Drug utilization pattern using WHO prescribing, patient care and health facility indicators in a primary and secondary health care facility

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ABSTRACT

Background: Incorrect prescribing practices result in ineffective and insecure treatment, exacerbation or continuation of illness, damage to patient, increased cost, and development of drug resistance. Aims and Objective: To assess the pattern of drug utilization including rationality in the outpatient departments of primary and secondary health-care facilities in rural health block of Jammu, India, using WHO indicators. Materials and Methods: Data was collected prospectively from 500 prescriptions on detailed prescribers indicator form, and prescribing, patient care, and health facility indicators were calculated. Result: The average number of drugs per encounter was 2.75, and 51.8% drugs were prescribed by generic name. Use of antibiotic (55% of encounter) was frequent, and injection use was (11.6%) little high. Only 40.9% of drugs prescribed conformed to essential drug list. Most patients (75.6%) knew the correct dosage, and average consultation time taken was 3.13 min. No copy of essential drug list was available. The availability of key drugs was 26%. Interventions to rectify overprescription of antibiotics, underprescribing by generic names, lack of knowledge of dosage, and lack of access to an essential drug list are necessary to further improve rational drug use. Conclusion: Some of drug prescribing and patient-care practices were found to be inappropriate indicating need for intervention. Strategies can be targeted toward changing specific problems of irrationality. Clear and comprehensive rules should be formulated and implemented by the state government to ensure rational use of drugs.

KEY WORDS: Drug utilization; Essential Drugs; Polypharmacy; Prescribing Indicators; Health Facility Indicators

INTRODUCTION

Drugs play an important role in protecting, maintaining and restoring health if used rationally. Medicines are used rationally when patient gets the proper medicines, in doses that fulfill their individual necessities, for a sufficient period of time and at the lowest price to them and their community.[1] Irrational prescribing of medicines is a worldwide difficulty. Globally, it is determined that more than 50% of medicines are prescribed, distributed, or traded inappropriately and that 50% of all patients fail to consume their medicines properly.[2] Evaluation of drug use pattern, therefore, is becoming ever more necessary to promote rational drug use, especially in developing countries.[3]

Drug utilization research has been defined by World Health Organisation (WHO) as “the marketing, distribution, prescription and use of drugs in a society, considering its consequences...
either medical, social or economic. In many developed countries, investigation on medicines use is repetitive in healthcare facilities and many studies have established its effectiveness. However, majority of developing countries do not possess data on this at the national level. So, these studies become significant in order to screen, assess, and, if necessary, suggest changes in prescribing patterns in order to make medical care balanced and cost effective.

Therefore, it was thought worthwhile to conduct this study with the aim to describe the prescribing pattern of drugs using WHO drug use indicators at primary and secondary levels of health care. Needless to say, baseline data gathered from this study can be used by researchers and policymakers to monitor and improve pharmaceutical prescribing and consumption practices in rural health block of Jammu region.

**Materials and Methods**

This study was conducted among patients attending three institutions namely Community Health Centre (RS Pura), Primary Health Centre (Dablehar), and Allopathic dispensary (Miran Sahib), which are primary and secondary care institutions located in the field practice area of Department of Community Medicine over a period of 1 year from November 2013 to October 2014. Patients attending OPD of different disciplines were the potential participants. The doctors of different specialties and general duty medical officers in these institutions were briefed about the purpose of the study. “Drug use encounter”—the period of interaction between the patient and health-care provider (WHO, Investigating Drug Use, 1993) was used to gather quantitative data prospectively by using WHO indicators in a standardized manner. The data were collected twice weekly, and on each such day, first 10 patients were enrolled for the study from all disciplines. Written informed consent was obtained from each participant; 500 prescriptions were taken and transcribed on detailed prescriber indicator form as per WHO guidelines immediately after the patient-prescriber encounter.

Three set of indicators (prescribing, patient care, and health facility) were calculated from the data collected. These indicators and their method of calculation are given in Appendix 1.

**Results**

A total of 500 prescriptions were analyzed. Total number of drugs prescribed were 1,375 with an average of 2.75 drugs per prescription. Majority of patients were in age group of 19–60 years, in both male (44.54%) and female subjects (68.75%), with mean age of 39.84 ± 11.87 years (Table 1).

**Prescribing Indicators**

Nearly half of the patients (55%) were prescribed antibiotics, and almost equal number of drugs (51.8%) were prescribed by generic name. On an average, 11.6% prescriptions contained an injection, and only 40.9% of drugs were from National Essential Medicine List.

The incidence of polypharmacy was also common with a maximum of six drugs prescribed per prescription. Nearly more than half of the patients were prescribed three drugs (54.8%), followed by patients prescribed with two drugs (27%). Monotherapy was advised to only 6.2% patients, whereas a comparatively high proportion (12%) was prescribed four or more drugs as shown in Figure 1.

