

General practitioner prescribing patterns in Babol city, Islamic Republic of Iran

A.A. Moghadamnia¹, M.R. Mirbolooki² and M.B. Aghili³

أنماط وصف الدواء من قِبَل الممارسين العموميين في مدينة بابول، في جمهورية إيران الإسلامية
علي أكبر مقدم نيا، محمد رضا ميربلووكي، محمد برادران عقيلي

الخلاصة: تم تحليل 4000 وصفة دواء تم انتقاؤها عشوائياً من بين الوصفات التي كتبها 52 ممارساً عمومياً في مدينة بابول في الفترة من 1999 إلى 2000، بغرض تحديد أنماط وصف الدواء في مجال الرعاية الأولية في جمهورية إيران الإسلامية. وقد وصل متوسط عدد الأدوية الموصوفة في كل مقابلة إلى 4.4 ± 1.7 ، وتم وصف 98% من الأدوية بالاسم الجنيس (غير المسجل الملكية). وكانت الأدوية المضادة للالتهاب الالاستيرويدية هي الأكثر شيوعاً في الوصف (62.9% من المقابلات)، تليها المضادات الحيوية (61.9%)، ثم أدوية الجهاز العصبي المركزي، ثم أدوية الجهاز الهضمي، ثم الكورتيكوستيرويدات، ثم الفيتامينات، ثم أدوية الجهاز القلبي الوعائي. كما وصفت الحقن في 58% من المقابلات. وبهتت الدراسة اختلافاً ملموساً بين الأطباء والطبيبات في أنماط وصف المضادات الحيوية. وتؤكد هذه الدراسة ميل مرافق الرعاية الصحية الأولية في إيران إلى الإفراط في وصف الأدوية. وتوصي الدراسة بوضع استراتيجيات للحد من الإفراط في استعمال الدواء.

ABSTRACT To determine patterns of prescribing in Iranian primary care, we analysed 4000 randomly selected prescriptions from 52 general practitioners (GPs) in Babol city during 1999–2000. The mean number of drugs prescribed per encounter was 4.4 ± 1.7 , with 98% prescribed by generic name. The most commonly prescribed items were non-steroidal anti-inflammatory drugs (62.9% of encounters) and antibiotics (61.9%), followed by central nervous system drugs, gastrointestinal tract drugs, corticosteroids, vitamins and cardiovascular system drugs respectively. Injections were prescribed in 58.0% of encounters. Female and male doctors had significantly different antibiotic prescribing patterns. Our study confirms the tendency of GPs to overprescribe.

Schémas de prescription des médecins généralistes dans la ville de Babol (République islamique d'Iran)

RESUME Afin de déterminer les schémas de prescription dans les soins de santé primaires en République islamique d'Iran, nous avons analysé 4000 ordonnances, choisies au hasard, de 52 médecins généralistes pratiquant dans la ville de Babol entre 1999 et 2000. Le nombre moyen de médicaments prescrits par consultation était de $4,4 \pm 1,7$, avec 98 % de médicaments prescrits sous leur nom générique. Les produits les plus couramment prescrits étaient les anti-inflammatoires non stéroïdiens (62,9 % des consultations) et les antibiotiques (61,9 %), suivis par les médicaments du système nerveux central, les médicaments du système gastro-intestinal, les corticostéroïdes, les vitamines et les médicaments du système cardiovasculaire, respectivement. Des injections ont été prescrites dans 58,0 % des consultations. Les médecins femmes et les médecins hommes avaient des pratiques de prescription d'antibiotiques significativement différentes. Notre étude confirme la tendance des médecins généralistes à la prescription abusive de médicaments.

¹Department of Pharmacology, ²Babol University of Medical Sciences, Babol, Islamic Republic of Iran.

³Endocrine Research Centre, Shaheed Beheshti University of Medical Sciences, Tehran, Islamic Republic of Iran.

