Review Article

Assessment of medication errors during prescription review at a community pharmacy

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Abstract

Prescription review and evaluation is a critical process in community pharmacies, ensuring patients receive the correct medication, dosage, and timing. This process aims to prevent medication misuse and promote the rational use of drugs. Community pharmacies stock and dispense medicines with valid prescriptions, and in some cases, legally without a prescription, while also providing professional services to improve patient health. Pharmacists play a vital role in ensuring patient safety within this setting. A recent evaluation of 319 prescriptions was conducted based on parameters such as date, patient name and age, superscription, Signatura, inscription, subscription, prescriber signatures, renewal instructions, registration number and address, and drug differentiation by pharmacological class, including disease evaluation.
Prescription errors in community pharmacies can arise from incorrect instructions regarding drug identity, dosage information, or duration of administration.

1. Introduction

Community pharmacies play a vital role in local healthcare by providing accessible pharmacy services. These pharmacies dispense medications under the supervision of registered pharmacists, who use their expertise to ensure professional service.

Community pharmacies deal directly with the public, taking on responsibilities such as compounding, counseling, and the careful, accurate, and legal dispensing of prescription drugs. As the most accessible healthcare professionals, community pharmacists also supply medications in accordance with prescriptions or, where legally allowed, offer over-the-counter drugs.[1-3]

It's important to note that prescription errors can occur for various reasons, potentially harming patients. Some sources of error include:

1. **Illegible handwriting:** Poorly written 10p10r10e10s10c10r10i10p10t10i10o10n10s10 10c10a10n10 10l10e10a10d10 10t10o10 10m10i10s10i10n10terpretations by pharmacists or patients. For example, "5 mg" could be misread as "50 mg.

2. **Abbreviation confusion:** Using abbreviations without clear context can also cause misinterpretations. For instance, "qd" (once a day) might be confused with "qid" (four times a day).
   Look-alike, sound-alike Medic4ations with similar names or packaging can be easily mixed up. A common example is confusing "Celebrex" with "Celexa.

3. **Incorrect dosage or frequency:** Prescribing the wrong dose or frequency can result in inadequate treatment or adverse effects, such as prescribing a medication twice daily instead of once daily.

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4. **Incomplete patient information:** Insufficient knowledge of a patient's medical history, allergies, or current medications can lead to inappropriate prescriptions.
5. **Lack of clear instructions:** Vague instructions, like "Take as directed" without specifying dosage or frequency, can cause confusion.

To minimize these errors, healthcare professionals should remain vigilant. Technology such as electronic prescribing systems can be helpful in reducing these risks.

1.1. Some examples of prescription errors found during screening prescription[4-7]

Community pharmacists play a crucial role in verifying the legality, safety, and appropriateness of prescriptions. They check the patient's medication record before dispensing and ensure that medication quantities are dispensed accurately.

1. **Wrong dose:** A 3-year-old patient, weighing 10 kg, was prescribed Ceftriaxone 250 mg IV BID instead of the correct dose of 500 mg IV BID for meningitis treatment.
2. **Incomplete prescription:** A prescription for paracetamol suppositories was missing essential information about the dose, frequency, and route of administration.
3. **Inappropriate indication:** A patient was prescribed both Dexamethasone 8 mg IV stat and dexamethasone 8 mg IV QID for 3 days for severe croup, even though dexamethasone 8 mg QID for 3 days was unnecessary.
4. **Wrong dosage form:** Amoxicillin syrup 125 mg/5 ml was prescribed instead of the correct dosage form, which is a suspension.
5. **Wrong frequency:** Ampicillin 30 mg intravenously was prescribed four times a day instead of the correct frequency of twice a day for a one-day-old baby.

2. Prescription Evaluation and Review Offers Several Key Benefits for Government Organizations

2.1. Public health monitoring

Enables monitoring of health trends and identification of emerging public health issues, facilitating proactive responses.

