

MAJOR DRUG-PRESCRIBING PATTERNS IN SINGAPORE GENERAL HOSPITAL

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SYNOPSIS

The drug-prescribing patterns of a medical ward and a surgical ward were studied over a period of two months in Singapore General Hospital. Prescriptions of 198 medical patients and 173 surgical patients were surveyed. All patients in the medical ward received some medications whereas 6% or 11 out of 173 patients in the surgical ward received no medication. During that two months period, 782 items of drugs were used in the medical ward which was 67% more than the total items of drugs used in the surgical ward although the number of medical patients surveyed was only 14% more than that of surgical ward. The mean number of drugs used per patient was 3.9 in the medical ward and 2.7 in the surgical ward. 33.8% of the medical patients received more than 4 drugs whereas only 16.2% of the surgical patients received more than 4 drugs during their stay in the hospital. However the problem of poly-pharmacy or multiple medication was serious in both medical and surgical wards for as many as 13 to 14 items of drugs had been found to be given to one single patient in both wards. This study also showed that the 5 most commonly prescribed drugs in medical ward were vitamins (71.7%), bronchodilators (62.6%), antibiotics (41.4%), diuretics (35.9%) and narcotics (30.3%) whereas the 5 most commonly prescribed drugs in surgical ward were narcotics (98.3%), antibiotics (54.3%), non-narcotic analgesics (27.7%), laxatives and purgatives (23.1%), tranquilisers, sedatives and hypnotic (22.5%).

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INTRODUCTION

The magnitude of drug prescription in Singapore has prompted a study of prescribing patterns in the Singapore General Hospital. In 1976 Singapore spent \$7 million for the purchase of drugs and chemicals of which \$1.6 million was spent in Singapore General Hospital alone. The purpose of this study is to compare prescribing patterns in a medical ward with those of a surgical ward.

METHODS AND MATERIALS

All patients admitted between 1st March 1976 and 30th April 1976 to a surgical ward (Ward 11) and those admitted between 1st October 1976 and 31st November 1976 to a medical ward (Ward 43) were selected for study. Any patient who was transferred to another unit during the period of study was excluded. Lodgers in the ward were also not included.

198 patients in the medical ward and 173 patients in the surgical ward were studied over a 2 month period. The following information of each patient such as sex, age, race, number of days spent in the hospital and final diagnosis of the patient was recorded. A complete medication profile of each patient including the entries of all drugs prescribed during the whole period of hospitalization, their dosage forms, the dose, route of administration, and frequency of administration was also obtained.

Drugs were classified according to the British National Formulary (1974-1976) and all agents with a pharmacological effect were recorded. Intravenous solutions for maintenance of fluid balance were not recorded but pharmacological substances added to intravenous solutions were noted. Data on the number of drug orders are to be interpreted as the number of types of drugs to which each patient was exposed and not as the number of doses each patient received. The data were derived from both hospital patient and pharmacy prescription records. No additional data was

sought.

RESULTS

In the medical ward every patient admitted was put on medication whereas 11 patients (6%) in the surgical ward received no medication as shown in Table I. The mean numbers of days of hospitalization was 6.8 days and 7.3 days respectively for patient in the medical and surgical ward, with a range of 1-46 days for medical and 2-44 days for surgical patient.

Table II shows that the medical ward used 782 items of drugs against 468 items used by the surgical ward. However there was no significant difference in the different group of drugs used in the two wards, the medical ward used 34 pharmacologically different groups of drugs whilst the surgical ward used 31 groups. The mean drug exposure was 3.9 per patient in the medical ward and 2.7 per patient in the surgical ward. 68 of medical patients (34.34%) received more than 4 drugs whereas only 28 of surgical patients (16.2%) received more than 4 drugs during their stay in the hospital. Fig 1 and Fig 2 show the number of drugs administered to the patients during their stay in the medical and surgical ward respectively. There was also no significant difference in the range of drugs prescribed for either medical patients or surgical patients. The former received 1-13 items and the latter 1-14 items.

