Awareness and management of peri-implantitis and peri-mucositis among private dental Practitioners in Hyderabad - A cross-sectional study

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Abstract:
Background: Implant therapy, in India, has flourished in recent years and is being practiced widely by many dental practitioners today. Along with the increasing number of implants being placed today, there has also been a constant rise in the number of complications associated with it. Objectives: The aim of this study is to evaluate the knowledge and awareness of implant placement and management of peri-implant diseases among dental professionals. Materials and Methods: A total of 568 dental practitioners were approached with a questionnaire for collecting data related to demographic details, experience, and knowledge about implant placement and management of its complications. Of these, only 282 were included as part of the statistical analysis. This data collected were compiled and analyzed using descriptive statistics. Results: Results showed that most dentists who participated in this study have adequate knowledge about etiological factors and its management. Those who acquired implant skills through sources that are not in accordance with accepted standards had unsatisfactory knowledge and practice behavior. Conclusion: The awareness and knowledge regarding the implant procedures and their complications such as peri-implant mucositis and peri-implantitis were higher in self-trained dentists and by dentists who are practicing for >10 years and calls for updating of knowledge.

Key words:
Peri-implant disease, peri-implantitis, peri-mucositis

INTRODUCTION

Since the last decade, implant dentistry has developed as an integral part of mainstream dentistry, facilitating dentists to improve the quality of life of their patients. Implants have become the preferred option for the rehabilitation of severe functional, anatomical, and esthetic problems arising from tooth loss. Dental implant treatment is sprouting as the preferred method of tooth replacement not only for partially edentulous but also for completely edentulous cases. Proper utilization of this treatment modality by the dentists has resulted in improvement in oral health-related quality of life in patients. This, in turn, has helped to restore normal function, speech, appearance, and health of the people with missing teeth, even in challenging situations.

Implant dentistry, once a specialty practice, has now been widely practiced by a number of general dental practitioners. However, successful implant practice requires in-depth knowledge of anatomy, biomechanics, and clinical skills among the practitioners. The clinical success of implants is influenced by many factors such as patient’s age, systemic and periodontal health, implant site, bone quality, oral hygiene of the patient, and deleterious habits. Although the success rates reported with dental implant treatment are relatively high, complications do occur as a result of improper treatment planning, surgical and prosthetic execution, material failure, and maintenance. Bacterial infection and inflammation of the surrounding tissue (peri-implant mucositis and peri-implantitis) are the most common causes of implant failure. Peri-implant mucositis is an inflammatory condition of the soft tissues...
surrounding an endosseous implant, whereas peri-implantitis is defined as the presence of inflammation in the soft tissues in addition to the loss of supporting bone around an osseointegrated implant. Various clinical protocols have been developed for the prevention and treatment of peri-implantitis, which include nonsurgical/surgical debridement, use of antiseptic agents, local or systemic antibiotics, etc.

There is a general concern that the frequency of peri-implantitis among the patients may increase as more implants are being placed by a variety of clinicians with varying expertise. Hence, comprehensive knowledge regarding the various aspects of complications is deemed necessary among the practicing dentists. Available literature shows a dearth of Indian studies assessing the perception of dentists towards peri-implant diseases. Hence, the present study was undertaken with an aim to evaluate the knowledge, practice, and awareness of various dental professionals regarding implant therapy and management of peri-implant diseases.

MATERIALS AND METHODS

The present cross-sectional survey was carried out among dentists practicing implant dentistry in and around Hyderabad city. Data were collected through a structured, online questionnaire that was mailed to the dentists. E-mail ids and contact numbers of the practicing dentists were obtained from the local dental association branch. A total of 568 dentists in and around Hyderabad city were contacted and explained the purpose of the study. Of 568 dentists, 363 dentists agreed to participate in the study (response rate = 63.9%), of which only 262 were included as their forms were fully complete.

An online, structured questionnaire consisting of three sections: (1) Demographic details, including the area of practice and years of practice (2) Implant therapy education and implant practice (3) Knowledge about complications in implant dentistry, and measures taken to treat those complications were used. Face validity was determined by administering the questionnaire to five experts to check for the grammatical considerations, question arrangement, use of appropriate words, filling time, etc., and necessary corrections were done. Test–retest reliability was assessed by administering the questionnaire to ten dentists (who were not a part of the main study) on two different occasions. The kappa coefficient value obtained was 0.7, which represents a good agreement between the two responses. The final questionnaire consisted of 22 items. The questionnaire was E-mailed to participating dentists, and the responses were recorded. Those dentists, who failed to respond within a week’s time, were again reminded about the questionnaire and were given another week’s time.

