KNOWLEDGE AND ATTITUDE OF ANTIBIOTIC PRESCRIPTION AMONG IMPLANTOLOGISTS: AN OBSERVATIONAL STUDY

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ABSTRACT

This article discusses the knowledge and attitude of antibiotic prescription among implantologists performing implant surgery and how we contribute to over prescription of antibiotics. Antimicrobial resistance is a substantial catastrophic threat to International Public Health. Antibiotic-resistant infections carry a burden in longer duration of illness, higher rates of mortality and increased treatment costs. Antibiotic resistance has become one of the substantial threats to the successful treatment of infections. A self-administered questionnaire was distributed to a sample of 200 participants and filled by the periodontist, oral surgeon, prosthodontist or dentist who were placing dental implants. The questionnaire comprises of knowledge and attitude of the implantologist related to antibiotic prescription patterns.

Keywords: Antibiotics, prescription, resistance, implants

INTRODUCTION

Antimicrobial resistance poses a catastrophic threat to International Public Health[1]. Antibiotic-resistant infections carry a high burden in longer duration of illness, higher rates of mortality and increased treatment costs[2]. Antibiotic resistance has become one of the substantial threats to the successful treatment of infections. The warning came from World Health Organization calling for immediate action to limit the spread of anti-microbial resistant bacterial strains[3]. They should be addressed to both the prescribers as well as to the community in order to increase the awareness of antibiotics. Life depends upon, to a great extent, on the way they are used and to stress that they may be harmful to both patients and to the environment[4]. It has been shown that the more we use, faster the resistance develops and spreads.

Antibiotic consumption is conceded as a principal driver of antimicrobial resistance. However, tooth replacement with implant-retained restorations is a common practice in modern dentistry[5]. Dental implants are associated with high success rates and patient satisfaction; however, when complications and failures of implants occur, it has a ruinous effect on the dentist-patient relationship[6]. There is a prolonged history of antibiotics being prescribed as surgical prophylaxis to accompany the placement of dental implants, but this developed historically at a time when problems of antibiotic resistance were not recognised, and prior to the emergence of antimicrobial stewardship[7]. It is therefore crucial to study the concept of routine administration of antibiotics to patients undergoing dental implant placement[8].

To date, controversy exists among dentists on prescribing antibiotics when placing implants. Some suggest that prescribing antibiotics has a positive treatment outcome and is beneficial, whereas others believe antibiotic coverage during routine implant placement has antagonistic influence[9]. Widespread overprescribing remains, driven largely by uncertainty about diagnosis, demand of patients and pressure of time on dentists[10]. The first step towards reducing its progress is developing awareness about its significance and seriousness. Alarmingly, this rise is at a time when universal recommendations and antibiotic prescribing guidelines are stern[11]. A lot has been done to prescribe appropriate antibiotics with suitable dose and duration for several dental procedures for clinicians to prescribe relevant antibiotics. This reduces the risk and torment of overprescribing by clinician[11]. To the best of our knowledge, indexed literature data on antibiotic prescription in implant procedures by dentists are not available. Such data reduces the risk and ill-use of overprescribing.

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MATERIALS AND METHODS

A self-administered questionnaire is distributed and filled by the periodontist, oral surgeon, prosthodontist or dentist who are placing dental implants. The questionnaire comprises of knowledge and attitude of the implantologist related to antibiotic prescription patterns. Study was descriptive where a structured and anonymous self-administered questionnaire was delivered and filled by a sample of 200 participants. The sampling process was dexterously and randomly performed with no sample stratification done to establish the representative sample size required. The questionnaire was devised to assess the knowledge and pattern of antibiotic prescription by implantologists (Fig. 1). Descriptive statistics were recruited to calculate the means and percentage for demographic data and preoperative and postoperative antibiotic-prescribing habit in dental implant placement.