Received: 29/04/01; accepted: 30/12/01

Introduction

General practitioner (GP) prescribing is a subject of legitimate interest to all those concerned with the quality of patient care. An analysis of prescribing patterns can reveal much about this quality [1]. Prescription volumes and patterns vary considerably between practices, depending in part on the prescribing behaviour of individual doctors faced with a range of therapeutically equivalent generic and branded drugs [2]. In a study by McGettigan et al., GPs' views about the most important influences on which drugs they prescribed were not those most often used in practice [3]. The importance of pharmaceutical representatives in influencing decision-making was consistently underestimated. The sources of greatest practical importance were those involving the transfer of information through personal contacts. For investigating drug prescribing practices in health facilities, one of the most effective means is the use of indicators created and validated by the World Health Organization (WHO) [4,5].

The primary care facilities within the Iranian health system are of three types: general practice facilities, specialist care facilities and pharmacies. The aim of our study was to determine the values of drug use indicators in primary care health facilities operating in the city of Babol, located in the north of the Islamic Republic of Iran. We anticipated that the values obtained could be used as baseline data for a follow-up study on the quality of drug use.

Methods

The study analysed 4000 prescriptions issued in 4000 encounters with 52 GPs (43 male and 9 female) in the city of Babol from

March 1999 to February 2000. Babol is situated 200 km from Teheran in the north of the Republic. Prescriptions were randomly chosen from remedy insurance prescriptions at the Medical Services Insurance Organization, an Iranian insurance organization. Prescriptions with radiography or laboratory requests were excluded.

The indicators chosen to provide an understanding of prescribing patterns in the city's primary health care facilities were:

- mean number of drugs prescribed per encounter, for the whole period and for different seasons of the year;
- percentage of drugs prescribed by generic name;
- percentage of encounters where an antibiotic was prescribed based on clinical diagnosis or microbiological investigation, for different seasons of the year and by sex of the prescribing physician;
- percentage of encounters where any type of injection was prescribed, for different seasons of the year;
- percentage of encounters where the following were prescribed: non-steroidal anti-inflammatory drugs (NSAIDs); drugs acting primarily on the central nervous system; drugs acting on the gastrointestinal tract; corticosteroids; vitamins; or drugs acting on the cardiovascular system;
- percentage of prescribed drugs where there were no directions for use.

Data were collected by examining prescriptions, then transferred to a questionnaire format to simplify data entry into a personal computer. The data were then analysed by SPSS, version 10.0. Chi-squared and ANOVA tests were used for statistical analysis. A value of $P < 0.05$ was considered significant.

Results

The mean and standard deviation number of drugs per encounter was 4.4 ± 1.7 with a higher than average rate (4.6 ± 1.8) in autumn (October–December), and a lower than average rate (4.2 ± 1.7) in spring (April–June) ($P < 0.001$). Although 98% of the 17 919 drugs were prescribed by generic name, approximately 25.9% of prescribed drugs did not include directions for patient use.

NSAIDs and antibiotics were the most commonly prescribed drugs (62.9% of encounters), followed by central nervous system drugs, gastrointestinal tract drugs, corticosteroids, vitamins and cardiovascular drugs (Figure 1). Overall, antibiotics were prescribed in 61.9% of encounters, with a higher rate (71.7%) in winter (January–March), Injections were prescribed in 58.0% of encounters overall, with a higher rate (63.9%) in summer (July–September).

A penicillin was prescribed in 33.2% of encounters for male GPs and 27.9% of encounters with female GPs (Table 1). There

was a statistically significant difference in the prescribing practices of male and female GPs with respect to penicillins and erythromycin (more often prescribed by male than female prescribers); and cephalosporins (more often prescribed by females than males).

Discussion

The present study is not the first in the Islamic Republic of Iran to quantify the large number of drugs prescribed by GPs for their patients (average 4.4 per encounter). This is higher even than the quantities of prescribed drugs recorded previously in Rasht (4.1 drugs per encounter), in the south of Teheran (3.3), in Isfahan (2.8), and the whole of the country (3.8). In the majority of developing countries, the number of drugs prescribed per encounter is in the range 1.3–2.2 [6–10].

Our findings indicate that Iranian primary care health facilities tend to overprescribe pharmaceuticals for their patients.

