Int J High Risk Behav Addict. 2026 June; 15(2): e170404 https://doi.org/10.5812/ijhrba-170404

Published Online: 2026 June 13 **Research Article**

Patients' Attitude and Behavior Toward Antibiotic Self-medication for Toothache

Narges Farhad-Mollashahi [1], Abolfazl Payandeh [2], Farzaneh Kazemi [3,*]

[1] Oral and Dental Disease Research Center, Zahedan University of Medical Sciences, Zahedan, Iran
[2] Department of Epidemiology and Biostatistics, School of Health, Health Promotion Research Center, Zahedan University of Medical Sciences, Zahedan, Iran
[3] School of Dentistry, Zahedan University of Medical Sciences, Zahedan, Iran

[*] ***Corresponding Author:*** School of Dentistry, Zahedan University of Medical Sciences, Zahedan, Iran. Email: farzaneh.kazemi2001@gmail.com

Received: 15 February, 2026; **Revised:** 28 May, 2026; **Accepted:** 2 June, 2026

Abstract

Background: Self-medication with antibiotics for dental pain, particularly in developing countries, is associated with easy access to these medications and limited patient awareness of adverse effects. This behavior may contribute to antimicrobial resistance and potential complications.

Objectives: This study aimed to evaluate patients' attitudes toward antibiotic self-medication for dental pain and to estimate the prevalence of this behavior.

Methods: This cross-sectional study included 380 patients aged > 18 years who attended the Dental School of Zahedan, southeast Iran, in 2024. Data were collected using a self-report questionnaire comprising 3 sections: demographic information, attitudes toward antibiotic self-medication, and the prevalence of antibiotic self-medication. Data were analyzed using SPSS version 24, descriptive statistics, and the chi-square test, with a significance level of 0.05.

Results: The mean attitude score was 27.52 ± 5.12, corresponding to a moderate level in 69.5% of participants. Overall, 71.3% of patients had attempted antibiotic self-medication at least once. Self-medication on more than one occasion was reported in 51.8% of cases. Attitudes differed significantly according to sex, age, education, income, and insurance history ($P < 0.05$).

Conclusions: The moderate patient attitudes and the high prevalence of antibiotic self-medication in the studied sample emphasize the need for educational interventions and policy measures to increase public awareness and prevent indiscriminate access to antibiotics. Regular educational programs for patients and physicians, along with stricter regulations on antibiotic dispensing, are recommended.

Keywords: Attitude, Antibiotics, Dental Pain, Self-medication

1. Background

Self-medication is a major health, social, and economic problem in many countries, including Iran. According to estimates by the World Health Organization, approximately 40% of treatment costs are allocated to self-medication (1, 2). Self-medication refers to behavior in which an individual attempts to manage a health problem without professional advice or intervention (3).

Multiple factors contribute to the occurrence and continuation of this behavior, including easy access to medications, high visit costs, lack of health insurance, insufficient awareness of adverse drug effects, limited access to health services, and long waiting times at treatment centers. In Iran, severe pain, prior self-medication, and the high cost of dental services have been reported as the most important causes of arbitrary antibiotic use (4). In addition, based on a content analysis of social networks, many people resort to arbitrary antibiotic use because of dental anxiety and the high cost of treatment (5).

Systematic reviews indicate that economic and cultural barriers, the high cost of dental treatments, and

How to Cite: Farhad-Mollashahi N, Payandeh A, Kazemi F. Patients' Attitude and Behavior Toward Antibiotic Self-medication for Toothache. Int J High Risk Behav Addict. 2026;15(2):e170404. doi: https://doi.org/10.5812/ijhrba-170404

the misconception that oral and dental problems are not serious are among the main factors contributing to self-medication (6). Incorrect attitudes and beliefs also play an important role in this behavior. In one study, 35.4% of participants believed that antibiotics should be taken before dental procedures, and 19.7% stated that they would lose trust if the dentist did not prescribe antibiotics (7).

