นิพนธ์ต้นฉบับ

Drug prescribing for the elderly medical outpatient at Chulalongkorn Hospital Medical school.

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The Thai elderly are increasing substantially in number and they live longer. In the next 25 years they will constitute 10 millions. They often suffer from multiple illnesses and receive polypharmacy with the consequent risk of adverse reactions. Today the elderly are the main victims of modern drugs and the system by which they are administered. Our study is outpatient drug prescribing by the general practitioner at Chulalongkorn Hospital during the period of January - December of 1988. The prescriptions and corresponding OPD cards of outpatients were collected once a week throughout the period of one year. The data were coded and recorded on computer tape and finally verified. SPSSX programs were applied for analysis in terms of range, frequency and percentage. Only 23% of the 8,173 patients were consideral elderly (age over 60 years). 73% of the these patients had been completely diagnosed and a total of 20,303 drug items were prescribed. The average number of drugs prescribed for the elderly was 2.74 items per prescription. A total of 2,392 of diagnoses were defined for the elderly. The prevalance of cardiovascular, endocrine, respiratory and alimentary system diseases were 41.1%, 13.5%, 13.4% and 13.3%, respectively. Hypertension was the most common ailment of the cardiovascular system in the elderly and diuretics (thiazide) was the most common drug prescribed. In the endocrine

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system, diabetes millitus was the most common disease and glibenclamide (Daonil) was the most commonly prescribed drug. The chronic obstructive pulmonary disease (COPD) was the most common disease of the respiratory system with antiasthmatic preparation (Choledyl) being the most commonly prescribed drug. Dyspepsia was the most striking symptom of the alimentary system. Chulalumin (antacid), the hospital formulation, was most frequently prescribed. Regarding expenses, the average cost per prescription was 160 baht. The highest cost per disease was 743 baht for hyperlipi-demia. 8.57 % of the drug prescriptions were considered to be inappropriate and the most common problem was unnecessary prescription. Another 9.9 % were of questionable value. This study may stimulate the awareness of the general practitioner in prescribing drugs for the elderly.

Key words: Prescribing practices, Elderly outpatient.

ปัจจุบันผู้สูงอายุไทย มีแนวโน้มที่จะมีปริมาณเพิ่มขึ้นและมีอายุยืนยาวขึ้น ท่านเหล่านี้ส่วนใหญ่มีการเจ็บป่วยหลาย ๆ โรค และได้รับการรักษาด้วยยาหลายชนิด ซึ่งจะทำให้เกิดความเสี่ยงในการเกิดโรคอันเนื่องจากปฏิกิริยาไม่พึงประสงค์ของยาสูงกว่าในผู้ป่วยทั่วไป คณะผู้วิจัยได้ทำการศึกษาการสั่งใช้ยาในผู้สูงอายุโดยแพทย์จากคลินิกผู้ป่วยนอก แผนกอายุรกรรมโรงพยาบาลจุฬาลงกรณ์ ระหว่างเดือน มกราคม-ธันวาคม 2531 ได้เก็บรวบรวมประวัติการรักษาพร้อมกับใบสั่งยาในผู้ป่วย โดยเก็บข้อมูลสัปดาห์ละ 1 วัน จากวันจันทร์ถึงวันศุกร์ของทุกเดือนตลอดหนึ่งปีของการศึกษา ซึ่งได้ลงรหัสและบันทึกลงในแบบฟอร์มและนำมาวิเคราะห์โดยโปรแกรมคอมพิวเตอร์ ผลของการศึกษาพบว่า ข้อมูลที่ครบถ้วนจำนวน 8,173 ราย ร้อยละ 23 เป็นผู้ป่วยสูงอายุ (อายุมากกว่า 60 ปีขึ้นไป) และร้อยละ 73 ของข้อมูลทั้งหมดได้รับการวินิจฉัยอย่างสมบูรณ์ ยาที่ใช้สั่งในการรักษาทั้งหมดมีจำนวน 20,303 ครั้ง สำหรับผู้สูงอายุ พบว่าได้รับยาเฉลี่ย 2.7 ชนิดต่อครั้งของการรักษา และได้รับการวินิจฉัยโรคจำนวน 2,392 ครั้ง โรคที่พบบ่อยมากที่สุดคือโรคในระบบหัวใจหลอดเลือด พบถึงร้อยละ 41.1 รองลงมาคือโรคในระบบต่อมไร้ท่อ, โรคระบบหายใจ, โรคระบบทางเดินอาหาร โดยพบร้อยละ 13.5, 13.4 และ 13.3 ตามลำดับ สำหรับในระบบหัวใจหลอดเลือด โรคความดันโลหิตสูงพบมากที่สุดและยาขับปัสสาวะ (thiazide) เป็นยาที่ใช้บ่อยที่สุดในการรักษา ในระบบต่อมไร้ท่อ โรคเบาหวานพบมากที่สุดในผู้สูงอายุ ซึ่งยาลดน้ำตาล (glibenclamide) เป็นยาที่ใช้บ่อย โรคหลอดลมอุดตันเรื้อรัง (COPD) เป็นโรคที่พบมากในผู้สูงอายุของระบบหายใจ และยาแก้หอบ (choledyl) พบว่าใช้บ่อยที่สุดในการรักษา สำหรับระบบทางเดินอาหาร อาการท้องอืดแน่นอาหารไม่ย่อย (Dyspepsia) เป็นโรคที่พบบ่อย และยาลดกรด (chulalumin)ก็พบว่าแพทย์สั่งใช้มากที่สุดในการรักษาอาการดังกล่าวนี้ ในการวิเคราะห์ถึงค่าใช้จ่ายพบว่าค่าใช้จ่ายเฉลี่ยต่อครั้งของการรักษาประมาณ 160 บาท ซึ่งโรคที่มีค่าใช้จ่ายสูงสุดคือโรคไขมันในเลือดสูง เฉลี่ยค่ารักษาต่อครั้งประมาณ 743 บาท ในการพิจารณาวิเคราะห์ใบสั่งยาซึ่งสั่งจ่ายโดยแพทย์พบว่าร้อยละ 8.57 เท่านั้นที่เห็นว่าไม่เหมาะสม เหตุผลที่พบมากที่สุดคือเนื่องจากจ่ายยาที่ไม่มีความจำเป็น สำหรับอีกร้อยละ 9.9 ของใบสั่งยานั้นเห็นว่ามีข้อมูลที่น่าสงสัยเนื่องจากไม่มีข้อบ่งใช้ชัดเจน ผลของการศึกษานี้จะเป็นการกระตุ้นให้แพทย์มีความตระหนักถึงความสำคัญของการสั่งยาในผู้ป่วยสูงอายุ

