments via predictive modeling and complex data analyses for extrapolation and translation between streams of evidence, particularly human biology-based new approach methodologies (NAMs) that serve as alternatives to animal testing. High-throughput screening (HTS) data annotated to toxicologically relevant molecular and cellular targets are also available for triazole compounds from the United States federal Tox21 research program. The objective of this study was to assess exposure to triazole fungicides through human biomonitoring and to integrate this human data with HTS data via computational toxicology workflows using the Integrated Chemical Environment (ICE). Volunteers were from the southern region of Minas Gerais, Brazil, included farmworkers and spouses occupationally and environmentally exposed to pesticides from rural areas (n = 140). The annotated HTS data were accessed in the ICE version 4.0.2, and the Search, Curve Surfer, IVIVE tools was utilized in the workflow. Three triazole fungicides, cyproconazole, epoxiconazole, and triadimenol, were detected in the urine samples of both men and women in the rural group by gas chromatography coupled to mass spectrometry. In the ICE workflow, active *in vitro* HTS assays were identified for these triazoles and three other active ingredients from the pesticide formulations used by the farmworkers. The curated HTS data confirmed bioactivities predominantly related to steroid hormone metabolism, cellular stress processes, and CYP450 enzymes impacted by fungicide exposure at occupationally and environmentally relevant concentrations based on the *in vitro* to *in vivo* extrapolation (IVIVE) models. The results highlight the potentially significant human health risk from the high frequency, intensity, and *in vitro* molecular target perturbations, particularly of exposure to epoxiconazole. They showcase the critical role of biomonitoring and the utility of computational tools in evaluating pesticide exposure and building confidence in NAMs in toxicological risk assessment studies.

Keywords: Pesticide exposure; Biomarkers; Computational Biology.

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Forest and wildland firefighter exposure to Polycyclic Aromatic Hydrocarbons during forest fires and health impacts: a systematic review

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Rising global temperatures due to climate change have affected the frequency, duration and severity of wildfires. Forest fires intensify deforestation and the emission of particles into the atmosphere, exacerbating of changes and creating a cycle of environmental destruction. These fires are responsible for the release of a wide range of chemical compounds into the atmosphere, including polycyclic aromatic hydrocarbons (PAHs). In this context, forest and wildland firefighters are exposed to physical, chemical and biological risks during their work. Exposure to PAHs has been reported to have genotoxic and oxidative effects, as well as DNA. In recent years, forest fires have been increased in several regions of the world, leading to increased exposure of these professionals to the chemical compounds. This literature review aimed to assess the health problems associated with firefighters' exposure to polycyclic aromatic hydrocarbons while fighting forest fires. This systematic review was previously registered in PROSPERO (International Prospective Register of Systematic Reviews) under the registration number CRD42024539449 and conducted according to the PRISMA methodology. A literature search was conducted from 2019 to 2024, and articles were searched in databases such as Scopus (n = 359), Web of Science (n = 57), CINAHL (n = 32), Pubmed (n = 59). Two authors selected the articles to be included in the review, initially based on the title and abstract of the studies. Studies were selected blindly and individually using the Rayyan literature review platform. A total of 698 articles were identified through the search, of which 191 were duplicates. Only 14 met all inclusion criteria. Most studies reported increased levels of OH-HPAs in biological samples of firefighters after some firefighting activity, including training, forest fire and others. The studies also reported a range of symptoms related to toxic organic compounds, including headache, burning eyes and difficulty breathing. The limited number of studies in this area underscores the need for a more comprehensive assessment of the exposures of these professionals, who will be increasingly relied due the Climate Change. Forest and wildland firefighters are exposed to a range of chemical compounds, including PAHs, which reinforces the need for ongoing health assessment of these professionals to prevent disease.

Keywords: Polycyclic Aromatic Hydrocarbons; Forest firefighters; Forest fires; Health impacts

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Gestational triclosan exposure and its effects on child neurodevelopment - a systematic review

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Triclosan (TCS) is a lipophilic antimicrobial agent commonly used in commercial and healthcare products. In September 2016, the U.S. FDA and the European Union banned TCS from soap products due to safety concerns. Despite these regulations, high concentrations of TCS are still found in other personal care products such as toothpaste, mouthwash, and hand sanitizers. Triclosan is easily absorbed through human skin and oral mucosa, and it has been detected in various human tissues and fluids. However, its toxicity and the adverse effects of continuous exposure, even at low concentrations, remain unclear. Triclosan disrupts thyroid hormone homeostasis and may be associated with metabolic disorders, cardiotoxicity, and an increased risk of cancer. Nevertheless, existing evidence on the association between prenatal triclosan exposure and adverse neurobehavioral outcomes remains limited. This systematic review aimed to verify the association between prenatal exposure to TCS and the occurrence of neurobehavioral impairments. Observational studies with pregnant women exposed to TCS during pregnancy were included, without gender or ethnicity restrictions. The MEDLINE, EMBASE, Scopus, Web of Science, and LILACS databases were searched up to February 27, 2024, to retrieve relevant studies. The reading of titles and abstracts was conducted, followed by a full-text review performed independently by two reviewers. Data extraction was conducted independently, and conflicts were resolved by consensus with a third reviewer. The included studies were assessed using an adapted version of the Downs and Black tool and qualitatively synthesized. Certainty of evidence was assessed by Grading of Recommendations Assessment, Development, and Evaluations (GRADE). The study protocol was registered with PROSPERO (CRD42024526426). Twelve cohort studies met the inclusion/exclusion criteria out of eighteen studies reviewed. The sample size among pregnant women/child pairs ranged from 193 to 794. Exposure to TCS during pregnancy, encompassing the first, second, and third trimesters, resulted in median concentrations ranging from 0.40 ng/mL to 28.2 ng/mL, with the highest levels detected during mid to late pregnancy. TCS exposure in all trimesters showed median concentrations of 0.40 to 28.2 ng/mL, peaking mid to late pregnancy. Cognitive tests varied: SRS-2 (three studies), WPPSI-III, BASC-2, and SDQ (two each), plus NEPSY-II, BRIEF-P, WISC-IV, GDS, BSID, WRAT-4, and VMWM (one each). Assessments were commonly at 3 years (five studies), 8 years (four), and 4, 5, 6, and 10 years sporadically. Three studies suggested a potential link between prenatal TCS exposure and neurodevelopment deficits. The studies included had low certainty of evidence. Consequently, the evidence does not confirm that prenatal TCS exposure leads to neurobehavioral disorders. The heterogeneity of the studies, their variable quality, and several confounding factors contribute to this uncertainty.

Keywords: Developmental disabilities; Neurobehavioral Manifestations; Pregnancy; Prenatal Exposure Delayed Effects; Systematic Review; Triclosan

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Magnetic particle spray mass spectrometry (MPS-MS) using restricted-access molecularly imprinted polymer for the extraction and analysis of tetracyclines in milk

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Tetracyclines are a class of broad-spectrum antibiotics used in the treatment of various bacterial infections. They stand out as drugs of choice for veterinary and agricultural use, mainly for the purposes of weight gain, prophylaxis and treatment of animals. However, indiscriminate use or use above the recommended doses has caused concern due to the possibility of residues in food of animal origin, consumed daily by the population. These residues can pose risks to public health. In this context, nanomaterials with selective properties associated with the MPS-MS technique are a promising tool for the extraction and analysis of analytes of interest in food samples. Thus, applying this new technique to detect residues in food can help to ensure food safety and protect consumer health. The objective of the work is to develop an analytical method using a restricted access magnetic molecular imprinting polymer selective for tetracyclines (tetracycline, oxytetracycline, chlortetracycline and doxycycline) in milk for analysis using the MPS-MS technique. For the methodology the nanomaterials were obtained in four stages: synthesis of the magnetic material Fe3O4 through co-precipitation; modification of the surface of the magnetic nanoparticles; molecularly imprinted polymerization; and coating with bovine serum albumin. Therefore, restricted access molecularly imprinted polymers (RAM-MIP) and restricted access non-imprinted polymers (RAM-NIP) were obtained. Characterizations will be carried out using scanning electron microscopy, Fourier transform infrared spectroscopy, thermogravimetric analysis and energy dispersive X-ray spectroscopy. The interaction and selectivity of the nanomaterials with tetracyclines will be evaluated by protein exclusion and adsorption studies. The method was optimized using a mass spectrometer for subsequent validation of the analytical method. After the synthesis steps, the nanomaterials that are being characterized were obtained. A protein exclusion test was carried out using the Bradford reagent, which showed that the materials coated with BSA had a higher exclusion rate (MIP-94.71%; RAM-MIP-103.11%; NIP-91.55%; RAM-NIP-103.49%). Adsorption studies will be carried out to verify the selectivity of the materials. In the optimization, the precursor and product ions were selected: tetracycline (445>410; 445>427; 445>154), oxytetracycline (461>426; 461>443; 461>201), chlortetracycline (479>444; 479>154; 479>462), doxycycline (445>428; 445>154) and deuterated doxycycline (448>341) was used as the internal standard. The studies have proved to be promising and in the end we hope to be able to develop an analytical method using direct desorption of analytes at the inlet of the mass spectrometer, since the technique in question has great potential and allows for rapid and low-cost analysis.

Keywords: Mass Spectrometry; Solid Phase Extraction; Nanostructures.