2.2. Cost control

Provides insights into healthcare utilization patterns, supporting informed decisions on resource allocation and cost-effective strategies.

2.3. Regulatory compliance

Helps ensure adherence to healthcare regulations, reducing fraud, waste, and abuse in government programs.

2.4. Evidence-based policy

Supports data-driven policy decisions to improve healthcare delivery, accessibility, and outcomes.

2.5. Drug Safety Monitoring

Allows tracking of medication safety and efficacy, aiding in the identification and management of potential risks.

2.6. Disease surveillance

Assists in tracking disease prevalence, enabling timely interventions and control measures.

2.7. Optimizing Health Programs

Informs the development and enhancement of health programs to effectively address prevalent health issues.

2.8. Resource planning

Supports planning for healthcare infrastructure, workforce, and medication supply based on prescription trends. These insights can be used to identify opportunities for improvement and develop benchmarks at the facility, district, state, and national levels. In summary, prescription evaluation and review contribute to a more efficient, cost-effective, and responsive healthcare system, benefiting both the government and the general population.

During a prescription review and evaluation for a review article, the insights gained can be valuable to government entities in areas such as:

1. Policy Development
2. Healthcare Resource Allocation
3. Public Health Initiatives
4. Drug Pricing and Reimbursement
5. Regulatory Oversight

3. Objectives[8-10]

Social and preventive pharmacy plays a vital role in prescription evaluation and review, with the primary objective of promoting public health and preventing diseases. Here's how it can be beneficial:

3.1. Community health awareness

It emphasizes community education, raising awareness about health issues, preventive measures, and proper medication use, leading to more informed prescription choices by both healthcare providers and patients.

3.2. Promoting rational drug use

Initiatives ensure medications are prescribed and used appropriately to maximize therapeutic benefits and minimize risks by educating healthcare professionals and the public on the importance of rational drug use.

3.3. Preventing medication errors

By promoting patient education and awareness, efforts contribute to reducing medication errors, improving adherence, and preventing adverse drug reactions, aligning with the goal of ensuring the safety and effectiveness of prescribed medications.

3.4. Lifestyle modification support

Interventions often focus on encouraging lifestyle modifications and preventive health measures. This can influence prescription patterns by emphasizing non-pharmacological approaches and reducing the reliance on medications when lifestyle changes can be effective.

3.5. Health promotion campaigns

Initiatives may involve campaigns promoting healthy behaviors, vaccination awareness, and disease prevention. These efforts contribute to a healthier population and can influence prescription practices by addressing the root causes of certain health issues and reduce the irrational usage of antibiotics, syrups, injections, etc.

3.6. Collaboration with healthcare providers

Professionals collaborate with healthcare providers to implement preventive strategies, including continuous education, training, and feedback loops, which influence prescription practices and channelize the good practice of writing complete, legible, and rational prescriptions by the service providers.

4. Role of Pharmacist[11-14]

Pharmacists play a crucial role in promoting public health within social and preventive pharmacy, contributing in several key areas:

1. **Health Education:** Educating the community on preventive measures, medication adherence, and lifestyle choices to improve overall health.
2. **Immunization Programs:** Actively participating in vaccination campaigns to ensure widespread immunization and disease prevention.
3. **Community Health Initiatives:** Engaging in community outreach programs, offering health screenings, counselling, and information to address public health concerns.
4. **Medication Management:** Promoting rational drug use and ensuring proper medication adherence to help prevent adverse drug reactions and enhance treatment outcomes.
5. **Collaboration with Healthcare Providers:** Collaborating with other healthcare professionals to develop and implement preventive healthcare strategies.
6. **Public Health Advocacy:** Advocating for policies and initiatives that enhance public health, contributing their expertise to health-related discussions and decision-making.
7. **Emergency Preparedness:** Playing a role in planning and responding to public health emergencies, ensuring the availability of essential medications and providing guidance on their use.

