

AWARENESS ABOUT ANTIBIOTIC PROPHYLAXIS PRIOR TO TOOTH EXTRACTION

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Abstract: Any invasive procedure is having the risk of bacteraemia. In some it is transient but in a percentage of cases it may lead to septicaemia. Guidelines for antibiotics prior to dental procedures for patients with specific cardiac conditions and prosthetic joints have changed, reducing indications for antibiotic prophylaxis. In addition to guidelines focused on patient comorbidities, systematic reviews specific to dental extractions and implants, support pre-procedure antibiotics for all patients. However, data on dentist adherence to these recommendations are scarce. The main objective of this study is to evaluate the knowledge and awareness on antibiotic prophylaxis for tooth extraction among undergraduate dental students, post graduate dental students and dentists. The study group consisted of undergraduate dental students, postgraduate dental students and dentists. Total number of participants included in the study was 150. The statistical analysis was done using SPSS software (SPSS version 21.0, SPSS, Chicago IL, USA). The data was analysed using a chi-square test. The p value of less than 0.05 was considered to be statistically significant. About 76% of dentists and 44% of post graduates are aware about dental conditions that require antibiotic prophylaxis. There was a significant difference between the study group and antibiotic prophylaxis. (chi-square, p value: 0.00 (p<0.05 statistically significant). Dentists and post graduates in this study have a good level of knowledge and positive attitude whereas undergraduate students lack knowledge regarding antibiotic prophylaxis for tooth extraction. Hence more awareness programs and refreshing courses regarding antibiotic prophylaxis for tooth extraction are necessary to update the knowledge among undergraduate dental students. A better knowledge of antibiotic prophylaxis is essential for safe practice in dentistry. This will ensure the provision of better and safer dental health care services for the population.

Keywords: Undergraduate students, Antibiotic prophylaxis, Dentists, postgraduates, Tooth extraction.

INTRODUCTION

Antibiotic resistance, driven by antibiotic prescribing, is one of the most serious health threats facing the world today (Website, no date a), and approximately 30% of antibiotics prescribed in primary care settings are considered unnecessary (Website, no date b) (Fleming-Dutra *et al.*, 2016). Dentists prescribe 10% of all antibiotics in the community, ranking fourth after family practitioners, pediatricians, and internists (Suda *et al.*, 2016) (Hicks *et al.*, 2015). Current evidence indicates that antibiotics administered prior to most dental procedures lack a clear benefit and that when antibiotics are not given, the risk of infection is minimal (Constantinides *et al.*, 2014). In fact, transient bacteremia from dental procedures has been estimated to occur at rates similar to those of daily oral health activities (Sconyers, Crawford and Moriarty, 1973) (Chung *et al.*, 1986) (Pallasch and Slots, 1996)

Antibiotic prophylaxis has been used in dentistry for patients at risk of infective endocarditis of prosthetic joint infection. The scientific rationale for prophylaxis was to eliminate or reduce transient bacteraemia caused by invasive dental procedures. Despite a long history of use and multiple guidelines for prophylaxis, there remains uncertainty about its effectiveness. In the last 10 years, there have been significant changes to the guidelines for antibiotic prophylaxis. These changes have been driven partly by global

concerns about antimicrobial resistance ('WHO | Antimicrobial resistance: global report on surveillance 2014', 2016) and subsequent recommendations that any prescription of antibiotics should be appropriate and judicious. (*Website*, no date c)

Another factor that has driven the changes has been the recognition that the incidence of transient bacteraemia caused by oral hygiene procedures is often the same as the incidence caused by many dental treatments for which prophylaxis has tradition ally been given. Regular tooth brushing and flossing pose a greater risk in relation to both infective endocarditis (Lockhart *et al.*, 2008) and prosthetic joint infection (Berbari *et al.*, 2010) than episodic dental treatment.

Toothbrushing, (Silver, Martin and McBride, 1979) flossing, (Wank *et al.*, 1976) pulsating water irrigators (Berger *et al.*, 1974; Wank *et al.*, 1976) and interdental woodsticks (Lineberger and De Marco, 1973) can all produce bacteraemia. Gingival inflammation has been significantly associated with an increased incidence of bacteraemia caused by toothbrushing. (Lockhart *et al.*, 2009)

Bacteremia (bacteria in the bloodstream) is anticipated following invasive dental procedures and can lead to complications in an immunodeficient patient. (Lockhart *et al.*, 2004) (Roberts *et al.*, 2006) High risk cardiac disease, immunosuppression, and immunodeficiencies may compromise one's ability to fight simple infection. The rationale for antibiotic prophylaxis is to reduce or eliminate transient bacteremia caused by invasive dental procedures. (Daly, 2017) Antibiotic usage may result in the development of resistant organisms. (Lockhart *et al.*, 2004) (Roberts *et al.*, 2006) (Fluent *et al.*, 2016) (*Website*, no date d) (Dajani *et al.*, 1997) Utilization of antibiotic prophylaxis for patients at risk does not provide absolute prevention of infection. Post-procedural symptoms of acute infection (e.g., fever, malaise, weakness, lethargy) may indicate antibiotic failure and need for further medical evaluation. The main aim of this study is to evaluate the knowledge and awareness on antibiotic prophylaxis for tooth extraction among undergraduate dental students, post graduate dental students and dentists.

Indications and contraindications

Many dental procedures cause bacteraemia, this may lead to invasive endocarditis in susceptible individuals. Previously, various national and international guidelines recommended that prior to invasive orthodontic procedures; those individuals at heightened risk of developing IE should be administered prophylactic antibiotics (Dar-Odeh *et al.*, 2010). In general, prophylactic antibiotics are only recommended in surgery for:

- Patients at risk of infectious endocarditis (except in non-surgical dental procedures)
- Immuno-compromised patients
- For prolonged and extensive surgical interventions
- Surgery in infected sites
- When large foreign materials are implanted

In 2008 the National Institute for Health and Clinical Excellence (NICE) published clinical guidelines (*Website*, no date e) (Gupta, Boland and Aron, 2017) (Lacasa *et al.*, 2007; Gupta, Boland and Aron, 2017) on antibiotic prophylaxis against infective endocarditis (IE), recommending that antibiotics for the purpose of preventing the development of IE should not be given to adults and children at risk of IE who are undergoing dental procedures.

The typical situations which could require the use of antibiotics during the dental procedures, are:

- 1- Management of complications in endodontics (Segura-Egea *et al.*, 2017) (Gaetano Isola *et al.*, 2019);
- 2- Apical abscess
- 3- Oral infections;
- 4- Tooth replantation;
- 5- Antimicrobial therapy in periodontology;
- 6- Pre- and post-extraction prophylaxis (G. Isola *et al.*, 2019) (Kappel and Calissi, 2002);
- 7- Other oral surgery procedures.

Dose adjustments are required for dental procedures in patients with kidney failure to avoid an increased plasma concentration of the drug. Almost all antibiotics, except cloxacillin, clindamycin, metronidazole and macrolides, require dose modification in patients with renal insufficiency (Kappel and Calissi, 2002). Dose adjustment can be carried out by reducing the amount administered in each dose or by increasing the interval between doses (without modifying the amount of drug) (*Website*, no date f).