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Optimization of chromatographic and spectrometric parameters for analysis of urinary benzene and xylene metabolites by LC-MS/MS

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The neurotoxic effects triggered by exposure to xylene, and the genotoxic and hematotoxic effects promoted by contact with benzene, highlight the necessity for studies to quantify these solvents in exposed individuals. Furthermore, the high toxicity of these substances and their ubiquitous presence in certain work environments have prompted Brazilian legislation to establish maximum allowable limits for urinary metabolites of benzene and xylene to the biological indicators of exposure (IBE). Urinary metabolites of benzene, S-phenylmercapturic acid (S-PMA), trans-trans muconic acid (t,t-MA), and xylenes, meta and para- methylhippuric acid (m/p-MHA), are preconized to IBE, with allowable limits of 45, 750 and 1500 µg/L, respectively. In this context, this work proposes to optimize the chromatographic and spectrometric parameters for the identification and quantification of t,t-MA and S-PMA, and m/p-MHA by Liquid Chromatography tandem Mass Spectrometry (LC-MS/MS). The chromatographic parameters tested during optimization, using a C18 150 x 4.6 mm 5 µm chromatographic column from Agilent, were: mobile phase (solvents and proportion), mobile phase flow rate, injection volume, and column oven temperature. The optimized spectrometric parameters were precursor ions, product ions and energies applied in the triple quadrupole analyzer (first quadrupole, collision cell, and third quadrupole), in MRM mode with negative electrospray ionization (ESI). As results, the optimal chromatographic conditions were obtained using a mobile phase of 0.01 mol/L ammonium acetate and acetonitrile (80:20, v/v), a flow rate of 0.3 mL/min, an injection volume of 20 µL, and an oven temperature of 32°C, achieving greater separation and intensity/area. All these parameters were tested based on literature studies. Regarding spectrometric parameters, for t,t-MA and m/p-MHA, the mass-to-charge ratios (m/z) of 141.20 and 192.20 correspond to precursor ions; m/z 97.20 and 53.15, and m/z 148.15 and 91.25, are equivalent to the product ions of t,t-MA and m/p-MHA, respectively. For S-PMA, m/z 238.10 and 109.05 are the precursor and product ions. Based on the Brazilian limits, the analytical ranges used for the analytes S-PMA, t,t-MA, and m/p-MHA were 5 to 200 µg/L, 125 to 1500 µg/L, and 450 to 2500 µg/L, respectively. From the data obtained, it is possible to suggest that the optimized technique is promising for the simultaneous analysis of the urinary metabolites S-PMA, t,t-MA, and m/p-MHA. Using this technique, a method will be developed, including the preparation of urine samples, aimed at biomonitoring human exposure to benzene and xylene.

Keywords: Benzene; Biological monitoring; Biomarkers; LC-MS; Mass spectrometry; Xylene.

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HEALTH AND PHARMACY

Optimization of spectrometric mass conditions for determination of multiresidues of pesticides in food samples

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The exposure to pesticides through the ingestion of contaminated food, may cause harmful effects on human health, like intestinal problems, genotoxic effects and even possible association with the development of cancer. To better ensure quality in the food consumed, pesticide residue analyses can be used as tools to elucidate their condition for consumption. In this way, we aimed evaluate the spectrometric mass conditions for determination of pesticides in food samples by LC-MS/MS. To evaluate the mass conditions, standard of the following pesticides commonly used on vegetable and fruit crops such as tomatoes: diazinon, cyproconazole, ethion and chlorpyrifos, both in a concentration of 1 ppm, were injected into the chromatographic system containing a C18 separation column (Thermo Fisher, 5 µm 100x4.6 mm), oven temperature at 45ºC, flow rate of 0.2 mL/min and 100% methanol as mobile phase. The retention time, mass charge (m/z) of the precursor ion, as well two of the mean ion products were evaluated for each pesticide. After this evaluation, one of the product ions of each pesticide was selected to be used as a quantification fragment and the other, for identification. The ideal collision energy for fragmentation of each analyte was also evaluated. The retention time of pesticides evaluate was 5.2, 5.1, 5.5 and 5.6 minutes for diazinon, cyproconazole, ethion and chlorpyrifos respectively. Regarding the precursor ion, diazinon presented m/z = 304,90 with products of 169.1 (quantification) and 153.1, likewise collision energy of this products were -21eV and -20eV respectively. Ciproconazole presented m/z = 292 with products of 70 (quantification) and 125 as well collision energy of this products were -21 eV and -28 eV respectively. Ethion presented m/z = 384,80 with products of 143 (quantification) and 171 as well collision energy of -27 eV and -18 eV. Chlopyrifos presented m/z = 349,80 with products of 97 (quantification) and 197,80. The both collision energy was -34 eV and -18 eV respectively. The spectrometric conditions evaluated were efficient and able in the determination of pesticides in food samples like tomato. Finally, the spectrometric conditions evaluated showed potential capacity in the determination of different classes of pesticides presents in food and could be a useful tool in assessing exposure to pesticides.

Keywords: Food security; pesticide exposure; tomato.

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Use of magnetic copolymer poly (methyl methacrylic-co-ethylene glycol dimethacrylate) in magnetic dispersive solid phase extraction of anticonvulsants in saliva followed by HPLC analysis

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The present work aims to use a magnetic copolymer poly (methyl methacrylic-co-ethylene glycol dimethacrylate) in dispersive solid phase extraction of the anti-convulsants primidone, phenobarbital, phenytoin and carbamazepine in human saliva, followed by analysis by liquid chromatography. high efficiency. The drugs analysed were chosen due to their administration in control seizures and disorders resulting from epileptic conditions by inhibiting neuronal hyperactivity as a consequence of blocking voltage-dependent sodium and calcium channels and may also inhibit the neurotransmission of excitatory amino acids resulting in increased GABAenergetic activity of g-aminovutyric acid. The preparation of complex samples involves several steps until the conditions for chromatographic analysis are obtained, and the conventional materials used for such extraction cannot eliminate all the necessary interferents. Therefore, the material proposed in this project aims to improve selectivity, reducing sample preparation time and possible interference with analytes adsorption. The material was obtained in 3 steps: synthesis of Fe_3O_4 nanoparticles, functionalization of the nanoparticles by coating with TEOS (tetraethylorthosilicate) and modification of the functionalized nanoparticle with MPS (3- (trimethoxysilyl) propyl methacrylate) and finally, the synthesis of the copolymer. The characterization of the material was carried out by zeta potential, infrared and scanning electron microscopy, revealing through the physical and chemical characteristics that the material was correctly synthesized. The analytical development was executed by multiresponse optimization, through the central rotational composite design using global desirability as variable response, analysing the variables pH, sample volume and amount of material mass, which resulted in optimal conditions of pH 5.87, volume 2.17mL and 12.87mg of material. The interaction of the material with the analytes was evaluated through kinetic and isotherms adsorption studies, in which the models that best fitted the data were the Avrani and Jovanovic models respectively. From the data obtained, it can be stated that this work contributes to improving analytical performance (chromatographic peaks and areas) and the adsorption of drugs by the material in a saliva sample, thus helping in the therapeutic monitoring of drugs administered by patients. The results obtained indicate that the developed analytical method allows the simultaneous detection of drugs, indicating that the magnetic copolymer is a promising material in sample preparation and chromatographic analysis.

Keywords: antiepileptic drugs; therapeutic monitoring; magnetic nanomaterials; sample preparation.

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Analysis of the direct costs of hospital pharmacotherapy applied to COVID-19 in Alfenas -MG

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The coronavirus disease (COVID-19) pandemic has prompted an urgent search for pharmacological interventions, but little research into the financial impact of these treatments. The imposition of extraordinary demands, especially in hospital environments, has exceeded the capacity to provide care, revealing the need to evaluate practices to optimize the use of public resources made available. The aims of this study were to analyze the direct costs of hospital pharmacotherapy applied to COVID-19 in Alfenas, Minas Gerais. This is a cross-sectional descriptive study, carried out with the pharmacological prescriptions of 216 patients hospitalized for COVID-19, at Santa Casa de Alfenas, from March 1, 2020 to March 1, 2021. The information on pharmacological interventions was collected from the patients' medical records and the costs were passed on by the "Hospital Health Cost and Quality Management" sector of the study hospital or by consulting the SUS Table of Procedures, Medicines and OPM Management System (SIGTAP). The data was treated using descriptive statistics and presented as absolute and relative frequencies, means and standard deviations. The study was approved by the Research Ethics Committee of Federal University of Alfenas. The total cost of hospital pharmacological treatment was R$ 177,266.43 during the study period. The average daily cost per patient was around 51% (R$122.00) of the amount provided by SUS for hospital management of COVID-19. Antibacterial drugs and anticoagulants consumed most (79%) of the costs of drug therapies. Azithromycin was the most commonly used antibiotic, but clarithromycin had the highest cost relative to its therapeutic group (34%). Enoxaparin was the most prescribed drug, consuming a total of R$52,989.26, which represented 30% of the total expenditure on medicines and 82% of the cost relative to the class. Anti-inflammatory drugs consumed 7% of total expenditure, with methylprednisolone accounting for the highest expenditure among the drugs in its class (R$8,951.68). Anti-parasitic drugs had the least impact on spending, accounting for around 1% (R$1,739.9) of the total cost of treatment for COVID-19. in the healthcare institution. Prescriptions without a scientific basis for COVID-19, such as antibacterials and antiparasitics, represented an unnecessary expense, which may also have contributed to increased hospital stays and morbidity and mortality, leading to secondary costs. On the other hand, drugs with scientific evidence of effectiveness in the disease, such as anti-inflammatories and anticoagulants, may have prevented more damage and/or deaths. The study therefore highlights the need for pharmacoeconomic studies of current treatments and the importance of rational drug use, so that new versions of drug protocols for the disease can be optimized in terms of cost-benefit, both for patients and for the health system.

Keywords: Coronavirus Infections; Pharmacological Treatment; Hospital Costs; Cross-Sectional Studies.

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HEALTH AND PHARMACY

Drug-related adverse reactions in the management of tuberculosis

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Adverse drug reactions (ADRs) used in tuberculosis (TB) therapy are an ongoing concern due to their frequency, severity and nature. Research indicates that pharmaceutical monitoring can improve treatment adherence and reduce drug-related problems (DRPs), such as drug interactions and ADRs. Rifampicin, isoniazid, and pyrazinamide are used as antituberculous agents. They are used globally for first-line treatment of fully sensitive tuberculosis. The present study is a literature review, carried out on the UpToDate platform and in the databases: PubMed and Google Scholar considering the affinity of the works with the chosen theme, published between January 2019 and July 2024, in the English languages, Spanish and Portuguese. The descriptors "Pharmaceutical Care", "Pulmonary Tuberculosis", "Side Effect and Adverse Reactions Related to Medicines" and "Medication Toxicity" were used in its title, combined with the search strategies "OR" and "AND". Recent studies of scientific evidence on adverse reactions to medications in the treatment of tuberculosis were examined. 5.374 articles were found. After applying the inclusion and exclusion criteria, considering eligibility, relevance to the topic and the presence of keywords, 25 articles comprised the study sample. The results highlight that the most frequent side effects were rash, vomiting and nausea, but symptoms such as fatigue, elevated liver enzymes, yellowing of the eyes and skin were also observed, which were more frequent and severe. Symptom burden was significantly higher in women than in men. Patients aged 60 years or older represent 48.5% of cases, mainly affecting the gastrointestinal systems (32.0%), skin and appendages (25.9%), and liver and biliary system (14.2%). Most ADRs occurred within a month, but some were reported after two months. Data from 2009 to 2018 from the Adverse Drug Event Reporting System in South Korea, 1,562,024 ADRs were recorded, with 17,843 (1.14%) related to first-line anti-TB drugs. Rifampicin (28.7%), Isoniazid (24.0%), Ethambutol (23.4%) and Pyrazinamide (23.9%) were the most reported medications. Advanced age is an independent risk factor for developing intestinal problems, such as gastrointestinal intolerance, but not for liver problems, such as hepatotoxicity. Pyrazinamide was responsible for the majority of serious adverse events, mainly hepatotoxicity and gastrointestinal intolerance, especially in elderly patients. Rifampicin significantly interferes with the effects of established antihypertensives such as calcium channel blockers, beta blockers and diuretics, affecting blood pressure control. Understanding the pharmacokinetic and pharmacodynamic parameters of anti-TB drugs is essential for creating effective and safe therapeutic regimens Against TB.

