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KNOWLEDGE, ATTITUDE AND PRACTICE ON PROTOCOLS FOR ANTIBIOTIC USAGE FOR ENDODONTIC INFECTIONS AMONG DENTAL STUDENTS - A QUESTIONNAIRE SURVEY

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ABSTRACT

Introduction: Antibiotics are medications that are used to cure or avoid bacterial infections. They work by either destroying or blocking bacteria from reproducing and spreading. In recent years, the endodontic regenerative procedure (ERP), an alternative therapeutic approach to apexification, has gained a lot of attention. Incorrect antibiotic use in dentistry would lead to secondary infections, and also it would make antibiotics ineffective against potentially lethal medical infectious diseases.

Aim: The purpose of the study was to know about the awareness on protocols for antibiotic usage for endodontic infections.

Methodology: A total of nearly 100 dental undergraduates and interns were requested to participate in the study. The questionnaire had 16 items which were designed in such a way to evaluate the awareness and attitude of protocols for antibiotic usage for endodontic infections. A small population of 100 dental undergraduates and specialists were aware of protocols for antibiotic usage for endodontic infections.

Result: 59.18% of the study population felt antibiotic therapy is not required in the case of systemic involvement in endodontics, 30.61% of the study participants felt antibiotic therapy is not essential in presence of persistent infection and 10.20% of the study population felt antibiotic therapy is not required in the case of indications of progressive infection (figure 2).

Conclusion: Most of the dental undergraduates and interns these days are aware of protocols for antibiotic usage for endodontic infections and show a responsible attitude towards these procedures. But there exists a group of population who are not aware of various protocols for antibiotic usage in endodontic infections.

Keywords: endodontic infections, antibiotics, LSTR

INTRODUCTION:

Antibiotics are medications that are used to cure or avoid bacterial infections. They work by either destroying or blocking bacteria from reproducing and spreading. Antibiotics including penicillin and amoxicillin (Amoxil) are used to treat a wide range of diseases that occur during dental treatment(1–4). Tetracyclines like doxycycline used to treat periodontal infections in dentistry. Previous studies quote that Penicillins are successful against the majority of bacteria that cause endodontic infections, including abscesses. Antibiotic overuse and the rise of antibiotic-resistant bacterial strains are causing alarm around the world (3,5,6). Antibiotic prescription in dentistry, especially in endodontics, has largely been studied using cross-sectional observational studies and surveys since the 1970s. In the past, the survey instrument has been effective in collecting relevant information about endodontic practice. Antibiotic therapy has become an inextricable part of a wide range of medical and dental-related therapies, and it serves as one of the most important lines of defense against microbes(7–10).

Antibiotics can be classified in a variety of ways; for example, these drugs can be divided into many subclasses, such as cillins, mycins, and porines(11–13). The primary objective of endodontic care is to remove as many bacteria as possible from the root canal system and to establish an atmosphere in which no microorganisms can survive. During the root canal preparation process, approximately 50% of the root canal peripherals and ramifications can go uninstrumented. Calcium hydroxide has historically been used to induce a bridge and clear the root canal space for potential treatments of open-apex teeth with necrotic pulp tissues(14–18). These good outcomes are impossible without the use of inter-appointment intracanal medications. The type of intracanal drug used is determined by a detailed evaluation of the tooth disease, a thorough understanding of the presence of bacterial community, and their growth survival mechanisms. Since the involvement of bacteria inside the root canal is the primary cause of endodontic disease, an antimicrobial agent is necessary(19–28).

The microbial suppression in the root canal and periapical area is crucial to the endodontic treatment's progress. A sterile state cannot be accomplished exclusively by endodontic instrumentation(29–34). The use of antibiotics locally has been studied since the start of non-instrumentation endodontic therapy, as well as lesion sterilization and tissue repair. A new antibiotic combination known as "triple antibiotic paste" (TAP) was recently introduced specifically for the regeneration and revascularization protocol as well as the treatment of open apex teeth with necrotic pulp. TAP (ciprofloxacin, metronidazole, and minocycline) is a mixture of these three antibiotics. Revascularization of necrotic pulps has recently regained prominence and has emerged as a restrictive treatment choice for young permanent teeth with premature roots(35–46). The use of a combination of antibacterial drugs (metronidazole, ciprofloxacin, and minocycline) for the disinfection of oral infectious lesions, such as dentinal, pulpal, and periradicular lesions, is known as lesion sterilization and tissue repair (LSTR). In recent years, the endodontic regenerative procedure (ERP), an alternative therapeutic approach to apexification, has gained a lot of attention. Incorrect antibiotic use in dentistry would lead to secondary infections, and also it would make antibiotics ineffective against potentially lethal medical infectious diseases(47–55).

