

Self-Medication With Antimicrobials Among Dental Healthcare Students: Behaviours and Perspectives

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ABSTRACT

Background: Antimicrobial resistance (AMR) is a growing global public health concern associated with the overuse and misuse of antimicrobial drugs, including antibiotics. Self-medication with antimicrobials is a common practice that can contribute to AMR. This study investigates the prevalence of self-medication with antimicrobials among dental healthcare students, their behaviors, and perspectives on this practice.

Methods: A cross-sectional study was conducted among dental students in Chennai, India. A structured questionnaire was used to collect data on self-medication practices, knowledge, and attitudes related to antimicrobial drug use. Data were analyzed using descriptive statistics.

Results: Of the participants, 61.3% admitted to self-medication with antimicrobials. While 76.8% correctly identified antimicrobial drugs, 47.4% believed these drugs should only be used with a doctor's prescription. Views on the relationship between AMR and self-medication varied. Knowledge of synergistic antibiotics and sulfa drugs was mixed. Commonly self-medicated antibiotics included Penicillin (28.6%) and Metronidazole (12.1%). Participants had mixed opinions on self-medication for self-healthcare, with 47.2% considering it a fair practice

Conclusion: This study reveals a complex landscape of self-medication with antimicrobials among dental healthcare students, with varying levels of understanding, practices, and awareness. Targeted educational initiatives are needed to promote responsible antimicrobial use, reduce unnecessary self-medication, and address knowledge gaps to combat AMR effectively.

Keywords: Antimicrobial resistance, self-medication, dental students, antibiotics, knowledge, attitudes.

INTRODUCTION

Antimicrobials, such as antibiotics, are essential medications for the treatment of bacterial infections.¹ However, their overuse and misuse can lead to the development of antimicrobial resistance (AMR), which

is a serious global public health threat. AMR occurs when bacteria develop the ability to defeat the antimicrobials that are used to treat them. This can make infections more difficult to treat, and can even lead to death.² Self-medication is the use of medications without a prescription from a healthcare professional. It is a common practice worldwide, and antimicrobials are one of the most commonly self-medicated types of medications. Self-medication with antimicrobials can be dangerous, as it can lead to the development of AMR, as well as other adverse effects. The study of self-medication of antimicrobials among dental students is important for a number of reasons. First, it can help to identify the prevalence and factors associated with self-medication in this group. Second, it can help to develop interventions to reduce self-medication and promote the rational use of antimicrobials. Third, it can contribute to the understanding of the overall problem of self-medication with antimicrobials in the community.³ This study aims to investigate the prevalence of self-medication with antimicrobials among dental healthcare students, as well as their behaviours and perspectives on this practice. The findings of this study will be used to develop interventions to reduce self-medication with antimicrobials among dental healthcare students and contribute to the global effort to combat AMR.

MATERIALS AND METHODS

This study employed a cross-sectional research design to explore the practices of self-medication with antimicrobial drugs among dental students. The investigation took place at a private dental college in Chennai and encompassed students from different academic years and backgrounds during the period from June 2023 to September 2023.

The study's target population included all the dental students from the first year, second year, third year, final year, internship, and postgraduates. Chronically absent students, and those not interested in providing consent for the study were not included. The sampling method was a non-probability convenient sampling.

To conduct the study, a well-structured questionnaire was designed explicitly to gather data regarding various facets of self-medication with antimicrobial drugs among dental students. The questionnaire was specifically formulated for the study in three sections. The first section was used to record the students' demographic details, the second section contained questions to assess students' knowledge on antimicrobials and the third section was associated with self-medication behaviours.

The questionnaire was validated by a pilot study among 30 students selected from the target group. This questionnaire underwent an evaluation and approval process by the department of public health dentistry at the private dental college, ensuring its validity and relevance to the research objectives. Additionally, ethical clearance was granted by the Institutional Review Board (IRB), demonstrating the study's adherence to ethical standards and protocols. In alignment with ethical guidelines, informed consent was diligently sought from each participant. The informed consent process highlighted the voluntary nature of participation and the commitment to maintaining the anonymity and confidentiality of each participant. Identifying information was not collected to ensure the privacy and security of the respondents. The required permission was obtained from the head of the institution and then the questionnaire was distributed electronically using Google Forms through various social media platforms, which allowed for efficient data collection and responses from the target population.

