Knowledge and Practice of BDS Graduates Regarding Antibiotic Prophylaxis in Infective Endocaraditis

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Abstract:

Objective: The objective of the study was to find out the BDS graduates' knowledge regarding antibiotic prophylaxis of infective endocarditis according to Amerian Dental Association guidelines.

Methodology: A questionnaire, containing 28 questions, was distributed among BDS graduates who were serving at Khyber College of Dentistry during the period between April 2018 to June 2018.

Results: In total 116 questionnaires were distributed among which 85 graduates responded back with response rate of 73.27%. Most graduates used multiple sources to gain knowledge. Most graduates (92.45%) knew that patients with previous history of endocarditis and patients suffering from rheumatic heart disease are the conditions which need antibiotic prophylaxis. In case of procedures which need antibiotic prophylaxis the highest percentage of correct answers was for periodontal surgery (98.11%) followed by extraction (92.45%). Regarding regime of antibiotics most graduate were of the option that penicillin is the first choice of drug and 1g of it should be given.

Conclusion: Most of the graduates had an inadequate knowledge regarding use of antibiotic prophylaxis against infective endocarditis and were unaware of the current guidelines, so there should be trainings and workshops to refresh their knowledge regarding current practices.

Keywords: Dental procedures, heart conditions, infective endocarditis, prophylaxis.

Introduction:

Infective Endocarditis (IE) was first described by William Osler in 1885.[1] It is a life-threatening infection of the linings of the heart and its valves. This disease most commonly occurs due to bacteria and fungi.[2,3] Other organisms which may seldom cause IE are chlamydia rickettsia, and mycoplasma.[4] There are more than 700 microbial species which may be present in the oral cavity.[5] These species have significant effect on the human health and development of diseases.[6] Several dental procedures in which gingival bleeding occurs are related to incidence of IE due to bacteremia.[7]

Until recently antibiotic prophylaxis was given routinely by clinicians to people at high risk before undergoing interventional procedures to prevent endocarditis.[8] However, the effectiveness of antibiotic prophylaxis advised to patients who are at risk of IE prior to any dental procedure is controversial. Moreover, there is difficulty regarding prediction of procedure and circumstances which may cause significant risk. Beside this, unjustified use of antibiotics may cause antibiotic resistance to microbes and anaphylactic reactions.[9] Many organizations such as American dental association (ADA),[10] National Institute for Health and Clinical Excellence (NICE), United Kingdom [11] and European Society of cardiology [12] have issued guidelines on the use of antibiotics for prevention or prophylaxis of endocarditis. These guidelines not only help clinicians to focus on those patients who already have a heart abnormality that predisposes them to infections but also focus on those medical procedures that may cause bacteraemia with organisms that commonly cause endocarditis.[13]

Studies showed low to moderate knowledge of general dentists and practitioners about the knowledge and prevention of infective endocarditis. This study was conducted at Khyber College of Dentistry, Peshawar as it is biggest and oldest dental institute of Khyber Pakhtunkhwa and no such study has been done previously in Khyber College of Dentistry, Peshawar. For this study a questionnaire used in a previous study was redesigned and distributed among the faculty staff, training medical officers (TMO's) and house officers (HO's).[14,15]

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The purpose of the study was to find out the BDS graduates' knowledge about infective endocarditis, their knowledge about procedures which can cause infective endocarditis and preventive measures that can be taken to avoid it according to American Dental Association (ADA) guidelines.

Methodology:

This cross-sectional study was conducted at Khyber College of Dentistry doing the period between april 2018 to june 2018. In this study convenience sampling techniques was used. After approval from the ethical committee a questionnaire, containing 28 questions, was distributed among 116 BDS graduates among which 20 were of faculty staff, 35 were TMO's and 61 were HO's. After distribution 85 participants responded back amongst which were 5 faculty members, 27 TMO's and 53 HO's. The questionnaire was prepared in a way to assess the information about heart conditions which need prophylaxis, dental procedures which can be cause of infective endocarditis and drug regimes, doses as well timings in which prophylaxis can be given.

Results:

The response rates from faculty staff, TMO's and HO's was 25%, 77.14% and 86.88% respectively with an overall response rate of 73.27%. When asked about their reference for information, 31 graduates (36.06%) selected books, 9 graduates (10.58%) picked internet, 2 graduates (2.53%) chose conferences while 43 graduates (50.59%) selected multiple options (Books, conferences, internet, and articles). The graduates who gave correct answer (Yes) that prophylaxis should be given before congenital heart disease were 61 (71.75%) which consisted of 36 HO's (67%), 21 TMO's (77.77%) and 4 faculty members (80%) while 24 (28.25%) gave incorrect answer (No) which consisted of 17 HO's (32.07%), 6 TMO's (22.22%) and 1 staff member (20%).

