

# Irrational drug use in India: A prescription survey from Goa

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## ABSTRACT

**Background:** There is concern regarding the irrational production, prescription and use of drugs in India. This study aimed to describe the quality of prescriptions by medical practitioners, including both the layout of the prescription and the type and number of drugs prescribed.

**Materials and Methods:** A survey of all prescriptions dispensed at a busy pharmacy in the state of Goa, India, was carried out over a consecutive seven-day period. Each prescription was rated on the basis of a *priori* and pilot-tested variable list. The prescriptions by private practitioners were compared with those from practitioners in the public healthcare system.

**Results:** Nine hundred and ninety prescriptions were collected. The majority (83.9%) were from private practitioners. The quality of the layout of the prescriptions was unsatisfactory: information to identify the practitioner was incomplete in more than a third of the prescriptions and information to identify the patient was incomplete in more than half. Clarity of written instructions on how to take the medicines was unsatisfactory in the majority of prescriptions. Polypharmacy was the norm, with more than half (52.7%) the prescriptions containing at least 3 medicines. Forty per cent of prescriptions included a vitamin or tonic preparation and a quarter of the prescriptions included an antibiotic and an analgesic. Over 90% of prescriptions contained only branded medicines. Private practitioners prescribed significantly greater number of medicines and were more likely to prescribe vitamins and antibiotics, and branded medicines.

**Discussion:** This study confirms that the quality of prescriptions, both in terms of layout and the content of the drugs prescribed, is inadequate. There is a need to standardize the format of prescriptions in India so that all essential information is included. There is a need to strengthen an independent mechanism for continuing professional development of practitioners to ensure that patients are always given evidence-based, cost-effective treatments.

**KEY WORDS:** Rational drug use, pharmacovigilance, survey

In the absence of a clear, comprehensive and rational drug policy, the production of pharmaceutical preparations in India is grossly distorted.<sup>[1]</sup> Thus, Indian markets are flooded with over 70,000 formulations, compared to roughly 350 preparations listed on the WHO Essential Drugs List. There are thousands of drug companies, and several companies manufacture generic preparations using different brand names. In addition, thousands of formulations of vitamins, tonics and multi-drug combinations that are unique to the Indian market are manufactured and marketed here. Thus, there is fierce competition amongst drug companies, and they encourage doctors to prescribe branded medicines, often in exchange for subtle favours. Such practices accrue benefits for the company concerned, but result in prescriptions of drugs that are not necessary and combinations that are irrational.<sup>[1,2]</sup> Thus, it is not surprising that studies of prescribing in primary care show that the majority of prescriptions in India are of drugs of 'doubtful efficacy'.<sup>[3]</sup>

The aim of this study was to describe the prescribing behav-

our of physicians in Goa, India. Our focus was not on whether the drugs were indicated for the patient's illness, but on the layout and content of the prescription. In particular, we wished to study the quality of the prescriptions in terms of the adequacy and clarity of the information contained, and to describe the types, and number, of medicines prescribed by doctors. We wished to examine the prevalence and extent of polypharmacy, and the use of drugs which are considered irrational, notably vitamins and tonics which, barring nutritional disorders, have no other specific indications in medicine. We also aimed to study differences between public and private practitioners on these factors; we hypothesized that private practitioners were more likely to prescribe branded medicines, because they were more likely to be influenced by pharmaceutical company marketing.

## Materials and Methods

The study was conducted in one of the busiest and oldest pharmacies (established in 1911 and catering to the needs for ayurvedic,

homeopathic and allopathic medicines of over 200 subjects daily) in Panaji, the capital city of the state of Goa situated on India's west coast. This state having a population of 1.4 million<sup>[4]</sup> is ranked along with Kerala as a state having the best human development and reproductive health indicators in the country.<sup>[2]</sup> Sixty per cent of Goa's population resides in rural areas. The infant mortality rate in the state is 36.7 per 1000 live births (national average 67.6). Although the data regarding the prevalence of malnutrition in Goa could not be located, the prevalence is acknowledged to be low due to the relative prosperity of the population.