In total, 309 dental students actively participated in the study, providing a substantial dataset for analysis. Data collected through the questionnaires were initially transferred into an Excel spreadsheet, a common

practice for data organization. Subsequently, the data was input into statistical analysis software, IBM SPSS Version 26. Statistical analysis primarily consisted of using the chi-square test to compare various variables and assess associations or differences. This statistical test is appropriate for examining categorical data, which is likely relevant when exploring self-medication practices among dental students. A significance level of $p < 0.005$ was set to determine statistical significance, ensuring a rigorous and stringent approach to statistical inference in the research. This level of significance is lower than the traditional $p < 0.05$ and implies that findings need to be even more robust to be considered statistically significant.

RESULTS

In this study, the participants consisted of 33.1% males and 66.9% females. Academic representation varied, with 19.2% being first-year students, 13.3% second-year students, 15.5% third-year students, 18.1% fourth-year students, 21.5% (CRI), and 12.4% Postgraduate (PG) students (Table 1). A majority (76.8%) correctly identified antibiotics, antivirals, antifungals, and antiparasitics as antimicrobial drugs. 47.4% of participants agreed that antimicrobials should only be used with a doctor's prescription, while 26.0% disagreed, and 26.6% were neutral. Views on the relationship between antimicrobial resistance and self-medication varied, with responses ranging from strong agreement (16.1%) to strong disagreement (8.5%). Opinions on the safety of taking antimicrobials without an infection were diverse, with 33.3% disagreeing, 24.3% strongly disagreeing, 10.2% agreeing, and 4.0% strongly agreeing. Regarding completing the full course of antimicrobial drugs, responses were mixed, with 20.6% strongly agreeing, 22.6% agreeing, 13.6% disagreeing, and 11.6% strongly disagreeing. A substantial portion (31.6%) remained neutral. 55.4% knew about synergistic antibiotics, while 44.6% did not. 52.8% were aware of sulfa drugs used as antimicrobials, while 47.2% were not (Table 2). Self-medication practices were prevalent, with 61.3% admitting to self-medication, and 38.7% abstaining from it. Among self-medicators, 9.3% always changed antimicrobial dosages during treatment, 42.9% sometimes did, 25.1% never did, and 22.6% found the question not applicable. Some respondents (33.1%) discovered they had taken the same antimicrobials under different names concurrently. Common antimicrobials for self-medication included Penicillin (28.6%), Metronidazole (12.1%), and Cephalosporins (9.6%). Participants had mixed opinions on self-medication with antimicrobials for self-healthcare, with 18.4% viewing it as a good practice, 47.2% as a fair practice, and 34.5% finding it unacceptable. Regarding the ability to treat common infectious diseases with antimicrobials independently, 24.6% agreed, 24.3% disagreed, and 51.1% were uncertain. Convenience and cost savings were the main factors pushing students to self-medicate. When choosing antibiotics, a sizeable fraction of students took into account the type of antibiotics and their indications for use, while the least amount of students took into account the cost of antibiotics. The antimicrobials' ineffectiveness was the most frequent cause of antimicrobial switchover during self-treatment (Table 3). Table 3 also lists the information sources and self-medication sources that the students have used.

Table 1: Demographics

QUESTION	OPTIONS	FREQUENCY [N]	PERCENTAGE[%]
Gender	Male	117	33.1
	Female	237	66.9

Year of study	1st year	68	19.2
	2nd year	47	13.3
	3rd year	55	15.5
	4th year	64	18.1
	CRI	76	21.5
	PG	44	12.4

Table 2: Knowledge on antimicrobials

QUESTION	OPTIONS	FREQUENCY[N]	PERCENT[%]
Which of the following is/are antimicrobial drugs?	Antibiotics	53	15.0
	Antivirals	13	3.7
	Antifungals	10	2.8
	Antiparasitics	6	1.7
	All of the above	272	76.8
People should use antimicrobials only when they are prescribed by a doctor/nurse	Strongly disagree	57	16.1
	Disagree	35	9.9
	Neutral	94	26.6
	Agree	83	23.4
	Strongly agree	85	24.0
Chances of antimicrobial resistance is more with self-medication	Strongly disagree	30	8.5
	Disagree	60	16.9
	Neutral	115	32.5
	Agree	92	26.0
	Strongly agree	57	16.1
It is safe to take antimicrobials without infection	Strongly disagree	86	24.3
	Disagree	118	33.3
	Neutral	100	28.2
	Agree	36	10.2
	Strongly agree	14	4.0
It is important to complete the course of antimicrobial drugs even when the infection is cured	Strongly disagree	41	11.6
	Disagree	48	13.6
	Neutral	112	31.6
	Agree	80	22.6
	Strongly agree	73	20.6