Overall, pharmacists in social and preventive pharmacy work towards improving community health outcomes through education, prevention, and active involvement in public health initiatives.

This review aims to identify the role of pharmacists and its benefits to the government, also highlighting the significant role of social and preventive pharmacy in prescription evaluation. The primary objective of this review is to offer insights that can guide healthcare professionals, policymakers, and researchers in improving prescription practices, fostering patient safety, and advancing the quality of healthcare delivery by providing a comprehensive synthesis of existing literature and summarizing key findings related to prescription errors. It also seeks to analyze patterns, contributing factors, and interventions for reducing errors in medication prescribing.[15]

5. Here's a Breakdown of Prescriptions and Their Key Parameters

A prescription is essentially an order from a physician or qualified medical practitioner to a pharmacist. This order directs the pharmacist to prepare and dispense a specific medication tailored for an individual patient. Along with the medication itself, the prescription includes essential instructions for both the pharmacist and the patient on proper usage.[16]

5.1. Key parameters of a typical prescription include

Prescriptions are generally written in a typical format which is usually kept as pads Date, Name, Age, Sex and Address of the patient, Superscription, Inscription, Subscription, Signatura, Renewal Instruction, Signature, Address and Registration Number of the Prescriber.

6. Materials and Methods[16-19]

6.1. Study design

This study is an observational, retrospective audit designed to assess the quality, appropriateness, and compliance of prescriptions within a clinical setting.

6.2. Audit objectives

Assess the prescribing patterns of healthcare providers. Evaluate adherence to clinical guidelines and standards. Identify areas for improvement in prescription practices. Ensure patient safety and optimize therapeutic outcomes.

6.3. Audit population

This audit includes all prescriptions issued within a defined period at a specific clinical setting, such as a hospital, outpatient clinic, or pharmacy.

6.4. Audit duration

The audit period should be clearly defined, typically ranging from several months to a year. For example, the audit may cover prescriptions from June to September 2023.

6.5. Data collection

Source of Data: Data is collected from medical records, pharmacy databases, or prescription logs.

Sample Selection: Select a representative sample of prescriptions for review. This can be done through random sampling or by including all prescriptions within the audit period.

6.6. Data extraction

Extract relevant information from each prescription, including:
Prescriber details (designation, specialty)
Patient demographics (age, gender)
Medication details (name, dosage, frequency, duration)
Indication for the medication
Adherence to clinical guidelines and protocols

6.7. Data analysis

Use descriptive statistics to summarize prescribing patterns, including the frequency of medications prescribed and common drug classes.

6.8. Compliance assessment

Compare the prescriptions against established clinical guidelines to assess compliance. Identify deviations and categorize them based on their potential impact on patient safety and treatment efficacy.

6.9. Identification of trends

Identify significant trends or patterns in prescribing practices, such as overuse of certain medications, under-prescribing of recommended treatments, or variations among different prescriber types.
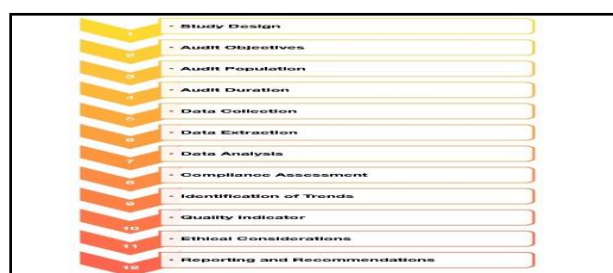
6.10. Quality Indicators

Evaluate key quality indicators, such as:
Percentage of prescriptions adhering to clinical guidelines
Incidence of prescribing errors (e.g., incorrect dosage, drug interactions)

6.11. Ethical considerations

This study will be conducted in accordance with ethical standards for observational research. No interventions will be made by the researchers, and patient consent is not required as the study involves retrospective analysis of existing pharmacy records. The confidentiality and privacy of patient information will be strictly maintained.

