

The changing pattern of general practitioner drug prescribing in the National Health Service in England from 1970 to 1975

ROY E. MAPES, B.SC, B. LITT, FSS

Professor and Director, Medical Sociology Research Centre, University College of Swansea

W. O. WILLIAMS, OBE, B.SC, MD, FRCGP

General Practitioner, Swansea; Senior Medical Research Fellow, Medical Sociology Research Centre, University College of Swansea

SUMMARY. We describe the changing pattern of general practitioner prescribing in the National Health Service in England between 1970 and 1975.

The percentage increase in items of prescriptions had increased 10 times as much as the percentage increase in the population in the same period. One of the reasons given is that there may be a growing tendency to give a prescription when it would be better to give advice.

The evidence seems to support other findings that the profession responds much more widely to reports on the good effects of a drug than it does to its adverse effects.

Introduction

DOCTORS in the National Health Service have a good deal of freedom to prescribe what drugs they choose for their patients. The ultimate responsibility for the quantity of each drug prescribed is the doctor's, but there are many factors which influence his choice (Hemminki, 1975). It is not surprising, therefore, that the popularity of different drugs changes from time to time. Some highly effective and safe drugs have stood the test of time, while others, not so endowed, are more sensitive to change, especially when a better or safer drug becomes available.

In the period of study there were some slight changes in the demographic character of the English population. In particular there was a slight increase in the proportion of elderly patients. For these patients there was clearly a greater need for medication, which could

be expected to result in an increase in the frequency of prescribing.

On the other hand, the study period was not characterized by excessive epidemics or any considerable changes in morbidity; yet the total number of prescription items written by general practitioners in England in 1975 was 282,000,000 compared with 248,000,000 in 1970, a rise of 13·8 per cent. The corresponding increase in the population in the same period was 1·1 per cent. Accordingly, it appears that such an increase in prescribing might be due to one or both of two tendencies. One is a response by doctors to a demand, rather than a need, of patients for pharmaceutical medication. Reference to this effect will be made later, but it is outside the immediate scope of this paper. The other is a tendency for pharmacological innovation to have produced, during the period, a number of new drugs which made treatment possible in instances where treatment was not previously available.

In examining this possible tendency, we shall look at prescription drugs on a pharmaco-therapeutic basis. First, we shall comment on those pharmaco-therapeutic categories in which prescribing changed considerably during the period of review; and secondly, we shall examine more closely groups which were found to be most changeable.

Method

The data used for this study were the DHSS Lists 'Ds'. The precise nature of these lists is described elsewhere (Benjamin and Ash, 1964). Suffice it to say that the data result from a one in 20 sample of the work of dispensing chemists. The List has been produced since 1961 and tests reveal a high order of validity.

Of a total of 88 pharmaco-therapeutic groups (Department of Health and Social Security, 1976) 82

were analysed, using the number of prescriptions written in 1970 as a baseline, with 100 used as an index for that year. Groups 83 to 88 were excluded because they comprised such items as dressings and reagents. A comparison was made for each of the 82 groups between the index figure of 100 for 1970 and the relative index prevalent in 1975.

The groups of drugs which had increased their index to over 150, an increase of 50 per cent, were examined more closely using the data provided by the Department of Health. Attention was also given to those groups of drugs which had decreased by 50 per cent. Individual drugs in any groups which had themselves shown a significant change were also studied in detail.

Results

The groups of drugs which had shown a general increase of 50 per cent or more are shown in Table 1. In six of these, the number of items written was so small that these groups were excluded from the study. Individual drugs from further groups were examined because they had shown significant changes in their prescribing within the period of study.

For the purpose of comment, the groups are listed according to their general pharmacological action.

Preparations acting on the alimentary system

In the study period, the prescribing of anti-infective agents for the alimentary system had dropped by 50 per cent (Index 57.8). This drop was more than compensated for by a corresponding increase in drugs which acted purely as gastro-intestinal sedatives (Index 157.7).

