Drug utilisation patterns in Zabljak municipality, Serbia and Montenegro

Sipcic M, MD
Jankovic SV, MD
Jankovic, SM, MD, PhD, MA
Medical Faculty, University of Kragujevac, Kragujevac, Serbia and Montenegro

Correspondence to: Prof Slobodan M Jankovic, e-mail: slobnera@EUnet.yu

Abstract

Background
Information about drug utilisation among outpatients in Serbia and Montenegro is scanty, and no publications on the topic are available. The objective of this study was thus to evaluate and compare patterns of drug utilisation in the Zabljak municipality.

Methods
Prescriptions for outpatients (n=456) and dispensing records from a local pharmacy in Zabljak for a three-month period were reviewed retrospectively.

Results
The leading diagnoses were infectious diseases of the respiratory system and hypertension. The total number of defined daily doses (DDD) per 1 000 inhabitants per day was 178.75. Cardiovascular drugs (41.139 DDD/1 000/day), drugs for the gastrointestinal system (36.881 DDD/1 000/day) and antibacterial drugs (18.318 DDD/1 000/day) were the most frequently prescribed drugs.

Conclusion
The total number of drugs utilised per 1 000 inhabitants per day was within the acceptable range. However, the pattern of diagnosis did not correspond to the pattern of drug utilisation. There is a need for intervention in order to promote the rational selection and use of drugs among outpatients in Serbia and Montenegro.

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Introduction

Drug utilisation statistics are an important tool with which to evaluate the quality of prescribing in a defined setting.[1] Although significant efforts have been made to introduce the principles of rational drug use worldwide, the situation is still far from ideal.[2,3] There are many reasons for this situation, including: (1) a lack of national guidelines for the treatment of mass diseases in some countries; (2) no system for the provision of continuing medical education in some countries; (3) the retention of obsolete drugs in the market; (4) medical practice not based on evidence; and (5) pressure from pharmaceutical companies.[4,5] Serbia and Montenegro is a country in socio-economical transition, with a high burden of poverty and many refugees. The country faces some of the abovementioned problems.[6] The aim of this study was to investigate patterns of drug use in the semi-rural municipality of Zabljak, which could be considered a typical municipality in Serbia and Montenegro.

Methods

This is a cross-sectional study of drug utilisation in the Zabljak municipality, which is located in the mountainous area of Serbia and Montenegro and has 4 880 inhabitants. The study was conducted from January to March in 2001. There was only one primary care health facility in Zabljak where prescribing was done, and only one state pharmacy, where prescribed drugs were dispensed. During the abovementioned period, the following data were collected from prescriptions and dispensing records: initials, sex and age of the patients, diagnosis, drugs dispensed, and the doses of the drugs.

Drug utilisation was calculated using the methodology of the World Health Organization,[7] and expressed in defined daily doses (DDDs) per 1 000 inhabitants per day. The diagnoses were classified according to the tenth revision of the International Classification of Diseases.[8]

Results

The total number of patients for the study period was 465. Of these, 259 (56%) were adults (124 males and 135 females) and 206 (44%) were children younger than 14 years (109 boys and 97 girls). Since Zabljak municipality is remote and isolated, the physicians only prescribed drugs that were available in the local pharmacy. The total drug utilisation was 178.75 DDD/1 000 inhabitants/day. The drugs comprising 90% of the total drug utilisation are shown in Table I, classified according to the Anatomic-Therapeutic-Chemical ATC classification. The diagnoses comprising 90% of all diagnoses for both adults and children are given in Table II. The number of diagnoses (411) was less than the number of patients (465); the remaining 54 patients did not have diagnoses in their dispensing records.

Discussion

Overall drug utilisation in Zabljak was not higher than in other countries, including developed ones.[9] However, the patterns of drug utilisation point to certain irrationalities.

The first problem we observed was related to the utilisation of anti-hypertensive drugs. The total quantity of all anti-hypertensive drugs used was about 30 DDD/1 000 inhabitants/day; at the same time, only 31 patients were diagnosed as having hypertension, which implies everyday drug therapy. Since Zabljak has 4 880 inhabitants, this means that there were about six hypertensive patients per 1 000 inhabitants. At first glance it appeared that each hypertensive patient was taking on average about five drugs with an anti-hypertensive action (diuretics, ACE inhibitors, beta-blockers or calcium-channel antagonists). However, since diuretics and ACE inhibitors could also be used for heart failure and beta-blockers or calcium-channel inhibitors for diseases of the coronary artery, these drugs could have been used for another four patients/1 000 inhabitants/day suffering from these two diseases. This leads to an average of three anti-hypertensive drugs for the patients with hypertension, which is still too high. Only exceptional hypertension should be treated with more than two drugs (in about 20% of patients), and there is no reason to believe that all of the patients required such a regimen.[10]

Over-utilisation was also observed with drugs against angina pectoris. Tables I and II indicate that there were three patients with angina pectoris per 1 000 inhabitants, while around 15 DDDs of anti-anginal drugs were dispensed per 1 000 inhabitants every day. Even if half of this drug utilisation is ascribed to anti-hypertensive treatment (beta blockers and calcium-channel antagonists also could be used for this indication), it remains that three to five anti-anginal drugs were used per patient.

