Original Article

AWARENESS ON ANTIBIOTIC PROPHYLAXIS FOR CARDIAC PATIENTS- A SURVEY AMONG DENTAL STUDENTS

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Abstract

INTRODUCTION: Infective endocarditis prophylaxis for dental procedures should only be prescribed for patients with underlying heart problems that are linked to a higher risk of infective endocarditis-related complications. Prophylaxis is recommended for all dental operations that require stimulation of gingival tissue or the periapical area of teeth in patients with these underlying cardiac conditions or perforation of oral mucosa.
AIM: the aim of the study was to produce awareness on antibiotic prophylaxis for cardiac patients - a survey among dental students.
MATERIALS AND METHODS: The study was performed in a sample size of 100 participants. A set of questionnaires was created by the use of google form. The analysis is done with the help of SPSS software and the representation by pie charts and bar graphs.
RESULTS: Awareness about the antibiotic prophylaxis for the cardiac patients were well developed. For several patients who may have been deemed candidates for prophylaxis, the risk of adverse antibiotic reactions outweighs the advantages of prophylaxis p-value of our study is <0.005.
CONCLUSION: For all dental procedures that require manipulation of gingival tissue or the periapical region of the teeth, or perforation of the oral mucosa, prophylaxis is recommended for the patients described. A well developed awareness was created among the dental students about the antibiotic prophylaxis for cardiac patients. Furthermore studies will improve the better knowledge briefly about the antibiotic prophylaxis for the cardiac patients.

KEYWORDS: Awareness, antibiotic prophylaxis, cardiac patients, dental students.

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INTRODUCTION:

Infective endocarditis (IE) is an inflammation of the heart's endocardial surfaces, including one or more heart valves. The majority of the patients (57.7%) were men, with more than a third being aged 70 or older. Patients are more likely to develop IE if they have structural heart disease, prosthetic heart valves, an indwelling cardiovascular system, or an intravascular catheter, chronic hemodialysis, human immunodeficiency virus infection, diabetes, or history of infective endocarditis(Murashita, 2018). Males over the age of 60, male gender, intravenous (IV) substance use, poor dentition, or dental infection are all risk factors. Infectious endocarditis can be acute or subacute in nature(Wilson and Estes, 2012). Acute infections cause high fevers, rigours, and sepsis, and they worsen quickly. The diagnosis of subacute bacterial endocarditis is often delayed, and symptoms include weight loss, fatigue, and dyspnea. Subacute bacterial endocarditis differs from acute bacterial endocarditis in many ways(Ruska, 1993). Penicillin-resistant S.viridans cause the majority of cases of subacute bacterial endocarditis, while S.aureus causes the majority of cases of acute bacterial endocarditis. Subacute bacterial endocarditis is more common in people who already have heart disease, whereas acute bacterial endocarditis is more common in healthy people(Nallarajah and Mujahieth, 2020). Subacute bacterial endocarditis seldom results in serious cardiac damage after treatment; however, most patients who survive acute bacterial endocarditis die of heart failure within weeks or months(Libman and Friedberg, 1948; Meynell, 1948). Prior to such dental procedures, antibiotic prophylaxis has been recommended for two classes of patients: those with cardiac defects that could predispose them to infective endocarditis, and those that have a prosthetic joint(s) and may be at risk for hematogenous infections at the prosthetic site(Dumanyan, no date). Antibiotics are only prescribed for endocarditis prophylaxis under very limited circumstances. This shift occurred for a variety of reasons. To begin with, infective endocarditis was more likely to occur as a result of routine dental and medical procedures than as a result of a particular medical or dental operation(Meerson, 1983). Second, it was thought that antibiotic prophylaxis for dental procedures stopped only a small number of IE cases. The cost of antibiotic therapy, as well as the risk of

