SELF-MEDICATION WITH ANTIBIOTICS IN LITHUANIA

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Abstract
Objectives: Excessive and not always proper use of antibiotic give rise to numerous problems, of which antimicrobial resistance, currently cause for worldwide concern, is the major one. Few single studies of antibiotic use have been carried out in some countries. This study was performed to estimate the prevalence of antibiotic use in the general population of Lithuania with special interest in self-medication with antibiotics and sources of their acquisition. Materials and Methods: Structured questionnaires on antibiotic use during the last 12 months were mailed to randomly selected adults and 746 of them were finally analyzed. Results: It was found that 39.9% of respondents reported antibiotic use during the last 12 months preceding the study and 53.2% of those used them in self-medication. In general, 22.0% (95%CI: 19.1–25.1) of respondents used antibiotics without prescription, whereas 45.0% (95%CI: 41.3–48.7) of them used antibiotics for intended self-administration. Adjustment for all the factors revealed the impact of the occupation, place of residence and presence of chronic disease on self-medication with antibiotics. Representatives of managerial, executive and professional occupations used non-prescribed antibiotics 8.38 times more often (95% CI: 1.76–39.91, p = 0.01) than retired people. Healthy people showed the tendency to self-medication 2.04 times more frequently than those with chronic diseases (95%CI: 1.11–3.75, p = 0.02). Rural people used non-prescribed antibiotics 1.79 times more often than inhabitants of urban areas (95%CI: 1.00–3.18, p = 0.049). Community pharmacies proved to be the most frequent (86.0%) source of over-the-counter antibiotics. Tonsillitis, bronchitis, and upper respiratory infections were the major reasons for self-medication with antibiotics. Conclusions: The high prevalence of self-medication with antibiotics was found in Lithuania. The study indicated the need for more strict control of antibiotic sales and promotion of education of the correct use of antibiotic among Lithuanian people.

Key words: Antibiotics, Antibacterial drugs, Self-medication, Intended self-medication

INTRODUCTION

Excessive and not always proper use of antibiotics gives rise to numerous problems, of which antimicrobial resistance, currently cause for worldwide concern, is the major one. Antimicrobial resistance is no longer considered as an entirely hospital problem as resistant bacteria are more and more prevalent among community-acquired infections. Because of increasing resistance, the treatment of
bacterial infections is becoming more expensive, thereby expenditures of health care institutions are growing. Moreover, the number of unsuccessfully treated or not-treated cases is rising and more human lives are lost [1]. Antibiotic consumption varies in different countries: higher rates are observed in the countries of South Europe and, lower ones in those of North Europe [2]. Published data from studies indicate that up to 50% of antibiotic usage in hospitals is inappropriate [3]. However, the main antibiotic load comes from the primary health care level. Researches from different countries show that 75–94% of all antibiotics are used by out-patients [4]. There is a clear tendency towards overuse of antibiotics owing to their frequent use in the treatment of viral and self-limiting bacterial diseases. The preferred use of broad spectrum antibiotics is often baseless [5–7].

Self-medication with antibiotics is one of the forms of their irrational use. People use antimicrobials, sometimes self-prescribed, as a basic medicine for various infections. Such uncontrolled use of antibiotics not only in humans, but also in animals could lead to a “post-antibiotic era” (as opposed to the “pre-antibiotic era” prior to the discovery of penicillin) in the foreseeable future, when many infectious diseases will be almost impossible to treat once again due to antimicrobial resistance [8,9]. Each country has its own rules and strategies for the use antibacterial drugs, but their implementation is not always successful. This situation should improve following new evidence-based recommendations and newly acquired knowledge or information. However, traditions, health care professionals and also awareness of the general population may contribute to more appropriate use of antibiotics. For instance, in France, one of the leading country in out-patient antibiotic use, more than half of the population expect an antibiotic prescription for common cold [10]. Studies of prescribed antibiotics in Lithuania also show that their use is very common (50.6% of patients who visit a doctor in outpatient clinics get prescriptions) and very often without any limitations as there is no national strategy for antibiotic usage [11]. Although antibacterial drugs are generally obtainable by prescription, people still manage to get them over-the-counter.

These data provide evidence that potential conditions for self-medication do exist and has become a very serious problem among out-patients in many countries. That is why this question has evoked special interest over recent years, but only few single studies have been carried out in some countries [12–15]. The aim of our study was to estimate the prevalence of antibiotic use in the general population of Lithuania with special interest in self-medication with antibiotics and sources of easy access to their acquisition.

