Inappropriate habits of antibiotic use among medical specialists and students in Vilnius

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Introduction. The resistance to antibacterial drugs is an emerging worldwide problem. Numbers of inappropriate ways to use antibiotics contribute to this issue. Self-medication is one of them. This study seeks to find out how prevalent the self-medication with antibiotics, their storage at home and the inappropriate acquisition of antibacterial drugs are among medical specialists in Vilnius, Lithuania.

Methods. A cross-sectional survey was conducted. To better identify the potential target groups, the respondents were classified according to their relation to medical care: physicians, other medical personnel, medical students and people, directly not related to medical care.

Results. The overall actual self-medication with antibiotics rate was 4.0%. And, although the actual self-medication rate might seem rather low, the intended self-medication rate was 51.4%. Also, a prevalent antibacterial drugs storage at home (45.8%) with a wide variety of preparations was reported. Only 61.9% respondents received prescriptions for antibiotics from their treating physician. 7.6% used the non-prescribed medicines and 22.0% received a prescription from a physician, who was either their colleague or a familiar person.

Conclusions. Inappropriate habits of antibiotic use are prevalent. While there were some differences between the research groups, most of them were not statistically significant. It means that measures should be taken targeting health care givers as well as the general population. Educational programs about the rational use of antibiotics may help reducing the improper habits of antibacterial drugs usage, including self-medication. Encouraging the electronic drug prescription may be beneficial while reducing the prevalent inappropriate acquisition of antibiotics.

Keywords: self medication, antibiotics, antibacterial agents, antibiotic resistance, inappropriate prescribing

INTRODUCTION

More and more is being talked about one of the biggest threats to global health today – antibiotic resistance. The World Health Organisation encourages to pay more attention to this problem with its worldwide events (1, 2). This highlights the importance of the issue in all populations all over the world.

It is known that irrational use (misuse) of antimicrobial medicines is a major driver of antimicrobial resistance (2). As rational medicine use is

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defined as when patients receive the appropriate medicines, in doses that meet their own individual requirements, for an adequate period of time, and at the lowest cost both to them and the community (3), the irrational use of medicines is when one or more of these conditions is not met. This includes antibacterial medication as well.

There are a number of factors, which determine that irrational use. One of the inappropriate ways to use antibiotics, that contributes to antibiotic resistance, is self-medication (4).

Many studies have reported the risk factors for irrational use and self-medication with antibiotics. The associated factors are age, education level, knowledge about antibacterial drugs, over-the-counter sales of antibiotics (5–8). While the prevalence of self-medication with antibacterial drugs in the general population are rather low in Western and Northern Europe, they are high in Southern and Eastern Europe, including Lithuania (9–11). Previous studies of Lithuanian population showed that the prevalence of self-medication with antibiotics in Lithuania were 22 and 31% (9, 12). High prevalence of self-medication with antibiotics is also a matter of concern, as the general population in Lithuania tends to be less knowledgeable about the appropriate use of antibacterial medications, compared with other European countries, such as Sweden, Netherlands, Austria and Belgium (13). The latest study of Lithuanian population also showed worrying results that Lithuanian residents' knowledge of antibiotics is insufficient and two-thirds of the respondents (61.1%) had poor knowledge of antibiotics (12).

This study aims to find out and compare the prevalence of self-medication with antibiotics among respondents, who were grouped according to their relation to medical care: medical students, physicians, other medical personnel and people, who are not directly related to medical care. Besides self-medication, the study also seeks to identify several other factors, that may contribute to inappropriate antibiotic use, such as inappropriate acquisition and antibiotic storage at home. Highlighting the medical specialists, the respondents were grouped respectively to identify if a particular group is at bigger risk of inappropriate antibacterial drug use, and therefore should be targeted when taking measures to reduce the problem.

MATERIALS AND METHODS

An observational, cross-sectional study was conducted. The convenience sampling method was chosen. The data were collected during the last three months of the year 2014. The study population consisted of undergraduates at the Vilnius University Faculty of Medicine (years 1, 2, 5 and 6), physicians and other medical personnel working in the Vilnius University Hospital. Corresponding research groups were formed. The data were also collected from the residents of Vilnius City, who were unrelated to medical care, thus forming a control group for a more consistent comparison.

