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A Prospective Observational Study on Optimization of Drug Therapy in Specific Patient Population; Geriatrics and Pediatrics

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Abstract

Background: The optimization of drug therapy is crucial for improving therapeutic outcomes, especially in paediatrics and geriatrics, two populations with distinct physiological and pharmacological needs. These groups often require specialized approaches to drug therapy due to difference in their age-related changes in metabolism, organ function, and drug absorption, distribution, metabolism, and excretion (ADME) properties.

Objective

- To ensure accurate dosing in paediatrics and diseases prevalence according to their age.
- Monitor geriatrics with polypharmacy, considering and monitoring co co-morbid conditions.
- Optimizing drug therapy of paediatrics and geriatrics and monitoring their drug related problems.

Method: A prospective observational study was conducted in a hospital setting, involving optimization of drug therapy in geriatrics and paediatrics populations for 6 months in different departments. Depending on the courses of treatment, 200 patients were enrolled in the study and interviewed to record their age diagnosis, medications, and laboratory investigations. Optimization of drug therapy in the geriatrics and paediatrics was conducted during this study.

Results and Discussion

These study analysed 200 patients, including both paediatric and geriatric populations, using descriptive statistical methods. In the geriatric group (65–84 years), the mean age was 65.1 years, with an average of 1.2 comorbidities per patient. Among paediatric patients, dengue fever was the most prevalent condition (18%), while viral upper respiratory tract infections (URTI) had the lowest incidence (10%). A comparative analysis with Antoine Piau Yoann et al.'s study on elderly medication optimization revealed that among 216 patients aged 85–

90+, 61.1% had chronic diseases, and the average number of medications per patient decreased from 7.2 ± 3.3 at admission to 5.7 ± 2.7 at discharge. In our study of 100 elderly patients, antibiotics and non-steroidal anti-inflammatory drugs (NSAIDs) were the most prescribed drug classes (71–72%). These findings underscore the importance of optimizing pharmacotherapy to reduce polypharmacy risks and improve therapeutic outcomes in both paediatric and geriatric populations.

Conclusion

Our study highlights the importance of optimizing drug therapy in distinct patient populations, particularly geriatric and paediatric groups. These populations differ significantly in parameters such as age, gender, pharmacokinetics, pharmacodynamics, polypharmacy, and comorbidities. Our findings emphasize that polypharmacy and comorbid conditions in geriatric patients increase the risk of drug-related problems and adverse effects. In paediatric patients, dose optimization is crucial, as drug metabolism is influenced by factors such as body weight, body surface area (BSA), and body mass index (BMI). Implementing tailored pharmacotherapy strategies for these groups can enhance personalized medicine by considering their unique demographic and physiological characteristics, leading to more effective medication management and improved patient-centred care.

Keywords: Optimization, drug therapy, safety and efficacy, geriatrics, paediatrics

Introduction

The optimization of drug therapy is a comprehensive and systemic approach designed to enhance the therapeutic benefits of medications while reducing adverse effects and risks. This process is vital for ensuring that patients receive the most effective, safe, and personalized treatment available. The optimization of drug therapy is a fundamental aspect of contemporary healthcare, closely tied to the overall quality of patient care and health outcomes. This process extends beyond simply prescribing medications; it involves a comprehensive strategy that combines clinical expertise, patient preferences, and the latest scientific advancements. At its essence, drug therapy optimization seeks to maximize therapeutic benefits while minimizing risks, ensuring that each patient receives the most suitable treatment tailored to their circumstances.

A crucial initial step in this optimization process is performing a thorough patient assessment. This includes collecting detailed information about the patient's medical history, such as prior treatments, allergies, and any chronic conditions. Additionally, understanding the patient's lifestyle-encompassing diet, exercise, and social support plays a significant role in developing effective treatment plans. By taking these factors into account, healthcare providers can identify potential barriers to adherence and proactively address them.

Ultimately, optimizing medication therapy is about improving the total patient experience, which goes beyond simply improving clinical outcomes. A healthcare practitioner may greatly enhance adherence, patient happiness, and health outcomes by fostering a collaborative atmosphere where patients feel heard, respected, and actively involved in their treatment decisions. The emphasis on individualized, evidence-based medication therapy will continue to be crucial as the field develops to provide the greatest outcomes for patients, changing the way healthcare is delivered and guaranteeing that each patient receives the best care possible.

Objectives

- To ensure accurate dosing in paediatrics and diseases prevalence according to their age.

