



KNOWLEDGE AND PRACTICES OF USING ANTIBIOTICS BY PATIENTS WITH ACUTE RESPIRATORY INFECTIONS

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Keywords: antibiotics, antibiotics in acute respiratory infections, antibiotics in primary health-care, self-medication, antibiotic resistance.

Introduction. Excessive and inappropriate antibiotic (AB) consumption is associated with the development of antibiotic resistance (AR). Insufficient knowledge and irrational practices in the use of AB for acute respiratory infections (ARI) by patients contribute to the development of AR. Aim: to assess the knowledge and practices of AB use in patients with ARI in order to identify educational needs.

Material and methods. The study included 393 patients with ARI. The standardized Happy Audit-2 questionnaire was applied. Complaints, the frequency of ARI occurrence, administered AB treatment, AB acquisition method, AB compliance, knowledge about AB, and AB resistance were assessed.

Results. AB were used by 40.3% of the patients. Antibiotic treatment was recommended by a doctor in 87.6% of cases, taken independently by 5.6%, recommended by a pharmacist in 5.0%, and recommended by relatives in 1.9% of cases. AB were obtained without a prescription in 6.3% of cases, and household reserves were used in 20.8% of cases. Patients were compliant with antibiotic treatment in 89.7% of cases but 10.3% of respondents did not adhere to the prescribed duration/dosage. 26.7% of respondents believed that AB were effective against viral infections, and 13.8% believed they were harmless to the human body. In 24.1% of cases, respondents were unaware of the adverse effects of AB, including the development of bacterial resistance in 29.7% of cases.

Conclusions. Insufficient knowledge about the effects of antibiotics and irrational usage practices, including self-medication, emphasize the need for strengthening awareness and education measures for potential antibiotic users.

Cuvinte-cheie: antibiotice, antibiotice în infecții respiratorii acute, antibiotice în asistența medicală primară, automedicația, rezistența la antibiotice.

CUNOȘTINȚE ȘI PRACTICI DE UTILIZARE A ANTIBIOTICELOR DE CĂTRE PACIENȚII CU INFECȚII RESPIRATORII ACUTE

Introducere. Consumul excesiv și inadecvat de antibiotice (AB) este asociat cu dezvoltarea rezistenței la antibiotice (RAB). Cunoștințele insuficiente și practicile iraționale de utilizare AB în infecții respiratorii acute (IRA) de către pacienți contribuie la dezvoltarea RAB. Scopul lucrării este de a evalua cunoștințele și practicile de utilizare a AB la pacienții cu IRA, în scopul identificării necesităților educaționale.

Material și metode. Studiul a inclus 393 de pacienți cu IRA. S-a aplicat chestionarul standardizat Happy Audit-2. Au fost evaluate acuzele, frecvența suportării IRA, tratamentul AB aplicat, modul achiziționării AB, complianța la AB, cunoștințele despre AB și a rezistenței la AB.

Rezultate. S-au tratat cu AB – 40,3% de pacienți. Tratamentul AB a fost recomandat de medic în 87,6% de cazuri, luat de sine stătător – de 5,6%, recomandat de farmacist – 5,0%, la recomandarea rudelor – 1,9% de cazuri. S-au procurat AB fără rețetă în 6,3% de cazuri, s-au utilizat AB din rezervele casnice în 20,8% de cazuri. Au fost complianți la tratamentul AB – 89,7%, dar nu au respectat durata/doza – 10,3% de respondenți. Au considerat că AB sunt eficiente în infecțiile virale – 26,7% și inofensive pentru organismul uman – 13,8% de respondenți. În 24,1% de cazuri, respondenții nu cunoșteau despre efectele adverse ale AB, inclusiv despre dezvoltarea rezistenței bacteriene în 29,7% de cazuri.

Concluzii. Cunoștințele insuficiente despre efectul AB și a practicilor iraționale de utilizare, practicarea automedicației impune necesitatea fortificării măsurilor de conștientizare și educare a potențialilor utilizatori de AB.

