Correspondence

Prescription practices & use of essential medicines in the primary health care system, Shimoga district, Karnataka, India

Sir

As per the estimates of the World Health Organization (WHO) worldwide more than half of all the medicines are prescribed, dispensed or sold inappropriately and about one-third of the world's population lack access to essential medicines[1,2]. Irrational use of medicines has several severe consequences including adverse drug reactions, drug resistance, protracted illness and even death. Inappropriate use and over-use of medicines waste resources, resulting in increased out-of-pocket expenditure by patients[1,2].

The Government of Karnataka in 2005 published essential medicines list (EML) and standard treatment guidelines (STG) for use in the primary health care facilities in the State[3,4]. Since the implementation of these guidelines there was no formal assessment of the prescription practices and availability of essential medicines in the State. Hence, a study was conducted to describe the medicine prescription practices of the medical officers, and medicine dispensing practices of the pharmacists in primary health centres (PHCs) of Shimoga district, Karnataka, following the WHO guidelines for investigation of drug use in health facilities[5].

Twenty of the 65 PHCs in Shimoga district were randomly selected. From each PHC, 30 consecutive patients were contacted on each Monday during the study period (December 2011-April 2012). The prescriptions of these patients were reviewed to abstract the details of medicines prescribed using the standardized data collection form to calculate five prescription indicators, *i.e. (i)* average number of medicines per prescription, *(ii)* percentage of medicines prescribed by generic name, *(iii)* percentage of prescriptions with antibiotic, *(iv)* percentage of

medicines prescribed as per the essential medicines list, and *(v)* percentage of prescriptions with injections.

For calculating the patient care indicators, ten consecutive patients exiting from dispensing room on each Monday during the study period were observed from each PHC to calculate the dispensing time, and were interviewed to know their knowledge about the dosage of medicines prescribed. From the prescriptions of these patients, the information about the number of medicines prescribed, number of medicines actually dispensed, and number of medicines adequately labelled with respect to their strength, dosage and frequency was abstracted.

To calculate the facility based indicators [availability of essential medicine list (EML) and STG, percentage availability of key indicator medicines], we physically verified the availability of 20 key essential medicines in the PHC and interviewed the medical officers and pharmacists to assess their awareness about EML and STG.

Averages and proportions were calculated for the medicine use indicators. To assess the degree of rational prescribing, the Index of Rational Drug Prescribing (IRDP) was calculated[6]. This index system has been validated for use in medical and health research[6-8]. The index of individual prescribing indicator was calculated by dividing the optimal level recommended for that indicator with the observed level in the survey. IRDP was calculated by adding up all the five indices described above. The study was approved by the institutional ethics committee of National Institute of Epidemiology (NIE), Chennai.

For describing the prescription indicators, information was abstracted from 600 prescriptions from the 20 sampled primary health centres. A total of 2059 medicines were prescribed in these prescriptions

(average: 3.43, SD=1.53, range: 1-9). Most of the medicines prescribed were from EML (94%) and were prescribed by generic name (84%). About a quarter of the prescriptions were poly-pharmacy prescriptions (defined as prescriptions with 5 or more drugs). Antibiotics and injections were prescribed in 49 and 61 per cent of the prescriptions respectively (Table I).

The 200 prescriptions surveyed for patient care indicators contained 673 medicines, of which 93 per cent medicines were dispensed in the PHC. Only 25 per cent of the medicines dispensed were adequately labelled with a mention of strength, dosage and duration. All prescriptions had a pictogram indicating the frequency of medicine use. Majority (75%, 149/200) of patients interviewed knew the correct dosage schedule for all the medicines prescribed. The average dispensing time was 86 ± 32.36 sec.

Overall, 82 per cent of the essential medicines were available in the PHCs. The EML and STG were available in three (15%) and 11 (55%) PHCs, respectively. Seventeen of the 20 (85%) medical officers and 15 of the 20 pharmacists (75%) interviewed were aware of essential medicines list. Twelve doctors (60%) were aware of standard treatment guidelines.