Until the rota virus was discovered in 1973 (Bishop *et al.*, 1973) the cases of infective diarrhoea which could be identified with an organism were usually associated with bacteria and the rest were thought to be due probably to viruses. However, it was only recently that a particular virus (the rota virus) was identified as a common cause (Gross *et al.*, 1976). Although gastro-enteritis is often given the name of 'gastric 'flu' by the patient, the influenza virus has only rarely been found to be the cause (Williams, 1971). Improved teaching about the treatment of gastro-enteritis has emphasized the importance of treating and preventing dehydration and not relying entirely on gastro-intestinal antibiotics. During this period of study it had become more common, when prescribing a drug for diarrhoea, to give one of the gastro-intestinal sedatives rather than treating blindly with an antibiotic. However, it has become accepted that all that is necessary in most cases of diarrhoea and vomiting is to combat and prevent dehydration, as the body takes care of the infection.

Table 1. Drug groups which had increased by 50 per cent between 1970 and 1975. (Some groups with a very small number of items have been excluded.)

Group of drugs	1970		1975	
	Actual prescribing (thousands)	Index number	Actual prescribing (thousands)	Index number
Gastro-intestinal sedatives	1,820	100	2,871	157.7
Preparations acting on the heart	4,141	100	7,960	192.2
Diuretics	6,902	100	12,834	185.9
Anti-migraine drugs	526	100	1,120	212.9
Anticoagulants	267	100	400	149.8
Other preparations acting on the vascular system	236	100	840	355.9
Other preparations acting locally on the lower respiratory tract	765	100	1,696	221.9
Other preparations affecting the lower respiratory tract, including stimulants	291	100	604	209.3
Non-barbiturate hypnotics	6,628	100	9,743	147.0
Preparations used in Parkinsonism	750	100	1,183	157.6
Anti-emetics (other than preparations of unadmixed hyoscine salts)	1,243	100	1,952	157.0
Other preparations acting locally on the urethra and vagina	68	100	102	150.7
Anti-fungal antibiotics	300	100	474	158.2
Other antibiotics	2,171	100	3,824	176.1
Other anti-infectives	2,787	100	5,022	180.2
Oestrogen/progestogen combinations	699	100	3,504	501.3
Other preparations affecting metabolism	137	100	251	182.5
Anti-mytotic preparations	45	100	80	179.5
Preparations for electrolyte and water replacement	1,782	100	2,784	156.2
Preparations for protein desensitization	56	100	93	164.3
Corticosteroid preparations acting on the ear, nose, and throat	932	100	1,580	164.3
Fungicides and anti-parasitics	960	100	1,549	169.7

Actual prescribing rounded to the nearest one thousand

Preparations acting on the cardiovascular system and diuretics

There was a great increase in the prescribing of drugs in this group. One drug (practolol), first introduced in 1970, had increased 14-fold before it was withdrawn because of the reporting of serious side-effects (Rowland and Stevenson, 1972). Beta-adrenergic receptor blocking drugs, such as oxprenolol and propranolol had also increased considerably in this period, especially in the treatment of hypertension and cardiac arrhythmias. The prescribing of oral diuretics had continued to increase ever since the introduction of the first oral diuretic, chlorothiazide, in 1959. Many other similar drugs had followed, making the treatment of heart failure much easier and more acceptable than by injections. Patients were being treated for heart failure while ambulant and even, in some cases, still able to carry on with their work. Diuretics were not only being used for heart failure, but also in the treatment of hypertension, either taken alone or with a hypotensive drug. A disadvantage of diuretics in general is that they cause potassium loss through diuresis. This deficiency has to be made up by taking potassium supplements and these preparations had increased in their prescribing by over 50 per cent in this five-year period. Since patients find it confusing to take too many kinds of tablets, combination tablets containing a diuretic and a potassium supplement were introduced and these gained considerable popularity in this period. There was also a marked increase in the prescribing of those diuretics which did not have the reputation of potassium loss.

It is now generally recognized that it is important to treat established hypertension, although the treatment of 'mild' cases is still being debated. Nevertheless, drugs in the treatment of hypertension were being used in gradually increasing amounts over the period of study. These drugs, once started, tend to be used for many years, so that their national usage is cumulative until a saturation point is reached or a better alternative treatment is found. When a higher dosage of the hypotensive drug was found to be more effective, a double dose tablet rapidly gained popularity. This happened after a 500 mg methyl dopa tablet was manufactured when its prescribing increased by a factor of five times, although the smaller dose tablet was still used more.