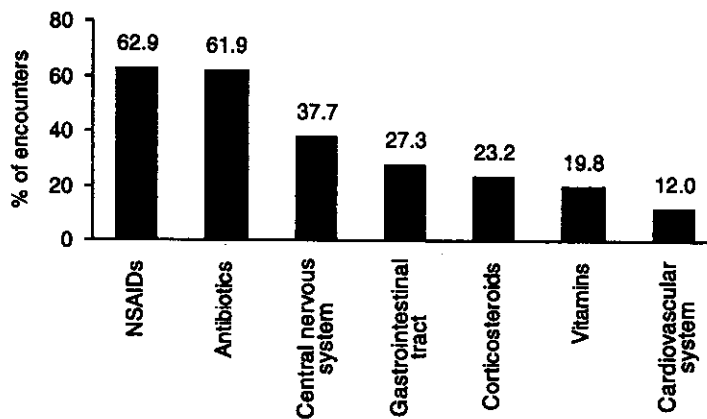


Figure 1 Prescribing rates of general practitioners for seven common drug categories in 4000 encounters (NSAIDs = non-steroidal anti-inflammatory drugs)

Table 1 Differences between prescribing rates of male and female general practitioners (GPs) for the five most prescribed antibiotics

Antibiotics prescribed	% of encounters			P-value (male versus female)
	Total (n = 4000)	Male GPs (n = 3400)	Female GPs (n = 600)	
Penicillins	30.5	33.2	27.9	< 0.01
Sulfonamides	11.1	10.2	12.3	NS
Cephalosporins	9.2	7.9	11.8	< 0.002
Erythromycin	7.8	8.3	3.7	< 0.0001
Aminoglycosides	3.1	3.7	2.3	NS

n = total no. of encounters.

NS = not significant.

Appropriate educational intervention may result in an overall decrease in drug prescribing and use. What form such an educational intervention should take is an important issue. A systematic review by Davis et al. suggests that to optimize behavioural change, the intervention should not take the form of lectures or one-day seminars, but should focus on periodically composing, issuing and distributing adequate educational texts [11].

The percentage of drugs prescribed by generic name in our study was much higher than in the majority of developing countries [6–9]. This high rate of prescribing of generic rather than the proprietary pharmaceuticals in the Islamic Republic of Iran is directly linked to the type of training medical students receive in the country. There is a strong emphasis in medical schools on teaching students to prescribe drugs by the generic name, rather than by brand.

Our study recorded an overall antibiotic prescribing rate of 61.9% of patient encounters, similar to rates reported elsewhere including England, 60.7% [12]; Norway, 48.0% [13,14]; and Sudan, 63.0% [6].

Table 1 shows a statistically significant difference in the prescribing practices of male and female GPs with respect to penicillins and erythromycin (more often prescribed by male than female prescribers) and cephalosporins (more often prescribed by females than males). Further studies would be needed to investigate the reasons for these sex differences in prescribing patterns.

As in another study [15], our data also show that the most prescribed antibiotics in Babol are penicillins, specifically, amoxicillin and amoxicillin/clavulanic acid. These data are in accord with a previous Iranian study showing high rates of amoxicillin use [16]. In findings elsewhere, a study by Mazzaglia et al. on Sicilian prescribing practices has shown that macrolides such as azithromycin and clarithromycin are the most commonly prescribed antibiotics [17]. In Norway, the most commonly prescribed antibiotic in general practice for common airways diseases is penicillin V [13,18].

Our results suggest that overprescribing in Babol is commonplace. It may be possible to reduce prescribing of antibiotics

in Babol outpatient facilities without any adverse effect on the quality of care received. Use of as-needed prescriptions that reduce antibiotic consumption should be encouraged. Exploration of patient expectations and providing appropriate information to patients during the consultation may help to reduce the prescribing rate [15].

In addition to addressing the issue of overprescribing, another problem requiring immediate attention is our finding that one-quarter of prescribed drugs do not have any directions for use by the patient.

