



*Original Contribution*

**SALE OF REGULATED ANTIBIOTICS WITHOUT PRESCRIPTION -  
RESEARCH ON THE PHARMACISTS' ATTITUDES AND PATTERNS OF  
ECONOMIC BEHAVIOR**

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**ABSTRACT**

The aim of this study is to explore the pharmacists' attitudes and patterns of economic behavior during the sale of regulated antibiotics without a prescription. The sociological method of secret participant observation was used. The total number of the observations is 71 units. The results presented 52 (73.24%) of pharmacists surveyed as willing to perform a sale of regulated antibiotic agent, while 19 (26.76%) of them refused to provide the remedy without doctor's prescription. The "patient-actor" role and the density of the population determine the pattern of economic behavior of the pharmacists.

**Key words:** patient safety, antibiotic resistance, pharmacist, patterns of economic behavior

**INTRODUCTION**

A set of international studies have determined that the misuse of antibiotics contributes to an increased antimicrobial resistance and most probably results in side (adverse) drug effects that negatively influence individual and public health. In this context, the enhanced use of antibiotics leads to higher costs and force up the consumption of medical services, which reflects not only on the individual but also on the public budgets (1, 2, and 3).

Not accidentally The World Alliance for Patient Safety part of WHO specify the antimicrobial resistance as a particularly significant national and international issue and called for sensible use of antibiotic agents (1, 4, 5).

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The set of results from international studies shows that this problem has the highest prevalence and negative impact on the countries of Eastern Europe and countries with economies in transition. In most EU countries the sale of antibiotic agents without a prescription is not allowed and in addition, they are prescribed by physicians in outpatient care after strict medical indications (6, 7, 8, 9, 10).

The results of the multicenter study presented that the prevalence of self-healing with antibiotics in various European countries is different, e.g. in the Netherlands - 0.1%, Sweden - 0.4%, in Denmark and the Czech Republic -0.7%, in Malta - 19%, in Romania - 19.8% and in Lithuania - 22% (11). Researches conducted in southern Europe indicate that between 75% and 94% of the total use of antibiotics occurs in outpatient care. (12). According to some authors, although outpatient care is less technologically complex than inpatient, the safety of patients in an outpatient setting shall constitute a unique challenge for health managers (13).

In our previous studies was found that most 165 (73%) of respondents have a positive

attitude about healing with antibiotics at home when the legal system allowed free access to them (14, 15).

According to the European directives of 2009 Bulgarian legislative body changed the existing legal framework and prohibited the sale of antibiotics from pharmacies without a doctor's prescription (16, 17).

Up to this moment no officially published results from similar studies that investigate the attitudes and the behavior patterns of pharmacists after the legal prohibition of selling antibiotics without a prescription ensure are available in our country. The lack of any data referring those two objects of interest (attitudes and economic behavior) limits the opportunities for comparisons and assessments at this stage (16, 17).

The aim of the survey is to identify attitudes and patterns of economic behavior of pharmacists during the sale of a regulated antibiotic without a prescription, after the legislative changes in 2009.

#### Working hypothesis

In the process of a sale of regulated antibiotics without a prescription the pharmacists' behavior is not determined by socio-demographic characteristics of patients and the density of the population.

### MATERIAL AND METHODS

The study design is representative cross-sectional.

All pharmacists working in pharmacies of two randomly selected cities are the logical units of this study. All pharmacies located in the same territory are the technical units.

Multi-stage cluster selection was used as sample size determination method. In every stage of the study a simple random sampling for selection of the monitored units was applied.

- During the first stage of the study two locations from all district towns of the country were selected. Those were city A and city B with a statistically significant difference ( $P < 0.05$ ) of the population density.
- The next step was to determine the sample size and the units of observation. The required number of logical units in our case was randomly selected. Pharmacists working at 55 from 184 registered pharmacies in the

regional cities were surveyed; represented 30% of the population. The distribution of the observational units is proportional to the size of the cluster, respectively, for A city - 41 and B city - 14 pharmacies.

- In the second stage five clusters from A and two clusters from B located in different residential areas were randomly formed from the lists of 55 pharmacies on the territory of both selected cities.

- On the third stage the final number of pharmacies for each city were chosen - 7 pharmacies for each preliminary set area with 95% Confidence interval.

The registration of the primary information was based on the sociological method of secret participant observation.

The authors and the two external interviewers in the role of "patient-actor" took part in the survey in order to record the pharmacists' behavior during the sale of regulated antibiotics without a prescription. The selection of the external interviewers was based on the following criteria:

1. Both genders included
2. Representatives of two distinct age groups were:
  - socially engaged (from 19 to 60 years of age) and
  - retirement age (over 65 yrs.).

