

# The Prescribing Pattern of Outpatient Polyclinic Doctors

K H J Lim, K B Yap

## ABSTRACT

**Objective:** This study aims to analyse the prescribing pattern of doctors working in a government outpatient polyclinic in Singapore.

**Design:** Retrospective study of 1 week of prescription scripts in 1996.

**Main outcome measures:** Number, types and duration of drugs prescribed; combination of drugs; age distribution; bad handwriting.

**Results:** Two thousand six hundred and seventy-nine scripts were analysed. The age of patients ranged from 1 to 93 years with a mean of 43.8 years. There were 44.0% males and 56.0% females. The overall mean of 'total number of drugs prescribed' was 2.8 items. The means of 'number of drug items prescribed for more than 1 week' by age-group were: < 20 years = 0.2, 20 to < 40 years = 0.5, 40 to < 60 years = 1.3 and > 60 years = 2.4. One way analysis of variance showed significant difference between the means of each age-group. Post hoc analysis revealed that the oldest age group accounted for most of this significant result. The top 10 drugs prescribed in descending order were: antihistamines, paracetamol, throat medications (eg. lozenges, gargles, etc), nifedipine, beta-blockers, antacids, mist benadryl expectorant, Procodin cough syrup (containing codeine and promethazine), amoxycillin and vitamin B. Nifedipine and beta-blockers were the most commonly prescribed anti-hypertensives. Non-steroidal anti-inflammatory drugs were usually prescribed with antacids. One hundred and twenty (4.5%) scripts were illegible.

**Conclusion:** This study provides a baseline data for monitoring future prescribing trends. There may be a need to re-evaluate the appropriateness of nifedipine as the first line anti-hypertensive drug and the usefulness of NSAID-antacid and amoxycillin-cloxacillin combinations. The prevalence of illegible handwriting was high.

**Keywords:** elderly, geriatric, diuretics, compliance, drug interaction

## INTRODUCTION

The present study aims at examining the prescribing pattern of doctors in an outpatient polyclinic setting.

The prescribing of drugs forms an important part of an outpatient practice. It is therefore essential to

study the prescribing habits of doctors in order to understand the current prescribing trends and to highlight any deficiencies.

Bukit Merah Polyclinic was chosen because it is one of the largest polyclinics in the Western region of Singapore; it is also in close proximity to 2 tertiary hospitals and one secondary care hospital. During the period of study, there were 13 doctors at the polyclinic writing out prescriptions.

## METHOD

A week in 1996 was chosen randomly using a computer generated number. The prescription scripts for the whole week (five-and-a-half working days) from the polyclinic were retrieved. The data was then entered into Microsoft Access 2.0 database and analysed using SPSS 6.1. The data captured included:

1. Age of patient
2. Sex of patient
3. Total number of drugs prescribed
4. Number of p.r.n. ("as needed") drugs prescribed
5. Number of drugs given for 1 week or less
6. Names of drugs
7. Duration of non-steroidal anti-inflammatory drugs (NSAIDs) and sedatives prescribed
8. Bad handwriting

The drug was considered to be given for 1 week or less if it was specified by the prescriber. All drug items indicated as '(1)' in the prescription scripts were considered to be prescribed for 1 week except for inhalers and methylcellulose eyedrops, both of which were presumed to be used for longer duration. Private prescriptions for non-standard drug items were not studied as these scripts were not available.

Antihistamines included tablet preparations like chlorpheniramine, and liquid preparations like syrup promethazine.

Bad handwriting was classified into 3 categories: illegible, unclear abbreviation and unclear prescription. It was considered as 'illegible' if the pharmacist could not read the script and had to confirm with the prescriber (this would be indicated on the prescription script) or the authors could not decipher the writing. 'Unclear abbreviations' included entries like PPL, MDP, CMZ, LOZ, etc. 'Unclear prescription' was the category where the prescription

Department of  
Geriatric Medicine  
Alexandra Hospital  
Alexandra Road  
Singapore 159964

K H J Lim, MRCP (UK),  
MMed (Int Med),  
Consultant

K B Yap, MRCP (UK),  
MMed (Int Med),  
DGM (Lond), FAMS  
Consultant

Correspondence to:  
Dr K H J Lim

Department of  
Geriatric Medicine  
Changi General Hospital  
2 Simei St 3  
Singapore 529889

did not indicate duration or use of medication, eg. 'normal saline solution' without specifying site of application.

## RESULTS

A total of 2679 prescription scripts were analysed. The age of patients ranged from 1 to 93 years and the mean age was 43.8 years. There were 1,179 (44.0%) males and 1,500 (56.0%) females.

