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Factors Affecting Prescription of Psychotropic Drugs in General Practice

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During one week in 1985, 227 general practitioners (GPs) in the county of Aarhus, Denmark, recorded all their prescriptions of psychotropic drugs, amounting to 4 180 prescriptions for 3 756 patients. There was great variation in the rate of prescribing among the GPs. The median number of prescribed defined daily doses per 1 000 registered patients per day was 84, and the corresponding median number of prescriptions per 1 000 patients per week was 14. There was a significantly lower rate of prescribing of psychotropic drugs by rural/small town GPs, compared with GPs in major cities (odds ratio, 0.84; 99 % confidence limits, 0.77-0.91), after correction for differences in patients' age and sex. There were no differences in rate of prescribing among GPs in relation to size and type of practice, nor to the age and sex of the GP.

Key words: defined daily dose, general practice, multipractice study, psychotropic drugs, prescribing.

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The rate of prescribing psychotropic drugs is higher in Denmark than in the other Nordic countries (1). Sale figures for hypnotics/sedatives and tranquilizers are on an average twice as high in Denmark as in the other Nordic countries. Several factors influence the rate of prescribing these drugs. A previous study described patient-related factors (2, 3), but the GP's attitude and other doctor- and practice-related factors might also come into play. Bjørndal et al. found that female GPs prescribed fewer psychotropic drugs than male GPs, while there was an increase in prescribing with GPs' age, apart from the oldest GPs (4). In that study, however, correction was not made for size of practice, nor for differences in the age and sex of the practice population.

The aim of the present study was to analyse the influence of the following factors on the prescription of psychotropic drugs in general practice: sex of GP, age of GP, type of practice (single-handed, partnership), size of practice (number of patients),

and location of practice (rural/small town or major city).

MATERIAL AND METHODS

At the time of the study (November 1985), the county of Aarhus, Denmark, had 564 154 inhabitants, of whom 447 937 were aged 16 years or over. All the GPs in the county (342 in 239 practices) were invited to take part in the multipractice study. One hundred and fifty-nine practices (67%) with 227 GPs (66%) participated. During one week they recorded all prescriptions of psychotropic drugs, amounting to 4 180 prescriptions for 3 756 patients.

Drugs were classified according to the Anatomical Therapeutic Classification (ATC) System, as recommended by the World Health Organization (WHO) (1). ATC groups NO5 (neuroleptics, minor tranquilizers, and hypnotics/sedatives) and NO6A (antidepressants) were recorded. The number of prescribed defined daily doses (DDD) was used as

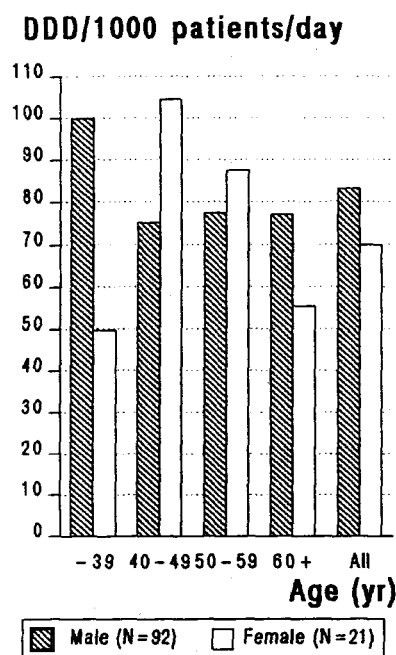


Fig. 1. Prescribed DDD/1000 patients/day by doctors' age and sex.

the unit of measurement, in accordance with principles drawn up by WHO and the Nordic Council on Medicines (1). The DDD and the number of prescriptions of psychotropic drugs were recorded for each practice during a defined period of one week. These counts were standardized based on the number of patients connected to the practices (i.e. patients aged 16 years or over).

Comparing the amount of benzodiazepines in the present study (1985) with the amount sold by chemists one year earlier, it is likely that about 20–25% of benzodiazepines were not reported by the GPs (2). Because the recordings were related to a practice, and not to individual GPs, the influence of the doctors' age and sex could only be analysed in single-handed practices. The influence of size of practice, number of GPs per practice, and practice location were analysed in both single-handed and partnership practices. Practices were geographically located in two groups on the basis of postal code. The town group ($N=114$) comprised practices in the three major cities in the county (Aarhus, Randers, Silkeborg), and the rural/small town group included the rest ($N=113$).

