Original Articles

Prescribing and dispensing activities at the health facilities of a non-governmental organization

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ABSTRACT

Background. Prescribing and dispensing surveys are prerequisites to achieving rational drug use. There is a dearth of such studies in India, particularly in the non-governmental organization sector.

Methods. We carried out a survey at the outpatient facilities maintained by the Southern Health Improvement Samity, a non-governmental organization in the South 24 Parganas district of West Bengal. Data were collected prospectively by interviewing patients immediately after patient–physician and patient–dispenser encounters. Pre-designed forms were used to collect data pertaining to World Health Organization drug-use indicators and some additional indices. The calculations of cost of therapy involved some approximation.

Results. Of the 312 prescriptions analysed, the majority were signed, legible and complete with respect to age/gender data; 95.5% used Latin abbreviations and 7.7% mentioned neither signs and symptoms nor diagnosis. The average number of drugs per encounter was 3.2; only 2 patients were treated without drugs; 46.2% of drugs were prescribed by generic name. Use of antibiotics (72.8% of encounters) and irrational fixed dose combinations (45.6% of prescribed drugs) were frequent, but injection use (3.9% of presciptions) was low. The average drug cost per encounter was Rs 74.19, of which antibiotics comprised 37.1%. The availability of first-line antitubercular drugs was adequate but other key drugs were in limited supply. Essential drugs lists and formularies were not followed. Only 45.7% of prescribed drugs conformed to the World Health Organization model list of essential drugs. Only 12 preparations accounted for 70.9% of the prescribed drugs, including therapeutically doubtful ones such as cough syrups, multivitamins and carminative syrups. For the dispensing survey, 301 prescriptions were analysed separately. All the prescribed drugs were supplied for only 11.6% of prescriptions. There were no serious errors in dispensing but 43.8% of dispensed products were inadequately labelled. Patients knew the correct mode of use for 64.5% of dispensed drugs. The average consultation and dispensing times were 3.7 and 3.1 minutes, respectively.

Conclusion. Frequent use of antibiotics, irrational fixed dose combinations and preparations of uncertain efficacy, inadequate labelling of dispensed drugs and lack of access to standard tools for rational drug use such as locally adapted essential drugs list, formularies and standard treatment guidelines were some of the problematic prescribing and dispensing trends identified through this survey. Educational interventions are required to rectify these problems.

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INTRODUCTION

Health administrators and policy-makers need to collect data to assess patterns of drug use, rectify specific problems in drug use and monitor drug use over a period of time. The aim is to improve therapeutic efficiency and cost-effectiveness of drug use.

A number of studies have reported investigation of drug use in the private and public (government) sectors in India and other countries with similar socio-economic characteristics.[1–8] However, very few studies have looked at the drug utilization scenario in the non-governmental organization (NGO) sector, although this sector often renders yeoman's service in areas underserved by the public health infrastructure.

Southern Health Improvement Samity (SHIS) is an NGO carrying out varied welfare activities for deprived sections of the community in the South 24 Parganas district of West Bengal. A prime component of SHIS's activities is the provision of health care through its outpatient facility at SHIS headquarters in the town of Bhangar, and its various peripheral outreach centres. The health care activity entails supply of drugs free of cost, which consumes a large proportion of the organization's health budget. The present study was undertaken at the initiative of SHIS administrators and advisers, who felt that a survey was necessary to assess the scope for improvement in rational drug use.

METHODS

Study design

The 'drug-use encounter'—the period of interaction between the patient and the health care provider—is probably the most important source of prospective data in drug-use surveys.[9] We planned to gather quantitative data prospectively from patient–prescriber and patient–dispenser encounters.

