

# Drug prescription habits in public and private health facilities in 2 provinces in South Africa

G. Mohlala,<sup>1</sup> K. Peltzer,<sup>1,2</sup> N. Phaswana-Mafuya<sup>1,3</sup> and S. Ramlagan<sup>1</sup>

## عادات وصف الأدوية في المرافق الصحية في القطاعين العام والخاص في مقاطعتين في جنوب أفريقيا غوردن مهلالا، كال بلتزر، نانسي فسوانا مافيو، شاندير راملاغان

الخلاصة: هدفت هذه الدراسة إلى استقصاء عادات وصف الأدوية باستخدام المؤشرات المعيارية لمنظمة الصحة العالمية في 15 مستشفى تابعاً للقطاع العام و36 من العيادات الجراحية التابعة للقطاع الخاص، وذلك في مقاطعتين في جنوب أفريقيا. واتضح من الدراسة ارتفاع العدد الوسطي للأدوية التي توصف للمرضى في المستشفيات التابعة للقطاع العام (3.2) مقابل ما يصفه الأطباء العامون (2.8)، وأن معدلات وصف الأدوية الجينية منخفضة لدى المستشفيات التابعة للقطاع العام (45.2%) مقابل ما يصفه الأطباء العامون منها (24.5%). أما معدلات وصف الحقن فقد كانت في المستشفيات التابعة للقطاع العام 8.3% مقابل ما يصفه الأطباء العامون منها 23.3%، ومعدلات وصف المضادات الحيوية في المستشفيات التابعة للقطاع العام 68.1% مقابل ما يصفه الأطباء العامون منها 31.9%، ومعدلات وصف أدوية مدرجة ضمن قائمة الأدوية الأساسية في المستشفيات التابعة للقطاع العام 92.6% مقابل ما يصفه الأطباء العامون منها 68.5% واستنتج الباحثون أن هناك حاجة لتنظيم وصف الأدوية في كل من القطاع العام والقطاع الخاص ولاسيما وصف المضادات الحيوية والأدوية الأساسية والأسماء الجينية.

ABSTRACT The aim of this study was to explore drug prescription habits using WHO standard indicators in 15 public hospitals and 36 private surgeries in 2 provinces in South Africa. A high mean number of drugs were prescribed per patient (3.2 versus 2.8) in public hospitals and by general practitioners (GPs) respectively and generic prescribing rates were low (45.2% versus 24.5%). The rates of prescribing in public hospitals and by GPs were 8.3% versus 23.3% for injections, 68.1% versus 31.9% for antibiotics and 92.6% versus 68.5% for drugs from the essential drugs list. Drug prescribing in both sectors needs to be regulated, especially the use of antibiotics, essential drugs and generic prescribing.

## Habitudes en matière de prescription de médicaments dans les établissements de santé publics et privés de deux provinces d'Afrique du Sud

RÉSUMÉ L'objectif de cette étude était d'examiner les habitudes en matière de prescription de médicaments à l'aide des indicateurs standards de l'OMS dans 15 hôpitaux publics et 36 cabinets privés dans deux provinces d'Afrique du Sud. Un nombre moyen élevé de médicaments était prescrit par patient (3,2 contre 2,8) dans les hôpitaux publics et par les médecins généralistes respectivement et le taux de prescription de médicaments génériques était faible (45,2 % contre 24,5 %). Le taux de prescription dans les hôpitaux publics et par les médecins généralistes était de 8,3 % contre 23,3 % pour les injections, 68,1 % contre 31,9 % pour les antibiotiques et 92,6 % contre 68,5 % pour les médicaments issus de la liste OMS de médicaments essentiels. Dans les deux secteurs, les prescriptions médicamenteuses ont besoin d'être régulées, en particulier en ce qui concerne l'utilisation d'antibiotiques, de médicaments essentiels et de génériques.

<sup>1</sup>Health Systems Development Unit, Human Sciences Research Council, Pretoria, South Africa (Correspondence to K. Peltzer: KPeltzer@hsr.ac.za).

<sup>2</sup>University of the Free State, Bloemfontein, South Africa.

<sup>3</sup>Nelson Mandela Metropolitan University, Port Elizabeth, South Africa.

