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## Patterns of cardiovascular drug prescribing in general practice at Chulalongkorn Hospital, Thailand.

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Thamaree S, Wittayalertpunya S, Tungphao O. Patterns of cardiovascular drug prescribing in general practice at Chulalongkorn Hospital, Thailand. *Chula Med J* 1997 Apr;41(4): 277-85

**Objective** : *To study the prescribing patterns of cardiovascular drugs at general practice division of the Out-patient Department, Chulalongkorn Hospital*

**Design** : *Descriptive study*

**Material** : *The OPD cards with corresponding prescriptions collected once weekly throughout a one-year period (1988-1989).*

**Methods** : *The data obtained from the OPD cards and prescriptions were transformed into tabular form with numeric codes and made consideration on each drug prescribed, as directed in the guidebook developed previously. The data were analysed in terms of range, frequency and percentage.*

**Results** : *From complete data on 8,173 patients obtained on 52 days it was found that diseases of the cardiovascular system was the major health problem which constituted 23.96% of the total, 56% of them belonged to hypertension. There were 3,192 items or 21.48% of the total single drug class, belonging to the cardiovascular drugs. The average number of*

drugs per prescription was 2.74 of which 91% of the prescriptions contained one to four drugs. It was found that 91% of the single drugs prescribed were contained in the National List of Essential Drugs A.D.1987, but 79.59% of them were prescribed by trade names. Hydrochlorothiazide was the most common single drug prescription and Moduretic was the most commonly prescribed drug combination. Inappropriate prescriptions were found in 10.75% of the total drugs prescribed to patients with cardiovascular diseases; 11.84% were prescribed questionably. Inappropriate uses of drugs included dosage error, unnecessary use, drug interaction, inappropriate time of administration and contraindication. Diazepam was the most preferential drug of non-cardiovascular group prescribed questionably. Complete prescriptions were found in 41.75% of the total prescriptions for patients with cardiovascular diseases. Prescribing errors were mostly due to omission (46.97%).

**Conclusion** : Although the cardiovascular drugs used in general practicing are mainly contained in the essential drug list, the practicing physicians prefer to prescribe by trade names. The problems associated with drug utilization arise primarily because of prescription writing. The practicing physicians should be instructed prescription-writing practices, the advantages and disadvantages of generic and trade names. Awareness, adequate knowledge and responsibility on the part of the prescribers may lead to the rational use of drugs.

**Key words** : Cardiovascular drug, Prescribing pattern, Essential drug list.

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โสภิต ธรรมอารี, สุพิชา วิทยาลัยปัญญา, อรณี ตั้งเผ่า, แบบแผนการสั่งใช้ยารักษาโรคหัวใจและหลอดเลือดในอายุรกรรมทั่วไป โรงพยาบาลจุฬาลงกรณ์ ประเทศไทย. จุฬาลงกรณ์-เวชสาร 2540 เม.ย;41(4): 277-85

**วัตถุประสงค์** : เพื่อศึกษาแบบแผนการสั่งใช้ยารักษาโรคหัวใจและหลอดเลือดในอายุรกรรมทั่วไปของแผนกผู้ป่วยนอก โรงพยาบาลจุฬาลงกรณ์

**รูปแบบการวิจัย** : เชิงพรรณนา

**วัสดุ** : เวชระเบียนพร้อมกับใบสั่งยาที่รวบรวมสัปดาห์ละครั้งในระยะเวลา 1 ปี (พ.ศ.2531-2532)

**วิธีการ** : ข้อมูลที่รวบรวมได้จากเวชระเบียนและใบสั่งยาถูกกรอกลงตารางโดยใช้รหัสตัวเลข และทำการพิจารณาที่สั่งจ่ายตามคำแนะนำในสมุดคู่มือที่จัดทำไว้ โดยคณะผู้วิจัย วิเคราะห์ข้อมูลโดยใช้พิสัย, ความถี่ และร้อยละ

