



Self-Medication Practice, its Causes and Risk Factors among People in Tehran, Iran: A Descriptive-Analytic Study

Hesam Aldin Varpaei^{1*}; Pariya Onsori¹; Faeze Esmaeili¹; Saba Abachi¹; Mohammad Mahdi Miremamini¹; Amir Mahdi Farahani¹; Pedram Nouroozi¹; Ali Kazemi²

¹Bachelor of Nursing, Islamic Azad University Tehran Medical Sciences, Iran.

²Department of Pharmacology, Islamic Azad University Tehran Medical Sciences, Iran.

***Corresponding Author(s): Hesam Aldin Varpaei**

Bachelor of Nursing, Islamic Azad University Tehran Medical Sciences, Tehran, Iran.

Email: hesam.varpaei@mail.mcgill.ca

Abstract

Background: Self-medication practice, unfortunately, is a current issue in different countries. Patterns of self-medication vary among different populations and are influenced by different characteristics. Therefore, the present study aims to explore the self-medication prevalence and associated factors in Tehran.

Methods: This descriptive-analytic study was performed from Oct 2019 to March 2020 by a researcher-designed questionnaire among people. The main determinants of the questionnaire included personal information, diet pattern, physical activity, smoking, alcohol consumption, and self-medication habits. Chi-square and Tukey's post hoc tests were used for statistical analysis of data.

Results: Eight hundred people participated in this study. The rate of self-medication was 78% among men and 88% among women. 35.75% of the participants had a chronic illness, and 90% of them had a history of self-medication. A significant correlation between gender and self-medication ($P=0.45$, $r=0.55$), also significant correlation between exercise and self-medication ($P=0.206$, $r=0.75$), alcohol consumption and self-medication ($P=0.37$, $r=0.19$) were not found.

Discussion & conclusion: Education and income levels, chronic diseases, history of drug allergies, smoking, and fast-food consumption seem to be associated with self-medication behavior. Having an old physician's prescription, saving time, and family members advising, were the most important reasons for self-medication. The most commonly used medications were analgesics, common cold medicines, and gastrointestinal drugs. Self-medication was mostly used to treat headaches, migraines, and common cold symptoms such as cough and muscle pain. Proper education of individuals could lead to improve self-medication behavior and health promotion in vulnerable populations.

Received: Nov 11, 2020

Accepted: Dec 14, 2020

Published Online: Dec 16, 2020

Journal: Journal of Community Medicine

Publisher: MedDocs Publishers LLC

Online edition: <http://meddocsonline.org/>

Copyright: © Varpaei HA (2020). *This Article is distributed under the terms of Creative Commons Attribution 4.0 International License*

Keywords: Self-medication; Public health; Chronic disease; Analgesics; Health promotion.

Cite this article: Varpaei HA, Onsori P, Esmaeili F, Abachi S, Miremami MM, et al. Self-Medication Practice, its Causes and Risk Factors among People in Tehran, Iran: A Descriptive-Analytic Study. J Community Med. 2020; 3(1): 1025.



Introduction

Self-medication is the arbitrary treatment of disease and illness using medication. According to the World Health Organization (WHO), self-medication is defined as medication for illness, disease, and disorders diagnosed by oneself, or the intermittent or consecutive use of a medication prescribed for oneself [1]. Studies have shown that there is no universal definition of self-medication, however this can be seen as the selection and use of Over-The-Counter (OTC) medications, the re-use of previously prescribed medications without professional health care supervision, and the use of defined medications prescribed to treat symptoms or diseases which have diagnosed himself [2]. Situations such as using medications recommended by friends or family members, not following a treatment plan, or changing the dosage of medications prescribed can also be defined as self-medication [3]. However, self-medication could benefit for health care systems (such as better use of clinical skills and increase access to medication, but self-medication is associated with risks such as misdiagnosis, overdose, long-term drug use, and drug interactions [22]. Self-medication can increase and expands Antimicrobial Resistance (AMR), which affects both human and animal health [23]. Self-medication with antibiotics is one of the most common types of self-medication, an estimated 5% of over-the-counter antibiotics, which are used without a prescription in most parts of the world [26].

