Content available at: https://www.ipinnovative.com/open-access-journals

Indian Journal of Pharmacy and Pharmacology

Journal homepage: https://www.ijpp.org.in/

Original Research Article

Assessing prescribing practices in a rural hospital: A cross-sectional study using WHO prescribing indicators

Jijo P. Abraham[1]*, **Reena R. Giri**[1], **Kavita M. Jaiswal**[1]

[1]*Govt Medical College, Akola, Maharashtra, India*

ARTICLE INFO

Article history:
Received 19-03-2024
Accepted 23-03-2024
Available online 07-05-2024

Keywords:
Prescribing practices
WHO prescribing indicators
Rural hospital
Polypharmacy
Generic prescribing
Antibiotic use

ABSTRACT

Introduction: This cross-sectional study aims to assess the prescribing practices of physicians at a rural hospital in Western India, focusing on adherence to WHO prescribing indicators. The main research question addressed the extent of alignment with optimal prescribing standards.
Aims & Objectives: 1: Evaluate prescribing patterns in a rural hospital using WHO indicators. 2: Assess alignment with WHO standards and identify areas for improvement. 3: Understand demographic influences on prescribing. 4: Provide insights for optimizing rural healthcare delivery.
Materials and Methods: A prospective, descriptive, cross-sectional approach was employed in the outpatient department of the rural hospital. A total of 604 prescriptions were sampled over two months, and data were collected using a random sampling method. The study followed ethical standards, and prescriptions were analyzed for demographic characteristics, prescribing patterns, and adherence to WHO indicators.
Result: The average number of drugs per prescription was 3.5, indicating a tendency towards polypharmacy. While 86% of drugs were prescribed generically, the study revealed areas of suboptimal adherence to WHO prescribing indicators, including antibiotic prescriptions (29%) and injectable use (50%). The analysis also highlighted disparities in prescribing patterns based on gender and age.
Conclusion: The study provides valuable insights into prescribing practices in a rural healthcare setting, emphasizing the need for interventions to streamline prescriptions and enhance adherence to global standards. The identified areas for improvement include addressing polypharmacy, promoting generic prescribing, and optimizing antibiotic and injectable use.

1. Introduction

Various therapeutic approaches, including medication, surgery, psychiatric treatment, radiation, physical therapy, health education, counseling, further consultation (second opinion), and no therapy, offer a spectrum of options for addressing health concerns.[1] Amidst these choices, the prescription, derived from 'pre' meaning before and 'script' meaning to write, stands out as the most common means to order or dispense a specific treatment.[2]

Highlighting the ubiquity of prescriptions, Katzung notes that, on average, patients receive 12.7 prescriptions per year. This underscores the significance of each prescription being rational, aligning with the principles set forth by the World Health Organization (WHO). The Conference of Experts on the Rational Use of Drugs, convened by WHO in Nairobi in 1985, defined rational use as ensuring that patients receive medications tailored to their clinical needs, in appropriate doses, for a suitable duration, and at the lowest cost to them and their community.[3]

Common reasons for irrational drug use, as identified by the World Health Organization (WHO), encompass various

* *Corresponding author*.
E-mail address: me.jijo4u@gmail.com (J. P. Abraham).

https://doi.org/10.18231/j.ijpp.2024.007

factors, including polypharmacy, inappropriate dosage forms, over-prescribing of antibiotics, deviations from clinical guidelines, non-adherence, and self-treatment.[4] Recognizing the global significance of rational drug use, WHO collaborated with the International Network for the Rational Use of Drugs (INRUD) to develop core drug use indicators. These indicators focus on prescribing practices, patient care, and facility-specific factors.

Within these core drug use indicators are five prescribing indicators that shed light on crucial characteristics related to polypharmacy, antibiotic use, injection use, generic prescribing, and adherence to the essential medicines list (EML).[5] The collaboration between WHO and INRUD provides a comprehensive framework for assessing and enhancing drug prescription practices worldwide.

Despite numerous studies estimating drug prescribing patterns in various healthcare settings in India, a significant gap remains when it comes to understanding these patterns in rural India. This study aims to bridge that gap by assessing the prescription pattern and prescribing behavior of physicians at a rural hospital in Western India using WHO prescribing patterns.

2. Materials and Methods

A prospective, descriptive, cross-sectional study was conducted in the outpatient department of a rural hospital in Western India. This hospital caters to the healthcare needs of the local population.

During the study, 604 prescriptions were sampled at the pharmacist's office, where prescriptions are collected for dispensing drugs and later stored.

Permission to conduct the study was obtained from the Ethics Committee, ensuring compliance with ethical standards. Confidentiality measures, and patient rights protection were diligently observed throughout the study.