- Monitor geriatrics with polypharmacy, considering and monitoring co co-morbid conditions.
- Optimizing drug therapy of paediatrics and geriatrics and monitoring their drug related problems.

Methodology

Study Design

Type: A prospective study was conducted on optimization of drug therapy in a specific patient population

Study Period: Six Months

Sample Size: 200 Patients

Study Criteria

Inclusion Criteria

- Geriatric patients (age more than 60 years), paediatric patients, and open (age birth to less than 18 years).
- Patients with relevant comorbid conditions (for example, diabetic in a patient with cardiovascular diseases), where polypharmacy or complex struck interactions need to be consider , mostly in geriatric patients.
- Patients experiencing challenges like poor adherence, drug interactions, side effects, or difficulty with drug dosing.
- Patient who are willing to provide informed consent.

Exclusion Criteria

- Patient with unknown hypersensitivity or contraindications to the drug are being consider for optimization.
- Patient who are already on a regimen with significant drug-drug interactions that may complicate the optimization process.
- Patient who cannot reliably follow the therapeutic plan due to cognitive impairments.
- Pregnant women.

Results

Gender Distribution:(geriatric population)

Table 1: Distribution of patients based on gender:

Gender	Percentage (%)
Males	43%
Females	66%

Graph 1:

Age Distribution

Table 2: Distribution of patients based on age

Age Groups	Percentage **(%)**
60-70	32%
71-80	16%
81-90	4%

Graph 2:

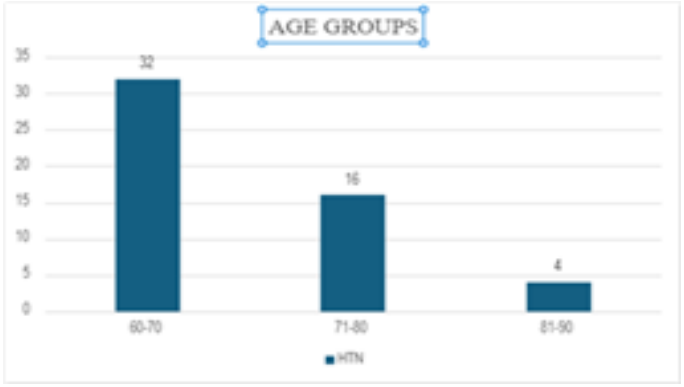
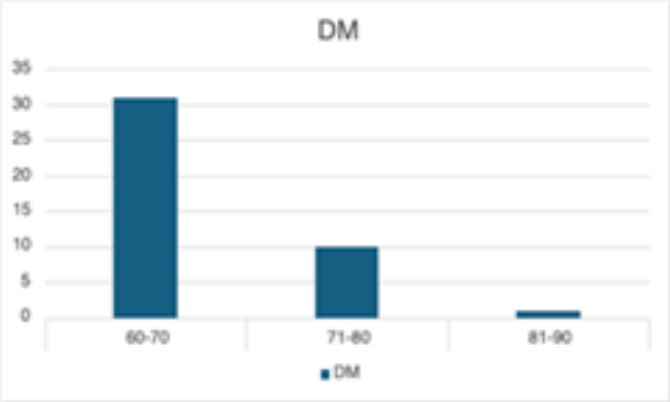


Table 3: Distribution based on Diagnosis [DM]

Age Groups	Percentage (%)
60-70	30%
71-80	10%
81-90	0.5%

Graph 3:

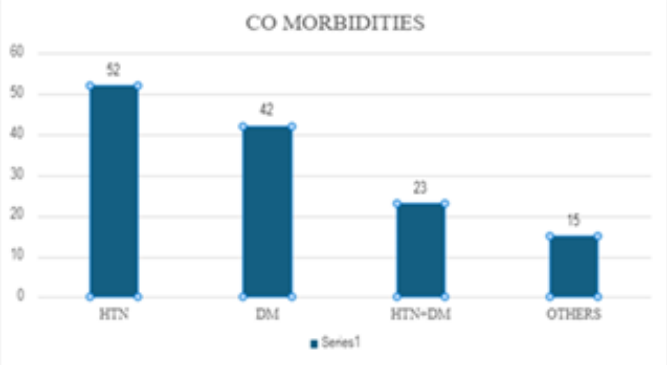


Comorbidities

Table 4: Distribution of patients based on comorbidities

Age Groups	HTN	DM	Other	HTN+DM	HTN+DM+ Others
60-70	32%	31%	11%	14%	2%
71-80	16%	10%	3%	8%	1%
81-90	4%	1%	1%	1%	0%

Graph 4:



Prescribing Patterns In The Geriatric Population

Table 5: Percentage of Antibiotics Prescribed in Geriatric Population.