Patients with liver failure require a dose reduction of erythromycin, clindamycin, metronidazole and anti-tuberculosis drugs. Oral zinc supplementation is effective in hepatic encephalopathy and consequently improves patients' health-related quality of life. (Ioannidou *et al.*, 2010)

Almost all antibiotics are contraindicated during pregnancy as a result of their major side effects. Risk of having a spontaneous abortion during the early pregnancy are associated with gestational use of diclofenac, naproxen, celecoxib, ibuprofen and rofecoxib, alone or in combination.(Haas, Pynn and Sands, 2000)

In general, all antibiotics can cause three potential problems for nursing infants. First, they can modify the bowel flora and alter gut defence mechanisms; this can result in diarrhoea and malabsorption of nutrients. Second, they may have direct effects that may or may not be dose related. Lastly, and often ignored, is that antibiotics can alter and interfere with microbiological culture, resulting in babies being investigated for sepsis.

Reports on systemic complication in absence

Vergis et al.(Vergis *et al.*, 2001) found that post extraction bacteremia take place in 10% of patients When previously treated with 3 g of amoxicillin by systemic (oral) administration, but in as much as 60% of patients previously treated with topical amoxicillin and in 89% of Untreated individuals. These results suggested that systemic amoxicillin should be able to protect most patients undergoing tooth extraction.

Role of drug resistance on the benefit of AP

According to the World Health Organisation (WHO), antibiotics are the most misused of all medicines due to ease of access, being inexpensive, familiar and with generally good safety profiles. This has led to the growing problem of antimicrobial resistance (AMR) which is becoming a global threat that could cause an eventual loss of antibiotic efficacy('WHO | Antimicrobial resistance', 2015). The Global Antimicrobial surveillance (GLASS) programme runs by WHO revealed 500,000 people across 22 countries with suspected infections becoming antibiotic resistant with microorganisms such as *Escherichia coli*, *Klebsiella pneumoniae*, *Staphylococcus aureus*, *Streptococcus pneumoniae*, and *Salmonella* spp. showing high rates of antibiotic resistance('GLASS | Global antimicrobial resistance surveillance system (GLASS) report', 2020). The European Union (EU) fact sheet on AMR estimates that antibiotic resistance results in approximately 25,000 deaths per year and in excess of €1.5 billion in related healthcare costs and productivity losses leading to resistance against different classes of antibiotics discovered to date(Guillemot, 1999)(McConnell, 2001). Alanis (2005) reports that infections caused by the new strains of antibiotic resistant bacteria are not only difficult to treat but require longer courses of antibiotics and more complex therapy(Alanis, 2005)

Prognostic value

Studies have been undertaken in an effort to understand whether AP might be effective, despite there being no proof that dental procedures lead to IE. In 1986, Horstkotte et al compared 229 patients with prosthetic heart valves in whom 287 procedures were performed and who had AP, with 304 patients with prosthetic heart valves in whom 390 similar interventions were performed and who did not have AP(Horstkotte *et al.*, 1986). In the first group no patient developed IE. In the second group, six developed IE within 14 days, which is nearly 3.6 %, is significant.

In 1990, Imperiale and Horwitz published a very small case control study(Imperiale and Horwitz, 1990). They enrolled eight patients with "high-risk" lesions who had IE for the first time on a native valve within 12 weeks of a dental procedure. They were each matched with three patients who had also undergone a dental procedure and who had a similar valve lesion and age. AP was used by 1/8 patients and by 15/24 controls. They concluded that AP offered protection from IE.

In 1992, Van der Meer et al published two linked studies from the Netherlands. The first study has already been described. The second study was a case-control study that examined the efficacy of AP to prevent IE in patients with native valve disease(Van der Meer *et al.*, 1992). Forty-eight patients who developed IE within 180 days of a medical or dental procedure requiring AP were compared with 200 age-matched controls who had a relevant procedure but did not develop IE. AP was given to 8/48 cases and 26/200 controls. It was estimated that AP reduced the risk of developing IE within 30 days by 49%.

Adverse events were reported in only two studies (Lacasa *et al.*, 2007)(Kaczmarzyk *et al.*, 2007), of which only one study saw events occur in the placebo/ no antibiotic group. Only two minor adverse events had been reported in antibiotic groups for included studies (diarrhoea and itching). This indicates that these antibiotic regimens seem to have been well tolerated but due to the small sample size of patients included in this review it is not possible to assess the occurrence of other rare adverse events associated with antibiotic use such as anaphylactic shock.

Overall, 2 out of 3 extraction studies(Kaczmarzyk *et al.*, 2007)(Sekhar, Narayanan and Baig, 2001) which report postoperative inflammatory complications as an outcome measure do not support the use of prophylactic antibiotics after third molar extraction ($n = 237$). Lacasa et al. (2006) found pre-emptive antibiotics are more beneficial than prophylactic antibiotics for complex extractive surgery requiring ostectomy ($p = 0.006$). The authors recommend single dose prophylaxis in simpler extractive procedures where ostectomy is not performed to reduce postoperative complications.(Mathew, 2004). It is evident that absence of AP has an adverse effect in patients who have underlying premedical conditions, but have to bear in mind that these are the cases who have shown complications with the follow up. In clinical practice the percentage will be higher.

Need of an antibiotic policy

Guidelines from the American Heart Association (AHA) and the American Academy of Orthopaedic Surgeons (AAOS) for antibiotic prophylaxis prior to dental procedures were changed in 2007 and 2013, respectively, secondary to a lack of evidence to support the utility of antibiotic prophylaxis in preventing infective endocarditis (or) prosthetic joint infections(Wilson *et al.*, 2007)(Quinn *et al.*, 2017)(Van der Meer *et al.*, 1992; Sollecito *et al.*, 2015). Thus, the AHA and AAOS guidelines significantly

revised their recommendations for pre procedure infection prophylaxis. Guidelines for the use of antibiotics for infective endocarditis prophylaxis prior to dental procedures recommend the use of antibiotics in patients with specific cardiac conditions undergoing certain dental procedures(Wilson *et al.*, 2007). Cardiac conditions for which prophylaxis is indicated include a prosthetic cardiac valve, prosthetic material used for a cardiac valve repair, history of infective endocarditis, specific congenital heart defects, and cardiac transplant patients who develop cardiac valvulopathy (Wilson *et al.*, 2007). Prophylaxis should be recommended in these patients undergoing dental procedures that involve manipulation of gingival tissue or the periapical region of teeth or perforation of the oral mucosa (such as extractions and implants). Following the AHA/ADA guidelines, in 2013 and 2016, the AAOS/ADA recommended discontinuing the practice of routinely prescribing antibiotics for patients with hip and knee prosthetic joint implants undergoing any dental procedure(Watters *et al.*, 2013; Quinn *et al.*, 2017).

MATERIALS AND METHOD

Study design:

A cross sectional questionnaire based study was carried out among undergraduate dental students, post graduates and dentists who are practising in clinics.

Sample:

This study was conducted in an online setting. The sample comprised 150 participants. Simple random sampling methodology was employed.