The prevalence of self-medication for toothache has varied widely across studies, ranging from 6.5% to 100%, and is higher in developing countries, including India and the United Arab Emirates (6). In the Middle East, the prevalence of antibiotic self-medication has ranged from 19% to 82%, and factors such as age, sex, educational level, and income play determining roles (8). In Iran, more than 42.6% of dental clients have reported antibiotic self-medication; men have a higher tendency toward this behavior, whereas marriage, good financial status, and higher education reduce its likelihood (4).

Irrational and arbitrary antibiotic use can have wide-ranging consequences, including microbial resistance, inadequate dose and treatment duration, unwanted adverse effects, increased pathogenicity and mortality, prolonged hospitalization, and adverse environmental outcomes. Antibiotic resistance causes approximately 700000 deaths annually, and this number is predicted to reach approximately 10 million by 2050 if inappropriate antibiotic use continues (7).

2. Objectives

Given the high prevalence of arbitrary antibiotic use and its widespread complications, this study was designed to assess patients' attitudes toward antibiotic self-medication for toothache among clients referred to the dental faculty in Zahedan, thereby providing a basis for planning and implementing effective interventions to reduce this behavior.

3. Methods

3.1. Participants and Setting

The population of this cross-sectional study comprised all patients who visited various departments of the Dental School of Zahedan, southeast Iran, in 2024. The inclusion criteria were age 18 years or older, willingness to participate, and the ability to complete the questionnaire independently. Patients with incomplete questionnaires were excluded.

3.2. Sample Size and Sampling Method

Based on a 95% confidence level ($\alpha = 0.05$), an expected prevalence of 50%, and a margin of error of 0.05, the minimum required sample size was calculated as 385 participants using the standard sample size formula for proportions. In total, 385 eligible patients were selected using nonprobability convenience sampling from literate individuals aged 18 years or older who attended the clinics during the study period.

3.3. Data Collection Instruments

Data were collected using a self-administered questionnaire comprising 4 sections:

1) Demographic information, including age, sex, marital status, educational level, income, and insurance status.

2) Attitude toward antibiotic self-medication, assessed using a validated Likert-scale questionnaire developed based on previous studies by Emad et al., Er, and Abu-Mostafa (4, 7, 9). Scores ranged from 1 ("strongly disagree") to 5 ("strongly agree") on a 5-point scale.

3) Prevalence of antibiotic self-medication, measured using 4-choice frequency items. Scores ranged from 1 ("always") to 4 ("never") on a 4-point scale: never, occasionally, often, and always.

4) Types of antibiotics previously used for self-medication for dental pain, collected using open-ended items and categorized after coding.

Content validity was confirmed by 10 dental experts specializing in endodontics, pediatric dentistry, and orthodontics, using the content validity index (CVI = 92.6) and content validity ratio (CVR = 87.0). Internal consistency was acceptable, with Cronbach alpha values of 0.74 and 0.81 for the main subscales.

3.4. Procedure

Eligible participants were informed about the study objectives and invited to complete the anonymous questionnaire after providing written informed consent. Questionnaires were completed individually in the waiting area and returned to the researcher. No personal identifiers were collected, and confidentiality was maintained throughout the study.

3.5. Ethical Considerations

The study was approved by the Ethics Committee of Zahedan University of Medical Sciences (IR.ZAUMS.REC.1403.220) and conducted in accordance with the National Guidelines for Research Ethics involving human participants in Iran. Participation was

voluntary, and refusal or withdrawal had no consequences for treatment access.

3.6. Statistical Analysis

Data were analyzed using the Statistical Package for Social Sciences (SPSS) version 24. Descriptive statistics, including the mean, standard deviation, frequency, and percentage, were calculated for demographic variables and questionnaire scores. The chi-square test was used to examine associations between the prevalence of self-medication and demographic characteristics. A significance level of 0.05 was considered statistically significant.

4. Results

A total of 380 eligible patients who met the inclusion criteria were enrolled. Female participants constituted 72.1% of the sample. Nearly half of the participants (49.7%) were aged 20 - 35 years, whereas the smallest proportion were aged 52 - 67 years (4.7%). Overall, 65.0% reported low income, and 69.2% had a diploma or university education. Only 19.5% were single.

The mean attitude score was 27.52 ± 5.12 (range, 13 - 39).

