Predictors of High Prescribing Rates in Family Practice during Actual Consultation: A Cross-sectional Study from Slovenia

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A B S T R A C T

With a cross-sectional survey wich was held on in Slovenia we would like to define the predictors of high prescribing rates in family practice. 42 involved family doctors reported 300 office contacts, i.e. a total of 12,596 contacts. The participants were asked to fulfil the questionnaire for each patient-doctor encounter in one day. In 12,596 recorded contacts, 14,485 prescriptions were issued to the patients. The patients got from 0 to 10 prescriptions per visit ($\overline{X} \pm SD$: 1.2±1.4). Among 7,363 (58.5%) patients, who got at least one prescription, the mean number of prescriptions was 2.0±1.4. The majority of prescribed drugs were for cardiovascular system. The multivariate model for higher number of prescribed drugs explained 20.2% of the variation. Independent predictors for higher prescribing rates during a consultation were female sex, older age, higher number of problems dealt within the consultation (comorbidity), longer consultation times, lower education grade, higher patient quota on the list, higher prescribing quota indexed by NHII for the past year, being a specialist in family medicine, male doctor and age of doctor more than 44 years. Practice characteristics did not show any correlations with high prescribing volumes. The results of this survey show that some patients' and doctors' characteristics and also some consultations' characteristics affect the prescribing rate. Additional analyses should be performed to identify reasons for that and to propose proper actions.

Key words*: family practices, family physicians, physicians' practice patterns, drug prescriptions, Slovenia*

Introduction

Prescription of drugs is an important part of the family doctors' (FD) therapeutic activities and it is an important role in the treatment of patients in the family practice setting. In Western Europe and USA, a drug is prescribed in more than 60% of the consultations[1]. Health care expenditures for the drugs are rising in every health care system in the world. In The Netherlands and in the United Kingdom, more than 60% FP consultations end up with a prescription[2]. In Southern European countries this percentage can even increase to over 90%[3,4]. In a cross-sectional study of Slovenian family practice, 58.1% of the consultations ended up with a prescription (min. 0 prescription, max. 9 prescription, $\overline{X}$=2.0 prescriptions, SD=1.3)[5]. There is a steady 7% yearly increase in prescribing costs in Slovenia, too (5% between 2007 and 2008)[6,7]. In 2008, the National Health Insurance Institute (NHII), which is responsible for basic mandatory health care coverage, paid 220 EUR on average for each citizen for the drugs[7]. These costs contributed to share of 17% of the total national health care budget. The mix of drugs chosen within therapeutic categories besides changes in drug prices causes spending per capita to increase[1,8].

There are considerable differences among FDs in terms of the choice of drugs and the quantities prescribed. Prescription practices in family practice are often tailored by other factors than solely by clinical guidelines. High variability in prescribing rates poses a public health threat due to costs and clinical implications of inappropriate use of drugs. The variations in prescribing habits cannot be explained only by demographic differences in the patient population or differences in morbidity alone but is also the consequence of differences in the prescribing behav-

iour and the quality of prescribing[9]. The differences in the prescribing behaviour and the quality of prescribing should be taken into account while planning interventions towards rational prescribing[2]. Patient pressure is often mentioned as one of the driving forces in variation. Patients' expectations and views and doctors' concerns that the patient may otherwise re-consult, have a powerful effect on doctors' decision to prescribe[10-12]. A positive patient's report reinforces prescribing, but the negative result such as a major side effect is often enough to stop the drug trial[13].

Limited marketing of drugs is one of the means to diminish patient pressure on the prescribing patterns of the doctors[14–16]. Doctors are the main targets of different and complex marketing strategies of the pharmaceutical industries. Heavy marketing pressure of pharmaceutical industry leads to an increase in prescribing[14].

These facts can explain country-to-country variations, but are of a limited use for the explanation of the variation between individual doctors. They found that 16.5% of variation in prescribing costs between individual doctors could be explained by the FDs' demographic characteristics, leaving majority of the prescribing costs variation unexplained[15]. For some clinical activities, some practice and patient characteristics were also found significant in explaining variation[17–20]. General model of predictors of high prescribing rates in family practice however is still missing in the literature. The aim of this study was to define the predictors of high prescribing rates in Slovenian family practice.

Participants and Methods

Study design

We conducted a cross-sectional study in a sample of Slovenian FDs.