Numerous studies have examined the prevalence and factors affecting self-medication, which show self-medication with OTC medication is a common problem worldwide and more so in developing countries [28,29]. Patterns of self-medication vary among different populations and are influenced by different characteristics such as age, sex, income and expenditure, level of education, medical knowledge, and intolerance to diseases [30,31]. Studies in Egypt and Iran show that self-medication is high among students [4,6]. Some studies in Rwanda have identified fever, colds, and coughs as the most important self-medication [10]. However, other studies have identified fatigue, weakness, anxiety, and fever as the most common symptom of illnesses treated with self-medication, with the most important reasons being self-medication without harm, having a history of illness, and the availability of medications at home [11]. A study in Spain reported that self-medication was closely associated with factors related to social cognitive demographics such as gender, level of education or age, and several health factors such as long-term physical illness [17]. Self-medication in children was strongly associated with factors such as maternal literacy level, number of children the order of birth, which did not correlate with maternal age, occupation, or subject matter. Antipyretics and analgesics were mostly used as monotherapy [15]. Studies show that some parents consult a specialist when their children become ill and simply give antibiotics to their children, assuming they are aware of their misinformation about the effects of antibiotics [33,34]. The rate of self-medication was high in Sri Lankan athletes with allopathic and herbal medicines [18]. Self-medication in athletes is also affected by the intensity of physical activity [19]. In previous studies, generally

referred to student self-medication, which limits the age range; also side effects and their frequencies have not been considered. In the present study, we tried to investigate the effect of chronic diseases, fast food consumption, smoking, and history of complications on self-medication, especially the relationship between the number of self-medication with chronic diseases and the effects of self-medication with antibiotics [20,21]. We also examined a wide range of people from different lifestyles, and drug allergies, the level of education of individuals, and the prevalence of drug forms. Due to the importance of the subject, this study aimed to determine the frequency of self-medication and its causes and affecting factors from Oct 2019 to March 2020 in Tehran.

Materials & methods

The present study was a descriptive-analytical cross-sectional study conducted from October 2019 to March 2020 on people (including students, ordinary people, business people, passers-by referring patients to clinics and hospitalized patients) in Tehran. This study was conducted by taking into account ethical considerations. The method of this study was that after the necessary coordination between the members of the research team and the design of the questionnaire, ordinary people entered the study with the condition of consent to participate in the project. A questionnaire designed by the researchers was used. All questionnaires were anonymous. Participants were assured of confidentiality. Tehran divided into eight geographical areas, and the questionnaires were filled in each area by the researchers. The questionnaire included 30 questions in the form of three axes of personal information (including age, sex, occupation, marital status, level of education and income and illness), diet pattern, physical activity, and smoking and alcohol (including fast food intake, type of food consumed, food allergies, duration of exercise, professional exercise and smoking and alcohol consumption). Self-medication habits (including illness, history of self-medication, cause of self-medication, type of self-medication, number of times self-medication, drug selection criteria the form of the drug used, the reason for choosing the drug, studying the drug prescription, history of drug side effects, action against the possible complication and the name of the drugs used) were used. Each numbered questionnaire and coded information were extracted. SPSS 23 software was used for statistical analysis. The significance level of the data was considered 5%.

Results

The results were as follows. Eight hundred twenty-three people were studied, and finally, 23 questionnaires were excluded from the study due to incompleteness and repetitive information. Of these 800 people, 632 (79%) individuals were self-employed, and 168 the others (21%) (companion or parents) answered the questionnaire. The demographic information of the participants in the study is shown in (Table 1). The average age of the participants in this study was 62 ± 39 . The rate of self-medication was 78% ($n= 275$) among men and 88% ($n= 394$) among women.

Table 1: Demographic information of the participants.

	Frequency (percentage)
Gender	
Man	352 (44 %)
Female	448(56%)
Total	800 (100%)
marital status	
Single	496 (62 %)
Married	304(38%)
Total	800(100%)
Education level	
Illiterate	24 (3 %)
Secondary/High school	120 (15 %)
Diploma	160 (20 %)
College/University education	496 (62 %)
Total	800 (100 %)
Income Level	
No income	320 (40%)
Under 500 thousand tomans	64 (8%)
From 500 thousand to 1 million	80 (10%)
From 1 to 2 million tomans	96 (12%)
From 2 to 5 million tomans	184 (23%)
From 5 to 10 million tomans	40 (5%)
Above 10 million Tomans	16 (2%)
Total	800 (100%)
Fast food consumption (in a month)	
1 to 2 times	384 (48%)
3 to 5 times	248 (31%)
5 to 10 times	96 (12%)
More than ten times	32 (4%)
/do not consume	40 (5%)
Total	800 (100%)
Exercise (per week)	
> 150 minutes	176 (22%)
From 60 to 120 minutes	128 (16%)
From 30 to 60 minutes	96 (12%)
<60 minutes	112 (14%)
/ do not exercise	288 (36%)
Total	800 (100%)
Self-medication with antibiotics	
Yes	448 (56%)
No	352 (44%)
Total	800 (100%)
Chronic disease	
Yes	286 (35.75%)
No	514 (62.25%)
Total	800 (100%)

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

Reason	Frequency	percentage
Having a previous prescription	161	20.12
Saving time	151	18.8
Advice from family members	117	14.62
The high price of doctor's visit	88	10
Crowded medical centers	85	10.62
Lack of trust in doctors	58	7.25
Remote doctor or clinic	30	3.75
Nurse advice	24	3
Pharmacist recommendation	20	2.5
Other reasons	90	11.25
Total	800	100

88 (11%) of the study population had a history of drug allergies. The most important drugs that cause allergies are penicillins (40%), aspirin (25%), corticosteroids (10%), anti-seizures (5%), and nonsteroidal anti-inflammatory drug (20%). The most critical causes of self-medication were the old version (20.12%), time-saving (18.8%), and advice from other family members (14.62%), respectively. The types of medications used by participants are listed in (Table 3).

