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Review Article

Assessing prescribing practices in Indian health facilities: a comprehensive review

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ABSTRACT

Prescription patterns play a critical role in healthcare delivery, affecting the efficacy of medication therapy and resource utilization. Rational prescribing practices are essential for safe and effective healthcare, necessitating comprehensive prescriptions containing medication details, prescriber information, and patient instructions. This review explores prescription completeness and rationality, utilizing WHO prescribing indicators and other completeness metrics, across Indian healthcare facilities. A systematic search was conducted in PubMed and Google Scholar for original research articles published between 2013 and 2023, focusing on WHO-recommended prescribing indicators and completeness criteria. Inclusion criteria covered articles in English, spanning primary, secondary, or tertiary care settings. Data from selected articles were extracted and analysed. Data were synthesized from sixty-seven studies, depicting various prescribing practices. The assessment encompassed prescribing, patient care, and facility indicators. Findings highlighted challenges such as illegible prescriptions, incomplete details, polypharmacy, brand name dominance, and inappropriate antibiotic use. Despite WHO recommendations, generic prescribing was limited. This review reiterates the need for interventions to enhance prescription quality, patient safety, and cost-effectiveness. Recommendations include adopting electronic prescribing systems, standardizing prescription formats, conducting regular prescription audits, implementing educational programs, promoting generic drug use, and adhering to essential medicines lists. These multifaceted strategies can improve prescribing practices and ultimately contribute to enhanced healthcare outcomes in India.

Keywords: Prescribing patterns, Rational drug use, WHO prescribing indicators, Medication therapy, Generic drugs, Essential medicines, Polypharmacy

INTRODUCTION

A study of prescription patterns is crucial to determining the efficacy of medication therapy and maximizing the use of available resources.[1] Prescribing practices play a pivotal role in facilitating the rational and evidence-based approach to medical treatment.[2] The completeness of a prescription is a critical aspect of safe and effective healthcare. It involves providing comprehensive and accurate information on the prescribed medication, including its name, dosage, frequency, route of administration, and duration of treatment. A complete prescription also includes the prescriber's details, patient information, and clear instructions for the pharmacist and patient. Ensuring prescription completeness is essential to minimize medication errors, enhance patient safety, and facilitate proper medication management.[3-5] Studies have assessed prescription completeness as part of evaluating prescribing practices to improve healthcare quality. Along with completeness, rational prescribing is also important. WHO has given indicators which can help in assessing rational prescribing.[6] According to these, improper

prescribing habits are typically characterized by polypharmacy, excessive antibiotic, and injection use, which can lead to ineffective and unsafe treatments, worsened or extended illnesses, cause patient discomfort, harm, and increased expenses.[7-10] The reasons for irrational drug prescriptions includes inadequate drug knowledge, inappropriate drug promotion strategies, and the irrational prescribing behaviours of healthcare professionals, which can include excessive drug usage, deviations from clinical guidelines, and the prescription of medications with questionable safety or efficacy.[11]

Approximately one-third of the global population lacks the access to essential medications.[12] Paradoxically, over half of the medications prescribed, dispensed, or sold are found to be inappropriate with 50% of patients using them improperly.[13] Out of the numerous pharmaceutical options accessible for use in India, mere 10% are capable of effectively addressing 90% of the clinical conditions that necessitate treatment through medications.[14,15]

Therefore, regularly evaluating way medications are prescribed within healthcare facility is crucial. This assessment helps pinpoint issues related to drug usage, educates healthcare providers about importance of rational prescribing practices, and supplies policymakers with valuable insights. These insights can be instrumental in revising drug procurement policies, policies governing prescribing practices within concerned institutions.

