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Awareness of Knowledge, Attitude and Practice of Antibiotics Usage among Postgraduate Students of Gujarat Post Dental Implant Placement: A Questionnaire-Based Study

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Abstract

The indiscriminate use of antibiotics in dental implantology contributes to antimicrobial resistance. Understanding the knowledge, attitudes, and practices of dental trainees regarding antibiotic use after implant placement is vital for stewardship. We conducted a cross-sectional questionnaire survey of 104 postgraduate dental residents in Gujarat (Prosthodontics, Periodontics, Oral Surgery). Responses were analyzed with descriptive statistics and Chi-square tests (SPSS v26, $p<0.05$). Most respondents (68.3%) felt antibiotic prophylaxis was not necessary before implant placement. Amoxicillin was the most commonly prescribed agent (53.8%), typically in a five-day regimen (86.5%). Awareness of formal guidelines was high (87.5%), and nearly all (95.2%) agreed prescriptions

should follow evidence-based recommendations. However, 83.7% reported routinely prescribing antibiotics for implant cases regardless of complexity. A large majority (91.3%) expressed interest in formal training on rational antibiotic use. Significant differences were found by specialty and training year: Oral Surgery and Periodontics trainees were more likely to oppose routine prophylaxis than Prosthodontics trainees, and first-year residents were much less aware of guidelines than seniors (p=0.0001). These findings indicate generally strong awareness of antibiotic stewardship but also highlight gaps between knowledge and practice. There is clear support for enhanced training and strict adherence to guidelines to optimize antibiotic use in implant dentistry.

Keywords: antibiotics; dental implant; knowledge; postgraduate students; prescription practice

Introduction

Antibiotic prophylaxis in dental implant surgery remains controversial. Although routine antibiotics have traditionally been used to prevent postoperative infection, recent evidence questions their necessity. A systematic review found no significant reduction in early implant failure with prophylactic antibiotics. In fact, routine prophylaxis is not strongly supported by current data, and international guidelines emphasize prudent use to combat rising antibiotic resistance. Nonetheless, surveys show many clinicians still prescribe antibiotics liberally for implants. For example, a worldwide review reported that about three-quarters of dentists routinely give antibiotic prophylaxis for implant surgery, typically amoxicillin or amoxicillin-clavulanate. Such over prescription is a concern since unnecessary antibiotic exposure contributes to resistant infections.

Dental curricula and continuing education are therefore urged to stress evidence-based prescribing. Studies among dental students and practitioners have found that knowledge and attitudes improve with training level, but significant gaps remain. In one multicenter Saudi survey, senior dental students and interns demonstrated high knowledge of antibiotic guidelines (~87%) and appropriate use, whereas earlier-year students lagged behind. Similarly, an Indian study of interns and postgraduate students found most had an acceptable baseline understanding of antibiotic use, but notable misconceptions persisted. Common drivers of antibiotic overuse include patient expectations and clinician inertia. Given these factors, it is crucial to assess the current KAP of antibiotic use post-implant among Indian dental trainees, identify areas of deficiency, and gauge interest in training.

In Gujarat, the Government Dental College Ahmedabad hosts postgraduate programs in Prosthodontics, Periodontics, and Oral Surgery. We administered a structured questionnaire to these trainees to evaluate their knowledge of implant-related antibiotic guidelines, attitudes toward prophylaxis and stewardship, and actual prescribing practices. We particularly examined awareness levels, adherence to guidelines, interest in further training, and whether these metrics varied by specialty or year of training. The goal was to pinpoint educational needs and reinforce rational antibiotic use in dental implantology.

Materials and Methods

A cross-sectional questionnaire-based study was conducted among all postgraduate (MDS) trainees in Prosthodontics, Periodontics, and Oral Surgery at the Government Dental College, Ahmedabad. Participation was voluntary and anonymous. The survey instrument (validated in prior studies) included items on demographics (age, gender, specialty, year of training) and multiple-choice questions assessing knowledge,

attitudes, and practices regarding antibiotic use in implant dentistry. Key domains covered included the perceived need for antibiotic prophylaxis, choice and duration of antibiotics for implant placement, awareness of official guidelines, beliefs about antibiotic resistance, routine prescribing behaviors, interest in continuing education, and factors influencing antibiotic selection.

Data were collected during departmental sessions and entered into SPSS (v26.0). Descriptive statistics (frequencies, percentages) summarized responses. We performed Chi-square tests to explore associations of responses with gender, specialty, and training year (with $p<0.05$ indicating significance). Main outcomes reported include proportions of respondents endorsing each response, and any significant group differences. Results are presented in text and tables.

Results

Participants: Of 104 respondents, 62.5% were female (Table I). Specialties were represented as Prosthodontics (41.3%), Periodontics (32.7%), and Oral Surgery (26.0%). The majority were senior residents, with 51.9% in the 3rd year, 46.2% in the 2nd year, and only 1.9% in the 1st year (Table I).