Since angina pectoris is treated mostly with a combination of two anti-anginal drugs, it seems that polypharmacy occurred.[11]

Regarding antibiotic utilisation, it is clear from Table I that the total consumption was around 18 DDDs/1 000 inhabitants/day. About 280 patients (both adults and children) were suffering from infections, and if one considers the five-day duration of a course of treatment for an infection, it means that there were 90/5 = 18 disease courses during the study period. Furthermore, it means that 280/18 = 15.6 patients had an infection every day. Since 18 DDDs were utilised for these 15.6 patients, it appears that each patient with an infection was receiving at least one antibiotic. According to other studies, at most 50% of patients with an infection should receive antibiotics,[12] which points to over-prescribing of antibiotics in this case.

Vitamins were also over-utilised, at 20 DDDs/1 000 inhabitants/day. However, over-utilisation of vitamins is not an isolated phenomenon specific to Zabljak. In a survey done in Germany, 4 030 persons aged from 18 to 79 were asked about their dietary habits, including vitamin and mineral supplement use. About 43% of the population reported using supplements at least once in the observation period of 12 months.[13] In Spain, 34.6% of all drugs sold in community pharmacies are vitamins.[14]

The utilisation of drugs that decrease hydrochloric acid secretion in the stomach (ranitidine, famotidine and omeprazole) was also inappropriately high. Only 10 patients had an indication for the use of these drugs (five patients with ulcer and five patients with gastritis, which is equal to two patients/1 000 inhabitants/day), while 10 DDDs/1 000 inhabitants/day of these drugs were utilised. This means that eight out of 10 patients who were taking H_2 blockers or a proton pump inhibitor had no rational reason to do so. This figure is much higher than the situation in primary care in the USA, where around 61% of patients with definite indications were found to be taking H_2 blockers or proton pump inhibitors.[15]

Finally, anti-asthmatic medication was dispensed in higher quantities than actually needed. There were 1.6 patients with bronchial asthma or chronic obstructive pulmonary disease per 1 000 inhabitants – the only ones who may have reason to use anti-asthmatic drugs. Even if each patient was

Table I: Drugs whose utilisation comprised 90% of the total drug utilisation (in DDD/1 000 inhabitants/ day) in Zabljak municipality during a three-month period

Group A	Drugs for gastrointestinal tract and metabolism	DDD/1 000 inhabitants/day
A02	Antacids, ulcer-healing drugs and carminative agents	
	Ranitidine	5.328
	Famotidine	2.459
	Omeprazole	2.104
A02 total		9.891
A06	Drugs for Constipation	
	Bisacodyl	0.847
A06 total		0.847
A07	Antidiarrhoeal, anti-infective and intestinal anti-inflammatory drugs	
	Nystatin	0.649
	Loperamide	0.601
	Bacillus IP 5832	1.202
A07 total		2.452
A10	Oral antidiabetic drugs	
	Glibenclamide	1.298
	Chlorpropamide	1.093
A10 total		2.562
A11	Vitamins	
	Vitamin A+D	6.375
	Vitamin B group	1.229
	Ascorbic acid	11.202
	Combinations of vitamins and minerals	1.366
A11 total		20.172
A12	Minerals	
	Calcium	0.956
A12 total		0.956
A group: 36.881 DDD/1 000 inhabitants/day		
Group B	Blood and blood-forming organs	DDD/1 000 inhabitants/day
B01	Anticoagulants	
	Ticlopidine	0.512
B01 total		0.512
B03	Drugs used in anaemias	
	Ferrous sulphate	0.717
B03 total		0.717
B group: 1.229 DDD/1 000 inhabitants/day		
C group	Cardiovascular drugs	DDD/1 000 inhabitants/day
C01	Treatment of cardiac diseases	
	Digoxin	2.596
	Amiodarone	0.546
	Pentaerythritol tetranitrate	5.707
	Isosorbide dinitrate	0.607
	Glyceryl trinitrate	0.892
	Isosorbide-mononitrate	1.503
C01 total		11.851
C03	Diuretics	
	Indapamide	5.191
	Furosemide	0.911
	Bumetanide	1.184
	Chlorothiazide, amiloride	1.002
C03 total		8.288
C04	Peripheral vasodilators	
	Pentoxifylline	1.22