In 1987, Thai elderly (over the age of 60 years) constituted 5.8% of our population. They increase substantially in number, live longer, and will number 10 million in the next 25 years. The life expectancy of the average Thai has improved remarkably since 1990. The male and female have life expectancies 63.5 and 68.8 years respectively.[1] The elderly are more likely to have social problems. They have lower incomes, stay in poorer housing, be isolated and lonely, and have to bear the stresses of bereavement and widowhood. They suffer from multiple physical and mental problems and receive polypharmacy, with the consequent risk of adverse reactions. Incidence of this iatrogenic disease increases with age. Significantly more patients of 60 years age and over, and more women than men, developed adverse drug reactions, and it was the major cause of the elderly admission to hospitals.[2-4] In the United States,[5] the elderly used 30% of all prescription drugs and 40% of all nonprescription drugs. In Thailand, one study[6] revealed that most of the Thai elderly used medical services from the public hospital, some from private sector, and made 30% of the over-the counter drug. Today the elderly are the main victims of modern drugs and the system by which they are admimistered and it is easy to appreciate the great care necessary in prescribing for this groups of patients.

This study was to evaluate the prescribing patterns and problems for the elderly at the out-patient clinic of Chulalongkorn Hospital Medical shcool.

Materials and Methods

This study was a part of the studies on the relationship of drug prescribing and diagnosis at Chulalongkorn Hospital, the data of the outpatients aged 60 and over was separately analysed and presented.

The study of outpatient drug prescribing by staffs, residents from medicine department and physicians from Thai Red Cross Society at Chulalongkorn Hospital Medical school was carried out during January-December of 1988. The prescriptions and corresponding OPD cards of the medical outpatients were collected once a week starting from Monday during the first week of the study, Tuesday during the second week and so on until the 52nd week. One investigator, a medical doctor, provided disease codes according to the International Classification of Disease.[7] Consideration of prescriptions in the term of appro-priate, inappropriate and questionable were judged by investigators referring to definitions and codes set by this team of researchers. The data from the corresponding prescription and OPD cards were codes on the tabular form regarding to the prepared guidebook by the investigators, and then recorded on computer tape and finally verified. SPSSX programs were applied. Analysis in term of range, frequency and percentage were done.

Results

Table 1 shows the characteristics of the studied outpatients. A total of 8,173 cases were recruited. Sixty-six percent were male. Diagnosis was recorded in OPD cards for 73.2%. It was found that only 22.9% of the patients were elderly. The average number of drugs prescribed for the patients of lower 60 years age was 2.5 items, but for the elderly it was 2.7 items. Regarding the expense, the average cost per prescription for all cases was 160 baht.