Questionnaire:

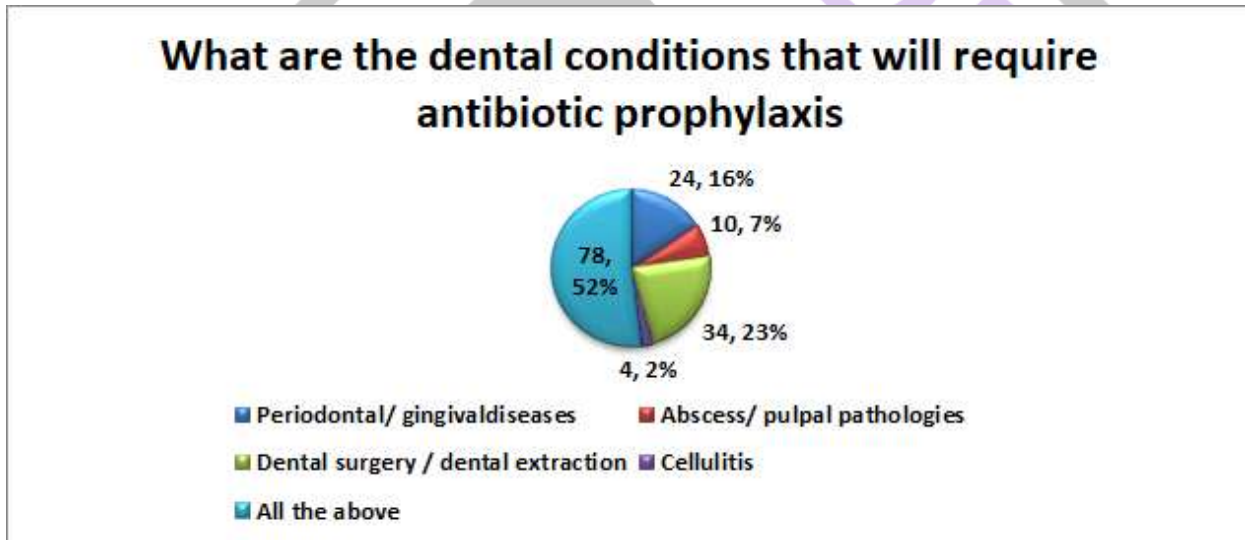
The questionnaire was framed with the help of experts in the field. The questionnaire kept the study group in mind and questions were linked to curriculum content of antibiotic prophylaxis for tooth extraction. A self-administrated questionnaire consisting of 10 close ended questions. The participants answered the questionnaire through an online setting survey planet. There were 10 questions to assess their knowledge, and attitude towards antibiotic prophylaxis for tooth extraction.

Statistical analysis:

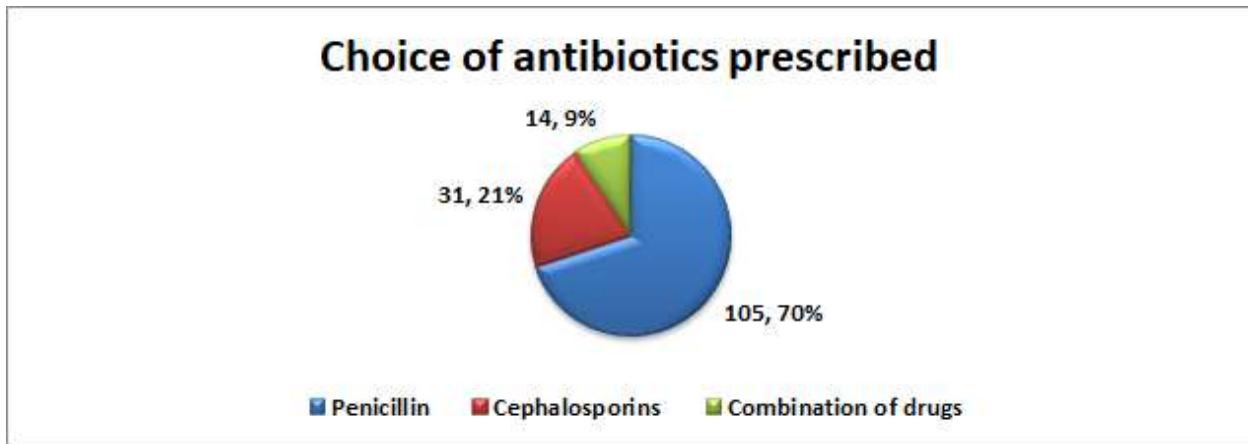
The data from their response were entered in the excel sheets. The data was later exported to SPSS Software (SPSS version 21.0, SPSS, Chicago II, USA) for statistical analysis. The data was analysed using a chi-square test. The p value of less than 0.05 was considered to be statistically significant.

RESULTS AND DISCUSSION

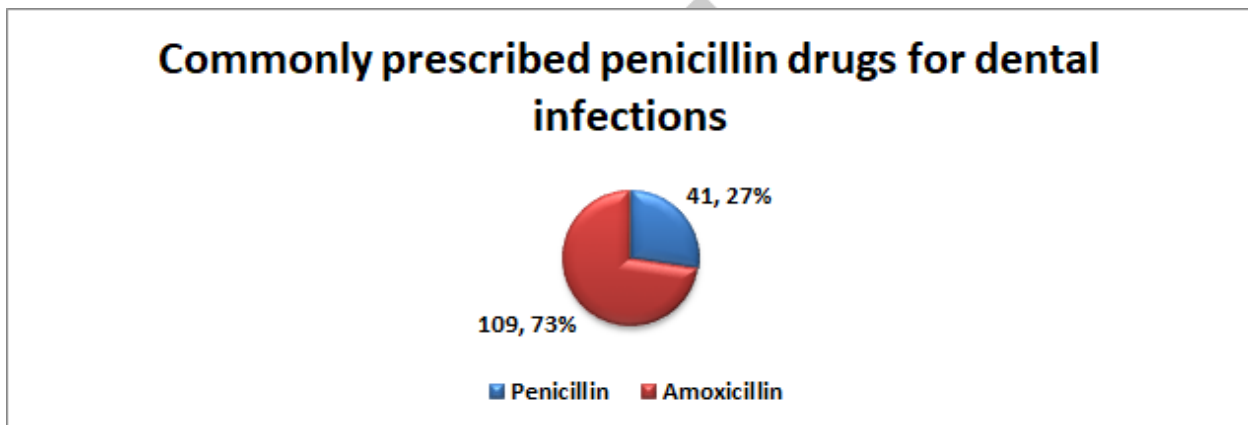
GROUP DISTRIBUTION



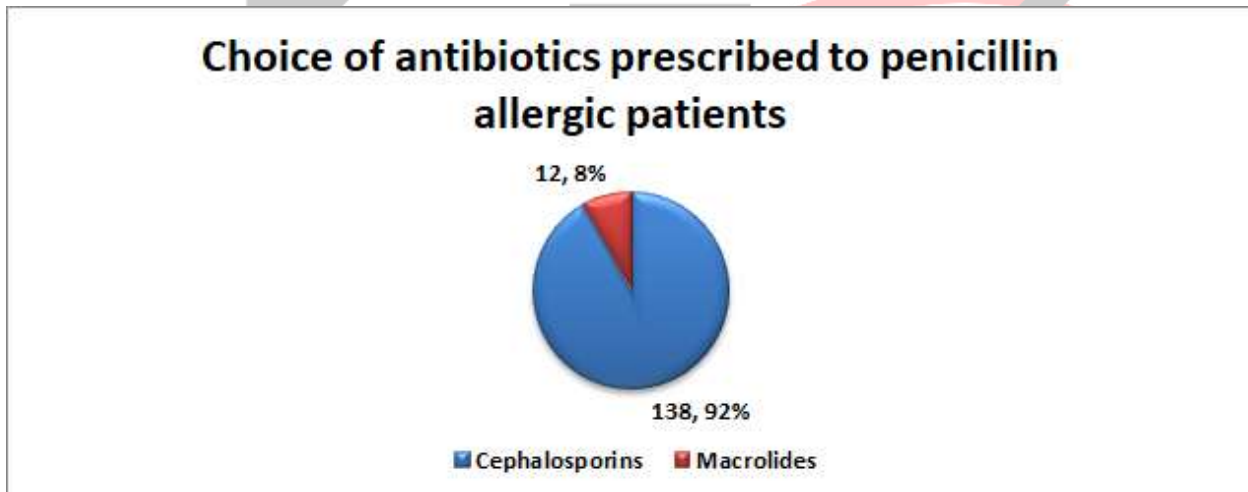
GRAPH 1: The pie chart showing study populations who were asked about dental conditions that require antibiotic prophylaxis. 78% of them answered all of the above.



