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KNOWLEDGE, AWARENESS, AND IMPLEMENTATION OF ANTIBIOTIC PROPHYLAXIS FOR INFECTIVE ENDOCARDITIS AMONG DENTAL PROFESSIONALS

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ABSTRACT

Infective Endocarditis is a serious and life-threatening infection that can develop when bacteria enter the bloodstream during certain dental procedures, particularly in patients with underlying cardiac risk factors. To reduce this risk, the American Heart Association issued antibiotic prophylaxis recommendations in 2007 for selected high-risk individuals. Despite these clear guidelines, variations in knowledge and clinical compliance among dental professionals may result in inappropriate or inconsistent preventive practices. The present study aimed to evaluate the level of knowledge, awareness, and actual clinical application of antibiotic prophylaxis for infective endocarditis among dental practitioners. A cross-sectional survey was carried out using a structured and pre-validated questionnaire that assessed participants' understanding of infective endocarditis, recognition of high-risk cardiac conditions, familiarity with current prophylaxis guidelines, and their translation into everyday dental practice. The collected data were subjected to suitable descriptive and inferential statistical analysis. The findings revealed considerable variability in knowledge and awareness, with many respondents demonstrating partial or incorrect understanding of guideline-recommended indications and antibiotic regimens. Although most participants were aware of the concept of antibiotic prophylaxis, notable discrepancies were observed between theoretical knowledge and its implementation in clinical practice. These results highlight important gaps in guideline adherence and underscore the need for ongoing continuing dental education, regular updates on clinical guidelines, and strengthened emphasis on evidence-based practice to improve compliance and ensure patient safety.

KEYWORDS: Infective Endocarditis; Antimicrobial Prophylaxis; AHA Guidelines; Antibiotic Prescribing

INTRODUCTION

Infective Endocarditis (IE) is a serious illness caused primarily by bacteria that infect the heart valves, the lining of the heart chambers, or blood vessels.[1] It may also be caused by *rickettsia*, *chlamydia*, or *fungi*. People with prosthetic heart valves, congenital heart defects, or a recent case of IE are at higher risk.[2] The disease is hard to treat and often leads to serious health problems or death. Because of this, preventing IE through proper prophylaxis is very important.[3] The mouth has many microorganisms that can enter the bloodstream when tissues are injured.[4] As more patients with heart problems survive, dental surgeons are more often treating those with cardiac issues. Dental procedures like extraction, gum treatments, and root canals can cause infections on heart valves in vulnerable patients, leading to infective endocarditis (IE).[5] Some heart conditions and dental treatments are clearly known to need antibiotics to prevent IE, but there is debate about whether other dental procedures require such prevention. Because of this, several organizations have issued guidelines on antibiotic use, which are updated regularly to reflect new

information.[6] Expert authorities such as the American Heart Association (AHA) updated their guidelines on endocarditis prevention in 2007 and 2008. The 2007 guidelines suggest that bacteremia resulting from daily activities such as eating and tooth brushing may pose a greater cumulative risk for infective endocarditis (IE) than transient bacteremia following invasive dental procedures.[7,8]

However there have been limited studies reported in the literature thus to determine the knowledge, awareness, and implementation of antibiotic prophylaxis for infective endocarditis among dental professionals in the prevention of IE in cardiac patients receiving dental treatments through questionnaires. (According to 2007 AHA guidelines for Endocarditis Prophylaxis).

METHODS

A survey using a cross-sectional questionnaire was carried out during the months of August and September 2025, A total of 154 undergraduate students, postgraduate students, and faculty members from Dental College have participated in this survey. A comprehensive literature review served as the foundation for the creation and development of the structured questionnaire.[10,11,12] Four sections comprised the questionnaire: demographic information, knowledge regarding need to prescribe antibiotics for various cardiac conditions; dental procedures that require antibiotic prophylaxis; and practice regarding type, dosage, and regimen of antibiotics to be prescribed. This study included participants who met the inclusion criteria, defined as correctly responding to at least 10 out of 15 questions. 148 responses were found to be valid and included in the final discussion. The remaining 6 responses were excluded due to incomplete data. The goal of the study was explained to the participants, and they were asked to fill out and submit the questionnaire.

RESULT

Out of 154 responses, 148 were analyzed, and six were excluded due to incomplete data. The response rate was 96.1%, with 45 males and 103 females.

Table 1: Role-wise distribution.

Role-wise distribution		
Sr. no	**Role/Class**	**Count**
1	III BDS	45
2	IV BDS	30
3	Intern	49
4	PG Student	5
5	Faculty	19
	Total	148

Table 2: Gender-wise distribution.

Gender-wise distribution			
Sr.no	**Gender**	**Count**	**Percentage**
1	Male	45	30.40%
2	Female	103	69.60%
	Total	148	100%

Table 3: Participant's responses.

