



# Prevalence of Self-Medication with Antibiotics amongst Clients Referred to Outpatient University Dental Clinics in Iranian Population: A Questionnaire-Based Study

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## ARTICLE INFO

Article Type: Original Article

Received: 08 Jul 2019

Revised: 02 Oct 2019

Accepted: 19 Oct 2019

Doi: 10.22037/iej.v15i1.24334

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## ABSTRACT

**Introduction:** Self-medication with antibiotics may increase the risk of inappropriate use and development of antibiotic-resistant bacteria. The aim of this study was to determine the prevalence of self-medication with antibiotics amongst dental outpatients in Iranian population. **Methods and Materials:** One thousand and two hundred of dentistry patients, who were referred to dental school clinics in ten major provinces of Iran, participated in this study. A valid self-administered questionnaire regarding self-medication with antibiotics in case of dental pain was used to collect data. Data were analysed using descriptive statistics and Logistic regression analysis. **Results:** In our study population, the prevalence of self-medication was 42.6%. Amongst the Iranian cities, the highest prevalence of self-medication with antibiotics belonged to the city of Bandar Abbas (64%) and the lowest was seen in the city of Kerman (27.3%). Men were more likely to take antibiotics. Amoxicillin was the mostly used antibiotic. Severe pain, previous self-mediations and high costs of dental visits were the most common reasons for self-medication with antibiotics in the investigated population. In addition, the present study showed that marriage, acceptable financial status and high level of education could decrease self-medication with antibiotics. **Conclusions:** In the current investigation, an alarming fact was that self-medication for dental problems seemed very common amongst the studied population. One of its most important consequences was bacterial resistance. Therefore, there should be plans to promote and prioritize public health awareness and encourage general public's motivation to reduce the practice of self-medication.

**Keywords:** Antibiotics; Dental Clinics; Prevalence; Self-medication

## Introduction

Self-medication (SM) is defined as patient's alternations in the use of medicaments without a physician's consultation/prescription or in the amount/duration of a prescribed medicine. It can also be described as getting drugs *via* self-diagnosis and regardless of the main disease [1, 2].

Nowadays, SM is a routine practice in many developing countries and is becoming a serious health issue all over the world [3, 4]. It has been found that up to 68% of the European

countries practice SM, while it is much higher in developing countries. A community-based study showed that 73.9% of Khartoum (Sudan) population have SM during a period of one month [5] whilst amongst Kuwaiti adolescents, the rate of SM reached 92% [6]. In the United Arab Emirates, 44% of people used antibiotics without doctor's consultation [7], and in India [8] and Nepal [9] the rate of SM was 31% and 59%, respectively. Such alarming statistics clarifies the fact that despite global limiting policies the prevalence of SM is dramatically on the rise [10]. The most prevalent self-

medicated antibiotics in the aforementioned research were cefixime, azithromycin, amoxicillin and penicillin.

The concern of SM became extremely noticeable when World Health Organization (WHO) changed some of the doctor-supervised drugs into over-the-counter (OTC) category, which could be sold without any prescription, in 1980s [11]. In the dental profession, one of the most common reasons that may lead to SM, is pain [12]. Beside toothache, there are many other causes that can reinforce SM; such as avoiding long waits in clinics [13], reducing costs especially in poor socioeconomic societies [14], having difficulties in gaining access to professional health care [3], lacking policies for feasible primary health care, having access to widespread OTC drugs and pharmaceutical information sources by means of internet and media [15, 16].