Prescription indicators serve as valuable tools for evaluating healthcare practices within various institutions, enabling comparisons, evaluating medication trends, and determining medication preferences within specific locales. One of these indicators is average number of drugs per prescription. This indicator aids in assessing polypharmacy. Another indicator assesses generic drug prescriptions and drugs from the Essential Drug List (EDL) or Formulary, using these can help in cost control within the healthcare system. Antibiotic overuse which is one of drivers of bacterial resistance, can also be assessed by using WHO indicators. One of metrics evaluate excessive use of injectables, which can lead to severe consequences like anaphylactic shocks and adverse effects.(6) Additionally, we are also examining indicators related to patient care and facility. Hence, we designed this study to analyse the drug utilization trends in healthcare facilities, utilizing WHO prescribing indicators as well as other prescription completeness indicators.

SEARCH STRATEGY

We used PubMed and Google scholar databases to search relevant articles for the review. Specific keywords were used in PubMed advanced search with Boolean operators to find the articles, search strategy used was as follows: ("prescription audit" (All fields) or "drug audit" (All fields) OR "prescription monitoring" (All fields) or ("who prescribing" (All fields) OR "who prescribing indicators" (All fields) or "antimicrobial prescription" (All fields) and "India" (All fields). Last search was conducted on July 7, 2023, and then we manually searched for articles on Google Scholar. We looked at original research articles on prescription audits published between 2013 and 2023.

Inclusion criteria

Studies were included if they were original research articles, in full text, published in English, and looked at any of the WHO-recommended prescribing indicators or any other indicator for assuring completeness of prescription. The current analysis included patients from all age groups and health conditions who were seen in OPD/IPD of primary, secondary, or tertiary health care Government hospitals or private hospitals, clinics.

Exclusion criteria

Studies evaluating medication errors, ADRs, healthcare cost/resource utilization, or focusing only on 1 specific drug class for audit (E.g., Antihypertensives, antifungals) were not included in analysis.

Data extraction

Total articles retrieved for the study (447) were downloaded from PubMed and Google Scholar and exported to Rayyan which is a web-based software platform designed to facilitate the process of reviewing and managing large volumes of scientific literature. Duplicate articles were identified and excluded. Title and abstracts of all articles were screened and articles were included based on inclusion and exclusion criteria. If the title or abstract raised any questions, the full text of the publication was retrieved and evaluated (Figure 1). After that included articles were imported to MS-excel where the data from articles were extracted on the basis of indicators e.g., demographic data, study design, research sample size and tool, and key conclusions were taken from the chosen papers.

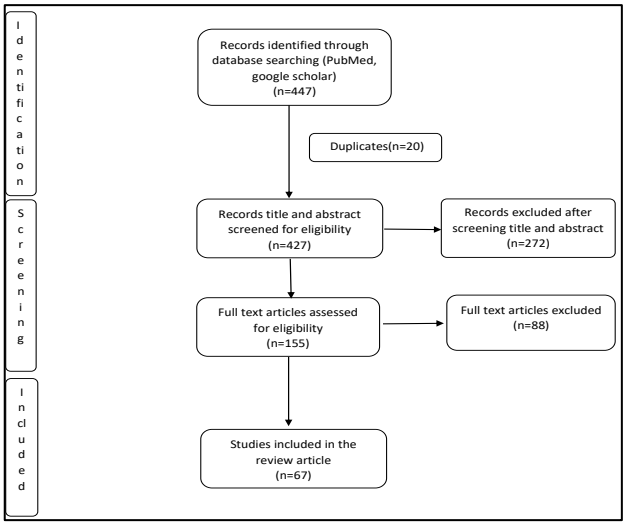

Figure 1: Flow of article retrieval and inclusion.

RESULTS

The world health organization (WHO) has established "core prescribing indicators" to analyse prescriptions and encourage proper medication practices. These indicators focus on three areas: 1. Prescribing indicators, 2. Patient care indicators and 3. facility indicators.