Antibiotics Prescribed	Percentage (%)
Penicillin	18%
Cephalosporin	50%
Metronidazole	5%
Other antibiotics	23%

Graph 5:

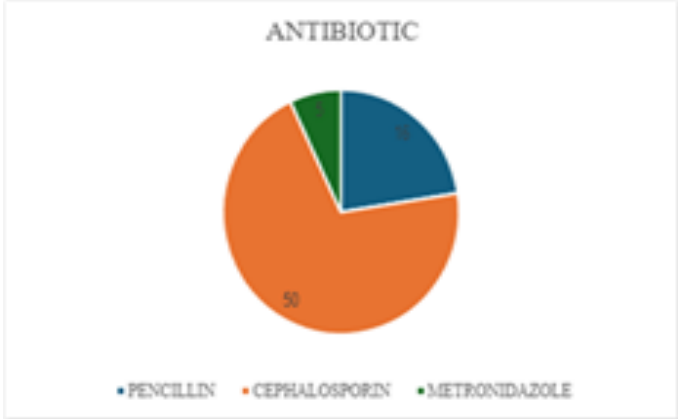


Table 6: Percentage of anti-hypertensive prescribed in geriatrics

Anti-hypertensive Prescribed	Percentage (%)
AR blocker	23%
CC Blocker	25%
Beta blocker	2%
Diuretic	5%
Others	45%

Graph 6:

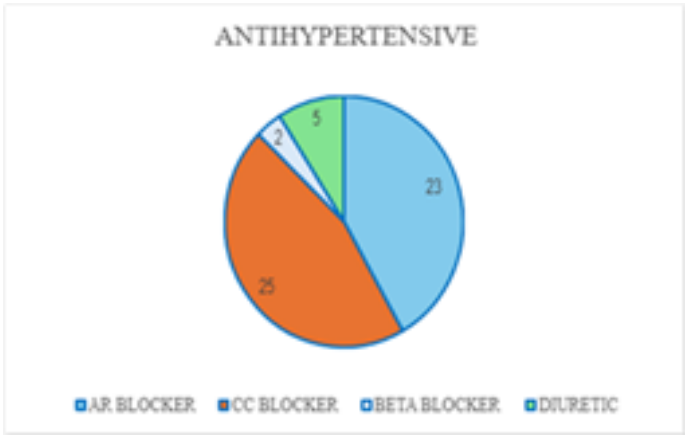


Table 7: Percentage of Antidiabetic prescribed in geriatrics

Antidiabetics prescribed	Percentage (%)
Biguanides	29%
Sulfonylurea	10%
H insulin	9%
Others	52%

Graph 7:

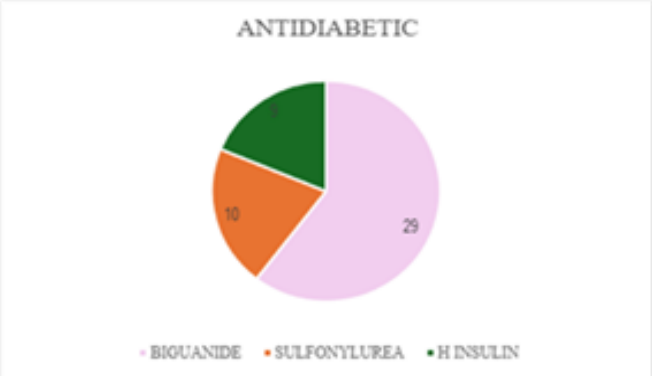


Table 8: Percentage of Analgesic prescribed in geriatrics

Analgesic prescribed	Percentage (%)
NSAIDS	69%
OPOID	13%
Others	18%

Graph 8:

Polypharmacy

Table 9: Distribution based on class of medications in geriatrics

Antibiotic	71%
Anti-HTN	55%
Anti-DM	48%
Analgesic	72%

Graph 9:

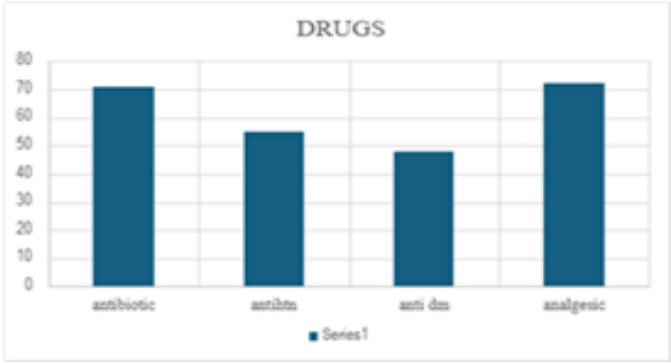
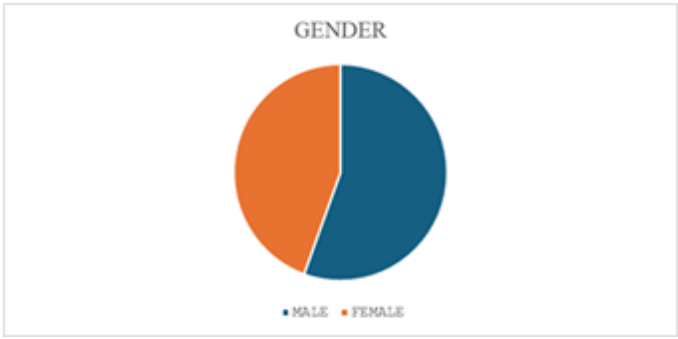


Table 10: Distribution of Patients Based On Gender In Pediatrics

Gender	Percentage
Male	55%
Female	44%

Graph 10:

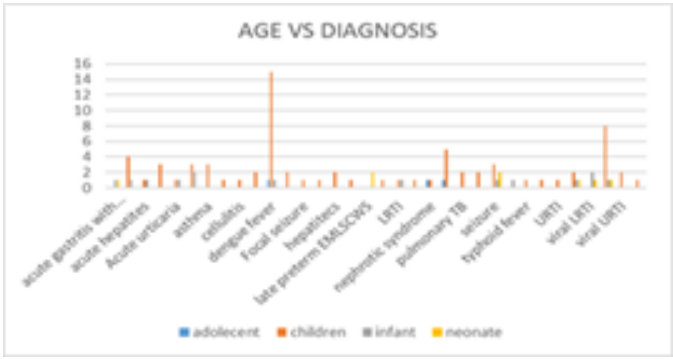


Age Groups In Pediatric Population

Table 11: Distribution of patients based on age groups

Age groups	Diagnosis
Adolescent	Dengue fever
Children	Pulmonary TB
Infant, Neonates	URTI

Graph 11:

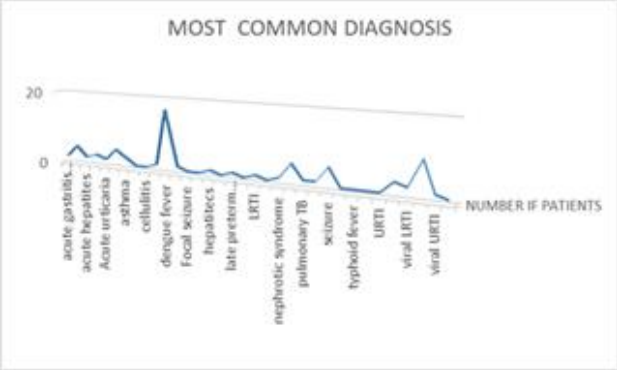


Disease Prevalence of the Pediatric Population

Table12: Distribution based on disease prevalence

Disease Prevalence	Percentage (%)
Dengue fever	18%
Viral URTI	10%

Graph 12:

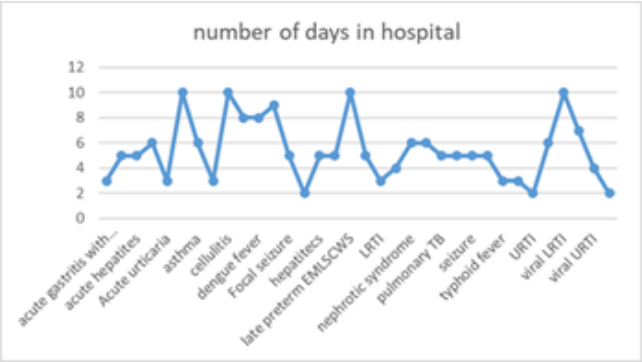


Number of Days Stay in Hospital in Pediatric Population

Table 13: Number of days in hospital stay per diagnosis

Diagnosis	**Number of days in hospital stay**
Pulmonary TB, Seizures	8 to 10 days
Asthma, cellulitis, dengue fever, nephrotic syndrome, LRTI, URTI	Around 4 to 6 days
Acute Urticaria	Approximately 2 days or less.