The data obtained through the responses were compiled and analyzed using SPSS version 20 (IBM Corp, New York, USA). The level of statistical significance was kept at 5%. Descriptive statistics (frequency distribution method) was employed to evaluate the data for all the variables studied.

RESULTS

The final sample of 262 was included for the statistical analysis. Table 1 shows the details about demographic variables, including the area of practice, years of practice, and implant therapy education. Of 262 dentists, 138 were male and 124 were female participants. The majority of the dentist (77.9%) belonged to the age group of 25–34 years, followed by the age group of 35–44 years (16%). Out of all the participating dentists, 64.1% were specialty practitioners (MDS), periodontists being in the majority (35.1%) followed by general practitioners (22.1%). The majority of the dentist participants were in the early phase of their clinical practice (60.3% being practicing for 0–5 years), followed by 23.7% of the dentists practicing for 6–10 years. More than half of the dentists (54.3%) learned about the implant therapy while doing their postgraduation/masters (MDS). Around one-third of the dentists (37.4%) learned about the implant therapy by attending various implant courses. Only 1.5% of the dentists made the use of online courses, whereas 6.9% of the dentists were self-trained.

Table 2 shows the details about implant practice among dentists and complications among the patients treated. The majority of the dentists (84.8%) preferred placing implants and fabricating implant-supported bridges and/or dentures to replace missing teeth. However, 69.8% of the dentists reported treating only <25% of their patients with implants. Only 4.6% of the dentists reported that they had replaced all the missing teeth with implants in their patients. The preferred mode of implant placement was either multistage surgery (47.3%) or single-stage surgery (42%). The majority of the dentists (69.1%) preferred to recall the patients 3 months after the implant placement, whereas 3.8% of the dentists preferred to recall the patients 1 year after the implant placement. The majority of dentists (80.2%) reported the frequency of mucositis within the range of 0%–25%. A similar range of 0%–25% was reported for peri-implantitis in patients with dental implants by 82.4% of dentists.

Table 3 demonstrates the knowledge and management of complications of implant therapy. When asked about the etiologic factors for peri-implant diseases, bacterial plaque was reported by 78.6% of the dentists, followed by adverse
Table 2: Details about implant practice among dentists and complications among the patients treated

| Variables                                      | Category                                      | Frequency (%) |
|------------------------------------------------|-----------------------------------------------|---------------|
| Choice of treatment for replacement of missing teeth | Bridges                                       | 38 (14.5)     |
|                                                | Conventional removable dentures              | 2 (0.8)       |
|                                                | Implant                                       | 126 (48.1)    |
|                                                | Teeth and implant supported bridge and/or dentures | 96 (36.7)    |
| Proportion of the patients with missing teeth treated with implants (%) | 25.00                                         | 189 (69.8)    |
|                                                | 50.00                                         | 59 (22.5)     |
|                                                | 75.00                                         | 8 (3.1)       |
|                                                | 100.00                                        | 12 (4.6)      |
| Preferred mode of implant placement            | Single-stage surgery                          | 28 (42.0)     |
|                                                | Multi-stage surgery                           | 124 (47.3)    |
|                                                | Either of the above                           | 110 (10.7)    |
| Periodic recall after implant placement (months) | 3                                             | 181 (69.1)    |
|                                                | 6                                             | 71 (27.1)     |
|                                                | 12                                            | 10 (3.6)      |
| Patients with dental implants diagnosed with mucositis (%) | 0-25                                          | 210 (80.2)    |
|                                                | 26-50                                         | 42 (16.0)     |
|                                                | 51-75                                         | 6 (2.3)       |
|                                                | 76-100                                        | 4 (1.5)       |
| Patients with dental implants diagnosed with peri-implantitis (%) | 0-25                                          | 216 (82.4)    |
|                                                | 26-50                                         | 32 (12.2)     |
|                                                | 51-75                                         | 10 (3.8)      |
|                                                | 76-100                                        | 4 (1.5)       |

