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Oral presentations

A preliminary scoping review: Pharmacist role and contributions to public health in South Korea

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Introduction: Pharmacists, as the most accessible healthcare professionals, have an essential role in public health to improve the well-being of patients and populations. However, there is limited awareness, recognition, and integration of the pharmacist in public health. Existing documents outlining the pharmacist's role in public health and health systems were published by the American Public Health Association and addressed by the World Health Organization. While pharmacists have contributed greatly to public health, especially during the COVID-19 pandemic, there is limited research and documentation on their increased role in public health.

Purpose: To conduct a preliminary scoping review of pharmacists' roles and limitations in public health initiatives in South Korea and identify pharmacy contributions to improve public health

Method: An environmental scan was conducted to provide an overview of pharmacist roles in various practice areas relating to public health. Search engines such as PubMed and clinical journals relating to global public health and social and administrative pharmacy were utilised. Key search terms included public health, population health, global health, community health, and population-based interventions. Selected articles were organised in tabular format to extract critical factors characterising pharmacist impact for role evaluation in South Korea. Due to the nature of the preliminary search, other databases such as Scopus, Embas, and Medline were not included at this time but will be expanded in future iterations to reduce bias.

Results: A total of twenty-three articles were reviewed in this preliminary search. In community settings, pharmacists primarily dispensed medications, counselled, conducted medication reviews and reconciliation, and addressed adherence issues. In hospitals, pharmacists performed medication interventions and prevented significant numbers of Adverse Drug Events (ADE). Responsibilities included answering drug information inquiries, a service request that has been steadily increasing over the years. Pharmacist interventions consistently optimised the medication use process and demonstrated improvements in healthcare, such as economic cost savings. These could be mapped to the role of pharmacists in public health statements in the future. Limitations included restrictive regulations and legal barriers, time constraints, and a shortage of counselling space that hindered comprehensive care. Insufficient interprofessional collaboration and lack of training in public health roles, including appropriate counselling, ADE reporting and communication techniques, were notable. Lack of pharmacist recognition as healthcare practitioners affects the status of the profession and lessens public trust, making patients unwilling to accept expanded pharmacist services. Lack of financial compensation issues and awareness regarding pharmacist practice competencies amongst the public and

other healthcare entities limited pharmacists' capacity for collaboration and discouraged seamless patient care transitions.

Conclusion: Findings show that the pharmacist's role in public health in South Korea is limited to traditional responsibilities but shows potential for development in response to technological advancements, shifting healthcare systems, and societal needs. The pharmacist niche must be expanded to include disease prevention, public health promotion, and the development of pharmacy services that bolster health systems. Education should prepare pharmacists by emphasising communication, collaboration, and professionalism. Interdisciplinary roles should be created to enhance patient safety and improve care delivery to promote advanced pharmacy practice to optimise health outcomes.

Development and establishment of a national hospital pharmacy competency framework for hospital pharmacists: A multi-method study

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Introduction: Despite the publication of a European-wide competency framework for hospital pharmacy (Common Training Framework; CTF) by the European Association of Hospital Pharmacists (EAHP) in 2017 and its well-known advantages, some countries have yet to adopt and implement such a framework.

Purpose: To develop and validate a bespoke national hospital pharmacy competency framework for Austria that supports the hospital pharmacy workforce development.

Methods: This multi-method study consisted of four phases. First, (I) a systematic literature review (SR) across 48 websites of healthcare-related associations (globally) and six scientific databases. Eligibility screening was done by two researchers independently (JS/AEW) using the Preferred Reporting Items for Systematic Reviews & Meta-Analyses (PRISMA). (II) Extracted behaviour competencies were reviewed for contextual national appropriateness (JS/BBM/AEW) prior to mapping against the first CTF domain, "*Patient Care and Clinical Pharmacy Skills*". (III) Validation of the resultant draft competency framework took place through an expert panel discussion. (IV) Interviews were conducted with twenty key healthcare-related stakeholders across Austria using a topic

guide based on the Consolidated Framework for Implementation Research (CFIR) to determine how best to implement the framework in practice and develop role profiles.

Results: (I) The SR identified 28 international frameworks, out of which (II) 19 additional behaviour competencies were added to the first CTF domain (360 duplicates removed). (III) Expert panel discussion resulted in suggested changes to specific statements. (IV) Stakeholders identified key challenges in relation to framework implementation, such as a missing legal role definition of a clinical pharmacist in Austria, a lack of knowledge on how hospital pharmacists contribute to patient safety, and a lack of acceptance of physicians.

Conclusion: This multi-method approach showcases a methodology on how to adapt a framework to national needs and highlights key challenges for its implementation. These may inform other countries who are struggling with competency implementation and role profile expansion.

Drug-related problems among inpatients in the cardiology department of a university hospital in the United Arab Emirates: A prospective study on their prevalence, risk factors, and associated pharmaceutical interventions

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Introduction: Even though cardiovascular pharmacotherapy has shown to be a life-prolonging intervention in many cardiovascular conditions, the benefit can be compromised by Drug-Related Problems (DRPs).

Methods: A hospital-based prospective and observational study was carried out for 11 months in the cardiology department of TUH, Ajman, to quantify the prevalence and characterise the pattern of DRPs among patients admitted to the cardiology department and to evaluate the associated pharmaceutical care interventions to ensure that the medications are used safely and effectively. A specifically designed structured data collection form was used for the purpose of the research. This form captured the demographic data, clinical characteristics of the patients, and drug prescription details. Appropriateness of dose, duration of therapy, indication, and choice of prescribed agent were evaluated using evidence-based guidelines. Potential drug-drug interactions and ADR were also evaluated. The post-graduate clinical pharmacy student discussed all the identified DRPs and the interventions made with the licensed clinical pharmacist. The DRPs that were considered valid by

the clinical pharmacist were discussed with the physicians. The identified DRPs and suggested interventions were categorised as per the PCNE classification V9.0.

Results: A total of 113 patients were included in the study. A total of 175 DRPs were identified. The majority of patients had problems associated with treatment effectiveness (90.28%). The most prevalent DRPs were inappropriate combinations of drugs (75.7%), drug doses too high (47.36), and drug doses too low (47.36%). Most of the interventions were classified as having a moderate level of significance (65.03%). Interventions at the prescriber level comprised the majority of the interventions (70.55%).

Conclusion: The study highlighted that patients admitted to the cardiovascular department suffer from a large number of DRPs that can be resolved or prevented by timely pharmacist interventions.

Enhancing community health: Impact of pharmacist-led screenings across urban and rural pharmacies

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Introduction: The pivotal role of pharmacists as frontline healthcare professionals was highlighted through a comprehensive health screening initiative conducted in recognition of World Health Day 2024. Seven pharmacies across both urban and rural regions of Bjelovar, Bjelovarsko - bilogorska county, Croatia, participated in this cross-sectional study aimed at reinforcing the importance of pharmacists in community health management. The initiative specifically targeted regular patients of the pharmacies, fostering a framework of continuity in care while enhancing community engagement with pharmacy services. Pharmacies conducted vital measurements of blood pressure, blood glucose levels, vitamin and mineral statuses, and Body Mass Index (BMI) for local residents, as well as management of skin problems and education. Standardised equipment and protocols were employed to ensure consistency and reliability in data collection across all participating pharmacies.

Methodology: The health screening initiative was conducted over a span of seven days. All participants provided informed consent for their measurements and data collection. The screenings employed standardised equipment and validated measurement devices to ensure consistent and accurate results across all participating pharmacies. The screening was meticulously designed to capture a broad spectrum of health metrics crucial for assessing cardiovascular and metabolic health. Follow-up consultations were arranged for individuals with out-of-range health metrics to address any potential health concerns. These consultations were crucial in highlighting the pharmacists' ongoing role in chronic health management and offering personalised guidance and recommendations.

Results: A total of 304 patients participated in the health screening initiative, with a majority being women, who accounted for 65% of the participants. The average age of the participants was 55.2 years. Preliminary analyses revealed significant findings regarding the prevalence of hypertension, hyperglycaemia, and nutritional deficits among the sample population. In rural pharmacies, a higher incidence of hypertension and elevated blood glucose was observed, with 27% of patients exhibiting high blood pressure and 32% presenting with elevated blood glucose levels. Correlations between BMI categories and other health metrics were also noted, emphasising the need for targeted interventions. The study underscored the prevalence of health risks within the sampled population and highlighted gaps in routine health assessments, which could otherwise help prevent long-term health complications. In addition to the health screenings, 20 patients received educational information about proper skin protection.

Conclusion: The results of this pharmacist-led initiative underscore the feasibility and critical importance of community health screenings conducted by pharmacists. The high participation rate and positive feedback reflect the trust placed in pharmacists as accessible healthcare providers capable of delivering vital services that address gaps in routine health assessments. The study's findings emphasise the potential impact of routine screenings in identifying individuals at risk and managing chronic conditions. Pharmacists are strategically positioned to provide comprehensive screening for patients with chronic illnesses, playing a vital role in promoting community well-being. Continued investment in pharmacist-led health screenings can significantly contribute to early detection and mitigation of health risks, ultimately improving health outcomes and reducing the burden on healthcare systems.

Enhancing competency-based education for pharmacists: A strategic initiative in Serbia

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Introduction: In the dynamic global healthcare landscape, pharmacists confront challenges such as burnout, second victim syndrome from adverse treatment outcomes, and a declining willingness to assume responsibility for therapy outcomes. The Galenika Academy, in alignment with the International Pharmaceutical Federation's (FIP) global competency framework, enhances pharmacists' organisational, personal, and professional competencies. This initiative, which supports FIP Development Goals 2, 5, 6, 8, 9, 11, 19, and 21, creates an educational environment that promotes safe and sustainable clinical practices amid significant sectoral changes and high attrition rates. The initiative aims to enhance pharmacists' competencies in organisational management, professional skills, and personal resilience, addressing gaps in foundational education and supporting pharmacy sustainability and service quality.

Method: The Galenika Academy, in collaboration with the University of Belgrade's Faculty of Pharmacy and EduMed, has designed a tailored educational approach. This methodology, designed for the busy schedule of pharmacists, includes webinars, accredited tests, and courses delivered via the user-friendly and interactive "*Galiverse*" digital application. Academic content is meticulously developed to enhance critical competencies identified by FIP, with each module targeting specific skills such as human resources management, interprofessional collaboration, and leadership. This approach ensures that learning and development are not only accessible but also applicable, empowering pharmacists to integrate new skills directly into their practice.

Results: Since the outset in 2021, the initiative has reached many pharmacists, engaging over 6,000 professionals, with 10,427 webinar views and 5,351 accesses to accredited tests. The collective success rate of 77.78% is a testament to the programme's effectiveness in disseminating skills. Moreover, 30 managers and HR business partners from medium and large pharmacy chains in Serbia have participated in four business forums dedicated to building effective relationships, leadership, performance management, employee development, and change management. The "*Galiverse*" platform has facilitated 24/7 access to academic resources, fostering pharmacist engagement. Feedback from the "*Galiverse*" user satisfaction survey indicates high satisfaction, with an average score of 4.75 out of 5, while 95.77% of participants reported enhanced organisational and personal competencies.

Conclusion: The Galenika Academy's competency-based education initiative has significantly impacted the professional growth of pharmacists in Serbia, aligned with global standards and local needs. The success of this programme underscores the importance of competency frameworks in continuous professional education. Future enhancements may focus on refining educational content and expanding modules to cover additional competencies, ensuring that pharmacists are well-prepared to meet the evolving demands of the healthcare sector. This initiative supports pharmacists' professional development and improves healthcare outcomes in Serbia.

Exploring patient safety climate of Ontario hospital pharmacies in Canada

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Introduction: A culture of safety is important for improving patient safety and patient care. Safety climate questionnaires, which provide a snapshot of safety culture, have not been reported in the literature for hospital pharmacy practice in Ontario, Canada. The objective of this study was to perform a descriptive, cross-sectional exploration of Ontario hospital pharmacy patient safety culture.

Method: This study was conducted using the Agency for Healthcare Research and Quality (AHRQ) Hospital Survey on Patient Safety Culture (HSOPSC) 2.0, consisting of 10 composite measures (from "*Communication About Error*" to "*Teamwork*"). An additional demographic section was added to the AHRQ HSOPSC 2.0 to reflect Ontario-specific demographic contexts. The online questionnaire was posted on LinkedIn, Facebook, and X in March 2024 and engaged by the Ontario College of Pharmacists and the Canadian Society of Hospital Pharmacists Ontario Branch on the same social media platforms for hospital pharmacy professionals' anonymous and voluntary participation. Descriptive statistics were used to analyse quantitative data, and thematic analysis was applied to free-text responses accordingly.

Results: Sixty-three responses (75% pharmacists, 25% pharmacy technicians) were received, with the majority (54%) from the Toronto Region. An overall positive patient safety culture was perceived by most pharmacy professional respondents (4.8% rated as excellent, 34.9% very good, 33.3% good, 17.5% fair, and 9.5% poor). Of the ten composite measures, "*Teamwork*" and "*Supervisor, Manager, or Clinical*

Leader Support for Patient Safety" were the top two, while "*Handoffs and Information Exchange*" was the lowest. Staffing, compensation, and ease of error reporting were identified from the free-text responses as important facilitators for advancing patient safety climate. From the Ontario-specific demographic subgroup analysis, it was found that pharmacy professionals with over 20 years of experience reported a more positive perception of patient safety culture when compared to colleagues with fewer years of practice in the profession.

Conclusion: The Ontario Hospital's pharmacy patient safety culture was generally positively perceived by pharmacy professionals. Teamwork, peer, and leader collaboration could be leveraged to address patient safety gaps at transition points of care, such as handoffs. The extrapolation of findings from this study to the rest of Ontario was limited due to its small sample size and the fact that responses were primarily from Toronto practitioners. Going forward, the patient safety climate could be explored using qualitative research methods for further insight, followed by the development of potential interventions.

Gamification as a way to improve preparation for the pharmacist license exam in Russia

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Introduction: In Russia, there's a noticeable lack of simulators for teaching pharmacy students pharmaceutical counselling, a vital aspect of their education. Integrating pharmaceutical counselling algorithms into pharmacy faculties is crucial for improving students' skills and patient safety. Mastery of these algorithms gives students confidence in interacting with patients and handling complex situations. Therefore, innovative methods like gamification could help fill this educational gap and better prepare future pharmacists.

Purpose: This study investigates how the pharmaceutical students training for the Pharmacist License Exam in Russia can be gamified by creating a simulation game.

Methods: A literature review related to the application of gamification in education was conducted. During the research, methods such as description, comparison, summarisation, and correlation were employed. The research objects were international examples of using gaming mechanics to train pharmaceutical specialists. A simulation game for pharmacy students is currently being developed.

Results: In Russia, there are no pharmacy simulators yet, but successful foreign examples like «SimPharm» and «Pharmacy Simulator» exist. «SimPharm» is a virtual training platform by the University of Otago, New Zealand, where pharmacy students act as clinical pharmacists in a hospital setting, solving cases and providing pharmaceutical care to virtual patients. Instructors receive instant reports on student performance. «Pharmacy Simulator» is a fully three-dimensional simulated learning environment with instant feedback, scenarios for all skill levels, and the ability to create custom scenarios to expand the scenario database, aid in teaching future generations of pharmacists, and track progress. Yu-kai Chou's "*Octalysis*" framework outlines eight principles for gamification, which can inform the creation of an effective pharmacy training simulator. Key aspects include context, goal-setting, feedback, virtual rewards, collaboration, urgency, surprises, and consequences for decisions. Developing such a game involves defining goals, designing scenarios, creating a user-friendly interface, testing, integrating with educational resources, and assessing effectiveness for improvement. You should also consider the features of the Pharmacist License Exam: situations where you need to consult on symptoms; situations where it is necessary to dispense medicine according to a prescription; situations where the visitor asks to dispense a prescription medicine without a prescription and over-the-counter medicine, needs to be recommended; age, physiological characteristics and whether the patient is taking other medications.

Conclusions: Creating an educational game can present various difficulties and challenges: maintaining a balance between educational content and entertainment; adjusting difficulty levels and personalising the experience; choosing the platform and devices for game accessibility; developing a student performance evaluation system; motivating students to participate in the game.

Impact of a pharmacist-led infodemic management intervention on perception, willingness to receive and pay for adult vaccines among civil servants in Nigeria.

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Introduction: Adult vaccines remain largely underused, leaving adults, particularly at risk during disease outbreaks due to a lack of immunity. The pervasive influence of misinformation regarding the use of vaccines promotes vaccine hesitancy among the adult population. This poses a great public health risk. The purpose of this study was to evaluate the impact of a pharmacist-led infodemic management intervention on the perception, willingness to receive, and willingness to pay for adult vaccines.

Methods: A cross-sectional interventional study was carried out among civil servants in Akwa Ibom State, Nigeria. A pre-

tested interviewer-assisted questionnaire was shared among the staff of the Akwa Ibom State Local Government Commission. The questionnaire assessed the perception of the respondents toward vaccination, their willingness to receive, and their willingness to pay for adult vaccines. Pre- and post-evaluation of the respondents was done before and after an onsite public health enlightenment intervention on adult vaccines/vaccination implemented by a public health pharmacist, respectively. The IBM Statistical Programme and Service Solutions (SPSS) version 25.0 was used to analyse the data. Inferential statistics such as the *t*-test and Pearson's chi-square test were used to test the difference between the pre- and post-evaluation data. Statistical significance was set at $p < 0.05$.

Results: Four Hundred and seventeen civil servants were recruited into the study; however, only 377 completed the study. There was a statistically significant increase in the vaccine perception score of the respondents post-intervention (pre-intervention = 5.713±1.723 *vs.* post-intervention= 6.679±0.962; *t*-test = -9.505; $p = 0.0001$). Also, there was an increase in the number of respondents who were willing to receive the vaccines between the pre-and post-intervention period. However, this increase was not statistically significant (pre-intervention = 328 *vs* post-intervention = 343; χ2 = 3.046; $p = 0.081$). A statistically significant increase in the number of respondents that were willing to pay for vaccine post-intervention was also observed (pre-intervention=200 *vs* post-intervention=241; χ2 = 9.807 $p = 0.02$).

Conclusion: The pharmacist-led infodemic management intervention had a statistically significant positive impact on the respondents' perception and willingness to pay for adult vaccines. Infodemic management interventions can effectively improve the uptake of adult vaccines.

Implementation of interprofessional education in pharmacy education: Studying opinions in a Nigerian University

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Introduction: The evolving roles of pharmacists in Nigeria's healthcare system have been met with curriculum change in pharmacy education. In addition, this has also led to increased collaboration with other healthcare professionals. Implementing Interprofessional Education (IPE) has proven to be one way of improving this collaboration. Although a proven method to enhance the pharmacist skillset for collaborative practice, more data on the implementation would be required to facilitate a seamless adoption in Nigeria's Pharmacy Education. A successful implementation of IPE would require expert opinion from faculty and the views of students for its design. This study aims to assess students' and faculty's opinions toward the formal implementation of Interprofessional Education (IPE) in a Nigerian university and provide methods for its implementation.

Methods: A mixed-method approach was employed, combining quantitative and qualitative methodologies between February 2022 and January 2023 at a Federal University in Nigeria. For the quantitative aspect, a prospective cross-sectional study was conducted utilising two validated questionnaires adapted from The Readiness for Interprofessional Learning Scale (for the students) and Interprofessional Knowledge and Attitude Scale (for the Faculty). Three hundred sixty-nine (369) students and twenty-two (22) lecturers from the Faculty of Pharmacy, Department of Nursing and Medicine completed the questionnaires.

Additionally, one-on-one in-depth interviews were conducted with three stakeholders from the three disciplines for the qualitative. Data analysis involved descriptive and inferential statistics set at ($p < 0.05$) using the Statistical Package for Social Sciences version 12. At the same time, the interviews were analysed using thematic analysis.

Results: It was revealed that more than half of the students (206; 55.8%) had an overall positive perception of IPE, with Nursing and Pharmacy students having the highest proportion (50; 61.7%) and (39; 61.9%), respectively, as opposed to students in Medicine and Surgery discipline. The subscale analysis revealed an association between discipline and positive professional identity ($p = 0.038$). However, 13 (59.1%) had good knowledge, while (14;63.6%) had a negative perception towards IPE implementation, characterised by scores greater than 70%. In addition, the relationship between the discipline of the lecturers and the overall perceptions was statistically significant ($p = 0.006$). The interview revealed that role clarification was crucial for successful IPE implementation, while curriculum differences and institutional constraints were reported as barriers.

Conclusion: The students had a positive perception and attitude towards implementing IPE in the school, as opposed to the negative perceptions of lecturers revealed. Since lecturers are key drivers in this implementation, their negative perception may result in unwillingness to facilitate this intervention and impede its success. Interventions such as training programmes should address the lecturers' concerns and, in turn, facilitate dialogues geared towards the formal implementation of IPE in pharmacy education in Nigeria.

Increasing vaccination service capacity by use of injection-certified pharmacy technicians: A qualitative analysis of best practices

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Introduction: Community pharmacies have demonstrated their role as accessible vaccination hubs. Yet community pharmacists' prioritisation of clinical and dispensary activities limits their ability to fit vaccination services into their busy practice. To meet increasing patient vaccine needs in community pharmacies, pharmacy technicians trained in injection administration have become important vaccination team members involved with screening prospective patients and/or administering vaccines following pharmacist assessment. It is important to identify vaccine service delivery models that incorporate technicians in an efficient and effective manner. This research describes injection-certified technicians and pharmacist self-identified best practices for optimal vaccination workflow in Ontario, Canada.

Methods: Ten pharmacy injection certified technician-pharmacist pairs from the same workplace completed individual semi-structured interviews. Participants were recruited using a purposeful sampling approach that targeted 6-12 pairs in seeking coding saturation or no further changes to the codebook. Qualitative data was categorised using thematic analysis to identify themes related to the injection-certified technician's role in the vaccination workflow, important workflow influences and associated workflow impacts in community practice in Ontario.

