Brief Original Article

Antibiotic use in Albania between 2011 and 2012

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Abstract

Introduction: Health institutions in Albania have recently reported an increase in antibiotic misuse and microbial resistance. Until now, there have been no comprehensive studies that analyzed the overall use of antibiotics in Albania. The aim of this study was to analyze the overall antibiotic use in Albania between 2011 and 2012, using standardized methodology of measurement, based on World Health Organization guidelines.

Methodology: Data from 2011 and 2012 on antibiotic use from ambulatory and hospital sector were examined. Antibiotics were divided based on anatomic therapeutic chemical classification. Defined daily dose (DDD) for each drug was assigned, and DDD per 1,000 inhabitants per day (DID) was used as a measurement unit. In cases of antibiotic combinations for which DDD were not available, unit doses were assigned.

Results: In 2011–2012, total antibiotic use decreased from 24.25 to 20.66 DID. Penicillin's were the most used antibiotic class, with 10.62 DID (2011) and 10.51 DID (2012). Tetracycline use decreased from 5.45 DID (2011) to 0.98 DID (2012). Macrolides increased from 1.36 to 1.88 DID, quinolones from 1.72 to 2.51 DID. The overall antibiotic use was significantly higher than the reimbursed antibiotic use – 3.17 DID (2011) and 2.79 DID (2012) – based on the official data for the same period.

Conclusions: This study enables policymakers to further analyze the quality of antibiotic prescriptions and draw comparisons to other countries. The analyzed data suggest there are different factors influencing out-of-pocket use of antibiotics and wrongly prescribed antibiotics. Further studies are necessary to evaluate these factors.

Key words: antibiotic use; drug consumption; Albania.

Introduction

Antimicrobial resistance is a serious public health issue associated with antibiotic use [1,2]. Overuse and misuse of antibiotics have been proven to be primary causes of antibiotic resistance [3]. Monitoring antibiotic use can help health authorities to implement structured surveillance programs for antibiotic resistance [1,4].

There have been successful efforts in Europe to assess and monitor antibiotic use in European Union (EU) and non-EU countries. Surveillance networks have been established through the European Surveillance of Antimicrobial Consumption Network (ESAC-Net) project [5] and through the World Health Organization Regional Office for Europe (WHO Europe) [6]. Annual reports are published periodically. The median antibiotic consumption in EU countries was reported as 19.5 defined daily dose (DDD) per 1,000 inhabitants per day (DID) in 2011 [7].

Until now, no data about antibiotic use in Albania have been reported. There are no published data on the overall use of antibiotics in the country. Neither public institutions, health organizations, nor international organizations have published a survey about antibiotic use in the country.

In Albania, there is no information on overall antibiotic prescriptions, their use, or their related resistance. The outpatient/inpatient sector and treatment protocols in general do not monitor antibiotic dispensing. There are no databases with information about primary and ambulatory care, and reports from health authorities are lacking.

The National Center of Drug Control (NCDC) is the designated institution that tracks wholesale drug data, yearly imports, drug dispensing, and controls any activity in the pharmaceutical sector in Albania. According to the regulatory environment, all pharmaceutical companies are subjected to the

registration process by NCDC to be allowed to dispense their products in the Albanian market [8].

We analyzed antibiotic (J01 ATC subgroup) use from reimbursement data obtained from the Albanian national health insurance fund for the health-insured population [9]. The aim of this study was to analyze the overall antibiotic use in Albania between 2011 and 2012, using standardized methodology of assessment based on WHO guidelines for drug utilization. We believe that analyzing overall antibiotic use is an important step forward.

Methodology

Data about antibiotics (J01 ATC subgroup) were officially obtained by the NCDC for 2011 and 2012. These data include all antibiotics dispensed in outpatient and hospital care in Albania.

The antibiotics were divided by the anatomical therapeutic chemical (ATC) classification system, and each DDD per route of administration was assigned to an ATC code [10]. Each antibiotic present in the Albanian market was selected and grouped by its ATC classification.

Beta-lactam antibiotics, penicillins (ATC code J01C), other beta-lactam antibiotics (ATC code J01D), amphenicols (J01B), tetracyclines (J01A), macrolides, lincosamides and streptogramins (J01F), quinolones (J01M), sulfonamides and trimethoprim (J01E), aminoglycosides (ATC code J01G), combinations of antibiotics (J01R), and other antibiotics (J01X) were investigated.

Analyses were done in accordance with the WHO's guidelines for the use of the ATC/DDD system, which provides standards of application for every ATC classification and DDD assignment linked to the ATC level. In cases of antibiotic combinations for which DDD were not available, unit doses (UDs) were assigned [10].

Antibiotic quantities were expressed in units of the pharmaceutical form (tablets, pills bottles, ampoules). The amount of active principle was found for every antibiotic classified by an ATC code and its pharmaceutical form for the years 2011 and 2012.