We conclude that the quality of drug prescribing in the Islamic Republic of Iran needs to be improved. This will be facilitated by limiting the role of pharmaceutical

companies in physician training, and by promoting more objective sources of information, such as therapeutic guidelines [19]. Our results also underline the need for further reform of our primary health care system and the promotion of better relationships among physicians, and between physicians and their patients. The development of national guidelines by a representative national medical body in the Islamic Republic of Iran might be one way to address the problem. This could be based, for example, on the Scottish model, where guidelines have been produced or supported by the Scottish Intercollegiate Guidelines Network [20].

References

1. Holden J, Wilson R. The quality of prescribing in general practice. *International journal of health care quality assurance*, 1996, 9:17-23.
2. Roberts SJ, Bateman DN, Smith JM. Prescribing behaviour in general practice: the impact of promoting therapeutically equivalent cheaper medicines. *British journal of general practice*, 1997, 47:13-8.
3. McGettigan P et al. Prescribers prefer people. The sources of information used by doctors for prescribing suggest that the medium is more important than the message. *British journal of clinical pharmacology*, 2001, 51:184-9.
4. World Health Organization Action Programme on Essential Drugs and Vaccines. *How to investigate drug use in health facilities: selected drug use indicators*. Geneva, World Health Organization, 1993 (DAP Research Series, No.7).
5. WHO Expert Committee on the Use of Essential Drugs. *The use of essential drugs: seventh report of the WHO Expert Committee (including the revised Model List of Essential Drugs)*. WHO technical report series, no. 867. Geneva, World Health Organization, 1997.
6. Bannenberg WJ et al. *Evaluation of the Nile Province Essential Drugs Project: Mission report by a WHO team, Sudan, 27 April-12 May, 1991*. Geneva, World Health Organization, 1991.
7. Ofori-Adjei D. Report on Tanzania field test. *INRUD [International Network for Rational Use of Drugs] News*, 1992, 3:9.
8. Hogerzeil HV et al. Impact of an essential drugs programme on availability and rational use of drugs. *Lancet*, 1989, 1:141-2.
9. Bimo. Report on Nigeria field test. *INRUD [International Network for Rational Use of Drugs] News*, 1992, 3:9-10.
10. Benjamin H, Smith F, Motawi UA. Drugs dispensed with and without a prescription from community pharmacies in a

- conurbation in Egypt. *Eastern Mediterranean health journal*, 1996, 2:506-14.
11. Davis DA et al. Changing physician performance. A systematic review of the effect of continuing medical education strategies. *Journal of the American Medical Association*, 1995, 274:700-5.
 12. Majeed A, Moser K. Age- and sex-specific antibiotic prescribing patterns in general practice in England and Wales in 1996. *British journal of general practice*, 1999, 49:735-6.
 13. Straand J, Rokstad KS, Sandvik H. Prescribing systemic antibiotics in general practice. A report from the More & Romsdal Prescription Study. *Scandinavian journal of primary health care*, 1998, 16:121-7.
 14. Straand J, Rokstad KS, Heggedal U. Drug prescribing for children in general practice. A report from the More & Romsdal Prescription Study. *Acta paediatrica*, 1998, 87:218-24.
 15. Arroll B, Goodyear-Smith F. General practitioner management of upper respiratory tract infections: when are antibiotics prescribed? *New Zealand medical journal*, 2000, 113:493-6.
 16. Islamic Republic of Iran Drug Development. Iranian pharmaceutical market \$400 million. *Scrip*, 1997, 2272:17.
 17. Mazzaglia G et al. Malattie infettive in medicina generale e prescrizione di antibiotici. Studio osservazionale in Sicilia. [Infectious diseases in general practice and antibiotic prescription. Observational study in Sicily]. *Recenti progressi in medicina*, 1998, 89:356-60.
 18. Lindbaek M et al. Influence of prescription patterns in general practice on antimicrobial resistance in Norway. *British journal of general practice*, 1999, 49:436-40.
 19. Figueiras A, Caamano F, Gestal-Otero JJ. Influence of physician's education, drug information and medical-care settings on the quality of drugs prescribed. *European journal of clinical pharmacology*, 2000, 56:747-53.
 20. Petrie JC, Grimshaw JM, Bryson A. The Scottish Intercollegiate Guidelines Network Initiative: getting validated guidelines into local practice. *Health bulletin*, 1995, 53:345-8.