Table 3: Knowledge and management of complications of implant therapy

| Variable                        | Category               | Frequency (%) |
|---------------------------------|------------------------|---------------|
| Etiologic factors              | Bacterial plaque       | 206 (78.6)    |
| for mucositis and peri-implantitis | Smoking              | 80 (30.5)     |
|                                 | Other                  | 30 (11.5)     |
| Type of instrument             | Plastic instrument     | 126 (48.1)    |
| used for mechanical debridement | Stainless steel        | 36 (13.7)     |
| of implant                     | Titanium instruments   | 46 (17.6)     |
|                                 | Ultrasonic scalers     | 44 (16.8)     |
|                                 | Other                  | 10 (3.8)      |
| Frequency of maintenance visits | Every 1-2 months       | 79 (30.2)     |
| after treatment of peri-implantitis | Every 3 months        | 160 (61.1)    |
|                                 | Every 6 months         | 19 (7.3)      |
|                                 | After 1 year           | 4 (1.5)       |

For etiologic factors, the percentages add up to >100% because the respondents could choose more than one reason.

Loading (38.5%). Smoking, as the etiologic factor, was reported by 30.5% dentists. Approximately half of the dentists (48.1%) preferred using plastic instruments for mechanical debridement of the implants. Stainless instruments were preferred by 13.7% dentists, titanium instruments by 17.6% dentists, and ultrasonic scalers by 16.8% dentists. Regarding maintenance visits after the treatment of peri-implantitis, 61.1% dentists preferred to recall patients after every 3 months of the treatment, whereas 30.2% of the dentists preferred to keep the visit after every 1–2 months. Recall visit after 1 year was preferred by 1.5% dentists.

Table 4 shows details about various treatment modalities used for treating mucositis and peri-implantitis. Oral hygiene instructions and maintenance were the most preferred treatment modality for mucositis and peri-implantitis (97.7% and 96.2%, respectively), followed by the use of antimicrobial gel/mouthrinse (86.3% and 91.6%, respectively) and nonsurgical debridement (71.8% and 76.3%, respectively). Control of occlusion/tension in supraconstruction was reported by 66.4% and 71% of the dentists for mucositis and peri-implantitis, respectively. Other treatment modalities reported included preoperative (59.5% for mucositis and 71% for peri-implantitis) and postoperative (74% for mucositis and 79.4% for peri-implantitis) local or systemic antibiotics and surgical debridement.

Table 5 shows the association of different variables with the incidence of mucositis and peri-implantitis. Prevalence of more than 75% and up to 100% mucositis and peri-implantitis was reported by dentists who were self-trained (22.2%), dentist who preferred to recall patients 12 months after implant placement (40%) and dentist who had been in dental practice for >10 years (9.5%).

Table 6 assesses the knowledge of risk factors and treatment preference for peri-implant diseases among dentists according to their route of acquiring implant education. When asked about the etiological factors of peri-implant diseases, bacterial plaque was reported by the majority of dentists (80.3% of the master degree holder and 81.6% of those who acquired implant skills through courses). Other factors reported were adverse loading, followed by smoking. However, those who were self-trained or trained through online courses showed a lack knowledge regarding etiological factors (55.6% and 50.0% reported plaque, respectively). Regarding the instrument used to perform mechanical debridement, around half of the dentists reported the use of plastic instruments followed by titanium and stainless steel instruments. 22.4% of the dentists who attended implant course and 22.2% of the self-trained dentists reported the use of ultrasonic scalers for mechanical debridement. Around half of the dentists from the masters’ group and implant course group preferred to recall patients after 6 months of implant placement, whereas more than half of self-trained dentists (55.6%) and 100% of online course group dentists preferred recall visit after 12 months.

DISCUSSION

Peri-implantitis may lead to implant failure, and this problem is faced more by dental professionals who do not
have adequate knowledge skills and expertise in implant placement. This study focused on knowledge of dentists about etiological factors of peri-implant diseases and treatment regimens followed by them to counter the problem. Though the results of the study clearly indicate improper and inadequate training among a few of the dentists, dentists had adequate knowledge about etiopathogenesis and treatment modalities of peri-implant diseases.