The study was a cross-sectional survey of all prescriptions received at the pharmacy over a seven-consecutive-day period in January 2003. Prescriptions were photocopied when presented to the pharmacist. A pilot study with 20 prescriptions from the pharmacy was conducted to define the variables to be rated. In the main study, each prescription was rated according to the variables shown below. The *layout of the prescriptions* was assessed on the basis of the presence or otherwise of the following details: use of letterhead, information about prescriber (doctor's name, address, phone number, qualifications, registration number and signature), patient details (patient's name and address and date of consultation). The *content of prescriptions* was assessed on the basis of drugs used (number, duration of therapy, type of medications: antibiotics; analgesics; steroids; vitamins/tonics; GI drugs; psychotropics; cardiac drugs; whether generic names or brand names were used, cost of drugs and if brand name was used if it was the cheapest brand of the molecule, use of non-allopathic medications and if injectable medications were prescribed)

The *clarity of prescriptions* was assessed on the basis of the following points:

- Whether the prescription was legible (four-point rating system): No problem reading all aspects of prescription + very clear immediately; Clear, but required effort; 1 aspect (name of the drug/dose/duration/patient's name) not clear; > 1 aspect not clear.
- Whether the dose (strength of the preparation + total daily dosage) was clear (four-point rating system); Clear dose stated for all medicines; clear, but took effort to interpret; Either criteria not met for at least one medicine; Either criteria not met for more than one medicine.
- Whether the instructions for the patient were clear (four-point rating system): Very clear; Took effort to interpret; Instruction for at least one 1 medicine not clear; Instruction for > 1 medicine not clear.

Each prescription was rated on the basis of the variables listed above. The four-point rating scales for the three Clarity variables were subjected to an inter-rater reliability test. Kappa exceeded 0.8 for all of them. The prescriptions were rated by one of the authors (PB) a qualified pharmacist working as a community pharmacist at the pharmacy. Discrepancies or difficulties in coding were referred to the first and second authors for resolution. Data was analysed using SPSS Version 11. Comparisons were made on these variables between private and public practitioners to test for differences in prescription behaviour between these practitioners. Chi-square tests (with continuity correction) were used to test for differences in categorical variables and t-test for continuous variables. Tests of significance are two-tailed.

### Results

A total of 990 prescriptions were received during the study period. The majority (83.9%) were from private practitioners. The findings pertaining to the layout and content of the prescription are shown in Table 1. The prescribing practitioner's name and contact details were missing from more than a quar-

ter of the prescriptions. Three-quarters of the prescriptions did not include the Medical Registration Number of the practitioner and less than half had the full name of the patient. The majority of the prescriptions did not have clear instructions for the patient on how to use the medicines prescribed.

Most patients (n=799; 80.7%) received more than one medicine per prescription; more than half (n=522; 52.7%) received three or more medicines per prescription. 13.3% (n=132) received 5 or more medicines. 21.5% (n=213) of prescriptions had no details of the duration of treatment. Most prescriptions (23.6% of valid prescriptions) were for a period of 30 days. Non-allopathic medicines were used in 8.7% (n=86) prescriptions and parenteral (injectable) preparations in 5.3% (n=52). The overwhelming majority of prescriptions (n=956; 96.6%) consisted entirely of branded medicines; in just over two-thirds of the prescriptions (n=672; 68.5%), the cheapest brand was used for at least one medicine. Details of the types of medications prescribed are presented in Figure 1.

As shown in Table 2, there were significant differences between the prescriptions of private and public practitioners: the prescriptions of private practitioners were more likely to include the practitioner's name and qualifications, contact details, and medical registration number, and the complete patient name. The private practitioners were more likely to prescribe more medicines. Their prescriptions specifically included certain classes of drugs: antibiotics, vitamins/tonics and non-allopathic medicines. On the other hand, public practitioners were more likely to prescribe psychotropics and cardiovascular drugs. Private practitioners were significantly more likely to prescribe only branded medicines, though over 90% of prescriptions by both groups were of branded medicines.

### Discussion

This study, probably the first of its kind to be reported from the state of Goa has highlighted the presence of severe deficiencies in the layout of a significant proportion of prescrip-

**Table 1: Layout, legibility and clarity of prescriptions**

Attribute studied	Frequency (n=990)
Letterhead used	676 (68.3) (+24.2% used a stamp)
Doctor's Name present	701 (70.8)
Qualification stated	645 (65.2)
Complete address stated	719 (72.6)
Telephone stated	614 (62)
Doctor's signature	927 (93.6)
Medical Registration Number stated	239 (24.1)
Date of consultation mentioned	837 (84.5)
Patient's full name stated	411 (41.5)
Patient Address stated	0 (0)
Legibility	875 (88.4) clear; 7.8% at least one aspect unclear
Clarity of Dose	570 (57.6) had at least one medicine dose unclear
Clarity of Instructions	857 (86.5) had unclear instructions for use of at least one medicine