Received: 25/08/07; accepted: 09/12/07

## Introduction

The South African national drug policy (NDP) [1] was launched in January 1996 with the aim of ensuring an adequate and reliable supply of safe, cost-effective medicines of acceptable quality and encouraging rational use of these drugs. Rational use of drugs requires that patients receive medications appropriate to their clinical needs, in doses that meet their own requirements, for an adequate period of time and at the lowest cost to them and their community [2]. Implementation of the NDP was, however, characterized by a mixed, and at times controversial, set of outcomes. Several reviews of the NDP highlighted important gains, notably the development of an essential drugs list (EDL) and standard treatment guidelines for various levels of public sector care [3]. Previous baseline and follow-up studies conducted in Gauteng, Western Cape and Limpopo provinces between 1996 and 2003 reported overprescribing of antibiotics (> 50% of drugs prescribed) in public health facilities [4].

The World Health Organization/International Network for Rational Use of Drugs (WHO/INRUD) has set standards that should apply to prescribing [5]. Under-prescribing can result in subtherapeutic effects, secondary infections, a false sense of wellness and delayed treatment. Over-prescribing, on the other hand, can lead to unwanted drug interactions, adverse effects and ultimately patient noncompliance. As a result, treatment failure usually leads to the prescribing of newer treatment regimens that are usually more costly and less tolerable, thus reducing the chances of treatment success.

Several studies have been done in other countries to assess prescribing habits but most of these were limited to drug handling in the public sector [6–8]. A study conducted in Zimbabwe compared prescription habits in practices of dispensing and nondispensing doctors in the private sector [9]. In South Africa,

however, there is little or no knowledge about rational drug use in the private health care sector as compared with the public sector. The aim of this study was to investigate rational prescribing indicators in private surgeries and public hospitals in Limpopo and Western Cape provinces of South Africa.

## Methods

A cross-sectional design was employed in this study carried out from August to December 2005 based on a retrospective analysis of recent medical information from patient files and exit interviews with patients at private surgeries and public hospitals in 2 provinces.

### Sample

Purposeful selection of 2 out of 9 provinces (Limpopo and Western Cape) allowed for a comparative analysis of findings between a predominantly urban and a predominantly rural province. In addition, Western Cape and Limpopo provinces were identified because of previous reporting of antibiotic overprescribing (> 50%) in public health facilities [4]. Within each province, 2 health districts (1 rural and 1 urban) were randomly selected.

To select health facilities in the provinces, a list of public hospitals was obtained from the provincial health department offices and was used to update the 1998 list of public hospitals in the Human Sciences Research Council database. The updated list was used to produce a sampling frame for hospitals. An overall proportionate random sample was made of 15 public hospitals (9 in Limpopo and 6 in the Western Cape). Random samples of 50 inpatient files, 50 outpatient files and 50 patients were set for each public hospital.

Lists of private surgeries in South Africa were obtained from *MEDPages* (a source for health care contact information in Southern Africa), the Health Professions Council of South

Africa and the national Department of Health website. These lists were collated to produce a sampling frame of 200 private GP surgeries (100 in each province). Over-sampling of private surgeries was necessary to compensate for an expected high refusal rate. A target of 10 general practitioners (GPs) was set for each district. In districts with less than 10 GPs, all GPs were included in the sample. For private surgeries, a random sample of 15 patient files and 15 patients were selected.

Overall, 15 public hospitals and 36 GPs participated in the study. A total of 733 exit interviews were conducted with patients at public hospitals and 296 at selected private GP surgeries. All targeted public hospitals agreed to participate in the study. The low response rate in private surgeries was attributable to fewer patients booked for consultation on the day of the survey or simply a low client turnout. Reasons for refusals from some GPs to participate in the study varied from fear of being investigated, patient confidentiality, lack of free time, the facility manager not being available at the time of survey and unwillingness to participate. For most patients the reason for refusal to participate in the study was lack of time, although this may have concealed a fear of divulging medical information to strangers.

### Measures

WHO methods and guidelines for the evaluation of drug use with specific reference to rational drug use indicators were used [10].

A retrospective analysis of recent medical information from patients' files allowed for the assessment of the number of drugs prescribed per hospitalization and number of drugs prescribed per consultation day. A data collection form adopted from the WHO guidelines [5] was used to collect information about patients' demographic data (not reported in this paper) and their most recent visit to the health facility. The medical history area had 11 items which

included among others, the patient's age, whether the patient's recent visit was for day consultation (outpatient) or for hospitalization (inpatient), the number of drugs prescribed and whether the drugs prescribed were generic.