GRAPH 2: The pie chart showing study populations who were asked about choice of antibiotics prescribed by them. 105% of them prescribed penicillin, 31% prescribed cephalosporins and only 14% of them prescribed a combination of drugs.

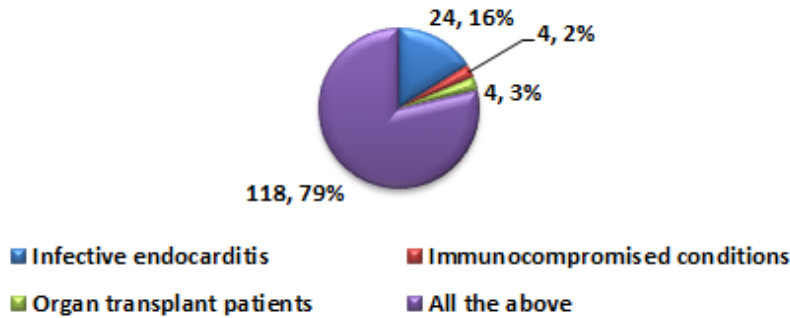


GRAPH 3: The pie chart showing study populations who were asked about commonly prescribed penicillin drugs for dental infections. 109% of the population prescribed penicillin whereas 41% of them prescribed amoxicillin as commonly prescribed penicillin drugs for dental infections.



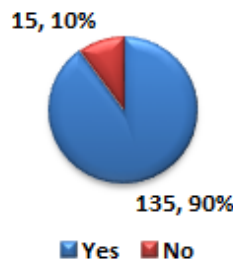
GRAPH 4: The pie chart showing study populations who were asked about the choice of antibiotics prescribed to penicillin allergic patients. 138% prescribed cephalosporins and 12% prescribed macrolides as the choice of antibiotics prescribed to penicillin allergic patients.

Which Patients are at high risk for bacteremias due to invasive dental treatments



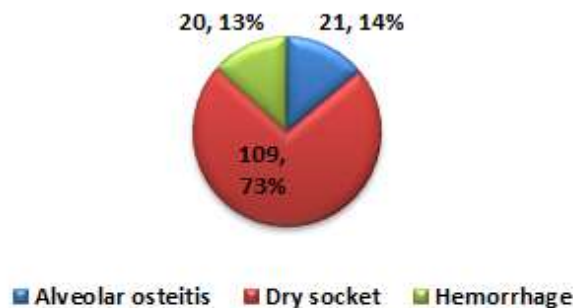
GRAPH 5: The pie chart showing study populations who were asked about the patients who are at high risk for bacteremia due to invasive dental treatments. About 118% choose all the above.

Are you aware about complications associated with extraction of teeth without antibiotic prophylaxis.



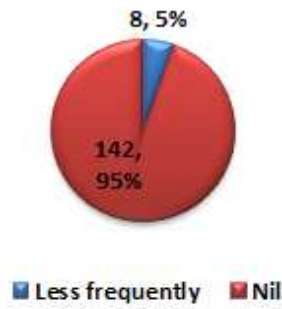
GRAPH 6: The pie chart showing study populations who were asked about complications associated with extraction of teeth without antibiotic prophylaxis. About 135% of them gave positive responses.

What are the Prevalence of complications associated with extraction of teeth without antibiotic prophylaxis.



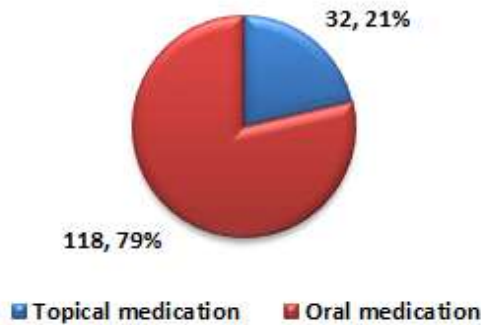
GRAPH 7: The pie chart showing study populations who were asked about the prevalence of complications associated with extraction of teeth without antibiotic prophylaxis. 109% of them answered dry socket as the prevalence of complications associated with extraction of teeth without antibiotic prophylaxis.

How many times patients reported with signs of sepsis



GRAPH 8: The pie chart showing study populations who were asked about the number of patients reported with signs of sepsis. 142% of the population reported no patients and only 8% of them reported less patients.

What are the treatment given in case of sepsis after extraction of teeth

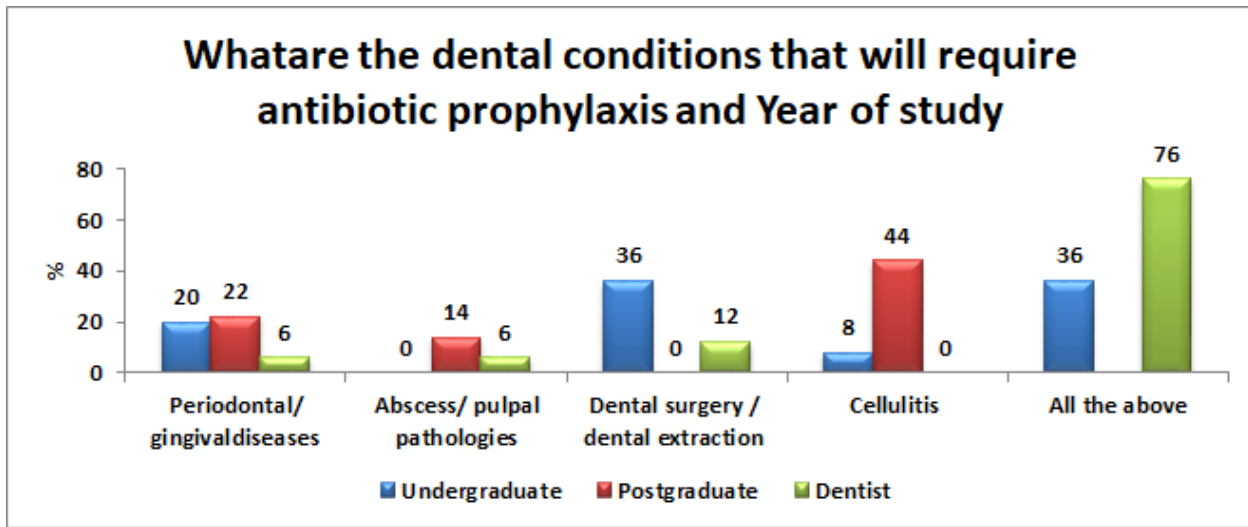


GRAPH 9: The pie chart showing study populations who were asked about the treatment given in case of sepsis after extraction of teeth. 118% of them opted for oral medication and 32% opted topical medication as the treatment given in case of sepsis after extraction of teeth.