Table 3: Medications used in self-medication.

	Frequency	Relative frequency percentage
Common cold medicines*	764	95.5
Analgesics	750	93.75
Gastrointestinal medications**	634	79.25
Multivitamins and minerals	547	68.38
Antibiotics	463	57.88
Antihistamines	454	56.75
Antitussive drugs and expectorants	352	44
Anti-inflammatory drugs	119	14.88
Sedatives	96	12
Ophthalmology medications	38	4.75
Contraceptives	32	4

* For example, Adult Cold or Cold Gel

** Included ant-acid drugs, anti-emetic and anti-diarrhea drugs.

Among the analgesics, acetaminophen, ibuprofen (Advil) and aspirin were the most drugs used. Furthermore, gastrointestinal drugs including ranitidine, omeprazole, and ondansetron (Demitron) and common cold medicines were the most drugs used, respectively. Regarding the antibiotics, amoxicillin (38%), cephalexin (24%), azithromycin (22%), and cefixime (16%) had the highest use, respectively. It should be noted that most participants used more than one type of medication for self-medication. According to the results, the most common form of medicine used in self-medication was pills and capsules. According to Pearson correlation analysis, there was not a significant correlation between gender and self-medication ($P=0.45$, $r=0.55$), exercise and self-medication ($P=0.206$, $r=0.75$), alcohol consumption and self-medication ($P=0.37$, $r=0.19$).

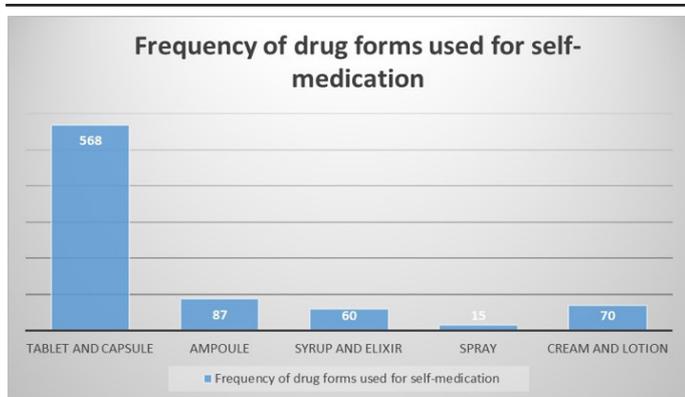


Figure 1: Frequency of drug forms used for self-medication.

The most commonly used drugs form was tablets and capsules, followed by ampoules. Although tablets and capsules are highly available in pharmacies, and they are easy to use, injectable drugs often require special care and must be injected in medical centers under the supervision of a physician. It should also be noted that not all medications (in any form) used included over-the-counter medications.

However, based on the Pearson correlation test, significant correlations were found between self-medication and various causes. According to the results of this table, the amount of self-medication in those who have an income level of one to two million tomans and two to five million is more than others. Also, the rate of self-medication is higher in those who consume fast food, use some kind of tobacco, have drug allergies. Self-medication was significantly higher in people with university education (bachelor (45%) and master (38%) than other groups. A history of drug side effects (such as diarrhea, vomiting) is also a factor that was directly related to self-medication, so from 500 people (75%) of those who did not experience side effects self-medicated. In contrast, 120 (85%) of people who experienced drug side effects had self-medicated. It seems that chronic disease (such as diabetes, hypertension) can provide the basis for self-medication, so that 90% of people with chronic disease (286 people) had self-medication. The diseases/illnesses that caused people to self-medicate are listed in (Figure 2). It is worth mentioning that all participants mentioned more than 1 case.

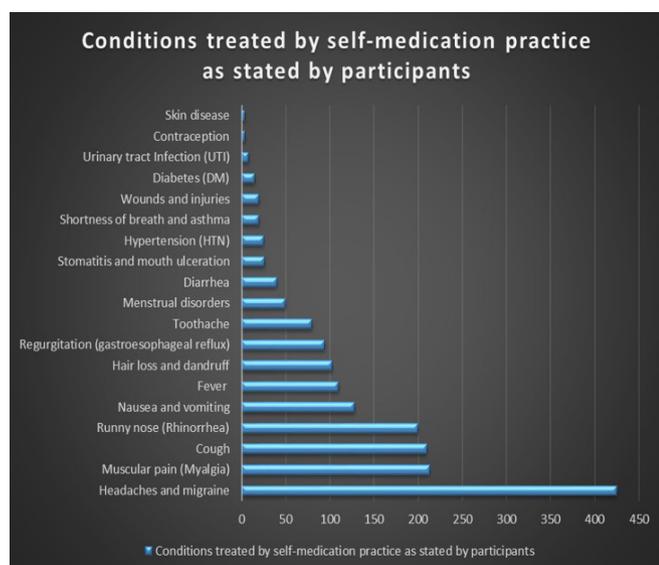


Figure 2: Conditions treated by self-medication practice as stated by participants.