Figures in parentheses indicate percentages

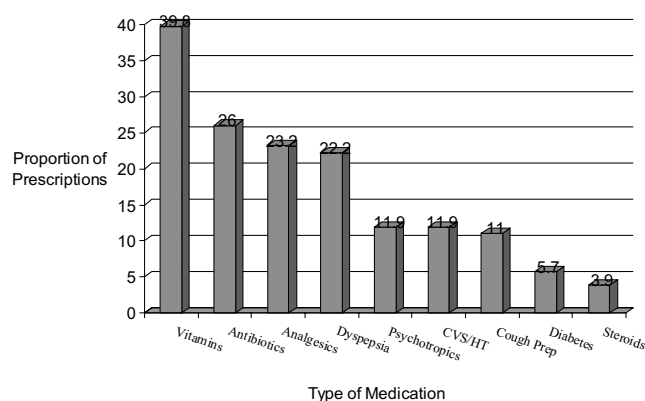


Figure 1: Type of medicines prescribed

Table 2: Attributes of prescriptions: Comparison of prescribers from private and public healthcare system

Item	Public (n=159)	Private (n=831)	df	P*
Doctor's name	4.4%	83.5%	X <sup>2</sup> =400.4, 1	<0.001
Qualification	1.9%	77.3%	X <sup>2</sup> =330.6, 1	<0.001
Clinic address	95%	82.3%	X <sup>2</sup> =45.8, 2	<0.001
Telephone	3.8%	73.2%	X <sup>2</sup> =269.8, 1	<0.001
Complete Medical Registration Number.	1.3%	44.6%	X <sup>2</sup> =117.1, 2	<0.001
Date	60.4%	89.2%	X <sup>2</sup> =82.4, 1	<0.001
Partly complete	84.2%	93.7%	X <sup>2</sup> =12.9, 2	<0.01
Patient name				
Legible	91.2%	87.8%	Not significant	
Clarity of dose	52.8%	40.4%	X <sup>2</sup> =8.9, 2	0.01
Clarity of Instructions	10.1%	14.1%	X <sup>2</sup> =5.8, 2	0.05
Number of medicines	2.4	2.9	T=-3.55, 988	<0.001
Antibiotics	14.5%	28.2%	X <sup>2</sup> =12.3, 1	<0.001
Vitamins/Tonics	27.2%	40.9%	X <sup>2</sup> =9.3, 1	0.002
Steroids	1.3%	4.5%	X <sup>2</sup> =3.5, 1	0.07
Non-allopathic med	4.4%	9.5%	X <sup>2</sup> =3.7, 1	0.04
Psychotropics	16.4%	11%	X <sup>2</sup> =3.2, 2	0.06
CVS/HT	17%	11%	X <sup>2</sup> =4.1, 1	0.04
All branded medicines	91.6%	97.5%	X <sup>2</sup> =13.1, 2	0.001

\*Chi-square test for categorical variables; t-test for continuous variables

tions. Several prescriptions lack even the basic information such as the identity of the practitioner and patient. While the legibility of prescriptions was good (and this may partly reflect the experience of the pharmacist coding the prescriptions!), the clarity of instructions was inadequate for more than half of all prescriptions. These limitations mean that instructions are likely to be only verbal, which in our view is unsatisfactory. Pharmacists often do not know which medical practitioner has prescribed the medicines, and thus are unable to contact practitioners in case they wish to check any element of the medication. Since a number of prescriptions were not dated, there is a potential of the same prescription being re-used for an indefinite period of time.

Polypharmacy was the norm, with 80% of prescriptions having more than one medicine, with a significant proportion of patients receiving 5 or more preparations. Since many preparations were multi-drug combinations,<sup>[5]</sup> the actual number of specific pharmaceutical entities prescribed was likely to be even

higher. Vitamins and tonics, for which there are few specific medical indications, were used in almost half of all prescriptions. Antibiotics, analgesics and drugs for dyspepsia were prescribed in almost a quarter of prescriptions. These findings are similar to studies from other parts of India. For example, in one study of 2400 prescriptions, antibiotics were widely, and inappropriately used, and food supplements and tonics of “dubious nutritional and pharmacological value” made up a high proportion of the total drugs bill.<sup>[5]</sup> A study of 2953 prescriptions from public primary health centres in south India revealed that patients received an average of 2.71 drugs and that vitamins, antibiotics, analgesics and antihistamines were the most commonly used, accounting for more than 80% of the drugs prescribed.<sup>[6]</sup> In a study from Andhra Pradesh, it was estimated, based on WHO criteria, that most of the drugs (60%) prescribed in rural areas were non-essential, compared with 47% in urban areas.<sup>[7]</sup> A study from North India also revealed the indiscriminate use of analgesics, antibiotics, and vitamins.<sup>[8]</sup> It was noted in our study that branded medicines were more commonly prescribed than generic preparations. This finding runs counter to the recommendations of medical ethics bodies and the WHO,<sup>[1,2]</sup> the fact that at least in one-third of prescriptions, the cheapest brand was not used also reflects the apparent lack of concern that practitioners have for the economic consequences of drug prescriptions.

