

Awareness of Knowledge About Antibiotics Prescription Among General Dentists in Kalaburagi Population

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Abstract

Background: Antibiotic resistance is a growing global health threat, fueled by the misuse and overuse of antibiotics. This has led to reduced treatment effectiveness, prolonged illness, increased mortality, and greater infectivity. In dentistry, infections of the dental pulp and periapical tissues are mainly microbial in origin, but not all cases require antibiotic therapy. Inappropriate prescribing contributes to resistance and raises healthcare costs, particularly due to the reliance on costly second-line antibiotics. The WHO's AWaRe (Access, Watch, Reserve) classification promotes rational antibiotic use and global stewardship

Methods: A cross-sectional survey was conducted among general dentists to evaluate their antibiotic prescribing patterns and awareness of the AWaRe classification. The structured questionnaire assessed knowledge, attitudes, and clinical decision-making related to antibiotic use in dental practice.

Results and Conclusion: Findings revealed variability in antibiotic prescribing habits. While many dentists followed appropriate indications, a significant proportion prescribed antibiotics unnecessarily. Awareness of the AWaRe classification was limited. These results highlight the need for increased education and stricter adherence to evidence-based guidelines to improve antibiotic use in dental practice.

Introduction:

Antibiotics have long stood as one of modern medicine's most powerful tools in combating infectious diseases. However, the escalating threat of antimicrobial resistance (AMR) poses a critical challenge to global public health ^[1]. The inappropriate, excessive, or uninformed use of antibiotics continues to accelerate resistance patterns, undermining clinical efficacy and straining healthcare systems worldwide. As the development of novel antibiotics lags behind the pace of resistance, the urgency to optimize the use of existing antimicrobial agents has never been greater.

To address this, the World Health Organization (WHO) introduced the **AWaRe (Access, Watch, and Reserve)** antibiotic classification system—an innovative framework designed to guide antimicrobial stewardship efforts, promote responsible prescribing, and ultimately preserve antibiotic effectiveness ^[2]. Despite its global significance, awareness and integration of the AWaRe tool among clinicians remain limited in many healthcare settings.

This study evaluates the effectiveness of a targeted educational intervention designed to enhance awareness and practical implementation of the WHO's AWaRe

(Access, Watch, and Reserve) antibiotic classification among hospital-based healthcare professionals. By comparing pre- and post-intervention data, the research assesses shifts in clinicians' knowledge, attitudes, and prescribing patterns in response to structured training on antimicrobial usage principles. The findings underscore both the existing knowledge gaps and the transformative potential of integrating AWaRe-guided practices into everyday clinical decision-making. Strengthening such evidence-based approaches is imperative to curb the growing threat of antimicrobial resistance and to promote the judicious use of antibiotics across healthcare systems.

Materials and Methods

Study Design: A descriptive cross-sectional survey study.

Study Setting and Population: The study was conducted among general dental practitioners practicing in Kalaburagi. Dentists from various private and institutional hospitals were included to participate.

Study Tool: A structured questionnaire consisting of 15 questions was developed after reviewing relevant literature and

WHO guidelines. The questionnaire included sections on:

1. Awareness of WHO AWaRe classification
2. Common microorganisms involved in odontogenic infections
3. Frequently prescribed antibiotics
4. Average duration of antibiotic therapy
5. Prophylactic antibiotic regimens for infective endocarditis
6. Timing of antibiotic prophylaxis
7. Dosage of commonly used antibiotics
8. Antibiotics considered safe during pregnancy
9. Determinants influencing antibiotic prescription
10. Indications for culture and sensitivity testing
11. Causes of antimicrobial resistance
12. Principles of antibiotic therapy
13. Assessment of medical and drug history

14. Identification of bactericidal antibiotics

15. Clinical conditions suggestive of anaerobic infections

Data Collection

The questionnaire was distributed digitally using Google Forms. Participation was voluntary, and informed consent was implied through submission of the form. Responses were exported into Microsoft Excel for analysis.

Statistical Analysis: Data were analyzed using descriptive statistics. Results were expressed as frequencies and percentages and presented using tables and graphs.