A questionnaire with specific questions was created and pilot tested. The questions were asked about the respondent's usage of antibacterial drugs during the past 12 months, how they were acquired and utilised, and whether the respondent would use them without consulting a physician. Details of usage, such as the duration of use, symptoms and diseases (which were coded with the International Classification of Primary Care codes) were also included in the questionnaire. The respondents were also asked to check whether they had any antibacterial medications, and, if so, what were the names of antibiotics present at home. Antibacterial drugs for systemic use (Anatomical Therapeutic Chemical Class J01) were included in the analysis. The medications, wrongly identified as antibacterial drugs, were excluded from the analysis. Some demographic data of respondents were also collected.

The respondents, who had taken the antibiotics during past 12 months without any prescription, were classified as self-medicating. The intended self-medication was determined as an intention to take the drugs without consulting a physician. The physician respondents were not classified as self-medicating, and only other antibiotic usage data, provided by them, were used for the study.

RESULTS

A total of 273 respondents fully completed the questionnaires, the data from which were used for analysis.

118 (42.8%) respondents had taken the antibacterial medications during the past 12 months. The mean duration of antibiotic use was 6.7 ± 2.4 days. As the data from physician

Table 1. General characteristics of respondents in each research group

Group	No. of respondents	Mean age, y ±SD	Female, %	Take medication daily, %
Physicians	24	40 ± 11	54	4
Other medical personnel	27	36 ± 7	100	7
Medical students	180	22 ± 2	78	5
Unrelated to medical care	42	41 ± 9	79	21
Total	273	28 ± 10	77	7

Table 2. The actual and intended self-medication with antibiotics rates among the respondents and overall usage of antibiotics during the last 12 months

	Rate per respondents, % (95% confidence interval)		
Group	Overall a/b use within past 12 months	Actual self-medication	Intended self-medication
Physicians	54.2 (34.2–74.1)	n/a	n/a
Other medical personnel	29.6 (12.4–46.9)	7.4 (0–17.3)	59.3 (40.7–77.8)
Medical students	39.4 (32.3–46.6)	4.4 (1.4–7.5)	51.1 (43.8–58.4)
Unrelated to medical care	61.9 (47.2–76.6)	0	47.6 (32.5–62.7)
Overall	43.2 (37.3–49.1)	4.0 (1.6–6.5)	51.4 (45.2–57.6)

Table 3. The comparison of antibiotic acquisition rates among the study groups

	Rate per respondents, % (95% confidence interval)				
Group	Prescribed by a physician	Prescribed by a colleague/ relative	Left-over	Over-the-counter	Overall non-prescribed
Physicians	23.1 (0.2–46.0)	7.7 (0–22.2)	7.7 (0–22.2)	0	7.7 (0–22.2)
Other medical personnel	62.5 (29.0–96.0)	12.5 (0–35.4)	12.5 (0–35.4)	12.5 (0–35.4)	25.0 (0–55.0)
Medical students	69.0 (58.3–79.8)	22.5 (12.8–32.3)	7.0 (1.1–13.0)	1.4 (0–4.1)	8.5 (2.0–14.9)
Unrelated to medical care	61.5 (42.8–80.2)	38.5 (19.8–57.2)	0	0	0
Overall	61.9 (53.1–70.6)	23.7 (16.1–31.4)	5.9 (1.7–10.2)	1.7 (0–4.0)	7.6 (2.8–12.4)

respondents were excluded, the actual self-medication rate was 4.0% (10/249), while the intended self-medication rate was 51.4% (128/249). The data of actual and intended self-medication with antibiotics are presented in Table 1.

Acquisition

While the most common way of antibiotics acquisition among the respondents, who reportedly had taken antibacterial medication during the past year, was through the prescription of the treating physician – 61.9% (73 out of 118), part of respondents acquired antibiotics in other ways. 26 (23.7%) have been prescribed by a physician, who was ei-

ther their colleague or a familiar person. 7 (5.9%) used the leftover antibiotics and 2 (1.7%) acquired

Table 4. The comparison of antibiotic storage at home rates among the study groups

Group	Rate per respondents, % (95% confidence interval)
	Currently have a/b at home
Physicians	58.3 (38.6–78.1)
Other medical personnel	51.9 (33.0–70.7)
Medical students	41.7 (34.5–48.9)
Unrelated to medical care	52.4 (37.3–67.5)
Overall	45.8 (39.9–51.7)

them without a prescription, making a total of 7.6% non-prescribed use. 8 out of 13 (61.5%) physician respondents prescribed antibiotics themselves.

Leftover antibiotics

Asked about the usual utilisation of the antibiotics, which would be left after use, 146 (52.9%) respondents replied that they save it for future use. 92 (33.3%) replied that they use all of the tablets in

the package and there would be none left. 19 (6.9%) discard them together with common waste and 18 (6.5%) bring them to pharmacy for the provided utilisation of drugs.