We found that the most common self-medicated diseases/illnesses were headache and migraine, muscle pain (myalgia), and cough, respectively. It is clear that, according to the results, the most common illness was cold and symptomatic treatment. However, due to over-the-counter drugs in most pharmacies in Tehran, self-medication is also seen in chronic diseases such as hypertension, asthma and, diabetes. Regarding the relationship between the frequency of self-medication and related causes, based on the Pearson correlation coefficient, there was a direct relationship between education and the number of times of self-medication.

Table 4: Pearson correlation coefficient and self-medication related causes.

Items	Chi-Square Tests	
	Value	Asymp. Sig. (2-sided)
Income and self-medication	7.895	0.048
Consumption of fast food and self-medication	4.740	0.029
Tobacco use and self-medication	11.130	0.004
Medication allergy and self-medication	8.372	0.004
Education and self-medication	31.305	0.000
Chronic disease and self-medication	40.980	0.000
History of drug side effects and self-medication	5.902	0.015
Frequency of self-medication and chronic illness	61.29	0.000
Frequency of self-medication and education	73.46	0.000
Frequency of self-medication and income	40.012	0.004

One-way analysis of variance (ANOVA) was used to compare the mean of the data and self-medication. The results are as follows: A significant difference was found between the different groups ($P=0.00$). Tukey post hoc test was used to follow the difference in results. On average, self-medication in the income of groups between 1 to 2 million tomans per month and group 2 to 5 million per month compared to other groups is the highest. Also, a significant difference was found in self-medication between different educational groups ($P=0.00$). So, in the diploma and undergraduate study groups, self-medication was significant, while at the higher education level, there was a significant difference not found ($P=0.75$). On average, people who ate more fast food per month were more likely to self-medicate ($P=0.029$). People who ate fast food 3 to 5 times and 5 to 10 meals were more likely to self-medicate. The history of drug allergy was significantly ($P=0.04$) higher in subjects who self-medicated. Tobacco use (of any kind) also showed a significant relationship with self-medication ($P=0.04$), a significant difference was found between chronic disease and self-medication ($P=0.00$). Significant differences were also found between chronic disease and self-medication ($P=0.00$). Also, the experience of drug allergy in individuals caused a significant difference ($p=0.01$) in self-medication behavior. Besides, the results of Tukey's post

hoc test on the frequency of self-medication showed that the frequency of self-medication ($P= 0.04$) in the non-income population (21.60 ± 0.58), and income levels less than 3 million per month (13.60 ± 0.76) was associated with the highest number of self-medication (respectively). The mean frequency of self-medication in people with chronic disease was significantly ($P= 0.00$) higher than people without chronic disease. Finally, on average, the number of self-medication in individuals with bachelor's, diploma, and pre-university education (respectively) was higher than in other educational groups ($P= 0.00$).

Discussion

In this study, various sufficient causes of self-medication were investigated. In 2017, a study published in the American Journal of Infection Control stated that socioeconomic status, gender, and age are not related to self-medication, while in our study, social conditions such as tobacco use (income level) was examined, and it was found that these people had the highest rate of self-medication, but based on Pearson correlation coefficient analysis, no significant relationship was found between age and gender with self-medication [35]. In this study, it was found that there is a significant relationship between self-medication frequencies with education. In such a way that self-medication is more common among people with higher education (bachelor-master). By stating that there is a relationship between self-medication and age, gender, and education [36], several studies have shown the relationship between low education and self-medication [37,38]. The diploma was more pre-university degree than others; however, because the participants in this study did not have a specific age limit and there was no specific criterion for gender selection, it was concluded that there is no relationship between age and gender ($P= 0.45$). In another study by Jamhour, Antoun, et al. it was found that there is a relationship between self-medication and a person's level of education, which measures the level of education, especially about the use of antibiotics. This means that people with less knowledge about antibiotics stopped taking them at the wrong time. However, in this study, no correlation was found between economic and social status, gender, and age [39]. Other relationships were also examined in this study. There is a relationship between the number of fast-food consumptions, drug allergies, and tobacco consumption with self-medication. People who consume more fast food (3-5 or 10-5 times a month) are more self-medicating. Previous studies have shown that self-medication is higher in middle and lower-income groups than in others [51,52,53]. Low to moderate-income seems to be an influential factor in self-medication. Also, low-income individuals and families prefer to buy drugs and self-medicate based on their previous experience due to the high cost of medical counselling [54].