In this review, we have extracted data from sixty-seven studies under the similar headings to provide a consolidated picture of prescribing patterns in the country. The findings of our review include additional details related to prescribing patterns like demographic details of patients, diagnosis, legibility of prescription, dose, and frequency of antibiotics. The findings also include the most prescribed antibiotics in all the selected studies.

Characteristics of the studies

The studies included in the review were conducted all over India covering almost all states and UTs, (Figure 2).

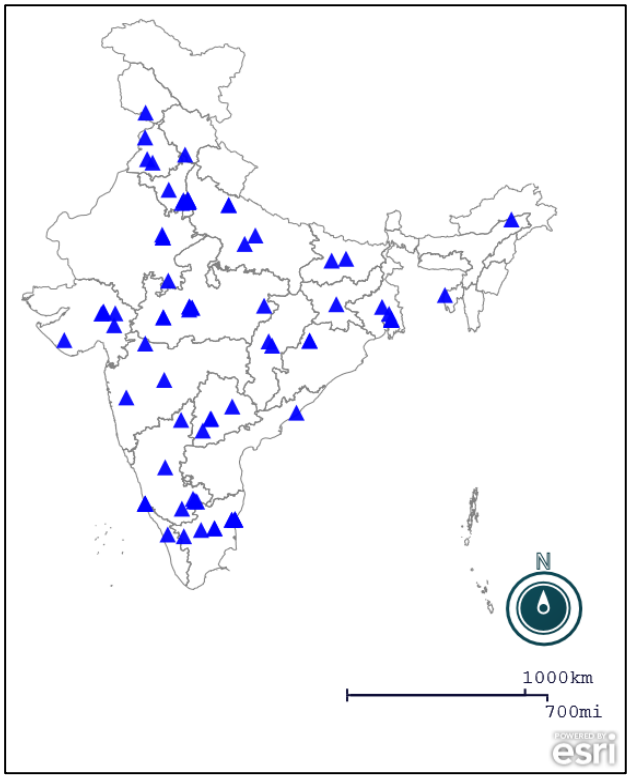

Figure 2: Distribution of studies included in review.

We included studies from last 10 years (2013-2023). Considering the study design, all the studies were Cross-sectional in nature, out of which three (4.5%) studies were retrospective and sixty-four (95.5%) were prospective in nature, most of the studies conducted descriptive analysis (97%). The data sources were mainly medical records or patient prescriptions, followed by administrative databases that were part of periodical health care monitoring systems.

From the selected studies, nineteen (45.2%) studies were conducted at primary level of healthcare (i.e., Primary health centre, community health centre, urban health centre and rural health centre), one (1.5%) of the studies was conducted in secondary care hospital, and majority of studies (n=58, 86.6%) were from tertiary care hospitals.

Some of the studies were conducted in only one department including general medicine (26.9%, n=18), general surgery (1.5%, n=1), obstetrics and gynaecology (1.5%, n=1), ICU (4.5%, n=3), pediatrics (17.9%, n=12), others* (10.4%, n= 7), whereas twenty-five (37.3%) studies collected data from multiple departments. The sample size in all the studies ranged from 50 to 4838. *other-dental, ophthalmology, psychiatry and dermatology.

Evaluation of various prescription parameters

The WHO core prescribing indicators were evaluated in 65 studies, other two studies evaluated other parameters of the prescription audit.

WHO cores indicators

Prescribing indicators were assessed by majority of studies (97%), facility indicators were evaluated by 6 studies, patient indicators were only assessed by three studies.

Prescribing indicators

Average Antibiotics prescribed per prescription: Out of 67 studies, four studies did not report this information. The average number of drugs prescribed per prescription varied from 1.7 to 10.9 drugs. Only one study reported the average number of drugs prescribed per prescription within the optimal range (1.6-1.8), all other studies had an average number of drugs per prescription higher than 1.8.