Most of the graduates (90.58%) gave correct answer (Yes) that patients having prosthetic heart valve should be given prophylaxis which consisted of 50 HO's (94.33%), 22 TMO's (81.48%) and 5 faculty members (100%) which makes a total of 77 out of 85, while only 8 (9.42%) graduates gave incoorect answer (No) that there is no need of prophylaxis. Like for prosthetic heart valve, most of the graduates (91.76%) gave correct answer (Yes) that prophylaxis is necessary for patients having previous history of endocarditis. The details of which are given in table 1.

Table 1: Previous History of Endocarditis

Level of Graduates	Yes	No
HO's	92.45%	7.45%
TMO's	88.88%	11.12%
Staff	100%	0%
Overall	91.76%	8.24%

The percentage of graduates who gave correct answer (No) that patients suffering from rheumatic heart disease should be treated with antibiotic prophylaxis was low. Further detail is is given in Figure 1.

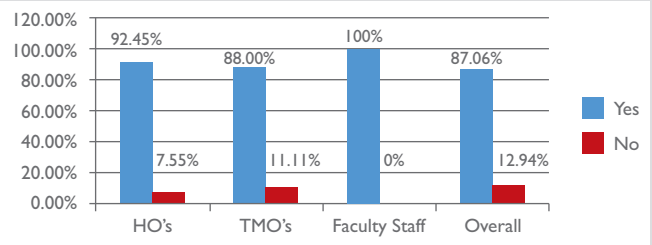

Figure 1: Patients suffering from Rheumatic Heart Disease

The percentage of graduates who gave correct answer (No) to questions such as patients having mitral valve prolapse, patients who had gone under cardiac bypass surgery and the patients having physiological murmur should not be given antibiotics was 31.8%%, 37.7% and 69% respectively where percentage according to designation is given in Table 2.

Table 2: Patients having Mitral Valve Prolapse, Physiological Murmur and history of Cardiac Bypass

	HO's		TMO's		Staff		Overall	
	Yes	No	Yes	No	Yes	No	Yes	No
Mitral Valve Prolapse	69.81 %	30.19 %	59.25 %	40.75 %	100 %	0 %	68.2 %	31.8 %
Cardiac Bypass	66.03 %	33.97 %	55.55 %	44.45 %	60 %	40 %	62.3 %	37.7 %
Physiological Murmur	26.41 %	73.89 %	33.33 %	66.67 %	60 %	40 %	31 %	69 %

The number of graduates who gave correct answer (Yes) according to guidelines that antibiotic prophylaxis should be given in patient's having rheumatoid fever was 65 (76.40%) while 20 graduates (23.60%) gave incorrect answer. The details according to designation are HO's (79.24%), TMO's (74.07%) and faculty staff (60%) while in case of patients having pacemaker the percentage of graduates gave correct answer (No) that regarding prophylaxis decreased as their designation increased which include 79.24% HO's, 55.55% TMO's and 20% faculty staff.

In 2nd part of questionnaire, the graduates were asked about dental procedures before which antibiotic prophylaxis should be given. The details are given in table 3:

Table 3: Dental Procedures before which Antibiotic prophylaxis is required

Procedure	Correct Answer	(HO's)	(TMO's)	(Staff)	(Overall)
Tooth Extraction	Yes	92.45%	85.18%	100%	92.47%
Periodontal Surgery	Yes	98.11%	85.18%	100%	95.29%
Scaling Root Planning	Yes	77.35%	85.18%	100%	82.35%
Endodontic Treatment	Yes	67.92%	48.15%	80%	68.24%
Rubber dam/ Wedge Application	No	86.47%	77.77%	40%	76.47%
Block Anaesthesia	No	73.59%	85.18%	40%	24.71%
Intra-ligamental Injection	No	73.59%	66.66%	40%	30.59%
Infiltration Anaesthesia	No	73.59%	81.49%	40%	57.65%
Prosthetic Moulding	No	84.91%	92.60%	100%	88.24%
Suture Extraction	No	52.84%	59.26%	40%	54.12%
Taking Dental Radiograph	No	96.23%	92.59%	100%	92.45%
Sub gingival cord placement	No	41.51%	59.26%	40%	47.06%

In the third part graduates were asked about drug regime, doses, and timings. Regarding first choice of drug, 77.35% HO's were of the opinion that penicillin should be first choice while 16.98% gave view that it should be cephalosporin while 1.87% and 3.77% thought that it should be macrolides and metronidazole respectively, while in case of TMO's and staff 100% of them were of the view that first choice of drug is penicillin.

When asked about dosage of drug 3 HO's (5.66%) were of the view that it should be 500 grams, 11 (20.75%) opted for 1 gram while 16 (30.19%) and 23 (43.40%) opted for 2 grams and dosage depends upon regime of drug used respectively. In case of TMO's 1 (3.70%) opted for 500 grams while 22 (81.48%), 1 (3.70%) and 3 (11.11%) opted for 1 gram, 2 grams and dose depend upon regime of drug respectively. In case of staff (40%) opted for 2 grams while 3 (60%) opted for depends upon regime of drug used respectively. The overall result in this case were 4.71% 500 grams, 38.82% 1 grams, 22.35% 2 grams and 34.12% depends upon regime of drug used.