The "patients-actors", who are looking to buy regulated antibiotic without a prescription conducted informal interviews with the pharmacists and reported their behavior during the observation.

In order to achieve the objective of the study, data from the observation were transferred to a specially designed for this particular study tools. On the questionnaire sheet the interviewers had to record the behavior of a pharmacist during the purchase of a regulated antibiotic without a prescription and to mark down their own demographic characteristics.

The following statistical methods of analysis were used: descriptive, alternative, nonparametric and graphical analysis. Various software products for data processing were used - for all statistical analysis SPSS 13.0, for the graphical analysis WINDOWS XP, MS Office Excel 2003.

The study covered the period from May to July 2011.

The survey is anonymous; results will not be used for other purposes thus no further harm for the observed units are expected.

## RESULTS

The sample size contains 71 units (pharmacists) of observation. The distribution of the units by city – A and B is illustrated in Fig. 1.

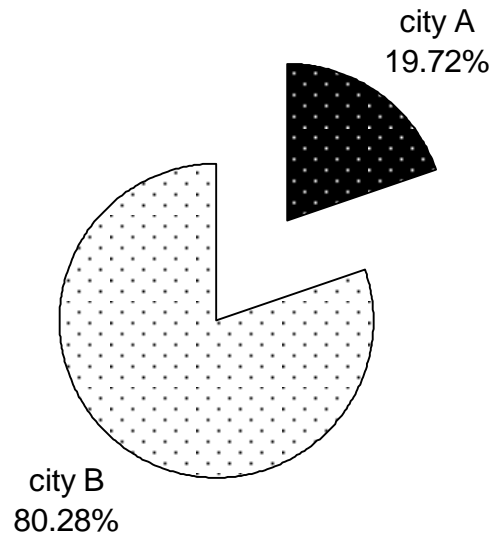


Fig. 1. The pharmacists' distribution by location of the pharmacies

Despite the existing law in the country, the study found failure of the sales of regulated antibiotics. From the total number of 71 units of observation 52 (73.24%) were ready

immediately to carry out an unregulated sale of antibiotic, while 19 (26.76%) of them firmly rejected (Table 1).

Table 1. The distribution of pharmacists and their behavior, according to the characteristics of the "patient-actor"

Pharmacist's Behavior Number of the observations performed by the interviewers	Tend to sell Abs immediately			Tend to sell Abs after persuasion (in conversation)			Adamant refusal			Total		
	n	%	Sp	n	%	Sp	n	%	Sp	n	%	Sp
<b>1. Number of observations by interviewers' gender</b>												
men	4	9,8	4,64	1	9,1	8,67	3	15,8	8,37	8	11,3	3,76
women	37	90,2	4,64	10	90,9	8,67	16	84,2	8,37	63	88,7	3,76
Total	41	100	-	11	100	-	19	100	-	71	100	-
<b>2. Number of observations by interviewers' age</b>												
19-59	32	45.1	3,74	8	11.3	2,08	17	23.9	1,88	57	80.3	4,72
Over 60	9	12.7	3,74	3	4.2	2,08	2	2.8	1,88	14	19.7	4,72
Total	41	57.7	-	11	15.5	-	19	26.8	-	71	100	-

Nonparametric analysis was applied in order to confirm the working hypothesis. The study found that demographic characteristics –

gender and age of "patient-actor" influenced the behavior of the pharmacist during the sale of regulated antibiotic without a prescription.

The pharmacists were more likely to sell antibiotics without a prescription to women ( $P < 0.001$ ,  $\chi^2 = 42.60$ ) and persons of retirement age ( $P < 0.001$ ,  $\chi^2 = 26.04$ ). These results could be explained by the fact that the employees of the control agency are mostly of working age.

During the secret observations was found that pharmacies, with lower-stream of customers

adhered strictly to the restriction to sell regulated antibiotic without a prescription than those with more intensive sales. In that case it is presumable that the legal framework is often not respected and the penalties are not high enough to prevent the illicit sale of antibiotic, especially for more profitable pharmacies (Table 2).

**Table 2.** The distribution of pharmacists and their behavior, according to the pharmacies' location

Pharmacist's Behavior City	Yes (right now)			Yes (after persuasion)			No (adamant refusal)			Total		
	n	%	Sp	n	%	Sp	n	%	Sp	n	%	Sp
<b>1. Pharmacy's location</b>												
City A	35	85,4	5,51	8	72,7	13,43	14	73,7	10,1	57	80,3	4,72
City B	6	14,6	5,51	3	27,3	13,43	5	26,3	10,1	14	19,7	4,72
Total	41	100	-	11	100	-	19	100	-	71	100	-

Data analysis shows that on the location with higher population density, the pharmacists are more likely to sell irregularly antibiotic without a prescription, rather than in a small city (see Table 2). The nonparametric analysis proved the results. ( $P < 0.001$ ,  $\chi^2 = 26.04$ ).