6.12. Reporting and Recommendations

1. Results Presentation: Summarize the findings in a detailed report, highlighting key observations, trends, and compliance levels.
2. Recommendations: Provide actionable recommendations to improve prescribing practices, enhance adherence to guidelines, and ensure patient safety. Recommendations may include targeted educational interventions, updated clinical protocols, or enhanced monitoring systems.
3. Dissemination: Share the audit findings and recommendations with relevant stakeholders, including healthcare providers, clinical managers, and policymakers, to facilitate informed decision-making and practice improvements.

7. Results

Overall, from the 319 prescriptions collected from the community pharmacy and found errors based on the prescription parameters. The details are as follows:

1. Inscription and Subscription: 100% of prescriptions included this information.
2. Date: 91.53% of prescriptions included the date.
3. Name: 86.20% of prescriptions included the patient's name.
4. Age: 70.84% of prescriptions included the patient's age.
5. Sex: 72.72% of prescriptions included the patient's sex.
6. Weight: 67.71% of prescriptions included the patient's weight.
7. Superscription: 76.80% of prescriptions included this information.
8. Signatura: 95.61% of prescriptions included this information.
9. Prescriber Information: 78.68% of prescriptions included the prescriber's signature, registration number, and address.
10. Renewal Instructions: Only 6.26% of prescriptions included renewal instructions.
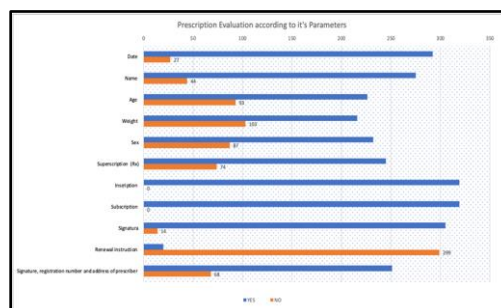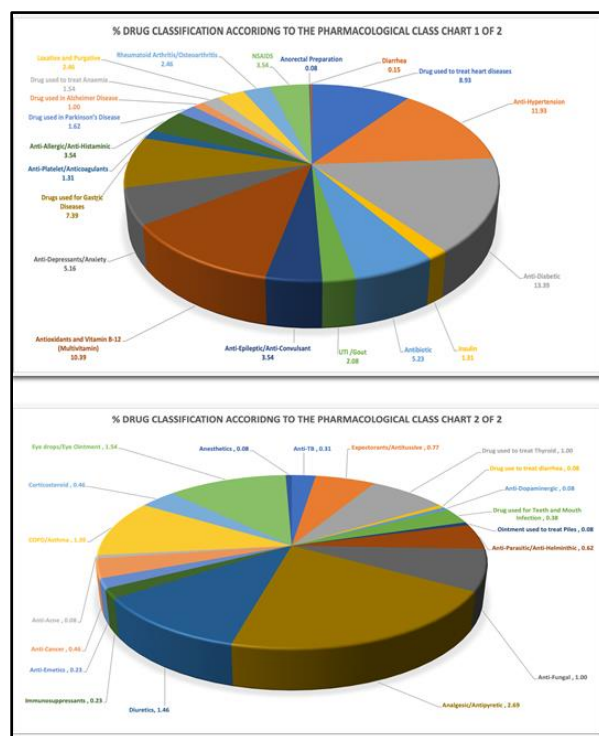

Figure 1: Prescription evaluation according to its parameters

7.1. Drug classification according to its pharmacological class

Based on evaluation, various diseases had (Diabetes, Heart related diseases, Hypertension) the most prescribed drugs according to their pharmacological class.