Table III shows the various drugs acting on the

Table I

	Medical Ward	Surgical Ward
Total number of Patients studied	198	173
Number of male patients	198	115
Number of female patients	0	58
Number of patients with no medication	0	11
Mean days of hospitalisation	6.8	7.3
Range of days of hospitalisation	1-46	2-44

TABLE II

	Medical Ward	Surgical Ward
Total number of drugs used	782	468
Total pharmacological groups of drugs used	34	31
Mean drug exposure	3.9	2.7
Number of patients receiving more than 4 drugs	68 (34.3%)	28 (16.2%)
Range of drugs prescribed	1-13	0-14

TABLE III: Drugs acting on the alimentary system

	Medical Ward	Surgical Ward
Antacids	23	15
Carminative	0	6
Hyoscine-N-Butylbromide	1	8
Propantheline	11	10
Liquid Paraffins	19	30
Bisacodyl Suppositories	6	6

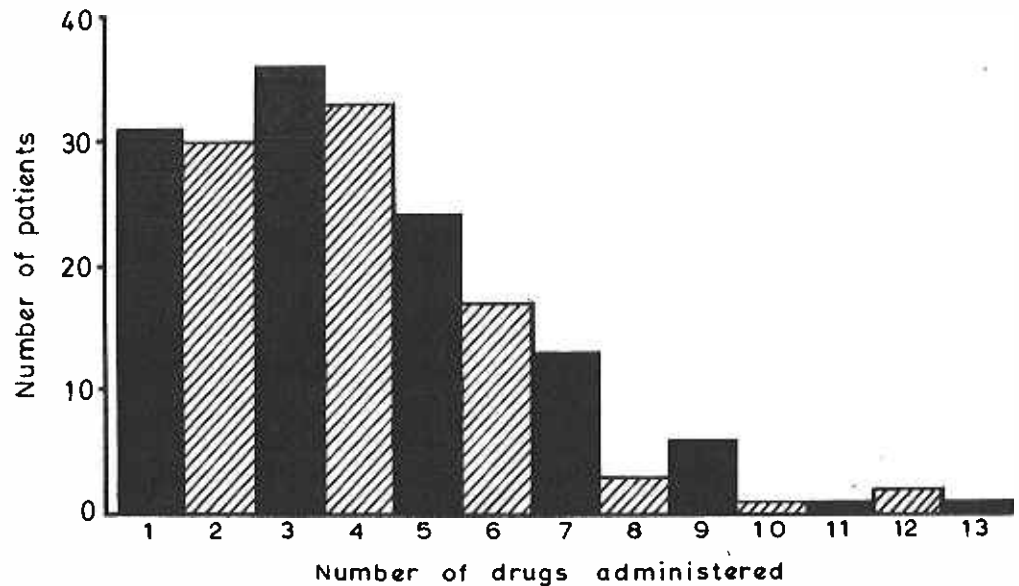


Fig. 1 Number of drugs administered to patients in the medical ward.

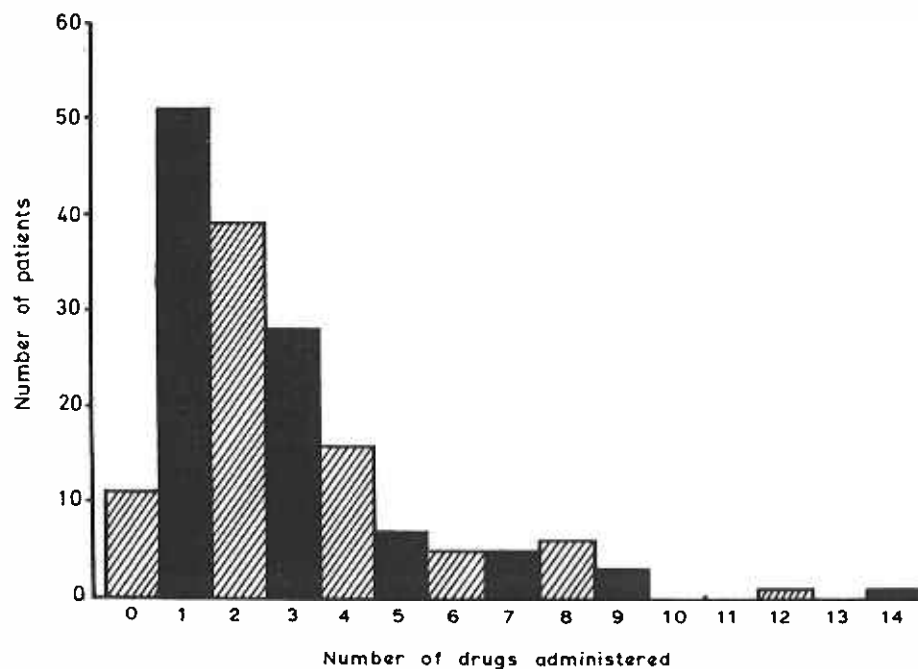


Fig. 2 Number of drugs administered to patients in the surgical ward.