Results: A total of **302 responses** were collected from healthcare professionals, of which 297 were complete and included in the final analysis. The survey assessed respondents' awareness, knowledge, and attitudes regarding the WHO AWaRe antibiotic classification, along with key clinical principles of antibiotic prescribing and recognition of odontogenic infections.

Table 1. Awareness of WHO AWaRe Classification

Response	Frequency (n)	Percentage (%)
Yes	197	65.4
No	99	32.9
None	5	1.7

Table 2. Average Duration of Antibiotic Prescription

Response	Frequency (n)	Percentage (%)
7 days	128	42.5
5 days	102	33.9
3 days	47	15.6
3 days;5 days	13	4.3
2 days	6	2.0
5 days;7 days	3	1.0
3 days;5 days;7 days	1	0.3
3 days;7 days	1	0.3

Table 3. Practice of Taking Medical and Drug History

Response	Frequency (n)	Percentage (%)
Yes	280	93.0
No	16	5.3
Nan	5	1.7

Table 4. Commonly Used Antibiotics in Odontogenic Infections

Response	Frequency (n)	Percentage (%)
Streptococci	263	87.4
Staphylococci	174	57.8
Actinomyces	54	17.9
Clostridium	18	6.0

Table 5. Prophylactic Dosage for Infective Endocarditis

Response	Frequency (n)	Percentage (%)
Oral Amoxicillin 2g	225	74.8
Oral Clindamycin 600mg	157	52.2
Oral vancomycin 600mg	51	16.9
Oral erythromycin 600mg	44	14.6

Table 6. Usual Dosage of Antibiotics for Adult Patients

Response	Frequency (n)	Percentage (%)
Amoxicillin (250 -500 mg 6-8 hourly)	228	75.7
Metronidazole (1000mg, then 250 -500 mg TID)	141	46.8
Amoxicillin (250 -500 mg 10-12 hourly)	62	20.6
Metronidazole (1000mg, then 250 -500 mg BID)	48	15.9

Table 7. Determinants for Prescribing Antibiotics

Response	Frequency (n)	Percentage (%)
All of the above	220	73.1
Facial swelling	59	19.6
Cellulitis	55	18.3
Lymphadenopathy	43	14.3
Trismus	15	5.0

Table 8. Indications for Culture Sensitivity Test		
Response	Frequency (n)	Percentage (%)
All of the above	242	80.4
Determining the sensitivity of colony of bacteria to particular drug	46	15.3
To guide clinician to select appropriate drug	31	10.3
To overcome microbial resistance	30	10.0
For recurrent infection	27	9.0

Table 9. Causes of Antibiotic Microbial Resistance		
Response	Frequency (n)	Percentage (%)
All of the above	234	77.7
Over prescribing of antibiotics	54	17.9
Patients not finishing their course of treatment	39	13.0
Inadequate compliance with treatment regimens	39	13.0

Table 10. Principles of Antibiotic Treatment		
Response	Frequency (n)	Percentage (%)
All of the above	197	65.4
To evaluate the status of patient host defence	71	23.6
To detect presence of infection	67	22.3
To treat infection surgically	22	7.3

Table 11. Drugs Identified as Bactericidal

Response	Frequency (n)	Percentage (%)
All of the above	199	66.1
Metronidazole	49	16.3
cephalosporins	44	14.6
Aminoglycosides	34	11.3

Table 12. Clinical Conditions Suggestive of Anaerobic Infection

Response	Frequency (n)	Percentage (%)
Anaerobic osteomyelitis	143	47.5
Acute necrotizing ulcerative gingivitis	102	33.9
Cellulitis	52	17.3
Periapical abscess	27	9.0

Discussion: The present questionnaire-based survey assessed the awareness, knowledge, and antibiotic prescribing practices among general dentists in Kalaburagi, with particular emphasis on antimicrobial stewardship and the World Health Organization (WHO) Access, Watch, and Reserve (AWaRe) classification. The findings reveal important gaps in awareness and notable variability in prescribing behavior, which may contribute to inappropriate antibiotic use and the growing burden of antimicrobial resistance (AMR).

Awareness of WHO AWaRe

Classification: Although approximately two-thirds of respondents reported awareness of the WHO AWaRe classification, a substantial proportion remained unaware of this globally endorsed antibiotic stewardship framework. This incomplete awareness suggests that stewardship concepts have not been uniformly disseminated among dental professionals. Similar findings have been reported in hospital-based studies, where baseline awareness of AWaRe classification

was low prior to targeted educational interventions ^[3].