Participants

A random sample of 50 FDs from a Slovenian Family Medicine Society register was drawn, 42 (84%) responded. The survey did not include the FD that are working in the social care institutes and doctors who do not work full time as FD.

The investigated patient population consisted of consecutive visitors in FDs' surgeries regardless of purpose or reason for visiting the surgery. The sample included also the patients that received doctors' care in a form of a house visit.

Questionnaire

The participants were asked to fulfil the questionnaire for each patient-doctor encounter in one day. The questionnaire included data about the patient (age, sex, education), his or her reason for the visit, diagnostic and therapeutic procedures and diagnoses as well as the recording days away from work and possible follow-up visit. The doctors were also asked to measure the duration of each visit.

Statistical analysis

For statistical analysis we used SPSS 13.0 (SPSS Inc., Chicago, IL, USA). We calculated the descriptive statistics. In the univariate analyses we used independent samples t-test and χ^2-test. In the multivariate analysis we used linear regression and logistic regression. We entered the variables that showed statistical difference in univariate analysis at $p < 0.05$. In a multivariable analysis following variables were included: patient gender and age, education level, No. of problems dealt with in the consultation, length of the consultation, doctor's sex and age, vocational training status, prescribing rate index, employment status, prescribing quota, appointment system, mean number of office visits. For other statistical tests the statistical significance was also set at $p < 0.05$.

National Ethical Board approved the study.

Results

The mean age ±SD of the FDs was 44.1±7.7 years. The age ranged from 33 to 63 years. The mean working time of the FDs was 15.8±8.2 years. The working time ranged from 4 to 35 years. Vocational training was finished by 22 out of 42 doctors (52.4%), 11 (26.2%) doctors were in service training and 9 (21.4%) doctors had not completed any vocational training at all. In total, 12,596 contacts were registered. The fastest working FD spent on average 3.2 minutes for one consultation and the slowest 12.3 minutes, giving an average time for a consultation 7.1±1.4 minutes. The mean prescribing index was 107.5±29.5, and ranged from 52.0 to 192.3. The number of patients on the lists ranged from 862 to 3,186. The mean number of patients on the FDs' lists was 1,775.4±435.9. The mean age adjusted prescribing quota was 2,387.5±633.4 standardised units, it ranged from 1,094.8 to 4,202.4 standardised units. The mean number of patients contact per day was 45.5±10.0 (from 31.3 to 78.6), the mean number of telephone consultation per day was 9.0±4.5 (from 0 to 19.4).

The practices were located in each Slovenian geographical region. 20 FDs (48.1%) were working on the locations with less than 10,000 inhabitants, 18 FDs (42.8 %) in towns with 10 to 100,000 inhabitants and 4 (9.5%) in cities with more than 100.000 inhabitants. The distances from the practice to the nearest hospital were from 1 up to 80 km (mean 24.7±20.0 km). 9 (21.4%) FDs worked in solo practices and the rest in dual or group practices. Mean number of doctors on one location was 6.1±5.0 (from 1 to 22). 34 doctors (80.9%) were employees in primary health care centres and 8 (19.1%) were self-employed.

In 12,596 recorded contacts, 14,485 prescriptions were issued to the patients, of which 5,680 (45.1%) were male and 6,916 (54.9%) were female. Mean age of the patients was 51.9±19.0 years (from 0 to 97 years). The majority of the patients had primary education (5,164, 41.0%), others had secondary or higher education grade. There were 9,107 (72.3%) contacts with physical examination and

TABLE 1
PRESCRIBED DRUGS ACCORDING TO ATC CLASSIFICATION

Code	ATC Roup	No.	%	Rank
A	Alimentary tract and metabolism	1420	9.8	4
B	Blood and blood forming organs	763	5.3	7
C	Cardiovascular system	4686	32.4	1
D	Dermatologicals	633	4.4	8
G	Genito-urinary system and sex hormones	171	1.2	11
H	Systemic hormonal preparations, excluding sex hormones and insulins	178	1.3	10
J	Antiinfectives for systemic use	1188	8.2	5
L	Antineoplastic and immunomodulating agents	55	0.4	13
M	Musculo-skeletal system	1644	11.3	3
N	Nervous system	2495	17.2	2
P	Antiparasitic products, insecticides and repellents	7	<0.1	14
R	Respiratory system	949	6.6	6
S	Sensory organs	302	2.1	9
V	Various	66	0.5	12