alimentary system and antacids were one of the most common preparations prescribed. They were mainly used for the treatment of gaastric and duodenal ulcers. It is observed that the surgical ward used more anti-spasmodics like hyoscine-N-butylbromide than the medical ward. Carminatives were never prescribed in the medical ward but in the surgical ward it was still given to patients who complained of "wind" in the stomach after abdominal operations. Liquid paraffin compound was the most popular laxative in both the medical and the surgical ward.

The fact that the medical ward prescribed more diuretics and cardiac preparations as shown in Table IV were to be expected because many medical patients suffered from cardiovascular disorders. This survey also showed that methyl dopa was the most popular anti-hypertensive agent used in both the medical and surgical ward. Beta-adrenergic receptor blocker like propranolol was used only sparingly for the treatment of hypertension inspite of recent great interest in this group of drug as a hypotensive agent.

During the period of survey the medical ward treated 44 patients with obstructive airway disease and hence a large number of bronchodilators were used. The cheaper drug phenobarbitone et ephedrine Compound (Franol) had given place to more specific beta-adrenergic receptor agonists like salbutamol because of the cardiac and neurological effects of ephedrine. It is interesting to note that an expectorant was also prescribed for almost every asthmatic patient (Table V).

A fair amount of corticosteroids were used in the medical ward. Hydrocortisone and prednisolone were chiefly prescribed for the management of asthmatic patients, whereas dexamethasone was used mainly for the purpose of reducing cerebral oedema (Table VI). It is most interesting to note that corticosteroid was used only in 1 patient in the surgical ward.

Paracetamol was still the most commonly prescribed analgesic for both the medical and surgical ward (Table VII). Aspirin, basically a very potent analgesic, has fallen out of favour because of the gastro-intestinal side

TABLE IV: Drugs acting on the cardiovascular system and diuretics

	Medical Ward	Surgical Ward
Chlorothiazide	25	5
Frusemide	39	5
Spironolactone	7	1
Digoxin	22	3
Etileprin (Ethylphenyleprine)	6	0
Glyceryl Trinitrate	6	0
Methyldopa	15	5
Propranolol	1	2
Guanethidine	1	1

effect. The medical ward used more mixture opii because it has more patients with opium addiction whilst the surgical ward used more pethidine because this was prescribed as pre-medication and also for post operative management of pain.

Negligible amount of hypnotics and sedatives were used but tranquilizers such as diazepam was often prescribed. The physicians prescribed this particular tranquilizer as often as the surgeons although patients admitted to a surgical ward generally give the impression of being more anxious than those who are treated for a medical disorder.

41.4% of the patients in the medical ward and 53.3% of patients in the surgical ward were given antibiotics. The surgical ward used more tetracycline, procaine penicillin and streptomycin than the medical ward but ampicillin seemed to be the antibacterial of choice in both the medical ward and the surgical ward. There was no evidence of any misuse of the more expensive antibiotics like gentamycin. Sulphonamides were hardly used.

Although no malnutrition or vitamin deficiency was recorded in either of the wards, 118 patients in the medical ward and 21 patients in the surgical ward received vitamin B₁, B complex and C. It appeared that many vitamin preparations were used almost routinely

TABLE V: Drugs acting on the respiratory system

	Medical Ward	Surgical Ward
Adrenaline	3	0
Aminophylline	24	2
Choline Theophyllinate	32	0
Phenobarbitone et Ephedrine Compound	2	0
Salbutamol	32	0
Mist Ammonium et Ipecacuanha	27	8
Linctus Tussis Rubra	4	2

TABLE VI: Corticosteroids

	Medical Ward	Surgical Ward
Hydrocortisone	13	0
Prednisolone	8	1
Dexamethasone	6	0

TABLE VII: Drugs acting on the central nervous system

	Medical Ward	Surgical Ward
Paracetamol	21	35
Aspirin	4	1
Codein Co.	4	8
Mist Opii	10	1
Hoyle's Cocktail	4	1
Methadone	2	0
Morphine	20	8
Pethidine	16	162
Barbiturates	12	6
Chlorpromazine	4	0
Diazepam	37 (18.7%)	33 (19.0%)