The material was processed at the regional computer centre (Uni.C., Aarhus). The statistical pro-

cedures included chi-square test with Yates' correction, Kruskal-Wallis one-way analysis of variance test, Spearman's rank correlations test, and stratified Mantel-Haenszel (M-H) test (5). In the latter analysis, confounding by differences in patients' age and sex was eliminated by the stratification, and the results of the M-H analysis were expressed in the odds ratio (OR). OR is an approximation of the relative risk or the relative difference between two groups (5). The figure 1.0 represents no differences, and the difference is significant if this figure is not within the confidence limits. In the patient age and sex stratified M-H analysis, 10 year age groups, and a group of 70 years or older were used. Patients in the age group below 20 years were excluded due to the small number of patients. The levels of significance in the analysis were both 5% and 1%. The study was registered at the regional scientific-ethical committee.

RESULTS

The median number of prescribed DDD/1000 patients/day was 84 (quartiles 53–113, range 3–403), and the median number of prescriptions/1000 patients/week was 14 (quartiles 9–19, range 1–81). Fig. 1 shows the median prescribed DDD/1000 patients/day in relation to doctors' age and sex for GPs in single-handed practices. There was no correlation between GPs' age ($p=0.94$, Spearman's test) or sex ($p=0.87$, Kruskal-Wallis test) and the prescribed DDD/1000 patients/day. There were no differences between male and female GPs in single-handed practices with regard to the median number of prescriptions/1000 patients/week (14.7 versus 14.6, $p=0.94$, Kruskal-Wallis test). However, this analysis is not corrected for patients' age and sex.

Patients' age and sex might be confounders in the analysis of doctor-related factors influencing prescription of psychotropic drugs. The results were therefore recalculated in the stratified M-H analysis on the basis of the number of prescriptions/1000 patients/week among patients registered with female and male GPs in single-handed practices. Three hundred and twenty-five prescriptions were recorded by 21 female GPs, and 1835 by 92 male GPs, in patient populations of 19838 and 108464, respectively, in the age group 20 years or older (4 prescriptions excluded because of age below 20 years). The OR for prescription of psychotropic drugs by female GPs compared to male GPs in

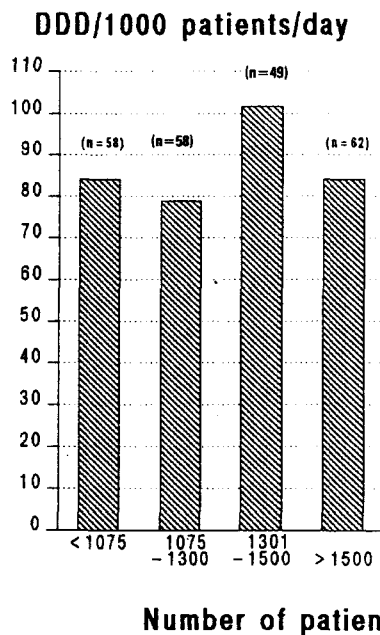


Fig. 2. Prescribed DDD/1000 patients/day by number of patients per doctor.

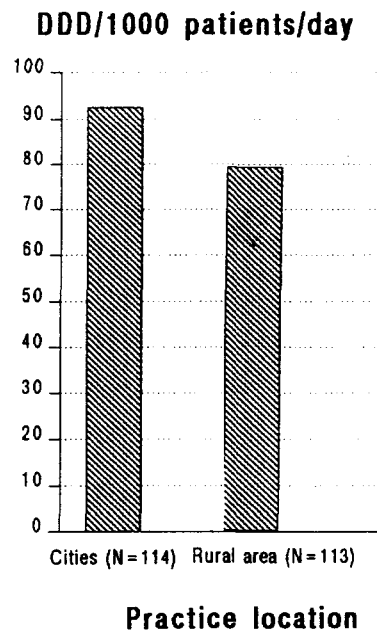


Fig. 3. Prescribed DDD/1000 patients/day by practice location.

single-handed practices was 1.03 (95% confidence limits: 0.92–1.16). The OR for prescription of psychotropic drugs to female and male patients by a female GP compared to a male GP in single-handed practices was 1.04 (95% confidence limits: 0.91–1.16) and 1.00 (95% confidence limits: 0.78–1.29), respectively. There was thus no significant interaction between doctors' and patients' sex in the prescription of psychotropic drugs.

The median prescribed DDD/1000 patients/day in single-handed practices was 82.3, and in partnership practices with two, three, and four GPs, it was 84.4, 87.3 and 79.0, respectively. No correlation was found between the number of prescribed DDD/1000 patients/day and the number of GPs per practice ($p=0.70$, Kruskal-Wallis test).