Antibiotic prophylaxis refers to the application of antibiotics prior to surgical and nonsurgical operations with the intention of avoiding local and systemic bacterial infections. The aim of Antibiotic prophylaxis in dentistry is to protect patients at risk from local microbial infection or systemic spread of oral bacteria during various dental procedures that cause bleeding and transient bacteremia(56–63). Antibiotics would become ineffective against deadly human infectious diseases if they were used improperly in dentistry. This would result in secondary infections. Antibiotic prophylaxis on a widespread basis is obviously unethical, but information about safe prescribing remains a challenge. Overprescribing has been a major drawback in the field of dentistry. For patients at risk of infective endocarditis and prosthetic joint inflammation, antibiotic prophylaxis has been used in dentistry. Prophylaxis was designed with the intention of preventing transient bacteremia caused by invasive dental procedures. Antibiotic prophylactic procedures have experienced constant reform and complexity in recent years(64–68). The high volume of antibiotic prescriptions written in dentistry may be attributed to a lack of knowledge of prophylactic recommendations. Our team has extensive knowledge and research experience that has translate into high quality publications(69–78),(79–82),(83–87)(88). The aim of this study was to evaluate the effectiveness of Antibiotics and protocols to be followed in endodontic treatments.

MATERIALS AND METHODS:

Study Design

A cross sectional study was conducted among 101 dental students from March - April 2021

Study Subjects

A simple random sampling method was used to select the study participants. Among 101 participants, 88 participants belong to undergraduate and 13 participants belong to CRI.

Inclusion Criteria:

All undergraduate dental college students of private dental institutions who were willing to participate were included.

Ethical Considerations

Returning the filled questionnaire was considered as implicit consent with no need for signing a written consent. Ethical approval for the study is obtained from the Institutional Review Board (IRB) .

Study Method:

Self-administered questionnaire of 12 close-ended questions was prepared and it was distributed among undergraduate dental college students of private dental institutions through online survey forms “GOOGLE FORMS”. Demographic details were also included in the questionnaire.

Statistical Analysis:

Data was analysed with the SPSS version (22.0). Descriptive statistics as number and percent were calculated to summarise qualitative data. Chi square test was used to analyze and compare the education level of students on protocols for usage of antibiotics in endodontic treatments. The confidence level was 95% and of statistical significance $P < 0.05$. Finally, the result was presented by using bar charts and frequency tables.

S.no	Questions	choices	responses
1	year of study	1st year 2nd year 3rd year 4th year CRI	16.33% 11.22% 27.55% 13.27% 18.37%
2	Which conditions do not require antibiotic therapy in endodontics?	Systemic involvement presence of persistent infection indications of progressive	59.18% 30.61%

		infection	10.20%
3	What are the antibiotic procedures required for dental procedures?	Root canal instrumentation intentional RCT Deep caries management all of the above	56.12% 19.39% 16.33% 8.16%
4	Which of the following is not recommended for antibiotic prophylaxis?	intra canal dental treatment taking of oral impressions placement of rubber dams all the above	53.06% 13.27% 19.39% 14.29%
5	Which is the drug used for general prophylaxis in endodontic treatment?	amoxicillin ampicillin cephalexin both and b	46.94% 22.45% 18.37% 12.24%
6	What is the recommended dosage of amoxicillin required for treating general prophylaxis?	2000 mg given orally 1 hr before procedure 2000 mg given orally a day before 500 mg orally given 2 hr before procedure	63.27% 23.47% 13.27%
7	Are you aware of Triple antibiotic paste?	Yes No	78.57% 21.43%
8	Triple antibiotic paste is a combination of?	ciprofloxacin, metronidazoleand minocycline ciprofloxacin, sulfamethoxazole, diazepam ofloxazole barbiturates, clotrimazole	64.29% 22.45% 13.27%
9	Which drug acts as a synthetic fluoroquinolone and has a bacterial mode of action?	ciprofloxacin metronidazole minocycline	65.31% 24.49% 10.20%
10	Triple antibiotic paste can be mixed with?	normal saline chlorhexidine Tale powder all of the above	56.12% 13.27% 14.29% 16.33%
11	Antibiotic prophylaxis recommended for which among the cardiac condition?	complex cyanotic heart disease RHD	69.39%