Patient exit interviews were conducted with the aim of assessing the percentage of drugs prescribed from the EDL and the percentage of prescriptions with at least 1 injection and 1 antibiotic. A group of 14 professional nurses were trained as fieldworkers to conduct interviews.

Informed consent was obtained from GPs, public hospital managers and patients. The study was approved by the Human Sciences Research Council's ethics committee.

### Data analysis and management

The data were double entered and verified using Microsoft *Access 2003*. The database was designed to include range checks. The data were converted to *SPSS*, version 13.0 for analysis. The descriptive statistics are reported with frequencies and means and standard deviation (SD). Tests of significance for categorical variables were based on chi-squared tests and for means on Student *t*-tests. All *P*-values were derived from mean differences with Student *t*-test. A *P*-value < 0.05 was considered statistically significant. Generic prescribing and EDL drugs were analysed by a pharmacist (G.M.) using recent pharmacological textbooks, the South African national standard treatment guidelines and the EDL [11].

## Results

The findings for each drug use indicator by province and type of health facility are shown in Table 1. Statistics for each analysis were based on the cases with no missing or out-of-range data for any variable in the analysis.

In the Western Cape a mean of 1.9 drugs was prescribed in private surgeries compared with 3.0 in public hospitals, and in Limpopo the mean was 3.7 in private surgeries compared with 3.4 in public hospitals. Analysis of data from patients' files revealed that significantly fewer drugs were prescribed per day consultation in private surgeries than in public hospitals (mean 2.8 versus 3.2). Comparing inpatients with outpatients in public hospitals, a mean of 3.6 (SD 2.3) drugs was prescribed per hospitalization (inpatient files) compared with a mean 2.7 (SD 1.9) drugs prescribed per day consultation (outpatient files).

In the Western Cape 92.0% of all prescribed drugs in public hospitals were drugs from the EDL compared with 68.0% in private surgeries. In Limpopo 93.1% of prescribed drugs were drugs on the EDL compared with 69.0% in private surgeries. Public hospitals significantly more often prescribed EDL drugs than did GPs.

In both Western Cape and Limpopo generic prescribing was significantly lower in private surgeries (27.1% and 21.9% respectively) than in public hospitals (48.6% and 41.7% respectively).

In both Western Cape and Limpopo antibiotic prescribing was significantly higher in public hospitals (72.8% and 63.4% respectively) than in private surgeries (27.2% and 36.6% respectively).

In the Western Cape 13.7% of patients who visited private surgeries received at least 1 injection compared with 6.7% in public hospitals, and in Limpopo the figures were 32.9% in private surgeries and 9.8% in public hospitals.

## Discussion

### Number of drugs per encounter/prescription

This study found a high mean number of drugs prescribed per prescription at public hospitals (3.2) and private GP surgeries (2.8). Our findings also

suggest that there may be a problem of over-prescribing in public hospitals in the Western Cape compared with Limpopo province where private surgeries prescribed slightly more drugs than public hospitals. Hogerzeil, in a study of drug use in 12 developing countries (including outlying values), found a high average numbers of drugs per encounter in Indonesia and Nigeria (3.3 and 3.8) [12]. Hafeez et al. found the average number of drugs per prescription was 2.7 in public sector facilities in Pakistan [13]. Keohavong et al. found that an average 3 drugs were prescribed per encounter in the public sector in Lao People's Democratic Republic [8]. Enwere et al. found the overall average number of drugs prescribed was 3.2 in a medical outpatient clinic of a Nigerian public tertiary hospital [14]. Compared with our study, where GPs prescribed 2.8 drugs per encounter, Moghadamnia et al. found an even higher rate (4.4) among GPs in the Islamic Republic of Iran [15] and Trap et al. found lower rates among GPs in Zimbabwe whereby dispensing doctors prescribing significantly more drugs per patient than nondispensing doctors (2.3 versus 1.7) [9].