Results: Participants described their experiences through themes of efficiency and flexibility, including two vaccination workflow models. These models differed by skill-based role allocation, vaccination offerings, staffing, and dispensary planning. The "*High Efficiency*" (HE) model was characterised by pharmacy assistants completing patient intake and monitoring while the technician administered vaccines during high volume times. Situations with lower vaccine volume, busy dispensaries, or staff shortages required the use of the "*Flex and Protect*" (FP) model, where pharmacy technicians conducted intake, administered vaccines and supported the dispensary between vaccinations. Although less efficient, the FP model was beneficial in protecting dispensary resources. Both workflow models involved pharmacists in clinical assessment for vaccine eligibility and appropriateness, providing patient assessment, and vaccine administration when technician resources were limited. Technicians were comfortable identifying when pharmacist involvement was needed to answer patient questions, provide clinical expertise, manage challenging appointments, and treat adverse events. Positive impacts on pharmacist workflow occurred due to a decrease in dispensary or clinical activity interruptions, reduced dispensary errors, and improved patient access to vaccination services. All pairs indicated a decrease in resource costs when pharmacy technicians delivered vaccination services relative to a pharmacist-only model.

Conclusion: Community pharmacies with injection-certified technicians can tailor their offering of vaccination services to optimally use the right staff at the right time to serve their patients' dynamic needs. Two workflow models were identified that optimised the use of pharmacy staff skills and managed patient volume while considering dispensary needs and staffing. These role-optimisation strategies can allow the safe and effective expansion of community pharmacy vaccination services. Future research is needed that compares efficient and flexible vaccination workflow models incorporating injection-certified technicians to pharmacist-only vaccination workflow models in terms of resources and patient outcomes.

Influence assessment of the characteristics of doctors and patients on the effectiveness of the predictive machine learning model in prescribing drugs to children

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Introduction: The PubMed database contains about 280 thousand publications on keywords such as "*big data*", "*data-driven*", "*artificial intelligence*" (AI) and "*machine learning*" (ML). According to Precedence Research, one of the leading providers of strategic marketing research, by 2030, AI in the healthcare market size will be almost seven times higher than now and, in total, will reach almost 188 billion dollars. These facts confirm the promise of data-driven methodology in medicine and pharmacy, not only in science but also in business, and open up many opportunities, such as the use of big data in the development of new drug circulation distribution models, drug coverage insurance products and their optimisation using ML.

Purpose: This study aimed to develop a metric for the accuracy of a predictive model for prescribing drugs to children, as well as evaluate the impact of key characteristics of doctors and patients on the effectiveness of the resulting model.

Methods: The research database included data on doctors' prescriptions of drugs from the medical information system of clinics' networks providing outpatient care for children. Data preprocessing, aggregation, statistical processing,

feature extraction and visualisation were performed using Python programming language tools and the Jupyter Notebook development environment. Predictive ML models were developed using Scikit-learn and Keras Python libraries.

Results: Two ML classification models have been developed: 1) a model, the result of which was an array of probabilities of prescribing a drug for a certain diagnosis, sorted in descending order; 2) a model, the result of which was also an array of probabilities of prescribing a drug, sorted in descending order, which takes into account the individual characteristics of the doctor and his patient. The accuracy metric (Acc) was evaluated by comparing the number of correctly predicted drugs to the total number prescribed from a sample of target values. The first model served as a simple baseline to compare against other more complex classification models. The accuracy of this model was 0.32 (32%). The second model, in its initial state, was trained on data containing columns with prescribed drugs and the names of the diagnoses with an accuracy of 0.18 (18%). After adding additional data on the patient's age and gender to the model, the accuracy of the model increased to 0.48 (48%), which already exceeds the accuracy of the first model. Further improvement of the predictive ability of the model was achieved by sequentially adding characteristics such as the specialisation of the doctor (Acc=0.53), the name of the doctor (Acc=0.55) and the date of the doctor's appointment (Acc=0.61).

Conclusions: Multilabel classification ML models can be effective for solving the problem of predicting drug prescriptions. Further study of the characteristics of doctors and patients and their use in the development of such models can significantly improve their performance. Such models can serve as a basis for the development of personalised drug insurance product offerings for children, as well as a tool for managing the assortment of pharmacies serving children's medical organisations.

Intervention by primary care pharmacists to reduce safety drug-related problems in nursing homes in Barcelona, Catalonia, Spain

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Introduction: Nursing homes (NH) are essential care centres for complex chronic geriatric patients. In Catalonia, healthcare in NH is provided by Primary Care (PC) centres, which coordinate with NH professionals for Integrated Care. Ensuring resident safety is challenging due to their complex healthcare needs, including medication management.

The Catalan Healthcare Service (CatSalut) ensures comprehensive, quality public healthcare coverage in Catalonia. CatSalut oversees all publicly funded Healthcare Provider Organisations (HPO), including PC centres. CatSalut utilises a Medication Safety Indicator (MSI) with 16 sub-indicators (SSI) to identify prescription incidents and prevent Drug-Related Problems (DRPs).

PC pharmacists play a strategic role in maximising medication benefits, minimising risks, and optimising allocated resources, with their support role to prescribers in PC. However, their involvement in medication reviews to reduce DRPs in NH settings has not been fully implemented.

Purpose: Firstly, the authors proposed that PC pharmacists review the pharmacotherapy of patients (at least 50%) in NH in the city of Barcelona with any of the three selected SSI prescription incidents. Secondly, the authors evaluated the impact of the interventions on those incidents.

Method: PC pharmacists were provided with two lists (early May and October 2023) of patients aged 75 years or older institutionalised in NH whose pharmacotherapy had any of these 3 SSI incidents: inappropriate medication (according to CatSalut-consensus criteria); three or more anticholinergic medications; and/or concomitant use of urinary absorbents and medications for urinary incontinence. These were identified from chronic (+3 months) electronic prescriptions awaiting dispensation.

PC pharmacists reported whether the medication review was an individual assessment by PC pharmacists or an automated tool-based review. The resolution of the intervention was reported when possible. The achievement of the objective, the review method, and their impact on these SSI incidents were evaluated at the end of December 2023.

Results: 2010 patients meeting the criteria were identified, 1412 in May and 598 in October, of which 86.0% (1728) remained active at the end of the evaluation. PC pharmacists reported that intervention was used in 84.8% (1466) of active patients, and there was no intervention in 2.7% (46); 12.5% (216) missed any intervention report. 76.9% (1128) had an automated tool-based review; 15.0% (225) had an individual review by a PC pharmacist with reported resolution; and 7.7% (113) had an individual review by a PC pharmacist without reported resolution. Among all patients with any kind of reported review, incidents were solved in 48.9% (717), and in those not reported or not reviewed, in 42.7% (112). The odds ratio of any review intervention is 1.28 (95% CI 0.9833-1.6716). Considering only individual reviews by PC pharmacists with reported resolution, it is 1.77 (95% CI 1.2331-2.5329).

Conclusion: Any review intervention is capable of impacting SSI incidents, but only individual reviews by PC pharmacists with reported resolution achieve this with statistically significant association. The established percentage objective of patient pharmacotherapy reviews was greatly exceeded.

Overcoming barriers to healthcare practice innovations: Tailored implementation strategies for health service providers

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Introduction: Implementing evidence-based practices in healthcare is a complex process with multiple barriers that can hinder its progress. Tailoring implementation strategies to the identified barriers may facilitate the successful adoption of these evidence-based practices in healthcare environments. However, whilst tailored implementation strategies have been suggested as an effective approach to facilitate implementation, and barrier-strategy matching tools have been developed, there is limited research on the effectiveness of these implementation strategies tailored to specific barriers.

Purpose: The objectives are to identify and assess the effectiveness of implementation strategies tailored to barriers identified during the implementation processes for healthcare providers.

Method: A systematic review was conducted in accordance with the PRISMA guidelines. A search of the literature indexed in PubMed, Scopus, Web of Science, PsycINFO, and the Cochrane Library databases up until February 2023 pertaining to barriers to implementation, implementation strategies, and associated terminology was performed. Articles were screened by title and abstract, and exclusion criteria were applied to identify eligible studies for the review. Identified barriers were coded to the CFIR 2.0 and the implementation strategies to the ERIC taxonomy.

Results: The interim results are presented. The initial searches produced a total of 5,804 distinct articles, with 52 articles included in the review. Data on the barriers faced by healthcare providers, the implementation strategies tailored to address those barriers, and the effectiveness of those strategies were extracted. The analysis so far has identified "*Innovation deliverers: Capability*" (n=86, 21.0%) and "*Innovation deliverers: Opportunity*" (n=62, 15.1%) as the most commonly reported barriers among healthcare providers. These barriers involve the innovation deliverers having inadequate interpersonal competence, knowledge, skills, availability, scope, and power to fulfil their roles effectively. The preliminary findings suggest that the implementation strategies "*Conduct educational meetings*" (holding meetings with healthcare providers to educate them about the innovation) and "*Promote adaptability*" (identifying ways to adapt the innovation to local requirements) are effective in addressing the "*Innovation deliverers: Capability*"

and "*Innovation deliverers: Opportunity*" barriers, respectively.

Conclusion: The interim results of this systematic review indicate that the characteristics of individual healthcare providers are the most frequent barrier to adopting innovations. Further analysis will clarify the nature and relationship between barriers and implementation strategies when implementing innovations in healthcare. As the review evaluates the effectiveness of these strategies, it will also provide recommendations for tailored implementation strategies to overcome specific barriers, reducing complexity in the implementation process.

Using multi-institutional leadership circles to support faculty leadership development

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Introduction: To explore anticipated and unexpected outcomes of the American Association of Colleges of Pharmacy (AACP) Leadership Circles (LCs), a leadership development programme that moves beyond traditional workshops and enables participants to tackle real-world academic leadership challenges.

Methods: LC goals included addressing leadership challenges, applying leadership frameworks, providing feedback, seeking advice, and expanding networks. LC participants were recruited from the AACP Leadership Development Special Interest group and were convened by faculty who had previously participated in an LC. LCs met virtually, and each member was assigned a specific role to play, with roles rotating for each session. A formal evaluation included two focus groups with six LC advisors to gather observations on LCs and reflections on their differences from traditional programming. Focus group transcripts were analysed by using thematic analysis and further examined to categorise LC education outcomes using an established taxonomy.

Results: Six LCs totaling 37 members from 33 institutions met during the 2022-2023 academic year. LCs grew into informal communities of practice. Assigning roles promoted accountability and a purpose for attending sessions. Theme 1: Sessions emphasised applying concepts in real, complex, emotionally charged situations, enabling members to share challenges, seek advice, and see immediate effects, increasing their investment and the practical application of leadership frameworks. Theme 2: The virtual format fostered engagement, relationship building, and rapid learning in a cost-effective environment. Theme 3: Members demonstrated vulnerability, psychological safety, and sustained commitment that surprised LC advisors. Cognitive, environmental, relationship and affect educational outcomes were identified.

Conclusion: LCs were an accessible, engaging, and flexible approach to leadership development. Members practised leadership skills by engaging with authentic academic leadership challenges. Unanticipated outcomes included supportive and enduring relationships.

Pharmacy practice research summer meeting for Ph.D. students, postdoctoral fellows and supervisors conference abstracts 2024

Hosted by FIP Pharmacy Practice Research Special Interest Group (PPR SIG)

Poster presentations

A review of pharmacist remuneration regulation in Indonesia

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Introduction: The remuneration for pharmacists is fundamental to ensuring their sustainable contributions to healthcare. Review of the policy regulating remuneration is central to pharmacist care. However, no studies have been conducted to review pharmacist remuneration regulations in Indonesia. Therefore, this study aims to review the regulations on pharmacist remuneration in Indonesia.

Methods: This review involved data on regulations at both the national and local levels implemented in Indonesia since 2020. Data was retrieved from Google, regulation repositories, and manual selection of established policies in the healthcare and pharmacy reimbursement systems. The study collected data on the type of policy, regulating bodies, implementation rate, and model of payment. A comparative analysis was subsequently used to describe the commonalities and differences in the regulations.

Results: A total of 50 policy documents were reviewed, comprising five national policies enacted by the central government and 45 local policies endorsed by the local government, respectively. The rate for reimbursing pharmacy services varied between regulations, reflecting the lack of standards for paying pharmacist contributions. In addition, the variation might be influenced by the ability of the government to pay for the service. In general, remuneration has been mostly attached to product dispensing. Capitation and fee for service were two common payment models. Overall, the pharmacist did not receive specific remuneration for their contributions apart from the payment delivered to the pharmacy.

Conclusion: A uniform and standardised model of payment was not recognised in Indonesia's current regulations. Defining and implementing a new remuneration model specific to pharmacists can be the next agenda for change.

A systematic review and meta-analysis investigating the effects of employing telemonitoring systems on systolic blood pressure

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Introduction: Hypertension is a prevalent condition associated with significant cardiovascular risks, necessitating effective management strategies. Telemonitoring systems have emerged as promising interventions for controlling systolic blood pressure among individuals with chronic

hypertension. However, the efficacy of telemonitoring systems in this context remains uncertain.

Purpose: A systematic review was conducted to evaluate the influence of telemonitoring systems on systolic blood pressure control of patients with chronic diseases.

Methods: A comprehensive search of the Cochrane Library database was conducted, and eligibility criteria were applied to identify relevant Randomised Controlled Trials (RCTs). Data extraction and risk of bias assessment were performed using standardised methods. A meta-analysis was conducted to estimate pooled mean differences in systolic blood pressure between telemonitoring and standard care groups.

Results: Ten RCTs met the inclusion criteria, and their characteristics were summarised. The meta-analysis revealed a statistically significant overall effect of telemonitoring on systolic blood pressure reduction, with an average reduction of 0.64 mm Hg (95% CI: 0.27 to 0.98).

Most of the studies were conducted in the USA with similar methods of intervention: eight studies conducted remote blood pressure monitoring as part of their interventions. Two RCTs studies conducted behavioural modifications together with telemonitoring and evaluated the impact on blood pressure control. A high heterogeneity (I2 = 0.98) was observed among the studies, indicating that substantial variability existed in the parameters that were studied. Potential sources of heterogeneity include differences in study settings, intervention modalities, and participant characteristics. A majority of the papers were graded as comprising moderate-quality evidence.

Conclusion: The systematic review and meta-analysis provided adequate evidence to support the effectiveness of telemonitoring systems in managing systolic blood pressure. Despite heterogeneity among the studies, a consistent trend towards systolic blood pressure reduction was evident, highlighting the promising role of telemonitoring in hypertension management. Further research is warranted to explore heterogeneity in the variables and optimise telemonitoring interventions for improved patient outcomes. The study findings offer valuable insights for informing evidence-based policies and clinical practices in hypertension management.

Adherence to immunosuppressive therapy after kidney transplant from a patient-clinician perspective

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Introduction: Immunosuppressive Therapy (IST) is a prescription-required drug with a narrow therapeutic index. The pharmacokinetic parameter of immunosuppressive agents varies among individuals requiring optimal dosing. Transplant recipients are prescribed IST to prolong graft survival and prevent acute and chronic graft rejection. It is important to maintain drug concentration in a therapeutic range to avoid graft rejection and adverse drug reactions. The steady-state concentration of IST in whole blood can be achieved by adhering to a medication. However, transplant recipients undergo so many challenges due to the complex nature of drug administration and poly-medication.

Purpose: This study was conducted in a tertiary care hospital in Bhutan to evaluate adherence to IST from the standpoints of the patient and clinicians using a self-reporting questionnaire validated by laboratory data.

Methods: An observational study was conducted in the therapeutic drug monitoring unit first by administering a self-reporting questionnaire. The questionnaire consists of four items on missing doses, several doses, time deviation of more than two hours and self-lowering of dose within the past four weeks. The responses were ranked in the order of a 7-point Likert scale from 0 as never to 7 as every day. Responses greater than 0 were classified as non-adherence. Second, the clinician's evaluation was taken from the patient's medical records, and third, laboratory results were prospectively gathered over six months. The percentage coefficient of variation (% CV) of drug concentration was calculated from five readings of tacrolimus trough concentration and classified as non-adherence if % CV > 43%, medium 20-43 % and good adherence < 20 %. Sociodemographic information such as age, sex, marital status, occupation, and education were collected with a self-reporting questionnaire. Descriptive analysis was performed, and data were expressed in percentage, median, and mean (SD). The impact of sociodemography on adherence was analysed using an independent t-test, Chai Squire, and Mann-Whitney U test.

Results: Fifty-eight kidney recipients participated in this study. Among these 31(53.4%) were non-adherent; 19(61.3%) missed the doses, 14(45.1%) took several doses, 24(77.4%) deviated time by more than two hours and

8(25.8%) took dose lower than the prescribed dose. Out of 58 participants, clinician evaluation found 5(8.6%) non-adherence and 9(15.5%) of them had % CV > 43%. The Kappa assessment score by the clinician did not differ significantly from CV % at 0.96 ($α$=0.05), and the level of agreement was excellence (0.93-1.00). Among non-adherence, a median rise in serum creatinine was 2.5 mg/dL (1.6 - 3.5) (p = 0.03) and urea 43.0 mg/dL (35.5-78.0) (p = 0.01). Age, sex, marital status, occupation, and education level did not impact the adherence level.

Conclusions: The clinician's assessment was supported by laboratory data with similar findings; however, the rate of non-adherence was higher in self-reporting. Periodic laboratory testing must be conducted to evaluate medication adherence.

Adherence towards good pharmacy practice of community pharmacists in Central Visayas, Philippines: Proposed policy brief

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Introduction: Community pharmacists play a pivotal role in bridging gaps in the delivery of health care services and in ensuring the rational use of medicines. With the advent of Good Pharmacy Practice, it is essential that there be an established national framework of quality standards and guidelines; however, there is dearth in the evaluation of GPP implementation in the country. Philippine community pharmacists are expected to exhibit expertise in medications. Nonetheless, their practices often diverge significantly from these expectations. In this literature study, community pharmacists grapple with consultation roles due to a lack of clinical guidelines, training, skills, and patient self-selection behaviour.

Purpose: The aim of the study was to assess the adherence towards Good Pharmacy Practice among community pharmacists in Central Visayas, Philippines and proposed a policy brief formulated based on the findings to gain a better understanding of the country's existing approach to community pharmacy practice.

Methods: The study used a quantitative descriptive cross-sectional research design to scrutinise community pharmacist practices in the Philippines, specifically in FDA-registered independent and chain pharmacies in Bohol, Cebu, Negros Oriental, and Siquijor provinces. The selection process involved stratified random sampling and a modified closed-ended questionnaire from Badro et al. (2020), tallying 321 respondents. Data was recorded as 1 for yes responses and 0 for no. The GPP adherence levels were categorised as poor adherence for less than 50% or good adherence for >75%.

Four experts validated the instrument, resulting in a high and acceptable S-CVI and a reliability index of .893, indicating good reliability.

Results: Findings revealed that the majority of community pharmacists in Central Visayas, Philippines have poor adherence to the GPP indicators on data management and data recording 69.8% (224), services and facilities with 94.7% (304), dispensing, preparation, administration and distribution of medicines with 96.2% (309), but good adherence to storage with 75.4% (242). The most significant challenges identified were time restrictions, a lack of understanding, and a lack of training and resources. Additionally, time constraints, excessive workload, workforce shortage, and lack of support from employers and other colleagues were recognised. However, the majority show compliance with FDA storage regulations and standards as a minimum requirement to continue the establishment, and pharmacists operate in the community setting. Therefore, a three-pronged strategy is likely necessary: increasing the number of trained pharmacy staff, engaging in professional development and regulatory advocacy.

Conclusion: Based on the findings of the study, the demographic profile of the respondents indicates that the majority belongs to the Millennial generation aged 27- 45 years old. These respondents are predominantly female community pharmacists, mostly in Cebu. They hold a BS Pharmacy degree, having 3 years to less than 6 years of practice. Their work schedule typically exceeds 40 hours per week, and they operate within independent pharmacy.

While the majority of respondents demonstrated good adherence to storage indicators, there were notable shortcomings in data management, services and facilities and dispensing indicators. These findings highlight the need for targeted interventions and tailored strategies to elevate standards.

Advancements in pharmacy practice: Introducing HealthAI assist by PharmBotAI

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Introduction: Pharmacy practice is experiencing a transformative shift with the integration of Artificial Intelligence (AI) technologies. PharmBotAI, a pioneering company in the field, introduces HealthAI Assist—a cutting-edge platform designed to revolutionise patient care and optimise pharmacy operations. This innovative solution harnesses the power of data analytics and machine learning to enhance medication management, streamline workflows, and improve patient outcomes.

Purpose: The objective of this study is to introduce and evaluate HealthAI Assist by PharmBotAI in pharmacy practice settings. This platform aims to address prevalent challenges such as medication errors, adherence issues, and operational inefficiencies encountered in traditional pharmacy settings.

Method: HealthAI Assist, currently in its initial stages of development by PharmBotAI, utilises advanced machine learning algorithms to analyse patient data, medication histories, and clinical guidelines. This platform is designed to provide personalised medication recommendations, dosage adjustments, and therapeutic interventions based on individual patient profiles and real-time health data. Additionally, it aims to offer predictive analytics to forecast medication adherence and identify potential drug interactions or adverse effects.

Results: As HealthAI Assist is still in its initial stages of development, there are no results to report at this time. However, PharmBotAI is committed to rigorously testing and validating the platform to ensure its effectiveness in improving medication management and patient outcomes.

Conclusion: HealthAI Assist by PharmBotAI represents a promising advancement in pharmacy practice, offering transformative opportunities to enhance patient care delivery and operational efficiency. While preliminary results are not yet available, the platform's potential to revolutionise medication management through AI-driven solutions is evident. Future research and implementation efforts will focus on further developing and evaluating HealthAI Assist to maximise its impact in diverse healthcare settings.

This abstract introduces HealthAI Assist by PharmBotAI, highlighting its potential to revolutionise pharmacy practice through AI-driven solutions while acknowledging its current stage of development and the absence of results.

AGREE HS translation to Brazilian-Portuguese and its benefits for health system guidance - A scoping review

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Introduction: Health System Guidance (HSG) provides recommendations to address challenges and difficulties in a health system. These documents are systematically developed based on scientific evidence, epidemiological data, and health system process information. AGREE collaboration has created the Appraisal of Guidelines for Research and Evaluation–Health Systems (AGREE-HS), a tool divided into five quality items.

Purpose: The authors aim to promote the Brazilian-Portuguese translation of the AGREE-HS instrument and the benefits of using this tool to evaluate and develop HS guidance documents by benchmark.

Method: The translation of AGREE HS was performed by two Brazilian-Portuguese speakers and retro-translated by two English speakers. The document was submitted for external independent review by AGREE Collaboration. The scoping review was conducted as described by JBI and reported using PRISMA-Scr in Pubmed, Scopus, and Web of Science databases. The authors included studies that systematically obtained HSG documents and reported the results for every AGREE-HS tool item. The benchmark was developed by statistically comparing AGREE-HS results and identifying HSG strengths and weaknesses.