Prophylaxis and Prescribing Habits: As shown in Table II, most trainees (68.3%) did not believe antibiotic prophylaxis was necessary before implant placement; only 26.9% thought it was needed. In practice, Amoxicillin was the most commonly prescribed antibiotic (53.8%), followed by Amoxicillin-Clavulanate (Augmentin) at 41.3%. Alternative antibiotics (azithromycin, clindamycin, metronidazole gel) were infrequently used (<2%). After implant surgery, 86.5% of respondents reported a standard antibiotic course of 5 days, with only 11.5% using 3-day courses and 1.9% prescribing 7 days or more

Guideline Awareness and Attitudes: A large majority (87.5%) were aware of formal guidelines on antibiotic use in implantology (Table II). Regarding resistance, 96.1% agreed that antibiotic overuse contributes to implant patient resistance (61.5% agree, 34.6% strongly agree). Despite awareness of guidelines, 83.7% believed antibiotics should be routinely prescribed for all implant surgeries, and 85.6% admitted that they actually prescribe antibiotics for every implant regardless of case complexity. On the positive side, 95.2% (57.7% agree, 37.5% strongly agree) endorsed that prescriptions should be strictly based on evidence-based guidelines.

Notably, 91.3% of trainees expressed interest in formal training or workshops on rational antibiotic use in implant dentistry. Only 1.0% were uninterested. Thus, virtually all respondents recognized the importance of continuing education in this area.

Practice and Stewardship Behaviors: Regarding factors influencing antibiotic choice (Table III), every participant cited the patient's systemic health as a consideration. Most also considered surgical factors: 89.4% noted surgery duration and 84.6% the number of implants as important. Institutional protocols influenced 54.8%, and mentor/senior advice influenced 51.9%. Interestingly, only 26.0% considered the presence of active infection when choosing antibiotics.

In terms of stewardship: 77.9% reported that they routinely reassess and update their implant antibiotic protocols (every 6–12 months). A high 89.4% stated they do record and audit their antibiotic prescriptions for implant procedures.

Specialty and Year Differences: Significant differences emerged by specialty. Oral Surgery and Periodontics trainees were more likely than Prosthodontics residents to oppose routine prophylaxis: 77.8% of Oral Surgery and 79.4% of Periodontics residents answered "No" to

prophylaxis necessity, compared to only 53.5% of Prosthodontics (p=0.02). Conversely, Oral and Periodontics residents were more inclined to prescribe antibiotics for all implant cases (88.9% and 94.1% answered "Yes" to routine prescribing) versus 72.1% of Prosthodontics (p=0.03). Prosthodontics residents were significantly less likely to audit prescriptions: only 18.6% reported auditing, compared to 96.3% of Oral Surgery and 94.1% of Periodontics residents (p=0.04). Other comparisons (choice of antibiotic, duration, guideline awareness) showed no significant differences by specialty, though Prosthodontics trainees had higher uncertainty and lower guideline awareness trends. Notably, across all specialties most were open to training and evidence-based practice.

Training year showed clear trends. First-year residents had no awareness of guidelines (0%), whereas 93.8% of second-years and 85.2% of third-years were aware (p=0.0001). Similarly, only 50% of first-years believed antibiotics should be routinely prescribed (somewhat equivocal) versus over 90% of 2nd/3rd years. Generally, senior trainees demonstrated higher knowledge and more confident attitudes than juniors. In summary, more experienced residents showed better alignment with stewardship principles.

Discussion

This study reveals a generally high level of awareness about antibiotic stewardship among Gujarat postgraduate dental trainees, alongside persistent contradictions in practice. Nearly all respondents acknowledged the existence of guidelines (87.5%) and agreed that antibiotic overuse drives resistance, reflecting a commendable knowledge base. The overwhelming interest in formal training (91.3%) and strong support for evidence-based prescribing (95.2%) indicate a positive attitude and readiness to improve practices.

However, actual prescribing habits lag behind this awareness. Most trainees still reported routine antibiotic use for every implant, regardless of case complexity (85.6%). This finding echoes previous reports of a "knowing–doing" gap: clinicians may understand resistance risks but feel compelled to prescribe due to habits or patient expectations. Indeed, over 80% of our respondents admitted often prescribing and felt influenced by patient demands. Similar factors have been noted in other studies: physician surveys identify patient pressure and fear of complications as major drivers of unnecessary prescribing. Dentists worldwide often default to antibiotics 'just in case,' despite evidence and guidelines to the contrary.

Our results align with global trends. Consistent with Bernabeu-Mira et al., we found amoxicillin to be the predominant prophylactic antibiotic, with amoxicillin-clavulanate as the second choice. The 5-day postoperative course favored by 86.5% of participants also mirrors common practice patterns in India and elsewhere, though guidelines often recommend shorter durations. These prescribing choices highlight the influence of local protocols and mentorship (Table III) – over half of trainees cited institutional norms or senior advice as key factors.