**MATERIALS AND METHODS**

The presented study was performed as a part of the European survey “Self-Medication with Antibiotics and Resistance Levels in Europe” (SAR project) carried out in eighteen European countries and in Israel with the aim to get a general overview on this important issue.

**Study population**

Two areas in Lithuania were selected randomly: one urban area with population of 191 000 and one rural area with population of 10 000. Random sampling of inhabitants from each of these two areas was made by the National Population Registry at the Lithuanian Statistical Department that provides data on the age and gender of the population. Structured self-administered questionnaires with one reminder were mailed to 3000 adult (≥ 18 years) residents. The overall response rate was 25.4% (753 completed and returned questionnaires). Finally, 746 questionnaires were accepted for the analysis.

**Questionnaire**

The questionnaire included questions on demographic data (age, gender, residence area, occupation, level of education), and also on the presence of chronic diseases. Individuals were asked about the use of antibiotics during the last 12 months preceding the study, reasons for taking them, sources of their acquisition, and the intended use of antibiotics. Self–medication was considered as the use of antibiotics without prescription during the last 12 months, irrespec-
tive of the source of their acquisition (bought at the pharmacy without prescription, leftovers at home after earlier treatment or antibiotics obtained from friends or family). The intended self-medication was recorded when people reported the use of antibiotics without consultation with doctors or nurses.

Occupations of respondents were classified according to the Standard Occupational Classification, 2000 (SOC2000) [16], combining similar groups:
- Occupational group 1 (OG1) – managerial, executive and professional occupations (including managers and senior officials);
- Occupational group 2 (OG2) – associate professional occupations (including associate professional and technical occupations, administrative and secretarial occupations);
- Occupational group 3 (OG3) – skilled occupations (including skilled trade occupations, personal service occupations, sales and customer service occupations, process, plant and machine operators);
- Occupational group 4 (OG4) – elementary occupations.

Besides that, some other categories were added:
- Occupational group 5 (OG5) – students;
- Occupational group 6 (OG6) – old age (retired) and disability pensioners;
- Occupational group 7 (OG7) – unemployed persons;
- Occupational group 8 (OG8) – other groups of people, e.g., on sick leave or parental leave, housewives or men running a household.

Education levels were grouped as:
1) primary – completed and not completed primary education,
2) lower secondary general or vocational education,
3) secondary general and vocational education,
4) higher education (college, university), higher technical education (college, technical university).

Statistical analysis
The data were checked, coded, entered into Microsoft Access and analyzed using SPSS for Windows 9.0.

The analysis of what kind of medicine people accept as antibiotics (all antibiotics, including those for topical use) showed that 87.3% of respondents defined them correctly. Only this group was included into the estimation of antibiotic use. To assess a possible bias due to a low response rate, the prevalence adjusted for non-respondents was also evaluated. “Continuum of the resistance model” based on the assumption that late respondents resembled non-respondents, was applied [17]. Late respondents in our study were those who replied after reminder.

The rates were presented with 95% confidence interval (95%CI). The adjusted prevalence was considered similar to the observed one when it fell within the 95%CI of the observed prevalence.

Multiple logistic regression was used to evaluate combined factors’ effect. The most reasonable model was chosen by the backward selection, and a level of statistical significance was established at a value of p < 0.05. Differences were assessed by odds ratio (OR) with 95%CI and a value of p < 0.05 estimated by the Chi-square and Wald statistics.

RESULTS

Study population
Characteristics of the study population are given in Table 1. In both areas about half of respondents were retired. In this group of the population, the majority had completed or not completed primary education (33.6%). The structure of education was very similar in both genders and higher general education was most common (44.0%). Nearly half of the respondents reported at least one chronic disease (43.5%).

Antibiotic use
The study revealed that 39.9% of respondents used antibiotics during the last 12 months preceding the study (Table 2). In general, women tended to use more antibiotics than men (p < 0.05), except for the prescribed use, where the proportion was almost the same.

The intended self-medication was higher than the actual during the last 12 months, 45.0% (95%CI: 41.3–48.7) and 22.0% (95%CI: 19.1–25.1), respectively.

The adjusted rate (for non-respondents) of self-medication (24.5%) was higher than the observed rate, but fell into the confidence interval of actual self-medication.
In the whole sample, 68.5% of the respondents (who reported antibiotic use during the last 12 months) used prescriptions, but more than half (53.2%) took non-prescribed antibiotics at least once a year, which means that some people took antibiotics sometimes with, sometimes without prescription.