Regarding attitude levels, 116 participants (30.5%) had a good attitude toward avoiding antibiotic self-medication, 264 (69.5%) had a moderate attitude, and no participants had a poor attitude (Table 1). Therefore, the poor-level column was omitted from Table 2.

As shown in Table 2, attitude scores were significantly associated with all examined variables, including sex, age, educational level, income, marital status, and insurance status, based on the chi-square test (P = 0.001).

A higher proportion of women than men had a good attitude (32.8% vs 24.5%), and no participants in either group reported a poor attitude. The 36 - 51-year age group had the highest proportion with a good attitude (34.1%), whereas the 20 - 35-year and 52 - 67-year groups had similar proportions (27.5% and 27.8%, respectively).

A good attitude was more common among participants with a university education (45.7%) than among those with a diploma (25.0%) or below-diploma education (20.5%), indicating a more positive attitude with higher educational attainment. Participants whose income was equal to or greater than living expenses showed a higher proportion with a good attitude (37.5% - 38.0%) than those with income below living costs (24.0%).

Married participants showed a higher proportion with a good attitude than single participants (31.5% vs 27.0%); participants without a spouse (divorced or widowed) showed a similar proportion to single participants (28.6%).

Across insurance types and statuses, including KHADAMAT-DARMANI, TAMIE-EJTEMAEI, military insurance, other types, and no insurance, participants with military insurance had the highest proportion with a good attitude (70%), whereas those without insurance had the lowest proportion with a good attitude (4.3%). Participants with other types of insurance showed a moderate attitude.

Table 3 shows variability in adherence to appropriate antibiotic use among dental patients. Approximately 45.3% reported always following the prescribed dosing frequency, and nearly half reported observing the interval between doses. In contrast, only 36.3% reported always completing the full antibiotic course despite partial pain relief. Adherence to the exact dosing time and reading medication instructions were also limited; 32.1% reported that they always read and understood the package instructions.

Only 36.6% reported never recommending antibiotics to others without a dentist's consultation for toothache. Moreover, 37.4% reported that they sometimes self-medicated with antibiotics before undergoing dental procedures.

Table 4 presents the frequency of self-medication episodes among the participants. Overall, 271 individuals (71.3%) reported self-medicating with antibiotics for toothache; among them, 37.9% reported doing so 2 - 5 times. The most frequently used antibiotics were amoxicillin (41.2%), amoxicillin plus metronidazole (16.1%), and metronidazole alone (10.1%).

5. Discussion

In many societies, individuals obtain medications without consulting a physician and practice self-medication; inappropriate antibiotic use for toothache is a common example. This study assessed the prevalence of antibiotic self-medication for toothache among clients of Zahedan Dental School and examined the demographic and attitudinal factors associated with this behavior.

In this study, attitude was measured using a researcher-developed questionnaire with acceptable psychometric properties (Cronbach alpha = 69.1; CVI = 92.6; CVR = 87.0). Scores of 11 - 25 were classified as a good attitude, 26 - 40 as a moderate attitude, and 41 - 55 as a poor attitude toward avoiding antibiotic self-medication. Prevalence was assessed using a researcher-

Table 1. Attitude Level Toward Antibiotic Self-Medication for Toothache Among Patients Attending Zahedan Dental School, 2024

Attitude Levels	No. (%)
Good (11-25)	116 (30.5)
Moderate (26 - 40)	264 (69.5)
Poor (41 - 55)	0 (0.0)
Total	380 (100)

Table 2. Attitude Level Toward Avoiding Antibiotic Self-Medication for Toothache Among Patients Attending Zahedan Dental School, Stratified by Sex, Age, Educational Level, Income, Marital Status, and Insurance Status [a, b]

Variables and Groups	Values	Good Attitude	Moderate Attitude
Gender			
Male	106	26 (24.5)	80 (74.5)
Female	274	90 (32.8)	184 (67.2)
Age (y)			
20 - 35	189	52 (27.5)	137 972.5)
36 - 51	173	59 (34.1)	114 (65.9)
52 - 67	18	5 (27.8)	13 (72.2)
Educational level			
Below diploma	117	24 (20.5)	93 (79.5)
Diploma	136	34 (25)	102 (75)
University education	127	58 (45.7)	69 (54.3)
Income status			
Higher than expenses	21	8 (38)	13 (62)
Equal to expenses	112	42 (37.5)	70 (62.5)
Lower than expenses	274	66 (24)	181 (76)
Marital status			
Single	74	20 (27)	54 (73)
Married	292	92 (31.5)	200 (68.5)
Without a spouse	14	4 (28.6)	10 (71.4)
Insurance status	24	17 (70)	7 (30)
Military insurance			
Without insurance	23	1 (4.3)	22 (95.7)

[a] Values are expressed as No. or No. (%).