		surgical repair of atrial septal defect	17.35% 13.27%
12	Antibiotic prophylaxis not recommended for which among the cardiac conditions?	cardiomyopathy bacterial endocarditis cardiac pacemaker	47.96% 43.88% 8.16%

RESULTS:

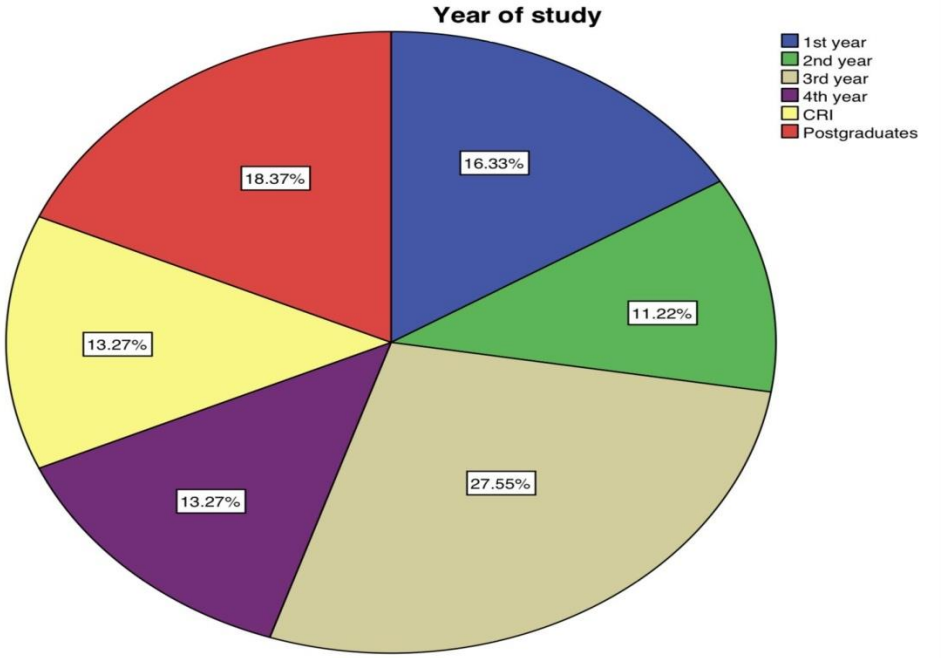

FIGURE 1: Pie chart representing the percentage of year of study, 16.3% of students were 1st years; 11.2% were 2nd year students; 27.6% were 3rd year students; 13.3% were final year students; 13.3% were interns; 18.4% of the respondents were postgraduates.