Percentage of drugs prescribed by generic name: The studies that provided data on drugs prescribed with generic names showed a wide variation, ranging from as low as 0.55% to 100%. Among the 60 studies (89%) that evaluated this indicator, three studies reported that all medications were prescribed using only brand names. Seven studies had over 80% of the drugs prescribed using generic names. However, only one study reported the optimal value of 100% drugs prescribed by generic names.

Percentage of encounters with an antibiotic prescribed: Fifty-nine studies (88%) documented the percentage of encounters in which antibiotics were prescribed. In two studies, no antibiotics were prescribed at all. However, in the remaining studies where antibiotics were prescribed, the percentage ranged from 0.7 to 95.14.

The range of antibiotics prescribed aligned with the WHOs recommended percentage of prescribed antibiotics

(20.0-26.8), in 11 studies (18.6%). Among the selected studies, twenty of them had a percentage of encounters with prescribed antibiotics lower than the optimal value. On the other hand, 28 studies (47%) had a percentage of encounters with prescribed antibiotics higher than the optimal value.

Percentage of encounters with an injection prescribed: This indicator was evaluated in 60 studies (89.5%) out of 67. The percentage of injections prescribed per prescription was observed within the optimal range (13.4-24.1) in seven studies (11.66%). However, in 37 studies (61.6%), the usage of parenteral was below the optimal range, with five studies reporting no parenteral usage at all. On the contrary, 16 studies (26.6%) showed a percentage of injections prescribed per prescription that exceeded the optimal range.

Percentage of drugs prescribed from essential drug/medical list (EML) or formulary: Percentage of drugs prescribed from EML/formulary was reported by 59 studies (88%). To evaluate this indicator, 53 studies had used EML provided by WHO as the reference drug list, National list of medicine (NLEM) was used in 4 studies, whereas both NLEM and WHO list of medicine was used as a reference in 1 of the studies. Hospital formularies were used as reference 52 studies. The percentage of drugs prescribed from EML/formulary ranged from 1.08% to 100% of the total drugs prescribed. Moreover, five studies (7.4%) reported the use of drugs from EML/Formulary as 100% from total prescriptions.

Data extracted from studies for prescribing indicators is represented graphically to provide a visual summary of the distribution, key statistics, presence of outliers and provides insights into skewness of data (Figure 3 and 4).

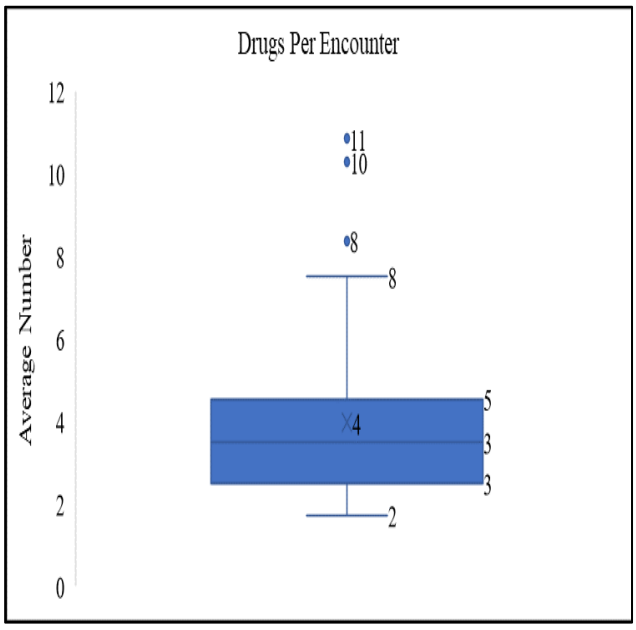

Figure 3: Distribution of drugs per encounter in studies included in the review.