ATC classification: Anatomical Therapeutic Chemical (ATC) classification
The patients got 0 to 10 prescriptions per visit (1.2±1.4). Among 7,363 (58.5%) patients, who got at least one prescription, the mean number of prescriptions was 2.0±1.4. The majority of prescribed drugs were for cardiovascular system

TABLE 2
P-VALUES FOR FAMILY DOCTORS' AND PATIENTS' AND PRACTICE CHARACTERISTICS IN CORRELATION WITH HIGHER PRESCRIBING RATES DURING ACTUAL CONSULTATION (T-TEST AND χ^2-TEST)

Characteristic	p value
Male doctor	<0.001
Age of the doctor >44 years	<0.001
Finished vocational training	0.006
Prescribing rate index >100%	<0.001
Average no. of office visits >45	0.844 (NS)
Mean time of the consultation >7 minutes	<0.001
Prescribing quota set by NHII >2,400	<0.001
Appointment system in place	0.272 (NS)
Female patients	<0.001
Age of the patient >64 years	<0.001
Education level below primary education	<0.001
More than on problem dealt in within the consultation	<0.001
Self-employed	0.383 (NS)

NHII: National Health Insurance Institute
Bivariate analyses shows doctor, patient and practice characteristics, which according to the literature might play a role in higher prescribing rates. Practice characteristics did not show any correlation with high prescribing volumes

3,489 (27.7%) contacts without it. Most contacts were due to acute problems (3,501, (27.8%) and 3,162 (25.1%) were due to check-up visits. Within actual consultation, the doctor dealt with 1 to 8 problems (1.6±0.9). Only one health problem was exposed in 60.7 (0.48%) consultations.

The patients got 0 to 10 prescriptions per visit (1.2± 1.4). Among 7,363 (58.5%) patients, who got at least one prescription, the mean number of prescriptions was 2.0±

1.4. The majority of prescribed drugs were for cardiovascular system (Table 1).

Bivariate analyses shows doctor, patient and practice characteristics, which according to the literature might play a role in higher prescribing rates. Practice characteristics did not show any correlation with high prescribing volumes (Table 2).

The multivariate model for higher number of prescribed drugs explained 20.2% of the variation. Inde-

TABLE 3
LINEAR REGRESSION MODEL OF HIGHER PRESCRIBED DRUGS DURING THE CONSULTATION
(MODEL: F=208, 13 df, / r^2=0.208, / p<0.001)

Model	B	C.I.		p value
		Lower	Upper	
Constant	0.342			
Female patients	0.083	0.129	0.037	<0.001
Age of the patient >64 yrs.	0.541	0.488	0.594	<0.001
Higher No. of problems dealt with in the consultation	0.931	0.882	0.980	<0.001
Mean time of the consultation >7 minutes	0.212	0.260	0.165	<0.001
Education level less than secondary education	0.122	0.074	0.171	<0.001
Patient quota on the list indexed by NHII >2400	0.123	0.070	0.177	<0.001
Prescribing quota index for previous year set by NHII >100	0.132	0.086	0.179	<0.001
Finished vocational training	0.076	0.045	0.108	<0.001
Male doctor	0.233	0.185	0.281	<0.001
Age of the doctor >44 yrs.	0.104	0.053	0.156	<0.001

Dependent Variable: No. of prescriptions in actual consultation

The multivariate model for higher number of prescribed drugs explained 20.2% of the variation. Independent predictors for higher prescribing rates during a consultation were female sex, older age, higher number of problems dealt within the consultation (comorbidity), longer consultation times, lower education grade, higher patient quota on the list, higher prescribing quota indexed by NHII for the past year, being a specialist in family medicine, male doctor and age of doctor more than 44 years

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Discussion

In Slovenian family practices 58.5% of the patients finish their consultation with a prescription, which is consistent with findings from other countries (in the Netherlands and in the United Kingdom more than 60% FP consultations end up with a prescription), but much lower than found in South European countries, where this percentage even higher to over 90% of consultations[2–4]. On an average, patients got two prescriptions. We found higher prescribing rates in male FD, doctors older than 44 years, in family medicine trained doctors, in doctors with above average prescribing volumes in the previous year, in doctors with consultations longer than a mean of 7 minutes, in doctors with above average prescribing quota as set by NHII, in female patients, older than 64 years, in patients with less than secondary or higher education, and after the consultations with higher number of health problems dealt with (Table 2). The same factors proved to be independent predictors of higher prescribing volumes during single consultation. These explain one fifth of the variation in prescribing rates during actual consultation (Table 3). Self-employment status and higher numbers of patients seen by the

doctor per day contrary to general believes have not proved to be statistically significantly different from FDs employed by non-for-profit health care centres.