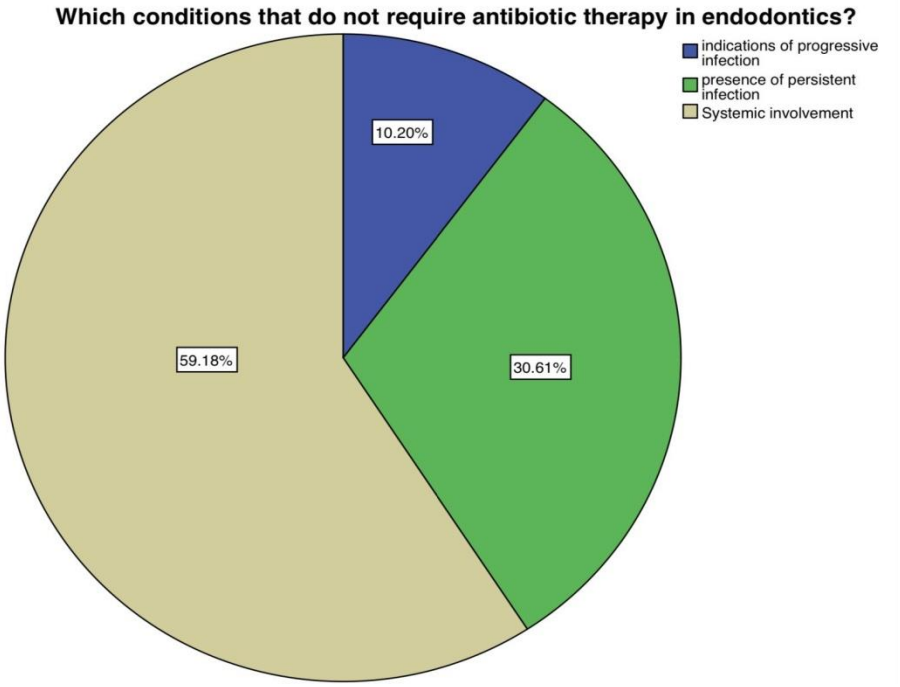

FIGURE 2: Pie chart representing the responses on whether the antibiotic therapy required in endodontic treatment, 59.2% said systemic involvement; 30.6% said presence of persistent infection; 10.2% of the respondents said indications of progressive infections.

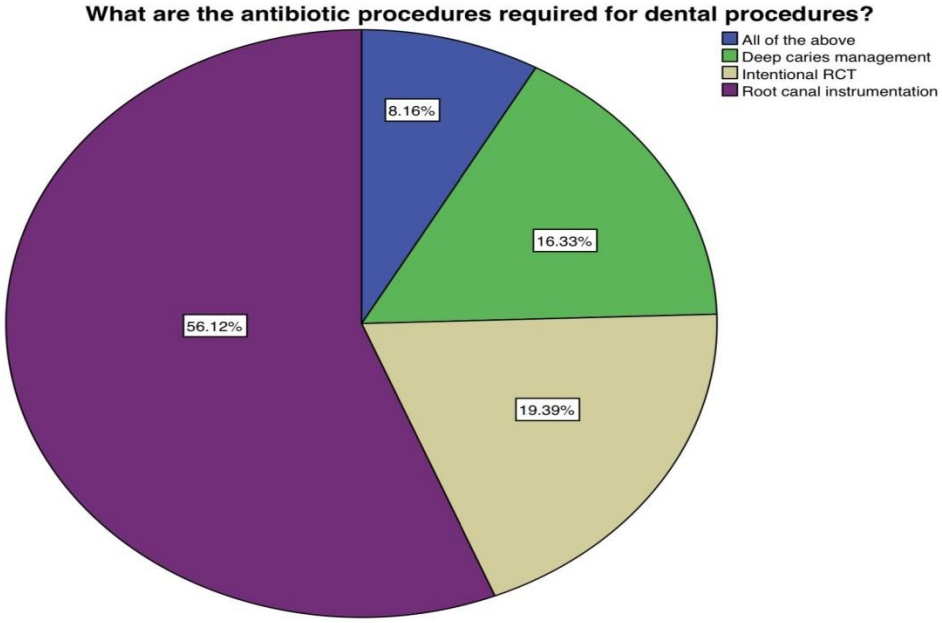

FIGURE 3: Pie chart representing the responses for the various antibiotic procedures required for dental treatment, 56.1% said root canal instrumentation; 19.4% said intentional RCT; 16.3% said deep caries management; 8.2% responded 'all the above'.