side effects and antibiotic resistance, far outweighed the value of such prophylaxis (Massicotte, Patricia Massicotte and Chair, 2005). Finally, continuous good oral hygiene is thought to be more effective than a single dose of antibiotics in preventing IE. Numerous medical conditions predispose patients to bacteremia-induced infections, according to the American Academy of Pediatric Dentistry (AAPD). Since it is impossible to foresee whether a vulnerable patient will become infected, prophylactic antibiotics are prescribed when these patients undergo procedures that may result in bacteremia(Dumanyan, no date). These recommendations are intended to help practitioners make decisions regarding antibiotic prophylaxis for dental patients at risk. The following are several medical conditions that may predispose patients to post-procedural infections(Giamberti *et al.*, 2020). This isn't meant to be a comprehensive list; rather, the classification should aid clinicians in identifying children who may be at risk. If a patient describes a syndrome or medical disorder that the physician is unfamiliar with. Given the serious implications of sternal wound infections, antibiotic prophylaxis has been a common procedure in cardiac surgery since then (Rao *et al.*, 2020). There is currently controversy about the best antibiotic(s), dosing, and prophylaxis length. Standard or double-dose cefazolin or cefuroxime are widely recommended in guidelines(Levine, 2013). General surgical guidelines suggest 24 hours of post-operative prophylaxis, with most usually only pre- and intra-operative coverage, for all procedures, while cardiac surgery-specific guidelines in the United States call for prophylaxis to be extended to 48 hours. A significant amount of intravascular foreign material stayed in place, normally for a long time, with the percutaneously inserted IABP and the intra arterial pump line(Candan, 2020). Percutaneously implanted devices and catheters that disrupt the skin barrier can increase the risk of local infection at the entry or exit site (Meerson, 1983). Our team has extensive knowledge and research experience that has translate into high quality publications(Sathivel *et al.*, 2008; Panda *et al.*, 2014; Govindaraju, Neelakantan and Gutmann, 2017; Johnson *et al.*, 2020; Saraswathi *et al.*, 2020) (Kumar *et al.*, 2006; Devi and Gnanavel, 2014; Varghese *et al.*, 2015; Sivamurthy and Sundari, 2016; Chen *et al.*, 2019).The main aim of the survey was to know the knowledge and awareness among the dental students about the antibiotic prophylaxis for cardiac patients.

MATERIALS AND METHODS:

The method involved in this study was an online survey of questionnaires, which involves assessing the awareness and knowledge about antibiotic prophylaxis for cardiac patients. Approval from the institutional ethical committee and informed consent from the participants was obtained. The total number of participants was 100. The method used in this study was stratified random sampling. A set of 12 questionnaires were prepared and the data were analysed by using the software SPSS version 23. The data was analysed and represented by pie charts. The analytical test used was the chi-square test.

RESULTS:

LIST OF GRAPHS:

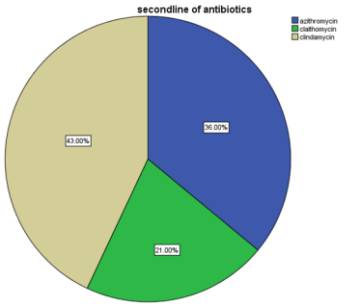

Figure 1:Pie chart depicting the distribution of responses to the question, second line of antibiotic prophylaxis for cardiac patients among the study population. 36% azithromycin (blue), 21% clarithromycin (green), 43% clindamycin (beige).

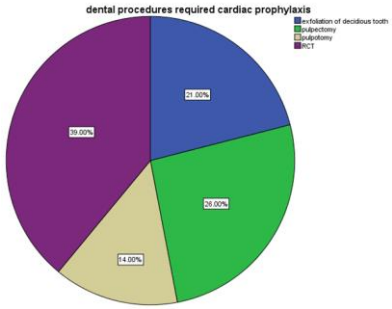

Figure 2: Pie chart depicting the distribution of responses to the question, type of dental procedures which require antibiotic prophylaxis for cardiac patients. 21% exfoliation of deciduous tooth (blue), 26% pulpectomy (green), 14% pulpotomy (beige), 39% RCT (purple).

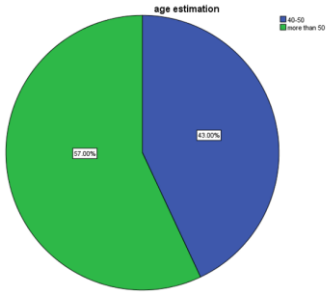

Figure 3: Pie chart depicting the distribution of responses to the question that for which age group people the cardiac prophylaxis required the most. 43% age group between 40-50 (blue), 57% more than 50 (green).

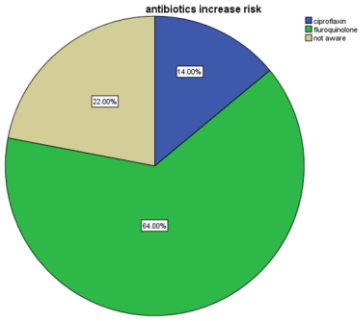

Figure 4: Pie chart depicting the distribution of responses to the question about the antibiotic which increases the risk among the cardiac patients. 14% ciprofloxacin (blue), 64% fluoroquinolone (green), 22% not aware (beige).