The WHO introduced the AWaRe classification to guide rational antibiotic use and preserve the effectiveness of last-resort antibiotics. Lack of awareness among dentists may result in increased reliance on broad-spectrum antibiotics, thereby accelerating resistance. Although the awareness level in the present study was higher than that reported among physicians and pharmacists in the reference AWaRe study, awareness alone does not guarantee correct implementation in clinical practice.

Antibiotic Prescribing Patterns in Dental Practice:

Amoxicillin-clavulanic acid, metronidazole, and clindamycin were the most commonly prescribed antibiotics for odontogenic infections. This prescribing pattern is consistent with previous dental and community-based studies, where these agents were favored due to their broad antimicrobial coverage against oral pathogens ^[4]. However, frequent use of broad-spectrum antibiotics raises concern, particularly when narrower-spectrum agents may be sufficient.

The majority of dentists prescribed antibiotics for five to seven days. While this duration is commonly practiced, evidence suggests that shorter courses combined with appropriate operative intervention may be equally effective for uncomplicated dental

infections). Prolonged antibiotic exposure increases the risk of resistance and adverse effects, highlighting the need for standardized prescribing guidelines in dental practice.

Prophylactic Antibiotic Use and Guideline Adherence:

Considerable variation was observed in prophylactic antibiotic selection, dosage, and timing for patients at high risk of infective endocarditis. Although many respondents administered antibiotics approximately 60 minutes prior to dental procedures, deviations from recommended regimens were evident. These findings suggest partial adherence to international guidelines and possible uncertainty regarding updated recommendations.

Inappropriate prophylactic antibiotic use has been widely documented and contributes to unnecessary antibiotic exposure without clear clinical benefit ^[5]. Reinforcement of evidence-based guidelines through continuing dental education is essential to minimize misuse.

Awareness of Antimicrobial Resistance and Contributing Factors:

Most respondents correctly identified over-prescription, incomplete antibiotic courses, and poor patient compliance as major contributors to antimicrobial resistance. This indicates a reasonable level of conceptual understanding of AMR among

dentists. Similar observations have been reported in studies assessing antibiotic knowledge among healthcare professionals and dental students ^[1]

However, recognition of AMR risk factors does not always translate into rational prescribing practices. Previous research suggests that fear of postoperative complications, patient pressure, and medicolegal concerns significantly influence antibiotic prescribing decisions in dentistry ^[6].

Clinical Practice Behavior and Patient Safety: A notable strength of the present study is the high proportion of dentists who reported routinely taking medical and past drug history prior to prescribing antibiotics. This practice reflects awareness of patient safety, particularly regarding drug allergies, systemic conditions, and potential drug interactions. Such practices are fundamental to rational antibiotic use and align with antimicrobial stewardship principles ^[7].

Comparison with the Reference AWaRe Study: Compared with the reference AWaRe study conducted among hospital clinicians, the present study demonstrates similar gaps in baseline knowledge and variability in antibiotic use ^[6]. However, unlike the reference study, which showed significant improvement following educational intervention, the current study

provides baseline data among dental practitioners. This underscores the potential benefit of implementing structured educational and stewardship interventions in dental settings.

Implications for Dental Practice and Antimicrobial Stewardship: Dentists play a crucial role in community antibiotic consumption and therefore have a significant responsibility in combating antimicrobial resistance. Incorporating WHO AWaRe principles into undergraduate and postgraduate dental curricula, promoting continuing dental education programs, and developing dental-specific antibiotic prescribing guidelines may improve rational antibiotic use ^[5].

Emphasizing definitive operative management of dental infections, rather than reliance on antibiotics alone, can further reduce unnecessary prescriptions and align dental practice with global antimicrobial stewardship goals.

Conclusion: The study highlights inadequate awareness of WHO AWaRe classification and variability in antibiotic prescribing practices among general dentists in Kalaburagi. There is a clear need for targeted educational interventions, regular training programs, and integration of antimicrobial stewardship principles into dental practice to promote rational

antibiotic use and combat antimicrobial resistance.

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