Following the Differentiation of the 1299 Drugs By Pharmacological Class, Here's A Breakdown of The Most Prescribed Categories:

1. Anti-Diabetic Drugs: 174
2. Drugs for Heart Disease: 116
3. Anti-Hypertensive Drugs: 155
4. Insulin: 17
5. Antibiotics: 68
6. UTI/Gout Medications: 27
7. Anti-Epileptic/Anticonvulsant Drugs: 46
8. Antioxidants/Multivitamins: 135
9. Antidepressants/Anti-Anxiety Drugs: 67
10. Gastric Disease Treatments: 96
11. Anti-Platelet/Anti-Coagulant Drugs: 17
12. Anti-Allergic/Anti-Histaminic Drugs: 46
13. Parkinson's Disease Treatments: 21
14. Alzheimer's Disease Treatments: 13
15. Anemia Treatments: 20
16. Laxatives and Purgatives: 32
17. Rheumatoid/Osteoarthritis Treatments: 32

7.2. Summary of the drug categorization results:

1. Non-Steroidal Inflammatory Drugs (NSAIDs): 46 drugs
2. Anorectal Preparations: 1 drug
3. Anti-Diarrheal Drugs: 3 drugs
4. Anti-Tuberculosis (TB) Drugs: 4 drugs
5. Expectorants/Anti-Tussive: 10 drugs
6. Drugs to Treat Thyroid Issues: 13 drugs
7. Anti-Dopaminergic Drugs: 1 drug
8. Drugs for Teeth and Mouth Infections: 5 drugs
9. Ointments to Treat Piles: 1 ointment
10. Anti-Parasitic/Anti-Helminthic Drugs: 8 drugs
11. Anti-Fungal Drugs: 13 drugs
12. Analgesic/Antipyretic Drugs: 35 drugs
13. Diuretics: 19 drugs
14. Immunosuppressant's and Anti-Emetics: 3 drugs
15. Anti-Cancer Drugs: 6 drugs
16. COPD/Asthma Drugs: 18 drugs
17. Corticosteroïd: 6 drugs
18. Eye Drops/Eye Ointment Preparations: 20 drugs
19. Anti-Acne/Anesthetic DrugsAnti-1 drug

Overview of quality improvement cycle for prescription audit

Figure 2: Prescription evaluation according to its pharmacological class
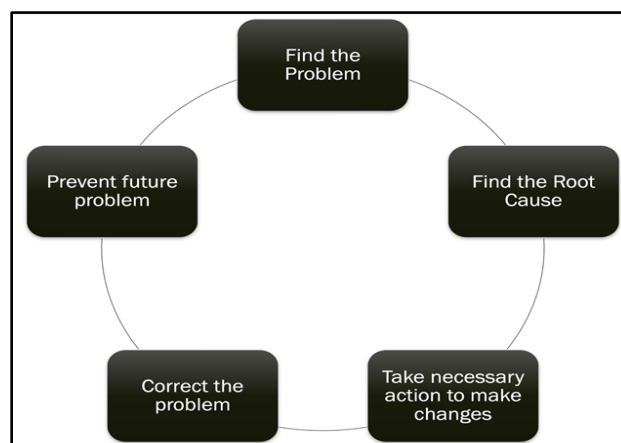
Figure 3: Overview of quality improvement cycle

8.   Discussion

A prescription error stems from a flaw in the prescription writing process, leading to incorrect instructions for one or more standard elements [21-25]. Common sources of errors include Abbreviations, Drug names, Preparation strength, Dosage form, Dose and Patient instructions and incompatibilities.

To ensure patient safety and accuracy, it's important to pay close attention to the following aspects when processing prescriptions:

9. Abbreviations

Due to the potential for misinterpretation, pharmacists should exercise caution when interpreting abbreviations in prescription orders, avoiding any guesswork when an abbreviation is ambiguous. For example, dispensing Achromycin for "Achro" could be problematic if the prescriber intended Achrostatin.