To encourage consistency in drug-use studies, the World Health Organization (WHO) has developed a set of core and

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complementary drug-use indicators[10] (Table I). These indicators were utilized for the present study. Data pertaining to all 12 core and 5 of the 7 complementary drug-use indicators indicated in Table I (excluding extent of prescription in accordance with treatment guidelines and percentage of patients satisfied with the care received) were collected prospectively. Data on a few additional indicators pertaining to the comprehensibility of the prescriptions were also collected. The collected data were also analysed for the use of fixed dose combinations (FDCs) and serious drug interactions.

Study setting

The outpatient facility at SHIS headquarters in the town of Bhangar and two of its outreach centres at Sarberia and Basanti were selected as study units. Patients attending these centres are mostly poor and cannot afford treatment offered by the local private practitioners on a regular basis. SHIS also maintains mobile riverine launch clinics which extend primary health care services to the nearby areas of the Sunderbans. These were excluded for logistical reasons. The selected centres are staffed by medical practitioners, from both allopathic and indigenous systems of medicine, and dispensers who have received mostly on-the-job training. None of the doctors are postgraduates. A large section of patients attending the health facilities suffer from tuberculosis (TB). Medicines to such patients are provided free of cost. Other patients receive drugs free of cost as far as possible, depending upon the availability.

Data collection

Data were collected from June 1999 to August 1999. Three investigators visited each centre on at least 2 non-consecutive days to gather data from at least 100 prescribing and 100 dispensing encounters.

TABLE I. World Health Organization drug-use indicators for outpatient facilities

Core drug-use indicators

Prescribing indicators

1. Average number of drugs per encounter
2. Percentage of drugs prescribed by generic name
3. Percentage of encounters with an antibiotic prescribed
4. Percentage of encounters with an injection prescribed
5. Percentage of drugs prescribed from an essential drugs list or formulary

Patient care indicators

6. Average consultation time
7. Average dispensing time
8. Percentage of drugs actually dispensed
9. Percentage of drugs adequately labelled
10. Patient's knowledge of correct dosage

Health facility indicators

11. Availability of a copy of an essential drugs list or formulary
12. Availability of key drugs

Complementary drug-use indicators

13. Percentage of patients treated without drugs
14. Average drug cost per encounter
15. Percentage of drug costs spent on antibiotics
16. Percentage of drug costs spent on injections
17. Prescription in accordance with treatment guidelines
18. Percentage of patients satisfied with the care they received
19. Percentage of health facilities with access to impartial drug information

To gather data, patients were interviewed and the prescription slips provided to them were inspected immediately after their interaction with the health care provider. All prescribers and dispensers were SHIS staff and the survey was carried out entirely on SHIS premises. Data were recorded on pre-designed data collection forms. Data pertaining to some of the indicators were gathered by visiting the health facility's stores and offices.

Logistical support was provided by SHIS administrators. To monitor objectivity, the investigators did not disclose the date of visit beforehand. Observations were made as discreetly as possible keeping the prescribers and dispensers ignorant of the exact nature of the survey. However, it was impossible to conceal the fact that some sort of survey was on.

Assessing the cost of therapy

Commercially available drug formularies were used to assess the cost of drugs prescribed at each encounter. Prescriptions that included antitubercular drugs were excluded from the analysis because the SHIS administration procures these drugs centrally and supplies them completely free of cost to all TB patients attending SHIS clinics. Prescriptions containing locally manufactured herbal preparations (SHIS has a herbarium and manufactures some herbal preparations in-house on a small scale) were also excluded from the cost analysis because of the difficulty in assessing the exact cost to be borne by the patient. The analysis, however, took into account the retail cost mentioned in the commercial drug formularies. Patients were actually paying this retail cost and local taxes while purchasing the medicines. The possibility of brand substitutions being made at the local chemist shops in case of non-availability of the prescribed brands and forcing the patient to buy more than the exact amount prescribed (e.g. a 10-tablet strip when 8 were prescribed) also could not be ruled out. Hence, the estimates of drug cost are approximations.

RESULTS

The data obtained have been analysed and summarized in the form of various drug-use indicators (Tables II and III).