This study revealed that there had been an increasing use of anticoagulants, especially warfarin, whose prescribing had increased from three to 10 times, depending on the dosage of the tablet. The reason for this is not clear, but it may be that it is cheaper than its competitors. The long-term treatment with anticoagulants had by this period become commonplace, as for example in the treatment of some cases of coronary thrombosis, chronic or recurrent venous thrombosis, or heart valve replacements.

Another cardiovascular drug which gathered momentum in its prescribing during this period was clofibrate. It was first prescribed in 1963, but it was not

until 1972 that there was an upsurge in its use, and by the end of the study period its prescribing had increased three and a half times.

The reason for this may have been the simultaneous publication of the results of studies by a group of physicians of the Newcastle upon Tyne region (1971) and the Scottish Society of Physicians (1971) which showed evidence of the benefit of long-term administration of clofibrate in the prevention of myocardial infarction in patients with angina pectoris. These studies had taken five and six years respectively to complete, but they were both reported at the same time.

The group of drugs used in Parkinsonism had increased in their prescribing from 100 to 159. Orphenadrine hydrochloride introduced in 1971 had gained considerable favour in the prevention and treatment of drug-induced Parkinsonism.

Preparations acting on the lower respiratory system

The most important drug to gain favour in this group was cromoglycate, commonly used to prevent attacks of asthma. This, inhaled into the lower respiratory tract in the form of a powder, prevents the processes which lead to bronchospasm. The prescribing of this drug had increased three-fold during the study period.

A locally acting steroid, also inhaled, and introduced in 1972, had also become popular, but it was designed to overcome bronchospasm, unlike cromoglycate which prevents it occurring. This product gained favour because it was probably felt that a locally acting steroid would be less likely to cause the side-effects of steroids taken parenterally.

Preparations acting on the nervous system

There was an interesting change in the prescribing of hypnotics. Although the prescribing of barbiturate hypnotics had been reduced by half, the prescribing of non-barbiturate hypnotics had been increased by a third, in the same period. The former acquired an increasingly bad reputation of having addictive qualities and greater risk when taken with alcohol. For these reasons the medical profession mounted a campaign against them (Mapes, 1977). A choice of two other hypnotics was offered to the public, both in proprietary form, methaqualone and nitrazepam. However, by 1961, letters began to appear in the medical press (Lawson and Brown, 1966) pointing out the dangers of the drug methaqualone, its risk when taken with alcohol, and the difficulty in treating overdose. However, in spite of these warnings, it continued to be prescribed until after 1970, when there was a dramatic reduction in the number of prescriptions from an index of 100 to 14.9 in 1975. Nitrazepam, on the other hand, had trebled in its prescribing in the same period.

While there had been only a slight general increase in antipyretic analgesics (100 to 118.8), the total number

of prescriptions for this group was still very high indeed—over 1·9 million in England in 1975. Some individual drugs showed substantial increases in this period. There was a great increase in the prescribing of some paracetamol-containing products, especially those combined with either dextropropoxyphene or dehydrocodeine tartrate; some of these had increased three times. Although there was no great increase in the prescribing of paracetamol itself, it must be remembered that the drug may be purchased readily over the counter. The ingestion of paracetamol in overdose may at first appear to be relatively innocuous to the taker, and the act could be attention seeking, but the delayed effect can be serious. Elimination of paracetamol from the body is slow and allows time for it to do irreversible liver damage (Proudfoot and Wright, 1970). There is evidence that dextropropoxyphene may lead to some dependence in some cases, and for this reason it may be unwise to combine it with paracetamol.

Drugs containing metoclopramide increased their prescribing from 100 to 526·6 in the study period. This drug is particularly favoured for drug-induced and postoperative nausea and vomiting.