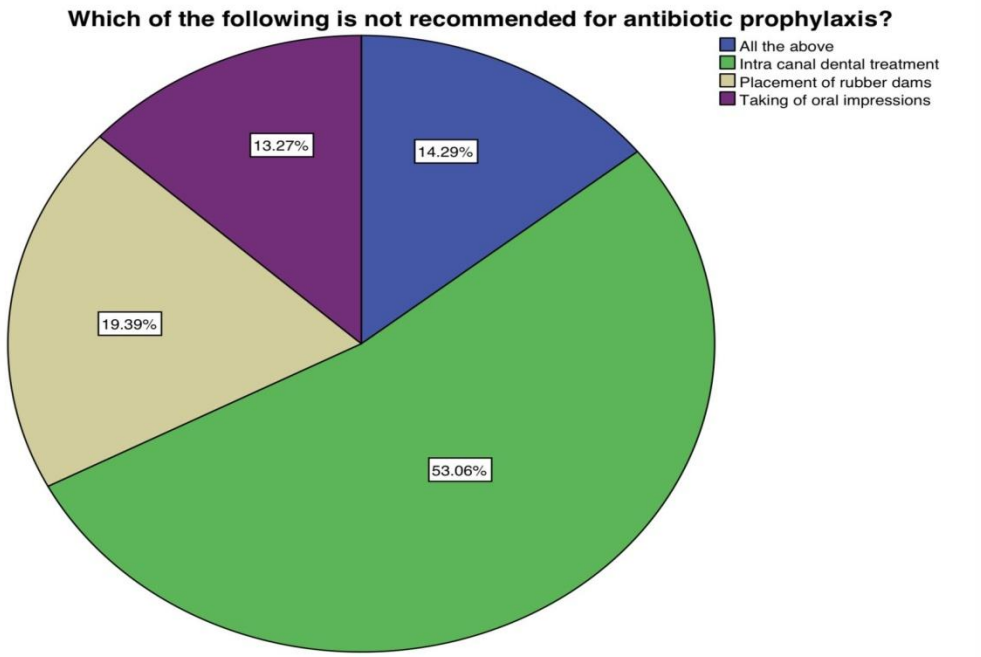

FIGURE 4: Pie chart representing the responses for antibiotic prophylaxis. 53.1% said intra canal dental treatment; 19.4% said placement of rubber dams; 14.3% said all the above are correct; 13.3% said taking of oral impressions.

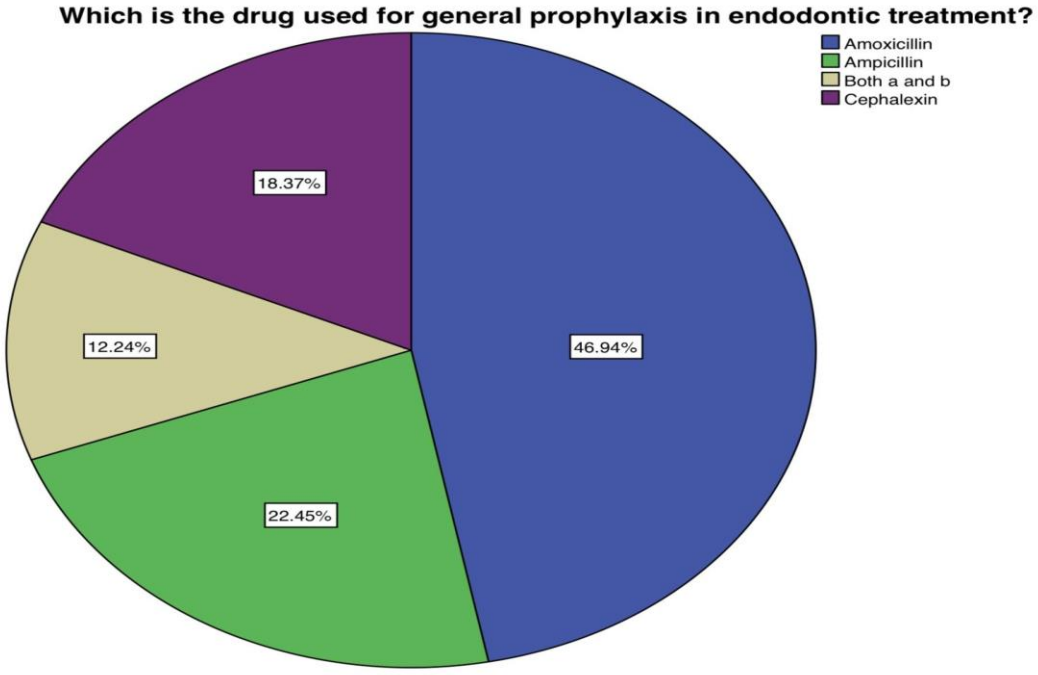

FIGURE 5: Pie chart representing the responses for the usage of drugs for general prophylaxis in endodontic treatment, 46.9% preferred amoxicillin; 22.4% preferred ampicillin; 18.4% preferred cephalexin; 12.2% responded both a and b.