The study population consisted of an almost similar proportion of male and female dentists, which is in contrast to the study conducted by Mattheos et al. in Australia and the United Kingdom, where male domination was seen among study participants. These differences might be attributed to the changing scenario in dentistry. A majority of the implant practitioners were young in age and were relatively fresh in dental practice (0–5 years), showing the inclination of young age practitioners towards implant dentistry as compared to older counterparts, which is probably due to the awareness in patients about implant therapy. Majority of dental specialists practicing implant dentistry belonged to periodontology, oral surgery, and prosthodontics branches because of the inclusion of implant therapy education in postgraduate curriculum of these three branches. More than half of participating

Table 4: Treatment modality used for treating mucositis and peri-implantitis (%)

| Treatment option                        | Mucositis |          |          | Peri‑implantitis |          |          |
|----------------------------------------|-----------|----------|----------|-----------------|----------|----------|
|                                        | Always    | Sometimes | Never    | Always          | Sometimes | Never    |
| Oral hygiene instructions              | 97.7      | 2.3      | 0.0      | 96.2            | 3.8      | 0.0      |
| Antimicrobial gel/mouthrinse            | 86.3      | 13.7     | 0.0      | 91.6            | 8.4      | 0.0      |
| Nonsurgical debridement                | 71.8      | 26.7     | 1.5      | 76.3            | 22.1     | 1.5      |
| Surgical debridement                   | 32.8      | 56.5     | 10.7     | 62.6            | 35.1     | 2.3      |
| Local antibiotics                      | 50.4      | 45.0     | 4.6      | 63.4            | 36.6     | 0.0      |
| Systemic antibiotics                   | 51.1      | 41.2     | 7.6      | 64.9            | 31.3     | 3.8      |
| Control of occlusion/tension in supraconstruction | 66.4     | 30.5     | 3.1      | 71.9            | 29.0     | 0.0      |
| Preoperative antibiotic use             | 59.5      | 33.6     | 6.9      | 71              | 26.7     | 2.3      |
| Postoperative antibiotic use            | 74        | 22.9     | 3.1      | 79.4            | 20.6     | 0.0      |

Table 5: Association of different variables with mucositis and peri-implantitis incidence

| Variables                           | Percentage of patients diagnosed with mucositis | Percentage of patients diagnosed with peri-implantitis | P          | P          |
|-------------------------------------|------------------------------------------------|-------------------------------------------------------|------------|------------|
| Route for acquiring implant education | 0-25 | 26-50 | 51-75 | 76-100 | 0-25 | 26-50 | 51-75 | 76-100 |
| Masters                            | 80.3 | 15.5 | 4.2 | 0 | 83.1 | 14.1 | 2.8 | 0 | 0.001* | 83.7 | 10.2 | 6.1 | 0 | 0.001* |
| Implant courses                    | 81.6 | 18.4 | 0 | 0 | 83.7 | 10.2 | 6.1 | 0 | 0.001* | 83.7 | 10.2 | 6.1 | 0 | 0.001* |
| Self‑trained                       | 77.8 | 0 | 0 | 22.2 | 77.8 | 0 | 0 | 22.2 |
| Online courses                     | 50 | 50 | 0 | 0 | 50 | 50 | 0 | 0 |
| Periodic recall after implant placement (months) | 3 | 80.1 | 16.6 | 3.3 | 0 | 0.001* | 82.9 | 13.8 | 3.3 | 0 | 0.001* |
| 6                                  | 85.9 | 14.1 | 0 | 0 | 87.3 | 7.0 | 0 | 5.6 |
| 12                                 | 40 | 20 | 0 | 40 | 40 | 20 | 0 | 40 |
| Number of years of dental practice | 0-5 | 84.8 | 15.2 | 0 | 0 | 0.001* | 84.8 | 11.4 | 3.8 | 0 | 0.001* |
| 6-10                               | 67.7 | 22.6 | 9.7 | 0 | 71 | 22.6 | 6.5 | 0 |
| 10+                                | 81 | 9.5 | 0 | 9.5 | 90.5 | 0 | 0 | 9.5 |

P<0.05 is considered significant, and P>0.05 is considered nonsignificant. P – *Indicates significant difference at P≤0.05

Table 6: Evaluation of knowledge of risk factors and treatment preference for peri-implant diseases among dentists according to their route of acquiring implant education