**Patient Care Indicators**

In 500 encounters, the average consultation time taken by the consultant was 3.13 min. Nearly three-fourth (75.6%) of the sample showed correct knowledge of dosage prescribed.

**Facility Indicators**

No essential drug list was available in health facilities of study area. Only three drugs, i.e., 20%, of fifteen key drugs mentioned in WHO checklist (to test the availability of drugs required for treatment of common diseases) were available in health facilities of study area.

![](figure1.png)

**Figure 1: Number of drugs per prescription**

<table>
<thead>
<tr>
<th>Number of Subjects</th>
</tr>
</thead>
<tbody>
<tr>
<td>One</td>
</tr>
<tr>
<td>31</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Table 1: Analysis of prescribing indicators of study population</th>
</tr>
</thead>
<tbody>
<tr>
<td>Prescribing indicators</td>
</tr>
<tr>
<td>-------------------------------------------------------------</td>
</tr>
<tr>
<td>Total no. of prescriptions analyzed</td>
</tr>
<tr>
<td>Total no. of drugs prescribed</td>
</tr>
<tr>
<td>Average no. of drugs per prescription</td>
</tr>
<tr>
<td>Percentage of drugs prescribed by generic name</td>
</tr>
<tr>
<td>Percentage of prescriptions with an antibiotic</td>
</tr>
<tr>
<td>Percentage of prescriptions with an injection</td>
</tr>
<tr>
<td>Percentage of drugs prescribed from Essential Medical List</td>
</tr>
</tbody>
</table>
DISCUSSION

Prescribing practices affect patient’s acquiescence and, thereby, therapeutic success or failure. Monitoring systems and interventions have been reported to be useful in improving the quality of health care in many countries.[11] Realizing this, WHO developed prescribing indicators to measure the degree of polypharmacy, the tendency to prescribe drugs by generic name, and the overall level of use of antibiotics and injections. The different prescribing, patient care, and facility parameters analyzed in this study provided an insight into the prescribing behavior of doctors in primary and secondary health-care facilities of a rural area of Jammu district, Jammu and Kashmir, India. The degree to which the prescribing practice conformed to the essential medicine list, formulary, or standard treatment guidelines were also measured by searching for the number of drugs prescribed from essential medicine list available.

Average number of drugs per encounter in this study was 2.75, which is slightly higher than the recommended limit of two drugs per encounter.[13] Many investigators, however, have reported even higher averages, with a few reporting six[10] or more than six[19] drugs per encounter. Thus, it is clearly evident that there is wide variation in prescribing practices in India. The reasons for polypharmacy and overprescribing are multifaceted. Some of these center around practitioners (e.g., ambiguity in diagnostic practices), patients (demand for quick relief), providers (availability of nonessential drugs and irrational drug combinations), and pharmaceuticals (aggressive medicine promotion). Polypharmacy is a significant patient health care issue in health sector. Unequivocal evidence exists that multiple medications are more likely to lead to more side effect, drug interactions, nonadherence to drug therapy, and repeated admission to hospital for adverse drug reactions.[10]

Encouraging prescriptions by generic name is constantly suggested by several national and international organizations to support rational use of drugs. Prescriptions by generic names are also known to differ widely across India, with a low of 51%[11] as is consistent with our results and a high of 84.2%[12]. The highest reported still falls short of WHO ideal, which is 100%. Prescription under generic name has been shown to improve inventory control, easy purchase of drugs, and decrease confusion among the pharmacist and the patients alike. Generic prescribing also reduces the chances of dispensing errors, which may be owing to misinterpretation of such as sounding brand names and drugs and helps to reduce the economic burden on patient.

Injection practices have received a lot of emphasis. WHO has proposed an acceptable limit of less than 10% or less in view of higher rates of injections linked with more harm to health of the population. A low rate of 2%–3%[13] and a high rate of 38.1%[14] suggest that the underlying reasons for such behavior ought to be complex and require attention. In this study, percentage of prescriptions with injections was 11.61%, which was slightly higher than proposed by WHO (≤10%).

Use of injections when oral formulations are more appropriate is an irrational use of medicines because cost of injections is always higher than that of oral therapy. Moreover, its administration requires trained personnel. In any case, its increased usage is associated with increased risk of transmission of blood-borne diseases.[15]

An essential medicine list is one of the major tools for implementing rational drug use, and adoption of such a list for any community-based health-care program can greatly improve the effectiveness of therapy. Primary and secondary health-care facilities in our study area do not maintain inventories in accordance to essential medicine list. This is because the state drug procurement agencies do not effectively purchase according to essential medicine list. Therefore, the observed low figures are not surprising. Few others reporting lower figures possibly have similar underlying reasons. In this study, drugs prescribed from WHO’s essential medicine list was found to be 40.9%, which is much below the standard (100%) derived to serve as ideal. Prescribing drugs from essential drug list issued by WHO provides a framework for rational prescribing as drugs on the list are well established, are already tested in practice, have established clinical use, and are of lower cost than newer drugs.[16]

In this study, the availability of key drugs was found to be 20%, which cannot be considered as satisfactory. These figures are in stark contrast to higher availability reported by other investigators.[13,17] The whole purpose of inclusion of key drugs stands defeated if its availability cannot be ensured. It has serious implications for increase in "out-of-pocket" expenditure for poor patients as the morbidities for which key drugs are meant are not only common but also tend to occur repeatedly. This also implies that drug management in these health facilities is not in accordance with national recommendations and not based on the prevalent morbidity.