Graph 13:

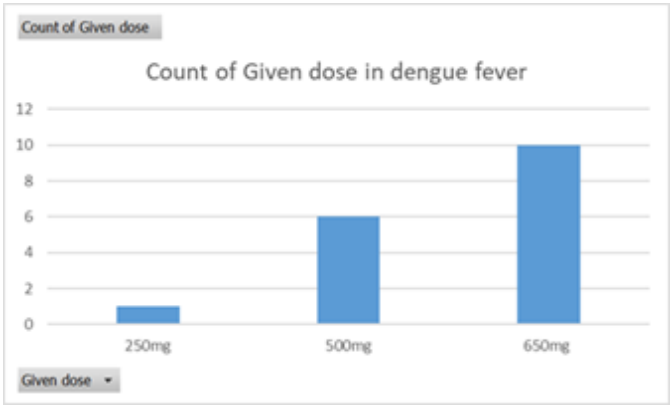


Dosing In Pedaitic Population

Table 14: Distribution of patients based on dosing

Given dose	Percentage (%)
250mg	5%
500mg	42%
650mg	56%

Graph 14:

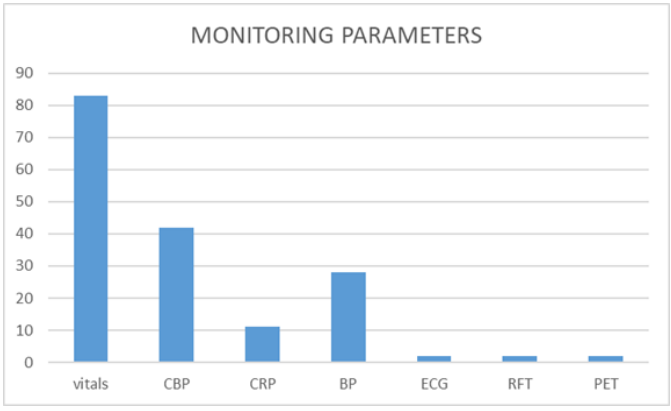


Monitoring Parameters

Table 15: Distribution of patients based on monitoring parameters

Monitoring parameters	Percentage (%)
Vitals, CBP	80-90%
RFT, PET, ECG	1-2%

Graph 15:



Discussion

In our study optimization of drug therapy in specific populations both pediatrics and geriatric population. In geriatrics age groups between 60-70 yrs (30-40%) and followed by pediatrics early adolescents of around 12-

14yrs (18-20%) have higher disease prevalence in a 200-patient population.

According to a study by Antonie Piau Yoann et al. on the optimization of medication therapy in elderly patients admitted to a geriatric unit, 216 patients aged 85 to 90+ had 133 (61.1%) chronic disease conditions. The average number of drugs at admission (7.2+_3.3) and at discharge (5.7+_2.7) was also covered in the study. In a sample of 100 elderly patients, our study found that the most often prescribed drug classes are antibiotics and non-steroidal anti-inflammatory drugs (71–72%).

The study on the optimization of health transformation plan by DUR in pediatric teaching hospital by P ARISA SAIYARSAI ET AL highlights the frequency of inappropriate prescriptions but our study emphasized the dosage adjustment in the specific pediatric population (100) high preferred doses for dengue fever is approximately 650mg least is 250mg.

The study of Paul Crawford et al discussed there is a reduction in polypharmacy and an improvement in medication appropriateness. Our study concluded that polypharmacy has increased incidence in the geriatric population and analgesic, antibiotics class (70-72%) monitoring and optimization is required in geriatric patients.

The study of Zhiwei Lui et al used a pharmacokinetic model for the rational use of drugs in the 12-14 age group early adolescents in combination with carbamazepine therapy for seizures in the absence of drug interactions are higher. This study limits the challenges and dosage accuracy In our study a population of about 200 patients approximately in the pediatric age group the early adolescent has a high disease prevalence of dengue fever (18%) and monitoring is essential for optimized drug therapy in the pediatric population for overall patient-centered care.