Prescriptions were sampled at a rate of approximately 10 per day using a random sampling method, ensuring a representative selection over the study period.

2.1. Inclusion criteria

1. Prescriptions of all patients visiting the outpatient department of the rural hospital.
2. Prescriptions containing drugs.

2.2. Exclusion criteria

1. Prescriptions with incomplete information
2. Patients who were referred out
3. Critically ill patients

A photocopy of each prescription was taken for record-keeping, and a case record form was employed for systematic data entry. The case record form captured essential details such as demographics, provisional or definite diagnoses, and medication details.

Data collected during the study were entered into Open Office Calc. To analyze the data, descriptive statistical tools, including frequencies, percentages, mean, and standard deviation, were employed to derive meaningful insights into prescription patterns and practices.

Table 1: Summary of parameters assessed as per World Health Organization drug use indicators

Parameters	n(%)
Total number of prescriptions collected	604
Number of prescriptions with monotherapy	24(3.97)
Number of prescriptions with polytherapy	580(96.03)
Number of prescriptions with brand names	272(45.03)
Number of prescriptions with drugs not from NLEM	464(77.20)
Number of prescriptions with antibiotics	176(29.13)
Number of prescriptions with injectables	303(50.16)

Table 2: Detailof average number of drugs of each parameters as per World Health Organizationdrug use indicators

Parameters	Average
Average number of prescribed drugs per prescription	3.5
Average number of drugs with brand names per prescription	0.49
Average number of drugs per prescription not from NLEM	1.13
Average number of antimicrobials per prescription	0.45
Average Number of injectables per prescription	0.50

3. Results

3.1. Demographic characteristics

Total of 604 prescriptions were assessed, revealing the following demographic insights:

3.2. Gender distribution

56% of the prescriptions were for male patients.

44% of the prescriptions were for female patients.

3.3. Age distribution

The mean age of patients in the study was 42 years.

3.4. Prescribing patterns

Total Drugs Prescribed: A total of 2120 drugs were prescribed during the study period.

Average Number of Drugs per Encounter: The average number of drugs per encounter was approximately 3.5.

Generic Prescribing: 86% of the drugs were prescribed using their generic names, totaling 1824 drugs.

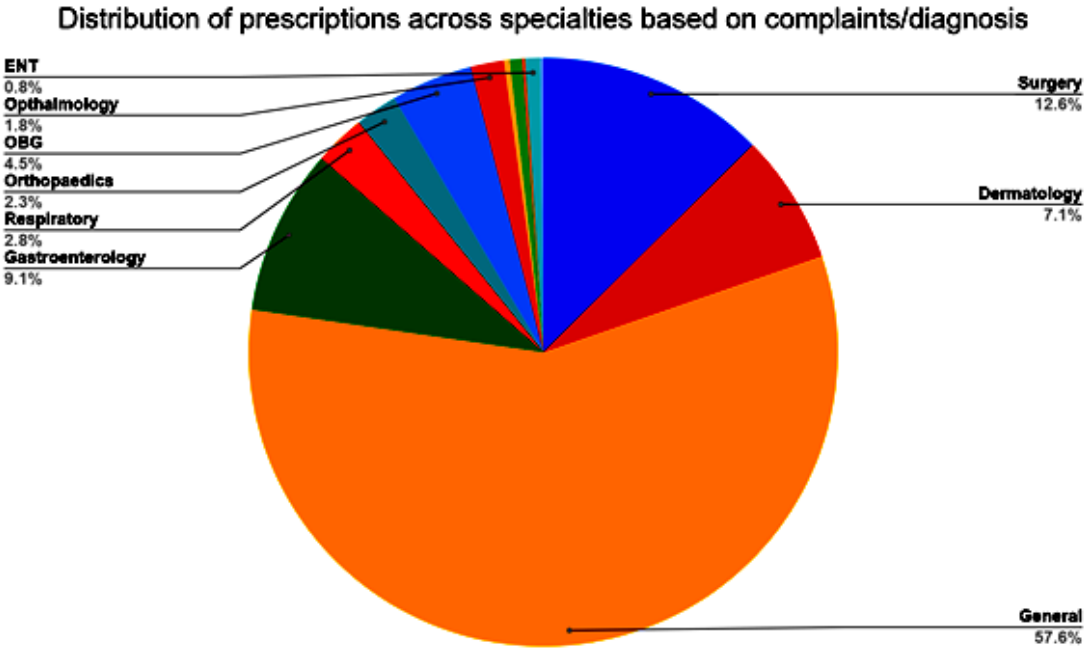

Figure 1: Percentages of prescriptions according to the complaints/ diagnosis

Table 3: Gender wise distribution of drug prescribing indicators

Gender	Average number of drugs	Percentage of generic drugs	Percentage of antibiotics	Percentage of injections	Percentage of drugs from NLEM
Female	3.56	90.18	22.22	56.66	71.49
Male	3.52	82.90	33.46	52.75	63.79