Do you know about synergistic antibiotics	Yes	196	55.4
	No	158	44.6
Do you know about the sulfa-drugs which are used as antimicrobials	Yes	187	52.8
	No	167	47.2

Table 3: Attitude and Practice on Self-medication

QUESTION	OPTIONS	FREQUENCY[N]	PERCENTAGE[%]
Have you ever treated yourself (self-medicated) with antimicrobials	Yes	217	61.3
	No	137	38.7
Did you ever change the dosage of antimicrobials deliberately during the course of treatment	Yes, always	33	9.3
	Yes, sometimes	152	42.9
	Never	89	25.1
	Not applicable	80	22.6
Have you ever found out that you had taken the same antimicrobials with different names at the same time	Yes	117	33.1
	No	137	38.7
	Not applicable	100	28.2
Which of the following antimicrobial have you taken for self-medication	Penicillin	101	28.6
	Cephalosporins	34	9.6
	Tetracyclines	30	8.5
	Metronidazole	43	12.1
	Clotrimazole	26	7.3
	Not applicable	108	30.5
	Azithromycin	11	3.1
	Cetirizine	1	.3
What do you think about self-medication	Good practice	65	18.4
	Fair practice	167	47.2

with antimicrobials for self health care	Not acceptable practice	122	34.5
Do you think you can treat common infectious diseases with antimicrobials successfully by yourself	Yes	87	24.6
	No	86	24.3
	Maybe	181	51.1

What was were your reasons for self-medication with antimicrobials	Cost saving	62	15.1
	Convenience	181	44.1
	Lack of trust in prescribing doctor	33	8.1
	Not applicable	134	32.7
What did you consider when selecting antimicrobials	Type of antimicrobials	143	22.9
	Brand of antimicrobials	101	16.2
	Price of antimicrobials	75	12.0
	Indications for use	134	21.4
	Adverse reactions	95	15.2
	Not applicable	77	12.3
For self-medication where did you usually obtain antimicrobials from	Community pharmacies	181	37.1
	Traditional medicine practioners	93	19.0
	Left over from previous prescription	83	17.0
	Online shopping/e-pharmacies	51	10.5
	Not applicable	80	16.4
How did you know the dosage of antimicrobials	By checking the package Insert	94	14.2
	By consulting a doctor	167	25.1
	By consulting a pharmacist	96	14.4
	By consulting family members/friends	51	7.6
	From the internet	56	8.4
	From the newspapers,magazines,books or TV programs	28	4.2
	From my previous experience	79	11.9

	By guessing the dosage by myself	33	4.9
	Not applicable	62	9.3
Did you switch antimicrobials during the course of self-treatment, if so why	The former antimicrobial did not work	98	21.1
	The former antimicrobial ran out	67	14.4
	The latter one was cheaper	34	7.3
	To reduce adverse reaction	74	15.9
	Didn't switch antimicrobials during the course of self treatment	68	14.6
	Not applicable	124	26.7
When did you normally stop taking antimicrobials	After a few days regardless of outcome	100	16.5
	After symptoms disappeared	113	18.6
	A few days after recovery	85	14.2
	After antimicrobials ran out	38	6.3
	At the completion of the course	95	15.7
	After consulting a doctor	75	12.3
	After consulting the pharmacist	25	4.1
	Not applicable	75	12.3

