

## WHO PRESCRIBING INDICATORS AND ITS APPLICATIONS- A REVIEW

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### ABSTRACT

Inappropriate use of medications can leads to cause potential implications on patient morbidity and mortality rate. In order to optimize medication use which leads to patient health condition as well as their healthcare expenditure, WHO has been planning by collaborating with different organizations and developed prescribing indicators. The indicators measure performance in three related areas of “prescribing practices, patient care, and facility-specific factors.”<sup>[1]</sup>The core drug use indicators have come to be recognized as “objective measures that can describe the drug use situation in a country, region or individual health facility.” The Performance of the health care providers related to the appropriate use of drugs can be accessed by analyzing the different prescribing indicators. The present study could serve as a frame work upon which further studies in

prescription audit using prescribing indicators can be launched to investigate the scope for educational intervention and improvement in prescribing patterns.

### INTRODUCTION

Medicines play crucial role in the delivery of healthcare service across the globe. Appropriate use of medicines can contribute immensely to reducing global morbidity and mortality.

However, the World Health Organization (WHO) has reported that around 50% of all medicines are inappropriately prescribed, dispensed or sold.<sup>[1,2,3]</sup> Inappropriate use of medicines is deemed to be more of a problem in the global South. This is seen to have potential implications on healthcare budgets as almost 25–70% of worldwide healthcare expenditure is spent on medicines.<sup>[4]</sup> In this sense, improvement in medicine use behaviors is seen as a step towards optimizing the use of limited health resources and also improving the quality of healthcare delivery. To highlight the need for attention into medicines usage, the WHO has been compiling medicines use from different parts of the world and publishing in its World Medicines Situation Reports since 1988.<sup>[5]</sup> The WHO has also championed efforts towards streamlining how information on medicine use are collated. In the early nineties, the WHO collaborated with the International Network for Rational Use of Drugs (INRUD) to develop a set of “core drug use indicators.” The indicators measure performance in three related areas of “prescribing practices, patient care, and facility-specific factors.”<sup>[8]</sup> The core drug use indicators have come to be recognized as “objective measures that can describe the drug use situation in a country, region or individual health facility.”<sup>[6, 7]</sup>

## **PRESCRIBING INDICATORS**

The prescribing indicators are mainly used for measuring the performance of health care professionals related to the appropriate use of drugs. These are based on prescriptions observed in the patients mainly takes place at outpatient department of a clinical setup for the treatment of acute or chronic treatment. These can be analyzed retrospectively, prospectively or from the patients went to the hospital or clinic on the day the data were collected. The prescribing indicators do not need any patient complaints, past medication history and any related data in it. It just analyzes the prescribing method of the drugs on the particular diagnosis.<sup>[9]</sup>

### **Prescribing Indicators**

1. Average number of medicines per encounter
2. Percentage number of medicines prescribed by generic name
3. Percentage of encounters with an antibiotics prescribed
4. Percentage of encounters with an injection prescribed
5. Percentage of medicines prescribed from the essential medicines list.<sup>[9]</sup>

**Indicator 1: Average number of medicines per encounter**

The main objective of this indicator is to analyze the level or degree of polypharmacy. The polypharmacy is one of the main problem to cause drug related discrepancies such as medication error, duplication of drugs, drug interactions and suspected adverse effects and also noncompliance of patient by polypharmacy.

It can be calculated average by dividing the total number of different drug products prescribed (x) by the number of encounters surveyed (y). The WHO recommended optimal value should be  $<2$ .<sup>[1,10,11]</sup>

Average number of encounters,  $p = x/y$

**Indicator 2: Percentage of medicines prescribed by generic name**

This indicator is used to measure the prescribing pattern of drugs written in generic name. By this can analyses the level of knowledge of prescribers of actual drug name rather than its brand name and can find out how pharmaceutical companies are influenced to the prescribers and the hospital management. It can calculated percentage by dividing the number of drugs prescribed by generic name (d) by the total number of drugs prescribed (y), multiplied by 100. The WHO recommended optimum value of 100% as all medicines should ideally prescribed by generic names.<sup>[1,10,11]</sup>

Percentage of medicines prescribed by generic name,  $g = (d/y) * 100\%$

**Indicator 3: Percentage of encounters with an antibiotic prescribed**

The main need of this indicator is to find out the frequency of antibiotic prescribing by the prescribers. This will also observe the use of antibiotics in hospitals according to WHO antibiotic classification. The percentage of encounters with antibiotics prescribed (b) is calculated by dividing the no. of clinical encounters in which one or more antibiotics was prescribed (f) by the total no. of encounters (x) and multiplied by 100. The WHO recommended optimum value should be  $<30\%$ .