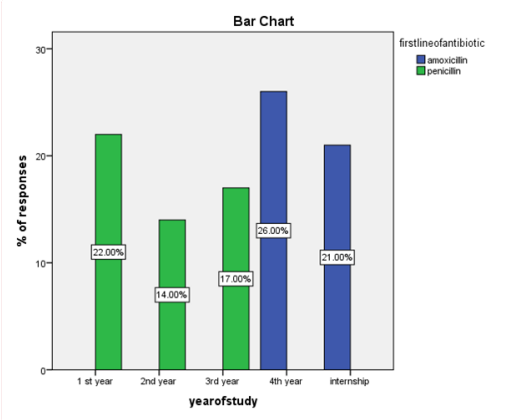

Figure 5: Bar graph represents the association between a student's year of study and response to the question about the first line of antibiotics to cardiac patients. 1st year 22%, second year 14%, third year 17% answered penicillin (green), fourth year 26%, internship 21% answered amoxicillin (blue).

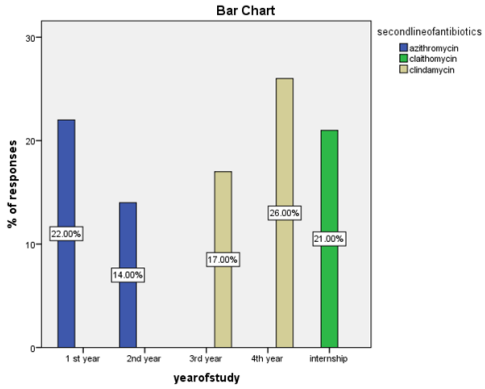

Figure 6: Bar graph represents the association of student's year of study and responses to the question the second line of antibiotics. 1st year 22%, second year 14% answered azithromycin (blue), third year 17%, fourth year 26% answered clindamycin (beige), internship 21% answered clarithromycin (green).

Commented [1]: error graphs?

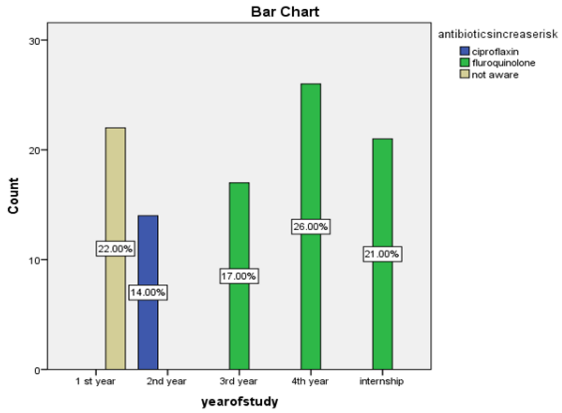

Figure 7: Bar graph represents the distribution of students in order to the year of study to question antibiotics which increase the risk in cardiac patients on frequent use. 1st year 22% not aware (beige), second year 14% answered fluoroquinolone (blue), third year 17%, fourth year 26%, internship 21% answered clarithromycin (green).

Among the total population 57% of the population were female and 43% population were males. Among the total population 22% of students studying 1st year, 14% of the students studying 2nd year, 17% of the students were in 3rd year, 26% of the population studying 4th year and 21% of the students doing internship. Among the total population 100% of the population were aware about the antibiotic prophylaxis for the cardiac patients. Among the total population 47% answered that amoxicillin is the first line of antibiotics given for cardiac patients and 53% of the total population thinks that penicillin was the first line of antibiotics for cardiac patients. Among the total population, azithromycin was the second line of antibiotic prophylaxis for cardiac patients, 21% of the population answered clarithromycin and 43% answered clindamycin. Among the total population 39% think that RCT needs antibiotic prophylaxis before the treatment, exfoliation of the deciduous tooth (21%), pulpectomy (26%), pulpotomy (14%). Among the total population 57% think that the prophylaxis is needed for the people whose age will be more than 50 and 43% of students think it needs to be between the age group of 40-50. Among the total population 21% think it is very useful for heart transplantation, 43% think it is for artificial heart transplantation and 36% answered all the above. Among the total population 78% think that it is not able to cure the disease and 22% answered that it might be cured by antibiotics. Among the total population 83% of the population thinks that it may cause high risk to the cardiac patients by overuse and 17% of the total population thinks it causes high risk by prolonged usage. Among the total population the antibiotic which increases the high risk in cardiac patients will be ciprofloxacin (14%), fluoroquinolone (64%) and 22% of the population were not aware. Among the total population the first (22%), second (14%) and third year (17%) students think that penicillin was the first line of antibiotics used and fourth year (26%) and internship (21%) thinks amoxicillin was used as the first line of antibiotics in cardiac patients. Chi square analysis (chi square value 100.000[a]) has been found to be statistically significant with P= 0.000. Among the total population first year (22%) and second year (1%) thinks that the second line of antibiotics was azithromycin, third (17%) and fourth year (26%) thinks clarithromycin and the internship (21%) people thinks it will be clindamycin. Chi square analysis (chi square value 200.000[a]) has been found to be statistically significant with P= 0.000. Among the total population third (17%) , fourth (26%) and internship (21%) students thinks that fluoroquinolone was the antibiotic prophylaxis which have high risk on cardiac patients, first year (22%) students were not aware and second year(14%) think that high risk was caused by ciprofloxacin. Chi square analysis (chi square value 200.000[a]) has been found to be statistically significant with P= 0.000.