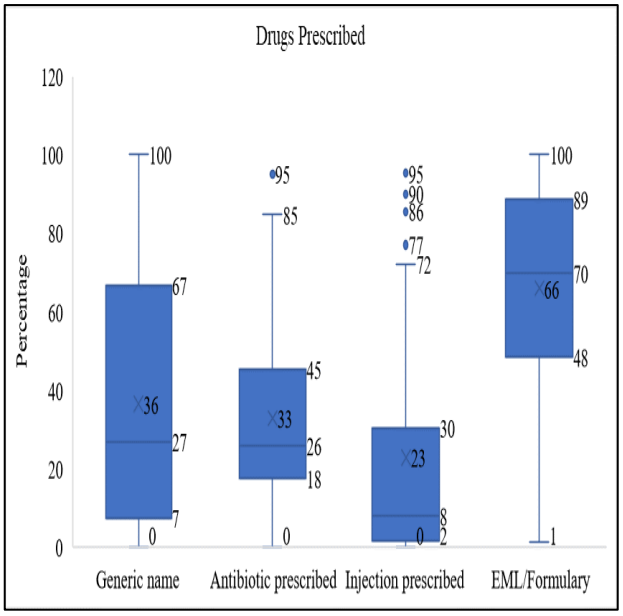

Figure 4: Statistics of a data distribution for WHO prescribing indicators of studies included in review.

Patient care indicators

Various patient care indicators were assessed and compared with WHO optimal value.

Average consultation time: The recommended minimum consultation time according to WHO is ≥10 minutes. Among the three studies that examined this indicator, one study met the optimal value for average consultation time, ensuring that patients received the recommended level of attention during consultations.

Average dispensing time (seconds): WHO suggests a minimum of ≥90 seconds for dispensing time. All three studies that assessed this parameter had dispensing time more than the WHO-recommended value.

Percentage of drugs dispensed: WHO recommends Percentage of drugs dispensed should be 100%. These findings were given in three studies and was observed above 80% in two studies

Percentage of drugs adequately labelled: WHO recommends that all drugs should be adequately labelled, aiming for a 100% compliance rate. Among the three studies that reported on this indicator, two achieved the desired level of adequate labelling (100%), while one study reported a slightly lower rate of 73%.

Health facility indicator

Five studies analyzed the WHO core health facility indicators. According to WHO guidelines, the availability of a copy of the national list of essential medicines of India (NLEM) should ideally be 100%. Among the four studies reporting this indicator, only one had 100% availability of a copy of NLEM. Additionally, the

availability of key drugs was assessed in all five studies, with one study reporting 100% availability and three studies reporting availability above 90%.

Other parameters of prescription audit

We have provided a detailed breakdown of the distribution of studies reporting a particular indicator. Patient demographics like patient name, age, sex, and weight were reported by 15 studies (22.38%). Among these, 9 studies reported that 100% of prescriptions included all these details.

Findings regarding mentioning prescriber details were reported by 6 studies (8.9%), it ranged from 69.5-100%, with two studies having prescriber details in all prescriptions. Information about the date of consultation was provided by 3 studies, with more than 95% of prescriptions having this detail mentioned.

The legibility indicator was evaluated in 17 studies (25.4%). Among these studies, legibility above 90% was observed in 6 studies (35.3%). Clinical history details were reported in 2 studies, but it was found in less than 50% of prescriptions in those studies. Nine studies reported on diagnosis details, with diagnosis mentioned in some of the prescriptions, it ranged from 21% to 81.7%.

A total of 12 studies (17.9%) assessed whether the dose of medicine and frequency of drugs is mentioned or not. Out of these 10 studies had more than 80% of prescriptions with details on frequency of drug intake. Details regarding duration of treatment were recorded in 13 studies (19.4%). Details on incorrect dosage, formulation, strength, route, direction for use, follow-up advice/review, supplements/vitamins/minerals, patient instructions, and abbreviations of medicine were only reported by one of the studies.

The practice of polypharmacy was assessed in 34 (50.7%) studies, out of these 6 (9%) studies reported that over 90% of prescriptions had more than one medicine. Use of fixed-dose combinations (FDCs) was reported in 22(32.8%) studies. Percentage of drugs prescribed as fixed dose combinations ranged from 5.9 to 76.2.