Percentage of encounters with an antibiotic prescribed,  $b = (f/x) * 100\%$

**World Health Organization Antibiotic Classification**

<b>MEDICINES USUALLY CLASSIFIED AS ANTIBIOTICS</b>	<b>MEDICINES WHICH SHOULD USUALLY NOT CLASSIFIED AS ANTIBIOTICS</b>
Pencillins	Antifilariasis
Anti-infective	Antischistosomes
Dermatological agents	Antileprosy drugs
Anti-infective	Antituberculosis drugs
Ophthalmological agents	Antifungals
Antidiarrheal drugs with streptomycin, neomycin, nifuroxazide or combination	Antiamoebic and anti giardiasis drugs
Other anti bacterials	Antileishmaniasis agents
	Antimalarials

**Indicator 4: Percentage of encounters with an injection prescribed**

The main purpose of this indicator is to analyse the overall level of use of two important, but commonly overused and costly forms of drug therapy in which immunizations are not to be counted as injections. The percentage of encounters with an injection used are calculated by dividing the no. of encounters during which an antibiotic or an injection are prescribed (t) by the total number of encounters surveyed (x) multiplied by 100. The WHO recommended optimal value should be < 20%.<sup>[1,11]</sup>

Percentage of encounters with an injection prescribed,  $j = (t/x) * 100$

**Indicator 5: Percentage of medicines prescribed from the essential medicine list**

The main purpose of this indicator is to measure the degree of which practices conform to national drug policy, as indicated by prescribing from the national essential drugs list or formulary for the type of facility surveyed. The percentage can be calculated by dividing the number of products prescribed which are listed on the essential drug list (m) by the total number of products prescribed (y) multiplied by 100 and the WHO recommended optimum value for this indicator is 100%.<sup>[1,11]</sup>

Percentage of medicines prescribed from EDL,  $k = (m/y) * 100\%$

**APPLICATIONS OF PRESCRIBING INDICATORS**

Prescribing indicators are useful for investigating potential medicines use problem areas. Such identified problem areas may alert health managers of potential drug use problems that require detailed examination and subsequently focus of improvement (such as prescriber understanding of rational pharmacotherapy). The prescribing indicators just like all the core drug use indicators are standardized and do not require country, regional or health facility

adaptation making for easy comparison.<sup>[8,12]</sup> The average number of medicines prescribed per encounter is important to assess if poly-pharmacy is an issue.<sup>[8]</sup> Increased number of medicines prescribed per patient encounter may signal prescriber, population and health system issues. For instance, lack of prescriber skill in managing local illnesses may lead to symptomatic treatment of cases resulting in the use of higher number of medicines per patient as in the case of high burden of comorbidities. Higher medicines per patient encounter may also indicate weaker health systems characterized by a shortage of essential medicines prompting prescribers to combine medicines to deliver the maximum clinical effect. A higher percentage of encounters which result in the use of antibiotics (exceeding proposed reference values) may potentially be signifying an indiscriminate use of antibiotics. While a high antibiotic use may highlight increased rate of local infections, it may be a sign of prescriber's inexperience or a weak local health system characterized by a lack of diagnostic facilities such as microscopes that often lead to presumptive treatment of cases.<sup>[13]</sup> The percentage of encounters with an injection prescribed highlight if there is a reasonable use of injectable medications. An increase in the rate of use of injections may highlight prescriber's skill issues, emergency issues, and/or a biased understanding on the potency of various medicine formulations (oral versus injectable forms). Percentage of medicines prescribed generically as well as from EML highlights conformity to lay down prescribing regulations and prevailing medicines situation. For instance, a low percentage of generic medications prescribed may signal unavailability of cost-effective generic medicines because of patency issues, prescriber's lack of confidence in generic medicines and/or patients preference for branded/innovator products. A low percentage of medicines prescribed from an EML may highlight prescriber's lack of knowledge on the role of EML in cost-effectiveness optimization or a general nonadherence to prescribing regulations.<sup>[14,15]</sup>

### **Limitations of prescribing indicators**

Although, the core prescribing indicators are useful for investigating medicines prescription pattern at PHC centers, they are less helpful for inpatient settings, and specialist outpatient facilities as medicines use patterns at these facilities may be more complex. The prescribing indicators are also susceptible to the data collection methods, i.e., either data are collected retrospectively (using past medical records) or prospectively (using current patients as they present for consultation). In the case of retrospective collation, the data may result in a potential overestimation of poly-pharmacy (average number of medicines), antibiotic utilization and injection use because patients who are not given a prescription are often likely

to be excluded.<sup>[8]</sup> On the other hand, prospective data collection can also potentially create an observer bias (Hawthorne effect) as it is difficult to blind the health facility staff who may then alter their prescribing behaviors which will influence the prescribing indicators recorded. Seasonal variations in prescribing can impact on the prescribing indicators for a health facility and the WHO recommends that data for prescribing should be collected over extended periods (ideally one year or more) but this is always not possible.<sup>[10]</sup> The prescribing indicators are also in a way vulnerable to the case mix presenting in a facility, region, or country. For instance, a higher antibiotic use rate will be expected in an area experiencing an infection outbreak than one with no outbreak. In the case of EML usage for instance, as most EML usually covers a limited sect of medicines it is impossible to have all prescriptions fully compliant with it. Again it is practically impossible to have all medicines prescribed in the generic form as some medicines are still not off-patent. In an area with known proliferation of sub-standard medications, prescribers' confidence in the treatment lies with the prescription of brand medicines. Prescribing indicators such as all core drug use indicators are facility-level data that do not show any information at a prescriber level. Furthermore, it is important to highlight that prescribing indicators fail to answer the question of rationality in the administration of medicine or treatment of patients which often requires thorough assessments of information.<sup>[8]</sup>

## CONCLUSION

Medication prescribing remains an important component of managing patients. Prescribing indicators provide useful information in understanding general medicines prescribing patterns. However, the interpretation and use of prescribing indicators should be done bearing in mind their inherent flaws and limitations.

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