Results: The AGREE HS tool was successfully translated and publicised on the AGREE Collaboration website. The systematic scoping review found 408 registers. After removing duplicates and the screening phase, twenty-two articles were fully read, and six were included in this study. The studies were from countries in Europe and Australia, and they evaluated 170 HSG written for several purposes, such as rehabilitation post-COVID and neonatal death reports. The statistical analysis revealed Topic (64% SD23.5) having the best evaluation using AGREE HS, followed by Recommendations (47% SD19.3), Implementability (38%SD21.2), Methods (29%SD21.6), and Participants (24%SD23.5). For the Methods and Participants items, 75% (n=127) of the studies have scores under 42% and 33%, respectively. These analyses revealed problems with methodological transparency and consistency, the need to improve stakeholders' participation, and the consideration of their values and preferences during HSG development.

Conclusion: Translation of appraisal tools is essential for non-English-speaking countries, especially Brazil, where less than 10% of the population speaks English. By analysing score results from the appraisal of worldwide HSGs using AGREE HS, the authors are empowered to pinpoint critical issues to address when writing or updating an HSG. Thus, it may strengthen health systems and equity by identifying contextually practical recommendations and the needed resources.

Antibiotic utilisation pattern and their cost analysis in burn patients: A retrospective study

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Introduction: Antibiotics are the key drugs for the treatment of nosocomial infections in burn patients. Overuse and inappropriate use of antibiotics increase both bacterial resistance and the cost of treatment. For better health outcomes, rational prescribing is imperative in burn patients. Without knowledge of the current situation of antibiotic consumption, the introduction of correct and rational use of antibiotics seems to be impossible. However, to the best of my knowledge, no such study has been conducted to determine the antibiotic utilisation pattern and their cost analysis among burn patients in Nepal.

Methods: A retrospective review of medical records was done to analyse the utilisation pattern of antibiotics. The data were collected from Kirtipur Hospital from June 2018 to May 2019. All the admitted patients, irrespective of age and gender, who were prescribed antibiotics and presented within three days of the burn were included in the study. Patients admitted for less than 24 hours of time were excluded from the study.

Results: A total of 249 case records were reviewed. It was found that 51.8% were females and 48.2% were males. The most commonly affected age group was 15-29 years (34.5%). Flame burn (51.8%) was the most common cause of burn. 91.20% of the patients had second-degree burns. 36.90% of patients had 0-10% burn. Third-generation cephalosporin, ceftriaxone had the highest (Defined Daily Dose) DDD/100 (Bed-days) BD (19.05). The most frequently used antibiotics were ceftriaxone, cefazolin and piperacillin+tazobactam. The (Drug Utilisation 90%) DU90% comprises 12 antibiotics out of 30 antibiotics. The average number of antibiotics prescribed was 2.12, with a range of 1 to 7. There was no significant difference between the cost of antibiotics and age ($p = 0.797$). No significant difference was found between the cost of antibiotics and gender ($p = 0.879$). There was no significant difference in the cost of antibiotics and the cause of the burn ($p = 0.071$). A significant difference was found between the cost of antibiotics and TBSA of burn ($p < 0.01$). There was a significant difference between the cost of antibiotics and the depth of burn ($p = 0.013$). Also, a significant difference was found between the cost of antibiotics and resistance pattern ($p < 0.01$).

Conclusion: This study shows the antibiotic utilisation pattern in burn patients at Kirtipur Hospital. Further, it shows the TBSA of burn, depth of burn and resistance pattern have a significant impact on the cost of antibiotics. Thus, this study can be taken as a baseline study for antibiotic utilisation patterns and control measures on the factors that can be taken to further reduce the cost of antibiotics.

Antimicrobial utilisation in a rural children's hospital in South India

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Introduction: The "*more-is-better*" antimicrobial prescribing philosophy, besides resistance, is a significant contributor to suffering and death in children. Only a few nations have given comprehensive and comparable statistics on paediatric antimicrobial usage. However, such paediatric research is scarce in India, which necessitates antimicrobial pharmaco-surveillance.

Methods: The retrospective antimicrobial drug use study was conducted in a rural children's hospital in south India. The antimicrobial paediatric prescription was investigated using WHO/INRUD prescribing indicators and classified according to the WHO ATC index. The antimicrobial use was calculated by using DDD, and its deviation, if any, from the prescribed daily dose was determined.

Results: Pneumonia was the most common illness and the main reason for hospitalisation in 38% of infants and toddlers. A total of 79.66% antimicrobial agents were administered intravenously. Ceftriaxone (n=40, 33.9%) was the most commonly used antimicrobial agent, with a PDD:DDD value of 0.84.

Conclusion: The paediatric antimicrobial utilisation was adequately studied which found no discrepancies, but on contrary it was observed that prescribing practices was not consistent with WHO core prescribing indicators. This necessitates the implementation of paediatric antimicrobial stewardship programmes.

Antithrombotic prescribing pattern among patients screened and diagnosed with atrial fibrillation

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Introduction: A significant number of Atrial Fibrillation (AF) patients may remain undiagnosed and asymptomatic. The timely identification of AF and the initiation of oral anticoagulants can effectively prevent life-threatening complications like stroke. Therefore, screening of disease in the general population is important. Approximately half of AF patients eligible for therapy were not treated as per the guidelines recommendation for thromboprophylaxis. Therefore, this study was designed to screen AF in the general population and highlight the current scenario of the use of antithrombotics in a Hospital setting.

Purpose: The objectives of this study were to screen AF among residents within the Dhulikhel Municipality, Kavre, Nepal, and identify its prevalence. In addition, this study encompasses clinical characteristics, a stroke risk profile based on the CHA2DS2-VaSc score, a risk of bleeding based on the HAS-BLED score, and the use of antithrombotic therapy in patients with AF.

Methods: All residents of Dhulikhel municipality from four different wards comprised a base population for screening. After obtaining informed consent, a team of trained research assistants enrolled 2048 participants aged 50 years and older and underwent a one-time electrocardiogram screening using a portable 12-lead electrocardiograph machine. These recorded electrocardiograms were consulted by the cardiologist, and suspected cases were referred to the hospital for further evaluation and appropriate management.

This was a cross-sectional study conducted between March 2022 and March 2023 at Dhulikhel Hospital, KUTH, Kavre, Nepal. A patient aged over 18 years with a diagnosis of AF (both valvular and non-valvular AF) was enrolled.

Results: Out of 2048 participants screened in the community, AF was detected in 16 participants, resulting in an overall prevalence of 0.78%. The final analysis comprised a total of 215 confirmed cases. The median age was 69 years (25-96), with a majority being female (51.6%). The median body mass index was 24.20 (14.41-40.89). 26.0% had a CHA2DS2-VASc Score of 2, and 46.5% had a HAS-BLED score of 1. Non-valvular AF was observed in 80.9%. Overall, 40.0% of patients received novel oral anticoagulants (NOACs), and 32.1% received antiplatelet treatment. Among non-valvular AF patients at high thromboembolic risk (71.3%), 56.5% were treated with oral anticoagulants, while 35.5% received antiplatelet treatment.

Conclusion: This study provided important insights into the prevalence of AF at the community level. Despite their need for oral anticoagulants, there was a noticeable underutilisation of such treatments, even in high-risk groups. Thus, this type of study can be conducted on a larger scale, enabling early detection of disease and initiating early treatment. Furthermore, it is necessary to implement current treatment guidelines to enhance the use of oral anticoagulants to prevent thromboembolic events in patients with AF.

Assessment of healthcare students' knowledge, attitude, and perception towards pharmacogenomics at Olabisi Onabanjo University, Sagamu Campus, Ogun State, Nigeria

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Introduction: Pharmacogenomics investigates the interplay between genomics and pharmacology, aiming to understand how genetic variations impact responses to drug therapies. Clinical pharmacogenomics testing aims to inform physicians about medications associated with genetic variants linked to adverse reactions and drug effectiveness. Achieving this objective requires an interdisciplinary approach involving physicians, pharmacists, and nurses. Healthcare students play a pivotal role in shaping the future of personalised medicine and pharmacogenomics awareness.

Purpose: This study aimed to evaluate the knowledge, attitudes, and perceptions of healthcare students towards pharmacogenomics at Olabisi Onabanjo University, Sagamu Campus, Ogun State.

Method: A cross-sectional survey was conducted among healthcare students (Medicine, Pharmacy, and Nursing) at Olabisi Onabanjo University Teaching Hospital, Sagamu Campus, Ogun State, using purposive sampling. Anonymous self-administered questionnaires were distributed to consenting students, comprising 43 items categorised into five sections: demographics, sources of information, knowledge assessment, perception, and attitude. Data analysis utilised IBM's Statistical Package for the Social Sciences (SPSS) version 20, employing descriptive statistics.

Results: 268 respondents participated in the study, including 101 from Pharmacy, 84 from Medicine, and 83 from Nursing. Confidence in pharmacogenomics knowledge varied, with 38.1%, 75.9%, and 42.6% among Medicine, Nursing, and Pharmacy students, respectively. Primary sources of pharmacogenomics information differed across fields, predominantly from educational institutions, the internet, and friends/family. Most respondents rated their

understanding of pharmacogenomics as average and highlighted curriculum inadequacies in covering pharmacogenomics ($p < 0.001$). However, there was a positive inclination towards learning more about pharmacogenomics, with many believing it could enhance future practice by facilitating appropriate drug selection and dosing.

Conclusion: Healthcare students demonstrate moderate knowledge and positive attitudes towards pharmacogenomics. Nonetheless, there is a need for curriculum revisions to adequately address the fundamentals and clinical implications of pharmacogenomics before students enter professional practice.

Assessment of herbal interactions with anti-cancer drugs using two drug interaction checker databases and attitudes of cancer patients toward the use of herbal: Single-centre experience

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Introduction: Cancer patients, especially geriatrics, are at risk of polypharmacy due to the number and variety of chemotherapy drugs and other medications. Combining herbal products with chemotherapy may increase the risk of food-drug interactions. Furthermore, cancer patients may use herbal medicines/products to reduce symptoms and side effects, prevent metastasis and strengthen their immune system during the chemotherapy cycle.

Methodology: This study was a retrospective and cross-sectional study conducted with chemotherapy-receiving cancer patients in the Oncology Clinic, Near East University Hospital, Northern Cyprus, between 1 June 2022 and 30 July 2022. The first purpose of the study was to evaluate the attitude of cancer patients toward the use of herbal medicines/products and to determine the herbal medicines/products used by cancer patients. The second purpose of the study was to determine the interactions between herbal medicines/products and anti-cancer drugs using Drugs.com and Medscape.com databases in the Oncology Clinic, Near East University Hospital. This study determined the relationship between social-demographic factors and cancer patients' attitudes towards herbal product use and between cancer patients' attitudes and herbal products users by applying the Pearson chi-square test. (NEU Health Sciences Ethics Committee, YDU/2022/102-1549)

Result: Only fifty-five cancer patients agreed to participate in this study. The total score of cancer patients' attitudes toward herbal products used in cancer treatment was 16.75 ± 4.23. The highest score of 2.22 ± 0.98 was herbal medicines/products that strengthen the immunity system, and the lowest score of 1.15 ± 0.45 was Herbal medicines/products that are better than chemotherapy. Cronbach's alpha (0.65) was calculated based on the cancer patients' attitudes. There was no statistically significant association between demographic factors and cancer patients' attitudes towards using herbal products, and there was no statistically significant association between herbal product users' attitudes towards using herbal medicines/products. According to the Medscape.com database, one interaction between Eucalyptus and Fluorouracil is the closely monitored category. The Medscape.com database informed us that Eucalyptus increases its levels of Fluorouracil. On the other hand, eucalyptus is not available in the list of Drugs.com databases, so the oncology pharmacist didn't evaluate the interaction between Eucalyptus and Fluorouracil with this database. According to the Drugs.com database, two interactions between Docetaxel+Echinacea and Cyclophosphamide+Echinacea have a moderate interaction category. Drugs.com informed that Echinacea may alter Docetaxel and Cyclophosphamide's blood levels and effects. On the other hand, according to the Medscape.com database, no interaction between Echinacea and chemotherapy agents has been found.

Conclusion: This study showed that cancer patients' attitudes toward herbal product use were poor. Cancer patients with poor attitudes were found to use more herbal products than cancer patients with good attitudes. The interaction between herbal medicines/products and anti-cancer agents should be checked and thoroughly investigated by oncologists and oncology pharmacists using more than one drug interaction checker database.

Assessment of knowledge gaps in antimalarial medication usage among Nigerian university students: Implications for antimicrobial resistance

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Introduction: Understanding how individuals use antimalarial medications is crucial for combating Antimicrobial Resistance (AMR). Misuse or incomplete use can lead to drug-resistant strains of malaria parasites. Addressing knowledge gaps

empowers patients to use medications appropriately, mitigating AMR development and spread.

Purpose: This study aimed to assess knowledge gaps among university students regarding artemether-lumefantrine usage and identify intervention opportunities.

Methods: This study was a cross-sectional study carried out among university undergraduates in southwestern Nigeria. An online questionnaire was used to collect data via students' WhatsApp groups. The students' knowledge was ranked as good (>70%), fair (50–69%), and poor (<50%). The difference in knowledge based on categorical variables was analysed using the independent sample *t*-test and one-way analysis of variance. Analyses were conducted using Statistical Package for Social Sciences software version 27, and significance was set at $p < 0.005$.

Results: The study included 392 students from three universities, with a slight majority being female (58.4%). The mean age of the participants was 19.53 years, while 44.4% of participants were Yoruba, and 99.2% were single individuals. The distribution of participants across different courses of study was also noteworthy, with 17% enrolled in arts-based courses, while a larger proportion studied science-based courses (35.2%) and healthcare-based courses (48.0%). A high percentage of participants (95.2%) reported having previously taken the antimalarial medication, while nearly half of the participants reported taking the drug 1-2 times during the year. Of these, 28.4% had taken the medication less than a month ago, while 21.7% had taken it 4-6 months ago. Regarding knowledge of artemether-lumefantrine usage, 57.9% believed it should be taken immediately after receipt from the pharmacy, while 64.5% knew the correct timing for the second dose. There were misconceptions, with 6.5% planning to discontinue medication after feeling better. Most students (94.9%) preferred swallowing the medication with water after food. Commonly recognised side effects included vomiting/diarrhoea (12.8%), with suggested actions including stopping medication (25.5%) or reporting to the prescriber (9.4%).

About 77% did not know the correct method of storage, and 70% exhibited poor overall knowledge of antimalarial drug usage. Statistical analysis showed significant differences in knowledge scores based on student levels ($p = 0.001$) and prior antimalarial usage ($p = 0.039$). Female students, older students, and those in healthcare disciplines tended to have slightly better knowledge, though not statistically significant ($p = 0.072$, $p = 0.265$, $p = 0.278$ respectively).

Conclusion: The study highlights notable misconceptions and poor knowledge of artemether-lumefantrine use among university students. Targeted educational interventions, such as personalised medication counselling by pharmacists and the use of informational pamphlets or digital tools, are essential to address these knowledge gaps and promote proper medication adherence. Implementing these strategies could potentially reduce the risk of treatment failure and drug resistance. While valuable, future research could benefit from methodological improvements like larger sample sizes, diverse participant demographics, longitudinal studies, and qualitative research methods to explore underlying reasons for misconceptions and behaviours.

Assessment of patients' attitudes and knowledge about long-term therapy with topical corticosteroids in southeastern Serbia

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Introduction: Topical Corticosteroids (TCS) are the most commonly prescribed medications in dermatology, used to treat numerous inflammatory and hyperproliferative dermatological conditions. Worldwide, TCS are registered as prescribed medicines, while low-potency TCS are registered as OTC in a few countries. In Serbia, there are no OTC TCS. Irrational use of TCS leads to the occurrence of adverse effects dependent on the potency of the TCS, duration of therapy, quantity of medication used, skin condition, site of application, and patient's age. Prolonged use of TCS results in corticosteroid dependence and withdrawal syndrome (Topical Corticosteroid Withdrawal, TSW), which can be avoided with adequate adherence and rational use. On the other hand, the dissemination of misinformation on the internet and social media contributes to an increasing phobia towards TCS use.

Purpose: This study aims to examine the knowledge and attitudes of patients using TCS, including understanding proper use, risks, and adverse effects to improve pharmaceutical dispensing services.

Methods: The study was conducted through an online survey previously validated by examining the general population. It was a pilot study involving 50 respondents, all patients prescribed or using TCS to treat specific dermatological conditions.

Results: Irrational use in indications such as allergies (6%), rosacea (2%), acne (2%) and bacterial/fungal skin infections (2%) was observed. Regarding stopping therapy, 22% of respondents stopped TCS therapy after symptoms stopped, and 26% of respondents stopped therapy according to the physician's instructions. Unfortunately, 38% of respondents would decide about starting or stopping TCS therapy based on independent research and information obtained online. During TCS therapy, 60% of respondents experienced worsening symptoms, while 55% noticed the appearance of new symptoms. In 54% of respondents, there was a loss of effectiveness. A high percentage of respondents (60-80%) are afraid to continue TCS therapy when considering potential

adverse effects associated with prolonged use. Over 60% of respondents indicated they lacked knowledge of the proper application of the medication and were unsure whom to consult for advice and assistance. Social media was identified as a main source of information regarding therapy among 52% of respondents.

Conclusion: Social media or unsupervised web information are unsure sources of information and often spread misinformation, leading to irrational drug-phobia. Community pharmacists are the most available healthcare professionals for patients to consult about proper use to achieve positive health outcomes and avoid side effects, corticosteroid addiction and TSW syndrome. Successful and safe TCS therapy requires interprofessional collaboration and therapy management.

Assessment of the coverage, utilisation and impact of a government health insurance scheme (AB-PMJAY) in Jammu and Kashmir

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Introduction: A central focus of global health initiatives is the advancement of Universal Health Coverage (UHC), aiming to ensure that every individual and community can access quality healthcare services without financial burdens. The Ayushman Bharat Pradhan Mantri Jan Arogya Yojana (AB-PMJAY) stands as a pivotal initiative within India's healthcare framework, striving to realise the objective of universal health coverage. Introduced in 2018, AB-PMJAY represents one of the largest government-backed health insurance schemes worldwide, extending coverage to over 500 million individuals from socioeconomically disadvantaged backgrounds. At its core, AB-PMJAY aims to broaden healthcare coverage and shift towards comprehensive protection against the financial risks associated with medical expenses.

Purpose: This study conducts a comprehensive examination of AB-PMJAY, scrutinising its inception, implementation, and impact on the journey towards UHC. Ultimately, this research endeavours to contribute to the expanding knowledge base on UHC by offering empirical insights, analytical perspectives, and policy recommendations informed by the experiences of AB-PMJAY.

Methodology: In this study, a primary survey was conducted across four districts of Jammu and Kashmir, namely Srinagar, Baramulla, Anantnag, and Budgam. The study focused on understanding the impact of the AB-PMJAY scheme on reducing OOPE and CHE due to hospitalisation in the region. Utilising a household survey approach, the study employed simple random sampling and calculated a sample size of 1000 households. Data collection was undertaken from March 2023 to August 2023, encompassing various aspects such as morbidity, insurance coverage, healthcare expenditures, and utilisation of AB-PMJAY services. Financial protection was evaluated using indicators such as average OOPE, median OOPE, and incidence of catastrophic health expenditures. Analysis was conducted using SPSS version 26, including one-way ANOVA and multivariate analysis to examine the effect of PMJAY on OOPE and CHE. The study also assessed impoverishment due to hospitalisation expenditures using poverty line thresholds recommended by the Government of India Planning Commission Report.

Results: This study found that among 1000 households surveyed, 952 (95.2%) reported being registered under AB PMJAY. Out of a total of 449 hospitalisation cases, 74.2% utilised services under the AB PM-JAY scheme.

Mean OOPE was high among the hospitalisation cases who did not utilise services under the AB PM-JAY scheme (56.03%). It was found that medicines were the single largest component of health expenditure, comprising 46% of the total health spending. The incidence of catastrophic health expenditure was high in the private sector and for those who did not utilise AB PM-JAY services. Multiple regression analysis proved that AB PM-JAY has a significant effect on OOPE and CHE due to hospitalisation episodes.

Conclusion: From this study, the authors concluded that widening the scope of this scheme beyond in-patient care and incorporating major OPD services under this scheme can further reduce OOPE and distress financing among the people of J&K. Also, there is a need to improve facilities at public hospitals such as continuous availability of essential medicines and upgradation of infrastructure to further improve utilisation rate of health care at public hospitals.

Attitudes of pharmacy students toward participation in public health actions

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Introduction: The role of pharmacists in public health is gaining more and more importance, and the pharmaceutical profession is developing more and more. Pharmacists can promote public health by developing patient education programmes about the safe and effective use of medications and other public health topics such as smoking cessation, exercise, and proper nutrition. They can improve public health by providing pharmaceutical care to patients,

preventing disease, and promoting screening programmes. Considering that the pharmacy profession's future is in today's students' hands, it is essential to train future pharmacists in how to provide public health services. Therefore, this paper aims to examine students' attitudes toward participation in public health actions.

Method: The research was conducted using a specific questionnaire. The respondents were pharmacy students from the Faculty of Medicine of the University of Niš. Data was collected online through social networks (Facebook, Viber, and WhatsApp) during November and December 2023.

Results: 94 subjects participated in the study, of which 83% were female and 17% were male. The average age of the subjects was 21.3 ± 2.2 years. The largest number of participants is from the first year of studies, 29.8%. Only slightly less than half of the students (44.7%) stated that they participated in public health actions. This study found that the main reasons students did not participate in public health actions were lack of time (53.33%) and information (33.33%) about organising actions. As the best way to spread information about holding public health actions, students cited social networks (51.1%) and live promotions (37.2%). Despite this, almost all students (92.6%) believe that public health actions are useful for them. At the same time, 80.8% of students demonstrate awareness regarding the potential impact of involvement in public health activities on their future career prospects; merely 37.2% express confidence in possessing adequate motivation to actively participate in such endeavours. Half of the students (50.0%) believe that introducing the subject "*Public Health*" would be significant for greater motivation and involvement of students in public health actions.

Conclusion: Pharmacy students' attitudes towards public health activities are mostly positive. Additional strategies are needed to shape positive attitudes into student engagement in public health activities. One strategy could be to motivate students to participate in a greater percentage of public health actions. Future promotions of public health activities should focus on social media to reach as many students as possible. It seems that formal public health education would positively affect students.

