Epidemiological Study of Antibiotic Self-Medication in Tehran 1399: A Descriptive Study

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ABSTRACT

Background: Self-medication is the use of medication to prevent, treat, or control the symptoms of illness, and often involves a combination of therapeutic resources, over the counter (OTC) medications, and antibiotics. Improper use of antibiotics and poor monitoring make antibiotic resistance a global health crisis, and the situation is exacerbated by the difficult discovery and production of novel antibiotics.

Materials and Methods: A cross-sectional descriptive study using questionnaire was conducted during the period from January 2020 to March 2020 targeting people who are living in Tehran.

Results: A total of 932 respondents to the questionnaire, about 86% of respondents in the past 6 months had self-medication with antibiotics. Previous experience of use and lack of time was the main cause of self-medication with antibiotics. The most self-administered antibiotic was amoxicillin (28.25%) followed by cephalexin (25.5%). The most common disease / symptoms of antibiotic self-medication were sore throat (49.5%), cough (14.5%) and runny nose (11%), respectively. Less than half of the subjects changed their antibiotic dose, the most important reason being accelerated It was a recovery. Roughly half of participants (44.5%) stopped taking antibiotics after the symptoms disappeared.

Conclusion: This study showed a very high prevalence of antibiotic self-medication that can lead to the development of microbial resistance and failure therapy. Therefore, educational interventions targeting the general public, pharmacists, and health care students are of particular importance.

Introduction

Self-medication is the use of medication to prevent, treat, or control the symptoms of illness and often involves a combination of therapeutic resources and the use of over the counter (OTC) medications, including antibiotics [1]. According to the World Health Organization, self-medication means the selection and use of medications by individuals to treat self-diagnosed diseases or symptoms. Self-medication is a relatively widespread practice around the world. Developed and developing countries focus on self-medication as a component of health care policy [2]. It has also been suggested that self-medication can help prevent and treat diseases that do not require medical advice and provide a cheaper alternative to treating common diseases [3]. In fact, self-medication is a part of self-care, which has greatly contributed to the efficient use of the health care awareness system with all its legal aspects [4].Antibiotics are the first successful class of drugs that can cure diseases and are effective in treating many infections [5]. Proper

use of antibiotics (correct medication, correct dosage, and course of treatment) can prevent Create an infection, treat, and prevent the infection from spreading. Antibiotic resistance is the ability of a pathogenic microbe to develop resistance to the effects of an antimicrobial (antibiotic) [6].

Antibiotic abuse and poor monitoring have turned antimicrobial resistance (AMR) into a global health crisis, and the situation is exacerbated by the difficult discovery and production of novel antibiotics [7].In recent years, various studies on antibiotic self-medication have been conducted in different parts of the world to identify the prevalence, risks and factors associated with antibiotic abuse [8-11]. The World Health Organization announces the sale of drugs without Prescription is challenging in most countries [12], however, according to a 2017 study, it is estimated that more than 50% of antibiotics are purchased without a prescription and are used without a prescription in most parts of the world [13]". Various studies state that the incorrect use of antibiotics among individuals is due to lack of awareness about the authority use of antibiotics or insufficient information [14-16]. However, one study states that despite sufficient knowledge about the side effects of self-medication with antibiotic, self-medication with these drugs is common [17]. In this regard, most studies of education and community awareness are considered important and necessary in the prevention of self-medication with antibiotics [14,18].

Although the World Health Organization has declared antibiotics as prescription-only drugs, research shows that factors related to the socio-cultural, behavioral, economic, and health systems play an effective role in self-medication with antibiotics in low-income countries [19-21].Most studies have shown that self-medication and prescription by a non-physician may be due to the high cost of antibiotics, the high cost of medical consultation, and other economic factors [22,23]. Of course, even in rich countries where most medicines are free and doctors' consultations are free, self-medication with antibiotic is prevalent [18].Therefore, considering the importance of self-medication in human health and the consequences of self-medication with antibiotics (such as antibiotic resistance), the aim of this study was to investigate the prevalence and causes of self-medication with antibiotics in Tehran in 1399. Also, quality (including duration of treatment, Discontinuation, and dose adjustment of self-medication with antibiotics) are also considered.

Materials and Methods

The present study was a cross-sectional descriptive study that was conducted in the spring of 1399 (April to July 2020) on community members (including students, ordinary people, businesses, passers-by, and patients in Tehran). It was done with ethical considerations. After designing the questionnaire, ordinary people in the community entered the study with the condition of consent to participate in the project. All questionnaires were anonymous. Participants were assured of confidentiality. Questionnaires were filled out by researchers in each section. Data collection tool in this study was the use of a written questionnaire that information was completed using two methods of self-fulfillment for literate participants and interviews for illiterate people. The questionnaire included questions in the form of two axes of personal information and self-medication habits with antibiotics and its causes. Each questionnaire was numbered, and coded information was extracted.

SPSS 23 software was used for statistical analysis. Data significance level was considered 5% (P-Value <0.05). Descriptive statistics analysis was performed, and the prevalence of self-medication with antibiotics was calculated. The same descriptive analysis was used to calculate the frequency of causes of self-medication with antibiotics and drug classes usage.