Most commonly prescribed antibiotic

Out of all the studies included, most commonly prescribed antibiotics were reported by 34 (50.7%). The top three classes of antibiotics prescribed in these studies were penicillin (38.2%), followed by cephalosporins (35.3%), and macrolides (5.9%).

DISCUSSION

The assessment of prescription patterns across diverse healthcare settings provides valuable insights into the landscape of medication utilization. The results from these studies collectively underscore the critical importance of rational prescribing practices to achieve optimal patient care and mitigate potential risks linked to drug therapy.

In our review, we observed prescription errors in several studies, including illegible writing being a major problem.[4] Furthermore, incomplete prescriptions, lacking crucial details such as allergy status, follow-up advice, and administration directions, were also noted.[16] Such errors can lead to medication-related risks and patient safety concerns. Investing in electronic prescribing systems with features like alerts and required fields can reduce prescription errors. Additionally, prescription quality can be further enhanced by standardization of prescription formats and continued medical education (CME) programs.[4]

Polypharmacy was another significant finding in our review. It is characterized by the prescription of multiple drugs to a single patient, has been a recurring concern in various studies.[17] It often leads to adverse drug reactions, drug-drug interactions, reduced patient compliance, unnecessary expenses, and even the emergence of bacterial resistance due to inappropriate antibiotic use.[18] These findings emphasize the need for interventions that promote rational prescribing practices. Implementation of interventions, such as medication reconciliation programs and regular medication reviews for patients taking multiple drugs can help reduce polypharmacy.[5]

Another indicator assessed in our study which pointed towards polypharmacy was average number of antibiotics prescribed, studies included in the study consistently noted a high percentage of antibiotic prescriptions.[19,20] This practice can lead to antibiotic resistance.[5] To address this issue, educational programs emphasizing evidence-based antibiotic prescribing and real-time monitoring through digital systems can be incorporated.[19]

In addition to polypharmacy, our study revealed the dominance of brand name prescribing over generic names.[21] Generic prescribing offers several advantages, including reduced medication costs and lower risks of dispensing errors.[22] Initiatives promoting generic prescription, along with prescription audits and reporting, could help encourage adherence to recommended guidelines.[21,22] Generic drug prescribing can be promoted through awareness campaigns and periodic prescription audits that specifically assess adherence to generic drug prescribing guidelines.[21]

Another strategy to streamline medication selection and reduce costs is use of essential medicines lists.[23] Prescribing from such lists encourages evidence-based choices and cost-effective treatment.[20] Adoption of essential medicines lists can be promoted through prescriber education and compliance monitoring.[20]

It's important to note that only six studies out of sixty-seven assessed patient care and facility care indicators.

The time that prescribers and dispensers spend with each patient sets important limits on the potential quality of diagnosis and treatment. They also help in assessing the degree to which health facilities are able to provide the drugs prescribed. Rational prescribing is also influenced by availability of essential medicines and access to unbiased information about these drugs.

Prescription audits played a vital role in assessing and improving prescribing patterns.[24] They provide insights into prescriber behaviour and offer opportunities for feedback and quality improvement.[23] These audits, when conducted regularly, can help identify areas for enhancement and ensure compliance with rational drug use guidelines.[23,24] Therefore, healthcare institutions should encourage the integration of prescription audits into healthcare quality assurance programs and provide resources to support these efforts.

CONCLUSION

This discussion synthesizes findings from multiple studies on prescription patterns. Polypharmacy, prescription errors, brand name dominance, and inappropriate antibiotic use were common concerns. Addressing these issues requires a multi-pronged approach involving electronic prescribing systems, standardized formats, prescription audits, education programs, and collaborations between healthcare stakeholders. Implementing these strategies can lead to improved prescription quality, enhanced patient safety, and cost-effective healthcare.

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