WHO recommends that a prescriber should spend at least 15 min with a patient. Average consultation time in this study was 3.13 minutes. Most investigators in India have also reported spending less than 5 min with the patients.[8,13] The situation in developed countries is far more favorable but still falls short of recommended 15 min. The short consultation time observed by us and most others in India point to higher patient loads in our hospitals, higher rates of prevailing morbidities, and low motivation of providers in government settings. Unarguably, for treatment to be effective, it is essential that the user receive information on different issues, including: (a) potential side effects; (b) interaction with other medications and food; (c) the importance of carrying out the treatment in its entirety; and (d) a correct understanding of the therapeutic scheme, and this is possible only if doctor gives adequate time to patient.

Low percentage of poor knowledge about the medications prescribed has been observed all across India.[18] This can be attributed to poor educational status of the patient as is evident from this study, inadequate labeling or inappropriate counseling by the prescriber, or a combination of all these. Even though patients revealed good knowledge of correct dosage, there is no guarantee that drug shall be used correctly as the methodology used evaluates knowledge only partially.
Limitations
Any drug utilization study based on WHO indicators has limitations.[3] This study used WHO prescribing indicators that are supposed to record exactly what is prescribed to patients but do not determine the quality of diagnosis and adequacy of drug choices. In addition, the patient-care indicators do not capture many fundamental issues related to the quality of examination and treatment.

Average dispensing time and percentage of drugs actually dispensed were not calculated. Hospital pharmacy counter was situated far off from outpatient departments; thus, it was impossible to collect data for dispensing times.

CONCLUSION
This study provides important useful baseline data that will be useful for comparison when in future any drug utilization study is carried out. Some of drug prescribing and patient-care practices are found to be inappropriate indicating need for intervention. Strategies can be targeted toward changing specific problems of irrationality. Clear and comprehensive rules should be formulated and implemented by the state government to ensure rational use of drugs.

REFERENCES

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### Appendix 1:

#### Prescribing Indicators

<table>
<thead>
<tr>
<th>Calculation</th>
<th>Formula</th>
</tr>
</thead>
<tbody>
<tr>
<td>Average number of drugs per prescription</td>
<td>( \frac{\text{Number of different drug products prescribed}}{\text{Total number of encounters surveyed}} ) × 100</td>
</tr>
<tr>
<td>Percentage of encounters with an injection</td>
<td>( \frac{\text{Number of encounters during which an injection was prescribed}}{\text{Total number of encounters surveyed}} ) × 100</td>
</tr>
<tr>
<td>Percentage of encounters with an antibiotic</td>
<td>( \frac{\text{Number of encounters during which an antibiotic was prescribed}}{\text{Total number of encounters surveyed}} ) × 100</td>
</tr>
<tr>
<td>Percentage of drugs prescribed from Essential Drug List</td>
<td>( \frac{\text{Number of products prescribed from Essential Drug List}}{\text{Total number of products prescribed}} ) × 100</td>
</tr>
<tr>
<td>Percentage of drugs prescribed by generic name</td>
<td>( \frac{\text{Number of drugs prescribed by generic name}}{\text{Total number of drugs prescribed}} ) × 100</td>
</tr>
</tbody>
</table>

#### Patient Care Indicators

<table>
<thead>
<tr>
<th>Calculation</th>
<th>Formula</th>
</tr>
</thead>
<tbody>
<tr>
<td>Average consultation time</td>
<td>( \frac{\text{Total time for a series of consultations}}{\text{Total number of consultations}} )</td>
</tr>
<tr>
<td>Patient’s knowledge of correct dosage</td>
<td>( \frac{\text{Number of patients who can adequately report the dosage schedule for all drugs}}{\text{Total number of patients interviewed}} ) × 100</td>
</tr>
</tbody>
</table>

#### Health Facility Indicators

<table>
<thead>
<tr>
<th>Calculation</th>
<th>Formula</th>
</tr>
</thead>
<tbody>
<tr>
<td>Availability of copy of Essential Drug List</td>
<td>Yes or No</td>
</tr>
</tbody>
</table>

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Parveen et al. (2016) Drug utilization pattern using WHO indicators