DISCUSSION

The study aimed to assess behaviour and perspectives regarding self-medication of antimicrobials among dental students. A majority of participants correctly identified antibiotics, antivirals, antifungals, and antiparasitics as antimicrobial drugs (76.8%). This shows a basic understanding of what antimicrobial drugs are, which is a positive finding. Roughly half of the participants (47.4%) agreed that antimicrobials should only be used with a doctor's prescription. This suggests that there is a significant portion of the population who understands the importance of responsible antimicrobial use, but there is still a sizable percentage (26.0%) that disagrees with this, which could be a cause for concern regarding overuse or misuse of these drugs. The study by Kalra et al. on the prevalence of self-medication among dental students reported a relatively lower prevalence of self-medication, accounting for approximately 40.9%. This finding contrasts with studies conducted globally, where higher levels of self-medication practice have been observed, with the maximum reported prevalence being as high as 98% in Palestine.^{4,6} The study conducted by Harshvardhan Chaudhary et al. found that a relatively small percentage of participants, specifically 6.9%, had taken antibiotics without consulting a doctor.^{5,6} Views on the relationship between antimicrobial resistance (AMR) and self-medication varied. It's noteworthy that a substantial portion of respondents had diverse opinions, ranging from strong agreement to strong disagreement. This indicates a need for more education and awareness campaigns about the dangers of AMR and its connection to self-medication. Opinions on the safety of taking antimicrobials without an infection were diverse, with a

significant percentage (33.3%) disagreeing. This suggests that a considerable number of individuals may be taking antimicrobials unnecessarily, which can contribute to AMR and other health risks. In a study by Namita Kumar et al Azithromycin was the most commonly self-medicated antibiotic, with 28.1% of participants using it., while it was penicillin in our study.⁷ In the study conducted by Osman Kamal Osman Elmahi, the most commonly used antibiotics for self-medication were identified as azithromycin, with a prevalence of 29.9%, and amoxicillin/clavulanic acid, with a prevalence of 26.8%.⁸ Responses regarding completing the full course of antimicrobial drugs were mixed. A significant percentage remained neutral, indicating a lack of strong consensus. Ensuring that people understand the importance of completing the full course of antibiotics is crucial to prevent the development of drug-resistant bacteria. Knowledge about synergistic antibiotics and sulfa drugs was also mixed, with roughly half of the participants being aware of each. This suggests that there is room for improvement in educating the public about the various types of antimicrobials. The study found that a substantial percentage of participants admitted to self-medication (61.3%). Self-medication can be risky, as it may lead to improper dosage, incorrect drug choice, and contribute to AMR. It's important to promote responsible and informed self-medication practices. Participants had mixed opinions on self-medication with antimicrobials for self-healthcare, with a significant portion viewing it as a fair practice (47.2%)., while 65% accepted self-medication as a part of self-care in a study by Aastha Shrestha et al.⁹ There is a need for public health campaigns to educate people about the risks associated with self-medication and when it is appropriate. A majority of respondents (51.1%) were uncertain about the ability to treat common infectious diseases with antimicrobials independently. This highlights a need for clear guidance on when and how to use antimicrobials for common infections.¹⁰ The study addresses an important public health issue – responsible antimicrobial use and the prevention of AMR. The study highlights the diversity of opinions and behaviors among participants, providing valuable insights into the complexity of this issue. The study has limitations related to the sampling method. The participants were not selected randomly or did not represent a diverse population. The study has not explored the underlying reasons for participants' attitudes and behaviours, such as cultural or socioeconomic factors. To address the issues identified in self-medication practices with antimicrobial drugs, several key strategies are recommended. Education and awareness campaigns are essential to inform the public, particularly healthcare students, about responsible antimicrobial use, the hazards of self-medication, and its connection to antimicrobial resistance (AMR). Clear guidance should be disseminated through public health campaigns, emphasizing when and how to use antimicrobials for common infections, with a strong emphasis on completing the full course of antibiotics. Regulatory measures should be considered by policymakers and healthcare authorities to limit over-the-counter availability and enforce prescription requirements for antimicrobial drugs. Healthcare provider training can play a crucial role in reducing unnecessary antibiotic prescriptions and educating patients on the risks of self-medication. Additionally, continuous research is vital to monitor self-medication trends and evaluate the impact of educational initiatives and policy changes, ensuring that efforts to combat antimicrobial misuse are effective and evidence-based.

CONCLUSION

In summary, the study reveals a complex landscape of self-medication with antimicrobials, with varying levels of understanding, practices, and awareness among the participants. There is a clear need for targeted educational initiatives to promote responsible antimicrobial use, reduce unnecessary self-medication, and address knowledge gaps to combat antimicrobial resistance effectively.

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