Results

In this study, 932 people in the community were studied, of which 764 (82%) were self-employed and 168 (18%) were other people (companion or parents) who answered the questionnaire. The mean age of the participants in this study was 62 ±39. Out of the total population, 800 (86%) had self-medication with antibiotics during the last 6 months. Self-reported diseases are listed in the (Table 1). Sore throat (pharyngitis) was the most important cause of antibiotic self-medication. Cough (with or without sputum) and runny nose were two relatively common causes of antibiotic self-medication. Genital infections (such as vaginitis), diarrhea, and urinary incontinence are less common causes of self-medication with antibiotics.Several antibiotics have been used for self-medication. Amoxicillin 226 cases, cephalexin 204 cases, cefixime 155 cases, azithromycin 126 cases, erythromycin 40 cases, ampicillin 30 cases were the most used antibiotics. The following were used by 19 cases: ceftriaxone (ampoule) 8 cases, cefazolin (ampoule) 6 cases, penicillin G 4 cases and clindamycin (ampoule) was 1 case.Participants were asked to change the dose of antibiotics used during self-medication.

Table 1: Demographic information of the participants.

Gender	Frequency (percentage)
Male	410 (44%)
Female	522 (56%)
Education	
High school and less	438(47%)
College education	494(53%)
Income level	
Less than 3 million tomans per month	380(41%)
More than 3 million tomans per month	494(53%)
Without Income	58(6%)

Self-medication with Antibiotics	
Yes	376(47%)
NO	424(53%)

(43.25%) said they did, and 354 (44.25%) said they did not change their dose.100 cases (12.5%) also stated that they did not know about this. Participants were then asked why the dose of the drug was changed. The results are shown in (Tables 2-4).The most common reason for increasing or decreasing the dose of the drug was to accelerate the recovery process. Also, reducing the side effects of the drug such as diarrhea, nausea and heartburn and insufficient medication were the second and third reasons for changing the dose of the drug.Participants were asked when to discontinue antibiotic self-medication.357 patients (44.5%) after the disappearing of symptoms, 258 patients (32.5%) after drug running out,100 patients (12.5%) after completing the treatment period and 85 patients (10.5%) discontinued antibiotics after a few days, regardless of the outcome. Respondents were then asked "after completing the treatment period" what source they learned about the treatment period. 38 people experienced previous doctor visits, 37 people with medication information (catalog or brochure), 17 people consulted a pharmacist, and 8 other family members experienced antibiotic treatment.

Table 2: Frequency distribution, by different causes of self-medication with antibiotic.

Causes	Frequency	Percentage
Previous use experience	161	20.125
Save time (lack of time)	151	18,875
Advice from family members	117	14,625
Other reasons	90	11.25
High price of doctors' visits	88	11
Crowded medical centers	85	10,625
Lack of trust in doctors	58	7.25
Remote distance from doctor or clinic	30	3.75
Pharmacist recommendation	20	2.5
Total	800	100%

Table 3: Frequency distribution of disease which self-medicated with antibiotics.

Disease/symptom	Frequency(percentage)
Sore throat (pharyngitis)	396(49.5%)
Cough	115(14.5%)
runny nose	82(11%)
Fever	62(8%)
Tooth infection	49(6%)
nausea and vomiting	34(4%)
eye infection	20(2.5%)
Genital infection	19(2%)
Diarrhea	13(1.5%)

Urinary tract infection (urinary incontinence)	10(1%)
Total	800(100%)

Table 4: Frequency distribution of antibiotic dose changing

Cause of dose changing	Frequency (percentage)
Accelerate the recovery of the disease	197(57%)
Reduce the side effects of the drug	57(16.5%)
Insufficient medication	52(15%)
Exacerbation of symptoms or disease	40(11.5%)
Total	346(100%)

Discussion

The prevalence of antibiotic self-medication in different countries and regions varies from 31% to 47.6% [9,15-17]. In the present study, the prevalence of self-medication with antibiotics in the last 6 months was about 86%, which is significant. It seems that the difference in the prevalence rate of self-medication may be due to differences in the demographic characteristics of the study samples, research methods, data collection tools, and the definition of antibiotic self-medication. Antibiotic self-medication is a complex phenomenon among individuals that is driven by a wide range of determinants [24].Several reasons for self-medication have been identified in various studies. The most common reason for self-medication is mild illness, followed by the cost of a doctor's visit, previous experience of use, long waiting time to see a doctor, and lack of time and health insurance [25]. In our study, the three main reasons for self-medication with antibiotics were previous experience with specific antibiotics (20.125%) followed by lack of time (18.875%) and family members' recommendations (14.625%). The results of a similar study confirm these reasons [9].A study in Saudi Arabia shows that penicillins and macrolides are the most widely used antibiotics [26], relatively similar results in our study showed that penicillins, macrolides and cephalosporins were the most commonly used antibiotics.