INTRODUCTION

Incorrect use of antibacterial preparations is recognized as a major cause of antibiotic resistance development (1, 2). The determinants of irrational antibiotic use relate to knowledge about rational use and the phenomenon of bacterial resistance in the general population (3). Incorrect behaviors and concepts regarding antibiotic use are observed in both developed and developing countries, where the general population, for the most part, has insufficient knowledge about antibiotics and a mistaken perception of their impact on bacterial resistance development (4). Over the decades, there has been no significant trend towards reducing irrational use and improving antibiotic use behaviors (5).

Self-medication with AB is widespread and varies in different communities, often associated with their inappropriate consumption (6). On one hand, self-medication can offer some benefits to individuals and healthcare systems by saving patient and physician time and reducing work absenteeism. On the other hand, self-medication is a practice that contributes to the increase in bacterial resistance (7).

Antibiotic resistance can be reduced through the systematic amplification of knowledge about rational use and the associated risks of irrational use of AB (8).

Aim: the conducted study assessed the knowledge and practices of antibiotic use by patients with acute respiratory infections (ARIs) in Chisinau, with the aim of identifying the needs for appropriate educational measures.

MATERIAL AND METHODS

Within the study, 393 patients from Chisinau, originating from various public medical-sanitary institutions (IMSP), who displayed signs of ARI at the time of seeking medical assistance, were included. Patients were selected by their own family physicians (FP), and after informed consent was obtained, they were enrolled in the study. The doctors who recruited the patients participated in the study's component on antibiotic use practices in ARI and also provided their consent to participate, which was prepared for FP. The standardized Happy Audit-2 questionnaire for patients with ARI, proposed by the Baltic countries' collaboration network (BARN) (9), was ad-

ministered. Recruited patients were assisted in completing the questionnaire by their family doctors. The study period spanned from September 2016 to March 2018. Inclusion criteria: age >18 years, resident of Chisinau, patients with signs of ARI at the time of visiting the family physician (FP), frequent ARI (more than 3 episodes in the previous year), absence of mental disorders. Exclusion criteria: age <18 years, absence of ARI at the time of recruitment, residents from other localities, fewer than 3 episodes of cold in the previous year, presence of mental disorders. Analyzed indicators: age, gender, education, frequency of ARI suffered in the previous year, main complaints at the time of seeking medical help, day of illness, seeking information from other sources before visiting the FP, time since the last cold, method of treatment with or without AB administration, access to the FP's consultation during the cold, trust in the FP for postponing AB use, adherence to the AB dosage and duration, procurement of AB based on prescription, and knowledge about the effect of antibiotics on bacteria, viruses, and the development of bacterial resistance.

RESULTS

The studied sample included: women – 71.3%, men – 28.7%; average age – 34.2±18.1 years; with higher education – 50.4%, secondary education – 44.2%, incomplete secondary education – 5.4% of respondents.

In the section on reported symptoms leading to seeking medical attention, the following predominated: cough – 81.7% (321/393), sore throat – 74.3% (292/393), general weakness – 66.7% (262/393), runny nose – 62.6% (246/393), headache – 53.9% (212/393), fever – 52.2% (217/393). Less frequent were: loss of appetite – 32.3% (127/393), chest pain – 21.1%, sleep disorders – 21.6%, pain in paranasal regions – 10.2%, ear pain – 10.7%, others – 2.5% (tab. 1).

Access to primary healthcare in case of ARI constituted 44.2% (173/391), while 55.8% (218/391) self-treated. The time of seeking primary care was as follows: within the first 3 days of illness – 76.3% (113/148) of patients; on the 4th-6th day of illness – 23.0% (34/148), after 6 days – 0.7% (1/148). Sources of information before consulting the family doctor were: the in-

ternet - 36.8% (42/114), another doctor - 31.6% (36/114), a relative/neighbour - 25.4% (29/114), medical books - 6.1% (7/114) of patients (fig. 1). In 12.9% (50/387) of cases, patients encountered difficulties in scheduling appointments with their family doctor. In cases

where patients could not get an appointment for consultation, they resorted to the following practices: self-medication - 34.3% (135/393), consulting another doctor - 40.2% (158/393), consulting a pharmacist - 25.7% (101/393) (fig. 2).