Barriers and facilitators of the drug revolving fund programme in Anambra state, Nigeria

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Introduction: The Anambra State Drug Revolving Fund (DRF) initiative is instrumental in enhancing access to essential pharmaceuticals for the populace. However, its effectiveness is influenced by various factors that either support or hinder its implementation.

Purpose: This study aims to investigate the barriers impeding the successful operation of the DRF programme in Anambra State and identify the facilitators contributing to its success.

Methods: A qualitative research design was employed, utilising semi-structured interviews to gather comprehensive insights into the barriers and facilitators of the DRF programs. The Consolidated Framework for Implementation Research (CFIR) guided the development of the interview guide and facilitated the interpretation of findings. Interview questions covered domains such as intervention characteristics, inner and outer settings, characteristics of individuals implementing the DRF programme, and the implementation process.

Results: Eight semi-structured interviews were conducted with key medical, pharmaceutical, and administrative stakeholders in secondary and tertiary healthcare institutions where the DRF programme operates in Anambra State. The findings revealed barriers such as lack of community engagement, resistance to change in hospital settings, and fraudulent practices such as inflating expenses for purchasing medical supplies. Conversely, potential facilitators identified included the availability of guidelines, community involvement, multidisciplinary teamwork, training programmes, and simplified procedures.

Conclusion: Participants from diverse roles highlighted barriers and facilitators within CFIR domains which could be exploited to improve the implementation of DRF in Anambra State hospitals.

Beyond the traditional pedagogy: Determining pharmacy student and academic staff readiness in artificial intelligence integration

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Introduction: Artificial Intelligence (AI) demonstrates its capacity for enhancing the educational experience, yet its full potential remains underutilised in Philippine pharmacy education. Integrating AI into educational delivery is crucial to maximise technical knowledge and skills. However, its adoption requires further research to promote integration and application. Hence, this study focused on determining the readiness for AI integration in the traditional pedagogical approaches, considering knowledge, attitudes, perceptions,

pedagogy, and ethical considerations among pharmacy students and academic staff.

Method: A mixed-method study approach employing an explanatory sequential design distributed close-ended survey questionnaires to pharmacy students and teaching academic staff for the quantitative phase. Subsequently, selected participants underwent structured interviews for the qualitative phase. The analysis involves correlation and identifying emerging themes for the quantitative and qualitative phases; among 398 students and 13 academic staff, 92.2% of students and 92.3% of staff used AI in learning/teaching. Both agree on AI's effectiveness in learning/teaching (73.4% students, 76.9% staff), citing time efficiency (84.2% students) and teaching flexibility (84.6% staff) as key motivators to use AI. However, ethical concerns (69.1% of students) and lack of training (84.6% of staff) hinder AI use. Nonetheless, concerns about AI replacing staff exist (47.5% students, 46.2% staff). Despite concerns, most support AI integration (74.1% of students and 69.2% of staff). Although the study is ongoing, its completion is anticipated before the presentation date, aiming to contribute valuable insights to supplementing AI in pharmacy education.

Cannabis consumers: Unveiling profiles, patterns, and associated health risks

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Introduction: The global rise in regular cannabis use highlights the urgent need to understand its associated risks and long-term consequences.

Method: To investigate patterns of cannabis consumption and their long-term health consequences, a cross-sectional observational study was conducted at the Constantine Provincial Intermediate Center for Addictive Care (CISA). Fifty individuals undergoing withdrawal treatment for cannabis dependence volunteered to participate.

Results: This study population had an average age of 28.58 years and skewed male (82%). All participants were considered chronic cannabis users, with 72% consuming for over five years and 78% reporting daily use. Notably, 92% felt the need to increase their cannabis dose and frequency over time, suggesting potential dependence. Furthermore, 96% reported experiencing health problems following use. Paranoia and anxiety were the most prevalent psychological effects, affecting all participants (100%). Respiratory problems were the most common physical complaint (73.9%). Worryingly, 30% of participants were completely

unaware of the potential health risks associated with chronic cannabis use.

Conclusion: This study, though limited in sample size due to time and resource constraints, revealed significant associations between chronic cannabis use and detrimental long-term health effects on both physical and mental well-being. Further research with larger cohorts and incorporating clinical and toxicological assessments is warranted to obtain more precise data on cannabis use patterns and their impacts, alongside the potential use of other psychoactive substances. Such comprehensive data will inform the development of targeted prevention and awareness campaigns to educate consumers about the potential risks associated with chronic cannabis use.

Community pharmacy course content delivery using an active-learning approach at JSS College of Pharmacy, Mysuru, India

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Introduction: Team-Based Learning (TBL) is one of the active learning approaches that facilitates students to take responsibility for their learning. It involves learning in small groups where students apply theoretical knowledge by engaging in activities requiring them to work individually and in teams and participate in immediate feedback. Despite the potential benefits of TBL in pharmacy education, neither structured studies have been conducted, nor does TBL exist as a teaching and assessment methodology in any of the pharmacy schools in India.

Purpose: To assess the impact of course content delivery following the Team-Based Learning (TBL) approach in community pharmacy courses.

Methods: This cross-sectional study was conducted in August 2023. Tuberculosis, one of the topics in the community pharmacy course of the second year of India's Pharm.D. programme, was delivered following the TBL approach. The standard procedure for TBL was followed; learning outcomes & reading material were circulated among students one week before the TBL session for self-reading. An in-class individual & Team Readiness Assurance test (iRAT & tRAT), followed by discussion, was carried out on the day of the TBL session. The impact of TBL was assessed by comparing the iRAT & tRAT scores using a paired t-test, and a p-value of less than 0.05

was considered statistically significant. The students' insights about TBL were captured using a 20-item validated feedback form. The items were categorised into three domains, namely, student accountability (7-items), student experience (7-items), and impact on learning & preferences for TBL (6-items). The items were measured on a 5-point Likert scale ranging from one (strongly disagree) to five (strongly agree), with the higher scores indicating more positive responses, and the results are presented descriptively.

Results: A total of 30 students attended the community pharmacy TBL session. The mean (±SD) iRAT and tRAT scores were 5.4 (±2.2) and 8.8 (±0.6) respectively. A statistically significant difference (3.4, $p < 0.00001$) was observed between iRAT and tRAT scores, indicating the impact of TBL in understanding the topic. Most of the students either agreed or strongly agreed on all the items of three domains: student accountability for TBL (180/210, 85.7%), student experience with TBL (189/210, 90%), and impact on learning & preferences for TBL to deliver community pharmacy course content (152/180, 84.4%).

Conclusion: Team-based learning, an active-learning approach, significantly improved the learning outcomes of the community pharmacy course among second-year Pharm.D. students.

Comparative analysis of open-source large language models in medication error classification

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Introduction: Accurate classification of medication errors is essential for improving patient safety and clinical outcomes. Traditional methods, which often rely on manual processes and rule-based systems, can be inefficient and prone to human error. This research explores the potential of open-source Large Language Models (LLMs), specifically Llama 3, Gemma, and Mixtral, to automate and enhance the classification of medication errors. The objective is to assess and compare the accuracy and performance of these models using the National Coordinating Council for Medication Error Reporting and Prevention (NCC MERP) criteria.

Method: A dataset of thirty case studies on medication errors was created using ChatGPT-4, a state-of-the-art language model. These case studies were designed to reflect a variety of error types and complexities. Each of the three LLMs—Llama 3, Gemma, and Mixtral—was prompted to classify the case studies according to the NCC MERP criteria, which categorise errors based on their potential or actual impact on

patients. The classifications provided by the models were then compared to evaluate their accuracy and overall performance.

Results: The results indicated varying levels of accuracy among the three LLMs. Llama 3 showed superior performance among open-source chat models, showcasing its advanced natural language processing capabilities. Gemma, trained on an extensive dataset, exhibited a strong understanding of medical terminology and context. Mixtral achieved impressive results while maintaining a lower computational cost. These findings suggest that open-source LLMs can potentially enhance medication error classification processes. However, challenges remain in ensuring accurate categorisation and decision-making, as previous rule-based AI models have been limited by issues such as overfitting. This study aimed to address these limitations by employing advanced open-source LLMs with more robust and generalisable learning capabilities.

Conclusion: The findings from this study highlight the potential of open-source LLMs to improve the classification of medication errors, a critical aspect of patient safety. Llama 3, Gemma, and Mixtral each demonstrated significant capabilities, although their performance varied. This comparative analysis provides valuable insights into the efficacy of these advanced models, suggesting that they can serve as effective tools in enhancing medication error classification processes and, consequently, patient outcomes. However, further research and development in this area are necessary to optimise the use of AI in healthcare settings. As the field of AI continues to evolve, it is essential to explore and refine the application of these technologies to ensure the highest standards of patient care and safety.

Development and implementation of 'Dose 4 You': A precision web tool for reducing dosage calculation errors

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Introduction: Medication dosage calculation errors can be extremely harmful to patients, particularly in the paediatric population. Crushing tablets for dose division increases the risk of calculation errors, which can result in incorrect dosing and jeopardise patient safety.

Purpose: To develop a dose division calculator webpage to eliminate calculation errors associated with dose division.

Methods: A group of pharmacists created a user-friendly webpage called "*Dose 4 You*" using the Wix platform. The advanced language model Chat GPT and Visual Studio were used to enable accurate HTML code for the dose division calculations. The tool guides healthcare professionals through a step-by-step process, allowing them to enter dosage and medication requirements. The reliability and feasibility of the Dose 4 You webpage were evaluated in a tertiary care teaching hospital in Southern India using retrospective data and validated questionnaires, including the System Usability Scale (SUS) and a Likert scale-based acceptance questionnaire.

Results: The mean age of the participants was 24 years, with the majority being female [16 (80%)]. The majority of the participants were Pharm.D. interns [18 (90%)], and 10% were clinical pharmacy residents. Retrospective data of 200 patient dose divisions showed 100% accuracy in calculating the amount of powdered tablets needed to be weighed. The SUS score obtained was 88.38, indicating excellent usability. The average score for all acceptance questions was 4.7 ± 0.15, indicating strong agreement on the tool's usefulness and effectiveness. Most participants reported "*strongly agree*" with questions about acceptance, which validates the calculator's positive reception among healthcare professionals.

Conclusion: Dose 4 You is a reliable tool that improves patient safety by streamlining dose calculations and reducing calculation errors. The positive perception among healthcare professionals highlights the tool's ease of use, practicality in daily clinical practice, and potential to reduce medication errors. The successful implementation of Dose 4 You demonstrates the transformative power of technology and collaboration in transforming medication administration and improving patient outcomes. Similar innovative solutions to improve healthcare practices can be investigated in future health informatics efforts.

Development of the EldenCare software: Empowering physicians and clinical pharmacists towards enhancing elderly care

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Introduction: The growing healthcare burden on the elderly population, combined with an increase in prescription drug use, necessitates the development of novel solutions to improve elderly care. This methods paper introduces the EldenCare software, a comprehensive digital assistant designed to assist physicians and clinical pharmacists in managing patient care and improving medication management for the elderly.

Methods: EldenCare is a platform that connects doctors, clinical pharmacists, and elderly patients. It is developed by a multidisciplinary team of geriatricians, clinical pharmacists, and software engineers. The software offers a variety of features tailored to the needs of each user group, revolutionising medication management and patient care. For geriatricians, EldenCare provides an efficient means of recording patient information, scheduling appointments and documenting follow-up. Clinical pharmacists can take advantage of the software's advanced features, including identifying medication risks, facilitating dose adjustments, identifying potentially inappropriate medications, and tracking adverse drug reactions. Elderly patients benefit from features such as medication alerts, appointment management, medication lists and an adverse drug reaction diary.

Results: The study is divided into six phases, which include gathering project requirements, designing interfaces, developing clinical rules, conducting functional and integration testing, and assessing reliability and feasibility. The software is in the development phase. Reliability of the software will be determined by comparing it to medication reviews conducted by independent research pharmacists, while its feasibility will be determined by implementing the software with discharged patients and assessing usability using standardised questionnaires.

Conclusions: In conclusion, the expected benefits of the EldenCare software are highlighted, which include increased medication safety, improved communication between healthcare providers and patients, and improved healthcare outcomes for older adults. EldenCare aims to revolutionise medication management and promote a patient-centred healthcare system by empowering clinical pharmacists and engaging older adults in their care through the use of technology. The software is under development and will soon be available for use.

Dietary supplement management in elderly by community pharmacists

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Introduction: Promoting active and healthy ageing can enhance the well-being and quality of life among the elderly population. This has led to a rise in the utilisation of dietary supplements among them. It remains uncertain whether the elderly possess sufficient knowledge to make informed decisions about supplement selection, and how important is

the involvement of pharmacists in that process. The aim of this study was to evaluate supplement use and examine the attitudes of the elderly regarding the importance of community pharmacist intervention in elderly care, specifically their involvement in supplement management.

Methods: This cross-sectional study enrolled an elderly population from Nis, Serbia, with a total of 179 participants. Demographic and pharmacotherapy data, as well as participants' attitudes and eating habits, were collected by survey. The surveys were administered online in November and December 2023. Statistical analyses were conducted using SPSS 20 with statistical significance $p < 0.05$.

Results: There were 179 participants (49.2% women, 50.8% men) mean age 73.04±6.55 years. The traditional (continental) type of diet was dominant among respondents (94%); only 1.12% of respondents were vegan, vegetarian or gluten-free. Dietary supplements are used by 69.8% of respondents regularly or temporarily when they experience health issues. Supplement use increases with age and is higher in women than in men. Among supplement users, vitamin or mineral supplements were the most commonly used supplement (60.3%), followed by probiotics (56.5%), herbal products (44.1%) and sports supplements (15%). The most common reasons for supplement use were overall health and to fill nutrient gaps in the diet. Supplement users showed a higher level of awareness of the importance of nutrition in maintaining physical condition and health. They were significantly more often stated that they wanted to make changes in their diet, reach a balanced diet, and increase their level of physical activity and well-being ($p < 0.05$). Although 81% of the respondents believe that community pharmacists are competent enough to provide counselling regarding sports activities, only 8.4% chose a pharmacist to manage supplementation.

Conclusion: Community pharmacists are acknowledged as highly qualified health professionals capable of supplementing the traditional elderly diet with essential nutrients, using their expertise and considering the needs of the elderly population. However, their involvement in supplement selection remains minimal. The expressed trust in pharmacists should be used as a potential for more intense involvement of pharmacists in the management of proper supplementation, thereby contributing to elderly well-being.

Economic evaluation of pharmacist's antimicrobial stewardship interventions through integrated electronic health record system in a cardiac care facility

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Introduction: Antimicrobial resistance is a daunting threat to global health and economic stability, where optimising antimicrobial usage is paramount. Pharmacists play an important role in this endeavour through interventions aimed at improving antimicrobial prescribing practices. Moreover, advancement in electronic health systems integrated with clinical decision support features in antimicrobial stewardship has been shown to improve patient care by focusing targeted therapy, preventing adverse drug reactions related to antimicrobials and decreasing the length of stay, thereby reducing cost burden and reducing antimicrobial resistance through prompt alerts and timely interventions. The purpose of this study is to conduct an economic analysis of the pharmacist's interventions on antimicrobials using an advanced integrated electronic health system in the hospital.

Purpose: The primary objective of this study is to conduct an economic analysis of pharmacist interventions on antimicrobial usage within a hospital setting, utilising advanced integrated electronic health record systems with clinical decision support features.

Research design and methods: A retrospective study was conducted in a cardiac care hospital from the inception of the antimicrobial stewardship programme through an electronic health record system, i.e. May 2019 to May 2020. Pharmacist interventions were retrieved from the hospital's electronic health record system. Cost-saving and cost-avoidance analyses were carried out for antimicrobials-related interventions. Economic analysis was performed through the Gregori method and tabulated both in PKR and USD.

Results: Out of 2311 interventions, 2136 (92.4%) interventions were accepted, and 175 (7.5%) were either rejected or had no decision by the primary physician. Interventions related to bug-drug mismatch system alerts (386, 16.7%), renal dose adjustments (806, 34.87%), unnecessary dual coverage (158, 6.8%), adverse drug reaction of antimicrobials through integrated lab alerts (290, 12.54%), IV to PO switch (496, 21.46%), and duration of therapy (175, 7.5%). The review of antibiotics is recorded as 100%, as all antibiotics orders appeared in the clinical pharmacist's daily queue for review, and the acceptance rate is recorded as 92.4% by the primary physician. Overall, cost analysis showed that pharmacist interventions through electronic health record systems saved around 150,110.23 US dollars.

Conclusion: Antimicrobial stewardship services provided by clinical pharmacist through integrated electronic health record system are a cost saving programme. The cost saved per intervention for this study is around USD 65.

Education on the role of new information technologies in marketing in pharmacy

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Introduction: New information technologies in pharmacy can be used in marketing through advertising, marketing products and services, and connecting with other health professionals.

Purpose: This paper aims to highlight the importance of pharmacist education and the importance and advantages of modern methods. A project includes a workshop for health professionals to raise digital literacy to a higher level.

Methods: The workshop was conducted three times for three months and included pharmacists from Serbia, Montenegro, Croatia, and Bosnia and Herzegovina. A total of 30 pharmacists attended it. In addition to basic pharmacy studies, the educator completed the School of Personal Development for Masters in Pharmacy education with respected colleague Arijana Meštrović, then the digital marketing course at the Ludus Academy, and the Virtual Assistant course at the Nikolina Andrić Academy.

Results: The workshop contains the following modules: 1. Basics of working in WordPress - website as the primary communication channel; 2—content and copywriting for health professionals; 3. Work in Mailchimp – newsletter; 4. Work at Thinkifink - a programme for online workshops; 5. Social Networks - Running an IG page, Facebook page – FacebookAds; LinkedIn; 5. Creation of an e-book; 6. Working in Canva – programme on design; 7. Programme Shopify. Recordings of lectures that participants could listen to indefinitely, as well as written material and 1-on-1 consultations at the end of the modules, were used. During the evaluation of the workshop's effectiveness, it was observed that the most significant % of colleagues started successfully writing professional texts on pharmaceutical platforms 50%. 10% of colleagues created their e-books, 10% of colleagues successfully conducted their online workshop, and all of them mastered the use of social media. Network to promote its services.

Conclusion: The most apparent benefit is marketing through advertising, the marketing of products and services, and connecting with other health professionals. Participants learned techniques for writing professional texts for pharmaceutical platforms and mastered the use of social networks and e-book writing. In future activities, the authors should devise ways to empower colleagues to master WordPress and Shopify better, which can be very significant in marketing their pharmacies.

Effectiveness of rhazes® telepharmacy in managing hypertension medication therapy in Buhangin District, Davao City, Philippines

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Introduction: Telepharmacies have emerged as an innovative intervention in chronic disease management, such as hypertension, by expanding the role of pharmacists and facilitating remote patient care.

Purpose: The study aims to evaluate the effectiveness of Rhazes® Telepharmacy, a Malaysian-based telehealth service, in optimising medication therapy for hypertension in the Buhangin District of Davao City, Philippines.

Methods: The research employs a pre-and post-intervention, quantitative, quasi-experimental design, utilising purposive sampling to assess the effectiveness of Rhazes® Telepharmacy on the respondents' medication adherence and blood pressure. Sixty (60) respondents were examined using ANOVA and Tukey's Test to compare pre-and post-intervention measures and assess clinical parameters throughout the study.

Results: The results showed a significant improvement in medication adherence (<0.001) and a reduction in blood pressure levels (<0.001) among patients who received Rhazes® Telepharmacy intervention. While there was no significant difference observed between the experimental and control groups' blood pressure levels (0.819), a notable improvement in medication adherence (<0.001) was evident in the experimental group compared to the control group.

Conclusion: The study's findings suggest the potential for Rhazes® telepharmacy to serve as an innovative intervention for addressing challenges related to medication adherence and patient education. However, further research with an extended timeframe is warranted to establish robust evidence supporting the effectiveness of Rhazes® telepharmacy in managing medication therapy for hypertension.

Evaluating quality of life in patients with Polycystic Ovary Syndrome (PCOS)

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Introduction: Everyday living can be complicated by health issues, even in the most basic ways. Polycystic Ovary Syndrome (PCOS) is to assess various aspects of their well-being, including physical, mental, emotional, and social factors.

Purpose: This evaluation aims to understand how PCOS impacts their daily functioning, relationships, emotional state, and overall satisfaction with life.

Methods: This study is designed to assess the quality of life in patients with PCOS. The study includes a diverse sample of PCOS patients aged 18-45 from different backgrounds. The assessment of quality of life in PCOS patients involved standardised tools such as the PCOS quality of life questionnaire (PCOSQ) (SF-36) and Hospital Anxiety and Depression Scale (HADS). These instruments capture various domains, including physical health, emotional well-being, social functioning, and symptoms related to PCOS.

Results & Discussion: The study reveals that married women are more likely than single women to be affected by PCOS. Of the 130 female patients, 112 patients (86%) were married, and 18 patients (14%) were single. The findings show that results indicate lower quality of life in PCOS patients, especially in physical and mental health domains. Discussion highlights the need for integrated care addressing both medical and psychosocial aspects to improve patient well-being.

Conclusion: Enhancing the quality of life for individuals with PCOS requires a comprehensive approach that considers their physical, emotional, and social well-being. By addressing the multifaceted challenges posed by PCOS and empowering patients to take an active role in their care, healthcare providers can make a meaningful difference in the lives of those living with this condition. Counselling has been found to enhance the patient's physical well-being, social relationships, and environment.

Evolution of specialisations in pharmacy practice in India: Impact of legislation

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Introduction: Pharmacy Practice in India has evolved since the beginning of civilisation, as evident in Charak Samhita, but the practice of the modern pharmacy profession started in the early nineteenth century. It was bolstered by the publication of the Drugs Act in 1940, the Drugs Rules in 1945 and the Pharmacy Act in 1948, which helped in the creation of a well-organised pharmacy profession in India. There was no specialisation in Pharmacy practice till two decades ago. Since 2008, several changes in pharmacy regulations by way of the introduction of new legislation or amendment of existing regulations have positively impacted the Pharmacy Practice in India as several specialisations have been introduced.

Methods: A survey was conducted on amendments to pharmacy regulations and the introduction of new pharmacy legislation from 2004 to 2023 through internet searching and searching websites of the Pharmacy Council of India and Central Drug Standard Control Organizations. The regulations were analysed to understand the impact of those legislations on Pharmacy Practice and the development of specialisations.