Keywords: Pulmonary tuberculosis; Adverse drug event; Metabolic side effects of drugs and substances; Drug toxicity.

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Effect of galactoglucomannan extract on modulating gut microbiota and protecting against Dimethylhydrazine-induced colorectal lesions

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Aqueous extracts obtained from Norwegian spruce (*Picea abies*) bark sawdust through non-polluting green chemistry extraction are rich in Galactoglucomannans (GGM). GGM has the potential to be applied as a soluble dietary fiber similar to guar gum and other galactomannans, which resist hydrolytic digestion and are fermented in the large intestine. As a fermentable carbohydrate, the consumption of GGM may be associated with intestinal health and reduced risk of colorectal cancer. However, understanding the toxicological safety and bioactivity of new extracts from unconventional sources is crucial for better valorization and utilization of renewable resources. Therefore, this study aimed to investigate the modulation of gut microbiota and the protective effect of GGM against 1,2-Dimethylhydrazine (DMH)-induced colorectal pre-cancerous lesions in male Wistar rats. In this study, 36 rats were divided into six experimental groups: G1 (negative control, EDTA), G2 (400 mg/kg GGM + EDTA), G3 (positive control, DMH), G4 (50 mg/kg GGM + DMH), G5 (200 mg/kg GGM + DMH), and G6 (400 mg/kg GGM + DMH). Colon cancer induction was performed via DMH injections (40 mg/kg) once a week for four weeks. At the end of the experiment, feces were aseptically collected for analysis of fecal bacterial content using RT-PCR. During euthanasia, the colons were collected for analysis of the frequency of aberrant crypt foci (ACF) and mucin-depleted foci (MDF) and immunohistochemical analysis. Additionally, animal welfare was assessed through nutritional and metabolic parameters (body mass gain, food and water consumption, caloric intake, and feed efficiency). Our findings indicate that GGM did not affect the welfare of the animals and was able to reduce colon hyperplasia by decreasing the frequency of ACF by 34.9% and mucin depletion, thereby reducing morphological alterations in the colonic tissue. Although GGM is known as a fermentable fiber that promotes intestinal health, its association with DMH led to the emergence of dysbiosis at the highest concentration. This correlation remains preliminary, suggesting that GGM could potentially be safe for the intestinal bacterial microbiome at lower doses, which encourages further investigations. Given the relative toxicological safety observed in the different *in vivo* assays, GGM represents a potential approach for the production of new functional ingredients for food and pharmaceutical applications.

Keywords: Hemicellulose; Soluble Fiber; Prebiotic; Colorectal Cancer.

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Elucidating key hub genes in primary and metastatic melanoma cancer

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Cutaneous melanoma is a malignant tumor originating from melanocytes and is the responsible for the highest number of deaths among skin tumors. Therapeutic approaches have advanced, driven by the introduction of immunotherapies and targeted therapies. Despite these new treatments, there is a need for further information about the proliferative pathways implicated in metastatic melanoma, due to the associated fatalities. In this study we delineated specific therapeutic targets through an in silico analysis aimed at elucidating the central pathways involved in metastatic melanoma, using network analysis tools based on gene expression data, through which proliferation pathways prone to metastasis were identified. The Gene Expression Omnibus (GEO) database (https://www.ncbi.nlm.nih.gov/geo) was used to select and downloand the dataset, and the the online tool GEO2R was used to identify differentially expressed genes (DEGs). We selected the GSE15605 dataset, which contains 74 samples, including 46 for primary melanoma, 12 for metastatic melanoma and 16 for skin samples. DEGs were obtained using a t-test, with a significant p-value ($p \leq 0.05$) and a fold change (Log2FC>1.5). Enrichment analysis was performed using the online tool Enrichr, with Gene Ontology (GO) analysis.. To construct a protein-protein interaction (PPI) network among the DEGs we used the STRING platform (https://string-db.org) with default parameters. Based on the obtained information and PPI degree analysis using the cytoHubba plugin in Cytoscape (Cytoscape_v3.6.1), we selected the top 15 most dysregulated genes as central genes. The genes *EYA1, C7, TPR, SSP* and *OLIG2,* which contribute to biological processes, were overexpressed between primary and secondary melanoma. In the GO biological function analysis, these genes were primarily involved in epidermal regulation. PPI analysis showed that the genes *EVPL, DSP, FLG,* and *DSC1* had the most significant impact on survival according to the number of cases and, developing a network of regulatory molecules of the genes, we obtained: HBEGF, TP53, IL1B, STAT5B, and KRT14. Among these, HBEGF, which has been correlated as an important marker in oncology, has the most interaction contacts. Focusing on these targets could lead to more effective therapies for melanoma.

Keywords: Metastatic Melanoma, *In Silico* Analysis, Gene Expression

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HUVEC Spheroids Exhibit Chemoresistance to WT-161

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Introduction: Angiogenesis is a physiological process involving the formation of new blood vessels from pre-existing ones, beneficial for organism homeostasis but implicated in pathological conditions such as cancer. Tumor angiogenesis results from factors related to the tumor's demand for oxygen and nutrients. At a molecular level, angiogenesis involves numerous pathways and enzymes, among which HDAC6 plays a significant role. Scientific literature has demonstrated HDAC6 overexpression as a driving force in tumor progression, including angiogenesis. Objective: Initially, evaluate how HDAC6 inhibition through WT-161 interferes with the antiproliferative effects in endothelial cell-derived HUVECs, aiming to inform future *in vivo* and *in vitro* angiogenic studies. Methods and Results: HUVEC cells were cultured in 3D to assess the impact of WT-161 on cell viability using the MTT assay and spheroid area via photoregistration analysis with Zeiss Zen 3.4 software. HUVECs showed an IC50 of 352.686 µM for WT-161, with no significant impact on the spheroid area observed. Conclusion: HUVECs exhibit chemoresistance to WT-161, suggesting a potential specific targeting of WT-161 for tumor cells. WT-161-mediated inhibition of HDAC6 did not significantly reduce viability in 3D cultures as anticipated. Future studies will include tube formation assays in 3D cultures with melanoma and glioblastoma cells in co-culture settings, guided by the IC50 value obtained.

Keywords: WT-161; HDAC-6; Angiogenesis.

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In vivo evaluation of the mutagenicity and cytotoxicity of WT-161 in a melanoma model

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The study of mutagenicity and cytotoxicity is essential for the development of new antineoplastic agents. Factors such as *in vivo* metabolism, pharmacokinetics, and DNA repair processes are active and contribute to the observed responses. The *in vivo* micronucleus test in mammals is widely used for the detection of chemically induced damage to chromosomes or the mitotic apparatus of erythroblasts. On the other hand, the PCE/NCE ratio test (PCE/(PCE+NCE)) is a crucial parameter in the study of cytotoxicity. PCE (polychromatic erythroblasts) are young cells that still contain ribosomes, while NCE (normochromatic erythroblasts) are more mature cells that have lost their ribosomes. The PCE/(PCE+NCE) ratio indicates the proportion of young cells relative to the total erythroid cells, reflecting the bone marrow's ability to produce new blood cells after exposure to chemical agents. In this context, the present study aims to evaluate the mutagenic effect and cytotoxicity of WT-161, a selective HDAC6 inhibitor, a type of histone that is overexpressed in melanoma. For this purpose, a syngeneic melanoma model was used, employing C57BL/6 mice and the B16F10 murine melanoma cell line. With a tumor area of 0.5 cm^2, treatment with WT-161 (2.5 and 5 mg/kg body weight) was initiated for 5 days, administered every 24 hours. Temozolomide (35 and 40 mg/kg body weight) was used as a positive control and was administered during the same period and intervals as WT-161. The vehicle control group received 5% DMSO, and the implant group received PBS administration. After the treatment, the bone marrow was collected and processed. It was observed that there was no statistical difference between the WT-161 group and the implant and vehicle control groups when evaluating the micronucleus and the PCE/(PCE+NCE) ratio. Temozolomide showed a high expression of micronucleus and a significant increase in the PCE/NCE ratio, indicating greater cytotoxicity and mutagenicity compared to WT-161. On the other hand, WT-161 did not show statistically significant differences compared to the control groups, suggesting lower toxicity and mutagenicity. These results are promising for the development of WT-161 as a selective therapeutic agent with a potentially lower risk of genotoxic adverse effects.

Keywords: erythrocytes, micronucleus, mutagenicity, cytotoxicity.

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Inhibition of triple-negative mammary tumor cell invasion by conditioned medium of macrophages stimulated with BCG

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Breast cancer is one of the leading causes of death among women in Brazil and worldwide. Among its subtypes, triple-negative breast cancer (TNBC) has the worst prognosis. Within the tumor microenvironment, there is infiltration of immune cells, mainly macrophages that play important roles in the tumor development process. Macrophages can be induced into a pro-tumoral state (M2), while an M1 phenotype would be more important for tumor control. Additionally, many studies currently use BCG (Bacillus Calmette-Guérin) as a promising bacterium in the immunotherapeutic treatment of some types of cancer, such as bladder cancer. The present study aimed to analyze the effect of conditioned medium produced by mice bone marrow-derived macrophages (BMDMs) stimulated with the BCG on the migration of triple-negative breast tumor cells 4T1 *in vitro*. BALB/c mice BMDMs were subjected to BCG or proteins extracted from 4T1 cells stimulation for 12 hours. Subsequently, the supernatants were used for TNF-α, IL-10, lactate, glucose, and nitric oxide dosage, as well as for conducting the wound healing assay. It was observed that the supernatants from conditioned medium of macrophages stimulated with BCG presented higher production of nitric oxide, lactate, TNF-α and partially prevented wound healing. On the other hand, the 4T1 proteins stimulation conditioned medium fails to prevent the closure of the cells. In addition, lower production of pro-inflammatory cytokines, nitric oxide and lactate were observed but increase of IL-10 production in this conditioned medium was observed compared to the BCG-stimulated cells supernatant. It is suggested that BCG is a potential macrophage immunostimulatory bacterium to an anti-tumoral state differing from the 4T1 proteins as potential pro-tumoral inductor.