**ผลการวิจัย** : ข้อมูลที่ได้ครบสมบูรณ์จากผู้ป่วย 8,173 คนในเวลา 52 สัปดาห์ พบว่าโรคของระบบหัวใจและหลอดเลือดเป็นปัญหาหลักของการเจ็บป่วยมีถึง 23.96% ของผู้ป่วยทั้งหมด ในจำนวนนี้เป็นโรคความดันโลหิตสูง 56% มีการสั่งใช้ยาเดี่ยว 3,192 รายการ หรือคิดเป็น 21.48% ของยาเดี่ยวทั้งหมด ค่าเฉลี่ยจำนวนรายการยาต่อใบสั่งยา 1 ใบเท่ากับ 2.74 พบว่า 91% ของใบสั่งยาจะมียา 1-4 รายการ ยาเดี่ยวที่สั่งจ่ายเป็นยาที่อยู่ในบัญชียาหลักแห่งชาติ พ.ศ.2530 ถึง 91% แต่พบว่าในจำนวนนี้เป็นคำสั่งจ่ายด้วยชื่อทางการค้าถึง 79.59% ยาไฮโดรคลอโรไรอะโซลด์ เป็นยาเดี่ยวที่สั่งจ่ายมากที่สุด ยามอดูเรติกเป็นยาสูตรผสมที่สั่งจ่ายมากที่สุด มีการสั่งใช้ยาที่ไม่เหมาะสม 10.75% ของยาทั้งหมด มีการสั่งใช้ยาอย่างมีข้อสงสัย 11.84% ของยาทั้งหมด การใช้ยาไม่เหมาะสมเกิดจากขนาดยามผิดพลาด ใช้โดยไม่จำเป็น เกิดปฏิกิริยาระหว่างยา ใช้ในเวลาที่ไม่เหมาะสม และใช้ในกรณีห้ามใช้ ไดอะซีแพมเป็นยาที่มักสั่งจ่ายมากที่สุดในพวกยาซึ่งไม่ใช้ยารักษาโรคหัวใจและหลอดเลือด ใบสั่งยาที่เขียนถูกต้องสมบูรณ์มี 41.75% ของใบสั่งยาทั้งหมด ความผิดพลาดที่พบในใบสั่งยามากที่สุดคือการเขียนตกหล่นหรือไม่เขียนไว้

**วิจารณ์และสรุป** : แม้ว่ายารักษาโรคหัวใจและหลอดเลือดที่สั่งใช้ในอายุรกรรมทั่วไปเป็นยาในบัญชียาหลักแห่งชาติเป็นส่วนใหญ่ แต่แพทย์นิยมสั่งจ่ายด้วยชื่อทางการค้า ปัญหาที่เกี่ยวกับการใช้ยาเกิดขึ้นจากการเขียนใบสั่งยา แพทย์ที่ปฏิบัติควรได้รับคำแนะนำในเรื่องการเขียนใบสั่งยา ผลดีและผลเสียของการใช้ชื่อสามัญและชื่อทางการค้าของยา การตระหนักถึงปัญหา การมีความรู้ที่เพียงพอ และมีความรับผิดชอบของแพทย์ผู้สั่งใช้ยาอาจช่วยให้มีการใช้ยาที่สมเหตุสมผล

Cardiovascular diseases are now becoming the top ranking health problem. The increased access to newly developed drugs has all too often meant increased opportunity for irrational and excessive use, and this has been recognized as a major problem at almost every hospital nationwide. Not only is the problem one of high costs but it also is one that involves problems of adverse effects and drug interactions.<sup>(1)</sup> Thai people spend 35% of the total cost of their health care on drugs, whereas more developed countries spend 10-20%. The cost of drugs has been increasing at a rate of about 23% per year, whereas the cost of health care is increasing 13% yearly, but the GNP has been increasing only 8% per year. There are more than 20,000 drug items registered by the Thai Ministry of Public Health. But in this amount there are only 2,000 active ingredients. Whereas the National List of Essential Drugs contains 390 items with 348 active ingredients.<sup>(2)</sup> The national drug policies and essential drug lists were implemented in Thailand in 1982, and high attention is given to this topic in the preclinical years of undergraduate medical study. However, physicians in training are likely to develop prescription-writing habits based on the practices of their colleagues, and the influence of pharmaceutical company representatives. This study aimed to determine the prescribing patterns for cardiovascular drugs at the general practice division of the Out-Patient Department (OPD) of Chulalongkorn Hospital. We also assessed the prescription writing habits and the physician's compliance with the

essential drug list issued by the Ministry of Public Health.