Results: The result shows that several amendments have been made to the Pharmacy Act of 1948, and several new regulations have been introduced during this period. Among these three regulations- Pharm.D. Regulations 2008, Bachelor of Pharmacy (Practice) Regulations 2014 and Pharmacy Practice Regulation 2015(PPR-15) and their subsequent amendments have an impact on Pharmacy practice in India through Pharm.D. Regulations 2008, a new six-year course has been introduced that has a pharmacy practice orientation, unlike the existing B.Pharm and M.Pharm, which have more industry orientation. Through the introduction of the Bachelor of Pharmacy (Practice) Regulations 2014, a new three-year specialised course on Pharmacy practice for practising Pharmacists (completed D. Pharm. Exam.) was started. The introduction of (PPR-15) made a paradigm shift in the existing pharmacy practice in India. This regulation has defined Pharmacy Practice, Pharmaceutical Care, Pharmacy Practitioner and several other related terminology. This legislation also prescribed the Ethics, Duties & Responsibility, Misconduct, etc., of the registered Pharmacist and prescribed the penal provisions for any misconduct. Through this regulation, different pharmacist positions were identified based on their qualifications and experience as pharmacists, drug information pharmacists, clinical pharmacists, etc. As per the legislation, any person who completed any pharmacy course and prescribed training can be registered as a Pharmacist, and they are allowed to practice as a pharmacist. To be qualified as a Drug Information Pharmacist, one needs a Bachelor's in Pharmacy or Pharm.D., and a Clinical

Pharmacist needs a Pharm.D. or M.Pharm. (Pharmacology) degree. As an impact of this newly introduced legislation, several healthcare establishments have started Drug Information Services and Clinical Pharmacy services by appointing Drug Information Pharmacists and Clinical Pharmacists.

Conclusion: Several new regulations have been introduced under the Pharmacy Act of 1948, and several legislation have been amended during the last two decades, which have made several changes in the education of Pharmacy, resulting in the evolution of some specialisations in Pharmacy Practice in India. These amended legislations and newly introduced legislations have developed some specialisations in Pharmacy practice education, having a positive impact on the health care system in India.

Experiences and perspectives of type 1 and type 2 diabetes patients and barriers to diabetes care: A qualitative study

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Introduction: Diabetes care is a mosaic of multiple integrated elements like self-care practices, patient education and awareness, societal support, equitable access to healthcare facilities and trained healthcare professionals, commitment from the diabetes associations and government policies. There is a shortage of research viewing the barriers experienced by both Type 1 Diabetes (T1D) and Type 2 Diabetes (T2D) patients in accessing the holistic elements of diabetes care. Understanding the lived experiences of patients with both T1D and T2D in receiving diabetes care is essential to apprehend how the patients are being impacted by barriers to self-care practices and the support system matrix that incorporates the level of social support and the current healthcare system. The majority of the research conducted has focused on T2D, leaving T1D in silos. This study thus aims to explore the barriers experienced by and perspectives of individuals with T1D and T2D from urban and rural areas receiving diabetes care in Nepal.

Purpose: The objective of this study is to explore the experiences and perspectives of both T1D and T2D patients in regard to the barriers they face in receiving diabetes care services in urban and rural areas of Bagmati Province in Nepal.

Method: This study uses a qualitative research method to explore the barriers to diabetes care from the lens of T1D and T2D patients residing in the capital (Kathmandu), semi-urban (Dhulikhel and Banepa) and rural sector (Sindhupalchowk). Participants who met the inclusion criteria were recruited

using the purposive sampling method. An in-depth interview of 15 patients with T1D and eight patients with T2D on insulin, residing in the capital and rural areas and receiving treatment at hospitals and clinics in the urban and semi-urban regions of Nepal was conducted using a semi-structured questionnaire. The interviews were transcribed verbatim and thematically analysed.

Results: The key barriers identified by this study include factors such as unawareness among the general public, particularly regarding T1D, thus gestating stigmatisation for young diabetes patients and the inadequacies in the role of diabetes organisations. Cost, unavailability of insulin and glucometer strips, forgetfulness, and needle phobia were other factors impeding diabetes self-care practices. Similarly, the frail availability of healthcare professionals and other healthcare facilities, particularly in rural sectors, and variation in the quality of counselling services in government and private hospitals also hindered diabetes care. Lastly, inclination to alternative treatment strategies and crevices in the National Health Insurance Scheme were the other barriers recognised by this study.

Conclusion: There is a need in raising awareness among general public, especially on T1D, implement policies supporting diabetes care, refine the National Health Insurance Scheme and strengthen of Health Care System by ensuring the availability of insulin, laboratory facilities and trained healthcare professionals in rural areas to address the inequity in access to healthcare in rural and urban sectors is essential.

Exploring dyslipidemia management strategies and challenges in reaching LDL targets: A comprehensive review

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Introduction: Cardiovascular Diseases (CVD) are one of the leading causes of morbidity and mortality worldwide, with dyslipidemia playing a key role in its development, as has already been proven in many studies for over 50 years. Given established guidelines, there is a critical need to thoroughly review and integrate the latest evidence on dyslipidemia management, particularly focusing on achieving optimal LDL cholesterol targets. Pharmacists are integral in the management of cardiovascular disease and dyslipidaemia, yet achieving optimal LDL cholesterol targets remains a challenge, considering how reducing its levels is recognised as a major therapeutic alternative to reduce the risk of cardiovascular disease, especially in high-risk individuals.

Purpose: This review is dedicated to thoroughly evaluating the current management protocols for dyslipidemia in cardiovascular diseases, with a specific emphasis on the critical importance of reaching optimal LDL cholesterol targets. Objectives include a detailed analysis of guideline recommendations, evaluation of the efficacy and safety of various lipid-lowering therapies, identification of barriers to adherence, and a strong emphasis on the importance of collaborative care in optimising patient outcomes.

Method: A comprehensive literature review, including the latest guidelines from reputable organisations like the European Society of Cardiology (ESC) and the American College of Cardiology (ACC) was carefully conducted. Also focused on randomised controlled trials, meta-analyses, and cohort studies to evaluate how well different medications, lifestyle changes, and risk assessment tools help reach LDL targets.

Results: Despite guideline recommendations, many CAD patients fail to achieve optimal LDL levels. Barriers such as medication non-adherence, lack of patient education, and therapeutic inertia contribute to suboptimal outcomes. Evidence showcased the significant impact of lipid-lowering therapies and targeted interventions, reinforcing the importance of pharmacist interventions.

Conclusions: This review pulls together the latest evidence showing how crucial it is to reach target LDL-C levels in treating cardiovascular disease. It highlights that this aspect is still not getting the attention it deserves. To succeed, ongoing education, working closely with healthcare teams, and tailoring treatment plans to each individual are crucial steps.

Exploring herb-associated adverse events: A pharmacovigilance perspective

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Introduction: Currently, the independent use of herbal medicines has become a widespread trend in Indonesia. The high level of public trust in the safety of herbal medicines without side effects compared to synthetic drugs needs clarification. This trend is also accompanied by an increase in reports of issues related to the use of herbal medicines, such as side effects, necessitating monitoring through the reporting of Adverse Drug Reactions (ADRs) to facilitate healthcare professionals and consumers in using appropriate herbal medicines. Therefore, a review of previous studies related to issues in the use of herbal medicines is important to be conducted to serve as considerations in determining

appropriate, effective, and safe herbal therapy in clinical applications.

Method: This study was conducted as a literature review by searching for keywords such as "*herbavigilance*," "*pharmacovigilance*," "*herbal medicine*," "*traditional medicine*," and "*adverse effects*" from various journal articles in NCBI, PubMed, and other journal sources. The literature search employed a combination of keywords with Boolean operators "*OR*" or "*AND*."

Results: Many studies have reported and identified adverse events from various herbal compounds, similar to allopathic drugs. Most of these studies are supported by countries that have successfully provided reporting mechanisms for safety issues in the use of herbal medicines, such as ADRs specifically for herbal medicines. The issues received and processed by the government can help healthcare professionals and consumers use the right herbal medicines. Information or detailed variables in reporting ADRs for herbal medicines are crucial in improving the quality of data reports, thus facilitating traceability actions. The impact of adverse events, drug interactions, and contamination in herbal products are findings that need to be monitored in herbavigilance to enhance patient safety and quality of life.

Conclusion: The implementation of herbavigilance requires cooperation between healthcare professionals and the government. Healthcare professionals play a role in reporting issues related to herbal medicines, while the government is responsible for storing the safety database of drug usage, disseminating information, and ensuring the safety of herbal products in circulation. This synergy can increase public awareness and ensure the safety of herbal medicine use.

Exploring preceptor perceptions of interprofessional education during pharmacy professional practice internships in Indonesia

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Introduction: The integration of Interprofessional Education (IPE) into Pharmacy Professional Practice Internships (PPPI) in Indonesia is essential for fostering effective collaboration among healthcare professionals. This study investigates the perceptions of preceptors about the integration and impact of IPE in PPPI, aiming to uncover the challenges and potential enhancements needed for effective implementation.

Method: A cross-sectional survey was conducted among preceptors from various healthcare settings in West Java and Jakarta. A total of 61 institutions were invited, resulting in 60 usable responses. Respondents completed a questionnaire evaluating their perceptions across several domains related to IPE. Data analysis included descriptive statistics and correlation analysis using Spearman's test.

Results: The survey revealed that preceptors generally recognise the urgency of integrating IPE into PPPI, with positive attitudes towards its importance and effectiveness shown in >80% of respondents. However, the perception scores on participation in IPE and potential integration were comparatively lower, indicated by a higher proportion of negative perceptions (approximately 30% and 15%, respectively). Statistical analysis indicated a moderate correlation between preceptor experience and higher perception scores on participation in IPE ($r = 0.325$; $p < 0.05$).

Conclusion: While preceptors acknowledge the value of IPE in enhancing interprofessional collaboration, there are evident challenges in its practical implementation during internships. This study highlights the need for increased support from educational institutions to improve IPE integration and effectiveness in Indonesia's pharmacy education.

Institutionalisation of telepharmacy services in a selected private university in Pangasinan: Basis for programme development

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Introduction: Telepharmacy refers to the provision of pharmaceutical care by registered pharmacists through telephones, teleconferencing, and other communication devices to patients at a distance. These services were extended to schools to cater to their employees. The study aimed to institutionalise telepharmacy services in a private university in Pangasinan and create a programme protocol tailored to the institution's needs.

Methods: The researcher utilised the mixed method type of research, particularly the explanatory concurrent design. A validated and reliability-tested research tool consisting of mapped indicators was utilised. The researcher conducted an extensive literature review of various studies about telepharmacy to determine the elements necessary for institutionalising telepharmacy services in a private university. The data were collected and clustered into themes, and statements were translated into indicators as the content of the researcher-made tool. The individual interview was employed to determine the respondents'

perceptions of the elements, benefits, and limitations of telepharmacy services at the private university. The total number of respondents in this study is 112.

Results: Findings revealed that, on average, all indicators under pharmacist and healthcare team, facilities, pharmacy services, policies, and procedures were deemed as "*highly essential*" by the respondents. The respondents rated "*strongly agree*" on the benefits of the telepharmacy programme and "*agree*" on the programme's limitations. When grouped according to age, sex at birth, and years of service, no significant differences were found among the responses. However, significant differences were seen under limitations when respondents were grouped according to job position. The perceptions of the respondents were categorised into themes. The universal theme is Modern Technology and Innovation. This means that in all responses, modern technology and innovation were determined based on the respondents' needs, barriers, and recommendations. Other themes that emerged from the qualitative data gathering included Health and Pharmacy Services, Provision of good technology to avail health and pharmacy services, need for modern technology, Approval and support from the administration, Acceptability and Need for the programme, Logistics, Assessment of Resources, Personnel and Complement Training and Organised Implementation. Budget, financial constraints, and approval and support from the administration were seen as major barriers to the programme's implementation. A standard telepharmacy protocol was crafted using integrated quantitative and qualitative data. The workflow was designed based on the institution's availability of resources and following the bare minimum requirements to start delivering telepharmacy services.

Conclusion: Overall, the institution's employees have a positive impression of institutionalising telepharmacy services at their university.

Investigating off-label practice among prescribers of different specialities: Insights into paediatric patient care

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Introduction: The prescription of medicines for unapproved indications, dosages, age groups, or administration routes is known as off-label prescribing. This practice, which often

arises from clinical experience, evolving scientific evidence, and the lack of approved treatments for certain conditions, is prevalent in several medical specialities. Understanding off-label prescribing from the prescribers' perspective is essential for uncovering the factors driving this practice, identifying unmet medical needs among different patient populations, and guiding research efforts to address these specific requirements. This study aims to gain insight into off-label prescribing by exploring the perspectives and practices of physicians in primary healthcare centres in Albania.

Method: A questionnaire survey was conducted among medical doctors in primary health care centres in two different regions in Albania over a two-month period. The questionnaire was designed to gain insight into prescribers' perspectives on off-label prescribing and their practices. The questionnaire was developed based on a review of the literature and refined through pilot testing to ensure clarity. The final version of the questionnaire comprised 26 questions divided into three main parts. The first part focused on gathering demographic information about the participants. The second section delved into prescribers' knowledge, practice, and perception regarding off-label prescribing. The last part aimed to explore off-label prescribing in a specific patient population. Ethical considerations, including informed consent and confidentiality, were carefully addressed. Statistical analysis of the survey data was conducted using SPSS IBM Statistics vs 28.

Results: Questionnaires were distributed to 160 medical doctors working in primary health care centres across two different regions in Albania. A completion rate of 82% (130/160) was achieved. Findings indicate that 87% of doctors in this study were familiar with the terminology of off-label prescribing. A significant number of physicians (90.8%; 118/130) reported that they had prescribed drugs in an off-label manner during their practice, and over one-third of participants (38.5%; 50/130) stated that they had prescribed drugs for unapproved uses in over 50% of their prescriptions. In terms of factors motivating doctors to prescribe drugs for off-label use, a significant majority (63.7%, 79/124) reported the lack of efficacy of approved therapeutic alternatives as the primary reason ($X^2_{(6)}$= 75.35; p < 0.0001). Among different off-label categories, 59% (72/122) of participants reported younger age than recommended as the most common reason for prescribing in an unapproved manner during their clinical practice ($X^2_{(6)}$= 78.69; p < 0.0001). Upon analysing the responses from the final section of the questionnaire, doctors indicated a predominant tendency to prescribe off-label for the age group of 1-23 months old (37.93%; 33/87) within the paediatric population, notably for analgesics and antipyretics (46%) as well as systemic antibacterials (42.5%).

Conclusion: The findings of this study demonstrate that primary care physicians across various specialities frequently engage in off-label prescribing as part of their routine clinical practice in order to address the unmet needs of their patients. Future research is needed to fully understand how

off-label prescribing is practised among children in this country.

Knowledge, attitude and practice of patient referral among patent and proprietary medicine vendors in Obio-Akpor, Rivers State

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Introduction: With the limited number of trained healthcare providers in Nigeria, PPMVs are inevitable and highly needed, especially in rural areas, for the supply of drugs for treating minor illnesses. This study assessed the knowledge, attitude, and practice of patient referral among PPMVs in an area with limited hospital infrastructure.

Method: This cross-sectional descriptive survey was conducted in Obio-Akpor, Rivers State, using a questionnaire which measured the participants' socio-demographic characteristics as well as knowledge, attitude and practice of patient referral. Descriptive and inferential analyses were conducted with SPSS version 25.

Results: A high proportion of respondents had moderate knowledge, attitude and practice (62.4%, 73.4% and 58%, respectively) of patient referral. Multivariate analysis carried out to ascertain the relationship between PPMV background characteristics and level of knowledge, attitude and practice of patient referral showed a statistically significant inverse relationship between years of experience and odds of having the attributes of interest, as PPMVs with three years of experience reported significantly higher odds of adequate knowledge (AOR = 178.96; 95%CI: 60.15 − 532.49; *p*-value < 0.005), attitude (AOR = 7.38; 95%CI: 3.78–14.40; *p*-value < 0.005) and practice (AOR = 131.56; 95%CI: 53.50 − 323.51; *p*-value < 0.005) than those with above ten years of experience after controlling for the effects of other variables.

Conclusion: The study found that most respondents had moderate knowledge, attitude and practice of patient referral. The study's respondents were very aware of how referrals affected their clients' overall treatment outcome, but they also gave a number of factors that constrained their referral practices, making it sub-optimal.

Knowledge, attitude, and perception of pharmacy students about adverse drug reactions due to prescribing cascades among elderly patients: A facility-based, cross-sectional study from Tumkur, India

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Introduction: Rarely do doctors misdiagnose Adverse Drug Reactions (ADRs) as a new illness and give patients new prescriptions. As a result, this process is called the Prescribing Cascade (PC). Pharmacists are the ideal professionals to counsel and assess the ADRs and PCs in patients, thereby minimising the incidence of PC.

Purpose: To study the KAP of pharmacy students about ADR due to PC among elderly patients in Tumkur.

Methods: This is a facility-based, cross-sectional study. A pre-validated questionnaire with a Cronbach's alpha reliability score of 0.8, which was reliable and had a high level of internal consistency, was used. The study was conducted in Tumkur, Karnataka.

Before the study's start, IEC approval was obtained. The two pharmacy colleges gave their approval for the study to be conducted. The significance and purpose of the study were explained to the students. The questionnaire was provided with an informed consent form.

Filled data was evaluated by using SPSS version 27. Using Epi Info 7.2.6.0, the necessary sample size for the study was determined, considering a 900-student population, a 50% expected frequency, and an acceptable 5% margin of error. The final sample size was 270 at a 95% confidence interval.

Result: Among the 270 respondents, 114 (42.2%) were male, and 156 (57.7%) were female, with a mean, median, and mode age of 21 years.

Knowledge domain: A total of 51.4% of respondents know what ADR is, and 55.1% know its classification. The majority [176 (65%)] know the elderly population is more likely to develop ADR and PC. Only 18.5% of respondents have heard of PC, and 14% coined the term.

Attitude domain: A total of 33% opined that reporting ADR and PC is their professional responsibility and should be made mandatory. Thirty-five percent of the respondents agreed that patients should be made aware of ADR and that monitoring of it should be done regularly. Almost 47.3% supported the idea that the PC concept should be in the curriculum. Most of them have a positive attitude towards ADR and PC. Sixty percent opined that deprescribing could reduce the incidence of ADR and PC.

Perception: More than 50% have a positive perception of voluntary reporting and patient education on ADRs. 52% of respondents expressed the need to review elderly patients to minimise PC. The majority (51%) perceived that clinical pharmacy services for elderly patients were essential to decreasing PC and ADR. Most of the respondents (52%) opined that continuing education helps to decrease PC. Finally, 53% of respondents expressed that they should review new medical conditions or symptoms in elderly patients to prevent PCs.

The reliability value of 0.906 indicated that the questionnaires have a high level of internal consistency between the items and questions.

Conclusion: According to the study's findings, most participants know about ADR, but few are familiar with PC. As per the findings, respondents have a strong understanding of ADRs and PCs and a positive outlook on them. Instructive educational activities minimise PCs.

Medication errors identified in the in-patient medication process at the Kwame Nkrumah University of Science and Technology Hospital

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Introduction: Medication errors have a variety of public health implications, ranging from significant morbidity to increased hospital length of stay, detrimental effects on quality of life, and death.

Purpose: The study aimed at investigating medication errors in the inpatients' medication use process at the Kwame Nkrumah University of Science and Technology (KNUST) Hospital, Kumasi.

Method: A prospective cross-sectional case study was conducted at the KNUST Hospital between March 2019 and August 2019. A semi-structured questionnaire and convenience and probability sampling techniques were employed in the study. The data were collected from the incident and prescription reports through direct oobservation and records review. The Institute of Safe Medication Practices (ISMP) model for assessing medication error rate was adopted to measure the Prescribing error rate. SPSS

version16 was employed for the analysis of the data collected. The study uses the 95% confidence interval.

Result: The major types of medication errors identified include wrong dose, extra dose, wrong frequency, missed dose, and wrong time. Wrong dose was the most frequent type of medication error (constituted about 22.2% of the errors recorded). An average of 1.39 error was made on drugs prescribed for the patient, with errors associated with about 61.1% of the drugs used. The major proximal cause of errors (almost 39%) was lack of knowledge about the drugs used by the healthcare professionals most significantly involved in the medication use process in the hospital. Dose and identity checking (33.3%), as well as drug knowledge dissemination (27.8%), were the main system failure recorded as the major sources of medication use error in the hospital. The pharmacist interventions in the hospital addressed some medication errors.

Conclusion: Medication errors are common in patients admitted in KNUST hospital. The involvement of the pharmacists reduced the risk and harm of medication errors of the patient admitted to the hospital.

Medication-related problems that cause avoidable emergency department visits from a gender perspective

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Introduction: Sex differences lead to errors and delays in the diagnostic process, therapeutic strategy, and uncertain prognoses in terms of morbidity and mortality. Gender disparities are known to affect pharmacological activity with differences in pharmacokinetics, pharmacodynamics and pharmacotoxicity. Ageing is a direct factor in modifying pharmacokinetics and pharmacodynamics, making the elderly a particularly vulnerable group to suffer Medication-related problems, which are known to be avoidable in an average of 69% of cases.

The pharmaceutical care programme focusing on the resolution of potential medication-related problems, from admission to the Emergency Department until discharge, is routinely conducted by clinical pharmacists and integrated into the multidisciplinary care programme for frailty in the Emergency Department at Hospital de la Santa Creu i Sant Pau. Such a programme has a favourable clinical impact, as it reduces the number and prevalence of medication-related negative outcomes. After a preliminary analysis of 1497 patients to whom the pharmaceutical care programme was

conducted significant differences were observed between men and women with regards to the reason for the Emergency Department visit and the type of Medication-related problem.

Purpose: The aim of this study is to describe and compare the reason and diagnosis associated with the Medication-related problem that causes Emergency Department visits and the type of medication causing it from a gender perspective, including the sex variable.

Method: Retrospective observational study with the collection of data from the medical records of older adults (≥65 years) receiving four or more medications included in the pharmaceutical care programme focusing on resolving potential medication-related problems initiated at the emergency department. Comparisons between men and women were made for the reason, diagnosis associated with the Medication-related problem that causes Emergency Department visits and the type of medication causing it.