Table 1. Common clinical signs of patients with ARI at the time of seeking medical attention.

Clinical signs	Number of cases (total 393)	Frequency of clinical signs in patients with ARI (%)
Cough	321	81.7%
Sore throat	292	74.3%
General weakness	262	66.7%
Runny nose	246	62.6%
Headache	212	53.9%
Fever	217	52.2%
Loss of appetite	127	32.3%
Sleep disorders	85	21.6%
Chest pain	87	21.1%
Ear pain	42	10.7%
Pain in paranasal regions	40	10.2%
Others	10	2.5%

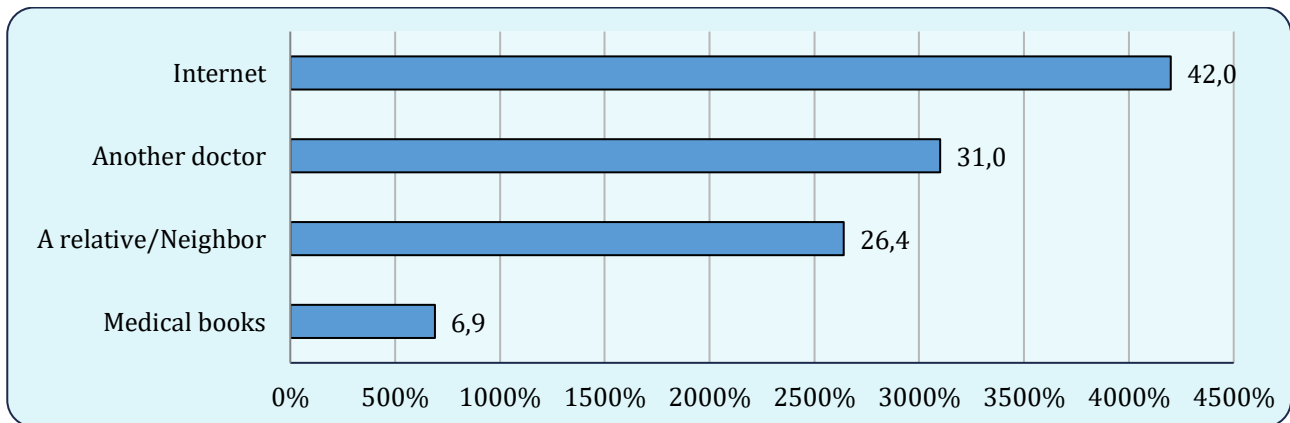


Figure 1. Sources of information for patients with ARI before consulting the family doctor