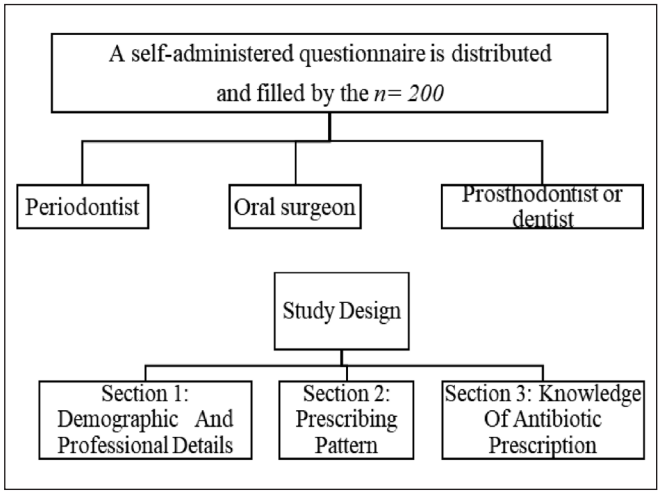

Fig. 1: Study design

RESULTS

A total of 200 participants responded to the questionnaire, of which 148 (74 %) were male and 52 (26 %) were female. Most of the participants (N = 168, 84 %) were aged between 30-40 years. Among the dental participants, 31 % (N = 62) were periodontists, 41 % (N = 82) were oral surgeons, 15 % (N=30%) were prosthodontists and 13 % (N=26) were others. Similarly, 19 % (N=38) and 23 % (N=46) of the respondents were affiliated with hospitals and institutes and 58 % (N=116) were private practitioners. Nearly 34 (17 %) of the practicing dentists had clinical experience of <5 years, whereas a majority (N=144, 72 %) had implant experience of 5-10 years and >10 years (N= 22, 11%) (Table I). When questioned about their clinical guideline of antibiotic prescription with implant placement, 184 (92 %) dentists answered positively. In the present survey, almost all practicing dentists or professionals prescribed antibiotics subsequent to routine dental implant placement (Table II) (Fig. 2). In addition, dentists who choose to prescribe antibiotics 5 days [82%] recommended penicillin (500 mg three times daily [TDS]) as the antibiotic of choice, whereas dentists who chose to prescribe antibiotics administered penicillin (500 mg) for 7 days (TDS) [26

Table I: Demographic and dental practice information of survey respondents

Demographic details and professional details	N	Percentage (%)
Age		
0-30	12	6%
30-40	168	84%
51 and above	20	10%
Gender		
Male	148	74%
Female	52	26%
Educational qualification		
Periodontist	62	31%
Oral Surgeon	82	41%
Prosthodontist	30	15%
Others	26	13%
Employment		
Hospital	38	19%
Institute	46	23%
Pvt practice	116	58%
Implant experience		
0-5 year	34	17%
5-10 year	144	72%
10 and above	22	11%
No. of Implants placed		
Less than 10	44	22%
10-100	116	58%
100 and above	40	20%
Prescribed antibiotics in implant cases		
Yes	184	92%
No	16	8%
Attended courses/read scientific material on use of antibiotics in oral implantology		
Yes	68	34%
No	132	66%