Of all the respondents, 125 (45.8%) replied that they had some kind of antibiotics present at home at the time the questionnaire was given to them; 148 (54.2%) had none. A wide variety of antibacterial medications present at home has been
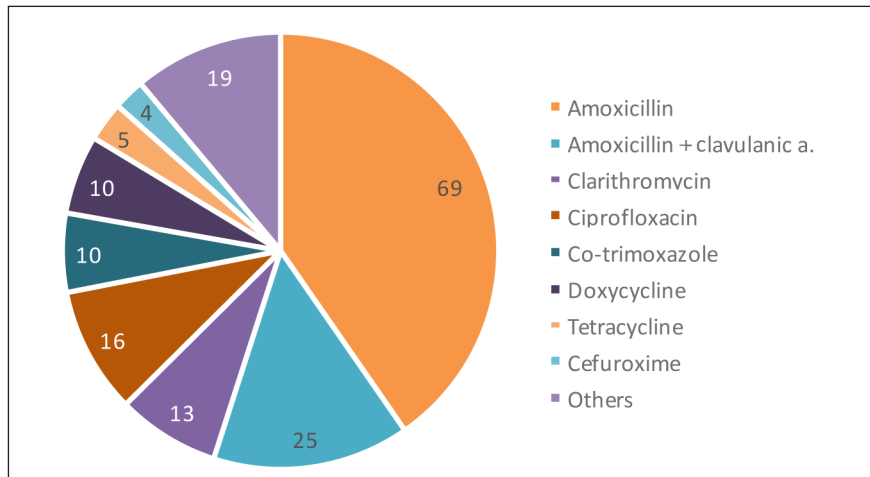

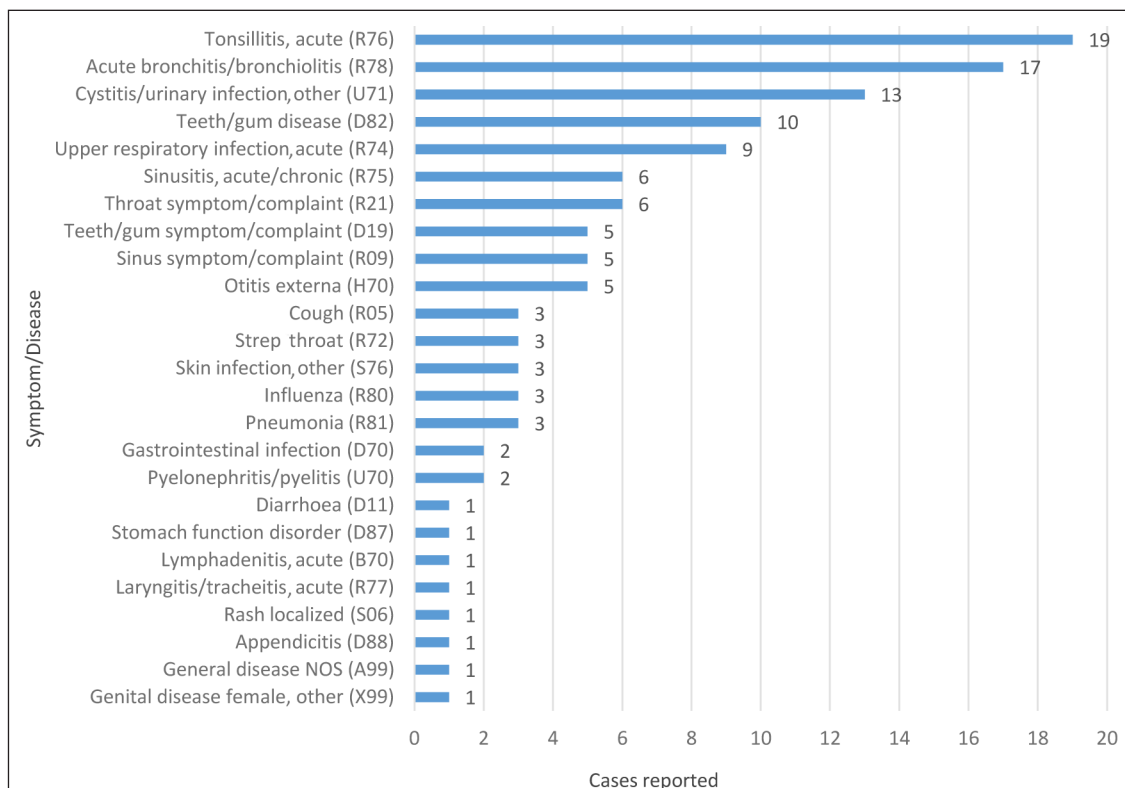**Fig. 1.** The overall reported cases of specific antibacterial drug storage at home

Fig. 2. The reasons for overall antibiotic use during the last year, classified by the International Classification of Primary Care codes

observed. Of 19 different preparations, amoxicillin was the most common (68 cases), amoxicillin with clavulanic acid being the second most common (25 cases).