The prescribing survey

New and old (follow up) patients were fairly well distributed in the surveyed population. Patients of TB generally require treatment with multiple drugs. However, in the overall sample, only 12.5% of the patients represented freshly diagnosed cases of TB, with another 3.9% being old cases presenting with fresh complaints. Hence, patients with TB were not analysed separately. Men (52.3%) and women (47.7%) patients were also almost equally distributed. The overall mean age (32.7 years) indicates a preponderance of adults, but not elderly, patients.

The great majority of prescriptions were signed, legible, decipherable and complete with respect to patient identification particulars. Over 95% tended to use Latin abbreviations. The majority mentioned at least the signs and symptoms for which the drugs were being prescribed, if not a clear-cut diagnosis. However, 7.7% mentioned neither.

A total of 995 individual drugs were prescribed for 312 drug encounters, giving an average of 3.2 drugs per encounter. Non-drug therapy was recommended in only 2 encounters. Although the majority of prescriptions (87.5%) contained brand names; 46.2% of the drugs were prescribed by generic name.

A reasonable number (90.5%) of the drugs prescribed had the complete prescribing regimen mentioned with respect to individual dose, frequency of dosage, route and duration of treatment.

TABLE II. Results of the prescribing survey

Assessment parameter*	Bhangar	Sarberia	Basanti†	Total
New patients	62 (56.4)	52 (51.0)	66	180 (57.7)
Patients with tuberculosis	10 (9.1)	18 (17.7)	11	39 (12.5)
Male patients	70 (66.0)	48 (49.0)	41	159 (52.3)
Mean age of all patients (years)	30.6	33.6	32.8	32.7
Prescriptions				
analysed	110	102	100	312
without age or gender data	4 (3.6)	4 (3.9)	0	8 (2.6)
not signed by prescriber	11 (10.0)	0	0	11 (3.5)
not written legibly	23 (20.9)	6 (5.9)	1	30 (9.6)
using Latin abbreviations	96 (87.3)	102 (100)	100	298 (95.5)
using difficult abbreviations	5 (4.6)	0	0	5 (1.6)
with diagnosis or differential diagnosis	42 (38.2)	44 (43.1)	88	174 (55.8)
with symptoms and signs	78 (70.9)	73 (71.6)	63	214 (68.6)
without diagnosis, differential diagnosis, symptoms or signs	14 (12.7)	10 (9.8)	0	24 (7.7)
without drugs	1 (0.9)	1 (1.0)	0	2 (0.6)
with solely generic names	13 (11.8)	6 (5.9)	20	39 (12.5)
containing antibiotics‡	84 (76.4)	77 (75.5)	66	227 (72.8)
containing injections	9 (8.2)	3 (2.9)	0	12 (3.9)
with fixed dose combinations	93 (84.5)	94 (92.2)	93	280 (89.7)
Total drugs prescribed	305	337	353	995
Average drugs/prescription	2.8	3.3	3.5	3.2
Drugs prescribed				
by generic name	109 (35.7)	128 (38.0)	223 (63.2)	460 (46.2)
with complete regime	231 (75.7)	321 (95.3)	348 (98.6)	900 (90.5)
number of antibiotics	122 (40.0)	129 (38.3)	91 (25.8)	342 (34.4)
number of injections	9 (2.9)	3 (0.9)	0 (0)	12 (1.2)
irrational fixed dose combinations	124 (40.7)	145 (43.0)	185 (52.4)	454 (45.6)
included in WHO essential drugs list§	146 (48.3)	162 (48.2)	144 (41.0)	452 (45.7)
Break-up of drugs prescribed frequently				
Albendazole	32 (10.5)	31 (9.2)	14 (4.0)	75 (7.5)
Amoxicillin	23 (7.5)	17 (5.0)	16 (4.5)	56 (5.6)
Antacid	10 (3.3)	5 (1.5)	47 (13.3)	62 (6.2)
Carminative syrup	16 (5.3)	31 (9.2)	62 (17.6)	109 (11.0)
Co-trimoxazole	11 (3.6)	12 (3.6)	21 (6.0)	44 (4.4)
Cough syrup	34 (11.2)	20 (5.9)	28 (7.9)	82 (8.2)
Deriphylline¶	2 (0.7)	12 (3.6)	14 (4.0)	28 (2.8)
H_2 blockers	14 (4.6)	23 (6.8)	31 (8.8)	68 (6.8)
Metronidazole	11 (3.6)	17 (5.0)	10 (2.8)	38 (3.8)
Paracetamol	14 (4.6)	7 (2.1)	32 (9.1)	53 (5.3)
Salbutamol**	20 (6.6)	7 (2.1)	0 (0)	20 (2.0)
Vitamin B complex	20 (6.6)	42 (12.5)	8 (2.3)	70 (7.0)
Total	207 (67.9)	224 (66.5)	283 (80.2)	705 (70.9)
Average consultation time (in minutes)	3.2	3.0	4.9	3.7
Availability of essential drugs list (either WHO or Indian)	No	No	No	
Commercial drug formularies	Yes	Yes	Yes	
Access to impartial drug information	Yes	No	No	