### Materials and methods

The OPD records, at the general medicine clinic (Room No. 9) together with the corresponding prescriptions, were collected once weekly, from Monday to Friday of 52 consecutive weeks during February 1988 to January 1989. One investigator, a medical doctor, provided disease codes according to the International Classification of Diseases standard.<sup>(3)</sup> The OPD cards and prescriptions were then grouped according to the diseases or symptoms of organ systems. Each group of the OPD cards and prescriptions was analysed by 1 or 2 investigators who are pharmacologists specialised in that particular field. The investigators transformed the data obtained from the OPD cards and prescriptions into tabular form with numeric codes and made consideration on each drug prescribed, as directed in a guidebook<sup>(4)</sup> previously developed by our group. Remarks on some details about the prescriptions were recorded as well. The data were keyed, with double checking by the technician, into a computer and analysed in terms of range, frequency and percentage. Interpretation of the analysed data was done by the investigators.

### Results

Complete data on 8,173 patients were collected during the one-year period. The patients who ranged in age from 20 to 59 years constituted

71.27% of the total; patients aged over 60 years and older accounted for 22.87%. It was found that 73.22% of the patients had been completely diagnosed. The number of diagnoses totalled

9,612 diseases or symptoms. Diseases of the cardiovascular system constituted 23.96% of the total, and for elderly patients it was clearly predominant (41.1%), as shown in table 1.

**Table 1.** Number and percentage of diagnoses for diseases or symptoms of organ system in all-age group and the elderly group.

Diseases or Symptoms of Organ System	All - age		Age $\geq$ 60	
	No. of diagnosis	%	No. of diagnosis	%
Cardiovascular system	2,303	23.96	983	41.10
Alimentary system	2,196	22.85	319	13.34
Respiratory system	1,513	15.74	321	13.42
Endocrine	906	9.43	322	13.46
Psychiatry	573	5.96	60	2.51
Neurological system	568	5.91	73	3.05
Bone and Joint	520	5.41	127	5.31
Hematological system	352	3.66	58	2.42
KUB	201	2.09	45	1.88
Integumentary system	90	0.94	25	1.05
Gynecology	28	0.29	2	0.08
Miscellaneous	362	3.77	57	2.38
<b>Total</b>	<b>9,612</b>	<b>100.00</b>	<b>2,392</b>	<b>100.00</b>

A total of 20,203 drug items were prescribed, i.e. 2.47 items per prescription for all age groups. For those in the elderly group and the group of cardiovascular diseases, the averages were comparable (2.74% vs 2.80% respectively).

Single drugs, drug combinations and hospital formulations were prescribed in the amount of 14,863 (73.21%), 3,470 (17.18%) and 1,970 items (9.75%), respectively. There were 3,192 items, or 21.48% of the total single drugs

prescribed, which were cardiovascular drugs, and there were 410 items, or 11.82% of the total drug combinations prescribed.

Most of the cardiovascular drugs prescribed, i.e. 2,905 items (91.01%), were listed in the "National Essential Drug List AD 1987" and

79.59% of them were prescribed by trade names. Whereas 63.20% of the total single drugs prescribed were contained in the essential drug list but 41.25% of them were prescribed by trade name, as shown in table 2.

**Table 2.** Number and percentage of single drug prescribing and compliance with the essential drug list in all diseases group and cardiovascular disease group.

Diseases		Single Drug Prescribing			Essential Drug		
		Total	Trade	Generic	Total	Trade	Generic
All	No.	14,863	7,092	7,771	9,394	3,875	5,519
	%		47.72	52.28	63.20	41.25	58.75
Cardiovascular	No.	3,192	2,590	602	2,905	2,312	593
	%		81.14	18.86	91.01	79.59	20.41

Hydrochlorothiazide, isosorbide and propranolol were the three drugs most often prescribed to patients with cardiovascular diseases, whereas diazepam was the most commonly prescribed drug for all patients. Hydrochlorothiazide combined with amiloride (brand name Moduretic) was the most common in the drug combination class. Diazepam and paracetamol were the non-cardiovascular drugs which were most frequently prescribed, as shown in table 3.