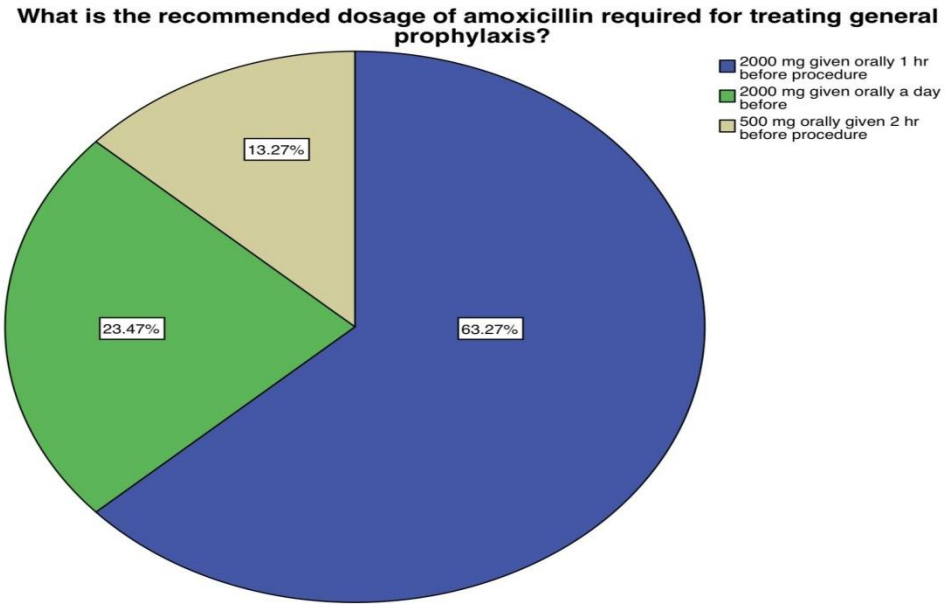

FIGURE 6: Pie chart representing the responses for the recommended dosage of amoxicillin required for treating general prophylaxis, 63.3% said 2000 mg given orally 1hr before procedure; 23.5% said 2000 mg given orally a day before; 13.3% said 500 mg orally given 2hr before procedure.