Table 1. Characteristics of studied outpatients (N = 8,173).

- Male (%)	65.6
- Age over (>) 60 yrs (%)	22.9
- All recorded diagnoses (%)	73.2
- No of drugs prescribed (< 60 yrs)	2.5
- No of drugs prescribed (> 60 yrs)	2.7
- Average cost/treatment (Baht)	160

A total of 2,392 diagnosis were defined for the elderly patients. The prevalence of cardiovascular, endocrine, respiratory and alimentary ailments were 41.1%, 13.5%, 13.4% and 13.3% respectively. Bone and joint, neurological and psychiatric problems were the more minor ailments among the Thai elderly medical outpatients (Table 2).

Table 2. Number and percentage of diagnoses for diseases or symptoms in the elderly patients.

System	No. of diagnosis	Percentage
Cardiovascular	983	41.1
Endocrine	322	13.5
Respiratory	321	13.4
Alimentary	319	13.3
Bone and joint	127	5.3
Neurological	73	3.1
Psychiatric	60	2.5
Hematology	58	2.4
KUB	45	1.9
Miscellaneous	84	3.5
Total	**2,392**	**100**

Table 3-9 lists the 5 most common diseases found in elderly outpatients, including the cost per prescribing and most often prescribed drugs for them per disease.

Hypertension (54%) was the most common disease of the cardiovascular system in the elderly medical outpatients and diuretics (thiazide) was the most often prescribed drug, the other common cardiovascular diseases were ischemic heart disease (17%), congestive heart failure (7%), cardiac arrhythmia (5%), and chest pain (4%). The average cost per prescription for ischemic heart disease was the most expensive, 575 baht. (Table 3)

Table 3. Percentage of diagnoses, average cost per prescription, most often prescribed drugs in cardiovascular system for the elderly.

Ranking of the five most common diseases or symptoms	% of DX	Average Cost/disease (Baht)	The most often perscribed drugs
Hypertension	54	310	Diuretic (Thiazide)
Ischemic heart disease	17	575	Anginal drug (Isordil)
CHF	7	279	Digoxin (Lanoxin)
Cardiac arrhythmia	5	212	Digoxin (Lanoxin)
Chest pain	4	127	Analgesic (Paracetamol)

Three hundred twenty two elderly outpatients had endocrine diseases. Diabetes Millitus (82%) was the most common disease which glibencalmide (daonil) was the prominent drug prescribed. Hyperlipidemia (10%), Graves disease (3%), Hypothyroid (2%) and euthyroid goiter (1%) were other less common endocrine diseases. Regarding to the expense, the highest cost per prescription was 743 bahts for hyperlipidemia and antihyperlipid, clofibrate derivative (bezalip) was the most often prescribed drug. (Table 4)

Table 4. Percentage of diagnoses, average cost per prescription, most often prescribed drugs in endocrine system for the elderly.

Ranking of the five most common diseases or symptoms	% of DX	Average Cost/disease (Baht)	The most often prescribed drugs
DM	82	306	Glibenclamide (Daonil)
Hyperlipidemia	10	743	Antihyperlipid (Bezalip)
Grave's disease	3	86	Antithyroid (Tapazol)
Hypothyroid	2	617	Thyroid extract (Eltroxin)
Euthyroid goiter	1	56	Thyroid extract (Eltroxin)

Twenty-two percent of the elderly suffered from chronic obstructive pulmonary disease (COPD) which was the most common problem of the respiratory system. Antiasthmatic preparation (choledyl) was the most often prescribed drug for this disease. Prevalence of upper respiratory tract infection (URI) and pulmonary tuberculosis (Pulmonary T.B.) were found in 17% and 12% of the respiratory patients respectively. (Table 5)

Table 5. Percentage of diagnoses, average cost per prescription, most often prescribed drugs in respiratory system for the elderly.

Ranking of the five most common diseases or symptoms	% of DX	Average Cost/disease (Baht)	The most often prescribed drugs
Chronic obstructive pulmonary disease (COPD)	22	183	Choledyl
Upper respiratory tract infection (URI)	17	98	Antihistamine (Chlorpheniramine)
Pulmonary tubuculosis	12	229	Anti TB (INH,Isoniazid)
Bronchitis	9	110	Antibiotic (Amoxycillin) Anticough (Ropect)
Asthma	7	197	Bronchodilator (Theodur, theophylline)

In the alimentary system, dyspepsia (38%) was strikingly frequent and chulalumin (antacid), the hospital formulation, was the most often prescribed drug. Peptic ulcer (16%) was the next most common alimentary disease found in the elderly. The degenerative joint diseases (DJD) were the most common diseases in the bone and joint system. Nonsteroidal anti-inflammatories (feldene) was the predominant drug prescribed and the cost per prescription was 300 baht. (Table 6, 7)

Table 6. Percentage of diagnoses, average cost per prescription, most often prescribed drugs in alimentary system for the elderly.