Keywords: Breast cancer; Immune response; Wound Healing; Cellular immunity

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Ivermectin impairs macrophage control of *Pseudomonas aeruginosa in vitro* without affecting acute pneumonia control under gut dysbiosis

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Excessive use of drugs, such as ivermectin, can disrupt the balance of bacteria in the gut, leading to gut dysbiosis. This imbalance makes the organism more vulnerable to opportunistic infections. To investigate the effects of prolonged ivermectin use on gut microbiota and susceptibility to virulent *Pseudomonas aeruginosa* lung infection, C57BL/6 mice were treated with ivermectin or PBS for 7 days as approved by the Committee on the Ethics of Animal Experiments of the Federal University of Alfenas (CEUA 23/2021). Ivermectin-induced bacterial gut dysbiosis in mice, mainly increasing the *Akkermansia* sp genus in faecal content. Probably, this led to increased inflammation and changes in caecum tissue structure. However, gut dysbiosis did not increase susceptibility to *P. aeruginosa* lung infection, as shown by similar bacterial recovery rates, tissue analysis, and cytokine expression in the lung of infected and non-infected mice. Notably, mice treated with ivermectin experienced liver damage and increased inflammation, especially after the bacterium infection, suggesting that while ivermectin treatment harmed the liver, it did not affect bacterial recovery in this organ. Since the inflammation may be related to bacterial components recognition by innate immune cells, mice bone marrow-derived macrophages (BMDM) were stimulated with ivermectin and infected with *P. aeruginosa*. It was verified that treatment with ivermectin impaired bacterial clearance, decreased NO and TNF-α secretion, despite of did not alter cell viability and glucose consumption. Therefore, ivermectin induces gut bacterial dysbiosis in mice and can alter responsiveness to external stimuli in macrophages what may explain the increase proinflammatory response observed in the mice liver together the harmfully effects of metabolized drug in the organ in the presence of *P. aeruginosa*.

Keywords: Ivermectin; Gut dysbiosis; Macrophages; *Pseudomonas aeruginosa*.

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Method of Virtual Screening Applied to the Study of MMP9 Inhibitors as a Potential Approach to Reducing Tumor Proliferation and Malignancy in Glioblastoma

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The glioblastoma is the most epidemiologically significant brain cancer, representing about 15% of all tumors and approximately 45% of primary malignant brain tumors among those affecting the central nervous system. One of the major clinical challenges in glioblastoma is its intrinsic resistance to temozolomide. Many factors within the tumor environment contribute to tumor progression and malignancy. It is known that various biological processes can influence both the propensity of glioma stem cells and their metastatic potential. Angiogenesis, which is related to cellular proliferation and the formation of new vessels in glioblastoma, makes these proteins important targets for novel therapeutic alternatives. In this context, new tools support preclinical research, notably bioinformatics methods such as molecular modeling and molecular docking. These tools are crucial for the rational design of new drugs, allowing for the construction of chemical and biological models that, when subjected to specific software, enable quantification, visualization, and simulation of protein-ligand interaction systems. Studying such interactions through computational methods allows for better direction in developing potential bioactives with improved therapeutic actions. This study aims to use bioinformatics tools to identify potential compounds capable of acting as an enzymatic inhibitor for the potential reduction of glioblastoma proliferation. For this the prediction of MMP-9, associated with tumor proliferation potential, was performed using AlphaFold. Subsequently, molecular docking was carried out using the AutoDock Vina software, with two compound libraries: FDA-approved compounds obtained from PubChem and Brazilian natural compounds from NuBBE. The enzyme with the ligand marking the active site was downloaded from the PDB. In the initial results, enzymes with higher reliability were selected during the prediction phase. The 8K5V structure was then downloaded, and the ligand coordinates were used to delineate the active site with a grid box. After the necessary preparations and molecular docking, we obtained 703 interactions with compounds from the FDA database and 4,430 from NuBBE. Subsequently, compounds with interaction values equal to or better than the VOO ligand downloaded with the PDB protein were selected, totaling 146 from the first database and 295 from the second. These were then compared for interactions with both binding sites of the enzyme, resulting in the selection of 62 compounds from the first database and 136 from the second. This allowed us to identify a group of potential compounds for MMP-9 inhibition. Based on these results, we plan to perform redocking to validate the best results in comparison with existing literature. We also aim to apply bioisosterism techniques to optimize pharmacodynamic and pharmacokinetic properties. If the results are satisfactory, pharmacokinetic properties and ADMET (Absorption, Distribution, Metabolism, Excretion, and Toxicity) will be evaluated to test synergy with the drug temozolomide.

Keywords: Molecular Targeted Therapy; Angiogenesis; Molecular Docking Simulation; Matrix Metalloproteinase.

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Multi-epitope potential vaccine for the re-emerging Mpox virus shows conservation in proteins of the emerging Alaskapox vírus

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With the emergence of new pandemics, such as COVID-19, outbreaks of emerging and re-emerging viruses have raised global alarm. In June 2022, the World Health Organization declared the Monkeypox Virus (MPXV), belonging to the Orthopoxvirus (OPXV) genus, a global health emergency. MPXV is a double-stranded DNA virus known for causing "monkeypox," which presents symptoms similar to smallpox, such as fever, headaches, and diarrhea, but is primarily characterized by the formation of pustules and ulcerated skin lesions. In 2023, our research group developed a multi-epitope vaccine based on proteins responsible for MPXV entry and exit processes in host cells, with the potential to induce an effective immune response. Using a defined pipeline, we conducted antigenicity, allergenicity, stability, and toxicity analyses and identified 10 epitopes with promising results. We then concatenated these epitopes to form a single multimeric protein with the addition of two adjuvants, PADRE and beta-defensin. After modeling the protein, we performed molecular docking with innate immunity receptors such as Toll-Like Receptors and predicted the protein's humoral and cellular response profile. In 2024, a new virus from the OPXV genus, Alaskapox (AKPV), recently renamed Borealpox, gained attention by causing the first death of an immunocompromised patient. The aim of this study was to identify if epitopes previously discovered by our research group for MPXV are conserved in AKPV, enabling the development of a bivalent vaccine for MPXV and AKPV. Initially, available AKPV genomes were obtained from the NCBI database. Subsequently, alignments were performed between the previously identified MPXV epitopes and the same proteins in AKPV. Epitopes with mutations in AKPV proteins were subjected to antigenicity analysis using the Vaxijen server, allergenicity analysis using the AllerCatPro server, and physicochemical property analysis using the ProtParam tool. The analysis revealed that three of the ten previously identified MPXV epitopes are conserved in AKPV, six have mutations, and one was completely deleted. Of the mutated epitopes, four have changes that still meet the requirements for antigenicity and structural stability, while two have become non-antigenic or unstable. The conserved epitopes between MPXV and AKPV provide a basis for developing a bivalent multi-epitope vaccine. The mutated epitopes that maintain adequate stability and antigenicity values are relevant for creating rapid viral identification tests, representing a promising approach for controlling and preventing diseases caused by these emerging and re-emerging viruses.

Keywords: Vaccinology, Computer Simulation, Immunoinformatics.

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Nanotechnology applied to the pharmaceutical industry: synthesis and characterization of CdTe quantum dots

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Quantum dots (QDs) are nanocrystalline semiconductors that exhibit outstanding optical and electronic properties, making them relevant for clinical and pre-clinical applications such as bioimaging, drug delivery, as well as simultaneous diagnosis and treatment. However, due to the instability of QDs, it is necessary to use surface ligands, which prevent aggregation, stabilize colloidal dispersion, and control the size of the nanocrystals. Additionally, these ligands play a crucial role in determining the interaction of QDs with different molecules, such as proteins. Both QDs and their ligands can exhibit high toxicity; therefore, understanding their synthesis and characterization is crucial for advancing their use. This study aims to synthesize and characterize CdTe quantum dots using thioglycolic acid (TGA) as a surface ligand via the one-pot technique in an aqueous medium. For the synthesis, 93.7 mg of CdCl2·6H2O were dissolved in 80 mL of Milli-Q water, followed by the addition of 52 µL of TGA and 7 mL of 0.2 M NaOH solution, resulting in pH 11. To this solution, 5.2 mg of Na2TeO3 and 3.7 mg of NaBH4 were added. The reaction was maintained at 98 °C with magnetic stirring and reflux for 90 minutes, with aliquots collected every 30 minutes. Optical characterization was performed using the final aliquot. UV-visible absorption values at 320 nm and fluorescence spectra in the range of 400-700 nm were obtained for different concentrations of the synthesized QDs and the reference standard, sodium fluorescein, which has a quantum yield of 92%. To determine the quantum yield of the synthesized QDs, the calibration curves were compared, resulting in 68.69%. This study highlights the importance of conducting further syntheses to obtain materials that maintain the achieved standards of quality and yield. Once synthesized and characterized, these QDs can be used in interaction studies aimed at understanding their kinetics and thermodynamics of complexation with proteins (key transport molecules in the body). Such investigations may pave the way for future applications of QDs in diverse pharmaceutical fields, ranging from clinical analyses to their potential use as carriers for new drugs.

Keywords: Nanotechnology; Quantum dots; Drug delivery.

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SCC9, an Oral Squamous Cell Carcinoma Cell Line, Exhibits a Doubling Time of 24.37 Hours

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Oral squamous cell carcinoma (OSCC) is the most common malignancy of the oral cavity, with a five-year survival rate of 50%, partly due to the late diagnosis. OSCC is a multifactorial pathology, arising from multiple molecular events, with environmental carcinogen exposure linked to genetic predisposition. The best prognosis occurs in early-stage OSCC, when well-differentiated and without metastasis. However, most diagnoses occur at advanced stages, leading to death within the first 30 months. This study aims to determine the doubling time (DT) of OSCC cells, as the cancer growth rate reflects the degree of malignancy and directly affects tumor prognosis. For doubling time determination, SCC9 cells were plated at a density of 2 x 10^4 cells, marked as day 0. Cell proliferation was assessed daily over an 8-day period using a Neubauer chamber for cell counting, following the formula N = (cells per small square x dilution factor) / small square volume. Throughout the assay, cells were maintained in DMEM medium supplemented with 10% fetal bovine serum. It was observed that the log growth phase occurred on average over 3 days, with a doubling time of 24.37 hours. Given that the experimentally obtained doubling time falls within the literature-described range of 18-26 hours, it can be inferred that the objective of measuring the cellular doubling time was achieved, thereby enhancing the understanding of OSCC cell behavior.