[b] Poor attitude in all variables = 0. In all comparisons below, P value = 0.001. Total N = 380.

developed questionnaire with acceptable reliability and validity (Cronbach alpha = 74.6; CVI = 94.0; CVR = 98.0).

In the present study, 30.5% of participants demonstrated a good attitude and 69.5% demonstrated a moderate attitude toward avoiding antibiotic self-medication; no participant exhibited a poor attitude. Participants in the 36 - 51-year age group demonstrated a more favorable attitude toward avoiding antibiotics than those in the other age groups, whereas attitudes were similar in the 20 - 35-year and 52 - 67-year groups. Moreover, higher education, being married, and better financial status were associated with a more positive attitude toward avoiding antibiotic use for toothache, suggesting that socioeconomic well-being, educational attainment, and marital status may contribute to reducing antibiotic self-medication.

These findings are consistent with previous studies conducted in Iran (4) and Turkey (10). In contrast, Butt and colleagues in Pakistan reported higher rates of self-medication among individuals with higher educational attainment, attributing this behavior mainly to time constraints and the perception that the condition was minor (11).

In the present study, 109 participants (28.7%) reported never self-medicating with antibiotics, whereas 74 (19.5%) reported 1 episode, 144 (37.9%) reported 2 - 5

Table 3. Responses to Items on Antibiotic-Use Practices for Toothache (N = 380) [a]

Question	Never	Rarely	Sometimes	Always
Do you take the daily doses of antibiotics according to the dentist's prescription?	25 (6.6)	30 (7.9)	153 (4.3)	172 (45.3)
Do you continue taking antibiotics until completion, even after partial relief of tooth pain, according to the dentist's advice?	43 (11.3)	56 (14.7)	43 (37.6)	138 (36/3)
Do you know the exact timing for taking antibiotics, and do you adhere to it?	26 (6.8)	98 (25.8)	192 (50.5)	64 (16.8)
Do you read the written instructions on antibiotics, and are those instructions understandable to you?	22 (5.8)	38 (10)	198 (52.1)	122 (32.1)
During toothache, have you recommended antibiotics to friends or relatives without a dentist's prescription?	139 (36.6)	87 (22.9)	130 (34.2)	24 (6.3)
Do you self-medicate with antibiotics before dental procedures?	99 (26.1)	94 (24.7)	142 (37.4)	45 (11.8)

[a] Values are expressed as No. (%).

Table 4. Frequency and Percentage Distribution of the Number of Antibiotic Self-Medication Episodes (N = 380)

Self-medication	No. (%)
Never	109 (28.7)
Once	74 (19.5)
2 - 5 times	144 (37.9)
More than 5 times	53 (13.9)

episodes, and 53 (13.9%) reported more than 5 episodes. Overall, the prevalence of antibiotic self-medication was 71.3%. This rate differs markedly from that reported by Emad et al. in several Iranian cities (42.6%) (4), which may reflect changes in economic conditions, such as inflation and reduced household welfare, as well as the restriction of the current sample to a single treatment center.

Two studies from Nigeria have reported varying rates of self-medication for toothache. In one study, 30.4% of participants reported antibiotic self-medication (12). In another, the overall prevalence of self-medication was 80.6%, with 23.5% specifically attributable to antibiotic self-medication (13).

In the present study, approximately half of the participants reported that the instructions on antibiotic packaging and the exact dosing schedule were largely understandable, which may reduce the perceived need for dental consultation and encourage self-medication.

Approximately half of the participants (45%) reported always adhering to the prescribed dosing frequency and interval between doses, and 37.6% reported completing the antibiotic course as recommended, even after partial relief of toothache. These findings suggest that many patients follow dentists' instructions and that the high prevalence of antibiotic self-medication in this population is less likely to be driven by distrust in dental professionals.