There was a relationship between fast food consumption and its amount, drug sensitivity, smoking, as well as its amount and type with self-medication. So that people who eat more fast food (3-5 or 10-5 times a month) are more self-medicating. According to the results, it was found that most of the drug allergy for the participants in this study was penicillin, and there is a significant relationship between drug allergies and self-medication. Nevertheless, when it comes to smoking, other than alcohol and tobacco is associated with self-medication [37,38]. In this study, no relationship was found between alcohol and self-medication (p -value >0.05). Also, considering the study of exercising, the type of exercise and its professionalism or not, no significant relationship was found with self-medication. According to several studies, such relationships were not found in

other studies.

It was shown that the main reasons for self-medication were having an old prescription, saving time, and recommending other family members. Other studies have also reported that people are more likely to quote from family members, friends, or other relatives, pharmacists, previous experiences with a similar disease, to alleviate the disease, to save money, to improve productivity. Patients' opinion that the value of a doctor's visit is not worthwhile due to the type of problem; they have turned to self-medication [40-43]. The research was also consistent. In the elderly, other factors besides themselves include the family, the environment in which they live, the health care system from which they receive services and their health care providers, and the social environment [45].

Numerous studies have shown that gastrointestinal diseases, fever, headache, respiratory diseases, colds, coughs, and cardiovascular diseases were the most common diseases that self-medicate [40,46,43] as well as people with due to these common diseases, medications such as analgesics, antibiotics, gastrointestinal drugs, and respiratory drugs are used in self-medication [36,40,41]. A study conducted in 2017 states that self-medication with antibiotics, followed by NSAIDs and cough and cold medicines, were the most common, while in our study, cold medicines were ranked at first and analgesics were ranked second, respectively. Gastrointestinal drugs with 634 cases were the most used drugs in our study [47]. According to the results obtained in our study, the most commonly used drugs in self-medication were common cold medication, gastrointestinal drugs, and analgesics. Therefore, considering this issue, it is concluded that the general public is more inclined to self-medicate for such problems. A study on graduated students in Nigeria found that paracetamol is the most widely used drug in self-medication [36]. Self-medication with analgesics is a stand method of treating toothache because most of these drugs are Over-The-Counter (OTC), easily accessible [22]. OTC medications are used for allergies, chronic pain, migraines, vaginitis, gastrointestinal symptoms, or colds [42]. However, proper self-medication with OTC medications can bring significant economic benefits to patients, employers, and systems. The findings suggest that a decision to adopt stricter regulations on OTC medications is needed to reduce the health risks associated with self-medication [43]. The issue of self-medication and the associated antibiotic resistance is an increasingly crucial global problem [2]. In a study, it was found that 12.1% of the total participants treated themselves with antibiotics, stating that the main reason for self-medication was not taking the disease seriously and feeling the need for a counselor [46]. The most common antibiotic used for self-medication was amoxicillin capsules [46]. According to the results of this study, 56% of participants treated themselves with antibiotics.

Self-medication with antibiotics is a common practice among students and in developed and developing countries (49-48-47-39). They were treated with it, and the antibiotics used revealed that all of these cases might be related to the lack of awareness about the need for rational use of antibiotics [46]. Various studies state that the incorrect use of antibiotics among individuals is due to a lack of awareness about the arbitrary use of antibiotics or insufficient information [55-57]. However, one study states that despite sufficient knowledge about the side effects of antibiotic self-medication, self-medication with these drugs is common [58]. In this regard, most studies of education and community awareness are considered essential and necessary

for preventing self-medication with antibiotics [55,59]. Most studies have shown that self-medication and prescribing by a non-physician may be due to the high cost of antibiotics, the high cost of medical advice, and other economic factors [60,61]. Of course, even in rich countries where most medicines are free, and doctors' consultations are free, antibiotic self-medication is prevalent [59].

Some people believe that antibiotics should be used to treat colds, but some knew that abusing antibiotics could lead to microbial resistance [39]. One study found that people who self-medicated had a strong belief in the benefits of the drug and a weak belief in its disadvantages [22]. However, some methods of self-medication are harmful and require immediate action [40]. One study found that more respondents were unaware of the side effects of self-medication. However, highly educated people were more aware of the side effects of self-medication [41], so targeted health education about the risks of self-medication should be considered [43]. In one study, it was stated that almost half of the respondents chose self-medication. Only a small number met the doctor only if they felt sickness, because if the illness is short-lived (less than seven days), participants tend to they have self-medication [43], some of them also stated that their condition has not changed after self-medication [41]. Finally, it should be noted that the training of general practitioners and health care providers on the types of diseases that are self-medicated and the drugs used should be done [40]. There is also a need to inform the public and enforce drug distribution laws to prevent self-medication with antibiotics [39].