| Variable                         | Route of implant education (%) |
|----------------------------------|--------------------------------|
|                                  | Masters | Implant courses | Self‑training | Online courses |
| Risk factors                     |         |                 |               |               |
| Plaque                           | 80.3    | 81.6            | 55.6          | 50.0          |
| Smoking                          | 29.6    | 26.6            | 33.3          | 100.0         |
| Adverse loading                  | 44.4    | 36.7            | 11.1          | 0.0           |
| Preferred instrument for mechanical debridement of implant surface | 47.9 | 51.0 | 33.3 | 50.0 |
| Plastic instrument               | 14.1    | 14.3            | 11.1          | 0.0           |
| Stainless steel instrument       | 21.1    | 12.2            | 11.1          | 50.0          |
| Titanium instruments             | 12.7    | 22.4            | 22.2          | 0.0           |
| Ultrasonic scalers               | 4.2     | 100.0           | 22.2          | 0.0           |
| Others                           | 8.5     | 12.2            | 22.2          | 0.0           |
| Preferred recall period (months) | 3       | 50.7            | 49.0          | 22.2          |
| 6                                | 50.7    | 49.0            | 22.2          | 0.0           |
| 12                               | 40.8    | 38.8            | 55.6          | 100.0         |
dentists obtained implant-related education through master’s course (MDS). However, there were few dentists, who learned the art of placing implants either through attending an implant course/online training or through self-training because implant science is not dealt with adequate depth at the undergraduate level (during BDS) in India. In the current situation, there is no compulsory requirement of training for practicing implant dentistry in our country. The general dental practitioner may go for continuing dental education programs that may be of a single day or two and begin with practicing this therapeutic modality. The major problem with the available training courses is that most of them differ considerably in objectives duration, course contents, and the quality of education and generally lack the necessary extensive clinical training for the participants, resulting in a lack of tangible outcomes such as a recognized qualification. In recent years, few dental institutions in India have come up with an idea of setting up the department of implant dentistry to make new graduates knowledgeable and competent with this aspect of dental treatment.

When asked about the choice of treatment for replacing missing teeth, majority of dentists (84.8%) responded that they preferred implants or implant-supported bridges/dentures. Multi-stage implant placement was preferred slightly more by participant dentists than single-stage placement. Available literature suggests that one-stage implants might be desirable in partially edentulous patients since it escapes one surgical intervention and reduces the treatment time, while a two-stage implant might be preferable for specific situations such as when an implant has not achieved an optimal primary stability and when barriers are used in combination with implants, especially in fully edentulous patients. Recall time of 3 months after implant placement was preferred by most of the participants. These findings are in contrast to the study conducted by Kadkhodazadeh et al. on Iranian dentists, where majority of the dentists preferred to recall their patients every 6 months after implant placement. Clinical practice guidelines for recall and maintenance of patients with implant-borne dental restorations states that patients with implant-borne restorations (fixed or removable) should be advised to obtain a dental professional examination visit at least every 6 months as a lifelong regimen. A majority of the dentists who were self-trained preferred to recall patients after 12 months, which suggests their lack of understanding.

It is vital for dentists to perform both soft tissue and hard tissue assessment before placing an implant. Furthermore, the patients should be made aware about the importance of oral hygiene maintenance after implant therapy for long-term survival of the implant. Various ways have been suggested to treat peri-implant diseases, the most important being the mechanical and chemical plaque control measures. In the present study, the bacterial plaque was reported by the majority of the respondents. The results show that oral hygiene instructions and antimicrobial mouth rinses/gels followed by nonsurgical debridement were the most preferred choices in the treatment of peri-implant diseases. Surgical debridement was preferred for the treatment of peri-implantitis. Local and systemic antibiotics, either preoperative or postoperative were preferred by most of the dentists as a choice of treatment. When assessed for the rate of mucositis and peri-implantitis among dentists, none of the dentists reported rates up to 100% except for self-trained dentist (22.2% reported). Furthermore, few cases of implant failure rates of up to 100% were observed among those dentists who are practicing for >10 years. This may be attributed to the fact that those who have acquired implant education recently and fresh in practice might be having updated information and knowledge about implant therapy as compared to older practitioners who may need to update their knowledge regarding the new protocols. Another reason for the high prevalence of peri-implant disease reported by senior practitioners could be attributed to the longer follow-up of cases by them and recognizing the complications as compared to younger practitioners who might not be able to have longer follow up owing to the limited years of practice.

**Limitations**

The study was carried out only in and around Hyderabad to use its conclusive results as a future direction for a large scale nation-wide study. The type and dosage of antibiotic prescribed was not evaluated in the present study.

**CONCLUSION**

Implantology has grown leaps and bound in the past few years, and so have peri-implant diseases. The present study done among dental practitioners suggest that they do have a satisfactory level of awareness and knowledge regarding the implant procedures and their complications. Although younger practitioners showed more inclination toward implant placement, the prevalence of peri-implant mucositis and peri-implantitis was reported to be higher in self-trained dentists and by dentists who are practicing for >10 years. Based on these conclusions, it is recommended that practitioners should update themselves with a special focus on educating dentists in diagnosing the complications of implants and treating them.

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