Preparations acting on the genito-urinary system

During the study period, there had been an appreciable increase in the prescribing of certain preparations acting on the urethra and vagina, particularly in anti-fungal agents. There is evidence that there had been an increase in vaginal discharge in women taking the contraceptive pill (Kay, 1978). This group of oestrogen/progestogen preparations had an increased rate of prescribing from 100 to 501·3 in the five-year period. At the same time, the prescribing of preparations acting locally on the vagina and urethra had increased from 100 to 150·7, boosted in particular by anti-fungal agents, used most commonly to combat candida infections. Corroborative evidence comes from Gruber and colleagues (1972) who found candidiasis present in 15·3 per cent of pregnant women, in 20·7 per cent of women taking oral contraception, and in only three per cent of controls.

Preparations acting systemically on infections

There had been a reduction in the use of systemic chloramphenicol (100 to 27), reflecting the profession's attitude to the risk involved in taking this drug.

There had also been a considerable reduction in the prescribing of streptomycin (100 to 12·1) although there was only a small decline in usage of anti-tuberculous drugs as a whole (100 to 90). Streptomycin is known to cause tinnitus and deafness in some people and has the added disadvantage of having to be given by injection, usually involving the time of a professional nurse.

Anti-fungal antibiotics had increased from 100 to 158·2, again reflecting a possible increase in vaginal candida infection.

The prescribing of erythromycin preparations for children had increased considerably in the study period,

and there was a corresponding decrease in the prescribing of tetracyclines for children, many of the preparations having decreased by over 50 per cent. Doctors had taken heed of the warnings in the medical journals about the risks to children taking these drugs, especially the discolouration of teeth (Moser, 1966; Baker and Storey, 1970).

The 'other' anti-infective agents had increased their prescribing from 100 to 180 in this period, this group being led by a sulphonamide derivative, co-trimoxazole, which showed an increase of 300 per cent.

Preparations affecting metabolism

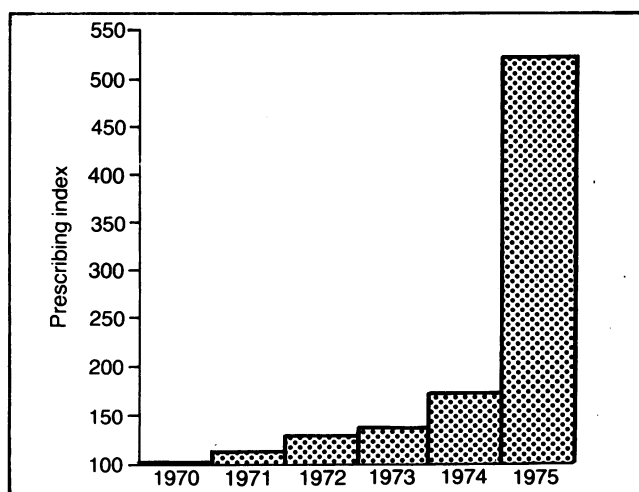
Leading the field in this group are the oestrogen/progestogen combinations, especially those used in the contraceptive pill. This group had increased five-fold as already shown.

Discussion

The salient finding in this study was that the percentage increase in prescribed items had grown 10 times more than the percentage increase in the population of England between 1970 and 1975. It is challenging to attempt to explain and, indeed, to justify such a disproportionate increase in terms of greater benefit to health or to quality of life. In the first place there is no evidence of there having been an increase in morbidity in recent years which might necessitate such a growth in the use of drugs. A comparison of the only two available national morbidity surveys in 1955 and 1970 (Crombie *et al.*, 1975) for example, showed no appreciable change in morbidity.

On the other hand it may be suggested that the profession is responding to the same sum total of morbidity with new drug use. If it is true that the efficiency of the drug repertoire has improved during the

Figure 1. Prescribing of oral contraceptives in England, 1970 to 1975.



five years in question, then this would imply that new drugs had been exchanged for old; it would not necessarily imply that *more* drugs had been used. As described above, there were some real therapeutic advances in the period of review, for example, sodium cromoglycate, but such advances imply substitution rather than a need for an increase in prescription writing. However, it has to be acknowledged that any review of prescriptions must remain somewhat speculative as to particulars. This is because of the lack of other supportive data. For instance, it is tempting to attribute the pattern of oral contraceptive prescribing (Figure 1) entirely to the changes in the regulations relating to the charges for such prescriptions. On the other hand, the reason for the increase might have been clinical rather than economic and the increase may have been a response to the 'clean bill' given to the contraceptive pill rather than economic demand from patients. It would be interesting if some research could be carried out to ascertain the extent of private contraceptive pill prescribing before 1975. This is outside the scope of this present paper as such an attempt would involve the co-operation of many sectors of the pharmaceutical industry.