There was no relationship between self-medication with antibiotics and possible determinants, such as age, gender and education, while occupation, residence area and chronic disease factor proved to have impact on self-medication.

Taking retired people (OG6) as reference, self-medication with antibiotics was 8.38 times more often (95%CI: 1.76–39.91, p = 0.01) in the OG1 group and 11.43 times higher (95%CI: 1.40–93.74, p = 0.02) in the OG8 group. There was no significant difference between other categories.

Healthy people tended to apply self-medication 2.04 times more often than those with chronic diseases (95%CI: 1.11–3.75, p = 0.02). Rural people used non-prescribed antibiotics 1.79 times more often than urban ones (95%CI: 1.00–3.18, p = 0.049).

Antibiotics were mainly self-administered for respiratory symptoms, particularly for tonsillitis/sore throat (17.3%), bronchitis/cough (13.8%) and upper respiratory infections (13.8%), and rather often for genitourinary diseases (11.8%) (Fig. 1).

Place of residence and occupation were relevant to intended self-medication. The people from the rural area intended to use antibiotics without prescription 1.61 times more often than urban ones (95%CI: 1.00–3.18, p = 0.049).

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Table 1. Characteristics of study population

<table>
<thead>
<tr>
<th>Characteristics</th>
<th>Number of respondents</th>
<th>Mean</th>
<th>Median</th>
<th>Standard deviation</th>
<th>Minimum</th>
<th>Maximum</th>
<th>(%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
<td>746</td>
<td>59.2</td>
<td>66</td>
<td>17.7</td>
<td>18</td>
<td>93</td>
<td>34.9</td>
</tr>
<tr>
<td>Females</td>
<td>34.9</td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Urban location</td>
<td>54</td>
<td></td>
<td></td>
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</tr>
</tbody>
</table>

Table 2. Use of systemic and topical antibiotics by gender

<table>
<thead>
<tr>
<th>Use of antibiotics</th>
<th>Both genders (n = 746)</th>
<th>Males (n = 476)</th>
<th>Females (n = 255)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Actual antibiotic use during 12 last months</td>
<td>298 39.9</td>
<td>174 36.6</td>
<td>121 47.5</td>
</tr>
<tr>
<td>Actual prescribed use</td>
<td>218 29.2</td>
<td>138 29.0</td>
<td>78 30.6</td>
</tr>
<tr>
<td>Actual self-medication</td>
<td>164 22.0</td>
<td>85 17.9</td>
<td>78 30.6</td>
</tr>
<tr>
<td>Intended self-medication</td>
<td>308 45.0</td>
<td>182 41.1</td>
<td>122 51.9</td>
</tr>
</tbody>
</table>

Fig. 1. Structure of indications, for which antibiotics were used (%).
higher position (OG2) and also the unemployed (OG7) showed a stronger tendency to use antibiotics than retired people (OG6), 3.54 (95%CI: 1.88–6.66, \(p = 0.00\)) and 3.38 (95%CI: 1.58–7.23, \(p = 0.002\)), respectively.

Respiratory symptoms/diseases were reported as the most frequent reason for intended self-medication (Fig. 2).

It was found that the over-the-counter acquisition in community pharmacies was the most common (86.0%) source of antibiotics for self-medication. This was followed by leftovers (23.2%) and getting from friends or family (6.1%). Sometimes people reported several aforesaid sources of obtaining one antibiotic.

**DISCUSSION**

This study was carried out as a part of multinational survey according to the standardized protocol. It revealed Lithuania as a country of considerably high level of self-medication with antibiotics (22.0%).

The low (25.4%) response rate to a mailed questionnaire (which is not unusual in Lithuania and in other countries of Eastern Europe) is likely to result from a low relevance of the issue in the opinion of the respondents. The rate among late respondents (who are assumed to be more like the non-respondents than the early respondents) was higher (25.4%) than that among early respondents (22.0%).

However, since the adjusted rate (24.5%) falls into the confidence interval of actual self-medication, the bias of non-response can be considered as not so significant.

The observed high prevalence of self-medication may be due to the fact that people were familiar with antibiotics, nearly 90% of the respondents identified antibiotics correctly. In a Maltese study, the latter estimate was much lower (64%) also with a lower self-medication rate (19%) [14]. Regarding that those rates refer to the use of antibiotics during the 2 years previous, while we restricted the exposure to 12 months, self-medication prevalence observed in our country (22.0%) seems even more alarming.