Conclusion

Various causes are involved in the development of self-medication behavior. Factors such as income level and education, chronic illness, history of side effects or drug allergies, smoking, and fast food seem to create self-medication behavior. It is worth noting that factors such as gender, exercise, and alcohol consumption do not have a significant effect on self-medication behavior. Having an old doctor's prescription, saving time, and advising other family members were the most important reasons for self-medication. The most commonly used medications were analgesics (acetaminophen), common cold medicines (adult colds), and gastrointestinal drugs (ranitidine). Pills and capsules were also the most commonly used form of medicine. Another vital point about self-medication, is multidisciplinary, is very useful in chronic disease, education level, and income level. Self-medication was mostly used to treat headaches and migraines and cold symptoms such as runny nose, cough, and muscle pain.

Patients with chronic diseases were also among the groups who self-medicated, and this issue can hurt their underlying disease. It seems that culture building in schools, universities, and at the community level, can have a positive effect on preventing arbitrary consumption. Researchers are advised to examine self-medication and its related causes in different social groups separately.

Limitations

There are several limitations to this study. Although self-reported data may contain a reminder bias, our findings were almost consistent with most other studies. Self-medication may vary from population to population, such as students. Given that only one province was surveyed, these results cannot be generalized to the whole country. Selection bias was also estab-

lished by setting a 6-month limit for self-medication. The next step is to focus on self-medication among priority groups, such as the elderly, women, and children, and those with chronic diseases and such studies should be based on a large representative sample size.

Acknowledgment

The authors are grateful to the investigators and study participants who contributed their precious time for data collection. The faculty members of the Islamic Azad University of Medical Sciences, especially Dr. Parcheh Bafieh and Dr. Seifi, who helped the researchers in designing and conducting this study, are highly appreciated.

References

1. Organization WH. Guidelines for the regulatory assessment of Medicinal Products for use in self-medication. Geneva: World Health Organization; 2000.
2. Locquet M, Honvo G, Rabenda V, Van Hees T, Petermans J, et al. Adverse health events related to self-medication practices among elderly: a systematic review. *Drugs aging*, 2017; 34: 359-365.
3. Shaghghi A, Asadi M, Allahverdipour H. Predictors of self-medication behavior: a systematic review. *Iran J Public Health*. 2014; 43: 136-146.
4. Helal RM, Abou-ElWafa HS. Self-medication in university students from the city of Mansoura, Egypt. *J Environ Public Health*. 2017; 2017: 1-7.
5. Kanwal ZG, Fatima N, Azhar S, Chohan O, Jabeen M, et al. Implications of self-medication among medical students-A dilemma. *JPMA. The J The Pakistan Med Assoc*, 2018; 68: 1363-1367.
6. Abdi A, Faraji A, Dehghan F, Khatony A. Prevalence of self-medication practice among health sciences students in Kermanshah, Iran. *BMC pharma and Toxicology*. 2018. 19: 36.
7. Zhu X, Pan H, Yang Z, Cui B, Zhang D, et al. Self-medication practices with antibiotics among Chinese university students. *Public health*. 2016; 130: 78-83.
8. Lei X, Jiang H, Liu C, Ferrier A, Mugavin J, et al. Self-medication practice and associated factors among residents in Wuhan, China. *Int J Environ Res Public Health*. 2018; 15: 68.
9. Noaman AA, Hussein MA, Mohammed SQ. Technical Institute/ Baquba, Middle Technical University (MTU), Iraq. Self-medication practices among a sample of university students attending college of science in diyala province. *J adv res med sci technol*. 2020; 6: 13-18.
10. Tuyishimire J, Okoya F, Adebayo AY, Humura F, Lucero-Prisno Lii DE. Assessment of self-medication practices with antibiotics among undergraduate university students in Rwanda. *Pan Afr Med J*. 2019; 33: 307.
11. Karimy M, Rezaee-Momtaz M, Tavousi M, Montazeri A, Araban M. Risk factors associated with self-medication among women in Iran. *BMC public health*. 2019; 19: 1033.
12. Ebrahimi H, Atashsokhan G, Amanpour F, Hamidzadeh A. Self-medication and its risk factors among women before and during pregnancy. *Pan Afr Med J*. 2017; 27: 183.
13. Marwa KJ, Njalika A, Ruganuzza D, katabalo D, Kamugisha. Self-medication among pregnant women attending antenatal clinic at Makongoro health centre in Mwanza, Tanzania: a challenge to health systems. *BMC pregnancy and childbirth*. 2018; 18: 16.