Further light might be shed on the reasons for increased drug prescribing by examination of changes in the number of drug items issued per patient per visit. If, during the five years of the study, there had been an annual increase in the number of separate drug items per prescription issued then this might have accounted for the growth in prescribing. Figures from the Department of Health and Social Security reveal a change from 1.55 to 1.60 items per prescription during the period, an increase of only 3.2 per cent. Clearly, therefore, an increase in the issuing of prescriptions between 1970 and 1975 has been established and this was roughly of the order of 10 per cent.

The figures presented in Tables 1 and 2 might provide theoretically the means of audit (in the old-fashioned sense of the word). That is to say, if we assume a stable repository of morbidity then the undesirable or outmoded drugs would be replaced by more efficient newcomers: thus barbiturates would be replaced by non-barbiturate hypnotics. However, the total prescribed from the groups which have increased so heavily during the period outweighs the total from the groups which have decreased during the same period so that, as

already suggested, the increase in prescribing has little to do with more efficient substitution. We consider, therefore, that two effects are at work. The first stems from a change in emphasis in treatment, the second relates to continued and increasing patient demand.

Figure 2 provides some evidence of the first of these effects. It is more than probable that the substantial increases in the prescribing of cardiovascular drugs represent not so much a change in the number of new semi-acute cases presenting but rather a therapeutic response to the perceived risks of untreated hypertension in cases already known. A slightly different reason (but with the same consequences) lies in different treatment régimes which are being adopted. For example, migraine headaches (Table 1) were once treated at each episode but in recent years there have appeared an increasing number of preparations which are taken continuously. In both of these cases, and in others, the result is that increasing numbers of patients will be receiving maintenance therapy for many years if not for their lifetime.

In summary, as far as this five-year period is concerned, two tendencies contribute to this first effect: both reveal a changing attitude to the management of an existing and fairly stable morbidity. The first tendency is the major one and is illustrated by the case of hypertension, wherein there is a growing tendency to avoid the possibility of crisis by preventive therapy

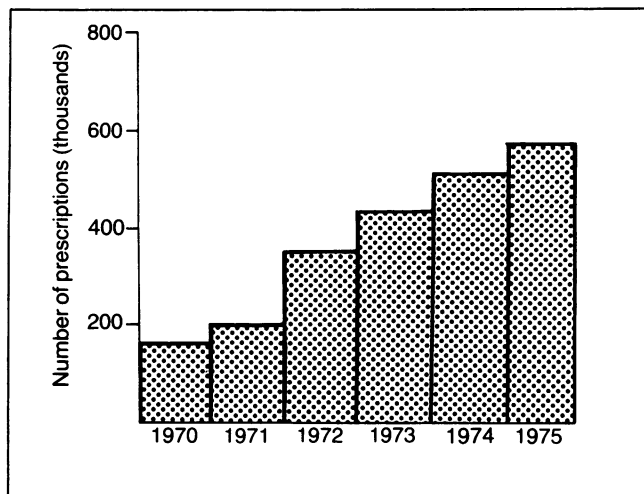


Figure 2. Prescribing of clofibrate in England, 1970 to 1975.

Table 2. Drug groups which had decreased between 1970 and 1975.

Group of drugs	1970		1975	
	Actual prescribing (thousands)	Index number	Actual prescribing (thousands)	Index number
Barbiturates	12,201	100	6,737	55.2
Preparations acting on the uterus	97	100	47	69.0
Streptomycins	140	100	18	12.1

using known means. The second tendency is closely related and is illustrated by the case of migraine, wherein the pharmaceutical industry appears to be innovating by the production of new maintenance therapy products in the place of former 'per episode' materials.