Amoxicillin and cephalexin are the two most commonly used antibiotics in this study. Amoxicillin is the most widely used antibiotic for self-medication in many countries [9,18,22,27]. Amoxicillin and potassium amoxicillin / clavulanate are considered as effective and safe first-line antibiotics for upper respiratory tract infections such as pharyngitis and otitis media [28,29]. It seems that high use of amoxicillin may be limited due to its low cost, easy availability, and limited side effects [30]. Amoxicillin and macrolides are also the most common antibiotics prescribed and patients tend to use these prescriptions as a reference for similar diseases in the future [31,32]. Also, since the most common disease treated with antibiotics was sore throat or pharyngitis, and amoxicillin is a good treatment for pharyngitis, amoxicillin had the highest rate of self-medication. Although many cases of sore throat or pharyngitis are related to viral infections and need not to be treated with antibiotics, this study is limited to confirming the bacterial infection

of self-treated pharyngitis.In this study, antibiotics were commonly used for sore throats, cold symptoms such as cough, rhinorrhea, and fever.This is consistent with other studies, and several studies confirm that the most reported cases of antibiotic self-medication included sore throat, cold, cough with sputum, flu-like symptoms, pain, fever, and runny nose [22,33,34].

The four main sources of information about self-medication with antibiotics reported by the participants of this study: previous experience (23%), medication prescription (catalog or medicine box) (21%), consultation with a physician (19.5%), search On the Internet (10%), however, a study by health care professionals identified the most important source of antibiotic information [15].A serious finding in the present study was the change in the dose of antibiotics used. Less than half of the subjects changed their dose of antibiotics during the course of self-medication with antibiotics. This is consistent with a similar study [35]. The most important reason for changing the dose of the drug was to accelerate the recovery process. Patients appear to be seeking antibiotics for symptomatic treatment and expect symptoms to improve with decreasing or increasing the dose of the drug. Less than half of the population stopped taking antibiotics after their symptoms disappeared. Only one-third of patients stopped taking antibiotics after taking the drug (which does not necessarily mean ending the course of treatment). More than 10 percent of the population stopped taking antibiotics after completing the treatment period, often learning about a previous doctor's visit and the instructions in the medication brochure about the treatment period.

The results of a study show that people often inform the pharmacist and doctor about the course of antibiotic treatment [35].There are several limitations to this study. The cross-sectional study design limited our preference for causal inference between self-medication with antibiotics and related factors. Although self-reported data may contain a reminder bias, our findings were almost consistent with most other studies. Antibiotic self-medication may vary from population to population, such as medical students. Given that only one province was surveyed, these results cannot be generalized to the whole country. Selection bias was also established by setting a 6-month limit for antibiotic self-medication.

Conclusion

This study showed a very high prevalence of antibiotic self-medication, which can lead to the development of microbial resistance, antibiotic resistance, and treatment failure. This study also shows that amoxicillin, cephalexin and cefixime were the most commonly used antibiotics for self-medication. Previous experience and lack of time were the most important reasons for self-medication with antibiotics. Sore throat and cold symptoms (such as cough, runny nose, and fever) were the most important symptoms for self-medication. A relatively large proportion of people changed their antibiotic dose, which was the most important reason for

accelerating the recovery of the disease.Educational interventions targeting the general public, pharmacists, and health care students are of particular importance. It was considered a powerful tool to increase the rational use of antibiotics in the community and improve patients' behavior regarding the use of antibiotics. Physicians and pharmacists should be encouraged through national health programs to provide more information about the proper use of antibiotics and their importance to individuals or patients when prescribing or distributing these drugs.

Patents

This section is not mandatory but may be added if there are patents resulting from the work reported in this manuscript.

Supplementary Materials: The following are available online at www.mdpi.com/xxx/s1, Figure S1: title, Table S1: title, Video S1: title.

Author Contributions: For research articles with several authors, a short paragraph specifying their individual contributions must be provided. The following statements should be used "Conceptualization, HesamAldinVarpaei; methodology, HesamAldinVarpaei; software, HesamAldinVarpaei; validation, HesamAldinVarpaei and Ali Kazemi; formal analysis, HesamAldinVarpaei; investigation, HesamAldinVarpaei and HoseinEsmaeili and Mohammad Yavari and Mohammad mahdiMirememi and Amir Mahdi Farahani and FaezeEsmaeili and Saba Abachi and PariyaOnsory and PedramNouroozi; resources HesamAldinVarpaei and HoseinEsmaeili and Mohammad Yavari and Mohammad mahdiMirememi and Amir Mahdi Farahani and FaezeEsmaeili and Saba Abachi and PariyaOnsory and PedramNouroozi; data curation, Ali Kazemi; writing—original draft preparation, HesamAldinVarpaei.; writing—review and editing, FaezeEsmaeili and Saba Abachi and PariyaOnsory and PedramNouroozi; supervision, Ali Kazemi; project administration, Ali Kazemi.; All authors have read and agreed to the published version of the manuscript.", please turn to the CRediT taxonomy for the term explanation. Authorship must be limited to those who have contributed substantially to the work reported.

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