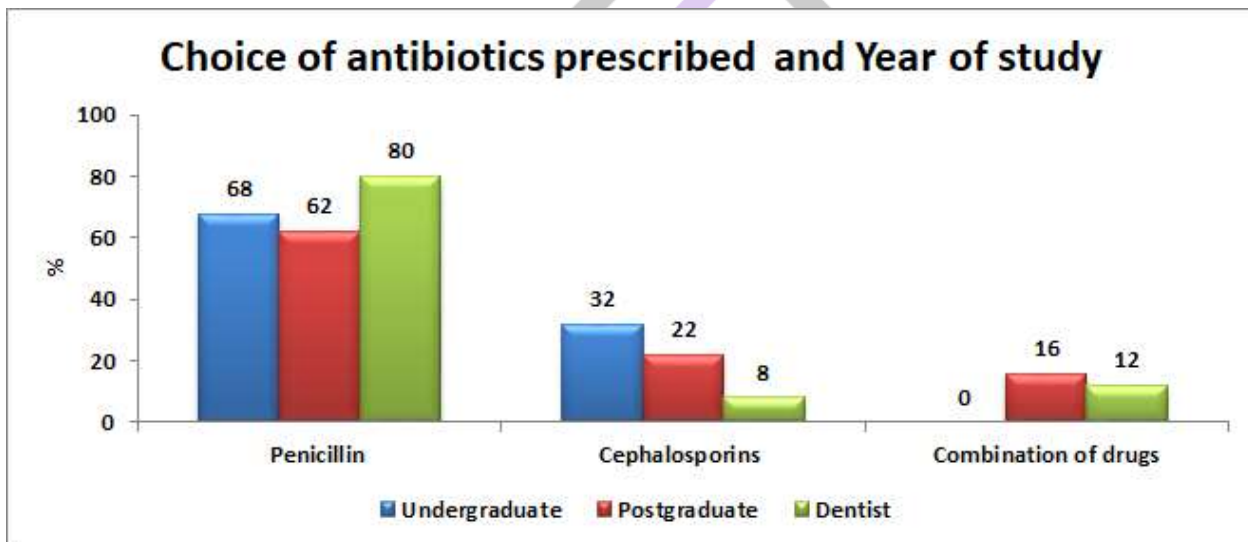
Do you recommend AB prophylaxis after extraction?



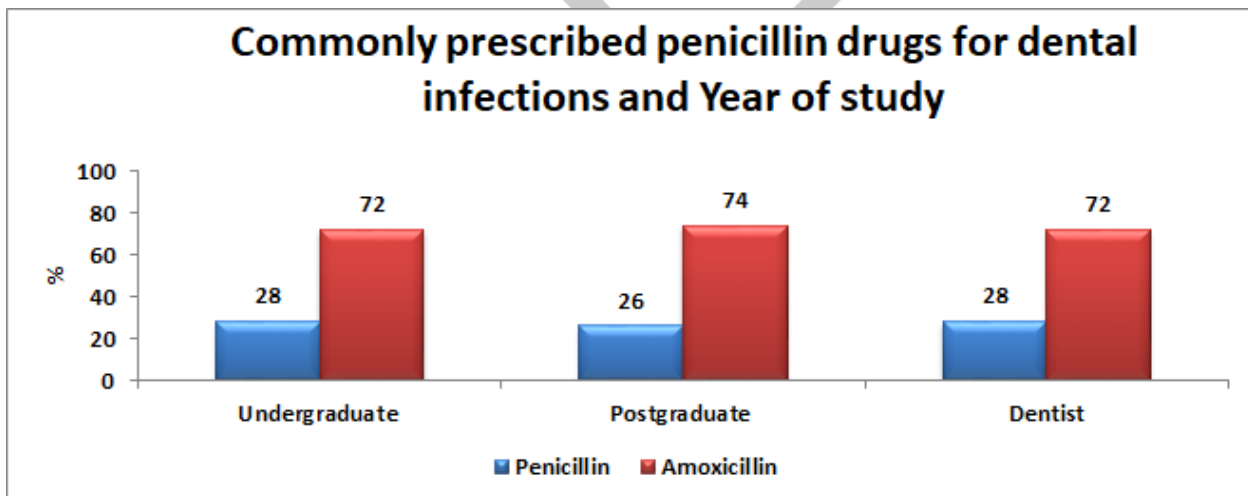
GRAPH 10: The pie chart showing study populations who were asked about recommendations of AB prophylaxis after extraction. 134% of them gave positive responses.



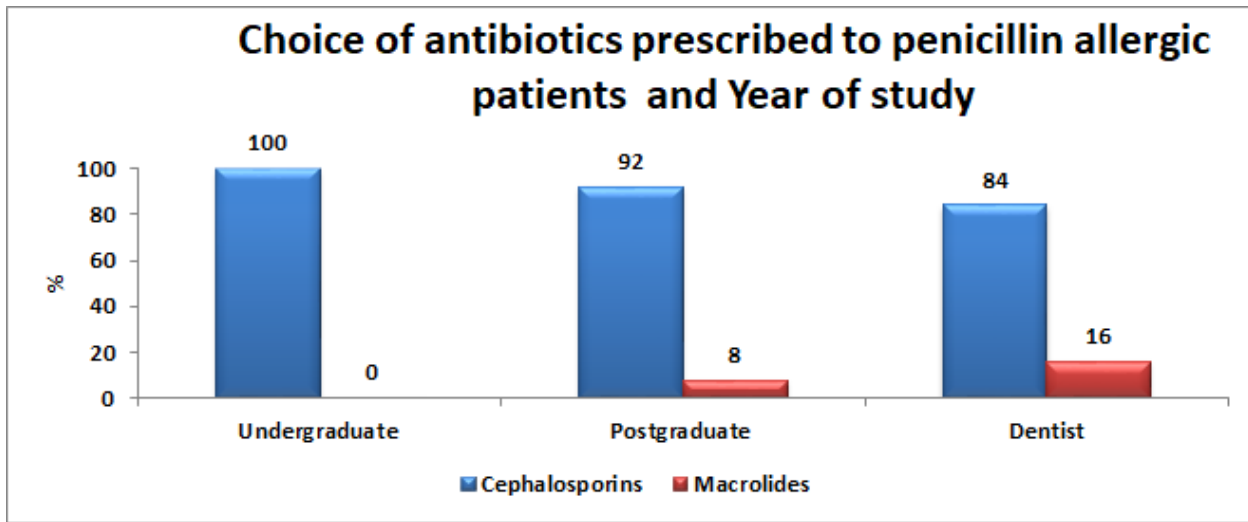
GRAPH 11: The bar graph showing the association between study group and antibiotic prophylaxis. Higher number of dentists choose all the above. There was a significant difference between the study group and antibiotic prophylaxis. (chi-square, p value: 0.00 (p<0.05 statistically significant))