Results: During 2021, 1497 patients consulted the Emergency Department for a Medication-related problem as a primary or secondary diagnosis: 859 women (57,3%) and 638 (42,7%) men. Women were more frequently seen in the Emergency Department for a Medication-related problem, and the greater the morbidity, the higher the percentage of women who consulted the Emergency Department.

The type of medication involved in the medication-related negative outcome was different from a gender perspective. In women, such events were caused more frequently by medications acting on the cardiovascular system, belonging to Group C of the Anatomical Therapeutic Chemical (ATC) (diuretics: 13,97% *vs* 8,78%) and the nervous system, belonging to Group N (opioids: 4,07% *vs* 1,41%). Regarding the active substance itself, it is shown that Digoxine and hydrochlorothiazide caused medication-related problems more frequently in women compared to men.

Regarding the diagnosis associated with the Medication-related problem that causes Emergency Department visits, it is more frequently seen in women with hypertension, hyponatremia, hypokalemia, decreased intestinal motility related or not to the use of drugs and unintentional poisoning by medication.

Conclusion: Clinical pharmacists' involvement in the detection and management of potential medication-related problems is crucial to assess sex differences in the treatment response to redesign primary prevention policies of health systems that may require a differential approach between men and women.

Migraine management insights: A pharmacy student cross-sectional study

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Introduction: Migraine, a heterogeneous, complex, and debilitating neurological disorder, affects annually one billion individuals worldwide and poses a unique challenge to both patients and healthcare providers. Effective management of migraine relies heavily on knowledgeable healthcare providers, including pharmacists, who play a crucial role in patient care. This study aims to evaluate pharmacy students' knowledge, attitudes, and practices concerning migraine management, identify educational gaps, and explore innovative approaches to enhance patient care.

Method: A cross-sectional survey was conducted in April 2024. Students at a Lebanese university anonymously completed a web-based questionnaire that addressed their understanding, perceptions, and clinical approaches to migraine management. Students' opinions on the effectiveness of current educational strategies and their suggestions for improvements were also explored. SPSS Statistics Version 28.0 was used to analyse the data.

Results: A total of 303 pharmacy students completed the questionnaire, with a mean age of 21.5 and 81.5% being females. Findings indicated that while 76.6% of students felt somewhat and moderately confident in managing migraines, only 25.1% could correctly identify all key migraine triggers. Approximately 63% of respondents believed it is very important to receive education on migraines, and innovative educational methods such as case simulations and interactive workshops were favoured by 58.5% of the students to improve their competency in migraine care.

Conclusion: The study revealed substantial gaps in pharmacy students' knowledge and attitudes towards migraine management, underlining the need for enhanced educational interventions. By integrating more practical and innovative teaching methods, pharmacy educators can better prepare students to effectively address the challenges of migraine management and contribute positively to community health.

Monitoring and assessment of adverse drug reactions associated with tyrosine kinase inhibitors in oncology patients: A two-year study in a tertiary care hospital in Western Maharashtra

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Introduction: Tyrosine Kinases are small-molecule target therapies which play an important role in the modulation of growth factor signalling in selected malignancies. The safety profile of Tyrosine Kinase Inhibitors (TKI) in palliative care patients and the last stage of life is not well known. Hence, the authors aimed to monitor and assess the adverse drug reactions associated with tyrosine kinase inhibitors used in the management of Chronic Myeloid Leukaemia, Non-Small Cell Lung Cancer, Renal Cell Carcinoma and Hepatic Cell Carcinoma patients in a tertiary care hospital in Western Maharashtra.

Purpose: To monitor and assess the adverse drug reactions associated with tyrosine kinase inhibitors used in Palliative care Oncology patients in a tertiary care hospital in Western Maharashtra.

Methods: The study was carried out in the outpatient department of Medical Oncology of a tertiary care hospital. A total of 100 patients meeting the inclusion-exclusion criteria treated with TKIs for Palliative care were followed up for a duration of 2 years. During the course of the therapy, patients were monitored for Adverse Drug Reactions (ADR). The ADRs were assessed for their pattern, causality and severity and the associated ECOG Performance status. Management of ADR in the last stage of patients was also studied.

Results: Out of 100, 21% of patients were CML, 79% had Solid malignancies, and a total of 181 Adverse Drug Reactions (ADRs) were observed. The prevalence of haematological ADRs was common at 71.4% (15 patients) with Imatinib, and the ADRs belonged to System Organ Class, Blood and lymphatic system disorders & non-haematological ADRs for Sunitinib, Sorafenib, Gefitinib treated patients 86% (68 patients), and the ADRs were belonging to Gastro Intestinal System and Skin and Subcutaneous tissue disorders. Further assessment showed that the ADRs were mild to moderate in nature. Causality assessment proved that the majority of the ADR belonged to the Possible category (76%).

Conclusion: The study shows the prevalence of ADRs in study patients even at moderate therapeutic doses of Oral TKIs, but showed that the majority of the ADRs were manageable with symptomatic treatment. A few ADRs only led to in-patient hospital admission, but it was also observed that ADRs didn't have a great impact on the performance status of the patients. The present study emphasises the importance of continued monitoring of patients using TKIs for palliative care and adopting management strategies according to evidence-based practice for better clinical outcomes.

Nepali manufacturers towards WHO prequalification of medicines: Situation analysis and recommendations

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Introduction: WHO initiated the Prequalification (PQ) of medicines programme in 2001 to ensure the availability of quality essential medicines in low and middle- and middle-income countries. The programme includes active pharmaceutical ingredients and finished products for twelve therapeutic categories. The PQ process involves the assessment of the product dossier followed by inspection of the site for compliance with Good Manufacturing Practices (GMP), including contract research organisation for compliance with good clinical practice and good laboratory practices. Although various manufacturers from forty countries have prequalified 645 finished products, none of the products from Nepali manufacturers are prequalified.

Methods: The Department of Drug Administration (DDA) of Nepal, in collaboration with the Promoting the Quality of Medicines Plus programme, invited domestic manufacturers for technical assistance towards prequalification of four products: amoxicillin tablet, azithromycin tablet, oxytocin injection, and zinc sulfate tablet. Six manufacturers out of twelve were shortlisted on the basis of site master file, product dossier, and history of previous regulatory inspections. The shortlisted manufacturers were inspected based on WHO guidelines.

Results: Major gaps were observed in good manufacturing practices, pharmaceutical quality systems, documentation, sanitation and hygiene of premises, equipment qualification and validation, and good practices in quality control. Other deficiencies were unavailability of suitable grade of API and excipients, product development, adoption of common technical document format for dossier, and bioequivalence studies.

Conclusion: The gaps identified from the detailed assessment highlight the requirement to improve the system and process to manufacture the products of interest before applying for prequalification to the WHO. Prequalification is a system-strengthening approach that is targeted to improve the quality of all products manufactured at the site and is not limited to a single product.

Non-steroidal anti-inflammatory drugs prescribing pattern and the prevalence of polypharmacy and potential drug-drug interactions among elderly: A cross-sectional study from a secondary care hospital

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Introduction: In clinical practice, elderly patients are frequently prescribed Non-Steroidal Anti-inflammatory Medications (NSAIDs) to treat pain and inflammation. Drug therapy can be challenging due to the risks of Polypharmacy and Drug-Drug Interactions (pDDIs), particularly in the elderly.

Purpose: The objective of the study was to evaluate the prescribing pattern of NSAIDs and the prevalence of polypharmacy and pDDIs among the elderly at the Outpatient Pharmacy Department of a Secondary Care Hospital.

Methods: The study included a prospective observational analysis based on information from electronic medical records of elderly who were prescribed NSAIDs between October 2022 and April 2023. The NSAID prescription patterns and co-administered drugs were tested for in the gathered data. The Micromedex database 2.0® was used to identify the pDDIs, which were then grouped and rated according to their severity, onset, and documentation. Descriptive statistics were utilised for the extraction and analysis of data. The potential relationship between sociodemographic factors and DDI risk was examined using chi-square analysis. Analysis of binary logistic regression was done to evaluate variables that might be connected to pDDIs and polypharmacy. Pearson's correlation was employed to correlate the number of medicines, age, DDIs, and comorbidities.

Results: In total, 173 elderly patients were included in the study. Diclofenac (36%) and celecoxib (41%) were the most commonly prescribed traditional NSAIDs and Cyclooxygenase -2 Inhibitors, respectively. Aspirin and celecoxib were the

most commonly involved NSAIDs causing pDDIs. Among the total patients, 340 pDDIs were identified with a mean of 1.95 ± 3.66 interactions per prescription. The majority of the DDIs were unspecified (57.64%) in onset, moderate (58.23%) in severity and fair (46.47%) in the documentation. A strong correlation was seen between the quantity of medications provided and the likelihood of developing DDIs ($p < 0.001$). While neurology (OR = 8.269; 95% CI: 1.082–63.183) and orthopaedics (OR = 0.220; 95% CI: 0.082–0.592) are associated with chronic NSAID use and incidence of polypharmacy, diabetes mellitus (OR = 0.439; 95% CI: 0.196–0.982), hypertension (OR = 0.255; 95% CI: 0.106–0.616), and number of medications (OR 0.049; 95% CI: 0.017–0.140) were significant predictors of pDDIs.

Conclusion: The study provides insight into the prescription pattern of NSAIDs and reveals the presence of polypharmacy and pDDIs among elderly patients. Giving the elderly the right screening and intervention resources to maximise their medication regimen may enhance their treatment success.

Paths through which primary care medicines circulate in Amazonas - Brazil

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Introduction: The project "*Access to medicines in the Amazon: influence of the Amazon factor on pharmaceutical policies and services*" financed by the Amazônia+10 Initiative is being conducted in 18 municipalities in the state of Amazonas in Brazil, with the objective of evaluating the management of Pharmaceutical Services in participating municipalities considering the organisational, operational and sustainability dimensions, with a view to collaborating in the planning of public health policies for access to medicines considering local and regional peculiarities. The operational dimension includes the ability to establish, maintain and expand logistical resources for medicines. to the main access points for forest and water populations.

Methods: A prospective, cross-sectional, exploratory and descriptive study was carried out in the state of Amazonas, approved by the Research Ethics Committee (CAAE registration: 60851222.0.0000.5020). Semi-structured interviews were carried out for managers, professionals and patients. Technical visits were carried out in health services in urban and rural areas. The researchers followed drug distribution routes in different modes of transport.

Results: The river is the main route for the distribution of medicines in the municipalities, which are transported by different types of vessels, such as boats, ferries, tugboats, and small boats, departing from the state capital, Manaus. By the river, medicines take 1 to 21 days to reach the municipal headquarters. Land transport is also used to ensure the arrival of medicines. When transportation takes more than 24 to 48 hours, heat-labile medicines are sent by air, with the costs being assumed by municipal management. The air route is also selected when there is urgency in the delivery of medicines, often due to shortages, delays on the part of the supplier or adverse environmental conditions, such as seasonal drought, which can delay the arrival of medicines for several days.

When the medicines arrive in the municipalities, a new stage of logistics begins. Each municipality has several communities that are distant from each other and have a complex hydrographic network where speedboats and boats are used to reach the inhabitants of these locations. There is no transport dedicated exclusively to medicines. Medicines are generally packed in cardboard boxes or plastic bags and transported in vehicles along with people and various products, including food, household appliances, and construction materials, among others.

Conclusion: The logistics of distributing medicines in the state of Amazonas are predominantly riverine. However, each municipality has access peculiarities. Therefore, to define the spatial arrangements of transport, whether air, road, or river, local health management uses the options available for the region, time, and cost as criteria, considering environmental conditions. In the case of thermolabile medicines, the means of transport guarantees the quality of the medicine throughout the journey. It was observed that geographic and hydrographic characteristics influence the distribution of medicines in the municipalities of Amazonas, as well as in their communities. The information presented reveals the logistical complexity, as well as the challenges faced by municipal management to ensure patients' access to treatment and the urgency of strengthening the commitment to equity.

Pattern of drug utilisation in the paediatric outpatient department of a tertiary care teaching hospital

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Introduction: In order to promote rational drug use in developing countries, assessment of drug use patterns using the World Health Organization drug use indicators is important. Drug utilisation studies have special significance among paediatric age groups as infants and children (under 15 years of age) represent about 26% of the total world

population as of mid-2020: 21% in developed countries and 42% of the population in developing countries. Generally, children are subject to the same adverse effects as adults but they have increased risk with certain drugs because of differences in pharmacokinetics and pharmacodynamics or because of drug effects on growth and development.

Many drugs used for paediatrics have not undergone clinical trials, and most of the drugs widely prescribed for infants and children are not available in suitable dosage forms.

Hence, the present research provided current information on drug use in the paediatric age group, which will be helpful in planning longitudinal prospective studies on patterns of drug utilisation in the paediatric population.

Purpose: This study aimed to evaluate the pattern of drug utilisation in the paediatric outpatient department of a tertiary hospital in Nigeria using WHO core prescribing indicators. Specifically, the study determined the average number of hospital visits in the paediatric outpatient department, identified the most common medical condition amongst the paediatric population, assessed the drug utilisation pattern using WHO prescribing indicators, characterised the drug exposure for children in the outpatient clinic of the health facility and determined the most frequently used anti-infective.

Methods: Using a cross-sectional retrospective study approach, Pre-Formed Format Sheets (PROFORMA) were used to collect data from medical records of the University of Abuja Teaching Hospital. The data obtained were analysed using Statistical Package for Social Sciences (SPSS) version 23 using descriptive statistics.

Results: Out of the 407 case files that were reviewed, only 316 case files were eligible for further analysis. A total of 949 prescriptions were collected and analysed in the study. The average number of drugs per encounter was 2.6. The percentage of drugs prescribed by generic name was 81.9%. The percentage of encounters with an antibiotic prescribed was 63.1%. Injectable drugs prescribed per encounter was 26.2%, whereas 100% of drugs prescribed were from the Essential Medicine List. The most prescribed antibiotic drug classes were the penicillins and cephalosporins. Amoxicillin + Clavulanic acid from the penicillin pharmacological class was the most frequently prescribed antibiotic drug, followed by ceftriaxone and cefuroxime from the cephalosporins. The most prescribed antimalarials were Artemether + Lumefantrin and Artesunate.

Conclusions: The current study showed that prescribing was based on the Essential Medicine List. However, the overall prescribing practice was not satisfactory when compared with the standard values of the World Health Organization (WHO). Hence, the authors recommend the implementation of measures to improve the prescribing habits in this facility.

Pharm.D. students' attitudes towards Continuous Professional Development (CPD) in twin cities Islamabad and Rawalpindi, Pakistan

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Introduction: Continuous Professional Development (CPD), a must-have for professional registration, not only suffices in maintaining competence but also helps improve the quality of healthcare services offered by pharmacists. On a world scale, not just in Pakistan but also in CPD should be accepted as the standard for pharmacists all throughout their careers. On the other hand, a gap has been created between academic research efforts and CPD in the Islamabad and Rawalpindi areas. Therefore, the inconsistency in CPD knowledge gaps demands this study to evaluate student awareness, perception, and motivation toward CPD regarding their professional lives.

Purpose: This study seeks to explore the perceptions of Pharm.D. students in Islamabad and Rawalpindi towards CPD and identify what variables affect their engagement in CPD activities after earning their degrees. These variables might include institutional support and financial constraints in many cases.

Method: The survey was designed to use a mixed-methods approach by applying qualitative techniques of semi-structured interviews and quantitative analyses of the questionnaire responses. Surveys were conducted among 500 pharmacy students from five universities considered major target institutions. This helped to select a more comprehensive and diverse sample across the various study years. Moving forward, 30 students were short-listed for more in-depth interviews to complement the survey data. The survey data was coded, tabulated, compared, and statistically analysed, while the interview data was thematically analysed to interpret the findings.

Results: The results yielded the fact that during the inquiry, 85% of students claimed that they knew CPD (continuing professional development) concepts, but only 50 percent of students understood and felt its meaning for the future in their careers. Further, the main barrier to participation was a concern for 65%. These fears include life and financial cost constraints and giving undue priority to their educational institution. The senior students tended to view CPD more positively, implying more understanding of CPD and acceptance at the higher level of education.

Conclusion: The research shows that the Pharm.D. students strongly recognise the utility of CPD in Rawalpindi and Islamabad City but that it is too wide an extension. Two key barriers to curbing financial problems and lacking

institutional support are named. Some of the propositions include adding the CPD more wholly and the professional bodies providing support. This study, in turn, adds to a broader tactic of pharmacy education reform in Pakistan aimed at developing future intervention measures geared towards attracting new graduates to CPD initiatives.

Pharmacist intervention in an education programme with a focus on person-centred care

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Introduction: Traditionally, health education has been limited to disseminating health-related information. However, approaches have been developed where the motivation and confidence to take action to improve health are fostered. Pharmacists' involvement in health education programmes is rare, and the role of pharmacists in addressing health problems such as medication non-adherence is fundamental within healthcare systems.

Purpose: To identify knowledge and personal behaviour regarding the rational use of medicines and adherence to treatment in patients with chronic non-communicable diseases through an education programme with a person-centred approach.

Methods: The intervention was conducted in a high-complexity clinic in Bogotá, Colombia, through repeated one-to-one education interviews with patients with chronic non-communicable diseases. The pharmacist provided the health care team with multifaceted information, including medication adherence support material and patient experience sessions. The intervention was based on the transtheoretical model of change, and adherence was assessed using the Morisky-Green test after validation. Prospective observational studies were conducted between August and December 2023. Information was collected on barriers, behaviours and motivations for rational medicine use and medication adherence. Data reported by patients in self-reported tests in terms of medication adherence and pharmacist interviews were used.

Results: The main diseases reported in fifty patients were cardiovascular disease, type 2 diabetes mellitus and dyslipidaemia. The first intervention identified barriers associated with a low perceived need for medication and misinformation without a health professional to answer questions. Similarly, poor understanding of the medication in terms of name, indication, dosage and interactions with other medications or food. Patients reported using plants, natural treatments and homoeopathic products as alternatives for their health care.

During the educational interventions and experiences in sessions with other patients, problems with the use of medicines related to frequency, duration, consumption habits and storage were identified. On the other hand, the motivations for remaining adherent to treatment are focused on family, personal well-being, better quality of life and work performance. Regarding adherence, the number of patients forgetting to take their medication decreased from 54% to 8%, an increase in administration behaviour from 78% to 94% and a decrease in voluntary discontinuation of medication from 42% to 2%. According to the Morisky Green test, patients moved from non-adherence (less than 3 points) to adherence (4 points).

Conclusion: Poor understanding of medication and lack of multifocal health education represent health problems for patients with chronic non-communicable diseases. However, pharmacist intervention in an education programme with a focus on person-centred care increased medication adherence and motivated patients to take ownership of responsible, health-informed decisions. Further evaluation of pharmacist intervention through health education programmes is suggested to expand the design of strategies to solve population health problems.

Pharmacist' perception on access to paediatric medicines in Albania

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Introduction: Medicines are critical to health systems strengthening; without medicines, confidence in the local health system declines. However, there is still a global scarcity of age-appropriate formulations of paediatric medicines to treat and prevent various conditions, especially in low- and middle-income countries. Children differ from adults in many pharmacotherapy aspects, including medicine administration capabilities, medicine-related toxicity and taste preferences. Paediatric medicines must be formulated to best suit a child's age, size, physiological condition and treatment requirements. Different routes of administration, dosage forms, and strengths may be required to ensure adequate treatment of all children. Research efforts have traditionally

focused on measuring access to medicines for the general population without particular consideration for medicines for children. As a result, there is a major gap in this understanding of the accessibility of medicines for children. This research, therefore, aims to identify the barriers and facilitators of access to paediatric medicines from pharmacist's perceptions in Albania.

Methodology: Semi-structured interviews were conducted (March-April 2024) with 18 pharmacists members of the Albanian Order of Pharmacists working in the most populated cities in Albania. Interviews were transcribed verbatim and analysed using a Pharmaceutical Value Chain framework.

Results: Barriers to accessing paediatric medicines were experienced, for example, due to limited items on the reimbursement list for different diagnoses and occasional stock-outs of medicines. The open communication channels with other healthcare professionals and patients' education were considered facilitators in access to paediatric medicines.

Conclusion: This is the first research to use structured interviews to understand how pharmacists deal with prescriptions for paediatric patients and their perception of the accessibility of paediatric medicines. The findings can be used to develop policies and health systems strengthening initiatives to improve access to paediatric medicines in Albania.

Pharmacists' perspective on involvement in point-of-care screening and testing in Armenia

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Introduction: In many countries, community pharmacists contribute to improving global health by providing various primary healthcare services, including Point-of-Care Screening and Testing (POCT). In Armenia, there is no regulatory framework covering the provision of POCT services in community pharmacies. Nevertheless, some community pharmacies offer certain POST interventions for Non-Communicable Diseases (NCDs) and deliver them free. Data on pharmacists' perceptions of their role in this area is important for further advocating and improving the practice. This work aimed to study community pharmacists' perception of their involvement in providing POCT interventions in Armenia and their wish to be engaged.

Method: The survey was conducted by collecting data from pharmacy professionals employed at community pharmacies (independent pharmacies and pharmacy chains) in different regions of Armenia, including Yerevan (the capital). Community pharmacy staff (pharmacists and pharmacy technicians) were asked to complete a pre-tested questionnaire aimed at identifying their involvement in providing point-of-care screening for NCDs and their wish to be engaged. Data were analysed with the SPSS statistical software, version 22.0.

Results: Almost half of the participating professionals (N=241) indicated that they are engaged in point-of-care screening for NCDs; some respondents noted that they are quite engaged (13.6%), and some reported that they are sometimes engaged (36.0%). 32.2% of professionals noted that they are quite involved, and 26.0% of respondents reported that they sometimes perform blood pressure testing. 10.7% of participants indicated their involvement in blood glucose testing, and 24.8% of respondents consider that they sometimes provide such a service. Only 2.5% of professionals reported their involvement in cholesterol testing, and 14.4% indicated that they sometimes are engaged in providing this POCT intervention. The percentage of respondents who reported their involvement in blood pressure testing to patients is higher among females than men (p = 0.009) and among those employed at pharmacy chains than those employed at independent pharmacies (p = 0.016). 52.9% of professionals are interested in being engaged in point-of-care screening for NCDs, 51.7% of respondents indicated their interest in being involved in blood pressure testing, 44.6% of participants are interested in blood glucose testing, and only 37.2% of professionals noted their interest in cholesterol testing.