The most frequently used antibiotics were amoxicillin (41.2%), amoxicillin plus metronidazole (16.1%), and metronidazole alone (10.1%). Consistent with our findings, an Iranian study also reported higher use of amoxicillin and metronidazole compared with other antibiotics (4). In studies by Tran TTN and Dar-Odeh (14), amoxicillin was likewise the most commonly used antibiotic. Such repeated and widespread use may increase selection pressure for resistance, potentially reducing the future effectiveness of amoxicillin and warranting concern.

5.1. Conclusions

Although participants' attitudes toward antibiotic self-medication were generally moderate, more than 70% reported having used antibiotics without a prescription at least once for toothache. This coexistence of a non-negative attitude with a highly prevalent behavior may reflect prior perceived treatment success, recommendations from others, such as family members or pharmacists, and easy access to antibiotics without a prescription.

Education was significantly associated with attitude, with higher educational attainment linked to a more critical view of arbitrary antibiotic use, underscoring the need for public education and targeted messaging for groups with lower educational attainment. Moreover, income level and insurance coverage

appeared protective, as individuals with better financial status and insurance were less likely to self-medicate.

5.2. Suggestions

Educational workshops and seminars should be implemented in clinics and pharmacies to improve public awareness of antibiotic resistance and adverse effects. Collaboration with mass media and social networks is also recommended to deliver clear and engaging health messages. Stricter regulations on nonprescription antibiotic sales should be enforced, supported by continuous monitoring by the Food and Drug Organization. Dentists' role in patient counseling should also be strengthened, with an emphasis on appropriate management and nonantibiotic alternatives, such as analgesics and nonpharmacological approaches.

5.3. Limitations

This study was conducted in a single educational center, which limits generalizability. Data were collected through self-report, which may be affected by recall bias and social desirability bias. In addition, the sample was imbalanced by sex, with fewer men, and included relatively few participants in the 52 - 67-year age group compared with other age groups.

5.4. Suggestions for Future Research

Multicenter comparative studies across different cities, as well as interventional studies evaluating the effectiveness of educational programs, are recommended to strengthen the evidence base and guide practical strategies.

Acknowledgements

The authors would like to express their sincere appreciation to the patients who generously participated in this study, whose cooperation made this research possible. We also extend our gratitude to the faculty members, clinical staff, and support personnel of the Dental University for their invaluable assistance, dedication, and professionalism throughout this work.

This paper is the result of a dentistry student thesis.

Footnotes

AI Use Disclosure: For the purpose of Text Editing, the Chatgpt was used Moderate in the Discussion section.

Authors' Contribution: N. F. M. contributed to the study concept and design, critical revision of the manuscript for important intellectual content, administrative, technical, and material support, and study supervision. F. K. contributed to data acquisition and drafting of the manuscript. A. P. contributed to data analysis and interpretation and statistical analysis. All authors read and approved the final manuscript.

Conflict of Interests Statement: The authors do not declare any conflicts of interests for this study.

Data Availability: The dataset presented in the study is available on request from the corresponding author during submission or after publication.

Ethical Approval: This study was approved by the Ethics Committee of Zahedan University of Medical Sciences under the ethical approval code IR.ZAUMS.REC.1403.220.

Funding/Support: No funding was received for this study.

Informed Consent: Written informed consent was obtained from all participants prior to enrollment in the study. Participants were informed about the study objectives, procedures, voluntary nature of participation, and their right to withdraw at any time without any consequences for their treatment. Confidentiality and anonymity of the collected data were assured.