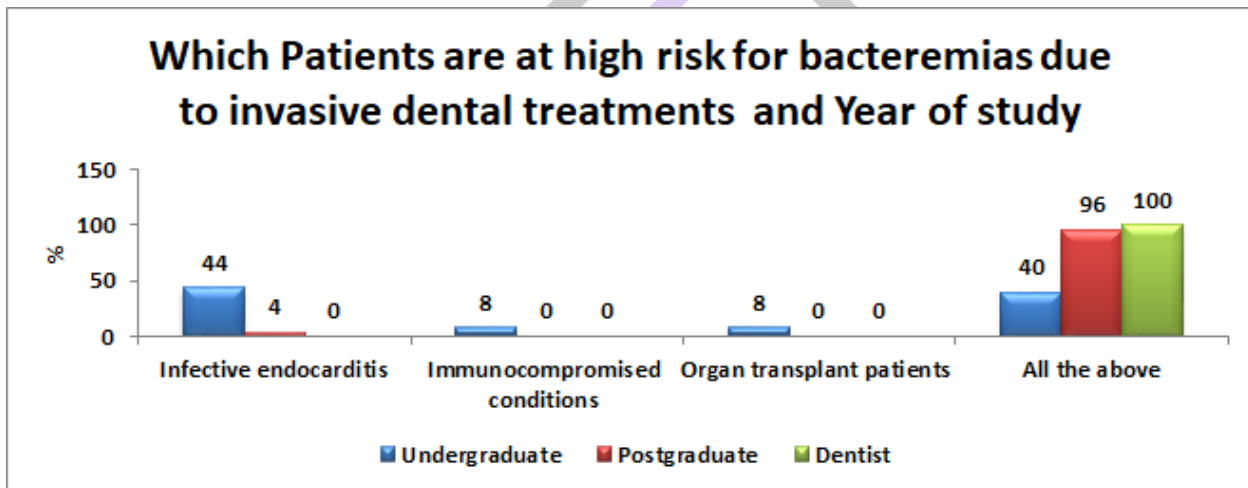
GRAPH 12: The bar graph showing the association between study group and antibiotic prophylaxis. Higher number of dentists prescribed penicillin when compared to undergraduate and postgraduate. There was a significant difference between the study group and antibiotic prophylaxis.(chi-square, p value: 0.00 (p<0.05 statistically significant))



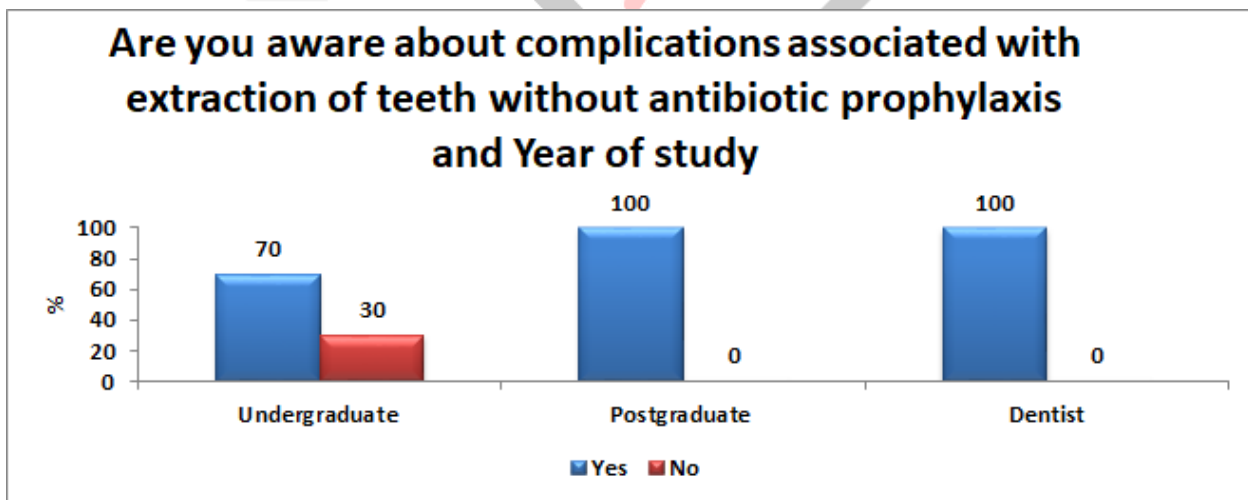
GRAPH 13: The bar graph showing the association between study group and antibiotic prophylaxis. Higher number of postgraduates prescribed amoxicillin. There was a significant difference between the study group and antibiotic prophylaxis.(chi-square, p value: 0.967 (p>0.05 statistically non significant))



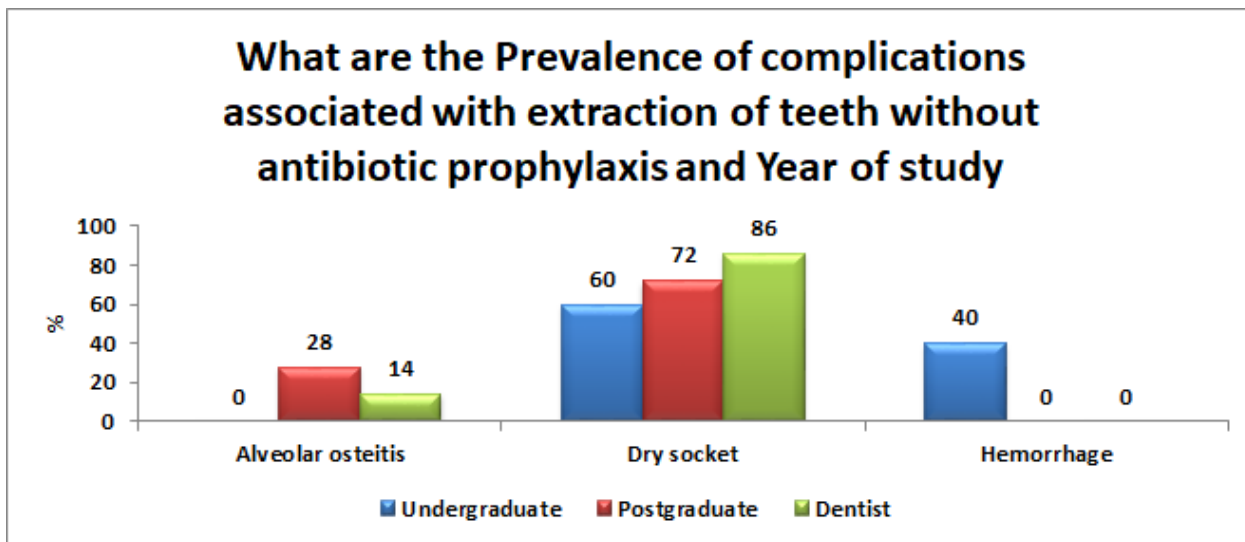
GRAPH 14: The bar graph showing the association between study group and antibiotic prophylaxis. Higher number of study groups prescribed cephalosporins when compared to macrolides as a choice of antibiotics prescribed to penicillin allergic patients. There was a significant difference between the study group and antibiotic prophylaxis.(chi-square, p value: 0.013 (p<0.05 statistically significant)