The greatest proportion of the prescribed drugs found in our study were from cardiovascular group, followed by osteomuscular drugs, gastrointestinal drugs and antimicrobals (Table 1). This is in line with the incidence of the diagnosed health problems[5].

The study identified patients who are at higher risk for polypharmacy, i.e. elderly, women, less educated and multimorbid patients. It also identified FD, who are at greater risk for professionally inappropriate or irrational prescribing, i.e. male doctors, older doctors, doctors who are not trained in family practice, doctors that have more consultations per day and doctors with a higher prescribing rate. This subpopulation of FD could present a target population for appropriate interventions. Further analyses are needed to elucidate the reasons for the observed differences, i.e. reasons for prescribing that is not in line with professional guidelines, reasons for irrational prescribing. We should propose actions for improvement of prescribing of those FD, in terms of professional approach and rational spending, i.e. targeted continuous medical education. This would also assist in overcoming obstacles in setting professional recommendations in everyday clinical practice.

Regular monitoring of prescribing habits should become a part of remuneration policies between the payer and provider. The strength of this study is a high proportion of involved FD.

This study has also several limitations. The first one is the use of questionnaire which was in paper form and

this resulted in the fact that FD spent a lot of time fulfilling it. Namely, they had to write the data from the patients' files. It would be better if this could be done in electronic form, which would also have minimized the possible bias.

Conclusions

Almost 60% of consultations in Slovenian family practice end with a prescription. Some patients' and doctors' characteristics and also some consultations' characteristics affect the prescribing rate. Additional analyses should be performed to identify reasons for that and to propose proper actions. If the doctors would have less administrative work, they would probably spend more time taking appropriate patients' history, clinical examination and reaching a therapeutic agreement, which would probably reduce the prescribing rates. Appropriate institutions should also perform a regular quality control of family doctors' work. There is also a need for establishment of clinical guidelines, which would facilitate the rationalization and improvement of prescribing patterns.

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PREDIKTORI VISOKIH STOPA PROPISIVANJA U OBITELJSKOJ PRAKSI TIJEKOM SAVJETOVANJA: TRANSVERZALNA STUDIJA U SLOVENIJI

S A Ž E T A K

Pomoću presječne studije, održane u Sloveniji, želimo definirati prediktore visokih stopa propisivanja u obiteljskoj praksi. 42 uključenih obiteljskih liječnika opisalo je 300 kontakta u ordinaciji, odnosno ukupno 12596 kontakta. Sudionici su zamoljeni da ispune upitnik za svaki susret pacijent-liječnik u jednom danu. U 12596 zabilježenih kontakta, za pacijente je izdato 14485 recepta. Pacijenti su dobili 0–10 recepta po posjetu ($\overline{X} \pm SD$: 1,2±1,4). Između 7363 (58,5%) ispitanika, koji su dobili barem jedan recept, prosječan broj recepata bio je 2,0 (±1,4). Većina propisanih lijekova su lijekovi za kardiovaskularni sustav. S multivarijatnim modelom za veći broj propisanih lijekova objašnjeno je 20.2% varijacije. Neovisni prediktori viših stopa propisivanja tijekom konzultacija su ženski spol, starija dob, veći broj problema tretiranih tijekom konzultacije (komorbiditet), dulje vrijeme konzultacija, niži stupanj obrazovanja, veća kvota pacijenta na listi, veća kvota propisivanja, indeksirana s NHII protekle godine, specijalist obiteljske medicine, muški liječnik i dob liječnika više od 44 godine. Obilježja obiteljske prakse ne pokazuju korelaciju s visokim količinama propisivanja. Rezultati ovog istraživanja pokazuju da na stopu propisivanja imaju utjecaj određene osobine pacijenta, liječnika i konzultacija. Trebalo bi provesti dodatne analize za identifikaciju razloga za to i predložiti odgovarajuće mjere.