Keywords: Squamous Cell Carcinoma of Head and Neck; Mouth Neoplasms; Cell Enlargement; Cell Count; Tumor Cell Line

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SP1 as a potential target in lung cancer therapy: an *in silico* and *in vitro* study

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Non-small cell lung cancer (NSCLC) is a highly aggressive malignancy with 5-year survival rate less than 18% and a significant mortality rate among overall cancer mortality figures. For these reasons, it is necessary to discover new and efficient therapeutic targets. In this context, bioinformatics has been utilised with great impact in preclinical oncology research. Based on this premise, our objective was to identify potential new targets in microarray databases related to NSCLC samples and to investigate these targets *in vitro*. To achieve this objective, we explored two databases, GSE32863 and GSE43458, using the GEO tool. Using the GEO2R tool, we identified differentially expressed genes (DEGs) from these two databases. The GEO2R analysis data were selected using the criteria |LOGFC| >=1 and P Value < 0.05, resulting in 858 and 527 DEGs, respectively. Subsequently, the genes from both databases were compared using a Venn diagram, selecting 413 DEGs. Protein-protein interaction analysis was performed using the STRING tool followed by Cytoscape software, utilising the MCC and DEGREE statistical methodologies, which identified ten genes. These genes from the Venn diagram intersection were further analysed using the Metascape web tool to verify PAGENBASE enrichment analysis, indicating that the primary tissues involved were lung tissues. Metascape was also used to apply the MCODE and TRRUST methodologies to identify transcription factors related to the pathways of the provided DEGs. Among the above data, we found that the top 10 transcription factors correlating with DEG enrichment, identified by the TRRUST analysis, were SP1, RELA, NFKB1, ATF3, GATA2, JUN, PPARA, ERG, TP53, and PPARG. Given SP1's significant impact among the transcription factors, we examined its correlation with the MCODE and Cytohubba proteins using available data from TRRUST analysis and identified 25 genes activated by SP1 and 8 genes repressed by SP1, highlighting its impact once again. To investigate SP1's role *in vitro* in NSCLC, we used NSCLC-derived cell lines A549 and H1299 and treated them with M4N, a global transcription inhibitor that directly interacts with SP1. We observed that M4N decreased cell viability in both cell lines, as verified by the MTT method, and showed an additive effect when combined with cisplatin in the A549 cell line, through the Chou-Talalay method. We also found that M4N, and its combination with cisplatin, decreased cell proliferation using the clonogenic method. We conclude that SP1 is a potential candidate for a therapeutic target in lung cancer.

Keywords: Non-small cell lung cancer; transcriptomics; tumoral heterogeneity.

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Synthesis and characterization of schiff Bases derived from benzaldehydes with ethylenediamine and naphthylamine: thermal behavior and coordination prospects with Palladium for biological activity evaluation

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Schiff bases are widely studied compounds due to their chemical properties and potential applications in various fields, including catalysis and biological activity. This study hypothesizes that Schiff base ligands derived from benzaldehydes with ethylenediamine or naphthylamine can form stable complexes with palladium, exhibiting significant biological potential. The objective of this study is to synthesize and characterize a series of Schiff base ligands, investigate their thermal behavior, and explore their coordination possibilities with palladium for biological activity testing. The ligands were synthesized through the condensation reaction between the chosen aldehyde and amine. Characterizations were performed using infrared spectroscopy (IR) to identify functional groups, nuclear magnetic resonance (NMR) to elucidate the molecular structure, and elemental analysis (CHN) to confirm the composition of the compounds. The thermal behavior of the ligands was evaluated by thermogravimetric analysis (TGA) and differential scanning calorimetry (DSC). The thermal stability of the ligands varied according to the type of amine and aldehyde used in the synthesis. The results showed that the ligands have the expected structures and are thermally stable up to specific temperatures, varying according to the type of amine and aldehyde used. The synthesized ligands will be subjected to future coordination reactions with palladium. The formation of complexes will be investigated through changes in spectroscopic and thermal properties. These palladium complexes will then be evaluated for their biological activity, focusing on anticancer and antibacterial tests. The Schiff base ligands synthesized in this study exhibit structural and thermal characteristics with high potential for forming stable complexes with palladium. Future investigations will focus on evaluating the biological activity of these complexes, with the potential for developing new therapeutic compounds. This work contributes to the advancement of knowledge in the field of coordination chemistry and its biological applications.

Keywords: palladium; schiff bases; differential thermal analysis.

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WT-161 inhibits *in vitro* growth and viability of melanoma spheroids and reduces tumor growth in C57BL/6 Mice

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Introduction: Although melanoma is the least common type of skin cancer, it is potentially more aggressive, responsible for 75-80% of skin cancer-related deaths. Melanoma exhibits rapid progression, high metastatic capacity, and notorious intrinsic chemoresistance. In this context, the enzyme histone deacetylase 6 (HDAC6) has been directly linked to tumor progression events, and its inhibition has been considered a promising anticancer therapy. Therefore, understanding the underlying molecular mechanisms dependent on HDAC6 that influence this tumor's phenotype becomes crucial. Previous results from 2D cell cultures have shown that the selective HDAC6 inhibitor, WT-161, reduced cell viability and clonogenic capacity of melanoma cell lines, increased apoptotic population, and reduced cell migration and invasion. Objective: Building upon these promising findings, our study aimed to expand investigations. Methodology and Results: Melanoma spheroids (3D culture) were used in CHL-1 and WM1366 cell lines. Following treatment with WT-161, there was a decrease in melanoma spheroid size and disintegration, accompanied by loss of viability assessed by acid phosphatase assay. Additionally, using the Chou-Talalay method, WT-161 demonstrated synergy when combined simultaneously with temozolomide (TMZ) and dacarbazine (DTIC). Furthermore, using C57BL/6 mice, a syngeneic murine melanoma model was established, revealing a significant reduction in tumor weight after 5 days of subcutaneous treatment with WT-161 at doses of 2.5 mg/kg and 5 mg/kg, with no change in total body weight or genotoxicity markers. Conclusion: These results reinforce the hypothesis that selective HDAC6 inhibition is a promising anti-melanoma strategy and confirm the biological relevance of this enzyme in the tumoral behavior and neoplastic phenotype of melanoma.

Keywords: Inhibition, cancer, melanoma.

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Antiplasmodial and antioxidant potential of jabuticaba tree leaves

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Among the products obtained from the jabuticaba tree, jabuticaba fruit, seeds, and pulp have proven to be the largest source of phenolic compounds, while jabuticaba tree leaves are still overlooked. Nevertheless, the leaves present a high phenolic content (i.e., 2,4 di-hydroxybenzoic acid, vanillin, p-coumaric acid, ferulic acid), along with significant antioxidant capacity. Therefore, the objective of this study is to evaluate the antiplasmodial effect of the jabuticaba tree leaf extracts (JLE) against the parasite *Plasmodium falciparum* and the antioxidant activity in erythrocytes. The *in vitro* antiplasmodial effect of the JLE was analyzed with 3D7 line (chloroquine-sensitive) incubated in 96-well. The culture was synchronized, aliquots were taken at 12 hr rings, and treated with different concentrations (3,5– 400 µg/mL) of JLE with the parasite suspensions (1% parasitemia and 2% hematocrit). After 48h, the culture was added to 100 µL lysis buffer solution and of gold nucleic acid gel stain (0.1 µL/mL), and the microplates were read. To assess how extracts from jabuticaba leaves impact antioxidant activity in red blood cells, the erythrocytes were isolated from the whole blood by successive washes with PBS (5 mmol/L, pH 7.35, NaCl 0.9 %) and diluted at hematocrit 20 %. The cells were incubated with JLE (50, 100, and 150 µg GAE/mL) or PBS (for the positive control) and the erythrocytes' oxidation was induced with AAPH 200 mmol/L for 120 min, 37¯ C, and 150 rpm of orbital shaking. The percentage of hemolysis and ROS protection was investigated. The JLE revealed antiplasmodial activity on the parasite at the ring stage (IC50= 15,2µg/mL), and antioxidant and antihemolytic effects reducing the erythrocyte oxidation in 95%. These findings suggest the potential of jabuticaba tree leaf extracts on the nutritional and biopharmaceutical applications against malaria disease and oxidative stress in erythrocytes.

Keywords: malaria, antioxidant activity, hemolysis.

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Auriculotherapy in University Pharmacy: experience report of the academics involved

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The University Pharmacy (FarUni) is a complementary body of the Faculty of Pharmaceutical Sciences of the Federal University of Alfenas (UNIFAL-MG). It consists of a health establishment that aims to contribute to the academic training of pharmacy students, through the practical application of the knowledge acquired during graduation. At FarUni, dispensing, handling, tracking and health education services, management of self-limited health problems, pharmacotherapeutic monitoring, as well as complementary integrative practices, such as auriculotherapy, are offered to the population of Alfenas. The UNIFAL Pharmaceutical Care Center (NAFAU) offers auriculotherapy to the population, which is one of the modalities of traditional Chinese medicine (TCM). This technique aims to balance the body's energy balance, and thereby promote the improvement of clinical symptoms such as anxiety and insomnia. The consultations were carried out from March to July 2024, and it is estimated that around 400 consultations were carried out during this time. Each NAFAU member was responsible for caring for 4 patients at a time during the week, this enabled the large number of visits mentioned, the experience of carrying out the auriculotherapy procedure provided several benefits, both for patients and pharmacy students. involved in the process. The main complaints presented during the consultations were anxiety, insomnia, acute and chronic pain, addictions, especially smoking and difficulties in concentrating. It was observed that most patients who underwent the procedure reported a significant improvement in symptoms and adhered to weekly auriculotherapy in order to improve their quality of life. Regarding the impact on the training of the students involved, it is highlighted that the experience provided an improvement in practical anamnesis skills, understanding of the techniques and application of auriculotherapy itself, and mainly a greater understanding and autonomy regarding the clinical area of the profession pharmaceutical.

Keywords: Pharmaceutical care; Health; Traditional chinese medicine.