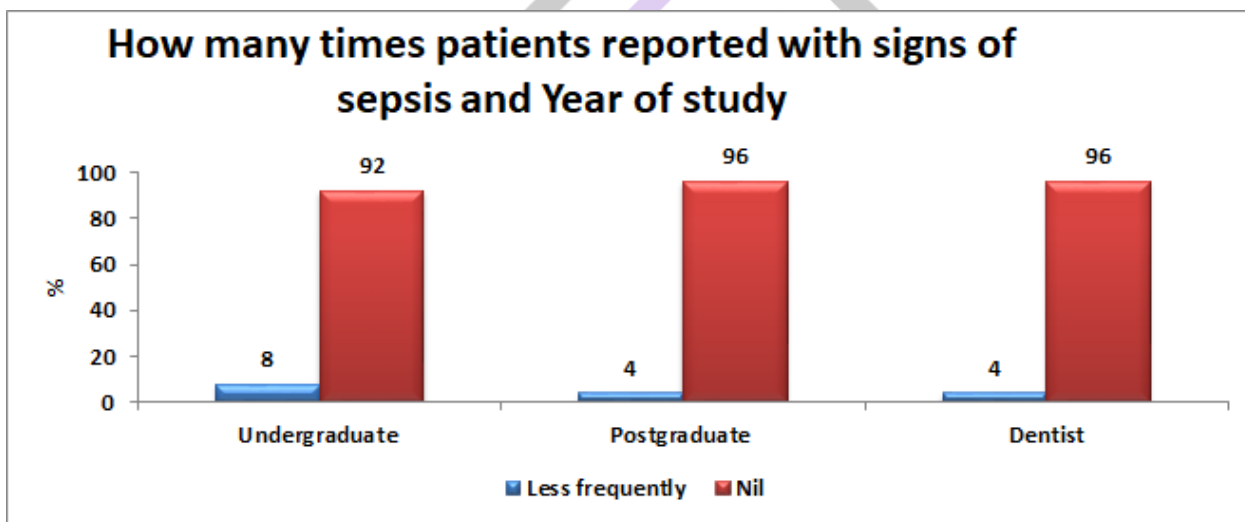
GRAPH 15: The bar graph showing the association between study group and antibiotic prophylaxis. Higher number of dentists choose all the above. There was a significant difference between the study group and antibiotic prophylaxis.(chi-square, p value: 0.00 (p<0.05 statistically significant)



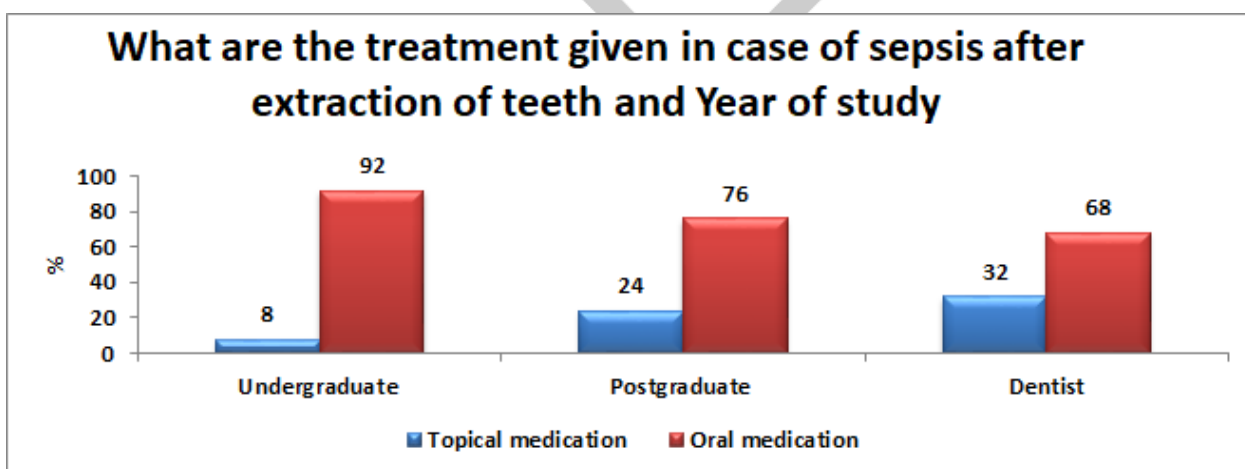
GRAPH 16: The bar graph showing the association between study group and antibiotic prophylaxis. Higher numbers of dentists and postgraduates are aware of complications associated with extraction of teeth without antibiotic prophylaxis. There was a significant difference between the study group and antibiotic prophylaxis.(chi-square, p value: 0.00 (p<0.05 statistically significant)



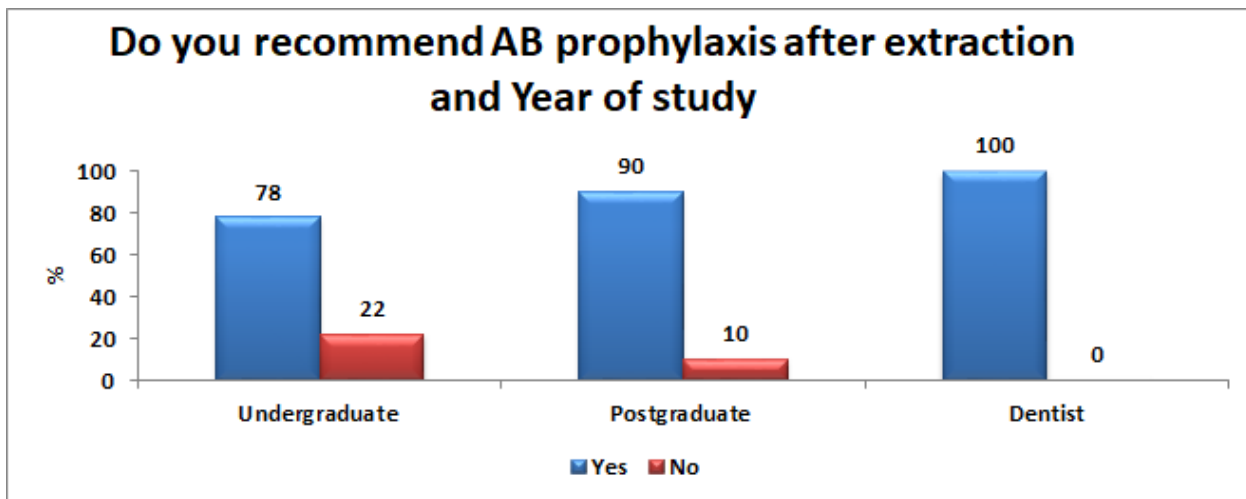
GRAPH 17: The bar graph showing the association between study group and antibiotic prophylaxis. Higher numbers of dentists answered dry socket as the prevalence of complications associated with extraction of teeth without antibiotic prophylaxis. There was a significant difference between the study group and antibiotic prophylaxis.(chi-square, p value: 0.00 (p<0.05 statistically significant)



GRAPH 18: The bar graph showing the association between study group and antibiotic prophylaxis. Higher numbers of dentists and postgraduates reported no patients with signs of sepsis. There was a significant difference between the study group and antibiotic prophylaxis.(chi-square, p value: 0.590 (p>0.05 statistically significant)



GRAPH 19: The bar graph showing the association between study group and antibiotic prophylaxis. Higher numbers of undergraduates choose oral medication as the treatment given in case of sepsis after extraction of teeth. There was a significant difference between the study group and antibiotic prophylaxis.(chi-square, p value: 0.012 (p<0.05 statistically significant)



GRAPH 20: The bar graph showing the association between study group and antibiotic prophylaxis. Higher numbers of dentists recommend AB prophylaxis after extraction. There was a significant difference between the study group and antibiotic prophylaxis.(chi-square, p value: 0.02 ($p < 0.05$ statistically significant))