Overall amounts of DDDs were found for every antibiotic classified by an ATC code and pharmaceutical form for the years 2011 and 2012. ATC/DDD values were obtained from the WHO ATC/DDD index [11].

Antibiotic use during 2011 and 2012 was expressed as defined daily dose per 1,000 inhabitants per year (DID) [12].

The population data on which this study was based was the official Albanian population reported annually from the Institute of Statistics (INSTAT) for the years 2011 and 2012 [13].

Results

Results of overall antibiotic use, derived from data provided by NCDC, were 24.25 DID for 2011, and 20.66 DID in 2012. The values of DID for every antibiotics class consumed by the Albanian population during 2011 and 2012 are presented in Table 1 and Figure 1.

Penicillins (ATC group J01C) were the most used subclass, with 10.62 DID (43.8% of overall use) in 2011 and 10.51 DID (50.9%) in 2012. Penicillins with the extended-spectrum subgroup (ATC group J01CA) were noted to be the most used antibiotic subclass, with 6.00 DID in 2011 to 6.94 DID in 2012 (Table 2).

Other beta-lactam antibiotics (ATC group J01D), mostly cephalosporins, had a DID of 3.49 in 2011 (14.4% of overall use) and a DID of 3.19 in 2012 (15.4%). An increase in use of third-generation cephalosporins, from 0.54 DID in 2011 (15.4% of overall ATC group J01D) to 0.73 DID in 2012 (22.9%), was found.

Table 1. Antibiotics for systemic use (J01) used during 2011–2012 in Albania

ATC	Antibacterial class	2011	2012
J01C	Beta-lactam antibiotics, penicillins	10.623	10.508
J01D	Other beta-lactam antibiotics	3.487	3.190
J01B	Amphenicols	0.314	0.118
J01A	Tetracyclines	5.448	0.975
J01F	Macrolides, lincosamides and streptogramins	1.364	1.880
J01M	Quinolones	1.719	2.509
J01E	Sulfonamides and trimethoprim	0.080	0.091
J01G	Aminoglycosides	0.375	0.629
J01R	Combinations of antibiotics	0.034	0.040
J01X	Other antibiotics	0.803	0.716
Total		**24.248**	**20.657**

ATC: anatomical therapeutic chemical classification system

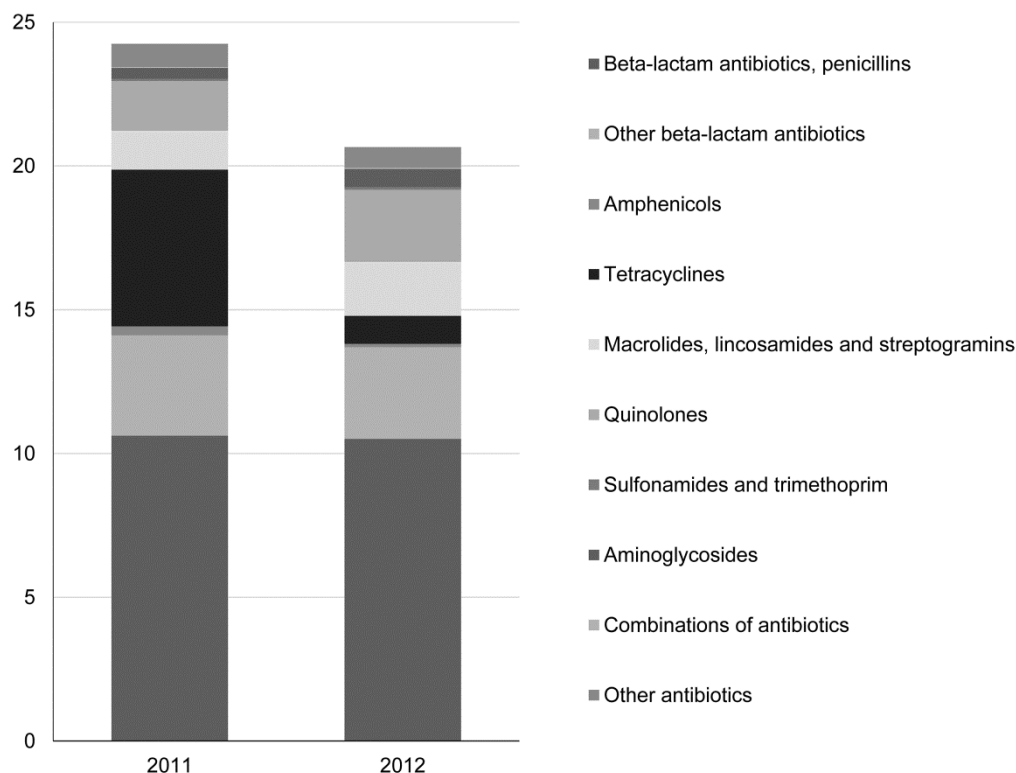**Figure 1.** Antibiotic use per each ATC subclass during 2011–2012 in Albania