In consideration of drug prescribing in relation to the diagnoses made and with regard to indications, dosage, duration of treatment,

contraindications, drug interaction, form of drug, etc., it was found that 10.75% of the total drugs prescribed to patients with cardiovascular diseases were considered to have been used inappropriately, and another 11.84% prescribed were of questionable value, as shown in tables 4 and 5. Of the total prescribed inappropriately, 84.71% were given in inappropriate doses. Digoxin was frequently prescribed at a once daily 0.25 mg dose for long periods of time. Hydrochlorothiazide was prescribed as a diuretic for lowering the high blood pressure. Inappropriate polypharmacy was observed in many prescriptions e.g. four anti-

**Table 3.** Number and percentage of drug prescribing with cardiovascular diseases.

Drug	Total No. of prescribing	Prescribed by	Prescribed by
		Trade name	Generic name
		%	%
Hydrochlorothiazide	742	84.05	15.95
Isosorbide	371	98.84	1.16
Propranolol	341	84.74	15.26
Moduretic*	285	100	0
Alphamethyldopa	244	98.84	1.16
Diazepam**	226	7.37	92.63
Digoxin	211	16.47	83.53
Paracetamol**	160	2.3	97.70
Nifedipine	132	100	0
Furosemide	131	88.84	11.16
Nitroglycerin	126	12.41	87.59
Iso-Triraupin*	110	100	0

\* Drug combination

\*\* Non-cardiovascular drugs

**Table 4.** Percentage of drug prescribing judged to be appropriate, inappropriate and questionable

Classification	%
Appropriate	77.41
Inappropriate	10.75
Questionable	11.84

**Table 5.** Percentage of various inappropriate uses of drugs.

Classification	%
Dosage error	84.71
Unnecessary use	5.88
Drug interaction	5.88
Time of administration	2.35
Contraindication	1.18
<b>Total</b>	<b>100.00</b>



hypertensive agents were prescribed for a hypertensive patient, but three of the drugs belonged to the same group, i.e. sympatholytic agents. Diazepam, paracetamol and vitamin-B complex were usually of questionable value when prescribed.

In terms of completeness and the correctness for each drug item prescribed to the patients with cardiovascular diseases, it was found that 41.75% of the drugs were prescribed completely and the other 58.25% were prescribed with omissions, errors and the use of non-standard abbreviations, as shown in table 6. Examples of omission included failure to specify the strength of drug dosage, form of drug, and the details of the labeling, among others. Errors were caused mainly by poor hand-writing and incorrect spelling. Non-standard abbreviations commonly

used included DZP for diazepam, para for paracetamol and HCT for hydrochlorothiazide.

## Discussion

The results of this study help confirm that cardiovascular diseases are the major current health problem. The problems with drug utilization arise primarily from prescription writing. Some practitioners are not fully familiar with the rational use of drugs in terms of their indications, efficacy, safety and affordability. The lack of knowledge about the drug being prescribed may lead to inappropriate use of the drugs, particularly inappropriate dosage regimen. These factors are responsible for the adverse effects of drugs as well as the ineffectiveness of certain drug therapies. Despite cardiovascular drugs used in general practice being mainly contained in the National Essential Drug List A.D.1987, the drugs are prescribed predominantly by trade names which are recognized to be more expensive than generic ones. As in our study, another study showed that family practice residents wrote brand names on prescriptions 66% of the time.<sup>(5)</sup> It is believed that physicians in training are likely to develop prescription-writing habits based on the practices of their colleagues and the influence of pharmaceutical company representatives. The ignorance and carelessness of some practitioners are commonly reflected in the prescriptions they write. Mistakes range from omission and errors to the use of non-standard abbreviations. Prescription errors may be hazardous to the patients and result

**Table 6.** Percentage of completeness and errors in writing prescriptions

Prescriptions	%
Complete	41.75
Omission	46.97
Error	3.45
Non-standard abbreviation	2.61
Omission + Error	3.34
Omission + Non-standard abbreviation	1.78
Omission + Error + Non-standard abbreviation	

in a waste of their time in consulting doctors to have the prescriptions corrected. It is believed that a number of patients may suffer from a new illness, i.e. the so-called "iatrogenic disease". Moreover, those prescribing the drugs may not have the opportunity to learn from their mistakes. The practicing physicians should be instructed in proper prescription writing practices, and the advantages and disadvantages of generic and trade name preparations. Despite that essential list drugs are mainly prescribed in general practice at Chulalongkorn Hospital, the compliance of the cardiologists with the National Essential Drug List and their rational use of the drugs are questioned. Drug prescribing patterns within other hospitals may differ, but prescribing diazepam is likely to be the most commonly prescribed single drug in many hospitals.<sup>(6)</sup> It is necessary to remind the physicians of the importance of being aware of the need for making rational drug prescriptions.

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