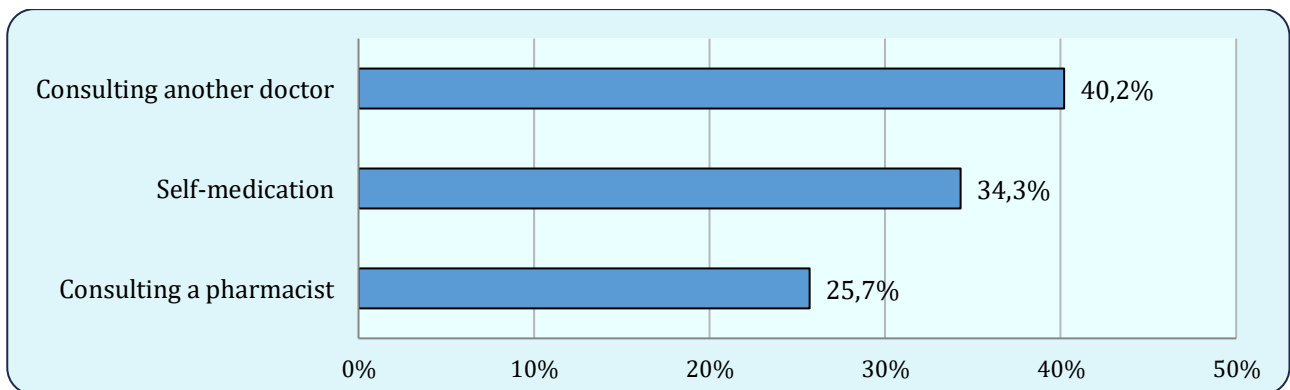


Figure 2. Practices of patients with ARI in the case of unsuccessful scheduling of a consultation with the family doctor

Out of a total of 389 respondents, 70.7% (275/389) consulted their family doctor before starting antibiotic treatment, while 19.5% (76/389) did not consult. Additionally, 9.8% (38/389) of respondents who frequently experienced respiratory infections occasionally consulted their family doctor regarding this decision (fig. 3).

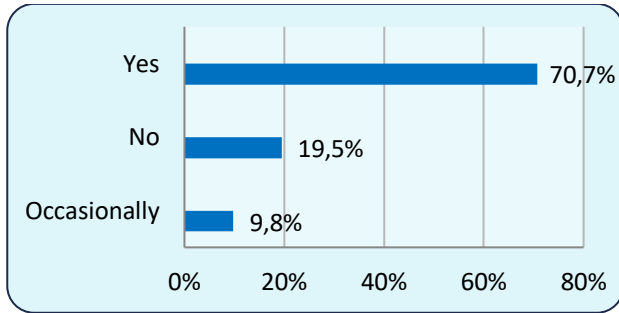


Figure 3. Proportion of patients with ARI who consult a doctor before antibiotic treatment

Out of a total of 388 cases, 79.4% (308/388) had an acute respiratory infection (ARI) in the last 6 months. Among these, 13.1% (51/388) had an ARI two to three weeks ago, 27.8% (108/388) had it one to two months ago, and 31.4% (122/388) had it three to four months ago. Acute respiratory infections older than 6 months were

reported by 20.6% (80/388) of respondents. Antibiotic treatment was recommended by a doctor in 87.6% (141/161) of cases. In other situations, respondents resorted to self-medication with antibiotics: 5.6% (9/161) of them took antibiotics based on previous medical recommendations, 5.0% (8/161) received suggestions from a pharmacist, and in 1.9% (3/161) of cases, self-medication was influenced by relatives (fig. 4).

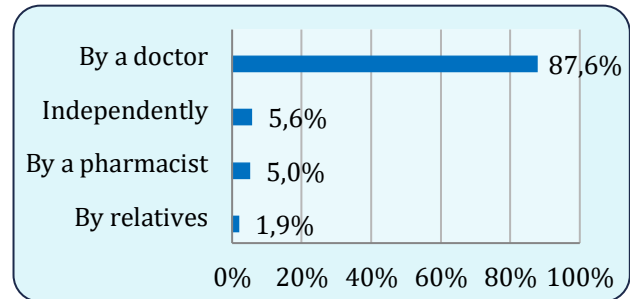


Figure 4. Sources of antibiotic recommendations in ARI

The antibiotics administered were purchased with a prescription in 87.9% (335/381) of cases, but in 6.3% (24/381) of cases, they were obtained without a prescription, and 5.8% (22/381) of respondents mentioned that they sometimes procure antibiotics with a prescription (fig. 5).