Table II: Breakdown of prescribing pattern of antibiotics

Antibiotic Prescription	N	Percentage
Placing Single implant in healed ridges:		
Never done	0	0%
Do not prescribe	4	2%
Prescribe preoperatively only	36	18%
Prescribe postoperatively only	108	54%
Prescribe preoperatively and postoperatively	52	26%
Placing multiple implant in healed ridges		
Never done	0	0%
Do not prescribe	0	0%
Prescribe preoperatively only	12	6%
Prescribe postoperatively only	104	52%
Prescribe preoperatively and postoperatively	84	42%
Immediate implant with active action		
Never done	26	13%
Do not prescribe	0	0%
Prescribe preoperatively only	68	34%
Prescribe postoperatively only	52	26%
Prescribe preoperatively and postoperatively	54	27%
Immediate implant without active infection?		
Never done	0	0%
Do not prescribe	0	0%
Prescribe preoperatively only	28	14%
Prescribe postoperatively only	94	47%
Prescribe preoperatively and postoperatively	78	39%
Advanced implant procedure like sinus lift or ridge augmentation		
Never done	28	14%
Do not prescribe	0	0%
Prescribe preoperatively only	22	11%
Prescribe postoperatively only	84	42%
Prescribe preoperatively and postoperatively	66	33%
With associated soft tissue grafting		
Never done	54	27%
Do not prescribe	0	0%
Prescribe preoperatively only	26	13%
Prescribe postoperatively only	24	12%
Prescribe preoperatively and postoperatively	96	48%
At follow up time; second stage surgery (during impression taking or crown delivery)		
Never done	0	0%
Do not prescribe	76	38%
Prescribe preoperatively only	0	0%
Prescribe postoperatively only	88	44%
Prescribe preoperatively and postoperatively	36	18%

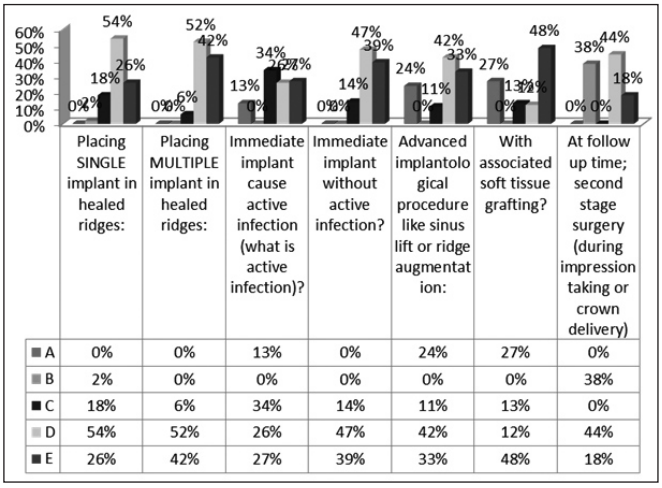

Fig. 2: Breakdown of prescribing pattern of antibiotics

%]. In total, 84 % (N = 168) of participants were in the habit of recommending antibiotics after routine implant placement; penicillin 500 mg (TDS) as the drug of choice. Furthermore, among the participants recommending antibiotics postoperatively, 93% and 7% are oral and intramuscular route of administration, respectively (Table III) (Fig. 3). All practicing dentists prescribing antibiotics preoperatively prior to routine dental implant placement were in practice of recommending antibiotics after routine dental implant placement.

Table III: Breakdown of knowledge of antibiotic prescription

Group of antibiotic mostly prescribed	N	Percentage (%)
Penicillin	168	84 %
Cephalosporin	22	11 %
Any other	10	5 %
Route of administration		
Oral	186	93 %
Intramuscular	14	7 %
Prescribing regimen		
Days	200	(5days 74%)× (7days 26%)
Any other factor affecting choice of antibiotics, like cost, patient preference, availability etc.		
Availability	128	64%
Cost	16	8%
Patient's specific preference	76	38%

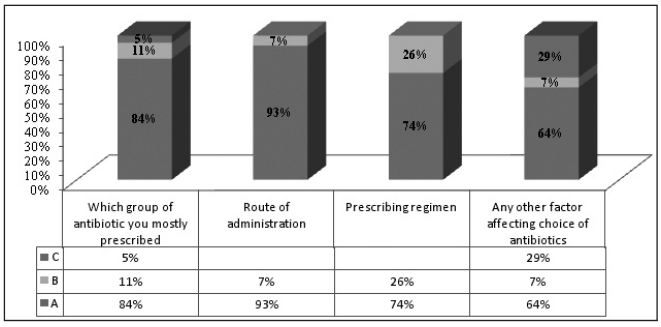

Fig. 3: Breakdown of knowledge of antibiotic prescription

DISCUSSION

The literature search was performed to bring out an equal division between studies supporting the use of antibiotic prophylaxis and those invalidating the use of antibiotics. However, a stumbling block in the ongoing literature became evident as many studies were excluded from this literature review because they did not include comparisons between no antibiotic, pre-operative, post-operative and both pre and post-operative antibiotic use. However, it was a significant finding that many more studies are required to help validate and improve current guidelines regarding antibiotic use and oral implants.