* all prescriptions mentioned the date except 1 at Sarberia † percentages not provided where denominator was 100
‡ include all antimicrobials and antihelminthics § includes drugs actually listed, drugs that are alternatives to therapeutic group examples actually listed and preparations whose strength is close to but does not exactly tally with the preparation strengths mentioned in the WHO list ¶ proprietary formulation of etophylline in combination with theophylline ** alone or in fixed dose combination with theophylline
TB tuberculosis FDC fixed dose combinations Figures in parentheses are percentages

Most of the incomplete regimes pertained to continued use of preparations such as cough syrups and multivitamins.

A large proportion (72.8%) of the prescriptions contained antibiotics (including all antimicrobials and antihelminthics) which accounted for over a third (34.4%) of the prescribed drugs. However, the use of injections was restricted, accounting for only 1.2% of all drugs prescribed.

A very large proportion of the prescriptions (89.7%) contained one or more FDCs and irrational FDCs accounted for 45.6% of the prescribed drugs. FDCs were considered to be irrational if they were not included in the WHO or National essential drugs lists. No prescription contained seriously interacting drugs.

The proportion of prescribed drugs (45.7%) included in the WHO model list of essential drugs fell short of the 50% level. Incidentally, copies of neither the 1998 WHO list[11] nor the 1996 National essential drugs list of India[12] were available at any of the 3 centres, though commercial drug formularies were available to enable cross-checking of brand names and prices. Only the

TABLE III. Results of the dispensing survey

Assessment parameter	Bhangar	Sarberia	Basanti	Total
New patients	60 (59.4)	57 (56.4)	69 (69.7)	186 (61.8)
Patients with tuberculosis	7 (6.9)	23 (22.8)	12 (12.1)	42 (14.0)
Male patients	54 (57.5)	47 (53.4)	39 (40.6)	140 (50.4)
Mean age of patients (years)	29.4	32.1	34.2	31.9
Prescriptions				
analysed	101	101	99	301
without complete age/gender data	7 (6.9)	13 (12.9)	3 (3.0)	23 (7.6)
against which no drugs dispensed	21 (20.8)	10 (9.9)	3 (3.0)	34 (11.3)
in which all prescribed drugs dispensed	11 (10.9)	19 (18.8)	5 (5.1)	35 (11.6)
against which wrong drugs dispensed	0	1 (1.0)	0	1 (0.3)
Encounters where no effort was made to explain drug use to the patient	12 (11.9)	4 (4.0)	0	16 (5.3)
Encounters where injections were given	0	2 (2.0)	0	2 (0.7)
Injections where adequate aseptic precaution was not taken	–	1 (50)	–	1 (0.3)
Drugs prescribed				
total number	280	356	357	993
average number per prescription	2.77	3.52	3.61	3.30
to patients with tuberculosis	26	86	50	162
average/patient with tuberculosis	3.71	3.74	4.17	3.86
Drugs dispensed				
in full	113 (40.4)	174 (48.9)	138 (38.7)	425 (42.8)
in part	15 (5.4)	6 (1.7)	81 (22.7)	102 (10.3)
inadequately labelled	49 (38.3)	51 (28.3)	131 (59.8)	231 (43.8)
the usage of which the patient knew	84 (65.6)	131 (72.8)	125 (57.1)	340 (64.5)
Average dispensing time (minutes)	3.7	3.1	2.6	3.1
Availability of antitubercular drugs	Yes	Yes	Yes	
Availability of other key drugs*	Yes	Yes	Yes	