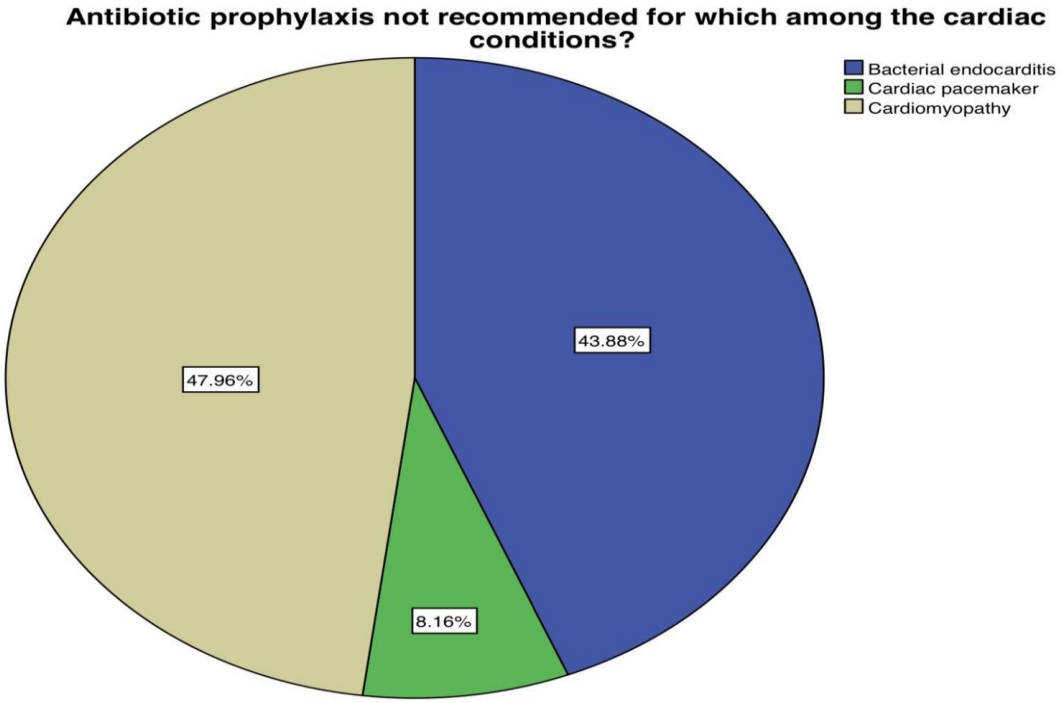

FIGURE 7: Pie chart representing the responses for antibiotic prophylaxis that is not recommended for cardiac condition, 48% said cardiomyopathy; 43.9% said bacterial endocarditis; 8.2% said cardiac pacemaker.

DISCUSSION:

In our study third years gave the highest participation for this e survey with 27.55% followed by postgraduates with 18.37% and the least was given by 2nd years with 11.22% (Figure 1). 59.18% of the study population felt antibiotic therapy is not required in the case of systemic involvement in endodontics, 30.61% of the study participants felt antibiotic therapy is not essential in presence of persistent infection and 10.20% of the study population felt antibiotic therapy is not required in the case of indications of progressive infection (figure 2). 56.12% of the study population felt root canal instrumentation is the antibiotic procedure for dental treatments, 19.39% of the study participants felt intentional RCT would be a better antibiotic procedure required for dental procedures, 16.33% of the respondents felt deep caries management would be the better antibiotic procedure for dental treatment (figure 3). 53.06% of the study participants felt inter canal dental treatment is not recommended for antibiotic prophylaxis, 19.39% of the students felt placement of rubber dams would not be a correct option for antibiotic prophylaxis, 13.27% of respondents felt taking oral impressions

would not be a right choice for antibiotic prophylaxis (figure 4).Similar findings were found in the study done by Drobac et al (23). 46.94% of the study participants felt amoxicillin would be the drug that can be used for general prophylaxis in endodontic treatment, 22.45% of the respondents felt ampicillin would be the right drug that can be used for general prophylaxis in endodontic treatment, 18.37% of the respondents felt cephalexin would be the right drug that can be used for general prophylaxis in endodontic treatment, 12.24% of the respondents recommended both amoxicillin and ampicillin for general prophylaxis in endodontic treatment (figure 5). 63.27% of the respondents recommended 2000mg dosage could be given orally 1hr before the procedure, 23.47% of the respondents felt 2000mg dosage could be given orally 1 day before procedure, 13.27% of the respondents felt 500mg dosage could be given orally 1hr before procedure (figure 6). Similar findings were found in the study done by DenizSungur et al(24). 47.96% of the respondents felt antibiotic prophylaxis would not be recommended for cardiomyopathy condition, 43.88% of the respondents felt antibiotic prophylaxis would not be recommended for bacterial endocarditis, 8.16% of the respondents felt antibiotic prophylaxis would not be recommended for cardiac conditions like cardiac pacemaker (figure 7).

Limitations and Future Scope:

The study consists of small sample sizes. The questionnaire was general and it is not specific. It is not distributed widely. It is only distributed to a selected population. To improve the awareness on endodontic infections, measures should be taken and the study should be expanded to more number of participants to create better knowledge on endodontic infections.

CONCLUSION:

In the present study it was evident that most of the respondents were aware of various protocols of antibiotic usage in endodontic infections. Majority of the study population belonging to the age group 17-25 years were aware of various protocols for endodontic infections. To obtain dental care during this pandemic seems to be very difficult as the situation is becoming worse everyday. Hence, awareness and thorough knowledge about the various protocols in endodontic infections is essential.

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