Table 4: Age wise distribution of drug prescribing indicators

Age groups	Average number of drugs	Percentage of generic drugs	Percentage of antibiotics	Percentage of injections	Percentage of drugs from NLEM
0-20	3.50	82.55	41.17	18.82	63.75
20-40	3.71	88.09	33.62	55.63	67.85
40-60	3.71	86.01	28.57	66.23	65.38
>60	3.36	86.09	19.49	66.66	68.98

Prescription of Antibiotics: 29% of the prescriptions included antibiotics, totaling 176 instances.

Prescription of Injectables: 50% of the prescriptions included injectable medications, totaling 303 instances.

National List of Essential Medicines (NLEM): Approximately 67% of the drugs prescribed were listed in the National List of Essential Medicines (NLEM), totaling 1432 drugs.

Table 1 presents a detailed summary of key parameters assessed in the study, guided by the World Health Organization (WHO) drug use indicators. The total number of prescriptions collected over the study period was 604. Among these, 3.97% featured monotherapy, while the majority (96.03%) involved polytherapy. Approximately 45.03% of prescriptions included brand names, and 77.20% contained drugs not listed in the National List of Essential Medicines (NLEM). Antibiotics were prescribed in 29.13% of cases, and injectables were included in 50.16% of prescriptions.

Figure 1 provides a visual representation of the distribution of patients across various medical specialties in the studied rural hospital. The chart illustrates the prevalence of patients presenting with different medical concerns, categorized by specialty. The majority of patients, constituting approximately 57.6%, reported general complaints. Dermatology cases accounted for 7.1%, surgery for 12.6%, ENT (Ear, Nose, and Throat) for 0.8%, ophthalmology for 1.8%, OBG (Obstetrics and

Gynecology) for 4.5%, orthopedics for 2.3%, respiratory for 2.8%, and gastroenterology for 9.1%. Notably, dental, nephrology, and psychiatry cases were comparatively fewer.

offers a detailed examination of the average number of drugs for each parameter, aligning with the WHO drug use indicators. On average, there were 3.5 prescribed drugs per encounter. Notably, the average number of drugs with brand names was 0.49, while the average number of drugs per prescription not from NLEM was 1.13. The average number of antimicrobials per prescription was 0.45, and the average number of injectables per prescription was 0.50. These averages provide a nuanced understanding of the prescribing practices, highlighting specific aspects such as the use of brand names, adherence to essential medicines lists, and the prevalence of antimicrobials and injectables in the prescriptions analyzed.

This figure enhances the understanding of patient distribution across medical specialties, offering a visual overview of the varied healthcare needs addressed within the rural hospital setting.

4. Discussion

In the present study, we evaluated the prescribing patterns and indicators in a rural hospital setting, utilizing the World Health Organization (WHO) prescribing indicators as benchmarks. The findings revealed several noteworthy aspects that warrant discussion, particularly in comparison to optimal WHO parameters and insights from other studies.

5. Comparison with WHO Prescribing Indicators

5.1. Average number of drugs per prescription

Our study reported an average of approximately 3.5 drugs per prescription, surpassing the WHO optimal value of less than 2 drugs per prescription.[6] This observation suggests a tendency towards polypharmacy, indicating a potential area for intervention to streamline prescriptions and enhance patient safety.

5.2. Percentage of generic drugs

Generic prescribing was observed in 86% of our prescriptions, falling short of the WHO recommendation of 100%.[7] While generic prescribing is crucial for cost-effectiveness, the gap highlights the need for strategies to promote increased use of generic names in prescriptions.

5.3. Percentage of antibiotics and injectables

Antibiotics were prescribed in 29% of cases, which is just within the WHO threshold of <30%, injectables were included in 50% of prescriptions, which surpassed the recommended <20%[6] These findings underscore the importance of antimicrobial stewardship and judicious use of injectable medications to align with global health standards.

6. Percentage of Drugs in National List of Essential Medicines (NLEM)

Approximately 67% of drugs prescribed in our study were from the National List of Essential Medicines (NLEM), below the optimal value of 100%. Enhancing adherence to the NLEM could further align prescribing practices with essential and cost-effective medications.