The second effect is a matter of common observation and is concerned with both the doctor's and the patient's perceptions of the nature of adequate treatment. Some studies (Stimson and Webb, 1975) have shown that up to 80 per cent of consultations end with a prescription. The majority of patients appear to expect the doctor to write a prescription at the end of a consultation, and it makes it all the harder for a doctor to stop, either for fear of disappointing the patient or running the risk of making himself unpopular.

Prescribing drugs for their placebo effects must be regarded as counter-productive in the long term, insofar as doctor/patient relationships are concerned. Furthermore, there may be some danger of unwanted effects. If the best treatment for a given problem is to give advice, as in the treatment of obesity for example, then it is better for the patient if the doctor does this. Here a doctor would have to spend more time than he would have done just writing a prescription. He has to convince a reluctant patient that a tablet is not necessary and that he will probably have to give up some of his favourite foods and drink.

All this takes time and patience, so that there is a great temptation to bring the consultation to a close by issuing a prescription for a drug to curb the appetite. This habit of ending a consultation with a prescription is now regarded as a symbol of completion by the patient and an instrument of disengagement by the doctor.

To be able to turn the tide of this habit requires more time and much determination on the part of the doctor. It is clear that any reduction in excessive prescribing must result from doctors' own initiatives. Not only are they the originators and instruments of prescribing, but such curtailing of prescribing frequency will be unaided by patients. At least two generations of primary care patients have been induced by the media to place their trust in pharmaceutical treatment to the exclusion of all other procedures. In such circumstances denial may be painful but necessary.

It is also important to have more teaching about sensible prescribing at both undergraduate and postgraduate levels in teaching institutions and teaching practices.

Medical journals also have an important part to play. There was evidence in this study that they can sometimes be very effective, especially when the beneficial effects of drugs are presented. The publication in 1974 of the Royal College of General Practitioners' report *Oral Contraceptives and Health*, and the two reports on the clofibrate studies mentioned earlier in this paper, are good examples. However, the profession seems slower to react to the untoward effects of drugs.

Not all doctors read journals, but the Committee on Safety of Medicines does send warnings to each doctor about serious drug reactions which have been reported. This Committee relies on information given to them by doctors on special notification cards (the yellow cards) of any important reactions to any drug. A note on the inside back cover of each prescription pad now acts as an effective reminder to the doctor to report these reactions as soon as they occur.

The study has shown that the profession has taken heed of the warnings about the risks of prescribing certain drugs and has responded well to the undoubted advances in the field. However, the speed of response of the profession to warnings has often been quite slow (Cleary, 1976). The criteria set for the production of Tables 1 and 2 inevitably obscure evidence and so it is appropriate to quote that the numbers of prescriptions for central nervous system stimulants and appetite suppressants (both largely of the amphetamine type) fell only from three million to 2·6 million during the period. Accordingly, there appears to be a continued need for the support by postgraduate training of reports in the journals of adverse reactions and of criticisms extending over a number of years.

Pharmaceutical companies who take the financial risk of producing new drugs sometimes take the initiative and withdraw those which they have found to be unsafe. The manufacturers of practolol, for example, warned doctors in July 1974 of the risks to some patients of taking it. They did this again in April 1975 when they drew attention to the possible risks of developing sclerosing peritonitis. Three months later, in July 1975, they withdrew the drug from the market except for special use in hospitals. Our figures show that the prescribing of the drug had increased 14-fold in the study period before it was withdrawn.

Conclusions

In general the increase in prescribing which we have found may be regarded as a composite of a number of effects. The scientific status of these effects varies. Some are self-evident from the tables; in some cases effects are deducible indirectly, whereas others are little more than hypotheses. There is clearly evidence of the continued and increasingly symbolic character of the act of prescription giving and we have argued against this becoming an invariable practice at the end of consultations. During the study period there was a small measure of genuine pharmacological innovation and the addition of a number of useful drugs to the practitioner's repertoire. These, however, had little to do with explaining the increase, as the result of these innovations is largely substitutive.

Insofar as the increase from 1970 to 1975 is concerned, it should be recognized that the figures are very cumbersome and the tables show only the more salient points. Many groups increased (and a few decreased)