Drug Names- Be aware of drugs with similar names (look-alike/sound-alike) such as Digoxin/Digitoxin and Prednisone/Prednisolone. Preparation Strength- When a prescription is received without a specific strength, pharmacists should not assume. For instance, if a prescription for Paracetamol Tablet is received without a specified strength, it would be incorrect to dispense Paracetamol Tablet 500mg.Dosage Form- To avoid ambiguity, prescriptions should always include the dosage form (e.g., liquid, tablet, capsule, suppository), especially since many medications are available in multiple forms. Dose- Pharmacists should verify any unusually high or low doses with the prescribig physician. Pediatric dosages, in particular, require careful consultation of pediatric posology references to prevent errors. Additionally, double-check the frequency of administration, especially for sustained-release formulations. Patient Instructions- Ensure that complete instructions are provided, including the quantity of the drug, frequency and timing of administration, and route of administration. Incompatibilities- Before dispensing, always check for potential pharmaceutical or therapeutic incompatibilities and drug interactions. For example, some antibiotics should not be taken with meals due to decreased absorption.

9.1. WHO core prescribing indicators[25]

The WHO Core Prescribing Indicators are designed to evaluate performance in key areas related to rational drug use.

These indicators include:
Prescribing indicators- Average number of drugs per encounter, percentage of drugs prescribed by generic name, percentage of encounters with an antibiotic prescribed, percentage of encounters with an injection prescribed, and percentage of drugs prescribed from essential medicine list or formulary. Patient care indicators- Average consultation time, average dispensing time, percentage of drugs actually dispensed, percentage of drugs adequately labeled, and patients' knowledge of correct dosage. Facility indicators- Availability of a copy of the essential drugs list or formulary and availability of key drugs.

10. Conclusion

Following a comprehensive review and evaluation, the current prescription demonstrates both strengths and areas needing improvement. While the prescribed medications effectively manage symptoms and chronic conditions in alignment with the patient's diagnoses, I've identified concerns regarding potential drug interactions, suboptimal dosages, and duplicate therapies. To optimize the prescription, it is recommended to- Adjust dosages where necessary, discontinuing redundant therapies, implementing a holistic approach to medication management, considering the patient's age, comorbidities, and lifestyle. A comprehensive follow-up plan will be crucial to monitor the patient's response and make further adjustments. Addressing these concerns and tailoring the prescription to the individual's needs will enhance therapeutic outco74es and improve the patient's overall quality of life. The insights from prescription reviews and evaluations can empower governments to make informed decisions that promote public health, optimize resource utilization, and ensure access to safe and effective medications.

10.1. Expected outcomes[26-28]

The expected outcomes of these guidelines are to assist health facilities in conducting prescription audits, which will:

Help public healthcare providers analyze and interpret prescription audit results and offer feedback to service providers.

Improve the quality of prescriptions at public health facilities. Promote the rational use of drugs. Reduce prescription errors, thereby enhancing patient safety. Lower treatment costs by minimizing unnecessary prescriptions (e.g., antibiotics), encouraging the efficient use of therapeutic agents and generic medicines, and reducing polypharmacy. Improve the overall Quality of Care (QoC).

10.2. What happen when brands have similar name but different ingredients?

In the competitive landscape of consumer products, brands often face the challenge of having similar names. This can lead to consumer confusion, especially when the ingredients differ significantly, which has various implications for brand identity, consumer trust, and market positioning.

Consider two brands named "Nutri Bar." One might offer a protein bar made primarily from whey protein and natural sweeteners, while the other could produce a vegan alternative using pea protein and agave syrup. Despite the similar names, the differing ingredients cater to distinct consumer preferences and dietary restrictions. Consequently, consumers might mistakenly purchase the wrong product, potentially resulting in dissatisfaction or even health risks for those with allergies or specific dietary needs.

The brand with more favorable ingredients may gain a competitive edge, as consumers increasingly seek transparency and health-conscious options. Therefore, it is crucial for brands to establish a clear identity and eff74ctively communicate their unique selling propositions to avoid confusion and build lasting consumer relationships.

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12. Conflict of Interest

None.

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