6.1. Comparison with other studies

In comparing our results with findings from various other studies, we find:

6.2. Polypharmacy

Our observed polypharmacy rate of 96.03% aligns with the high rates reported in a multicentric study by the Indian Council of Medical Research (83.05%)[7] and a prescription audit involving secondary level hospitals in Maharashtra (3.1 drugs per prescription).[8] These consistent observations highlight the widespread prevalence of polypharmacy in diverse healthcare settings.

6.3. Antibiotic prescribing

Our antibiotic prescription rate of 29% is within the range reported in the multicentric study by the Indian Council of Medical Research (17.63%)[7] and a study of outpatient facilities run by a non-government organization in West Bengal (72.8%).[9] The variations emphasize the complex nature of antibiotic prescribing patterns and the need for targeted interventions to address overprescribing.

6.4. Injectable use

The high injectable use in our study (50%) contrasts with the low rates reported in the study of outpatient facilities run by a non-government organization in West Bengal (3.9%)[9] and a cross sectional study in Western Uganda (25.22%).[10] Understanding the reasons behind these variations could inform strategies to optimize injectable use.

7. Potential Reasons for Suboptimal Findings

Polypharmacy: Complex patient situations and having multiple health issues contribute to the use of multiple medications, highlighting the importance of thorough patient assessments and comprehensive treatment plans. Polypharmacy is influenced by various factors like age, lifestyle, diet, and how healthcare is accessed. People who are frail, dealing with multiple health conditions, overweight, or experiencing challenges in both physical and mental health are at a higher risk.[11,12]

Generic Prescribing: Physician preferences, patient demands, or concerns about generic drug quality could influence prescribing practices. Addressing these barriers may involve physician education and patient awareness campaigns. Doctors may be hesitant to prescribe unbranded generic medicines primarily due to a lack of confidence, both on the part of physicians and patients, in the quality of these medications, with concerns about substandard quality and perceived lower effectiveness compared to branded counterparts playing a significant role in the limited use of generic medicines. [13,14]

Antibiotic and Injectable Use: Cultural factors, patient expectations, and diagnostic uncertainties may contribute to higher rates of antibiotic and injectable prescriptions. Strengthening antimicrobial stewardship programs and providing guidelines for rational use could address these challenges. Antimicrobial stewardship leads to improved patient care, diminished antibiotic usage, and more cost-effective healthcare. [15]

National List of Essential Medicines (NLEM): Limited availability of certain essential medicines in the hospital formulary or lack of awareness among healthcare providers about the NLEM could contribute to suboptimal adherence. The suboptimal prescribing from the National List of Essential Medicines (NLEM) could also indicate a need for improvements within the NLEM itself to better cater to the community's healthcare requirements. [16]

In delving deeper into prescribing patterns, our study extends its focus to gender and age based analyses, revealing nuanced variations in drug prescriptions.

7.1. Gender-based comparisons (Table 3)

Upon examination of gender-specific data, both females and males are prescribed an average of 3.5 drugs, demonstrating similarities in overall medication patterns. However, distinct trends emerge in the percentages of generic drugs, antibiotics, injections, and drugs from the National List of Essential Medicines (NLEM). Females receive a notably higher percentage of generic drugs (90.18% vs 82.90%), indicating potential gender-related disparities in preferences, responses, or physician prescribing habits. In terms of antibiotic prescriptions, females receive fewer antibiotics than males (22.22% vs 33.46%), suggesting a more conservative approach to antibiotic use in female patients. Interestingly, the percentage of injections is higher in females compared to males (56.66% vs 52.75%), prompting further investigation into gender-based differences in injectable prescription rates. Additionally, female patients exhibit a higher percentage of drug prescriptions from the NLEM compared to males (71.49% vs 63.79%), highlighting gender-related variations in adherence to essential medicines, with potential implications for health outcomes.

7.2. Age-based comparisons (Table 4)

The stratification of prescribing indicators across age groups provides additional insights. While the average number of drugs prescribed remains relatively consistent across age groups, ranging from 3.36 to 3.71, variations are evident in the percentages of generic drugs, antibiotics, injections, and drugs from the NLEM. The youngest age group (0-20) demonstrates a higher percentage of antibiotic prescriptions (41.17%) compared to other age groups, potentially reflecting a higher susceptibility to infections or different diagnostic considerations. In contrast, the oldest age group (>60) shows a lower percentage of antibiotic prescriptions (19.49%), suggesting a more cautious approach in this demographic. The percentage of drugs from the NLEM increases with age, reaching the highest value in the oldest age group (68.98%), indicating a greater adherence to essential medicines in the elderly population.