As mentioned above, there are various sources for acquiring information about medications. Existing studies suggest that most people practicing SM obtain knowledge from relatives, neighbours, friends, internet, media and even road side unqualified persons [17]. In many developing countries, a great number of people practice SM, and it seems that SM is on the rapid increase especially amongst dental patients with history of toothache [12]. Lack of awareness towards its adverse effects is a key factor in promoting SM. Furthermore, the effects of common perceptions about certain drugs such as antibiotics and pain killers could not be neglected [17]. As a matter of fact, dentists know that most patients, suffering from toothache, might have used antibiotics/analgesics to alleviate pain [14]. It is also notable that people are often not aware of drugs adverse effects; such as medicinal interactions, delayed appropriate treatments, missed diagnosis and increased risk of drug resistance; especially in antibiotics consumption [1], [12]. However, people might imagine that fewer physician visits and reduced costs could be advantageous [12]. Moreover, we should not overlook the importance of antibiotic-resistance, which is rapidly spreading around the world. Some major diseases could accompany SM practice [18], thus it is better to weigh and evaluate the drawbacks and benefits in advance.

There seems to be higher prevalence of SM in the Iranian community [19]. However, and to the best of our knowledge, there has been no study which evaluated SM for dental purposes. Therefore, the aim of this study was to determine the prevalence of self-medication practice with antibiotics in case of dental problems, in ten major provinces of Iran as a sample of Iranian population.

## Materials and Methods

This cross-sectional hospital-based study was conducted in 2018. Based on the expected prevalence of self-medication (80%) [18]

with accuracy of  $d=2.5\%$ , and confidence level of 95%, the volume of the study was calculated 120 individuals in each province.

People were randomly selected amongst literate men and women between 12-year and 80-year olds, attending outpatient health departments in the schools of dentistry in ten major provinces in Iran. Physicians, dentists and pharmacists were excluded from the study. Participants, who were uneducated or mentally disabled to give a valid response to questionnaires, were excluded from the study. The study was conducted in the schools of dentistry in the cities of Tehran, Shiraz, Mashhad, Esfahan, Ahvaz, Kerman, Yazd, Bandar Abbas, Zahedan and Tabriz. The study was explained and the individuals, who were satisfied, were chosen by convenience sampling methods, and then filled the questionnaire. Participants' demographic data, educational level and their SM habits were recorded.

This survey was carried out with a single page questionnaire which was validated *via* pretesting on a small group of 38 patients with Cronbach's alpha equivalent to 0.85; showing an acceptable level of reliability. In addition, the validity of the questionnaire content was approved by Waltz and Bausell method [20]. Participants, who were asked to fill in the questionnaire, were informed that they were part of an investigation, and their personal information would remain confidential. Incomplete filled-in questionnaires were excluded from the study.

The questionnaire composed of 5 major sections. First section investigated demographic information while the second section probed participants' health status including questions about smoking, frequency of getting physical and routine medical checkups. Next section asked for taken antibiotics in case of toothache (whether the antibiotic was prescribed or self-prescribed), dosage of the taken antibiotics and their duration of use. The fourth section consisted of questions concerning the use of antibiotics without prescription; *i.e.* exploring sources, causes and the prevalence of SM with antibiotics when having toothache. The last section inspected possible side effects of antibiotics. The main purpose of the questionnaire was to determine the level of public awareness in this regard.

Data were analysed using SPSS software (SPSS version 22, SPSS Inc., Chicago, IL, USA), and were reported as mean  $\pm$  standard deviation (SD) and studied descriptively. Logistic regression was used to analyze the variables simultaneously. In all statistical analysis,  $P<0.05$  was considered significant.

## Results

A total number of 1200 participants completed the questionnaire, consisting of 490 men and 710 women. The prevalence of SM was 42.6% in our study population. The

highest prevalence of SM belonged to the city of Bandar Abbas (64%), followed by Zahedan (57%) and Ahvaz (53%). There were no significant differences in SM habit amongst them. However, there was significant differences between Bandar Abbas and the following cities; Tehran, Shiraz, Mashhad, Esfahan, Tabriz and Kerman (Table 1). The lowest SM practice was related to the city of Kerman (27.3%). Logistic regression analysis revealed that there were no statistically significant differences amongst gender, marital status, educational level and economic conditions in different cities. The only statistically significant variable was age ( $P=0.007$ ).