### Generic prescribing

In this study the rate of prescribing drugs by generic name was found to be low in public hospitals (45.2%) and by GPs (24.5%). This is similar to the outpatient clinic of a Nigerian public hospital where the average percentage of drugs prescribed by generic names was 49.5% [14], whereas in the Islamic Republic of Iran 98% of GPs prescribed by generic name [15]. If doctors wrote more prescriptions for cheaper branded generic drugs, both the government and consumers would achieve significant savings without any deterioration in patient care [13]. However, a number of factors have been attributed to the failure of private doctors to prescribe generic medicines. Economic factors may play a role, as some pharmaceutical

**Table 1 Comparison of drug prescribing habits in public hospitals and private surgeries by province using WHO/INRUD indicators**

Province/facility	No. of drugs per prescription Mean (SD)	% of encounters with $\geq 1$ injection prescribed		% of antibiotics prescribed per total responses		% of drugs prescribed from EDL		% of drugs prescribed generically	
		No.	%	No.	%	No.	%	No.	%
<b>Limpopo province</b>									
Public hospitals	3.4 (1.8)	429	9.8	1552	63.4	1409	93.1	1367	41.7
Private surgeries	3.7 (1.6)	152	32.9	630	36.6	415	69.0	147	21.9
<b>Western Cape province</b>									
Public hospitals	3.0 (2.0)	282	6.7	902	72.8	828	92.0	859	48.6
Private surgeries	1.9 (2.5)	124	13.7	275	27.2	181	68.0	153	27.1
<b>Total</b>									
Public hospitals	3.2 (2.3)	721	8.3	2454	68.1	2237	92.6	2226	45.2
Private surgeries	2.8 (1.3)	276	23.3	905	31.9	596	68.5	300	24.5
<i>t</i> - or $\chi^2$ -value	<i>t</i> = 9.42	$\chi^2$ = 18.55		$\chi^2$ = 34.34		$\chi^2$ = 23.38		$\chi^2$ = 29.35	
<i>P</i> -value	< 0.001	< 0.001		< 0.001		< 0.001		< 0.001	

WHO/INRUD = World Health Organization/International Network for Rational Use of Drugs; SD = standard deviation; EDL = essential drugs list.

companies pay rewards to doctors who prescribe their products and this discourages generic prescribing. A study conducted in Zimbabwe found that other factors, such as the desire to sustain income, play a role in the prescribing and dispensing habits of private doctors [9].

### Use of injections

We found injections were prescribed in 8.3% of encounters in public hospitals and 23.3% in private surgeries. Other studies have found higher rates of injection prescribing in public health facilities in developing countries, ranging from 36% to 48% in Uganda, Sudan and Nigeria [12], 18% in Lao [8], over 37% in Ethiopia [7] and 41% in the Islamic Republic of Iran [16]. While our study found an injection prescribing rate of 23.3% among GPs, a much higher rate of prescribing of injections (58%) was found among Iranian GPs [15]. Similar rates have been found among doctors in Zimbabwe, with dispensing doctors providing injections to more patients (28.4%) than non-dispensing doctors (9.5%) [9]. In South Africa patients today have the right to accept or reject treatment and to choose the form of

treatment when there are several options. Therefore a patient can choose if they want to take an injectable drug or not. Our results suggest that injection use is not a general problem in South Africa.

### Use of antibiotics

Our study found that antibiotic prescribing was very high in the 2 provinces (68.1% in public hospitals and 31.9% by GPs) compared with more than 50% in public hospitals in the EDP survey in South Africa in 2003 [4]. Similar high rates of antibiotic prescribing of 1 or more antibiotics have been reported in public health facilities in Uganda and Sudan (56% and 63% respectively) [12], 47% in Lao [8] and 60%–65% in Ethiopia [7], 58% in the Islamic Republic of Iran [16] and 60.9% in Jordan [17]. Our findings suggest that antibiotic prescribing in the public sector needs to be regulated. Tuberculosis and other opportunistic infections related to HIV infection might have an influence on high antibiotic prescribing. Today, the problem of antibiotic use is receiving global attention as a result of increasing antimicrobial drug resistance.

### Prescribing drugs from the EDL

With regards to prescribing drugs from the national EDL, we found that public hospitals (92.6%) prescribed more drugs from the EDL than did private surgeries (68.5%). Other studies have found that the rate of medicines prescribed in the public sector conforming to the national EDL was over 70% in Tanzania [6], 84% in Lao [8] and 96% in Nigeria [14]. Rothberg and Walters found in a large health maintenance organization in South Africa that only 22.4% of current GP prescriptions included EDL items; a further 19.6% included "other forms of EDL" items [18]. Simply obtaining those EDL products that are currently prescribed at state tender prices would reduce costs by almost 20%, while extending the use of EDL products might save in excess of 70% on private sector GP prescriptions. Compared with 1996, there has been a significant increase from 22% to 69% in prescribing from the EDL in the private health sector in South Africa. One reason why EDL prescribing is not higher might be that in South Africa the private sector is only encouraged and not obliged to use the EDL. Furthermore, essential drugs in

the public sector only apply to certain common ailments and it is therefore not possible to have 100% drug prescribing out of the EDL. Since the South African EDL does not contain all medications for all illnesses or diseases but only for most common ailments, prescription of highly scheduled, more costly medications that do not appear on the EDL is permitted but requires extensive motivation on the part of the medical doctor or specialist who is prescribing (he/she has to be convinced or know about other medications not on the EDL list and has to go through a lot of bureaucratic red tape to get permission to prescribe the non-EDL drugs that are

highly scheduled and/or are used for rare diseases).