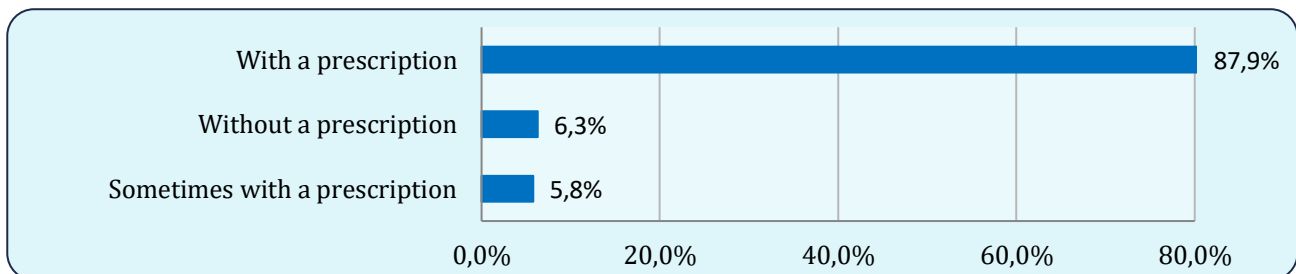


Figure 5. Ways of acquiring AB in ARI

Among patients who took antibiotics without a prescription, 20.8% (81/389) indicated that these came from household reserves. They started taking antibiotics in the first 3 days of illness – 18.5% (15/81) of respondents, while 81.5% (66/81) began administration after 3 days from the onset of acute respiratory infection.

Patient trust in the family doctor influences the choice of antibiotic treatment for ARI. In 84.1% (328/390) of cases, respondents mentioned that they trust their family doctor when they postpone antibiotic treatment, while 6.2% (24/390) do not trust, and 9.7% (38/390) have doubts. In 31.5%

(124/393) of cases, patients requested laboratory tests before deciding to start antibiotic treatment. Among patients who took antibiotics, 89.7% (349/389) followed the doctor's recommendations, while 10.3% (40/389) did not follow them.

Regarding patients' knowledge about ARI, the study identified the following findings: 26.7% (104/389) of respondents believed that antibiotics act on viruses, while 28.3% (110/389) did not provide a clear answer on this aspect. Additionally, 62.1% (242/390) of respondents considered antibiotics to be harmless to the human body, while 24.1% (94/390) were unsure about this.

Regarding the development of bacterial resistance to antibiotics, 29.7% (116/390) of respondents had no knowledge about this aspect. Moreover, 76.8% (289/388) of respondents believed that antibiotics reduce the duration of acute respiratory infections (tab. 2).

DISCUSSIONS

Self-medication is a behavioral practice observed especially in low- and middle-income countries (10, 11). Self-medication with antibiotics in the case of acute respiratory infections involves using these medications without well-founded medical recommendations (6, 12).

Numerous studies have identified self-medication as a contributing factor to the emergence of antibiotic resistance (6, 13). According to the literature, respiratory conditions such as sore throat (34.0%), common cold with fever (47.0%), and cough (40.0%), along with the belief that antibiotics can reduce the duration of acute respiratory infections (6), and the ease with which they can be obtained without a prescription, contribute to the prevalence of self-medication with antibiotics (14). Our study found that patients exhibited symptoms such as cough (81.7%), sore throat (74.3%), runny nose (62.6%), fever (52.2%), and the belief that antibiotics reduce the duration of the illness (76.8%). Additionally, the difficulty of getting an appointment with the family doctor (12.9%) was a likely reason for antibiotic administration (40.3%), of which 12.5% represented cases of self-medication with antibiotics. The data obtained in our study show that the rate of self-medication with antibiotics is three times lower compared to the data from a meta-analysis of 34 studies conducted in low- and middle-income countries (12) but three times higher compared to developed countries (15). The COVID-19 pandemic likely had an impact on antibiotic self-medication practices in the Republic of Moldova as in other countries. Recent studies have shown a reduction in the prevalence of this phenomenon, ranging from 20.8% to 45.8% among the general population, compared to the pre-COVID-19 period when prevalence ranged from 19% to 82% (16). According to research conducted by Zheng Y in 2023, during the pandemic, antibiotics were the most commonly mentioned drugs used in self-medication, often left over from previous treatments or purchased from unreliable sources. Self-medication with antibiotics in the context of

COVID-19 was driven by concerns about infection and limited access to medical services (17).