The present survey provided a unique assessment of antibiotic-prescribing patterns by dentists when practicing implant surgery. The response rate in the present survey was 100 % in which 148 (74%) were male and 52 (26%) were females. A similar high response rate was also noted in Abukaraky et al[12] and Datta et al studies[13]. This type of survey was distinguishing, according to our knowledge. In the present study, the maximum age of dentists who practiced implant surgery was between nearly 34 (17%) of the practicing dentists had clinical experience of <5 years, whereas a majority (72%) had implant experience of 5-10 years and >10 years (11%). We believe that the following trend is due to extensive undergraduate and postgraduate training and theoretical courses on implant dentistry. Similar findings was also found in a study by Khalil et al in Sweden[8]. The findings of those studies indicated that dentists preferred to prescribe antibiotics prior to routine dental implant placement[13]. The reason that penicillin group is used as an antibiotic of choice in implant surgery is attributed to its established evidence in reducing implant failure through clinical trials[14]. In addition, penicillin has better compliance, good absorption, and bioavailability, with a wider bactericidal effect on oral micro flora; therefore, it is preferred in implant surgery compared to other antibiotics[15].

In the present study, antibiotic- prescribing patterns and habits preoperatively and postoperatively were found to be diverse among dentists. Based on these findings, more than half of the respondents (84 %) considered prescribing penicillin both preoperatively and postoperatively as a drug of choice for a duration of 3- 5 days. These results were found to be in concurrence with those of Datta et al[13] and Hossein et al[16]. Therefore, disparity in prescribing patterns is due to a lack of specific guidelines and concurrence on the pattern of antibiotic prescription during implant surgery. Patients with substandard plaque control are prescribed antibiotics during implant placement, as these patients are at high risk of developing bacteremia, which is directly related to poor plaque control[17]. Surprisingly, dentists believed that antibiotic prescription is necessary with complex implant surgery (eg, augmentation or sinus lifting), although the evidence for antibiotic prescription is much stronger for such procedures[18]. The present study has limitations due to its small sample size and study design. The cost-benefit ratio of any therapy, including all potential adverse effects, must be established. Studies of this sort with respect to the treatment of infective endocarditis have already been conducted. The ill-advised use of antibiotics has proven to be high-priced as well as directly responsible for development of resistant microorganisms[19]. From a long-term perspective, one must be able to appreciate the concerns when a patient develops antibiotic resistant. This is a potentially catastrophic concern, which is very difficult to estimate. In addition, there is a tremendous

financial concern with respect to the development of new drug therapies to treat such patients. The negative effects associated with use of antibiotic therapy must be assessed in comparison to the costs and morbidity related to treating infective endocarditis or infected prosthetic materials. If the risk-benefit or cost-benefit ratios are thoroughly assessed, it becomes clear that if there are specific therapeutic indications based on sound physiologic, anatomic and scientific substantiation, then antibiotic prophylactic therapy may be justified[20]. A similar larger scale study with an increased sample size and an assessment of influencing patterns and reasons can be helpful to identify elements that contribute to different prescribing patterns preoperatively and postoperatively by dentists during implant procedure. Other antimicrobial therapies, such as antimicrobial mouthwashes as prophylaxis, should be explored; these were not looked at in the present study. Based on the results of this survey, it is important that antibiotic- prescribing patterns are based on international implant regulatory bodies best available evidence and guidelines in order to avoid antibiotic misuse in implant procedures.

CONCLUSION

The above research showed variable levels to provide an important insight regarding the dentists/practitioner's knowledge, attitude, perceptions and practices regarding antibiotic resistance and usage among various strata of dentists, which can be considered, in order to plan for an effective curriculum.

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