* Stocks often not sufficient to supply full quota of all drugs against each prescription. Adjustments made accordingly, e.g. antibiotics given for first 3 days only. Figures in parentheses are percentages

Bhangar centre had access to impartial drug information in the form of a small library which had books on pharmacology, internal medicine and some well-known reference texts in various medical subjects.

The average consultation time was 3.7 minutes per encounter.

The dispensing survey

The total sample here had a preponderance of new cases (61.8%) but the proportion of TB cases (14%) was low. Men (50.4%) and women (49.6%) patients were almost equally distributed. The overall mean age (31.9 years) was similar to that in the prescribing survey.

Only 7.6% of the prescriptions handled by the dispensers were incomplete with respect to patient identification parameters such as age and sex.

The 301 prescriptions handled called for 993 drugs to be dispensed at an average of 3.3 drugs to be supplied per prescription. For only 11.6% of the prescriptions was the full quota of prescribed drugs supplied. In 46.9% of encounters, the prescribed drug items were not dispensed at all due to non-availability.

Serious dispensing errors were few, for example, a wrong drug was dispensed in only 1 case. However, 43.8% of all dispensed drugs were inadequately labelled and in 5.3% of patient–dispenser encounters, no effort was made to explain to the patient how the drug was to be taken. Overall, for 64.5% of the dispensed drugs, the proper dosage schedule and mode of use was known to the patients at the end of the prescribing and dispensing encounters.

The average dispensing time, inclusive of explanation time, was 3.1 minutes.

Cost of therapy

The cost of therapy parameters have been presented in Table IV. The average cost of drugs per encounter at the Basanti centre (Rs 59.25) was substantially lower than those at the Bhangar (Rs 82.64) and Sarberia (Rs 79.54) centres.

DISCUSSION

Prescribing and dispensing are key components of the drug-use cycle. The quality of these encounters has a direct bearing on patient compliance, which in turn influences therapeutic success or failure. Irrational prescribing and errors in dispensing are global problems.[13–16] The first step in any intervention programme to improve drug utilization is to assess the extent of existing problems in prescribing and dispensing. The present study at the SHIS health facilities was undertaken with this goal in mind. It is

TABLE IV. The cost of therapy indicators

Assessment parameter	Bhangar	Sarberia	Basanti	Overall
Prescriptions analysed for cost data	83/110 (75.5)	81/102 (80.4)	76/100 (76.0)	240/312 (76.9)
Average drug cost per encounter (in rupees)*	82.64	79.54	59.25	74.19
Drug cost spent on antibiotics†	(39.6)	(38.0)	(32.3)	(37.1)
Drug cost spent on injections	(0.91)	(0.09)	(0)	(0.39)

* drug cost estimations are exclusive of local taxes paid by the patients while purchasing the drugs from chemist shops and are approximate as explained in the text
† antibiotics include all antimicrobials and antihelminthics
Figures in parentheses are percentages

one of the few studies, if not the only Indian one, covering both prescribing and dispensing in the NGO sector.