Overall, the mean of 'total number of drugs' prescribed was 2.8 with a minimum of 1 and maximum of 10 items. The mode and median of 'total number of drugs' prescribed were 2 (Fig 1). Analysis of 'total number of drugs' by age group showed the following means: < 20 years = 2.4, 20 to < 40 years = 2.8, 40 to < 60 years = 2.7 and > 60 years = 3.3. One-way analysis of variance showed significant differences between the means of each age-group ( $p < 0.05$ ). Post hoc analysis revealed that the oldest age group accounted for most of this significant result.

'Number of drugs prescribed for more than 1 week' was derived from 'total number of drugs prescribed' minus 'number of drugs prescribed for 1 week or less'. The means of 'number of drugs prescribed for more than 1 week' by age group was found to be: < 20 years = 0.2, 20 to < 40 years = 0.5, 40 to < 60 years = 1.3 and > 60 years = 2.4. One-way analysis of variance showed significant difference between the means of each age group ( $p < 0.05$ ). Post hoc analysis revealed that the oldest age group accounted for most of this significant result.

Overall for all ages, the 10 most prescribed drugs, in descending order, were antihistamines, paracetamol, throat medications (eg. lozenges, gargles, etc.), nifedipine, beta-blockers, antacids, mist benadryl expectorant (MBE), Procodin™ cough syrup (containing codeine and promethazine), amoxicillin and vitamin B. If MBE, Procodin™ cough syrup and dextromethorphan cough syrup were combined, they would occupy second place in the top 10 drugs prescribed. The 10 most prescribed drugs according to different age groups is shown on Table I.

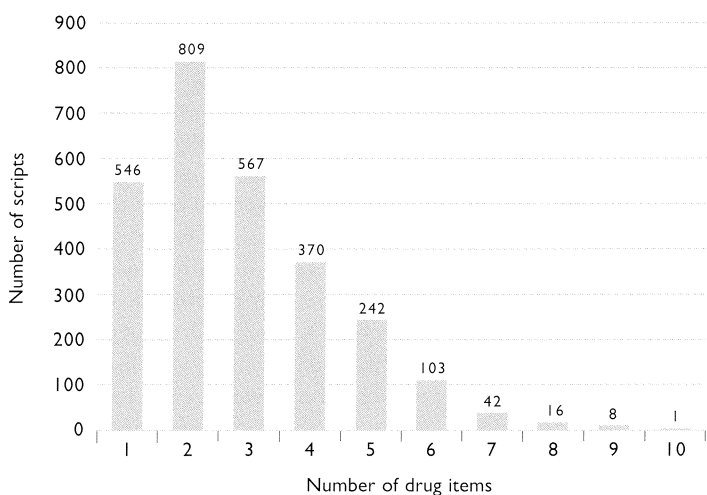


Fig 1 – Number of drug items in prescription scripts.

Non-steroidal anti-inflammatory drugs (mefenamic acid, indomethacin and ketoprofen) were prescribed in 193 scripts. In 189 (97.9%) scripts, antacids were also prescribed simultaneously. The most common duration of NSAIDs was 1 week (56.0%) and the range was 1 to 8 weeks. Aspirin was prescribed in 113 scripts and in 50 (44.2%) scripts, it was prescribed with antacids.

Sedatives (diazepam) was prescribed in 19 (0.7%) scripts. The most common duration of sedatives was 1 week (68.4%) and the range was 1 to 3 weeks. Hypnotics (eg. haloperidol, thioridazine, etc) were prescribed twice. There were only 3 (0.1%) scripts for anti-depressants.

Amoxicillin was prescribed in 229 scripts while cloxacillin was prescribed in 16 scripts. Cloxacillin was always prescribed with amoxicillin. The frequency of prescription of other antibiotics is shown on Table II.

The 2 most commonly used anti-hypertensive drugs were nifedipine, 403 (15.0%) scripts and beta-blockers, 364 (13.6%) scripts. The frequency of diuretics, angiotensin converting enzyme inhibitors (ACEI), methyldopa and hydrallazine were 68, 48, 35 and 19 respectively. Frusemide accounted for most of the diuretics prescribed.

The 3 most commonly prescribed oral hypoglycemics were metformin, 146 (5.4%) scripts, glibenclamide, 139 (5.2%) scripts and tolbutamide, 133 (5.0%) scripts. Only 3 (0.1%) scripts were made out for chlorpropamide.