Ranking of the five most common diseases or symptoms	% of DX	Average Cost/disease (Baht)	The most often prescribed drugs
Dyspepsia	38	97	Antacid (Chulalumin)
Peptic ulcer	16	152	Antacid (Chulalumin)
Flatulency	7	84	Antacid (Chulalumin)
Alcoholic cirrhosis	5	165	Diuretics (Spironolactone)
Constipation	4	110	Laxative (milk of magnesia)

Table 7. Percentage of diagnoses, average cost per prescription, most often prescribed drugs in bone and joint system for the elderly.

Ranking of the five most common diseases or symptoms	% of DX	Average Cost/disease (Baht)	The most often prescribed drugs
Degenerative joint disease (DJD)	26	300	NSAIDS (Feldene)
Muscle pain (Myositis)	14	84	Analgesic (Paracetamol)
Gouty arthritis	14	581	Antigout (Allopurinol)
Spondylosis	9	211	Antacids
Low back pain	9	107	Antacid, Muscle Relaxant (Aspirin, Mydocalm)

The cerebrovascular accident (CVA) was the most common disease of the neurological system and antiplateletes (aspirin) was the most often prescribed drug for the elderly outpatients. The average cost per prescription was 315 baht for CVA. The other most common ailment in the neurological system was tension headaches, and analgesics (paracetamol) was most commonly used to relieve this symptom. In mental problems, anxiety was the most prominent symptom of psychiatric ailments among the elderly. The other most common problem was insomnia for which minor tranquilisers (diazepam) was the most often prescribed drug. (Table 8,9)

Table 8. Percentage of diagnoses, average cost per prescription, most often prescribed drugs in neurological system for the elderly.

Ranking of the five most common diseases or symptoms	% of DX	Average Cost/disease (Baht)	The most often prescribed drugs
Cerebrovascular accident (CVA)	23	315	Antiplatelets (Aspirin)
Tension headache	22	56	Analgesics (Paracetamol)
Headache causes	15	52	Analgesics (Paracetamol)
Cerebral insufficiency	10	303	Cerebral dilatation (Stumed)
Transient ischemic attack (TIA)	7	373	Antiplatelets (Aspirin)

Table 9. Percentage of diagnoses, average cost per prescription, most often prescribed drugs in psychiatry for the elderly.

Ranking of the five most common diseases or symptoms	% of DX	Average Cost/disease (Baht)	The most often prescribed drugs
Anxiety	65	68	Minor tranquilisers (Diazepam)
Insomnia	20	76	Minor tranquilisers (Diazepam)
Neurosis (Tension state)	12	59	Multivitamin with minerals (Viterra)
Dementia	2	21	Major tranquilisers (Haldol)
Depression	2	91	Minor tranquilisers (Frisium)

Regarding prescription indications, dosages, contraindications, drug interaction, form of drugs etc., a total of 1,739 drug prescriptions (8.57%) were considered to have been inappropriat (Table 10). The prominent error was unnecessary use (Table 11). The most common unnecessary drugs were vitamins, sedatives and analgesics. Another 2,021 drug items (9.9%) were considered to be of questionable value (Table 12). with unknown indications. The questionable prescribed drugs were diazepam, vitamin-B and paracetamol.

Table 10. Number and percentage of drug prescriptions judged to be appropriate, inappropriate and questionable.

Classification	No. of drug prescribing	%
Appropriate	16,543	81.48
Inappropriate	1,739	8.57
Questionable	2,021	9.95
Total	20,303	100.00

Table 11. Number and percentage of various inappropriate uses of drugs.

Classification	No. of drug prescribing	%
Overdose	0	0.00
Contraindication	20	1.15
Drug interaction	22	1.26
Unnecessary	719	41.35
Insufficient dose	30	1.73
Duration of therapy	17	0.98
Route and time of drug administration	629	36.17
Inappropriate form of drug	2	0.11
Others	300	17.25
Total	**1,739**	**100.00**

Table 12. Number and percentage of drug prescribed questionably.