8. Conclusions

Our study offers a thorough analysis of prescribing patterns in a rural hospital, highlighting demographic characteristics, trends, and adherence to WHO indicators. We found an average of 3.5 drugs per prescription, indicating potential polypharmacy concerns. Generic prescribing is at 86%, below WHO's 100% recommendation. Variations in antibiotic and injectable use reveal complexities influenced by cultural factors. Suboptimal adherence to the NLEM suggests the need for improvements and increased awareness among healthcare providers.

While our study sheds light on key aspects, limitations include its single-site focus and lack of exploration into socio-economic factors. Despite these, our findings provide valuable insights for optimizing prescribing practices in rural healthcare settings, guiding targeted interventions and policy considerations to enhance healthcare delivery quality.

9. Source of Funding

None.

10. Conflict of Interest

None.

References

1. Lofholm PW, Katzung BG. Rational Prescribing & Prescription Writing. *Basic & Clinical Pharmacology*. 2018;p. 1195–1195.
2. Srivastava SK, Rohan S. Drug Nomenclature, Prescription Writing, Error in Prescription & Communication with Patient Including Use of Devices and Storage of Medicines. *Manual of Practical Pharmacology for MBBS*;p. 34–34.
3. Holloway K, Tanna S, Laing R. 2004. Available from: https://iris.who.int/bitstream/handle/10665/68735/WHO_EDM_PAR_2004.5.pdf.
4. Dr B, Chowdhury A, Das A, Diwan V, Kafle K, Mabadeje B. Available from: https://iris.who.int/bitstream/handle/10665/60519/WHO_DAP_

93.1.pdf?sequence=1.
5. Ofori-Asenso R. A closer look at the World Health Organization's prescribing indicators. *J Pharmacol Pharmacother*. 2016;7(1):51–55.
6. Joshi R, Medhi B, Prakash A, Chandy S, Ranjalkar J, Bright H. Assessment of prescribing pattern of drugs and completeness of prescriptions as per the World Health Organization prescribing indicators in various Indian tertiary care centers: A multicentric study by Rational Use of Medicines Centers-Indian Council of Medical Research network under National Virtual Centre Clinical Pharmacology activity. *Indian J Pharmacol*. 2022;54(5):321–329.
7. Potharaju HR, Kabra SG. Prescription audit of outpatient attendees of secondary level government hospitals in Maharashtra. *Indian J Pharmacol*. 2011;43(2):150–156.
8. Hazra A, Tripathi SK, Alam MS. Prescribing and dispensing activities at the health facilities of a non-governmental organization. *Natl Med J India*. 2000;13(4):177–82.
9. Goruntla N, Ssesanga J, Bommireddy BR, Thammisetty DP, Vishwanathasetty K, Ezeonwumelu V, et al. 2023.
10. Rieckert A, Trampisch US, Klaaßen-Mielke R, Drewelow E, Esmail A, Johansson T. Polypharmacy in older patients with chronic diseases: a cross-sectional analysis of factors associated with excessive polypharmacy. *BMC Fam Pract*. 2018;19(1):113–113.
11. Ye L, Yang-Huang J, Franse CB, Rukavina T, Vasiljev V, Mattace-Raso F. Factors associated with polypharmacy and the high risk of medication-related problems among older community-dwelling adults in European countries: a longitudinal study. *BMC Geriatr*. 2022;22(1):841–841.
12. Roy V, Rana P. Prescribing generics: All in a name. *Indian J Med Res*. 2018;147(5):442–446.
13. Charan J, Saxena D, Chaudhri M, Dutta S, Kaur RJ, Bhardwaj P. Opinion of primary care physicians regarding prescription of generic drugs: A Cross-sectional study. *J Fam Med Prim Care*. 2021;10(3):1390–1398.
14. Shrestha J, Zahra F, Cannady J, Stewardship. Available from: http://www.ncbi.nlm.nih.gov/books/NBK572068/.
15. Manikandan S. 2023. Available from: https://www.thelancet.com/journals/lansea/article/PIIS2772-3682(23)00062-8/fulltext#secsectitle0010.
16. Sarkar S, Srivastava V, Mohanty M. Rational Use of Drugs. *Postgraduate Pharmacology*;p. 51–51.

Author biography

Jijo P. Abraham, Junior Resident https://orcid.org/0009-0001-4326-110X

Reena R. Giri, Associate Professor & Guide https://orcid.org/0000-0002-9970-4547

Kavita M. Jaiswal, Professor & Head https://orcid.org/0009-0002-4905-0116

Cite this article: Abraham JP, Giri RR, Jaiswal KM. Assessing prescribing practices in a rural hospital: A cross-sectional study using WHO prescribing indicators. *Indian J Pharm Pharmacol* 2024;11(1):38-43.