Methodological issues

There are quantitative and qualitative methods for collecting data on drug use.[9] Quantitative methods provide hard statistical facts pertaining to various indicators in the drug-use process. Qualitative methods are useful for examining underlying knowledge, beliefs and attitudes. Quantitative studies may be retrospective or prospective. Retrospective surveys, based upon existing records, are usually simpler, less time-consuming and inexpensive. Prospective studies are more elaborate and involve greater observation time and expense but they probably yield more comprehensive and reliable information.

The WHO indicators have been widely field-tested, including in India.[4,7] Their use in community-based surveys would make comparison between such studies easier. Older studies[1,2] do not offer this advantage of a consistent set of indicators. The core indicators are highly standardized and do not require adaptation to the specific health facility being investigated. However, the complementary indicators are less standardized and require defining and adaptation before use. Two of the complementary indicators could not be used in this study because SHIS doctors do not follow any standard treatment guidelines and the study setting made it difficult to gather objective data on patient satisfaction with the care received. The additional indicators pertaining to the comprehensibility of prescriptions and the use of irrational FDCs are particularly important in the Indian context.

The possibility of bias in such studies cannot be eliminated completely. The very presence of an observer may induce doctors to write better prescriptions and dispensers to dispense more carefully. However, in the present survey, every effort was made to ensure that the exact nature and purpose of the study was concealed from the health care providers. Further, no investigator had any conflict of interest in the results. There may also be seasonal variations in some of the indicators but this cannot be commented upon without conducting studies throughout the year.

Quality of prescribing

The completeness of the prescriptions with regard to patient and prescriber identification and their legibility was reasonably satisfactory. However, the use of Latin abbreviations cannot be encouraged. Prescriptions that failed to mention either signs, symptoms or diagnosis could create problems during follow up.

The average number of drugs per prescription, at 3.2, is at the borderline of polypharmacy. Non-drug therapy was not an option, since only 2 of 312 prescriptions advocated only non-pharmacological treatment. Thus, the possibility of drugs being used for placebo effects (e.g. a multivitamin prescription for a child complaining of a mild attack of coryza) cannot be discounted.

The extent of generic prescribing was less than 50% and there is scope for improvement here. A very large number of the prescriptions contained one or more FDCs, which accounted for a large proportion of the prescribed drugs. Although FDCs are not necessarily irrational, the majority of those encountered during the survey cannot be justified in terms of better therapeutic efficacy, less toxicity or reduced cost. Incidentally, anti-TB drugs were used separately and not as FDCs. The use of antibiotics was also frequent and they accounted for slightly over one-third of the prescribed drugs. However, a satisfactory trend was the use of injections only in genuinely demanding situations.

An essential drugs list is one of the major tools for implementing rational drug use and adoption of such a list for any community-based health care programme can greatly improve the cost-effectiveness of therapy. SHIS does not yet have an essential drugs list of its own and the 1996 National essential drugs list of India is mostly not available. Using the WHO list as a model, about 46% of the drugs prescribed were found to be from this list. Thus, here also there is room for improvement.

An interesting finding was that over 70% of the individual drugs prescribed were accounted for by just 12 preparations, 6 of which (including co-trimoxazole) were multi-ingredient formulations. The most frequently prescribed preparations (cough syrup, vitamin B complex and carminative syrup at Bhangar, Sarberia and Basanti, respectively) are controversial preparations in that their efficacy is questionable in the majority of situations and no definite therapeutic benefit is known to be obtained from their use. While a restricted number of preparations can make drug procurement and supply logistics simpler and tends to keep the incidence of adverse drug reactions and drug–drug interactions low, the frequent use of controversial preparations is a cause for concern.

The average consultation and dispensing times were brief but this has to be considered in the context of a heavy patient load—250 to 300 patients per working day of 7 hours (inclusive of breaks) attended to by 3 prescribers and 2 to 3 dispensers concurrently.