According to 16.98% (9) HO's prophylaxis (orally) should be given night before treatment, 79.25% (42) were of the view that it should be given 1 hour before the surgical procedure while 1.89% (1) was the case each in just before treatment and HO having no idea, while in case of TMO's 3.70% (1) responded that it should be given 1 hour before the treatment while 1 (3.70%) and 3 (11.11%) responded with just before the treatment and no idea respectively. In case of staff 100% responded with 1 hour before treatment.

When asked about if prophylaxis forgotten can it be given after treatment, if patient sensitive to some drug can other regime be given and whether antibiotics should be given after treatment 61 graduates (78.82%), 83 graduates (97.64%) 72 graduates (84.76%) respectively responded with yes whose details are given in table 4 and Figure 2 and 3 respectively

Table 4: If prophylaxis forgotten can it be given after treatment

Level of Graduates	Yes	No	No Idea
HO's	77.36%	13.21%	7.54
TMO's	77.77%	14.82%	7.41%
Staff	100%	0%	0%
Overall	78.82%	12.94%	7.05%

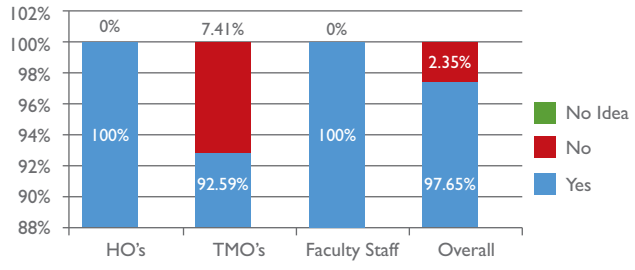

Figure 2: If patient sensitive to some drug can other regime be given

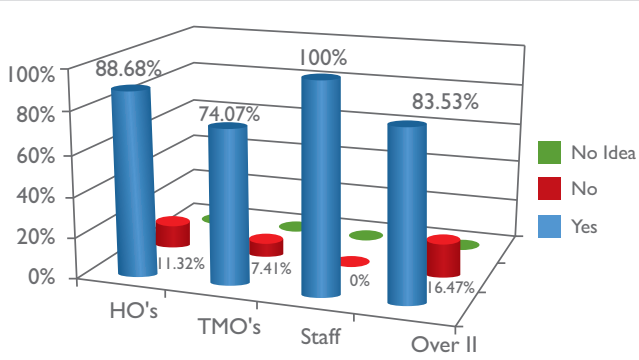

Figure 3: Whether antibiotics should be given after treatment

Discussion:

Infective Endocarditis is dangerous disease of heart and can be fatal. Early diagnosis and prompt treatment is very necessary for this disease as once it becomes severe then it is very difficult to treat it.

Dental procedures are thought to be a key factor in inducing infective endocarditis as result of bacteraemia induced during these procedures.[16, 17] Previously antibiotic was recommended for many dental procedures as well in many heart conditions but now only few procedures and conditions require antibiotic prophylaxis.

The results of the study show that the graduates have a moderate to poor knowledge of antibiotic prophylaxis and many conditions in which now prophylaxis is not needed they were of the view that they will administer antibiotics. These conditions include rheumatic heart disease, mitral valve prolapse, patients having pacemaker, patients having rheumatoid fever and patients undergone bypass surgery.

When compared with results of other studies, the findings of our study were similar to the studies conducted by Coutinho et. al.[18], Hashemipour et. al.[19] and Fatemeh Ahmadi[15]. The condition according to most of the graduates which didn't need any prophylaxis was physiological murmur.

When asked about dental procedures like tooth extraction, periodontal surgery and scaling root planning were the treatments which required prophylaxis while according to graduates taking dental radiograph, rubber dam application and prosthetic moulding were the procedures which didn't require prophylaxis. These results were like other studies conducted by Rayalat et.al.9 and Cummins et.Al.[20]

Penicillin was considered as first choice of drug by high percentage of graduates which matched the results when compared with another study[19] but high percentage of graduates were unaware of the dosage. While regarding the timing of prophylaxis most of them were aware of the time before which prophylaxis should be given.

Regarding drug sensitivity almost all the graduates were aware that other regimes can be given in case of sensitivity but many of them were unaware that there is no need of antibiotics after the procedure.

Conclusion:

Most of the graduates have inadequate knowledge regarding use of antibiotic prophylaxis and are unaware of the current guidelines issued by American Dental Council (ADA) although they are available widely. In some cases, designation had no influence on the result but in some cases the knowledge increased as the designation increased while in some questions knowledge decreased as designation increased.

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Author Contributions

1. Uzair Ahmad Saleem - Conceptualization and Study Design
2. Simran Jouth Choala - Data collection
3. Nafiah Bashir - Proof Reading and Content Reviewing
4. Usama Siddiqui - Paper Writing and Critical Analysis
5. Basheer Rehman - Critical analysis and Approval of questionnaire