Symptoms

The most common reasons of overall antibiotic use during the past 12 months were acute tonsillitis, acute bronchitis and urinary tract infection (UTI). Among those, who were described as self-medicating, the most common reasons were acute upper respiratory tract infection, acute bronchitis, and UTI. Among those, who were prescribed by a non-treating physician, the most common reasons were UTI and acute tonsillitis.

DISCUSSION

This study revealed that the self-medication with antimicrobial drugs is still a major issue among Lithuanians. Although the actual self-medication rates were lower compared to the studies conducted earlier (4.0% compared to 22% in 2006 (9) and 31.0% in 2015 (12)), such variance may be due to the differences between study populations and selection bias, therefore, it cannot be entirely comparable. However, the overall intended self-medication is still highly reported with a half of the respondents (51.4%) saying that they would use antibiotics without consulting a physician.

One of the most interesting findings in this study is that there are basically few differences between the study groups, regarding the antibiotic usage habits. This comparison, however, should be

made carefully, as the study design is limited to uneven sample sizes between the groups.

Comparing the self-medication rates, no significant trend could be identified. Only the respondents, who are not directly related to medical care, reportedly have not been actually self-medicating with antibiotics (zero cases reported). However, the intended self-medication rates do not differ between the study groups, as this can be determined by overlapping 95% confidence intervals.

The physician respondents mostly prescribe the antibiotics themselves, while others mostly (66.7%) get a prescription from their treating physician. What is interesting, the respondents, who are not directly related to medical care, is the group, who gets the most (38.5%) prescriptions from a relative physician. This shows that there is an easy access to a physician bypassing the conventional health care system. Also, a high prevalence (7.6%) of non-prescribed antibiotic usage has been reported. This includes the over-the-counter sales and the usage of the leftover drugs. Despite the fact that there is a national regulation, defining antibiotics as prescription-only medicines, these findings indicate that a stricter control of drug prescription is needed. One of the ways how it can be achieved is by encouraging the use of electronic prescription system, which is currently being installed nationally.

Another important finding is the prevalent antibiotic storage at home. A lot of the respondents (43.3%) said that they had used antibacterial drugs during the past 12 months. Asked about the usual utilisation of the drugs, more than a half (52.9%) people answered that they would save the antibiotics
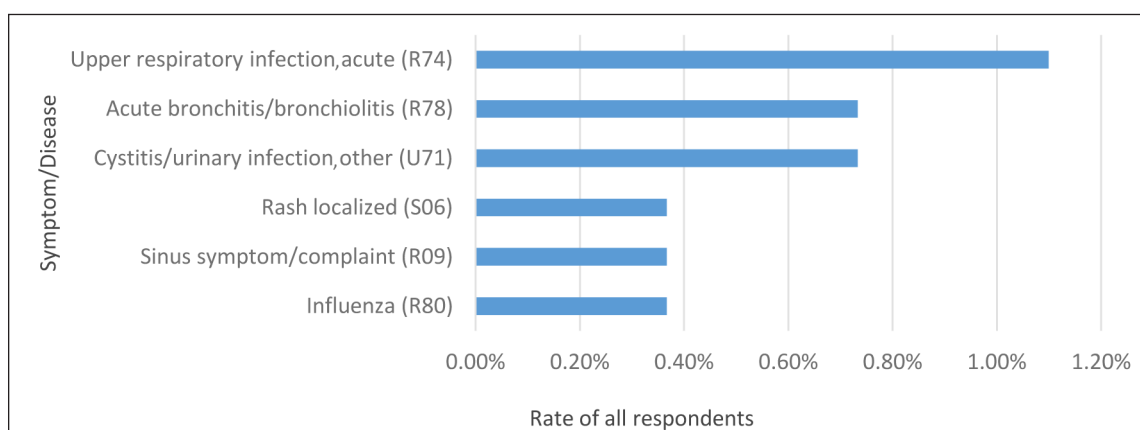

Fig. 3. Prevalence of actual self-medication by symptoms or diseases classified by International Classification of Primary Care codes

for future use. Knowing this, it is not surprising that 45.3% of the respondents had some kind of systemic antibiotics present at home.