14. Sisay M, Mengistun G, Edessa D. Epidemiology of self-medication in Ethiopia: a systematic review and meta-analysis of observational studies. *BMC Pharm and Toxicology*. 2018; 19: 56.
15. Ortiz MV, Ruiz-Cabello FJS, Uberos J, Ros AFC, Ortiz CV, et al. Self-medication, self-prescription and medicating "by proxy" in paediatrics. *Anales de Pediatría (English Edition)*. 2017; 86: 264-269.
16. Mensah BN, Agyemang IB, Afriyie DK, Amponsah SK. Self-medication practice in Akuse, a rural setting in Ghana. *Nigerian Postgraduate Med J*. 2019; 26: 189-194.
17. Niclos G, Olivar T, Rodilla V. Factors associated with self-medication in Spain: a cross-sectional study in different age groups. *Int J Pharm Pract*. 2018; 26: 258-266.
18. Fernando A, Bandara LMH, Bandara HMST, Pilapittha S, de Silva A. A descriptive study of self-medication practices among Sri Lankan national level athletes. *BMC Res Notes*. 2017; 10: 257.
19. Locquet M, Beaudart C, Larbuisson R, Buckinx F, Kaux JF, et al. Self-medication practice among amateur runners: Prevalence and associated factors. *J Sports Sci Med*. 2016; 15: 387-388.
20. Spellberg B, Gilbert DN. The future of antibiotics and resistance: a tribute to a career of leadership by John Bartlett. *Clin Infect Dis*. 2014; 59: S71-S75.
21. Bell BG, Schellevis F, Stobberingh E, Goossens H, Pringle M, et al. A systematic review and meta-analysis of the effects of antibiotic consumption on antibiotic resistance. *BMC Infect Dis*. 2014; 14: 13.
22. Hughes CM, McElnay JC, Fleming GF. Benefits and risks of self medication. *Drug saf*. 2001; 24: 1027-1037.
23. WHO. "Global action plan on antimicrobial resistance". 2015: 1-19.
24. World Health Organization. Investing to overcome the global impact of neglected tropical diseases: Third WHO report on neglected tropical diseases (2015). World Health Organization. 2015: 3.
25. Silva D, Correa MG, Soares MCF, Muccillo-Baisch AL. "Self-medication in university students from the city of Rio Grande, Brazil." *BMC Public Health*. 2012; 12: 339.
26. Rodrigues CF. "Self-medication with antibiotics in Maputo, Mozambique: practices, rationales and relationships." *Palgrave Commun*. 2020; 6: 1-12.
27. Auta A, Omale S, Folorunsho TJ, David S, Banwat SB, et al. "Medicine vendors: Self-medication practices and medicine knowledge." *North Am J Med Sci*. 2012; 4: 24-28.
28. Sarahroodi S, Maleki-Jamshid A, Sawalha AF, Mikaili P, Safaeian L, et al. "Pattern of self-medication with analgesics among Iranian University students in central Iran." *J Family Community Med*. 2012; 19: 125.
29. Ehigiator O, Azodo CC, Ehizele AO, Ezeja EB, Ehigiator L, et al. "Self-medication practices among dental, midwifery and nursing students." *Euro J General Dentistry*. 2013; 2: 54-57.
30. Abay SM, Amelo W. "Assessment of Self-medication practices among medical, pharmacy, health science students in Gondar University, Ethiopia". *J Young Pharm*. 2010; 2: 306-310.
31. Klemenc-Ketis Z, Hladnik Z, Kersnik J. "A cross sectional study of sex differences in self-medication practices among university students in Slovenia". *Coll antropol*. 2011; 35: 329-334.
32. Heidari M, Karaminejad R, Rezaei far M, Dastjerdi M, Rezaei E. "Determination of the most prevalent reasons for requesting drugs without prescription in Kerman pharmacies." *J Babol Univ Med Sci*. 1999; 1: 32-37.
33. Wun YT, Lam TP, Lam KF, Sun KS. "Antibiotic use: do parents act differently for their children?". *Int J Clin Pract*. 2012; 66: 1197-1203.
34. Pileggi C, Mascaro V, Bianco A, Pavia M. Over-the-counter drugs and complementary medications use among children in southern Italy. *Biomed Res Int*. 2015; 2015: 413912.
35. Jamhour A, El-Kheir A, Salameh P, Hanna PA, Mansour H. "Antibiotic knowledge and self-medication practices in a developing country: A cross-sectional study." *Am J Infect Control*. 2017; 45: 384-388.
36. Esan DT, Fasoro AA, Odesanya OE, Esan TO, Ojo EF, et al. Assessment of self-medication practices and its associated factors among undergraduates of a private university in Nigeria. *J Environ Public Health*. 2018; 2018: 5439079.
37. Lee C-H, Chang F-C, Hsu S-D, Chi H-Y, Huang L-J, et al. "Inappropriate self-medication among adolescents and its association with lower medication literacy and substance use." *PloS One*. 2017; 12: e0189199.
38. Lee C-H, Chang F-C, Hsu S-D, Chi H-Y, Huang L-J, et al. "Inappropriate self-medication among adolescents and its association with lower medication literacy and substance use." *PloS one*. 2017; 12: e0189199.
39. Jamhour A, El-Kheir A, Salameh P, Hanna PA, Mansour H. "Antibiotic knowledge and self-medication practices in a developing country: A cross-sectional study." *Am J Infect Control*. 2017; 45: 384-388.
40. Ayalew MB. "Self-medication practice in Ethiopia: a systematic review." *Patient Prefer Adherence*. 2017; 11: 401-413.
41. Mensah BN, Agyemang IB, Afriyie DK, Amponsah SK. "Self-medication practice in Akuse, a rural setting in Ghana." *Nigerian Postgraduate Med J*. 2019; 26: 189-194.
42. Noone J Christopher MB. "The value of self-medication: summary of existing evidence." *J Med Economics*. 2018; 21: 201-211.
43. Lei X, Jiang H, Liu C, Ferrier A, Mugavin J, et al. "Self-medication practice and associated factors among residents in Wuhan, China." *Int J Environ Res Public Health*. 2018; 15: 68.
44. Rahmawati R, Beata VB. "Self-medication among people living with hypertension: a review." *Family pract*. 2017; 34: 147-153.
45. Mortazavi SS, Shati M, Khankeh HR, Ahmadi F, Mehravaran S, et al. "Self-medication among the elderly in Iran: a content analysis study." *BMC geriatrics*. 2017; 17: 198.
46. Tuyishimire J, Okoya F, Adebayo AY, Humura F, Lucero-Prisno Lii DE. "Assessment of self-medication practices with antibiotics among undergraduate university students in Rwanda." *The Pan Afr Med J*. 2019; 33.
47. Limaye D, Fortwengel G, Limaye V, Krause G. "A systematic review of the literature to assess self-medication practices." *Annals of Medical and Health Sciences Research*. 2017.
48. Zhu X, Pan H, Yang Z, Cui B, Zhang D, et al. "Self-medication practices with antibiotics among Chinese university students." *Public health*. 2016; 130: 78-83.
49. Aziz MM, Masood I, Yousaf M, Saleem H, Ye D, et al. "Pattern of medication selling and self-medication practices: A study from Punjab, Pakistan." *PloS one*. 2018; 13: e0194240.
50. Ebrahimi H, Atashsokhan G, Amanpour F, Hamidzadeh A. "Self-medication and its risk factors among women before and during pregnancy." *Pan Afr Med J*. 2017; 27: 183.