The revealed intended self-medication (45.0%) is a very important estimate that reflects beliefs and attitudes of people in the society as well as their possible behaviors. This applies to a part of Lithuanian citizens, who would use antimicrobial drugs without consultation with health care professionals. Such a high percentage of intended self-medication is a very serious evidence that provides grounds for measures, which should urgently be taken.

Self-medication rates are found to be rather different in different European countries. The Netherlands (0.1%), Sweden (0.4%), Denmark and Czech (0.7%) are the countries with low rates, while the highest ones are mostly observed in East and South Europe, e.g., Romania (19.8%) or Spain (15.2%) [18].

Our data did not confirm our initial belief in discrepancies in age groups, between males and females or education levels. This study revealed that the main impact upon self-medication with antibiotics could be assigned to occupation, residence area and the presence of chronic disease.

The employed people taking the most responsible positions (OG1) (managers, executives) showed the tendency towards self-medication more often than the retired. This could be explained by their lack of time, highly valued work and self-trust in their own knowledge of antibiotics. However, confidence intervals were found rather broad, most probably because of small study groups.

The effect of place of residence found in this study is similar to that observed in some other countries, where this problem has been surveyed. For instance, self-medication in Nepal was also more common among rural households [19]. Possible reasons for this could be explained by more
difficult access to medical services than in urban areas, reluctance to “bother” a doctor, trust in pharmacists and also relatively easy access to antibiotics without prescription. The lower self-medication rate among people with chronic diseases could be related to their more frequent visits to the doctor due to their illness or other complaints, so they are more likely to use prescribed antibiotics.

Although in Lithuania antibiotics are prescription drugs, little attention is paid to complying with this principle. The same happens in other countries, especially in those with poor drug regulations. A study performed in Vietnam also showed a similar tendency towards self-medication, where people prefer to go through an illness without the assistance of health professionals, and treat themselves with the most common antibiotics (Penicillin V and Ampicillin – the first drugs of choice) [20].

Indications for antibiotic use revealed the general attitude of Lithuanian people – it is very common that antimicrobial drugs are taken for viral infections. Most of the respondents took and would take antibiotics for treating upper respiratory infections (symptoms/diseases). This follows the pattern of other countries [21–23].

Our study exhibited the lack of correct information about appropriate use of antibiotics and their side effects as well as a rather easy access to medicines without prescription in our country. The results support the findings of an earlier pilot study based on interviews with people in several regions of Lithuania (large and small towns and rural areas). The prevalence of self-medication with antibiotics was very similar (23%) and again pharmacies were found to be the most common source of antibiotics available without prescription [24].

Unlike other studies [14], our study defined the sources of antibiotics from respondents, but not from all the cases of treatment courses taken, which could help assess people’s behavior. Some respondents could have used several courses per year, applying to the same source. On the other hand, some respondents applied to several sources during one course.

There was an interesting finding that people who know names of antimicrobial drugs, and have heard about or experienced their rapid effect, are very often not aware of the darker side of the coin, especially of the harm caused by the uncontrolled, excessive use of them [23]. This is the case even among educated people, including medical professionals, who believe that antibiotics can be used to cure common cold [25].

One of the main consequences of irrational antibiotic use is antimicrobial resistance. Although the prevalence of self-medication in Lithuania is high, available data do not show high resistant rates. In the multinational study performed in 2001, only 8.6% of S. pyogenes were found resistant to macrolides; 7–9% of S. pneumoniae resistant to Penicillin; and 5–7% to Erythromycin [26–29].

Despite this favorable situation, neglecting or ignoring the problem of self-medication and failing to learn the lessons of other countries may worsen the situation in future. To decrease the level of resistance is much more difficult than to prevent its increase. Therefore, priority should be given to the development of education program for the promotion of evidence-based behavior. It is essential to restrict the sale of antibiotics to prescription-based only as it is suggested in EU and WHO recommendations. It is worth mentioning that legal regulations on this issue have been reinforced during the last years after the study.

A closer collaboration should be developed between health professionals and the society, particularly at the primary health care level [30].

CONCLUSIONS

As stated before, the strict control of sales is highly needed. It should prevent the unnecessary consumption of antimicrobial drugs. Some steps have already been taken since joining the European Union in 2004, and the situation is getting better, though as seems the progress is still not satisfactory. Therefore, education of the population, and not only of health professionals is important and the media as a powerful tool could assist in this area.
REFERENCES