Sr. no	Question	Correct	% Correct	Incorrect	% Incorrect
1	Which is the most common oral pathogen causing bacterial endocarditis following dental procedures?	92	62.16%	56	37.84%
2	Which step in the pathogenesis of infective endocarditis is most influenced by dental procedures?	121	81.76%	25	16.89%
3	For which of the following dental procedure do you most frequently prescribe prophylactic antibiotics?	17	11.49%	131	88.51%
4	Which is the most commonly used antibiotic for endocarditis prophylaxis?	135	91.22%	13	8.78%
5	In penicillin-allergic patients, which is the most recommended prophylactic antibiotic?	88	59.46%	59	39.86%
6	Why is a single pre-procedure dose preferred over multiple doses for prophylaxis?	68	45.95%	80	54.05%
7	Which principle is violated if antibiotics are prescribed to all dental patients "just to be safe"?	45	30.41%	97	65.54%
8	Does a dental procedure involving marsupialization of the periapical region of teeth require antibiotic prophylaxis in high-risk patients?	140	94.59%	7	4.73%
9	What is the standard adult dose of amoxicillin for bacterial endocarditis prophylaxis?	81	54.73%	63	42.57%
10	Should a patient with a heart murmur but no valvular abnormality receive antibiotic prophylaxis for dental procedures?	79	53.38%	68	45.95%
11	Which cardiac condition has the highest risk of bacterial endocarditis from dental procedures?	106	71.62%	40	27.03%
12	What is the greatest risk of serious adverse event	24	16.22%	123	83.11%

	associated with prophylactic antibiotics?				
13	Is antibiotic prophylaxis recommended for a patient with mitral valve prolapse without regurgitation for dental procedures?	85	57.43%	60	40.54%
14	How does post-dental infective endocarditis typically manifest?	124	83.79%	22	14.86%
15	In your clinical practice, what is the main barrier for optimizing prophylactic antibiotic choice?	66	44.60%	78	52.70%

In table no.3 outcomes were categorised into: antibiotic prophylaxis, cardiac conditions and generalised questionnaire.

DISCUSSION

The survey study shows that dental practitioners have a good grasp of basic concepts in infective endocarditis prevention, including disease pathogenesis and the use of amoxicillin as first-line prophylaxis. However, gaps appear in more detailed clinical understanding. Many were unsure of the main oral pathogen, despite its importance in justifying prophylactic choices. Most respondents also misidentified the dental procedures for which they prescribed prophylaxis, indicating over-prescription contrary to guideline recommendations that restrict its use to highly invasive procedures.[13] This reflects broader patterns of inappropriate antibiotic use in dentistry.[14] Only about half knew how to manage penicillin-allergic patients, highlighting the need for better awareness of alternatives such as clindamycin or azithromycin.[15]

This shows that although dental professionals generally know the procedural steps for antibiotic prophylaxis, there remain areas requiring greater clarity or updated knowledge. Many do not fully grasp the rationale underlying these recommendations. It is essential for dentists to keep up with the latest guidelines on antibiotic use to effectively prevent infective endocarditis and provide the best care for their patients.[12, 5] Only about half understood the purpose of a single pre-procedure dose, which is to achieve peak antibiotic levels during the period of potential bacteraemia rather than to provide prolonged protection.[12] This reflects a broader gap in antimicrobial stewardship, as many did not recognize that prescribing "just to be safe" is harmful and contributes to resistance and unnecessary side effects.[16] Despite this, most correctly identified high-risk procedures such as marsupialization.[12,17] However, uncertainty remained around implementation, including the correct adult dose of amoxicillin, with several unsure of the required 2 grams.[12,18] The divided response about prescribing for a patient with a simple heart murmur further highlights slow adoption of updated guidelines, which restrict prophylaxis to only the highest-risk cardiac conditions.[12,19]

The highest risk of bacterial endocarditis during dental procedures occurs in individuals with congenital heart disease repaired using prosthetic material or a device, who remain high-risk for six months after treatment and low-risk thereafter.[20] Antibiotic prophylaxis is not required for patients with mitral valve prolapse without regurgitation, as per ACC/AHA guidelines, though confusion about this remains among clinicians.[8,9] A major obstacle in antibiotic selection is the lack of understanding of antimicrobial resistance caused by lax infection control, overuse, and inappropriate antibiotic choices or durations.[21] Many dental professionals still follow outdated prescribing habits and fail to adapt to updated guidelines.[19,22] Post-dental IE typically presents with low-grade fever and malaise, requiring prompt medical evaluation.[21] IE can appear as either an acute, rapidly progressing illness or as a chronic, low-grade condition with vague symptoms that complicate diagnosis.[23] Antibiotics most likely to cause adverse events are those inducing allergic reactions, including anaphylaxis, which must be recognized as significant within 14 days of use.[24] Common side effects of IE antibiotics include nausea, diarrhoea, and allergic reactions, while severe cases like anaphylaxis or antibiotic-related colitis require urgent medical attention and patient awareness.[25]

CONCLUSION

While many practitioners understand the biological basis of infective endocarditis (IE) and the importance of prophylactic antibiotics, their decisions in clinical practice are often inconsistent due to uncertainties, especially when managing penicillin-allergic patients or understanding specific procedure indications. This gap highlights the need for more practical, scenario-based training that connects knowledge with real-world application, ensuring adherence to guidelines and safer patient care. Although most can identify high-risk groups, such as patients with repaired congenital heart defects, misconceptions about prophylaxis in conditions like mitral valve prolapse persist, with some practitioners still providing incorrect advice. Addressing these issues requires educational efforts that combine procedural knowledge with stewardship principles, pharmacology, and current clinical standards. Improving this integration will help reduce unnecessary antibiotic use, promote responsible prescribing, and protect both individual and public health.

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