Table 2. Use of penicillins (ATC group J01C) in Albania during 2011–2012

Antibiotics	ATC	DDDs per 1,000 inhabitants per day	
		2012	**2011**
Penicillins	**J01C**	**10.51**	**10.62**
Penicillins with extended spectrum	J01CA	6.94	6.00
Beta-lactamase-sensitive penicillins	J01CE	0.003	Not present
Beta-lactamase-resistant penicillins	J01CF	0.06	0.04
Combinations of penicillins, including beta-lactamase inhibitors	J01CR	3.50	4.58

ATC: anatomical therapeutic chemical classification system; DDD: defined daily dose

Table 3. Use of cephalosporins (ATC group J01D) in Albania during 2011–2012

Antibiotics	ATC	DDDs per 1,000 inhabitants per day	
		2012	**2011**
Cephalosporins	**J01D**	**3.19**	**3.49**
First-generation cephalosporins	J01DB	0.95	1.65
Second-generation cephalosporins	J01DC	1.50	1.27
Third-generation cephalosporins	J01DD	0.73	0.54
Fourth-generation cephalosporins	J01DE	Not present	0.19

ATC: anatomical therapeutic chemical classification system; DDD: defined daily dose

There also was an increase in use of second-generation cephalosporins (ATC group J01DC), from 1.27 DID in 2011 to 1.50 DID in 2012 (Table 3).

The greatest differences in antibiotic use were noted in the tetracyclines (ATC group J01A) subgroup, where the consumption in 2011 was 5.45 DID (22.5%) and in 2012, 0.98 DID (4.7%).

The use of macrolides, lincosamides, and streptogramins (ATC group J01F) increased from 1.36 DID (5.6%) in 2011 to 1.88 DID (9.1%) in 2012. Also, the use of quinolone antibiotics (ATC group J01M) increased from 2011 to 2012, with 1.72 DID (7% of overall use) to 2.51 DID (12.1%).

Azithromycin (ATC code J01FA10) use increased from 0.48 DID in 2011 to 1.18 DID in 2012. Amphenicols (ATC group J01B) use decreased from 2011 to 2012, from 0.31 DID to 0.12 DID. Sulfonamides and trimethoprim (ATC group J01E) use increased from 0.08 DID in 2011 to 0.09 DID in 2012.

The use of aminoglycosides (J01G) increased from 0.38 DID in 2011 to 0.63 DID in 2012. Also, the use of combinations of antibiotics (J01G) increased from 0.03 DID in 2011 to 0.04 DID in 2012. Data show that the use of other antibiotics (ATC group J01X) decreased from 2011 to 2012, from 0.80 DID to 0.72 DID.

In 2012, tetracycline (J01AA07 ATC code) was absent in the Albanian market. Also, fourth-generation cephalosporins (J01DE ATC code) were not present in the Albanian market in 2012.

Discussion

Compared with the data on reimbursement antibiotic use (3.174 DID in 2011 to 2.794 DID in 2012), the overall use of antibiotics (ATC group J01) (24.25 DID in 2011 to 20.66 DID in 2012), was almost seven times higher. Data on reimbursement antibiotic use taken from a previous study were measured using the same methodology as the study group [5].

The above-mentioned difference in use may depend from several factors, such as sidestepping the use of insurance services and/or low access to reimbursement services. It is evident that most of the population chose to avoid or was not able to benefit from the reimbursement scheme, bypassing medical protocols and the insurance/reimbursement procedures. This can be indicative of an inappropriate prescription.

It has been suggested that there is a tendency by physicians to prescribe latest-generation antibiotics. These antibiotics are more expensive and their prescriptions fees are not reimbursed. More importantly, these prescriptions are not filled correctly and have missing information, which can lead to abuse [14].

Another factor may be non-compliance with treatment protocols. This occurs when antibiotics are prescribed out-of-pocket, or when they are used without any prescription; this commonly occurs in many developing countries [15]. The treatment protocols used to prescribe reimbursed antibiotics refer to the standards approved by the Ministry of Health.

The health authorities in the country have admitted the existence of a high tendency to consume antibiotics out-of-pocket, which has led the Ministry of Health to express interest in monitoring antibiotic use in the country [16].

Conclusions

This study is the first to report data on overall antibiotic use in Albania. The findings of the study may raise surveillance and awareness of possible inappropriate antibiotic use in the country to national and international authorities. The results can also be referenced in the implementation of public health strategies to control antibiotic prescription, reduce its related resistance, and prevent antibiotic use without prescription.

High differences in overall antibiotic use compared with the data on reimbursed antibiotics found in this study indicate that investigation into access of the population to reimbursed health services, compliance with standard protocols for out-of-pocket antibiotics prescriptions, and health professionals' perceptions about antibiotic prescriptions and dispensing.

Annual surveys and quantitative studies on antibiotic use in the country would help to elucidate this important issue.

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