Fig. 2 shows the median prescribed DDD/1000 patients/day in relation to the number of patients aged 16 years or older per GP in both single-handed and partnership practices. There was no correlation between prescription rate and practice size ($p=0.82$, Spearman's test).

Fig. 3 shows the median prescribed DDD/1000 patients/day in relation to geographic location of practice. The median prescribed DDD/1000 patients/day in rural/small town practices and city

practices was 78.9 (quartiles: 53.0–105.8, range: 2.7–336.8) and 92.5 (quartiles: 60.4–125.7, range 5.0–403.3), respectively. The difference was significant ($p=0.01$, Kruskal-Wallis test). There was also a significant difference in the median number of prescriptions/1000 patients/week between rural/small town practices and practices in major cities (12.7 versus 15.2, $p=0.01$, Kruskal-Wallis test).

Differences in age and sex distribution among patients in rural and city practices might be confounders. The results were therefore recalculated in a patient age and sex stratified M-H analysis on the basis of the number of prescriptions/1000 patients/week. One thousand seven hundred and ninety-one and 2327 prescriptions were recorded by rural/small town practices and major city practices to patient populations of 153 604 and 169 861, respectively, in the age groups 20 years or older (12 prescriptions excluded because of age below 20 years, and 50 prescriptions because of missing sex or age). The OR for prescription of psychotropic drugs to patients in the age groups 20 years or more at practices in rural/small town areas compared to practices in major cities was 0.84 (99% confidence limits: 0.77–0.91). This means that the differences demonstrated in the prescription rate with respect

to geographic location were not due to differences in age and sex distribution among the patients.

DISCUSSION

We have described previously how valid and representative this study was (2). The county of Aarhus represents 11% of the Danish population, and the population is representative of the whole of Denmark with regard to major demographical factors. There were no differences among participating and non-participating practices in relation to the analysed doctor and practice factors, so the doctors in this study should be representative for the GPs in the county of Aarhus. By using the postal codes, the practices in the county were divided into town and rural/small town groups. Since GPs in Denmark are only allowed to cover an area with a radius of 10 km, this tends to group the patients similarly.

The main findings were that the prescription rate for psychotropic drugs was significantly lower in rural/small town areas than in major cities, but that it was independent of the GP's age and sex and the practice form and size. These findings can be compared with several other studies that have analysed some of the doctor and practice factors analysed in the present study (4, 6-9).

A Danish study of the prescription of all state-subsidized drugs in the county of Vejle showed that there was a significantly lower prescription rate in rural than city practices and among older than younger doctors (6). There was no difference with respect to practice type. With respect to psychotropic drugs, there was a tendency for lower prescription with increasing doctors' age, but, in contrast to our findings, there were no differences with respect to geographic location. A British study has shown that doctors in urban practices were more likely to prescribe tranquillizers than those in rural practices (7).

These studies, including the present, do not explain the differences in prescription rate among doctors in relation to the geographic area. The differences may be explained by 1) differences in doctors' attitude and experience, 2) differences in behaviour and demand between patients in rural and city areas, 3) nature of city as opposed to rural life influencing the morbidity of psychological disorders and mental diseases, and 4) differences in social network in the two geographic locations.

A Norwegian study showed minor differences in GP factors, but the results were not analysed statistically with standardization for practice size and patients' age and sex (4). In that study there was a tendency for lower prescription rate among female GPs and older GPs, though the very oldest GPs prescribed more psychotropic drugs than younger doctors. In the county of Aarhus, considerably fewer patients are registered with female than with male GPs in single-handed practices. If these differences hold in Norway, this would tend to produce false differences in prescription rate among male and female GPs in single-handed practices. Differences in sex and age distribution among patients registered with male and female GPs in single-handed practices might be confounders. For instance, if more female patients were registered with female GPs, this would tend to overestimate the prescription rate by female GPs. On the other hand, if more younger people were registered with female GPs, this could give a falsely low prescription rate among female GPs in single-handed practices.

An American study did not show any differences between male and female GPs in the rate of prescription of benzodiazepines (8). This is in accordance with the present study, as was the lack of interaction between GPs' and patients' sex. Another American study has shown that the prescription of non-psychotropic drugs was relatively predictable, while the prescription of psychotropic drugs was not (9).

Most of the prescribed psychotropic drugs are for patients who are not suffering from psychiatric illness, but to normal patients suffering from somatic, psychosocial or existential problems (3, 9). The present investigation did not show any important single explanation for the great differences in the prescription rate, except practice location. The great variation in prescription rate among GPs might instead be explained by the GPs' attitude to the use of psychotropic drugs and proficiency in the handling of everyday problems of living. This hypothesis will be studied in future investigations.

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