Conclusion: Only some community pharmacists and technicians are quite or sometimes engaged in providing point-of-care screening for NCDs. Several factors influence the involvement of professionals in certain types of activity in this area. More than half of professionals are interested in providing POCT interventions for NCDs. There is an urgent need to advocate for introducing a regulatory framework for POCT services in Armenia, as well as other strategies aimed at expanding and improving a practice related to point-of-care screening and testing in the country. A draft of recommendations for policymakers was developed and will be submitted to the Ministry of Health.

Prescribing pattern of drugs used in hospitalised paediatric population in a tertiary care hospital

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Introduction: The treatment of most paediatric conditions primarily involves medication. The present study aims to

evaluate the drug prescription pattern and assess the therapeutic efficacy and progress of health conditions in the paediatric population.

Methods: A study to examine the most prevalent illnesses causing paediatric hospitalisations and drugs used in treating underlying illnesses was carried out in the paediatrics department of a tertiary care hospital. This study was conducted for six months using a prepared structured questionnaire/proforma.

Results: In a span of six months, the total number of cases collected in the ward was 80, out of which 51 were male children (63.5%) and 39 were female children (36.5%). The majority of paediatric hospitalisations are due to Respiratory and gastrointestinal tract problems. Most drugs prescribed are Electrolytes, Multivitamins, Antipyretics/Analgesics, Antibiotics, PPIs, antihistamines, Antiemetics, Bronchodilators, and Nasal decongestants.

Conclusion: The evaluation of drugs used in paediatrics is important as it provides awareness for rational prescribing of drugs, as irrational prescribing can lead to morbidity, mortality, and socio-economic burden on the health care system, which can become a global threat.

Prices, availability, and affordability of selected medicines for asthma management in Nigeria: A nationwide study

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Introduction: The prevalence of asthma in Nigeria is high, with variabilities across regions and age groups. Since there is

no cure for asthma, the management aims to achieve good control of symptoms, maintain normal activity levels, and minimise future risk of exacerbations. Recent inflation in Nigeria and the departure of key multinational pharmaceutical companies could hinder access to medicines. The study aimed to evaluate the prices, availability, and affordability of selected medicines for asthma management in Nigeria.

Method: This cross-sectional survey (January 2024–March 2024) was conducted in community pharmacies in the six geopolitical zones of Nigeria. Data for Originator Brand (OB) and Lowest-Priced Generic (LPG) were collected with the Medicine Price Data Collection Form developed by the World Health Organisation/Health Action International (WHO/HAI). Twenty-three (23) selected medicines for asthma management were utilised. The Median Price Ratio (MPR) was the ratio of the median local unit price to the International Reference Unit Price (IRP). The IRPs were South African government procurement prices. Availability was reported as the percentage of medicine outlets in which the medicine was found on the day of data collection. Affordability was the number of days of work by the lowest-paid unskilled national government worker to purchase a defined course of treatment for a specific condition.

Results: Of the 300 community pharmacies that were sampled, 214 responses were retrieved (participation rate: 71.3%). The majority of the medicines (n = 18 of 21, 85.7%) were more than two times the IRPs. Salbutamol 100 mcg inhaler OB was 11.8 times the IRP, while the LPG was 5.3 times the IRP. The average per cent availability across OBs (11.2%), LPGs (18.8%), and all medicines (15.0%) were less than 50%. The majority of the medicines (n = 36 of 39, 92.3%) cost more than a day's wages. Salmeterol 25 mcg/Fluticasone 125 mcg inhaler would require 31.0 days' wages with OB and 9.5 days' wages with LPG.

Conclusion: The findings reveal high medicine prices, poor availability, and low affordability of asthma medicines. There is a need for subsidies on medicines for the management of asthma. Payments are usually out-of-pocket. The National Health Insurance Agency should consider the inclusion of medicines for asthma for relief, control, and maintenance in their list of medicines. Local pharmaceutical industries should be encouraged to manufacture generic medicines for asthma. Future studies can evaluate factors that could be responsible for high prices, poor availability, and affordability of medicines for asthma.

Public perception toward 3D printed medicines: Acceptability of 3D printed medicines; aspirations and concerns

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Introduction: Three-dimensional (3D) printing in pharmaceutical research and development has developed rapidly over the last decade and shows great promise for use in personalised and novel medicines manufacture. A combination of still developing technology, regulatory hurdles and identifying appropriate clinical opportunities currently limits the utilisation of 3D printed medicines, although there are now a number in advanced stages of development and clinical trials, with one on the market. Understanding the public acceptability of 3D-printed medicine is important for the future of such personalised medicines. Here, the authors seek public perceptions of the potential for 3D-printed medicines.

Purpose: To understand public perceptions toward 3D printed medicines.

Method: Semi-structured focus groups (n=5) were conducted with members of the public (n=16). Participant recruitment was performed using convenience and snowball methods. Audio recordings were transcribed verbatim and analysed thematically.

Results: Three main themes - safety of 3D printing and 3D printed medicines, personalisation and adjustment of medicines, and economic and societal impact of 3D printed medicines – were generated. Perceptions towards specific tablet physical characteristics were agreed. Acceptance of 3D printing of medicines increased when further information about the technology was provided.

Conclusion: This study highlights the public perceptions towards 3D printed medicines. Overall perceptions were positive toward the technology; however, valid concerns were highlighted, offering areas for consideration for manufacturers and policymakers.

Research self-efficacy predictors among pharmacy students in Nigeria: Insights for pharmacy educators and curriculum developers

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Introduction: Studies have shown that strong research self-efficacy is often associated with higher levels of motivation, persistence, and success in research-related as well as other academic and professional endeavours. In Nigeria, pharmacy undergraduates must successfully complete and submit a supervised research project as one of the requirements for their degree. This provided a useful context for this study, which sought to explore predictors of research self-efficacy among final-year undergraduate pharmacy students.

Method: A 24-item validated questionnaire was deployed online for data collection from 1,167 final-year students across eight conveniently selected pharmacy schools as part of a cross-sectional study design. Seven items were on research self-efficacy, eight items on perception of research, and nine on socio-academic characteristics. SPSS version 27 was used for data analysis and a high and low categorisation was assigned to research self-efficacy scores using the median as the cut-off mark because they were not normally distributed. Scores that fell on the median and below were categorised as low, while those above the median were considered high. Descriptive statistics such as frequencies and percentages were used. The inferential statistics used were correlation to determine the relationship between research self-efficacy and positive research perception, chi-square was used to assess the association between the socio-academic characteristics of the participants with the categorised research self-efficacy, and binary logistics regression was used to determine the predictors of research self-efficacy. The level of significance was at $p < 0.05$.

Results: In total, there were 878 respondents for the online survey (response rate 75.2%), and 508 (57.9%) were female. Research self-efficacy correlated positively with a positive perception of research ($r = 0.168$, $p < 0.001$). Participants with high research self-efficacy were 376 (42.8%), while those with low research self-efficacy were 502 (57.2%). There was a significantly lower proportion of participants within 21-25 years (41.4%) and 26-30 years (43.4%) with high research self-efficacy than those aged > 30 years (62.9%) $p = 0.044$. The proportion of those with high research self-efficacy was higher among participants with previous post-secondary education (52.3%) than those without (40.5%) respectively ($p = 0.006$). Previous involvement in research (adjusted odd ratio (AOR 1.682, 95% Confidence Interval (CI): 1.252-2.260),

intention to pursue a postgraduate degree (AOR 1.640, 95% CI: 1.036-2.597) and high positive perception of research (AOR 1.597, 95% CI: 1.199-2.128) were predictors of high research self-efficacy.

Conclusion: After adjusting for confounders, quantitative analysis revealed significant correlations between high research self-efficacy among final-year pharmacy students and factors such as previous involvement in research, intention to pursue a postgraduate degree and high positive perception of research. These findings offer practical implications for pharmacy educators and curriculum developers in Nigeria, emphasising the need for targeted strategies such as research mentorship to nurture students with predictors for low efficacy whilst concurrently motivating students with predictors for high self-efficacy throughout their academic journey and professional careers.

Risk factor analysis and therapeutic outcome in respiratory tract infection

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Introduction: Respiratory Tract Infections (RTIs) provide a huge challenge to worldwide healthcare systems, resulting in significant morbidity and mortality across various populations. This study seeks to fill this information gap by comprehensively investigating the relationship between risk factor profiles and therapy results in RTIs.

Methodology: This study was carried out with a sample of 108 patients who visited the hospital with symptoms of RTI. Inclusion Criteria: Paediatrics (<18 years), Adults (>18 years), Geriatrics (>65 years), patients with all comorbid conditions. Exclusion Criteria: Pregnancy and lactating women, outpatients, Tuberculosis, Patients who did not provide consent for the study.

Discussion: In a study of 108 hospitalised patients, RTIs were more common in LRTIs (73%) than URTIs (27%). Antibiotics were prescribed for 83% of LRTI and 17% of URTI. The average recovery time for URTIs was five days, while it was 13 days for LRTIs. Paediatric patients had a negative correlation (*p*-value < 0.0001) between RTIs and diseases such as anaemia and obesity.

Conclusion: This study found that anaemic and obese individuals are at higher risk of respiratory tract infections due to their haemoglobin levels and BMI. Lower Respiratory Tract Infections (LRTIs) were the most commonly diagnosed. LRTI patients had longer recovery times and higher antibiotic

usage compared to Upper Respiratory Tract Infection (URTI) patients.

Satisfaction and confidence level of pharmacy students after a simulation-based clinical rotation course

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Introduction: Pharmacy schools in Nigeria have to contend with large numbers of student entrants beyond their optimal carrying capacity, and this has negatively impacted the quality of learning students receive. Through its pioneering work, the Department of Clinical Pharmacy, University of Nigeria, introduced Simulation-Based Laboratory Training (SBT) into the final year curriculum four years ago to complement the didactic training final year pharmacy students receive while introducing them to new clinical skills. The training programme is nearing maturity, but very little is known about its impact on the expectations of graduating pharmacy students. This research examined the satisfaction and confidence levels of students upon the completion of the SBT course within a large pharmacy school.

Methods: The authors conducted a university-based cross-sectional survey among all final-year pharmacy students at the Department of Clinical Pharmacy, University of Nigeria, taking the mandatory 10-week SBT clinical rotation course in the 2022/2023 academic session. The students completed a content-validated paper-administered questionnaire comprising questions on satisfaction (15 items, 4-point satisfaction scale), confidence to utilise learned skills (12 items, 4-point confidence scale), and challenges experienced (10 items, 4-point agreement scale) after the course. Survey items were analysed using descriptives to measure the level of satisfaction, confidence, and perception of barrier and chi-square tests for any association.

Results: Three hundred and seventy-nine students (184 female and 195 male, mean age 26 years) completed the survey and returned usable questionnaires (response rate of 94.5%). Nearly a similar proportion of students made oral presentations (27.2%) or created a learning video (20.8%) during the course. Overall mean (SD) satisfaction with the SBT reported was 3.24 (0.17) of 4.00, with 96.3% of the students reporting being satisfied/very satisfied with the "*opportunity to work with peers*" and 93.6% with "*makes the learning process interesting*". The students were least satisfied with

"*comfort in the simulation labs*" (64.1%) and "*use of human simulators*" (83.1%). Students were very confident of their abilities to carry out pharmacists' skills in the community (74.4%) and hospital practice (59.6%) settings, efficient vital sign measurements (67.0%), and teaching patients the usage of self-diagnostic kits (61.2%).

Nonetheless, their confidence in utilising an electronic medical record system (26.1%) and critically appraising published literature (19.0%) was notably low. Students identified challenges that impacted their learning negatively, such as large group sizes, limited time for some training, and limited SBT equipment to match group sizes. No student characteristics were significantly associated with any of the measures.

Conclusions: Pharmacy students were satisfied with simulation-based training as a supplement to traditional didactic methods. It notably bolstered their confidence in applying the majority of clinical skills acquired during their education. Nevertheless, various resource and structural challenges persist and require more effective management to enhance the learning experience.

Selection criteria for priority patients in medication therapy management services: An integrative review

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Introduction: Medication-Related Problems (MRPs) represent an increasing challenge in healthcare, impacting the safety and effectiveness of treatment. The Comprehensive Medication Management (CMM) service emerges as a crucial approach to optimise pharmacotherapy and offer comprehensive care through shared decision-making with patients. However, the availability of this service remains limited due to a lack of training in the area and the limited time pharmacists have due to administrative burdens. This highlights the need to define clear eligibility criteria to prioritise patients who would most benefit from the service. Therefore, this research aims to identify criteria for selecting patients for CMM at different levels of care.

Methods: An integrative review was conducted in September 2022 using the PubMed/Medline database, based on the research question: "*What are the eligibility criteria for patients for the Comprehensive Medication Management service?*" The PICo strategy was structured into three dimensions: (1) Population: patients using the CMM service; (2) Intervention: studies assessing patient eligibility; (3) Context: all healthcare levels. The search strategy used MeSH terms: ("*Pharmaceutical Services*", "*Medication Therapy*

Management", "Pharmacotherapy follow-up", "*Comprehensive Medication Management*") AND ("*Patient Selection*", "*Patient Admission*", "*Eligibility Criteria*") AND ("*Primary Health Care*", "*Secondary Care*", "*Tertiary Healthcare*", "*Centers for Medicare & Medicaid Services*"). Included articles evaluated Comprehensive Medication Management service users and presented the selection criteria used. Excluded were review studies, non-CMM populations, and studies that did not address patient eligibility.

Results: A total of 176 studies were found, six articles were eligible, and 1 document was included through a manual search. All studies were conducted in the United States of America (USA) between 2011 and 2021. The results encompass aspects of patient and healthcare service/system structure. Some of the criteria appear in more than one study: having specific annual medication costs (US$) and having one or more chronic diseases (5 studies); using 2-8 medications covered under prescription drug coverage (Medicare Part D) and direct payment for CMM services (3 studies); previously identified MRPs (or previous hospitalisation) and being the elderly person (60-75 years) (2 studies). Other criteria were cited only once (in different studies): using a high-risk medication (which increases the risk of adverse events); having a "*complex*" pharmacotherapy (based on the Medication Regimen Complexity Index - MRCI); low family income; non-white; female sex, all associated with a higher likelihood of MRPs. Various settings are possible for CMM provision (outpatient clinics, hospitals, long-term care institutions, primary health care).

Conclusion: This review showed that the criteria being used are heterogeneous, and more qualified studies are needed to show the realistic and humanistic criteria used to select patients for CMM. The standardisation of patient selection criteria for CMM service enables pharmacists to prioritise patients with evidence-based information, promoting quality clinical practice by identifying patients most in need of CMM and who would achieve better outcomes, thereby improving the routine of pharmaceutical services.

Self-care priorities of international travellers visiting Indonesia: Development of a Q-Set

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Introduction: Some international travellers may visit a community pharmacy to engage in self-care, especially for acute, minor ailments that do not require hospitalisation.

Understanding the range of self-care practices in this group can help community pharmacies deliver optimal services for them. However, exploration and prioritisation of travellers' self-care practices in the context of travelling to developing countries such as Indonesia are limited. Self-care experience, practices, needs, and prioritisation may vary between travellers, suggesting the subjectivity of the topic. Therefore, Q-methodology, as a research technique to study subjectivity, can be used to explore this topic. In this methodology, subjective statements representing the spectrum of the topic are gathered from different sources and then distilled into a manageable number of statements. Study participants will rank these sample statements, and the results will inform the shared viewpoints of the participants.

Purpose: The authors report the development of a collection of statements called Q-Set as a Q-Methodology instrument for exploring and prioritising self-care among international travellers in Indonesia. This Q-Set development is part of a more extensive study that explores the prioritisation of self-care and the readiness of Indonesian community pharmacies to facilitate international travellers' self-care needs.

Method: El-Osta's Self-Care Matrix Framework (SCMF) was used to understand self-care in international travel. The framework comprises four dimensions: Self-Care Activities, Behaviour, Context, and Environment. Travellers' personal statements were collected via a meta-synthesis of eleven qualitative research articles, web scraping of four online travel fora, and individual interviews with 16 international travellers and 12 Indonesian community pharmacy staff from Bali and Borobudur, Indonesia. Extracted statements from these sources were grouped along the SCMF's four dimensions, and the Q-Methodology Concourse (population of statements) was composed. The authors identified thematic similarities between statements and selected 1 or 2 statements from each theme to represent the various constructs of the SCMF and to develop the initial version of the Q-Set. Two reviewers narrowed down the number of statements using the Content Validity Index on a 5-point Likert scale.

Results: The authors obtained 673 statements for the Concourse: 207 from meta-synthesis, 227 from online forum scraping, and 239 from interviews. The concourse revealed 31 SCMF constructs and subconstructs relevant to self-care in the context of international travel. The authors selected 96 statements to represent these 31 constructs and subconstructs to be included in the preliminary version of the Q-Set. After being reviewed using the Content Validity Index, 55 statements remained in the Q-Set.

Conclusion: The authors have developed an initial Q-Set consisting of 96 subjective statements relevant to self-care performed by international travellers in Indonesia. The next stages are to consult with domain experts and then pilot the Q-Set. The final Q-Set will be disseminated to international traveller participants in Indonesia, and the results will inform shared perspectives on self-care among this group.

Shortage of essential medicines for palliative care

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Introduction: Medicines play a crucial role in managing symptoms in palliative care. However, a lack of access to medicines for palliative care is observed in some countries. According to data published annually worldwide, more than 61 million people experience suffering related to health issues; this suffering could be alleviated if they use appropriate medication. Most of these people live in low- and middle-income countries where access to medicines for pain relief and palliative care is often limited. The objective of this work is to assess the availability and affordability of essential palliative care medicines in Armenia.

Method: A list of medicines authorised in Armenia (2023) and pricelists of 4 main wholesalers (2024) were analysed. The following indicators have been calculated: percentage of medicines from the World Health Organization Model Essential Medicines List (WHO EML, 2023), which are authorised in Armenia, and percentage of medicines from WHO EML (2023), which are included in pricelists studied. The affordability of essential medicines available in the country was calculated using methodology adjusted from the method developed by the World Health Organization and Health Action International (medicine is considered to be affordable if the cost of treatment is less than an official national minimum wage calculated for one day). Data on prices have been collected from two online pharmacy chains' websites.

Results: 17 (60.7%) of 22 medicines and six therapeutic equivalents for palliative care, which are listed in WHO EML (2023), are authorised in Armenia, and only 12 (54.5%) of 22 medicines are available in wholesalers' pricelists (narcotic opioids are not included in these pricelists). Calculation made by taking into account dosage forms and strengths of the essential medicines listed in WHO EML shows that 42.9% of 49 pharmaceutical forms and 33.8% of 77 strengths recommended by WHO for 22 palliative care medicines are authorised. Only 26.5% of pharmaceutical forms and 27.3% of strengths recommended by WHO for palliative care medicines have been found in the price lists of main local wholesalers that were studied. The cost of treatment calculated for essential medicines for palliative care is mainly affordable (some medicines for pain relief in cancer treatment are free of charge for patients as they are covered by a national regulation on medicines reimbursement). However, for certain medicines, the cost of treatment is unaffordable (it is higher than an official national minimum wage calculated for one day) or is affordable at low doses and can be unaffordable if medicines are used at higher doses.

Conclusion: Only a part of the essential medicines recommended by the World Health Organization for palliative care are authorised and available for patients in Armenia. Many dosage forms and strengths recommended in the WHO EML (2023) for these essential medicines are not supplied. Lack of access to essential medicines for palliative care, as well as their dosage forms and strengths, can compromise symptom management in palliative care. Strategies aimed to improve the situation with a shortage of medicines intended to decrease patients' pain and suffering should be introduced. Monitoring the shortage of medicines in the country could be the first step.

The association between medication adherence and Quality of Life of patients with diabetes attending public hospital in Indonesia: Findings from cross-sectional study

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Introduction: Medication adherence determines the therapeutic success of patients with diabetes mellitus. Non-adherence has been reported to affect Quality of Life (QoL). Therefore, the assessment of the association between medication adherence and QoL is substantial.

Purpose: To analyse the association between medication adherence and QoL of patients with Type 2 Diabetes Mellitus (T2DM) attending a public hospital in Indonesia.

Methods: A cross-sectional study was conducted between November 2023 and February 2024 at Pasar Rebo Hospital Jakarta, Indonesia. Patients were recruited at an outpatient care clinic using a purposive sampling technique with a sample size of 121 respondents. A validated Adherence to Refills and Medications Scale (ARMS) questionnaire was used to assess the level of medication adherence, and the Diabetes Quality of Life (DQoL) questionnaire was used to measure QoL, respectively. In addition, a retrospective medication record review was also conducted to obtain patients' health status and treatment history. The association between medication adherence and QoL was explored by using the Wilcoxon signed-rank test.

Results: Of 121 respondents, only 51 respondents (42.1%) had a high adherence to treatment. In contrast, 88 respondents (72.7%) showed high QoL. A statistically significant but modest association of ARMS score (13,14) and all DQoL domains score (49,40) was found ($p < 0.05$).

Conclusion: There is a significant relationship between medication adherence and QoL of T2DM patients at the outpatient care clinic of Pasar Rebo Hospital, Indonesia. The findings suggest the need for intervention programmes targeting medication adherence and improving health outcomes through regular assessment of medication adherence and QoL.

The correlation between knowledge and patient behaviour in the use of non-steroidal anti-inflammatory drugs for pain self-medication at pharmacies

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Introduction: The use of drugs for self-medication without proper knowledge and behaviour can have a negative impact.

Purpose: This study explores the relationship between the knowledge and behaviour of patients self-medicating for pain at Serang City pharmacies.

Method: This study adopted cross-sectional research and purposive sampling. The level of knowledge and behaviour was assessed using a questionnaire. This study included a total of 222 respondents (aged 18-59 years) who were using Non-Steroidal Anti-Inflammatory Drugs (NSAIDs) for pain and had taken them for the previous three months. The analysis of the relationship between knowledge and behaviour was measured using the Spearman rho test.

Result: The results showed a sufficient level of knowledge of the respondents (59.9%) with responsible behaviour (57.2%). Spearman rho correlation test showed that there is a significant relationship between knowledge and behaviour with a fairly strong correlation value ($r = 0.715$) in a positive direction.

Conclusion: the higher the knowledge of self-medication, the better the behaviour will be.