C group	Cardiovascular drugs	DDD/1 000 inhabitants/day
C04 total		**1.22**
C07	**Beta-adrenoceptor blocking drugs**	
	Propranolol	0.541
	Metoprolol	2.96
	Atenolol	2.805
C07 total		**6.306**
C08	**Calcium-channel blockers**	
	Nifedipine	4.091
	Verapamil	1.594
	Diltiazem	1.46
C08 total		**7.145**
C09	**ACE inhibitors**	
	Captopril	4.053
	Enalapril	0.728
	Quinapril	1.548
C09 total		**6.329**
C group: 41.139 DDD/1 000 inhabitants/day		
H group	Hormones	DDD/1 000 inhabitants/day
H02	**Glucocorticoids**	
	Dexamethasone	0.045
	Prednisolone	0.569
H02 total		**0.614**
H03	**Thyroid hormones**	
	Carbimazole	1.275
H03 total		**1.275**
H group: 1.889 DDD/1 000 inhabitants/day		
J group	Antibacterial drugs	DDD/1 000 inhabitants/day
J01	**Antibiotics**	
	Ampicillin	2.025
	Amoxicillin	8.866
	Penicillin G benzathine	0.914
	Cefalexin	2.339
	Cefaclor	0.581
	Co-trimoxazole	2.425
	Azithromycin	1.161
J01 total		**18.311**
J group: 18.318 DDD/1 000 inhabitants/day		
M group	Drugs for musculoskeletal disorders	DDD/1 000 inhabitants/day
M01	**Non-steroidal anti-inflammatory drugs**	
	Indometacin	4.098
	Diclofenac	10.715
	Piroxicam	1.184
	Acetylsalycilic acid	4.554
	Noraminophenazone	2.087
	Paracetamol	0.587
	Ibuprofen	3.104
M01 total		**25.742**
M group: 25.742 DDD/1 000 inhabitants/day		
N group	Drugs acting on nervous system	DDD/1 000 inhabitants/day
N02	**Antimigraine drugs**	
	Dihydroergotamine mesilate	1.4
N02 total		**1.4**
N03	**Antiepileptics**	
	Phenobarbital	5.191

N group	Drugs acting on nervous system	DDD/1 000 inhabitants/day
N03 total		**5.191**
N05	**Psycholeptics**	
	Haloperidol	0.81
	Diazepam	4.023
	Bromazepam	1.055
	Prazepam	0.637
N05 total		**5.078**
N group: 11.669 DDD/1 000 inhabitants/day		
R group	**Drugs for respiratory system**	**DDD/1 000 inhabitants/day**
R01	**Nasal formulations**	
	Phenylephrine , trimazoline	4.554
R01 total		**4.554**
R03	**Bronchodilators**	
	Salbutamol	0.592
	Fenoterol, ipatropium	11.612
	Aminophylline	0.645
R03 total		**11.612**
R05	**Dugs against cough and common cold**	
	Bromhexine	4.401
R05 total		**4.401**
R06	**Antihistamines**	
	Astemizole	0.911
R06 total		**0.911**
R group: 21.478 DDD/1 000 inhabitants/day		
S group	**Drugs for eye and ears**	**DDD/1 000 inhabitants/day**
S01	**Drugs for eye**	
	Dexamethasone plus neomycin	0.763
	Naphazoline	1.764
S01 total		**2.527**
S group: 2.527 DDD/ 1000 inhabitants/day		
TOTAL 90% UTILISATION: 160.872 DDD/1 000 inhabitants/day		

Table II: Diagnoses in the patients comprising 90% of all conditions (n=465)

Code	Diagnosis	Number of patients and percentage	Females	Males
J02	Acute pharyngitis	156 (37.8%)	77	79
J00	Acute nasopharyngitis ("common cold")	41 (9.8%)	20	21
I10	Primary hypertension	31 (7.4%)	26	5
J20	Acute bronchitis	27 (6.5%)	15	12
R50	Fever of unknown origin	23 (6.4%)	12	11
R05	Cough	16 (3.8%)	8	8
I20	Angina pectoris	15 (3.5%)	7	8
N39	Urinary tract infection	12 (2.9%)	7	5
J01	Acute sinusitis	11 (2.7%)	4	7
M54	Back pain	10 (2.4%)	4	6
J18	Pneumonia	10 (2.4%)	4	6
R51	Headache	8 (1.9%)	4	4
K26	Peptic ulcer disease	5 (1.2%)	2	3
K29	Gastritis	5 (1.2%)	3	2
R55	Syncope	5 (1.2%)	3	2
H10	Conjunctivitis	5 (1.2%)	4	1
G40	Epilepsy	4 (1%)	3	1
J44	Chronic obstructive pulmonary disease (COPD)	4 (1%)	1	3
J45	Asthma	4 (1%)	4	0

Code	Diagnosis	Number of patients and percentage	Females	Males
L50	Urticaria	4 (1%)	4	0
N23	Renal colic	4 (1%)	1	3
S61	Wounds	4 (1%)	4	0
I42	Heart failure	4 (1%)	2	2
J05	Acute laryngitis	3 (0.7%)	2	1
TOTAL		411 (100%)	221	190

using three different anti-asthmatic drugs, this would amount to 5 DDDs/1 000 inhabitants/day. Yet 12 DDDs/1 000 inhabitants/day were being used (dispensed), probably because the patients were creating personal drug stocks. This practice should not be tolerated, because it bears two negative consequences: a drug overdose or poisoning becomes more possible, and the drug budget is not distributed evenly throughout the fiscal year.[16]

Conclusion

It would appear that drugs are not being used rationally in this small, isolated community. This leads to the need for significant interventions in the education of general practitioners and for the adoption of a clear drug policy in primary care in the Zabljak municipality of Serbia and Montenegro.[16]

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