51. Kaushal J, Gupta MC, Jindal P, Verma S. "Self-medication patterns and drug use behavior in housewives belonging to the middle income group in a city in northern India." *Indian J Community Med: official publication of Indian association of preventive & social medicine*. 2012; 37: 16-19.
52. Agbor MA, Clement CA. "Self medication for oral health problems in Cameroon." *Int dental J*. 2011; 61: 204-209.
53. Torres NF, Chibi B, Middleton LE, Solomon VP, Mashamba-Thompson TP. "Evidence of factors influencing self-medication with antibiotics in low and middle-income countries: a systematic scoping review." *Public health*. 2019: 168: 92-101.
54. Chang J, Qing W, Yu F. "Socioeconomic differences in self-medication among middle-aged and older people: data from the China health and retirement longitudinal study." *BMJ open*. 2017; 7.
55. Jamhour A, El-Kheir A, Salameh P, Hanna PA, Mansour H. "Antibiotic knowledge and self-medication practices in a developing country: A cross-sectional study." *Am J Infect Control*. 2017; 45: 384-388.
56. Pavyde E, Veikutis V, Maciuliene A, Maciulis V, Petrikonis K, et al. "Public knowledge, beliefs and behavior on antibiotic use and self-medication in Lithuania." *Int J Environ Res Public Health*. 2015; 12: 7002-7016.
57. Lv B, Zhou Z, Xu G, Yang D, Wu L, et al. "Knowledge, attitudes and practices concerning self-medication with antibiotics among university students in western China." *Trop Med Int Health*. 2014; 19: 769-779.
58. Shah SJ, Ahmad H, Rehan RB, Najeeb S, Mumtaz M, et al. "Self-medication with antibiotics among non-medical university students of Karachi: a cross-sectional study." *BMC Pharmacology and Toxicology*. 2014; 15: 74.
59. Al Rasheed A, Yagoub U, Alkhashan H, Abdelhay O, Alawwad A, et al. "Prevalence and predictors of self-medication with antibiotics in Al Wazarat health center, Riyadh City, KSA." *BioMed research international*. 2016.
60. Helal RM, Abou-ElWafa HS. "Self-medication in university students from the city of Mansoura, Egypt." *J Environ Public Health*. 2017.
61. Al Flaiti M, Al Badi K, Hakami WO, Khan SA. "Evaluation of self-medication practices in acute diseases among university students in Oman." *J Acute Disease*. 2014; 3: 249-252.