Five hundred and two (18.8%) scripts were found to have bad handwriting. One hundred and twenty (4.5%) were illegible; in 365 (13.6%), the abbreviation used was unclear and in 18 (0.7%), the prescription was unclear.

## DISCUSSION

Generally, the elderly are given more medication<sup>(1,2)</sup> and this study again confirmed this observation. The difference was even more obvious when only medications prescribed more than 1 week were taken into account. This is not surprising as the elderly have more chronic illnesses and, therefore, are prescribed more medications<sup>(3)</sup>.

The overall top 3 drugs prescribed were antihistamines, paracetamol and throat medications. This suggests that upper respiratory tract infection is the most common reason for patients to seek the doctor at the polyclinic.

Seven of the top 10 drugs in the 60 years and older age group were medications for chronic illnesses. This suggests that the elderly group attends the polyclinic mainly for treatment of chronic illnesses, namely hypertension (nifedipine and beta-blockers), cardiovascular diseases (nitrates and aspirin) and diabetes mellitus (tolbutamide and metformin). Vitamin B is the third most commonly prescribed drug in this age group. This drug is probably overprescribed because it is unlikely that many elderly have vitamin B deficiency states in Singapore. It may have been given for placebo effect.

**Table I – Ten most prescribed drugs according to different age groups**

Rank	< 20 yrs	20 to < 40 yrs	40 to < 60 yrs	> 60 yrs
1	antihistamines	antihistamines	beta-blockers	nifedipine
2	paracetamol	throat medications*	nifedipine	beta-blockers
3	throat medications*	paracetamol	antihistamines	vitamin B
4	MBE	amoxicillin	throat medications*	antacids
5	topical anti-infective***	promethazine cough syrup	antacids	nitrates
6	amoxicillin	antacids	paracetamol	antihistamines
7	topical steroids	MBE***	MBE	tolbutamide
8	Procodin cough syrup	topical anti-infective***	Procodin cough syrup	metformin
9	oral salbutamol	anti-flatulent	baserol****	aspirin
10	nose drops	mefenamic acid	glibenclamide	throat medications*

\* includes lozenges, gargles, etc

\*\* includes antiseptic creams, potassium permanganate wash, etc.

\*\*\* Mist benadryl expectorant

\*\*\*\* combination of paracetamol and chlormezanone

**Table II – Frequency and types of antibiotics prescribed**

Antibiotics	Frequency	%
Amoxycillin	229	70.2
Erythromycin	65	19.9
Cloxacillin	16	4.9
Co-trimoxazole	13	4.0
Nalidixic acid	2	0.6
Nitrofurantoin	1	0.4
Total	326	100.0

There was 193 prescriptions for NSAIDs. This figure would make NSAIDs the twelfth most prescribed drug. If aspirin was included, the total prescription would rise to 306, making it the seventh most commonly prescribed drug. It is interesting to note that NSAIDs was prescribed with antacids in 181 of 193 (97.9%) prescriptions while the figure was 50 of 113 (44.2%) for aspirin. In the previous local study of hospital doctors, prescription of NSAID-antacid combination was found to be 84%. The reason why antacids were prescribed with NSAIDs is unclear. It is probably based on erroneous belief that NSAID-antacid reduces peptic ulcers<sup>(4,5)</sup>. NSAIDs should not be prescribed with antacids because the latter has not been proven to reduce the incidence of NSAID-induced peptic ulcers. Aspirin was less frequently accompanied with antacids presumably because the prescribers felt that low dose aspirin had less ulcer risk. The combination of aspirin and antacid would reduce the effectiveness of the aspirin prescribed<sup>(5)</sup>.

Cloxacillin was always prescribed in combination with amoxycillin presumably for treatment of skin infections. This practice was found to be less frequent (20%) among hospital doctors in a previous study<sup>(6)</sup>. For treatment of skin infections, cloxacillin is adequate to cover *Staphylococcus aureus* and gram positive organisms<sup>(7)</sup>. Adding amoxycillin only increases the cost and side-effects, and decreases compliance.

The 2 most commonly prescribed anti-hypertensives in the polyclinic are nifedipine and beta-blockers. In the hospital study<sup>(6)</sup>, the 2 most commonly used anti-hypertensive in the geriatric and medical departments were diuretics and nifedipine, and nifedipine and beta-blockers respectively. The prescribing pattern in the polyclinics may be a reflection of the prescribing pattern among hospital doctors. This is because patients referred to polyclinics for follow-up are usually continued on drugs started in the hospital. Furthermore, many doctors practising at the polyclinics were trained in public hospitals.