According to the meta-analysis, the main source of antibiotics obtained without a prescription in low- and middle-income countries was pharmacies (65.5%)(18). In our study, the percentage of antibiotics procured without a prescription from pharmacies was 5.4 times lower (12.1%). Additionally, the habit of keeping antibiotics at home, including from unfinished batches and even after the expiration date, promotes the practice of self-medication (19). According to studies, 50.0% of antibiotics obtained without a prescription come from household reserves (12, 19, 20). This could result from the over-dispensing of antibiotics or the lack of adherence to treatment by patients with acute respiratory infections (13). In our study, we observed that the use of antibiotics from household reserves was 2.4 times lower (20.8%) than reported in the meta-analysis (12). However, this practice raises questions about the reasons for storing antibiotics at home, and these reasons require detailed evaluation.

Low educational level and age have been identified in studies as factors associated with antibiotic self-medication, especially in developing countries (13, 16). According to a study by Faten Alhomoud in 2017 (21), the prevalence of self-medication was higher among middle-aged individuals (40-59 years), while a study conducted by Torres, Chibi et al. in 2021 showed a higher prevalence among young and middle-aged adults (18-40 years) (14). In our own study, we observed that self-medication was more common among middle-aged individuals (40-59 years), with a proportion of 52.6% for those with higher education and 47.4% for those with secondary education, while respondents with incomplete secondary education did not mention this habit. Therefore, the level of education may be one of the determinants of antibiotic self-medication. During the COVID-19 pandemic, factors associated with self-medication, such as gender, age, education, marital status, and the level of concern about COVID-19, were also identified (17).

Self-medication appears as a favorable alternative in regions without access to qualified medical care when potential benefits are considered to outweigh associated risks (10). The patients in our study were from urban areas and had good access to primary healthcare (PHC), received

without difficulty in 80.9% of cases. However, 12.9% of respondents faced difficulties in getting an appointment for a family doctor consultation. These difficulties likely contributed to the practice of self-medication with antibiotics, based on previous medical recommendations, in 5.0% of cases. Our study highlighted that the majority of respondents had limited knowledge about the effects of antibiotics on the human body and microorganisms. Specifically, over half of the respondents (55.0%) did not know that antibiotics are ineffective in treating viral infections, while more than a third of respondents (37.9%) were not aware of the harmful effects of antibiotics on the human body. However, the majority of respondents (76.8%) were confident that antibiotics reduce the duration of acute respiratory infections. Similar data have been observed in other countries, such as those in Europe, Asia, North Amer-

ica, and Australia, where over 53.9% of interviewed individuals believed that antibiotics are useful in treating viral infections (3).

This study has several limitations. One of them is the geographical coverage, as the research was conducted exclusively in urban areas, within the Public Health Institutes of Chisinau municipality, although the sample was designed to represent the entire Republic of Moldova. Another limitation arises from the differences between patients with ARI in urban and rural environments. It's also worth noting that the data were collected before the COVID-19 pandemic, which could have influenced antibiotic usage practices. Importantly, the study was conducted during the implementation of the Ministry of Health's order regarding the prescription-only release of antibiotics (22).

CONCLUSIONS

1. Our study identified a low level of knowledge among patients with ARI regarding antibiotics and their effects. To address these gaps and improve attitudes towards antibiotic use, it is necessary to strengthen educational measures aimed at potential users.
2. The practices of using antibiotics from household reserves highlight issues related to the quantity of prescribed/dispensed antibiotics or the level of patient compliance. Purchasing antibiotics without a prescription from pharmacies underscores the need to strengthen control measures for enforcing current legislation regarding the prescription only release of antibiotics.

CONFLICT OF INTEREST

In conducting this study, we had no conflicts of interest.

ETHICAL APPROVAL

The study was approved by the Ethics Committee of the *Nicolae Testemitanu* State University of Medicine and Pharmacy (approval number 56 from 12.06.2015).

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