The overall IRDP of the Shimoga district was 3.42 compared to the optimal level of 5. The indices of rational antibiotic prescribing and injection use were low at 0.68 and 0.19, respectively (Table II). The findings of our study indicated that majority of the health facilities in Shimoga district had the key essential medicines. However, the index of rational drug prescribing was below the optimal level with high proportion of prescriptions containing injections and antibiotics. The findings of our study were comparable with the findings of studies conducted in 35 low-income countries which reported 45 per cent (range: 22-77%) of prescriptions had antibiotics[2]. It is a well established fact that overuse of antibiotics leads to bacterial drug resistance, which is an important public health problem in many developing countries[9,10].

Overuse of injection was the most prominent manifestation of irrational prescribing in Shimoga with more than 60 per cent prescriptions containing at least one injection as compared to the optimal level of 10 per cent. High proportion of prescriptions with at least one injection was reported from several studies in India[11,12].

Our study had certain limitations. First, the prescribers were aware about the study, which could

Table I. Indicators of rational drug use, Shimoga, Karnataka, India, 2012			
Indicator	Observed (n)	Total (N)	Percentage
Prescribing indicators			
Medicines prescribed by generic name	1736	2059	84
Non poly-pharmacy prescriptions	467	600	78
Encounters with an antibiotic prescribed	291	600	49
Encounters with an injection prescribed	368	600	61
Medicines prescribed from essential medicines list	1926	2059	94
Patient care indicators			
Medicines actually dispensed	626	673	93
Medicines adequately labelled	149	626	25
Correct knowledge of dosage	149	200	75
Facility indicators			
Availability of essential medicines list or formulary	3	20	15
Availability of standard treatment guidelines	11	20	55
Percentage availability of key indicator medicines	328	400	82

Table II. Index of rational drug prescribing (IRDP) in primary health centres of Shimoga, Karnataka, India, 2012

Facility	Index of rational antibiotic prescribing	Index of polypharmacy	Index of injection use	Generic name index	Essential medicine index	IRDP[#]
1	0.64	0.90	0.21	0.98	0.97	3.70
2	0.60	0.77	0.18	0.96	0.96	3.46
3	1.50	0.97	0.30	0.70	0.92	4.39
4	1.29	0.97	0.50	0.76	0.85	4.36
5	0.39	0.80	0.25	0.95	1.00	3.40
6	0.64	0.83	0.16	0.73	0.94	3.31
7	0.53	0.80	0.19	0.71	0.87	3.10
8	0.53	0.87	0.23	0.62	0.77	3.01
9	0.90	0.90	0.11	0.84	0.99	3.73
10	0.64	0.83	0.21	0.99	1.00	3.68
11	0.47	0.77	0.12	0.91	0.91	3.17
12	0.53	0.67	0.16	0.68	0.87	2.90
13	0.56	0.43	0.14	0.91	0.97	3.02
14	0.60	0.87	0.14	0.59	0.99	3.18
15	0.69	0.57	0.12	0.73	0.85	2.95
16	0.75	0.93	0.18	1.00	1.00	3.86
17	0.64	0.97	0.14	0.95	1.00	3.70
18	0.53	0.43	0.18	0.88	1.00	3.02
19	0.69	0.93	0.14	0.98	0.91	3.65
20	0.50	0.37	0.11	0.94	0.94	2.86
Total	0.68	0.78	0.19	0.84	0.94	3.42

[#]Optimal levels used for calculation of IRDP: Prescriptions including antibiotics: 30 per cent, polypharmacy prescription: 0 per cent, prescriptions including injection: <10 per cent, drugs prescribed by generic name: 100 per cent, drugs prescribed from essential medicines list: 100 per cent. The optimal value for each indicator was 1.

have biased the prescribing indicators in a socially desirable direction. Second, determining the quality of diagnosis and evaluating the appropriateness of choice of medicine was beyond the scope of our study. Third, the study was conducted in only one district of Karnataka and hence it would not be possible to generalize the findings in other districts.

In conclusion, prescription and dispensing practices of health care providers in Shimoga district were found to be below the optimal level, especially with respect to prescribing injection and antibiotics. It is, therefore, necessary to train the health care providers in the district about the rational use of injections and antibiotics. Interventions such as interactional group discussion on safety of injection to doctors working in the primary health centres have shown to reduce injection prescribing[13]. It is also necessary to ensure that the EML and STG for antibiotic use are made available in every primary health centre. Shimoga is one of the better performing districts in the State with respect to health indicators[14]. The prescribing indicators observed in the district are, therefore, likely to reflect the best case scenario in the State and are likely to be better compared with other districts.

Conflicts of interest: None.

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