The effectiveness of the SEPO (Self Education Programmes for Osteoarthritis) application in reducing joint pain and increasing the functional activity ability of knee osteoarthritis patients

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Introduction: Osteoarthritis (OA) is a type of chronic degenerative disease that attacks the joints and cartilage. Many factors cause OA. The emergence of OA results in joint pain and decreased functional activity of the body. This affects the patient's quality of life. SEPO (Self Education Programmes for Osteoarthritis) is a pharmaceutical care programme in the form of a digital application with knowledge, training and educational content in the form of leaflets, posters and videos. The SEPO application is provided by pharmacists and doctors about OA and its management.

Purpose: The aim of the research is to determine the effectiveness of SEPO in reducing joint pain and increasing the functional activity abilities of knee OA patients.

Method: This research has received a letter of appropriate health ethics from the medical faculty ethics committee. The quantitative research method has a quasi-experiment design and one group pre-and post-test. Subjects were selected according to the inclusion criteria from six Community Health Centers in Malang, East Java, Indonesia. Each subject was given an explanation and agreed to informed consent. Subjects who agree and are willing to take part in the research will be given an application link to download on their Android cellphone or iPhones. The meetings with subjects were only held once at the community health centre. Monitoring of symptoms of illness and treatment of subjects is carried out through the SEPO application. The SEPO application consists of demographic data, questionnaires VAS (Visual Analytical Scale) and WOMAC, the Western Ontario and McMaster Universities Osteoarthritis Index (Pre), education, questionnaires VAS and WOMAC (Post). VAS is an instrument for measuring joint pain, while WOMAC is for functional activity abilities. Applications are provided for one month, with educational times every week. Assessment of joint pain and functional activity was carried out on days 0 and 30.

Results: The subjects obtained were 66 people. Female = 42 subjects (64.92%) and male = 24 subjects (35.08%). The largest age range was 56 – 65 years = 24 subjects (42.10%)

with a normal BMI of 20 subjects (35.09%). A total of 48 subjects (84.21%) did not have a smoking habit and exercised less than 30 minutes once a week, and 26 subjects (45.61%). The results of the average reduction in VAS scores before and after the SEPO application intervention were 4.37 ± 0.919 and 2.12 ± 0.847 with a *p*-value < 0.0001. Meanwhile, the WOMAC value showed an average decrease from $20.67 \pm 7,684$ to $13.47 \pm 6,316$ with $p < 0.0001$.

Conclusion: The conclusion is that the application of SEPO is effective in reducing knee joint pain and increasing the functional activity abilities of knee OA patients. Patients need education in the care and treatment process. Education is also effectively provided in digital form.

The impact of pharmacist-led intravenous to oral switch in a tertiary care hospital's intensive care unit: A before-and-after study

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Introduction: Many patients admitted to the hospital are initially started on Intravenous (IV) medications due to their clinical conditions that necessitate only the use of the parenteral route of administration. As the patient's clinical status improves and the patient can tolerate oral intake, drugs can be converted from IV to oral (PO) form. IV to PO switch (IVOS), in a timely manner, is an effective and safe approach that leads to improved rational use of medications and contributes to overall cost savings. The prevalence, factors associated with IVOS practice, and the impact of pharmacist-led IVOS clinical service were not adequately evaluated in tertiary care hospitals in the UAE, specifically in the Intensive Care Unit (ICU).

Purpose: This study aims to evaluate the impact of pharmacist-led IVOS in the ICU with regard to antibiotics, proton pump inhibitors, and acetaminophen.

Method: The first phase of this study (Before) was a retrospective cohort study that looked at the current IVOS practice without structured pharmacist involvement, performed from October 2020 to October 2022 in a tertiary care hospital in the UAE. All patients were admitted to the ICU and had received an IV antibiotic, proton pump inhibitors or acetaminophen for more than 48 hours, were able to eat or tolerate oral formulation and enteral feeding, patients with intact gastrointestinal tract and the absence of bowel abnormalities, adequately absorbed oral medications via the oral, gastric, or nasogastric tube route. The second phase of the study involved the prospective implementation of pharmacist-led IVOS clinical service in the ICU for the above-listed eligible patient. Primary outcomes were the switch rate, duration of IV antibiotics, proton pump inhibitors or

acetaminophen treatments, and the estimated total cost savings from IVOS.

Results: In the first phase of the study, 118 patients were included. The majority of the patients (84.7%) were able to tolerate an oral diet. 89% of these patients were good candidates for IV to PO switch. However, the medical team failed to make the switch. The total cost for the total duration of IV therapy was 119,400 AED (USD 32,500). Upon calculating the costs, it was found that 18,377 AED (USD 5000) could have been saved if the IV to PO switch had been done in a timely. In the second phase of the study, 105 patients were included. Pharmacists switched 63/93 (67.7%) of eligible patients to oral metronidazole in the post-IVOS period. In the post-IVOS group, the mean duration of IV antibiotics, PPIs, and acetaminophen treatment in patients switched by pharmacists was shorter than in those who were not switched by pharmacists (2.7 ± 3.7 days vs. 6.8 ± 3.5 days, p = 0.02). IVOS pharmacist switch saved 10,360 AED.

Conclusion: This data has demonstrated the successful implementation of the pharmacist-led IVOS service in the ICU and the significant impact it has on overall patient outcomes and healthcare costs. This opens the door for future multi-centre research across different countries to quantify the value of introducing this service to the ICU and other departments in the hospital.

The impact of nonprescription medicines on the ability to drive and operate machinery

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Introduction: Although many medications do not influence driving abilities, some nonprescription (commonly known as Over-The-Counter or OTC) medicines might have adverse effects that make driving or operating other heavy machinery dangerous. The side effects may include sleepiness/drowsiness, shakiness or unsteadiness, blurred vision, slower reaction times, poor coordination, and difficulty concentrating.

Purpose: This study aims to analyse the OTC medicines authorised in Bulgaria and their impact on driving ability and machine operation.

Method: The list of authorised OTC medicines in Bulgaria, as of April 22nd, 2024, was obtained from the Bulgarian Drug Agency's (BDA) website and analysed. Dermal dosage forms and medicines for paediatric use were excluded from the analysis as they were not within the scope of the study's objectives. For all other OTC medicines, Section 4.7 of the Summaries of Product Characteristics (SmPC) was evaluated, which describes the effects of the product on the ability to drive and use machines.

Results: As of April 22nd, 2024, 1,100 OTC medicines were authorised in Bulgaria, of which 795 were included in the final analysis. The examined medicines were categorised based on their impact on driving ability and machine operation into the following groups: 1) No or negligible influence (n=535, 67%); 2) Minor influence (n=177, 22%); 3) Moderate influence (n=62, 8%); 4) Major influence (n=21, 3%).

Conclusion: Some medicines can significantly affect the ability to drive and use machines. For this reason, it is good for the packaging of these medicinal products to be appropriately labelled. Currently, there is no warning symbol for this in Bulgaria, unlike other European countries, such as France and Spain.

The relationship between sodium intake, vitamin D and calcium levels on bone strength in the populations of Madura Island

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Introduction: Bones are the main component of the human body's skeleton. The function of bones is to move the body, which has flexible and strong properties to withstand a given load. Strong bones are influenced by changes in the structure and composition of cortical bone, spongy bone, and the amount of cartilage. Apart from that, calcium and vitamin D are bone minerals that can maintain bone density and strength. High sodium intake is a risk factor for bone fragility, especially if it is not supported by adequate calcium intake. This occurs due to decreased calcium absorption along with increased sodium intake and absorption. The people of Madura Island are accustomed to consuming foods high in sodium because Madura Island is a salt producer.

Purpose: To determine the relationship between sodium intake, vitamin D, and calcium levels and bone strength in the people of Madura Island.

Method: The research was conducted on Madura Island, Bangkalan and Sampang Villages using cross-sectional quantitative descriptive methods. The research has received a letter of appropriate health ethics from the Faculty of Medicine, Brawijaya University. The research subjects were

fishermen, salt farmers and their families who met the inclusion criteria and signed an informed consent letter. Each subject's daily sodium intake was measured by interview using the SQ-FFQ (Semi-Quantitative Food Frequency Questionnaire), and the SQ-FFQ result data was calculated using the Nutrisurvey Indonesia application. For measuring Vitamin D levels (normal= 40-60 ng/ml) and Calcium S100 (normal= 85-102x10^6 ng/L) were measured using ELISA (Enzyme-Linked Immunosorbent Assay) while bone strength was measured via T score using a tool. Hologic Sahara Quantitative Ultrasound. Statistical analysis of this research uses the Chi-Square test.

Result: The research subjects were 107 people, consisting of women = 75 people and men = 32 people. The largest age range was 40-65 years with 66 people, BMI in the obese category = 33 people. The incidence of osteopenia (T score -2.5 to -1) = 49 people and osteoporosis (T score < -2.5) = 22 people. The highest sodium intake was above normal = 57 people. The highest value of Vitamin D levels was below normal = 73 people, and the highest level of Calcium S100 was below normal = 83 people. The results of statistical analysis between sodium intake, vitamin D levels, Calcium S100 levels and T score values are that there is a significant relationship with a *p-value* < 0.001.

Conclusion: High sodium intake can cause bone fragility by increasing the excretion of calcium and vitamin D, which causes decreased bone mineralisation. It is necessary to provide ongoing education to the people of Madura Island on how to reduce sodium intake by reducing the intake of salt or processed foods high in salt.

The role of the internet in influencing self-medication behaviours among urban residents in India – A cross-sectional study

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Purpose: The objective of the study was to understand the influence of the internet on self-medication practices amongst the laypeople residing across the three urban centres (Bengaluru, Amritsar, and Chennai).

Methodology: This cross-sectional study explores the role of the internet in influencing self-medication behaviours among urban residents in three Indian cities: Bengaluru, Amritsar, and Chennai. A web-based questionnaire was administered to adults aged 18 and above, excluding medical and allied medical students, resulting in 350 valid responses.

Results: The findings reveal that 34.5% of respondents had engaged in self-medication in the past three months, with 35.5% of them citing the internet as a source of information for self-medication decisions. The study identified the most common reasons for self-medication, such as minor ailments not necessitating a healthcare provider's consultation (36%) and the convenience of timesaving (35.4%). Internet usage was more prevalent among participants aged 21-40 years, with Bengaluru reporting the highest internet-based self-medication instances (62%). When examining the role of the Internet in self-medication, the study found that it significantly influenced decision-making in 26.7% of the cases. Participants primarily used internet search engines (87%) to gather information, with a focus on drug prices (60%) and common adverse effects (19%). Importantly, this study assessed the risk of adverse events associated with internet-based self-medication and found no statistically significant difference when compared to self-medication based on old prescriptions or advice from family and friends.

Conclusion: This study sheds light on the evolving patterns of self-medication practices in urban India, highlighting the growing role of the Internet as a source of information. While concerns about the internet's influence on self-medication exist, the study's findings suggest that it does not pose a significantly higher risk of adverse events compared to traditional sources of information. Further research on self-medication behaviours across diverse populations and regions is warranted to gain a comprehensive understanding of this prevalent healthcare practice.

Time to treatment and evidence-based medication practices among patients with Acute Coronary Syndrome (ACS): An observational study

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Introduction: Management of patients with Acute Coronary Syndrome (ACS) according to guidelines is associated with improved long-term survival and substantial survival benefits. Patients with ACS are highly sensitive to the door-to-diagnosis time and are advised to receive optimal therapy. The aim of this study, therefore, is to evaluate whether patients with ACS receive evidence-based secondary prevention treatment and assess whether the length of door-to-diagnosis time is within guidelines.

Method: This cross-sectional study was conducted on patients with ACS based on 2019-2022 data in a multicenter manner at Yogyakarta hospitals. Conformity of the secondary prevention therapy profile to the guideline is defined as the patient receiving five treatments based on the guideline

(ACEI/ARB, beta-blocker/CCB, Aspirin, P2Y12 inhibitor, and statin) at the time of hospital discharge. Door-to-diagnosis time is the time interval between when a patient arrives at the ER and a diagnosis is made. This study applied multivariate analysis to evaluate the predictive factors among patients with Acute Coronary Syndrome (ACS) who received complete recommended therapy and experienced delayed door-to-diagnose.

Results: Out of the 773 patients with ACS, the overall proportion of receiving completed recommendation therapy, as per the guidelines, was found among 15.8% (n=122) hospitalised patients with ACS. The highest prescribing adherence towards the guideline's recommendation was observed in the administration of statins, with a rate of 93.5%, while the lowest adherence was seen in the administration of ACEI/ARB, with a rate of 40.9%. Meanwhile, this study identified that the majority of patients with ACS (92.9%) encountered a delay in door-to-diagnosis. The multivariate analysis results revealed that hypertension (p-value 0.019, OR 2.331), obesity (p-value 0.013, OR 1.453) and GRACE risk score (p-value 0.008, OR 1.901) were the significant predictors among hospitalised ACS patients who received completed guideline recommendation therapy. Moreover, among hospitalised ACS patients, the GRACE risk score (p-value 0.016, OR 1.044) and the COVID-19 pandemic era (p-value 0.029, OR 1.497) were found to be significant predictors of delayed door-to-diagnosis.

Conclusion: Conformity to guidelines for secondary prevention treatment and door-to-diagnosis occurred only in a small proportion of patients. The low percentage of appropriate therapy and the high percentage of delay to diagnosis indicate that quality improvement strategies must be implemented, considering that guideline adherence in patients with ACS is extremely important to reduce Major Adverse Cardiac Events (MACEs). Understanding the underutilisation of therapy recommended by guidelines for secondary prevention among ACS patients in Indonesia requires further studies. Investigating potential errors in the hospital care of time-sensitive patients with ACS is also vital for enhancing patient outcomes.

Toolbox for Implementing Pharmacy Services (TIPS) intended for pharmacists and education

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Introduction: Implementing a professional service in pharmacy - i.e. a service integrated into practice that is routinised and institutionalised over time to achieve and maintain the expected service outcomes - is a complex process. From theory to practice, the implementers need a structured approach for strategy, planning, managing and monitoring the service during the process. The study reports on the development and evaluation of a user-friendly toolbox (named "*TIPS: Toolbox for Implementation of Community Pharmacy Services*"), which aims to guide pharmacists, managers and other pharmacy staff wishing to implement professional services in a community setting.

Method: TIPS has been developed between trainers in implementation science (including academics and service implementers) who teach the tools as part of a continuing education course for registered pharmacists. TIPS has been designed for training purposes and is not specific to any pharmacy service. Tools are derived from project and business management, as well as implementation sciences. Each tool included in TIPS has been developed and/or selected to meet the specific objective of the implementation phases (following the FISpH, Framework for the Implementation of Services in Pharmacy) and is generic enough to be adaptable for various types of services and pharmacy characteristics.

As the next step, TIPS will be evaluated and validated by a group of experts, including i) community pharmacists to ensure that TIPS meets their expectations and needs in carrying out their implementation projects; ii) pharmacy managers to ensure that TIPS helps them achieve their objectives, make the right decisions according to their environment and characteristics, and monitor key aspects such as profitability and sustainability, iii) pharmacy academics in implementation science in other Swiss universities to ensure that TIPS is helpful in the collection of research data.

Results: TIPS includes 15 methodological tools structured by implementation phases:

1) Exploration phase: stakeholders' matrix and SWOT (Strengths, Weaknesses, Opportunities, Threats) analysis, Pharm-Business Simulation tool;

2) Preparation phase: CFIR (Consolidated Framework for Implementation Research) framework, SMART (Specific, Measurable, Achievable/Ambitious, Relevant/Realistic, Time-Bound) goals, Working breakdown structure (WBS) & Product Breakdown Structure (PBS), PERT (Programme Evaluation Review Technique) diagram, GANTT diagram;

3) Testing/Operation phase: Checklist of key indicators and data source of information, PDCA (Plan-Do-Check-Act) approach, Quality and risk management;

4) Maintenance phase: Basics in clinical trials, economic evaluation and policy regulations applied to pharmacy services.

The final tool of TIPS is the formalisation of a network to encourage peer exchanges and the pooling of resources, which cuts across all phases of the implementation process. The TIPS validation process is underway.

Conclusion: TIPS can be useful as training and practical when implementing services for an independent pharmacy, a pharmacy group/chain, a professional association or researchers. The next steps, after its validation, will be to find the right format to make the tool accessible and promote its use.

Understanding how pharmacy-led health checks and vaccination service are delivered within community pharmacy: A qualitative observational case study with interviews

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Introduction: Improving the uptake of existing health checks offered by community pharmacies can help many people detect early on health risks or conditions that may not be otherwise identified through usual care. People who are identified as high risk for certain health conditions, such as cardiovascular disease, can then be promptly followed up by referral to appropriate services suggested by the community pharmacy. This could help in reducing the pressures and demands on the NHS health system. Integrating existing health checks in a more personalised way as part of a vaccination service could improve their uptake by the public.

Purpose: This study is part of a wider project developed by Aston University in partnership with the Pharmacists' Defence Association (PDA), which aims to refine the combination of health checks that can be integrated with a vaccination service at Priory Community Pharmacy in Dudley and evaluate the feasibility of such a combined service. There is still limited knowledge, however, on how the service functions, the range of health checks offered, and opportunities to deliver them. Therefore, the proposed qualitative observational study aims to explore how this service operates and staff experiences of delivering health checks alongside a vaccination service.

Method: Observations of pharmacy staff, including a pharmacy technician, locum pharmacist, lead pharmacist, pharmacy dispensing staff, and admin personnel at Priory Community Pharmacy, will be conducted weekly for over three months in June. Semi-structured interviews will also be conducted with a sample of 15 community pharmacists who are members of the PDA. Observations will be recorded as field notes, and interviews will be audio-recorded with permission. An observational structured guide and interview topic guide have been developed using the Theoretical Domains Framework (TDF). Analyses will be conducted using NVivo v14 software.

Results: The observational component of the study will highlight how health checks are being implemented at Priory Community Pharmacy and how criteria are applied to patients to identify those requiring further referral to local services. Any contextual factors identified, including, for example, local and national policies and competing or complementary similar type initiatives that might have a bearing on intervention implementation, will be discussed. Preliminary interview findings will highlight barriers, facilitators, contexts of implementation, fidelity to deliver existing checks in other contexts and views of an integrated service.

Conclusion: Extending and integrating existing community pharmacy health checks as part of a vaccination service could improve public uptake. This would help many people to detect early health risks that can be addressed with support from community pharmacies. Findings provide guidance on the optimisation of an integrated service and highlight key supporting resources for the implementation of this new way of working.

Unveiling the rituals: A phenomenological study of the medicine storage and disposal practices of households in an urban community in the Philippines

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Introduction: Medicines are essential components of healthcare, prescribed to address a specific condition or bought off-the-shelf for self-care. Often, prescription and over-the-counter medicines are changed or stopped, resulting in leftover medicines that cannot be used. They become pharmaceutical wastes. Improper storage of these medicines endangers household members from accidental or intentional ingestion, while improper disposal contributes to pharmaceutical waste pollution and opportunities for misuse by garbage scavengers. Thus, proper medicine disposal is the best option for leftover medicines in households.

Methods: This phenomenological study interviewed twenty-one unemployed mothers regarding medicine storage and disposal practices. The medicines they stored were categorised as active, unused, unwanted, and expired. An interview guide comprising open-ended questions was used to ensure the consistency of questioning during the in-depth interview. The interview was voice-recorded and transcribed verbatim. Data analysis was done through coding and clustering until data saturation was reached. Thematic analysis was employed to explore the participants' medicine storage and disposal experiences.

Findings: The participants store medicines in plastic containers or pouches placed on tables or inside cabinets. Active medicines include prescriptions that are store-bought or supplied by the community health centre and OTC cough/cold treatments, which are taken when symptoms appear. The participants often accept prescription medications from other sources as giveaways, even if not needed, believing someone else might need them. Unused, unexpired medicines are discarded due to the perception that their potency diminishes over time, even when still in sealed blister or pouch packaging. Liquid medicines are disposed of when they change physical appearance and taste. Both solid and liquid medicines are disposed of in their original packaging by putting them in plastic bags and then throwing them with common trash. Others flush down liquid paediatric medicines in the sink or toilet, and the medicine bottle is disposed of in the trash or sold for recycling. Three themes were identified from the responses: the improper practice of medicine storage and disposal, misconception about drug storage, and treatment economics.

Conclusion: Based on the findings, the misconceptions about medicine storage are the drivers of improper medicine disposal, which impacts treatment economics. The community will benefit from education campaigns focused on building knowledge of proper medicine storage, risks of improper medicine disposal, and steps in proper medicine disposal. A medicine take-back site where medicines are sorted for disposal or reclaimed as medicine donations should be put up in the community. This will enable the community to practice proper medicine disposal and, at the same time, prevent the wastage of medicines that have not expired.

Yemeni physicians' attitudes and perceived barriers toward ward-based clinical pharmacists in hospital settings

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Introduction: Clinical pharmacy services CPSs are still in their infancy in Yemen. Furthermore, pharmacists are not members of a multidisciplinary healthcare team, and their responsibilities are limited to drug dispensing and marketing. Thus, this study investigates physicians' attitudes and perceived obstacles toward clinical pharmacists working in hospitals' medical wards.

Methods: A descriptive observational study was carried out using a validated self-administered bilingual questionnaire. The study's questionnaire was conducted among physicians in three teaching hospitals. Those hospitals were at the front to establish clinical pharmacy units and embrace clinical pharmacy services.

Results: Sixty-five responses were included. These data results indicated that physicians believed the most contributions for clinical pharmacists to improve patient care was "*Attend medical rounds*" 70.8%, followed by "*Order review*". About 75% of physicians showed positive attitudes toward the clinical pharmacist role. However, more than 70% of physicians thought that clinical pharmacists should leave patient care to other healthcare members and care about drug products. There were Nine potential barriers out of 18 barriers were identified. Not enough clinical pharmacist staff

working in the health centre was considered as the top perceived barrier 83.1%; followed by clinical pharmacist responsibilities were not clearly defined" and "*clinical pharmacist recommendations are not properly documented*" in terms of enhancing physicians' general attitudes and overcoming reported barriers.

Conclusion: In Yemen, physicians appreciate the role of clinical pharmacists in direct patient care, but they prefer that clinical pharmacists focus more on drug product services such as drug information sources and patient education while limiting drug selection and treatment change for physician responsibilities.

Protocols should be established to outline how clinical pharmacists and physicians should collaborate. Inter-professional collaboration relations must be developed to overcome resistance and raise knowledge and awareness of CPS adoption among healthcare team members. Additionally, during both doctors' and pharmacists' undergraduate training programmes, a collaborative or multidisciplinary work environment needs to be supported or fostered.