DISCUSSION:

Antibiotics had to be instituted in more patients of the control group than the prophylaxis group. It is demonstrated that an additional and prolonged postoperative period of broad-spectrum prophylaxis with low-dose vancomycin and ticarcillin/clavulanate could not effectively influence infectious outcome in a high-risk group of patients undergoing cardiac operations. Low-dose vancomycin did not reduce the rate of infections or the colonization of intravascular

catheters with gram-positive organisms. Our team has extensive knowledge and research experience that has translate into high quality publications (Narendran *et al.*, 2020; Teja and Ramesh, 2020; Bhavikatti *et al.*, 2021; Chakraborty *et al.*, 2021; Karobari *et al.*, 2021; Muthukrishnan, 2021a, 2021b; PradeepKumar *et al.*, 2021; Sawant *et al.*, 2021), (Romera *et al.*, 2018; Ezhilarasan, 2020; R *et al.*, 2020; Rohit Singh and Ezhilarasan, 2020), (Priyadharsini *et al.*, 2018; Vijayashree Priyadharsini, 2019; Gudipaneni *et al.*, 2020; Maheswari, Nivedhitha and Ramani, 2020; Chaturvedula *et al.*, 2021), (Kanniah *et al.*, 2020).

According to Farook et al., the results of the study confirm that most trainers (95.7%) and trainees (94.1%) are aware of this guideline but only 62% of trainers and 69.7% of trainees have read the guideline(Kumar and Sneha, 2016). Compliance with the guideline was low among trainers (55.7%) and trainees (77.6%)(Bahammam and Abdelaziz, 2015). Compliance was high among those who had read the guideline. Trainers were more likely to prescribe prophylaxis antibiotics for HRCP. The majority (74-76%) would prescribe antibiotics on a specialist's request(Pokharel and Chapagain, 2019). The limitation for the current study was the sample size surveyed.

According to Dumanyan et al, Despite the fact that the hazards of infective endocarditis in terms of mortality and morbidity are well established, the use of antibiotic prophylaxis in prevention has been controversial due to a lack of good evidence as well as the potential side effects of routine antibiotic prophylaxis (i.e., antibiotic resistance, adverse drug reactions, costs).In the previous decade, ESC guidelines have limited antibiotic prophylaxis to the most high-risk patients undergoing high-risk procedures. Prophylaxis is usually accomplished by giving a single dosage of an antibiotic 30-60 minutes before the procedure that is intended to cover the probable microorganisms(Dumanyan, no date). Observational, epidemiological evidence from the post-guideline era has not yet been good enough to make a decision.

According to Bisno et al, Clindamycin, azithromycin, or clarithromycin are the antibiotics of choice for AP. Alternatively, if possible, treatment should be postponed for at least 10 days after the antibiotic has been finished to allow for the restoration of normal oral flora. When a patient is receiving a long-term parenteral antibiotic for IE, the therapy should be given 30 to 60 minutes after the parenteral antibiotic is delivered(Bisno, 1981).

From another study, the number of people and operations for whom AP is advised has decreased dramatically, as have the dose and administration regimes. AP is recommended by virtually every guideline committee in the world for high-risk persons undergoing high-risk invasive dental operations(Habib and Thuny, 2011).

CONCLUSION:

The antibiotic prophylaxis for the cardiac patients should be given before some dental procedures. It is essential that dental clinicians, including dental students, have sufficient knowledge of and adhere to relevant prophylactic guidelines for the prevention of infective endocarditis. Because the overprescription of antibiotics contributes to the development of drug resistance, antibiotic stewardship should be at the forefront of patient care. From this study it was concluded that the students of third year, fourth year and internship students were having better knowledge about the antibiotic prophylaxis for cardiac patients than the first and second year students. Furthermore studies will make more understanding and knowledge about the antibiotic prophylaxis of cardiac patients.

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AUTHOR CONTRIBUTION: In the study all authors had equal contribution in drafting the manuscript.
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