The present study showed that marriage, better financial status and educational level can decrease SM habit. SM was negatively associated with the number of family members. However, none of them were statistically significant amongst cities.

The Relation between health awareness and SM showed that SM practice was lower in non-smokers and participants

who did routine exercise/medical checkups, nevertheless, the difference was not statistically significant. In addition, although SM practice was more commonplace in men, the difference was not significant between men and women.

In the present study, 36% of participants recommended their prescribed antibiotic to other people. Sources of providing antibiotics amongst participants were as follows: pharmacies with prescription (44.8%), pharmacies without prescription (42.6%), home left medications (9.6%), family/friends (3%).

Table 2 shows the main reasons for taking antibiotics as SM practice in case of dental pain. When asked about types of antibiotics, dental pain was mostly treated by amoxicillin (16.4%), followed by metronidazole (4.2%), cefixime (2.7%), azithromycin (2.2%), penicillin (1.7%). Of the questioned participants, 1.1% claimed that they had used dexamethasone for the treatment of dental pain.

**Table 1.** Logistic regression analysis of self-medication habit amongst cities in comparison with the city of Bandar Abbas, which had the highest prevalence. The significance was set at 0.05

City	B	S.E.	Wald	df	P-value	Exp (B)
Tehran	0.804	0.297	7.336	1	0.007	2.234
Shiraz	1.252	0.307	16.644	1	0.000	3.499
Mashhad	1.224	0.326	14.090	1	0.000	3.399
Esfahan	1.287	0.330	15.235	1	0.000	3.623
Ahvaz	0.647	0.329	3.877	1	0.059	1.910
Kerman	1.116	0.334	11.178	1	0.001	3.053
Yazd	0.965	0.352	7.507	1	0.006	2.626
Zahedan	0.436	0.308	2.012	1	0.156	1.547
Tabriz	0.999	0.342	8.511	1	0.004	2.714

B: Regression Coefficient; S.E: Standard Error; Wald: Wald's T statistic; df: Degree of Freedom; Exp.B or Odd Ratio( OR)

**Table 2.** Reasons for self-medication with antibiotics in case of dental pain in major Iranian cities

Reasons	Frequency
Expressing severe pain	35.30%
Having Experienced previous similar signs/symptoms	15.90%
High costs of dental visits/appointments	13.50%
Efficient previous self-medication	10.60%
Over the counter medications	10.60%
Having no access to dentists	8.90%
Time-consuming dental visits/appointments	8.40%
Unwilling to pay for dental visits/appointments	6.70%
Consulting with friends	6.60%
Ignoring the disease	6.20%
Lacking trust in dentists	4.70%
Lacking trust in non-medication treatments	4.70%
Believing in side-effects of medications	1.90%

## Discussion

Self-medication has become a critical issue in the societies where people, based on their own information/awareness or a friend's advice, tend to manage their maladies. The aim of this study was to determine the prevalence of taking self-prescribed antibiotics due to dental problems, next to investigating factors contributing to SM practice in Iranian population. This practice had a prevalence of 42.6% in our study population. SM can vary from one place to another, depending on the people's awareness in the study population, culture, knowledge and laws of pharmacies. In Iran, the prevalence of SM is higher than that of India (34.5%) and China (32.5%) [21]. Our result was close to Nigeria (42%) [12] and several European countries; *i.e.* France (46.1%) [22], Spain (48%) [23] and Turkey (45%) [24]. On the other hand, there was a significant difference when our findings were compared with Pakistan (70.8%) [14] and Sudan, in which both countries showed a much higher prevalence of (81.8%) [25] and (73.9%) [5]. The most prevalent self-medicated antibiotics in the aforementioned research were cefixime, azithromycin, amoxicillin and penicillin.