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Challenges and Expectations Regarding the Solubilization of Cannabidiol: A Scoping Review

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Cannabidiol (CBD), a compound derived from *Cannabis sativa* L., has been increasingly explored for its therapeutic effects, showing efficacy in terms of anti-inflammatory, antipsychotic, analgesic, antidepressant, and anxiolytic properties in the treatment of various ailments, including chronic pain from arthritis, cancer, neurodegenerative diseases, neuropathic pain, inflammation, and multiple sclerosis. Currently, most CBD applications are systemic, such as oral administration, which results in a lower concentration of the drug reaching its receptors compared to the administered dose. This route has the blood-brain barrier as a limiting factor since its main active receptors are located in the central nervous system and the brain, and it undergoes first-pass metabolism. Additionally, this method is more prone to generating adverse and unwanted effects. Thus, intrathecal administration is a good alternative as it allows the drug to bypass the blood-brain barrier and achieve high concentrations in the cerebrospinal fluid (CSF) and consequently in its active receptors. This provides the benefit of applying a lower dose compared to the dose required for systemic routes and reduces side effects. However, this route is limited by the solubility of Cannabidiol in the CSF, as it is lipophilic and the CSF is hydrophilic, leading to low solubility of the drug in the liquor, incorporation into fatty cell membranes of the subarachnoid space, and interaction with matrix proteins. Therefore, the aim of this work is to conduct a scoping review to evaluate the state of activity in the search for solutions to promote the solubilization of Cannabidiol in water. The methodology will follow the PRISMA-ScR (Preferred Reporting Items for Systematic Reviews and Meta-Analyses - for Scoping Reviews) guide as a manual, using the PICO mnemonic strategy to outline a research question and search for evidence in databases. This search strategy will include the use of Boolean operators and MESH terms. A team will be assembled to ensure all data is collected for the execution of the review. The following databases will be used for article search and selection: Latin American and Caribbean Literature in Health Sciences (LILACS), SciELO, Google Scholar, Medical Literature Analysis and Retrieval System Online (Medline/PubMed), and CAPES Periodicals. This work aims to create a project proposal for the development of a drug delivery system for intrathecal administration of Cannabidiol. Thus, it can be concluded that the scoping review will be an excellent tool to support strategic decision-making within our research group.

Keywords: Aqueous solubility; CBD; Nanocarriers; Drug delivery

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Collection of secondary data from pharmacists working in the area of aesthetics in the south of Minas Gerais

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The pharmacist is an outstanding professional who has knowledge that guarantees his performance in several areas, including aesthetics, where scientific and intellectual knowledge is used, combined with ethics in pharmaceutical care and clinical practice activities. The area of aesthetic pharmacy is constantly expanding, since the implementation of the resolution of the Federal Pharmacy Council (CFF) n°. 543 of 2013, which regulated the pharmacist to work in aesthetic health, and recognizing the area as a new field of activity for this professional. This has created new opportunities for pharmacists, allowing active involvement in the aesthetics field. The CFF's recognition of aesthetic health has officially become a new area of activity where these professionals need to undertake a *lato sensu* specialization (minimum workload of 360 hours) to qualify and work in this field. Despite the space that this area has gained, there is still little data on professionals working in Minas Gerais. According to a secondary survey carried out on the database of the Regional Pharmacy Council of the State of Minas Gerais (CRF-MG), currently, the total number of pharmacists in the state is 31,661 and, of these, 148 work in aesthetic health and 63 They have a cosmetic health pharmaceutical office. To obtain a better understanding of the training process of these professionals, an online form was created to collect data. The analysis of this information revealed important *insights* such as: the training of pharmacists in the area of aesthetics still lacks the implementation of specific disciplines in the course curriculum. Professionals who choose to work in this area need to complement their training through *lato sensu* postgraduate courses and free theoretical and practical courses. Another highlight of the applied form is the need for continuous updating and participation in events are common practices among these professionals, who face challenges related to patient recruitment, dissemination of their services and certification of competence and excellence in service. carried out because he is not a medical professional. To improve the training and qualification of pharmacists in the area of aesthetics, it is suggested the inclusion of specific disciplines in undergraduate courses and the promotion of greater unity within the pharmaceutical profession.

Keywords: Pharmaceutical; aesthetic pharmacy; aesthetics.

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Complementary Activities in the Academic League of Pharmacology: Enriching Health Education

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The Academic Pharmacology League (LAFAR) was established with the purpose of fostering knowledge, research, and awareness about pharmacology, playing a role in promoting the proper use of medications, as improper usage often stems from the lack of accurate information available to the public. Throughout the ongoing extension project, from 2023/1 to 2024/1, the primary aim was to provide a thorough theoretical and practical understanding of pharmacology, focusing on current topics. This was accomplished through weekly meetings for discussions and internal seminars, followed by activities such as lectures and discussions for both internal and external communities. In 2023, internal seminars were conducted to review relevant current topics in pharmacology, such as studies on cannabinoids which resulted in a lecture titled "medicinal use of cannabinoids in pain and toxicological aspects of their recreational use," studies on immunobiological drugs leading to the online event titled "Emicizumab immunobiological for the treatment of hemophilia," and in the first semester of 2024, internal seminars continue to be held, along with presentations by professionals in the field, especially focused on the study of antineoplastics, a topic rarely addressed in undergraduate studies. These activities, which involved the participation of the external community, enriched the academic and professional development of the League's members. Overall, the actions carried out in the periods of 2023/1, 2023/2, and 2024/1 were essential for the academic and external community, as they contributed to the training of members and raising awareness among the population regarding the rational use of medications, thus promoting health education.

Keywords: Pharmacology education; Rational drug use; Health awareness.

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Cosmetology and Health: Impact of educational extension actions

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Carrying out extension activities with society is of fundamental importance, as it allows scientific and technical information to be shared in order to solve real problems and improve quality of life. In view of this, the aim of the Cosmetology and Health Extension Project between 2023 and 2024 is to work with the theme of skin diseases of great relevance to society. In 2023, the educational activities focused on skin cancer. According to the National Cancer Institute, the annual estimate is 180,000 new cases, the most common being non-melanoma. The high incidence of cosmetic product use is due to the beauty standards imposed by society, whose purchase of cosmetic products is facilitated by the influence of social networks. This influence is detrimental to the consumer, as most do not receive professional advice. Thus, the project's educational activities, which aim to disseminate scientific information about skin cancer and the cosmetics involved in its prevention and treatment, have contributed to give the population of Alfenas autonomy over their state of health. Until July 2024, the project reached out to the community through informative posts on Instagram®, reaching 3308 accounts with 17 posts, with an averaging of 169 accounts per post. In addition, the team distributed educational folders at events promoted by the university, carried out monthly visits and applied a questionnaire to find out the sunscreen use profile of patients at Dr. Plínio's clinic during 2023. Partial analysis of the results showed that the majority of those interviewed were female, of white ethnicity, with an average age of 51 and residents in Alfenas. As for the questionnaire, 17 answered that they always use sunscreen, 12 never use it and 9 only use sunscreen when exposed to the sun's rays. Regarding the areas of application, 30 patients answered that they only apply it to their face and only 11 patients reported that they reapply it. Of all the interviewees, only one had ever had an artificial. Finally, 30 answered that they expose themselves to the sun for one or two hours a day from 8 am to 10 am. Throughout the second semester of 2024, the project's theme will be "rare skin diseases". The aim is to share scientific knowledge and patients' experiences with the wider community. The subject will be addressed through educational posts on Instagram, as well as conversation circles with experts on the subject and patients with rare skin diseases, and direct health education with the community at face-to-face events promoted by the university. The aim of the project is to provide information and a better quality of life for patients and to raise awareness among the general population against prejudice and discrimination.

Keywords: health education; skin cancer; rare skin diseases; cosmetics.

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Development of an *Aloe vera*-based gel for distribution through the SUS by FarUni

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Brazil is a country with extensive biodiversity, which facilitates the use of plants for medicinal purposes. Recognizing the importance of traditional medicine and the benefits of medicinal plants, the *Sistema Único de Saúde* (SUS) has gradually incorporated these treatments into health policies to increase access for the population. *Aloe vera*, commonly known in Brazil as *babosa*, is a medicinal plant with healing properties, used to treat small wounds, such as inflammations, and first and second-degree burns. Its versatility of use makes it an effective strategy for distribution via SUS, treating various ailments with the same active ingredient. In Alfenas-MG, one of the ways in which medicinal plants are distributed by the SUS is through the *Farmácia Universitária* (FarUni) of the *Universidade Federal de Alfenas - MG*, main campus. This project aimed to produce an *Aloe vera*-based gel, from harvesting the leaves to laboratory processing to obtain raw material for gel production. Pilot tests were carried out to identify methodological flaws until the best production technique was found, from harvesting to storage. The *Aloe vera* leaves used for gel production were sourced from the medicinal garden at the *Universidade Federal de Alfenas - MG*, Unidade Educacional Santa Clara campus, in Alfenas, MG. They were collected in the morning during dry periods. At FarUni, the leaves were washed, sanitised, and manually filleted. The extracted gel was cut, homogenised and strained. It was pasteurised using the hot temperature short time method: heated in a water bath to 65°C, held for 3 minutes, and cooled in ice water to 5°C. After cooling, 0.025% ascorbic acid was added to prevent oxidation. The material was stored in sterilised amber glass bottles. With this material, we will conduct microbiological tests to verify the presence of total mesophiles. After that, we will test the stability of the final product to ensure that it is safe for public use. If so, the *Aloe vera*-based gel will be available to the city's population free of charge, via SUS, at FarUni.

Keywords: medicinal plants; *Aloe vera;* phytotherapy.

Acknowledgments: We would like to thank FAPEMIG for founding this project and FarUni for the infrastructure. This study was financed in part by the Coordenação de Aperfeiçoamento de Pessoal de Nível Superior, Brazil (CAPES) (Finance Code 001).

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Development of technological platforms for the production of drug delivery systems with low solubility and permeability

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Drug delivery systems (DDS) directly influence the efficacy and safety of treatment by controlling the rate and site of drug release in the body, optimizing therapy and minimizing side effects. Mucoadhesive systems are DDS that promote increased residence time of two materials held together by interfacial forces, thus directing a drug to a specific site to increase its absorption. This study aims to develop an in vitro analytical method for measuring the mucoadhesion of pharmaceutical systems. For this purpose, mucoadhesion, defined as the bond between the material and the mucus layer, will be analyzed by the fluid flow method, which stands out for its simplicity, versatility, and ability to simulate physiological conditions. In this method, previously sanitized swine or bovine mucous membranes will be used, inserted into an inclined semi-cylindrical support, and kept under continuous hydration with simulated mucus throughout their extensions, using a peristaltic pump, which will simulate salivary flow. The quantification of the non-adsorbed sample and the study of the mucosa will be analyzed by analytical methods, which will allow the evaluation of the drug adhesion efficiency. Along with a comprehensive review of the scientific literature, using platforms such as Google Scholar, Medline/PubMed (Medical Literature Analysis and Retrieval System Online), the advancement of the fluid flow method in drug delivery systems will be studied, covering different aspects of the method, such as its principles, methodologies, applications, advantages, disadvantages, recent advances, and challenges. Therefore, it is expected that this study will make a greater contribution to the development of new mucoadhesive drug delivery systems, with greater efficacy, safety and versatility, providing precise control over drug release, allowing fine adjustments in dosage and release time. Successful implementation of mucoadhesive DDS can reduce the frequency of medication administration, improve treatment adherence, and decrease side effects, resulting in improved quality of life for patients.