Conclusion

Our study highlights the importance of optimizing drug therapy in distinct patient populations, particularly geriatric and paediatric groups. These populations differ significantly in parameters such as age, gender, pharmacokinetics, pharmacodynamics, polypharmacy, and comorbidities. Our findings emphasize that polypharmacy and comorbid conditions in geriatric patients increase the risk of drug-related problems and adverse effects. In paediatric patients, dose optimization is crucial, as drug metabolism is influenced by factors such as body weight, body surface area (BSA), and body mass index (BMI). Implementing tailored pharmacotherapy strategies for these groups can enhance personalized medicine by considering their unique demographic and physiological characteristics, leading to more effective medication management and improved patient-centred care.

References

1. Shalini S. Lynch P. drug effectiveness and safety [Internet]. 2022 [cited 2025 Feb 5]. Available from: https://www.merckmanuals.com/professional/clinical-pharmacology/concepts-in-pharmacotherapy/drug-efficacy-and-safety
2. Samara C, Garcia A, Henry C, Vallotton L, Cariolato L, Desmeules J, et al. Safety Surveillance During Drug Development: Comparative Evaluation of Existing Regulations [Internet]. Vol. 40, Advances in Therapy. Adis; 2023 [cited 2025 Feb 5]. p. 2147–85. Available from: https:// pmc.ncbi.nlm.nih.gov/ articles/PMC10075498/
3. L J Lesko SS. Individualization of Drug Therapy: History, Present State, and Opportunities for the Future. 2012 Sep 5 [cited 2025 Feb 5]; Available from: https://ascpt.onlinelibrary.wiley.com/ doi/ 10. 1038/clpt.2012.113

4. Tisdale RL, Ma I, Vail D, Bhattacharya J, Goldhaber-Fiebert JD, Heidenreich PA, et al. Availability of Cost-effectiveness Studies for Drugs with High Medicare Part D Expenditures. Annu Rev Plant Biol [Internet]. 2021 Jun 18 [cited 2025 Feb 5];4(6). Available from: https://jamanetwork.com/journals/jamanetworkopen/fullarticle/2781189
5. Vinther S, Christensen M, Christensen HR. The importance of convenience for patient adherence to drug treatments – an overview of secondary Literature. Clin Ther [Internet]. 2015 Aug [cited 2025 Feb 5];37(8):e95–6. Available from: https://www.clinicaltherapeutics.com/action/showPdf?pii=S0149-2918%2815%2900581-0
6. Babu BK. Personalized Medicine and Advancements in Pharmacology: Shaping the Future of Healthcare. Int J Pharm Investig [Internet]. 2024 Apr 2 [cited 2025 Feb 5];14(2):338–42. Available from: https://jpionline.org/article/33114/
7. Sadee W, Wang D, Hartmann K, Toland AE. Pharmacogenomics: Driving Personalized Medicine [Internet]. Vol. 75, Pharmacological Reviews. American Society for Pharmacology and Experimental Therapy (ASPET); 2023 [cited 2025 Feb 5]. p. 789–814. Available from: https://pmc.ncbi.nlm.nih.gov/articles/PMC10289244/
8. Su J, Yang L, Sun Z, Zhan X. Personalized Drug Therapy: Innovative Concept Guided With Proteoformics. Molecular and Cellular Proteomics [Internet]. 2024 Mar 1 [cited 2025 Feb 5];23(3). Available from: https://pmc.ncbi.nlm.nih.gov/articles/PMC10950891/
9. Marques L, Costa B, Pereira M, Silva A, Santos J, Saldanha L, et al. Advancing Precision Medicine: A Review of Innovative In Silico Approaches for Drug Development, Clinical Pharmacology and Personalized Healthcare [Internet]. Vol. 16, Pharmaceutics. Multidisciplinary Digital Publishing Institute (MDPI); 2024 [cited 2025 Feb 5]. Available from: https://www.mdpi.com/1999-4923/16/3/332
10. Integration of CMM into Practice PERSPECTIVE [Internet]. 2021 [cited 2025 Feb 5]. Available from: https://pmc.ncbi.nlm.nih.gov/articles/PMC8845520/pdf/ahdb-14-111.pdf
11. personalised medicine [Internet]. [cited 2025 Feb 5]. Available from: https://en.wikipedia.org/ wiki/ Personalized_medicine
12. four guiding principles for medicine optimisation. [cited 2025 Feb 5]; Available from: https://pduk.net/article/23/Four_guiding_principles_for_medicines_optimisation