Classification	No. of drug prescribing	%
Diazepam	262	12.97
Vitamin-B complex	213	10.54
Paracetamol	147	7.27
Multivitamin	143	7.07
Vitamin-B1-6-12	95	4.70
Clorazepate	51	2.52
Chulalumin	42	2.08
Amoxycillin	36	1.78
Ampicillin	33	1.63
Ferrous+B+Calcium	33	1.63
Others (152 drugs)	966	47.8
Total	**2,021**	**100.00**

Discussion

At present, most Thai elderly are in the young-old (65 to 75 years) category and this is different from the elderly in western countries where the majority are old-old (over 85).[8] In Thailand, since life span and the quality of life continue to increase as the quality of health care improves, so we are going to face the problems of the elderly like western nations, and more and more elderly patients will seek medical treatments for multiple illnesses.

Our study of medical outpatient drugs prescribed for the Thai elderly at Chulalongkorn Hospital revealed that our elderly suffered from multiple physical and mental problems similar to the elderly in the United States.[5] The most common diseases in the Thai elderly requiring drug treatment are hypertension, heart disease, diabetes millitus, hyperlipidemia, chronic obstructive disease, digestive disease, arthritis, cerebrovascular disease and anxiety.

In the United Kingdom, multicenter studies[3] found that diuretics were the most commonly prescribed drugs for the elderly, but in Los Angeles, U.S.A.[5] antihypertensive drugs are the most often prescribed drug followed by diuretics. In our study, diuretics were also found to be the most commonly prescribed drugs, and other commonly prescribed drugs were digitalis, hypoglycemic, antihyperlipid, bronchodilator, antacid, nonsteroidal anti-inflammatories and minor transquilisers.

The elderly receive polypharmacy due to multiple diagnoses. A survey of the elderly from Moir[9] showed that 28% of them needed no medications, but 57% were taking 1-3 drugs and 15% were receiving 4 of more drugs. In study we found that an average of 3 drugs were pre-scribed for the elderly per prescription in our outpatient clinic. In the next twenty years, our elderly population will gradually increase to the old-old group, and more drugs will be given to the elderly to relieve their problems but with the consequent risk of adverse reaction. Only 8.57% of drug prescriptions were judged to be used inappropriately while the most common problem was unnecessary prescription. Questionable prescriptions were found 9.9% of the time. Reflection from our study may stimulate the awareness of the general practitioner in prescribing drugs for the elderly. As increasing numbers of drugs are consumed by the elderly, the greater the chance of adverse reaction. It is generally acknowledged that there are other predisposing factors such as advanced age, female sex, small body size, hepatic or renal insufficiency and previous drug reactions. Prescribing doctors need to remember the words of the Bard : "A body yet distemper'd which to his former strength may be restored with good advice and little medicine." Geriatric therapeutics is a sophisticated, good prescribing practice often only requires existing resources to be used in a more efficient, sensible manner and does not necessarily require high costs to the patient.

Acknowledgement

References

1. กองวางแผนทรัพยากรมนุษย์ คณะทำงานประมาณ
   ประชากร ในคณะอนุกรรมการนโยบายและ
   แผนประชากร. การคาดประมาณประชากรของ

ประเทศไทย 2532-2528. สำนักงานคณะ
กรรมการพัฒนาการเศรษฐกิจและสังคมแห่ง
ชาติ, 2529.

2. Hurwitz N. Predisposing factors in adverse
   reaction to drugs. Br Med J 1969 Mar 1;1
   (5643):536-9

3. Williamson J, Chopin JM. Adverse reactions
   to prescribed drugs in the elderly : a
   multicentre investigation. Age Ageing
   1980 May; 9(2):73-80

4. Blaschke T, Cohen S, Tatro D. Drug-drug
   interactions and aging. In : Jarvik L, ed.
   Clinical Pharmacology and the Aged
   Patient. New York: Raven Press, 1981:
   11-26

5. Brooks T.R. Drug prescribing for the elderly
   outpatient and for those confined to con-
   valescent hospitals. J Natl Med Assoc
   1993 Dec; 85(12):921-7

6. Chayovan N, Wongsith M, Saengtienchai C.
   Socio-economic consequences of the
   aging population in Thailand. Bangkok :
   Institute of Population Studies, Chula-
   longkorn University. 1988"

7. International Classification of Diseases,
   Manual of the International Statistical
   Classification of Diseases, Injuries and
   Causes of Death. Vol 2. Geneva : World
   Health Organization 1978.

8. Cohen JL. Pharmacokinetic Chages in aging.
   Am J Med 1986; May 80; (Suppl 5A)
   31-8

9. Moir DC, Dingwall-Fordyce I. Drug taking in
   the elderly at home. J Clin Exp Gerontol
   1980;2:329