## DISCUSSION

1. The consumers' characteristics influence the pattern of the pharmacists' behavior / performance.

2. The study found that the attitudes and the patterns of economic behavior of the pharmacists are directed more towards economic benefits rather than to the established social and ethical norms.

3. Because of the commercial interests the pharmacists fail in keeping the regulatory framework and neglect the concept of patient safety (according to WHO).

Recommendations that we could head to the competent authorities are:

1. To improve the control of antibiotics sales.
2. To increase penalties for violators.
3. To create a program to implement the WHO's concept for patient safety in our country.

## REFERENCES

1. Mina Popova. The problem of the safety patient in Bulgaria - *The beginning. Health*

*economics and management*, Iss 7, 1, 3-11, 2007.

2. Priest P, Yudkin P, McNulty C, Wise R. Antibacterial prescribing and antibacterial resistance in English general practice: cross sectional study. *BMJ*, Nov. Vol 323, 3, 1037-1041, 2001.
3. Ibia EO, Schwartz RH, Wiedermann BL. Antibiotic rashes in children: A survey in a private practice setting. *Archives of Dermatology* Jul. Vol136, 7, 849-855, 2000.
4. World Alliance for patient safety of the evidence on the patient safety: Implications for research. The Research Priority Setting Working Group of the World Alliance of Patient Safety. Health Organization 2008. 20080523\_summary\_of\_the\_evidence\_on\_patient\_safety.pdf (23.Sept.,2008, date last accessed).
5. Simpson SA, Wood F, Bulter Ch. C. General practitioners' perceptions of antimicrobial resistance: a qualitative study. *Journal of Antimicrobial Chemotherapy* 59, 292-296, 2007.
6. Theresa M. Chenot. Patient Safety and the Ambulatory Care Setting. *Northeast Florida Medicine*, Vol.58, №3, 23-26, 2007
7. Caminal Josefina, Rovira J. Antibiotic prescription in primary health care: clinical

- and economic perspectives (Spain). *European Journal of Public Health*, Vol. 15, 3, 273-281, 2005.
8. Baucher H, Osganian S, Smith K, Triant R. Improving parent knowledge about antibiotics: a video intervention. *Pediatrics*, Oct. Vol. 108, 4, 845-850, 2001
  9. Willson Tim, Pringle M, Sheikh Az. Promoting patient safety in primary care. *BMJ*, Sep 15, 323, 583-584, 2001
  10. Grigoryan L, Burgerhof JM, Degener JE et al. Determinants of self-medication with antibiotics in Europe: the impact of beliefs, country wealth and healthcare system. *Journal of Antimicrobial Chemotherapy*, 61, 1172-1179, 2008.
  11. Berzanskyte A, Valinteliene R, Haaijer-Ruskamp F, Gurevicius R et al. Self-medication with antibiotics in Lithuania. *International Journal of Occupational Medicine and Environmental Health*, 19, (4), 246-253, 2006.
  12. Grigoryan L. Burgerhof JG, Degener JE. Et al. Determinants of self-medication with antibiotics in Europe: the impact of beliefs, country wealth and the healthcare system. *Journal of Antimicrobial Chemotherapy*, 61, 11-1179, 2008.
  13. Picazo JJ, Perez-C E, Hereras A, et al. Grupo DIRA en Atención Primaria. Respiratory infections outside the hospital. DIRA study. *Enferm Infecc Microbiol Clin*, 21, 410-416, 2003.
  14. Hande Arslan, Özlem Kurt Azap, Önder Ergo et al. Risk factors for ciprofloxacin resistance among *Escherichia coli* strains isolated from community-acquired urinary tract infections in Turkey. *Journal of Antimicrobial Chemotherapy*, 56, 914-918, 2005.
  15. D. Dimitrova, Dimova R, Levterova B. Self-treatment with antibiotics and its determinants. EGPRN Meeting "Children in General Practice" 6th -9th .May, 2010., Plovdiv, Theme: "Children in General Practice" Bulgaria, *European Journal of General Practice*, 16, 154-173, 169-170, 2010.
  16. Dimova R, Dimitrova D, Hristov G, Tarnovska M. Risks of self-medication with antibiotics in general practice - legal and regulatory aspects. *Proceedings of Scientific Works of the Union of Scientists - Plovdiv, Scientific Session November 4 to 5, 2008., Series B. Natural Sciences and Humanities, Volume XI, Plovdiv, , 324-328, 2008.*
  17. Ordinance № 28 / 09.12.2008 on the structure, order and organization of the work of pharmacies and nomenclature of medical products, *State Gazette*, 109, 61-77