## Conclusions

Our findings suggest that drug prescribing by public and private prescribers needs to be regulated closely in South Africa. Use of injections was not found to be a problem in the 2 provinces studied. With regards to the prescribing of generic medicines, all prescribers should be obliged to prescribe generically to give the patient a choice of brand they want to use at the cost that suits them.

## Acknowledgements

The team acknowledges with thanks the contribution and assistance of the following: the Department for International Development for funding the study; the provincial Departments of Health in Limpopo and the Western Cape as well as the private doctors who participated in the study for giving us permission to collect information from their health care facilities; Dr Khangelani Zuma, Dr Henry Fomundam and Adlai Davids for their input in the study and sampling design; Professor Andy Gray for earlier review comments; and the anonymous reviewers for their useful comments.

## References

1. *National drug policy for South Africa*. Pretoria, South Africa, Department of Health, 1997.
2. Le Grand et al. Intervention research in rational use of drugs: a review. *Health policy and planning*, 1999, 14(2):89-102.
3. Gray A et al. *Policy change in the context of transition: drug policy in South Africa 1989-1999*. Johannesburg, South Africa, Centre for Health Policy, School of Public Health, University of the Witwatersrand, 2002.
4. *Impact of essential drugs programmes at primary health care level in South Africa: key findings and recommendations of surveys in 2003*. Pretoria, South Africa, Department of Health, 2003.
5. *How to investigate drug use in health facilities*. Geneva, World Health Organization, 1993.
6. Masele AY et al. A study of prescribing patterns with special reference to drug use indicators in Dar es Salaam Region, Tanzania. *Tropical doctor*, 1993, 23(3):104-7.
7. Desta Z et al. Assessment of rational drug use and prescribing in primary health care facilities in North West Ethiopia. *East African medical journal*, 1997, 74(12):758-63.
8. Keohavong B et al. Rational use of drugs: prescribing and dispensing practices at public health facilities in Lao PDR. *South East Asian journal of tropical medicine and public health*, 2002, 33(3):647-53.
9. Trap B et al. Prescription habits of dispensing and non-dispensing doctors in Zimbabwe. *Health policy and planning*, 2002, 17(3):288-95.
10. *Indicators for monitoring national drug policies: a practical manual*. Geneva, World Health Organization, 1999.
11. *Standard treatment guidelines and essential drugs list for South Africa: primary health care*, 3rd ed. Pretoria, South Africa, Department of Health, 2003.
12. Hogerzeil HV. Field tests of rational drug use in twelve developing countries. *Lancet*, 1993, 342:1408-11.
13. Hafeez A et al. Prescription and dispensing practices in public sector health facilities in Pakistan: survey report. *Journal of the Pakistan Medical Association*, 2004, 54(4):187-91.
14. Enwere OO, Falade CO, Salako BL. Drug prescribing pattern at the medical outpatient clinic of a tertiary hospital in south-western Nigeria. *Pharmacoepidemiology and drug safety*, 2007, 16(11):1244-9.
15. Moghadamnia AA, Mirbolooki MR, Aghili MB. General practitioner prescribing patterns in Babol city, Islamic Republic of Iran. *Eastern Mediterranean health journal*, 2002, 8(4-5):550-5.
16. Cheraghali AM et al. Evaluation of availability, accessibility and prescribing pattern of medicines in the Islamic Republic of Iran. *Eastern Mediterranean health journal*, 2004, 10(3):406-15.
17. Otoom S et al. Evaluation of drug use in Jordan using WHO prescribing indicators. *Eastern Mediterranean health journal*, 2002, 8(4-5):537-43.
18. Rothberg AD, Walters L. Formulary and funding implications of the gap between the national Essential Drugs List and current prescribing in a large health maintenance organisation. *South African medical journal*, 1996, 86(9):1084-90.