Keywords: Drug delivery systems; Fluid flow; Bioadhesion.

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Digested galactoglucomannan mitigates oxidative stress in human cells

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Norway spruce is a tree bark that contains a wide variety of polysaccharides (mostly hemicelluloses) and bioactive compounds, that are considered capable of improving health. Galactoglucomannans (GGM) are the main hemicelluloses in Norway spruce, classified as dietary fibers, that can be used for food, cosmetics, and pharmaceutical applications. GGM is considered an underutilized by-product and residue in the wood processing industries, and the pulp and paper industry. In this sense, the valorization of by-products such as GGM can be attractive for the food industry to obtain ingredients of nutritional interest and research evolving the antioxidant and anticarcinogenic effects of GGM extract is necessary. This study evaluates the chemical profile of an aqueous extract rich in GGM, as well as the effects of simulated gastrointestinal digestion on the bioaccessibility of phenolic compounds, cytotoxic in human cells and antioxidant effects *in vitro*. The *in vitro* digestion process was employed using an enzymatic method that includes oral, gastric, and intestinal phases, and at the end of the process, the bioaccessibility was calculated. The total phenolic content was determined using the Folin–Ciocalteu method, and antioxidant capacity was analyzed using the free radical scavenging method (DPPH) and iron-reducing capacity (FRAP). Regarding biological assays, the cytotoxicity was evaluated in SCC9, HCT8, and HUVEC cell lines, using the 3-[4,5-dimethylthiazol-2-yl]- 2,5- diphenyltetrazolium bromide (MTT) colorimetric assay. Intracellular ROS generation was assessed using DCFH-DA assay as a fluorescent probe. Herein, we found that the *in vitro* digestion process decreased the bioaccessibility of phenolic compounds from 33 ± 2 mg GAE/g to 18 mg GAE/g, which reflects on the antioxidant capacity measured by FRAP and DPPH. Both crude and digested GGM extracts presented cytotoxicity in SCC-9, HCT-8, and HUVEC cells lines and demonstrated a protective antioxidant effect reducing the oxidative stress induced by hydrogen peroxide, especially in the digested fraction. With these results, we highlight that despite the low bioaccessibility of phenolic compounds, GGM exhibited a strong cytotoxic and antiproliferative effects and reduced the damage caused by oxidative stress in human cells, possibly due to the action of the phenolic compounds present in the extracts. Further studies are necessary to confirm that potential resource to produce new functional ingredients for food and pharmaceutical applications.

Keywords: *Picea abies*, bioaccessibility; hemicellulose; digestion; reactive oxygen species

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Effects on Antioxidant Activity and Erythrocyte Protection of digested Blackcurrant Press Cake extract

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Blackcurrant (*Ribes nigrum L.*) is widely valued as a food ingredient for its positive impact on human health. Recognized as a nutraceutical, it aids in managing various diseases, including antimicrobial, antiproliferative, anti-inflammatory, and hypoglycemic activities, crucially supported by its antioxidant properties. However, its byproduct (i.e., blackcurrant press cake) is underestimated once it is a valuable source of phenolic compounds. This study aims to evaluate the chemical profile and how the *in vitro* digestion of blackcurrant press cake (BPC) affects the antioxidant activity against erythrocyte oxidation. For this purpose, fresh blood was collected from male donors and erythrocytes were isolated by successive washes with PBS (5 mmol/L, pH 7.35, NaCl 0.9%) until a 20% hematocrit. Then, they were exposed to samples (50, 100, and 150µg GAE/mL)or PBS (positive control). Erythrocyte oxidation was induced by adding AAPH (200 mmol/L) or PBS (negative control) for 120 minutes at 37 °C with orbital shaking at 150 rpm. Hemolysis, hemoglobin oxidation and intracellular Reactive Oxygen Species (ROS) generation rates were assessed, and hemoglobin oxidation was analyzed by spectrophotometry at 540 and 630 nm. Herein, digested BPC exerts a protective effect against oxidation stress, reducing the hemolysis, hemoglobin oxidation, and ROS-generation in a dose-dependent manner, mainly considering the content of phenolic compounds, particularly anthocyanins (as demonstrated in previous studies from our group). The protective effects observed can be attributed to the polysaccharides and phenolic compounds in the samples, particularly chlorogenic acid and cyanidin-3-rutinoside, which safeguarded RBCs from oxidative hemolysis. Despite their potent biological activities, anthocyanins are structurally unstable during digestion, absorption, and metabolism in the body, which affects their bioavailability. Oxidative stress in RBCs leads to the conversion of Fe2+-hemoglobin (oxyhemoglobin) to Fe3+-hemoglobin (methemoglobin), measured through absorption peaks at 540 and 576 nm, shifting to 630 nm upon oxidation. The samples significantly reduced hemoglobin oxidation rates from 80% (positive control) to 52.5% (BPC) and 58% (DBPC), showing better efficacy when compared to quercetin at 25 and 50µg/mL. Notably, BPC at 150µg GAE/mL, maintained oxidation rates similar to the basal level of RBCs (negative control), which suggests effective protection against oxidative damage through scavenging reactive species and reducing oxidized iron. Regarding inhibition of AAPH-induced intracellular ROS generation in RBCs, efficacy was evident at 150µg GAE/mL, the highest concentration tested, indicating unaffected erythrocyte antioxidant activity post-digestion. This effect may be attributed to phenolic compounds in the samples, including anthocyanins, proanthocyanidins, chlorogenic acid, and neochlorogenic acid. In conclusion, the distinct antioxidant behavior observed against AAPH and ROS-induced oxidative stress reflects specific characteristics related to the stability and bioavailability of anthocyanins in the digested samples. These findings highlighted the potential health benefits of blackcurrant press cake-derived compounds in protecting against oxidative damage, supporting their possible use as functional food ingredients.

Keywords: nutraceutical; antioxidant activity; erythrocyte protection.

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Evaluating metabolic effects of synthetic terpenes on *Plasmodium falciparum* for new drug development

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Malaria, caused by *Plasmodium falciparum* parasites, constitutes a substantial public health concern, particularly in developing nations. While existing medications hold the capacity to combat the disease, the emergence of *Plasmodium* resistance to these drugs has posed a formidable challenge, prompting the exploration for novel antimalarial agents. Drawing upon the discoveries of our research team, diverse natural terpenes, including geraniol, nerolidol, and limonene, have exhibited both *in vitro* and *in vivo* antimalarial effects. These compounds have manifested multifaceted impacts on isoprenoid metabolism. Moreover, geraniol has demonstrated inhibition of a parasitic prenol kinase, an enzyme recently identified by our research group. This inhibition increases the effectiveness of several other antimalarials targeting isoprenoid biosynthesis, such as fosmidomycin and clindamycin. This project's core objective involves the exploration of synthetic terpenes' potential as modulators of isoprenoid metabolism and inhibitors of the prenol kinase enzyme of *P. falciparum*. Additionally, the project seeks to enhance the antimalarial efficacy of these compounds through structural refinements and to assess their synergistic effects with other drugs. The overarching aim is to contribute significantly to the advancement of innovative therapeutic approaches for combating malaria.

Keywords: geraniol, malaria, *Plasmodium falciparum*.

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Evaluation of the physical-chemical and microbiological quality of pasteurized milk from the municipality of Alfenas-MG

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Considering the importance of complying with regulatory standards and promoting public health, this study aimed to evaluate the physical-chemical and microbiological quality of pasteurised milk sold in Alfenas-MG. In the period from April to May 2024, 12 samples of pasteurised milk from four different brands were analysed. The analyses included microbiological tests to count enterobacteria and physical-chemical tests to determine peroxidase, density and acidity. The results indicated that, in the peroxidase analysis, the Muai brand of pasteurised milk showed a slight ring formation when placing salmon, suggesting overheating and potential risk of destruction of nutritional properties, however, the other brands such as Legal, Legado and Serrania presented compliance. in the peroxidase test. However, the other results of the physical-chemical and microbiological analyses were extremely satisfactory, demonstrating compliance with the rigorous standards established by legislation. This is extremely important to guarantee the quality and safety of dairy products intended for human consumption, contributing to the preservation of public health and consumer confidence in the origin and integrity of pasteurised milk available in local stores. These results reinforce the importance of surveillance and quality control in the dairy industry, highlighting the continuous need for monitoring and evaluation to ensure compliance with regulatory standards and, consequently, the protection of consumer health.

Keywords: Enterobacteria, Peroxidase, milk quality control.

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In vitro cytotoxicity evaluation of phenolic extract from *Myrciaria cauliflora* leaves on normal and cancer cells

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Myrciaria cauliflora (or jabuticaba) is a Brazilian native fruit, which is rich in phenolic compounds with biological actions of functional interest. Jabuticaba leaves are considered agro-industrial byproducts and are usually discarded, generating a large amount of waste that could be beneficial. A cell viability assay was performed to evaluate the *in vitro* cytotoxic potential of the phenolic extract from jabuticaba leaves (PEJL) and the digested phenolic extract from jabuticaba leaves (DPEJL) on tumor and normal cell lines. In this experiment, lung adenocarcinoma tumor cell line (A549) and normal human lung fibroblast cell line (IMR90) were used, both obtained from the Rio de Janeiro Cell Bank. The cell lines were seeded under laminar flow procedures, in aseptic conditions, using sterile materials. The cell cultures were maintained in HAM-F12 medium, supplemented with 10% fetal bovine serum (FBS) for A549 and 20% for IMR90, and kept at 37°C in a humidified atmosphere with 5% CO2. The A549 and IMR90 cell lines (6x103) were seeded in 96-well plates containing 100 µL/well of medium and incubated for 24 hours. Then, the samples were diluted in medium at concentrations of 5, 10, 25, 50, and 100 µg/mL and added to the cells as a treatment for 48 hours under 5% CO2 tension. After the incubation period, 10 µL of MTT (3-(4,5-dimethylthiazol-2-yl)-2,5-diphenyltetrazolium bromide; 5 mg/mL) was added to the wells, and the cells were incubated for another 4 hours at 37°C. The medium was removed, and 100 µL of DMSO/well was added. Absorbance was detected at a wavelength of 570 nm in a spectrophotometer, and the IC50 parameter (50% inhibition of cell viability) was obtained. PEJL showed cytotoxicity to A549, inhibiting its viability by 50% at a concentration of 49.41 µg GAE/mL, while the digested extract (DPEJL) showed no effect on the same cell line. The different concentrations of both extracts did not show cytotoxicity on the normal cell line (IMR90), with IC50 >100 µg/mL. In conclusion, PEJL showed relevant cytotoxicity on the malignant cell line (A549) and showed greater selectivity for cancer cells compared to normal cells (SI > 2.02), suggesting relative safety.