Significant differences were noted between public and private prescriptions on all parameters and there is no evidence-based explanation for these differences. Public practitioner prescription layout was more likely to be unsatisfactory in terms of doctor and patient identification and this is likely to reflect the fact that different doctors may see patients at different times and prescription formats usually consist of scraps of paper with only the hospital stamp on it. Private practitioners' prescriptions revealed a significantly greater numbers of drugs, especially antibiotics, vitamins/tonics and steroids, and branded medicines. These differences have also been reported from other studies showing that private doctors prescribe more medicines,<sup>[5]</sup> and public doctors use generics more often.<sup>[8]</sup> It is likely that some of these differences reflect the differential impact of the incentives and information provided by pharmaceutical companies to public and private practitioners in India.<sup>[9]</sup>

The principal limitation of the study was that it was located in only one pharmacy and may thus not be representative of prescription patterns across the state. However, the pharmacy selected was one of the oldest and most reputable in the state. Another limitation was the lack of information regarding the patient's diagnosis; thus, it is possible that differences between the private and public practitioners could reflect true differences in the types of diseases being treated. However, the principal findings of the study, which show the use of irrational drugs and polypharmacy, are unlikely to be affected by these differences since there are few diagnostic factors which are likely to interact with these outcomes. Another limitation is that the use of over-the-counter medicines and self-medication was not evaluated; this accounts for a significant fraction of drug use in India.<sup>[7]</sup>

The findings of our study, along with those of similar studies elsewhere in India, highlight the continuing crisis of irrational drug prescribing in the country. Given that the vast majority of drug purchase costs are borne out of pocket, the ultimate burden of this irrational drug use falls entirely on the patient. The differential patterns of private and public prescribing suggest a greater influence of drug company marketing and promotion on private doctors. The variation, and unsatisfactory nature of the layout and information contained in the prescriptions is largely the result of the lack of standardisation of prescription formats in the country. There is a need to carry out systematic research in this regard, which could cover both public and private pharmacies to describe the specific types of irrational drug prescription and in particular the reasons why practitioners use vitamins and tonics so frequently. It is necessary that independent bodies develop evidence-based guidelines for specific conditions. The latter would help counter the exaggerated and at times unfounded claims made in the promotional material distributed by the pharmaceutical companies. It is also important that we conduct doctor education programs on rational drug prescribing and consumer education on rational drug use. It is also necessary that we develop and use a standardised “ideal” format for all prescriptions. A sample of the format considered most appropriate is shown in Figure 2.

Irrational prescribing is a habit that is difficult to cure.<sup>[10]</sup> However, prevention is possible. There is some evidence that in-

terventions such as short problem-based training course in pharmacotherapy<sup>[10]</sup> and rational use focused workshops<sup>[11]</sup> can improve prescription behaviour and skills. There is an urgent need to implement training initiatives, with support from public sources to ensure that there is no conflict of interest, to improve prescription behaviour of practitioners in India and ensure that patients receive evidence-based, cost-effective treatments for their health problems.

### Acknowledgements

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**Figure 2: MODEL PRESCRIPTION SAMPLE**

PATIENTS NAME :	AGE:
ADDRESS :	SEX:
TEL.No. :	Rx DATE:

DISPENSED AMOUNT (for pharmacist use)	MEDICINE (generic)	TOTAL QTY	INSTRUCTIONS
	Chloramphenicol eye drops 0.5 %w/v	2bottles	1—0—1 x 30 daysInstil 1 drop every 12 hours in the left eye for 30 days
	Omeprazole 20 mg	15 caps	1—0—0 x 15 days1 cap every morning half to one hour before breakfast
	Ibuprofen 400 mg	15 tabs	1—1—1 x 5 days1 tab every eight hours on a full stomach

REFILL INFORMATION:	DO NOT	DOCTOR'S SIGN
REFILL		
REFILL	1    2    3	

DOCTORS NAME QUALIFICATION MED.REG.NO ADDRESS PH.NO:(O) (R) (MOBILE) : (Optional) CONSULTATION DAYS/TIMINGS: DOCTOR'S RESIDENCE ADDRESS:OPTIONAL	SPACE FOR DISPENSED STAMP  <table border="0" style="margin: auto;"> <tr> <td colspan="4" style="text-align: center;">DISPENSED</td> </tr> <tr> <td style="text-align: center;">1</td> <td style="text-align: center;">2</td> <td style="text-align: center;">3</td> <td style="text-align: center;">4</td> </tr> <tr> <td colspan="4" style="text-align: center;">SIGN</td> </tr> </table> _____ Next visit on:	DISPENSED				1	2	3	4	SIGN			
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