TABLE VIII: Antimicrobials

	Medical Ward	Surgical Ward
Tetracycline	6	16
Crystalline Penicillin	9	9
Penicillin V	0	2
Procaine Penicillin	7	17
Ampicillin	49	23
Erythromycin	2	0
Gentamycin	2	2
Streptomycin Complex	2	15
Co-trimoxazole	1	1
Sulphamethizole	1	1
Sulphadiazine	1	0
Nalidixic Acid	2	0
Nitrofurantoin	0	

TABLE IX: Nutrition Supplements

	Medical Ward	Surgical Ward
Vitamin B ₁	6	1
Vitamin B Complex	98	10
Vitamin C	14	10
Iron Preparations & Folic Acid	12	5
Other Vitamins & Nutrition Supplements	11	8

as a placebo (Table IX).

The 5 most commonly prescribed drugs in the medical ward were vitamins (71.7%) bronchodilators (62.6%) antibiotics (41.4%) diuretics (35.9%) and narcotics (30.3%) whereas the 5 most commonly prescribed drugs in the surgical ward were narcotics (93.6%) antibiotics (54.3%) non-narcotics analgesics (27.7%) laxatives and purgatives (23.1%) tranquilizers, sedatives and hypnotics (22.5%) (Table X).

DISCUSSION

This study of drug prescribing patterns in the medical and surgical ward in the General Hospital shows that the medical ward used 67% more drugs than the surgical ward though the number of patients surveyed in the medical ward was only 14% more than that of surgical ward. It also shows that the medical patient used more drugs per patient than the surgical patient as shown by the fact the mean number of drugs used per patient was 3.9 in the medical ward and 2.7 in the surgical ward. However the problem of multiple medications was serious in both medical and surgical ward for as much as 13 to 14 items were prescribed to a single patient by both surgeons and physicians alike. The 13 items prescribed for 1 medical patient consisted of aminophylline, ampicillin, chlorothiazide, frusemide, ethylphenylephrine, nikethamide, hydrocortisone, antazoline, salbutamol, digoxin, potassium chloride, mixture ammonium and ipecacuanha and vitamin B Co. The 14 items prescribed for 1 surgical patient consisted of digoxin, vitamin K, crystalline penicillin, streptomycin, ampicillin, frusemide, spironolactone, codeine phosphate, paracetamol, potassium chloride, sodium chloride, kaolin, benzoin inhalation and vitamin A & D. It must be easily appreciated that over-prescribing adversely affects the cost of medical care. More importantly over-prescribing is probably the most significant factor contributing to the ever increasing number of adverse reactions which occur in hospitalised patients. Complex regimens also lead to an increase incidence of drug interactions (Maronde et al 1971). This is well illustrated by the

TABLE X: Most commonly prescribed drugs

Medical Ward		Surgical Ward	
Vitamins	71.7%	Narcotics	93.6%
Bronchodilators	62.6%	Antibiotics	54.3%
Antibiotics	41.4%	Analgesics (non narcotic)	27.7%
Diuretics	35.9%	Laxatives, purgatives	23.1%
Narcotics	30.3%	Tranquillizers, Sedatives	
		Hypnotics	22.5%

above medical patient who received 13 items of drugs during hospitalisation. He was given two potent diuretics namely frusemide and chlorothiazide together with digoxin for the treatment of cardiac failure. He developed hypokalaemia and clinical signs of digitalis toxicity. Fortunately the patient recovered after correction of hypokalaemia and withdrawal of digitalis from his medication. In the case of the surgical patient receiving 14 items of drugs, undesirable drug interaction can also occur between kaolin and digoxin when they are administered together orally. The expected effect of digitalis will be decreased as the intestinal absorption of digitalis is delayed or decreased by the concomitant administration of kaolin.

Although it is a known fact that not every patient

admitted to a hospital requires medication, every patient warded in the medical ward was put on drugs. The large percentage of patients on vitamins (71.7%) seem to indicate that vitamins were used almost routinely as a placebo. Some 6% of the surgical patients received no medication because only dressings were used for minor operations and also there were a few admissions of unknown diagnosis for investigation.

REFERENCES

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