We observed notable differences by specialty and seniority. Oral Surgery and Periodontics residents were significantly more skeptical of routine prophylaxis than Prosthodontics residents, and more likely to prescribe in all cases. One interpretation is that surgeons and periodontists, who manage more complex or infectious cases, may trust their clinical judgment to reserve antibiotics only when needed. Prosthodontists (focused on prosthetic planning) might rely more on standardized protocols. The low auditing rate in Prosthodontics suggests a need for greater emphasis on stewardship

practices in that department. The clear increase in guideline awareness and prudent attitudes with training year is encouraging and matches literature: senior trainees and interns typically outperform juniors in antibiotic knowledge and prescribing behavior. This underscores the role of clinical experience and education in fostering responsible prescribing.

Overall, these findings emphasize that while core knowledge is high, additional training is needed to translate it into practice. The almost-unanimous demand for formal antibiotic education suggests that workshops or curriculum modules would be well-received. Educational initiatives should address specific misconceptions (e.g., the belief in routine prophylaxis) and stress guideline recommendations. Given the global imperative to combat resistance, it is vital that dental educators reinforce stewardship at all stages of training. The study also highlights the importance of institutional protocols and audits: encouraging regular review of implant prescribing protocols (currently done by ~78% of trainees) and systematic audit (currently 89%) can maintain accountability.

A limitation is that this single-center survey may not reflect all regions; however, the large sample of 104 postgraduates provides robust insights. Future research could explore patient and mentor perspectives, and measure actual prescribing rates. For now, the evidence is clear: Indian dental trainees are aware of antibiotic issues but eager for more guidance. Harnessing this motivation through targeted education and strict adherence to evidence-based protocols can help align practice with stewardship principles, ultimately improving patient outcomes and preserving antibiotic efficacy.

Table 1: Descriptive statistics-Demographics

		N	%
Gender	Female	65	62.5
	Male	39	37.5
Specialty	Oral Surgery	27	26.0
	Periodontics	34	32.7
	Prosthodontics	43	41.3
Year of Postgraduate Training	1st	2	1.9
	2nd	48	46.2
	3rd	54	51.9

Table 2: Descriptive statistics-Questionnaire

		N	%
Do you think antibiotic prophylaxis is necessary before implant placement?	No	71	68.3
	Not sure	5	4.8
	Yes	28	26.9
What is the most commonly prescribed antibiotic for implant surgery in your department?	Amoxicillin	56	53.8
	Augmentin	43	41.3
	Azithromycin	1	1.0
	Clindamycin	2	1.9
	Metro gel	2	2.0
What is the usual duration of antibiotic therapy post-implant placement	3 days	12	11.5
	5 days	90	86.5
	7 days or more	2	1.9
Are you aware of any official guidelines for antibiotic usage in dental implantology?	No	13	12.5
	Yes	91	87.5
Do you think overuse of antibiotics can lead to resistance in implant patients?	Agree	64	61.5
	Neutral	4	3.8
	Strongly agree	36	34.6
Do you believe antibiotics should be prescribed routinely for all implant surgeries?	No	9	8.7
	Somewhat	8	7.7
	Yes	87	83.7
Would you prefer formal training or workshop on rational antibiotic use in implantology?	Maybe	8	7.7
	No	1	1.0
	Yes	95	91.3
Should antibiotic	Agree	60	57.7

prescriptions be strictly based on evidence-based guidelines?	Neutral	5	4.8
	Strongly agree	39	37.5
Do you think patient expectations or demand influence antibiotic prescribing habits?	Always	11	10.6
	Never	1	1.0
	Often	43	41.3
	Rarely	6	5.8
	Sometimes	43	41.3
Do you prescribe antibiotics for every implant placement, regardless of case complexity?	No	9	8.7
	Occasionally	6	5.8
	Yes	89	85.6
How often do you reassess and update your antibiotic prescribing protocols?	Never	2	1.9
	Occasionally	18	17.3
	Rarely	3	2.9
	Routinely (every 6–12 months)	81	77.9
Do you record and audit your antibiotic prescriptions for implant procedures?	No	11	10.6
	Yes	93	89.4

Table 3: Which of the following factors influence your antibiotic choice? (Select all that apply)

	Frequency	Percent
Patient's systemic condition	104	100.00
Duration of surgery	93	89.42
Number of implants placed	88	84.62
Institutional protocol	57	54.81
Mentor/senior advice	54	51.92
Presence of infection	27	25.96

Conclusion

Postgraduate dental trainees in Gujarat demonstrate high awareness of antibiotic resistance and guidelines in implant dentistry, and a strong willingness to pursue further training. Most correctly identified the limited need for prophylaxis and favored evidence-based prescribing. Nonetheless, routine antibiotic use remains commonplace. This gap indicates a need for targeted interventions. Integrating antibiotic stewardship education into the curriculum and reinforcing audit-based practice can ensure that prescriptions for implants are judicious and guideline-driven. By capitalizing on the trainees' interest in formal training and their foundational knowledge, educators can further improve antibiotic use and help mitigate resistance in the dental setting.

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