Out of 150 participants, 78% of them answered all of the above. [GRAPH 1] 105% of them prescribed penicillin, 31% prescribed cephalosporins and only 14% of them prescribed a combination of drugs.[GRAPH 2] About 109% of the population prescribed penicillin whereas 41% of them prescribed amoxicillin as commonly prescribed penicillin drugs for dental infections. [GRAPH 3] About 138% prescribed cephalosporins and 12% prescribed macrolides as the choice of antibiotics prescribed to penicillin allergic patients.[GRAPH 4] 135% of them are aware about the complications associated with extraction of teeth without antibiotic prophylaxis. [GRAPH 6] 109% of them answered dry socket as the prevalence of complications associated with extraction of teeth without antibiotic prophylaxis. [GRAPH 7] 142% of the population reported no patients with signs of sepsis and only 8% of them reported less patients with signs of sepsis. [GRAPH 8] 118% of them opted oral medication and 32% opted topical medication as the treatment given in case of sepsis after extraction of teeth.[GRAPH 9] Out of 150 participants, 134% of them recommend AB prophylaxis after extraction.[GRAPH 10] Higher number of dentists choose all the above. There was a significant difference between the study group and antibiotic prophylaxis.(chi-square, p value: 0.00 ($p < 0.05$ statistically significant))[GRAPH 11] Higher number of dentists prescribed penicillin when compared to undergraduate and postgraduate. There was a significant difference between the study group and antibiotic prophylaxis.(chi-square, p value: 0.00 ($p < 0.05$ statistically significant))[GRAPH 12] Higher number of postgraduates prescribed amoxicillin. There was a significant difference between the study group and antibiotic prophylaxis.(chi-square, p value: 0.967 ($p > 0.05$ statistically non significant) [GRAPH 13] Higher number of study groups prescribed cephalosporins when compared to macrolides as a choice of antibiotics prescribed to penicillin allergic patients. There was a significant difference between the study group and antibiotic prophylaxis.(chi-square, p value: 0.013 ($p < 0.05$ statistically significant))[GRAPH 14]

Higher number of dentists choose all the above. There was a significant difference between the study group and antibiotic prophylaxis.(chi-square, p value: 0.00 ($p < 0.05$ statistically significant))[GRAPH 15] Higher numbers of dentists and postgraduates are aware of complications associated with extraction of teeth without antibiotic prophylaxis. There was a significant difference between the study group and antibiotic prophylaxis.(chi-square, p value: 0.00 ($p < 0.05$ statistically significant))[GRAPH 16] Higher numbers of dentists answered dry socket as the prevalence of complications associated with extraction of teeth without antibiotic prophylaxis. There was a significant difference between the study group and antibiotic prophylaxis.(chi-square, p value: 0.00 ($p < 0.05$ statistically significant))[GRAPH 17] Higher numbers of dentists and postgraduates reported no patients with signs of sepsis. There was a significant difference between the study group and antibiotic prophylaxis.(chi-square, p value: 0.590 ($p > 0.05$ statistically significant))[GRAPH 18] Higher numbers of undergraduates choose oral medication as the treatment given in case of sepsis after extraction of teeth. There was a significant difference between the study group and antibiotic prophylaxis.(chi-square, p value: 0.012 ($p < 0.05$ statistically significant))[GRAPH 19] Higher numbers of dentists recommend AB prophylaxis after extraction. There was a significant difference between the study group and antibiotic prophylaxis.(chi-square, p value: 0.02 ($p < 0.05$ statistically significant))[GRAPH 20]

Although there is a strong emphasis on prevention of bacteremia in the dental office setting, the relative risk for IE from dental procedures versus routine daily events such as toothbrushing is unknown. Bacteria commonly gain entrance to the circulation through ulcerated gingival crevicular tissue that surrounds the teeth.(Lockhart *et al.*, 2002) Although dental extractions are among the most likely of dental procedures to cause bacteremia, toothbrushing may disrupt a far larger surface area of gingival crevicular tissue. Although brushing does not appear to have the same incidence and nature of bacteremia as a dental extraction, we found a substantial incidence (23%) of bacteremia of IE-causing species from this common daily oral hygiene activity.

A systematic review by the Cochrane Collaboration on the use of antibiotics for infection prophylaxis following tooth extractions found that antibiotics reduced the risk of infection, but also increased the risk of adverse events(Lodi *et al.*, 2021). The authors concluded that due to the risk of adverse events and resistant bacteria, clinicians should carefully consider treating healthy patients with post procedural.

The goal of antibiotic prophylaxis in oral surgery is to prevent the onset of infections through the entranceway provided by the therapeutic action. Therefore, antibiotics are indicated where there is a considerable risk of infection, either because of the characteristics of the operation itself or the patient's local or general condition. (Gutiérrez *et al.*, 2006) An aseptic approach to the surgical site and careful surgical technique to minimize trauma would seem to be the most appropriate mechanisms to minimize these negative outcomes of extraction; many investigators have evaluated antibiotics for their effect on these problems. (Zeitler, 1995)

According to this survey it is found that the awareness about usage and choice of antibiotics is good among the dental practitioners but at the students level it is very poor or non-committal. The acceptance level of the complications in the absence of AP is good but in contradiction it is not practiced. Thus it should be as a policy with case selection, recommended drug and evaluation. This will sort the knowledge difference among the dentist especially during the early period of dental practice.

LIMITATIONS

The main limitations of this study was limited sample size and it was confined to limited geographical population. For further scope of the study increased sample size with inclusion of varied population ethnicity would give better results.

CONCLUSION

Dentists and post graduates in this study have a good level of knowledge and positive attitude whereas undergraduate students lack knowledge regarding antibiotic prophylaxis for tooth extraction. Hence more awareness programs and refreshing courses regarding antibiotic prophylaxis for tooth extraction are necessary to update the knowledge among undergraduate dental students. A better knowledge of antibiotic prophylaxis is essential for safe practice in dentistry. This will ensure the provision of better and safer dental care services for the community.

CONFLICT OF INTEREST

The authors declare that there is no conflict of interests.

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Annexure**Year of study**

- Undergraduate
- Postgraduate
- Dentist

1. What are the dental conditions that will require antibiotic prophylaxis
 - a) periodontal/ gingival diseases
 - b) abscess/ pulpal pathologies
 - c) dental surgery / dental extraction
 - d) All the above
2. Choice of antibiotics prescribed
 - a) penicillin
 - b) tetracycline
 - c) Cephalosporins
 - d) Quinolones
 - e) combination of drugs
3. Commonly prescribed penicillin drugs for dental infections
 - a) penicillin
 - b) amoxicillin
 - c) ampicillin
4. Choice of antibiotics prescribed to penicillin allergic patients
 - a) cephalosporins
 - b) Nitroimidazoles
 - c) macrolides
5. Which Patients are at high risk for bacteremias due to invasive dental treatments
 - a) infective endocarditis
 - b) immunocompromised conditions
 - c) organ transplant patients
 - d) liver failure
 - e) All the above
6. Are you aware about complications associated with extraction of teeth without antibiotic prophylaxis.
 - a) Yes
 - b) No
7. What are the Prevalence of complications associated with extraction of teeth without antibiotic prophylaxis.
 - a) alveolar osteitis
 - b) dry socket
 - c) hemorrhage
 - d) Trismus
 - e) Chronic fistula
8. How many times patients reported with signs of sepsis
 - a) More frequently
 - b) Less frequently
 - c) Nil
9. What are the treatment given in case of sepsis after extraction of teeth?
 - a) Topical medication
 - b) Oral medication
 - c) Surgical
10. Do you recommend AB prophylaxis after extraction?
 - a) Yes
 - b) No
 - c) Sometimes