References

1. Azami-Aghdash S, Mohseni M, Etemadi M, Royani S, Moosavi A, Nakhaee M. Prevalence and cause of self-medication in Iran: a systematic review and meta-analysis article. *Iranian journal of public health*. 2015;**44**(12):1580. https://doi.org/10.22038/IJPH.2015.6016.
2. Behroozpour A, Shams M, Mousavi M, Ostovar R. Application of the Health Belief Model to Change Women's Self-Medication Behavior regarding Prescription-Only Medicines in Yasuj City, Iran. *The Journal of Tolooebehdasht*. 2019. https://doi.org/10.18502/tbj.v18i5.2271.
3. Aljinović-Vučić V. Self-Medication as a Global Health Concern: Overview of Practices and Associated Factors-A Narrative Review. *Healthcare (Basel)*. 2025;**13**(15):1872. [PubMed ID: 40805905]. [PubMed Central ID: PMC12346020]. https://doi.org/10.3390/healthcare13151872.
4. Emad S, Abedi S, 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. *Iranian Endodontic Journal*. 2020;**15**(1):1-5. [PubMed ID: 36704324]. [PubMed Central ID: PMC9723210]. https://doi.org/10.22037/iej.v15i1.24334.
5. Emmott R, Barber SK, Thompson W. Antibiotics and toothache: a social media review. *International Journal of Pharmacy Practice*. 2021;**29**(3):210-7. [PubMed ID: 33880539]. https://doi.org/10.1093/ijpp/riaa024.

6. Figueiredo MS, Nepomuceno AFSF, Castro CTD, Gama RS, Oliveira MG. Self-medication associated with toothache: a systematic literature review. *Revista Ciência Plural*. 2023;**9**(3):1-20. https://doi.org/10.21680/2446-7286.2023v9n3ID33232.
7. Er N. Knowledge and behavior of dentistry patients about the use and misuse of antibiotics: A cross-sectional study. *Selcuk Dental Journal*. 2022;**9**(3):753-62. https://doi.org/10.15311/selcukdentj.1033705.
8. Alhomoud F, Aljamea Z, Almahasnah R, Alkhalifah K, Basalelah L, Alhomoud FK. Self-medication and self-prescription with antibiotics in the Middle East-do they really happen? A systematic review of the prevalence, possible reasons, and outcomes. *International journal of infectious diseases*. 2017;**57**:3-12. [PubMed ID: 28111172]. https://doi.org/10.1016/j.ijid.2017.01.014.
9. Abu-Mostafa NA, Al-Mejlad NJ, Al-Yami AS, Al-Sakhin FZ, Al-Mudhi SA. A survey of awareness related to the use of antibiotics for dental issues among non-medical female university students in Riyadh, Saudi Arabia. *Journal of infection and public health*. 2017;**10**(6):842-8. [PubMed ID: 28245964]. https://doi.org/10.1016/j.jiph.2017.01.005.
10. Ilhan MN, Durukan E, Ilhan SÖ, Aksakal FN, Özkan S, Bumin MA. Self-medication with antibiotics: questionnaire survey among primary care center attendants. *Pharmacoepidemiology and drug safety*. 2009;**18**(12):1150-7. [PubMed ID: 19827009]. https://doi.org/10.1002/pds.1829.
11. Butt H, Liaqat S, Aqsa, Khan AN, Khan NR, Tahir F. Association of Sociodemographic Factors with Trends of Self-Medication Practice and Its Hazard Perception for Oral Health Problems among Patient. *Journal of Gandhara Medical & Dental Sciences (JGMDS)*. 2022;**9**(2):43-50. https://doi.org/10.37762/jgmds.9-2.159.
12. Afolabi AO, Akinmoladun VI, Adebose IJ, Elekwachi G. Self-medication profile of dental patients in Ondo State, Nigeria. *Nigerian Journal of Medicine*. 2010;**19**(1):96-103. [PubMed ID: 20232763]. https://doi.org/10.4314/njm.v19i1.52488.
13. Heydari H, Kamran A, Ahari S, Biria M, Malepour A. Toothache and self medication practices: a study of patients attending a Niger delta tertiary hospital in Nigeria. *Annals of medical and health sciences research*. 2014;**4**(6):884-8. [PubMed ID: 25506487]. [PubMed Central ID: PMC4250992]. https://doi.org/10.4103/2141-9248.144914.
14. Dar-Odeh N, Othman B, Bahabri RH, Alnazzawi A, Borzangy S, Fadel HT, et al. Antibiotic self-medication for oral conditions: Characteristics and associated factors. *Pesqui bras odontopediatria clín integr*. 2018;**18**(1):1-10. https://doi.org/10.4034/PBOCI.2018.181.61.