Overall, the results are more or less in concordance with community-based surveys carried out in India and other developing countries.[4,7,17,18]

Quality of dispensing

On account of budgetary constraints, the policy of SHIS is to supply drugs free of cost only to TB patients. Other patients are supplied free drugs, if available. That the full quota of prescribed drugs was supplied in only 11.6% of the prescriptions and 47% of prescribed drug items were not dispensed at all has to be interpreted against this background.

Sincere efforts were made by the dispensers to explain drug use to the patients. However, patients were still leaving the premises without a proper idea about the use of over 35% of dispensed drugs. This aspect needs improvement. The counselling activities of community pharmacists have a vital bearing on patient compliance. Most physicians accept this role.[19-21] Pharmacists can also be trained to screen prescriptions for possible prescribing errors and significant drug interactions.[21,22] Close cooperation between physicians and pharmacists is essential for the safety and efficiency of pharmacotherapy. Physicians at SHIS agree that the role of the dispensers is complementary to their activity but opine that they also need continuing education to achieve better integration into the framework of rational pharmacotherapy.

Cost of therapy

The average drug cost per encounter was Rs 74.19. Though this amount is not very high, in view of the continually increasing prices of many formulations in the Indian pharmaceutical market, efforts to contain this cost would be worthwhile, since a large proportion of patients who seek health care at SHIS come from daily-wage earning families. Switching over to fully generic prescribing is a possible solution. However, SHIS doctors fear that the cost-containment purpose of generic prescribing would be defeated by the attitude of local drug sellers who tend to dispense the costliest brands against generic prescriptions in order to maximize profits. While we have not formally verified this observation, personal observations suggest that there is an ele-

ment of truth in it. Further, the large number of multi-ingredient FDCs being prescribed make generic prescribing a difficult proposition.

Intervention strategies

Correction of prescribing and dispensing errors can considerably reduce errors in the use of medication by patients.[23] Various measures have been advocated to promote rational prescribing. Proven effective interventions in developed countries include regular audit; standard treatment guidelines based on wide consultation and consensus, properly introduced and with scope for feedback; structured drug order forms; face-to-face feedback on specific errors to selected individuals; and focused educational efforts.[24–28] Antibiotic control policies and formularies, combined with educational intervention, can improve patient outcome and contain the antibiotic budget. Essential drugs lists and printed materials are probably not effective without a concurrent educational programme.[24,29] The principal contributing factors to errors in dispensing, identified in community-based surveys, include high prescription volumes, pharmacist fatigue, interruptions to dispensing, and similar or confusing drug names.[30,31] Factors identified as being important in reducing the risk of dispensing errors include a systematic dispensing workflow, improving the packaging and labelling of products, having distinctive drug names, keeping one's knowledge of drugs up-to-date, avoiding interruptions, improving doctors' handwriting, privacy when counselling patients and reduced workload on pharmacists.[30,31] Unfortunately, in developing countries, most of the interventions to correct drug-use problems have not been studied adequately and therefore remain unproven.[24] At SHIS, the number of prescribing and dispensing personnel cannot be increased at the moment to take care of the high patient load. However, the other problems identified through the present survey are being targeted for rectification through a focused educational approach. Plans to develop a local formulary and standard treatment guidelines for commonly encountered clinical situations are on the anvil.

In conclusion, it can be said that, from the viewpoint of the rational drug-use investigator and the health administrator, the picture which emerges from the present survey of prescribing and dispensing at SHIS health facilities is mixed. Many trends are encouraging, while others, including the high proportion of antibiotics and irrational FDCs among prescribed drugs, frequent use of preparations of equivocal therapeutic benefit, inadequate labelling of dispensed drugs, and inadequate counselling, are cause for concern. These are the areas which can be targeted for rectification through educational efforts so as to improve the therapeutic and economic efficiency of drug use.

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