It is unclear why hospital doctors favour nifedipine over diuretics, eg. hydrochlorothiazide, for treatment of hypertension. It could be that calcium channel blockers are fast acting and enables rapid control of blood pressure before patients are discharged. Fear of side-effects of diuretics may be another reason. The efficacy of calcium entry blockers is still under study, whereas diuretics and beta-blockers have been shown in many large studies to be effective in reducing cardiovascular morbidity and mortality<sup>(8,9)</sup>. Short acting nifedipine, the only type of nifedipine available in the polyclinic, is prescribed for consumption three-times-a-day while hydrochlorothiazide need only be consumed once daily. The convenient dosing schedule of hydrochlorothiazide is likely to increase compliance<sup>(10)</sup>. Furthermore, diuretics like hydrochlorothiazide are cheaper. Perhaps doctors should reconsider using diuretics as first line anti-hypertensive drug if there are no contraindications.

The 3 most commonly prescribed oral hypoglycemics in the polyclinic were metformin, glibenclamide and tolbutamide. A similar finding was noted in a previous study<sup>(6)</sup>. The only difference was that there were more tolbutamide prescriptions compared to glibenclamide in hospital, probably because there were more elderly patients in hospital. Glibenclamide is longer acting compared to tolbutamide and is less suitable for the elderly.

There were 19 scripts for sedatives, mainly diazepam. This is a healthy trend but it may also mean that patients may be getting sedatives from other sources, eg. the general practitioner. Anti-depressants were prescribed on only 3 occasions. This may either mean that patients with mood disorders are seldom seen at the non-psychiatric outpatient clinics or depression is much under-diagnosed in the polyclinic.

Bad handwriting was found on a significant number of scripts (18.7%). 13.6% of the scripts had abbreviations which had dubious acceptance. The use of non-standard abbreviations can lead to serious errors in prescribing. For instance, a prescription for MDP may either mean methyl dopa or madopar. 4.5% of the scripts were illegible. Illegible handwriting only

accounted for 0.15% of scripts in the previous study<sup>(6)</sup>. Polyclinic doctors are probably more hard pressed for time. We suggest that if abbreviations are to be used for in-house prescriptions, an approved list of standard abbreviations should be made available to doctors practising in the polyclinic.

### CONCLUSION

The prescribing habits of doctors should periodically be analysed and any change highlighted. This study aims to provide baseline data for monitoring future trends. There is a need to re-evaluate the use of nifedipine as the first line anti-hypertensive drug and use of NSAID-antacid and amoxicillin-cloxacillin combinations. The prevalence of bad handwriting was found to be uncomfortably high.

### ACKNOWLEDGEMENTS

The authors wish to thank Mrs Ng, head pharmacist at Bukit Merah Polyclinic, for helping us to retrieve the prescription scripts for the study and Dr Ling Sing Lin, previous director of Family Health Service, for approving the study.

### REFERENCES

1. Greenblatt DJ. Drug disposition in old age. *N Engl J Med* 1982; 306:1081-8.
2. Davidson W. Principles of geriatric therapeutics. In Brocklehurst JC, ed. *Geriatric Pharmacology and Therapeutics*. Oxford: Blackwell Scientific, 1984:17-26.
3. Lonergan ET. Medications. In Lonergan ET, ed. *Geriatrics*. Stamford: Prentice-Hall, 1996:38-46.
4. Altman DF. Gastrointestinal Disease. In Lonergan ET, ed. *Geriatrics*. Stamford: Prentice-Hall, 1996:189-93.
5. Murray MB, Brater DC. Non-steroidal anti-inflammatory drugs. In Lamy PP, ed. *Clinics in Geriatric Medicine*. Philadelphia: WB Saunders, 1990:365-97.
6. Yap KB, Chan KM. The prescribing pattern of hospital doctors. *Singapore Med J* 1998; 39:496-500.
7. Sanford GM, Richard OB. Skin and appendages. In: Tierney LM Jr, McPhee SJ, Papadakis MA, eds. *Current Medical Diagnosis and Treatment*. Stamford: Appleton and Lange, 1996:129-30.
8. MRC Working Party. Medical Research Council trial of treatment of hypertension in older adults: principal results. *Br Med J* 1992; 304:405-12.
9. JNC. The Fifth Report of the Joint National Committee on detection, evaluation and treatment of high blood pressure. *Arch Intern Med* 1993; 153(2):154-83.
10. Davidson W. Practicalities of drug treatment. In Brocklehurst JC, ed. *Geriatric Pharmacology and Therapeutics*. Oxford: Blackwell Scientific Publication, 1984: 27-40.