While the antibiotics were mostly present at the physician homes (58.3%) and least present at medical students' homes (41.7%), the differences are also not statistically significant with overlapping 95% confidence intervals.

The big spectre of reported antibiotics (19 different preparations) and the fact that some of them (e. g. gentamicin) are not the first-line choice for community acquired infections is also a matter of concern, as it predisposes irrational antibiotic use and contributes to overall resistance to antibacterial drugs. One of the recommended ways to reduce the leftover antibiotics at home may be achieved by dispensing exact numbers of antibiotic tablets in pharmacies as implemented in other countries (14, 15).

According to the study results, the most common reasons of antibiotic use were acute tonsillitis, acute bronchitis and urinary tract infection (UTI). As for the self-medicating respondents, the most common reasons were acute upper respiratory tract infection, acute bronchitis and UTI. This highlights the problem of self-medication with antibacterial preparations – most of the cases are likely not to be treated with antibiotics, thus contributing to the antibiotic resistance.

All of these findings remind us that there is still a need for more education for the health care professionals, as well as for the general public about the potential risks of self-medication and the inappropriateness of using antibiotic therapy for minor ailments. The physicians should be aware that prescribing antibiotics for minor respiratory tract infections may increase the risk of self-medication for such ailments in the future (11). There have already been successful national campaigns in Australia and in France, that help rationalise the antibiotic use (16, 17), which can be taken as a positive example to Lithuania, when introducing similar methods.

CONCLUSIONS

This study revealed several inappropriate habits of antibiotic usage, including a high intended self-medication rate and a prevalent antibacterial medication storage at home with a wide variety of preparations. There is a tendency that a lot of respondents can eas-

ily get a prescription for the antibiotics from a physician, who is either their colleague, a relative or a familiar person. This is a reminder for all health care professionals, that a prescription should only be given after the full examination of a patient.

There is a need to reduce the inappropriate use of antibacterial medications. A stricter control of drug prescription may be beneficial. Also, education programs about the proper use of antibiotics for the public and health care givers should be encouraged.

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NETINKAMI VILNIAUS MEDICINOS SPECIALISTŲ IR STUDENTŲ ANTIBIOTIKŲ VARTOJIMO ĮPROČIAI

Santrauka

Įžanga. Atsparumas antibakteriniams vaistams – ryškėjanti problema visame pasaulyje. Ją lemia įvairūs netinkami antibiotikų vartojimo įpročiai, vienas jų – savigyda. Šiuo tyrimu siekiama išsiaiškinti, kaip tarp medicinos specialistų ir studentų Vilniuje paplitę savigyda antibiotikais, jų laikymas namuose bei netinkami įsigijimo būdai.

Metodika. Atlikta pjūvio tipo apklausa. Siekiant geriau identifikuoti rizikos grupes, respondentai buvo suskirstyti pagal jų santykį su medicina: gydytojai, kitas medicinos personalas, medicinos studentai ir asmenys, tiesiogiai nesusiję su medicina.

Rezultatai. Bendras savigydos antibiotikais paplitimo dažnis – 4,0 %. Nors jis atrodo ir mažas, polinkis vartoti antibiotikus nesikreipus į gydytoją – didelis – net 51,4 %. Taip pat nustatytas paplitęs antibiotikų laikymas namuose (45,8 %) ir stebėta didelė namuose laikomų preparatų įvairovė. Tik 61,9 % respondentų teigė receptą antibiotikams gavę iš savo gydančio gydytojo, 7,6 % vartojo be recepto, 22,0 % receptą gavo iš kolegos ar draugo.

Išvados. Netinkami antibiotikų vartojimo įpročiai yra paplitę. Nors pastebėta šiokių tokių skirtumų tarp tiriamųjų grupių, dauguma jų statistiškai nebuvo reikšmingi. Siekiant mažinti netinkamus antibiotikų vartojimo įpročius reikėtų kreiptis tiek į sveikatos priežiūros specialistus, tiek į visuomenę. Šių įpročių, taip pat ir savigydos, paplitimą galėtų sumažinti edukacinės programos apie racionalų antibiotikų vartojimą. Skatinimas išrašyti elektroninius receptus galėtų padėti mažinti netinkamą antibiotikų įsigijimą.

Raktažodžiai: savigyda, antibiotikai, antibakteriniai vaistai, atsparumas antibiotikams, netinkami antibiotikų vartojimo įpročiai