Keywords: Cell viability; MTT; lung adenocarcinoma.

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Ionic liquids as new intermediate pharmaceutical products for enhancing BCS class III APIs permeability - a mini review

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The development of new drugs is often limited by the low permeability of Active Pharmaceutical Ingredients (APIs). Permeability, which controls drug absorption in the body, contributes to predicting bioavailability and can affect therapeutic efficacy. The Biopharmaceutics Classification System (BCS) aims to categorize APIs into four different classes: class III APIs have low permeability as a limiting factor for absorption. In this context, ionic liquids have emerged as a promising solution to overcome this barrier, being identified as a strategy to enhance the permeability of class III drugs. Objective: This research project aims to provide an overview of the literature regarding the pharmaceutical development of ionic liquids used in nanostructured formulations to optimize drug delivery systems. Methods: The mnemonic strategy used will be PICO (Population = drug delivery systems, Intervention = ionic liquids, Comparator = class III APIs, Outcomes = solubility, permeability, FTIR, crystallography, NMR, DSC): "What advancements have ionic liquids provided for drug delivery systems development?" Search filters will be developed for the PubMed-Medline electronic database, using relevant descriptors obtained from Mesh along with synonyms and indexing keywords related to the topic. Descriptors and keywords will be combined using boolean operators (AND/OR). The reference manager software Mendeley will be used. To broaden the search strategy, articles from the reference lists of selected full-text studies in the primary search will be manually selected to identify relevant studies. All relevant published, indexed, and full-text retrieved studies will be included in the review. There will be no chronological limit on publication dates or language restrictions in the search strategy. Results: Regarding the most relevant expected outcomes, by the end of 48th Pharmaceutical Week, the aim is to obtain an overall view of the current state of literature on the use of ionic liquids in drug delivery systems. As preliminary conclusions, reviewed articles demonstrate the potential improvement in permeability of class III APIs through the use of nanoparticulate ionic liquids, enhancing efficacy parameters across different administration routes. Improved therapeutic efficacy results from pharmacokinetic factors such as enhanced bioavailability and tissue distribution, enabling targeting of more distant sites, increased systemic exposure, improved absorption, and reduced enzymatic metabolism due to protection afforded by drug encapsulation in nanoparticles. Future steps involve screening new articles in electronic databases and drafting the article for intellectual production publication.

Keywords: Administration routes; Drug delivery systems; Nanostructured materials; Pharmaceutical development.

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Pharmaceutical offices in the SUS of Alfenas

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The pharmacist is a strategic professional for the Unified Health System, however, there are still barriers that hinder access to pharmaceutical services in the area of patient care. One of these barriers is work overload and almost exclusive involvement with technical-managerial activities. In 2020 and 2022 respectively, the CRF/MG and the Federal Pharmacy Council regulated the opening of pharmaceutical offices across the country. Therefore, there are currently six pharmaceutical offices implemented in the SUS in the city of Alfenas, which provided autonomy and training for pharmaceutical professionals. The objective of this study is to report the experience of academics in SUS pharmaceutical offices. During pharmaceutical consultations, students participating in the Unifal Pharmaceutical Care Center extension project, under the supervision of teachers, perform pharmacotherapeutic monitoring and other pharmaceutical services. Additionally, they employ auriculotherapy as a non-pharmacological therapeutic approach and promote health education and screening activities. Since the beginning of the year until now, the offices implemented in the city's SUS have carried out around 790 consultations and almost 1000 health screenings. The implementation of pharmaceutical offices in the SUS of Alfenas was an important advance in patient care, highlighting the importance and effectiveness of the pharmaceutical service in improving drug therapy. Therefore, the continuity and expansion of this service model are essential to solidify the strategic role of the pharmacist in the SUS and guarantee comprehensive and excellent care for patients, furthermore, the project of pharmaceutical offices in the SUS offers important experiences for academics who they have the opportunity to put into practice all the learning acquired in theoretical classes and guarantee the training of professionals with a clinical perspective and perspective focused on the patient and not just on their pharmacotherapy.

Keywords: Health education; Pharmaceutical services; Ambulatory care facilities.

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Potentially inappropriate and essential medications present in pharmacotherapy of patients hospitalized in the palliative care sector of a charity hospital from the south of Minas Gerais

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As the population ages, more people are likely to suffer from multiple, long-term illnesses and take multiple medications. With the evolution of such diseases, the goals of care shift from curative or course modifiers to symptom relief and comfort, so pharmacotherapy must be reconsidered and adjusted to adapt to the new goals to provide better care. Thus, the present study aims to analyze the pharmacotherapy of patients in palliative care, focusing on potentially inappropriate medications (PIM) and essential medications, in a reference hospital in the south of Minas Gerais. This is a cross-sectional study carried out at the Casa de Caridade Nossa Senhora do Perpétuo Socorro (Santa Casa de Alfenas-MG). The pharmacotherapies of admission, discharge or death (obtained through electronic medical records) of patients hospitalized in the Palliative Care sector were studied. Validated tools were used (European Consensus, PIP-CP, PEACE, ONCPAL, Stoppfrail for MIPs and WHO and IAHCP for essential ones) to classify medications as inappropriate and essential. Data collection was carried out from January to June 2024. During this period, 33 patients participated in the research, 21 (64%) using PIMs during their treatment and all using at least one essential medicine. 464 medications were prescribed in pharmacotherapies, of which 69 (15%) were potentially inappropriate and 325 (70%) were essential. For essential medicines, those most used were morphine (n=62), ondansetron (n=48), omeprazole (n=29), tramadol (n= 34) and lactulose (n=24). most frequently was omeprazole (n=29), followed by furosemide (n=14), captopril (n=10) and clonazepam (n=10). Thus, by analyzing the data cited, it was observed that the predominance of essential medicines demonstrates a favorable trend in the management of palliative conditions, however, the classification of essentiality and the identification of potentially inappropriate medicines (PIM) are fundamental to optimizing therapies and minimize risks and adverse effects, solidifying the strategic role of the pharmacist in palliative treatment and ensuring comprehensive and excellent care for patients.

Keywords: Patient safety; Treatment outcome; Drug-related side effects and adverse reactions

Ethics Committee approval protocol: CAAE 69835523.7.0000.5142 - Federal University of Alfenas

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Report of the "III Curso de Fitoterapia Integrada" of the FITOconsCIÊNCIA Program

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Since ancient times, humans have recorded the use of medicinal plants as a natural source of treatment against diseases. In this regard, the FITOconsCIÊNCIA Program has studied the potential of medicinal plants to modulate complex conditions like metabolic syndrome or to be used as a complementary therapy for managing anxiety, a psychological disorder that is increasingly prevalent in modern society. This study evaluated the influence of the lectures and workshops developed on medicinal plants with a perspective on the metabolic syndrome, mental health, and fostered self-care during the activities of the FITOconsCIÊNCIA Program at the event "III Curso de Fitoterapia Integrada" on May 7, 8, and 9, 2024. Activities have been developed not only to guide the participants toward the safe and effective use of medicinal plants but also to encourage self-care practices that help mental and physical well-being and contribute to preventing metabolic diseases. Furthermore, the potential of practical workshops as a significant learning method was explored. Theoretical-practical activities were conducted, including lectures, workshops on preparing carqueja tea and handmade lavender soaps, with interactions with professionals specialized in these subjects. The practical activities were especially effective in promoting learning and exchanging experiences, with the theoretical part being essential for the comprehensive knowledge of the event participants. It is concluded that the proposed activities have contributed positively to the dissemination of knowledge about medicinal plants and strengthening mental and physical health practices. Encouraging the responsible and informed use of medicinal plants not only promotes individual health but also contributes to a more holistic and sustainable approach to well-being.

Keywords: medicinal plants; metabolic syndrome; mental health; phytotherapy; self-care.

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Synthesis of abietic acid esters with phenylpropanoids and evaluation of their potential against bacteria of dental interest

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Enterococcus faecalis is a bacterium frequently isolated in cases of endodontic treatment failure, known for its resistance to major endodontic irrigants such as sodium hypochlorite and sodium hydroxide. This resistance presents a significant challenge in dental practice, necessitating new therapeutic approaches. The proposition of hybrid drugs is a promising strategy to enhance therapeutic effects and minimize side effects. In this research, we propose the use of abietic acid chemically combined with different phenylpropanoids to develop substances with antimicrobial capability against this bacterium. Abietic acid is a natural resin product known for its antimicrobial properties. Phenylpropanoids, such as eugenol, isoeugenol, and dihydroeugenol, also possess antimicrobial activity reported in the literature. The esterification reaction between abietic acid and the phenylpropanoids was carried out using EDAC and DMAP, resulting in three different esters. The obtained esters were purified by silica column chromatography and characterized by infrared spectroscopy and nuclear magnetic resonance (NMR). Infrared spectroscopy confirmed the formation of the esters by the characteristic bands of the ester groups, while NMR provided signals corresponding to the molecular structure of the designed compounds, such as the typical ester carbonyl signal in the 13C spectra. Currently, minimum inhibitory concentration (MIC) tests are being conducted to evaluate the antimicrobial efficacy of the esters against E. faecalis. Preliminary results indicate relative antimicrobial activity, with the novel compounds showing a potential higher inhibition capacity of bacterial growth compared to the starting materials. Concurrently, cytotoxicity assays are being conducted to evaluate the safety of the compounds in human cells. Initial results suggest that abietic acid and phenylpropanoid-based hybrids may represent a solution for the treatment of endodontic infections and an alternative for future research against multidrug-resistant bacteria.

Keywords: Antibacterial; Coupling agents; Eugenol.

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