Previous studies conducted in Iran, have shown similar results; 43.7% irrational use of antibiotics amongst high school and faculty members [26], 42.2% and 48% amongst Iranian medical and non-medical students, respectively [27]. However, these rates exhibited the prevalence of SM amongst educated groups, and besides, were not specified solely to the antibiotic consumption due to dental pains. To the best of our knowledge, there has been no available data regarding SM as a result of dental problems. Therefore, our result showed that SM practice was rather prevalent in Iran. Our results indicate that in Iran, SM practice was higher in men; however, there was not a significant difference in the prevalence of SM between men and women. Moreover, it was found that SM was lower in both graduated and married participants, and also in better financial status. It proved that marriage, being well-off and education could play an important role in decreasing SM. A study conducted in Pakistan exhibited that only 28.4% of graduates had practiced SM and thus, it showed that higher level of knowledge could be a preventive factor for practicing self-medication [14].

On the contrary, there are other investigations which showed that "non-doctor" treatments were more prevalent in groups with higher education [3, 28, 29]. The studies show that people with higher education have some ideas concerning the cause and origin of their dental pain and thus, it accounts for more tendency to take non-prescribed medications. Hence, it is not apparent whether higher level of education could lead to self-medication practice or not.

The present study demonstrated that people who did not smoke and had routine physical exercise or medical checkups, showed less SM practice. It can be assumed that better health status led to better knowledge/awareness or in other words, people with higher score of knowledge/awareness had better health status. It was revealed that people who cared about their health, used SM less than others.

Owing to the present results, it was seen that men, compared with women, were more likely to provide their antibiotics for dental problems without prescription. The main reason for this finding could be their busy work schedule and slow consultation process in Iran [1]. Another reason for the medicinal overuse was that antibiotics were widely available in private pharmacies as OTC drugs.

Similar to a result reported in Iran [27], in Nigerian and Jordanian population [1, 28], the most common antibiotic used in SM practice was amoxicillin. It could be assumed that amoxicillin was popular amongst people [1, 28]. However, possible bacterial resistance towards amoxicillin could become a serious issue in the near future.

Moreover, the current study revealed that the most prevalent reason for practicing SM was dental pain, followed by the experience of the pain while taking previously prescribed drugs. Such approach could cause temporary relief of pain without the need to refer to a dental professional. Nevertheless, people's awareness towards the side effects of taking self-prescribed antibiotics could have impact on the reduction of SM practice [9]. In our sample society, more than 65% of the participants believed that there were no side-effects for antibiotics. It can be concluded that informing people about the possible side effects of antibiotics could be a preventive measure for practicing SM.

It should be noted that the population of our investigation to be valid enough so as to evaluate the prevalence of SM and its contributing factors, was considered larger than previous studies.

Furthermore, there were restrictions in our study which led to the need for further research in this field. One limitation of our study was that the questionnaires were based on self-reports of the patients without any validity checking. Furthermore, despite the fact that the current study covered ten major provinces in Iran, it was hospital-based and might not include all social backgrounds.

## Conclusion

The disturbing fact is that the "Self-Medication" practice for dental problems is very common amongst Iranians. One of its most significant consequences is the bacterial resistance towards antibiotics, an issue which needs to be addressed and prevented

by setting strict regulations and increasing public awareness. Therefore, there should be plans and protocols to *a)* promote public health information/awareness, *b)* give such promotion a high priority and *c)* motivate patients to minimize the practice of self-medication.

## Acknowledgement

The authors of this manuscript wish to thank the vice-chancellor of “Shiraz University of Medical Sciences” for supporting the research (grant no: 97-01-09-8628). The authors would also like to thank Dr. M. Vosoughi, Dental Research Center, School of Dentistry for her/his statistical analysis.

Conflict of Interest: ‘None declared’.

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*Please cite this paper as:* Emad S, Abedi SH, Dehghani Z, Ghahramani Y. Prevalence of Self-medication with Antibiotics amongst Clients Referred to Outpatient University Dental Clinics in Iranian Population: A Questionnaire-based Study. *Iran Endod J.* 2020;15(1): 1-5. *Doi:* 10.22037/iej.v15i1.24334.