Knowledge, Attitude, and Practice of Dental Implants among Dental Postgraduates and Practitioners in Davangere City, Karnataka: A Cross-sectional Study

Abstract

**Background:** Implant therapy has become an important part of treatment to restore function and esthetics in partially/completely edentulous patients. In spite of the progress made in implant dentistry since its inception, there have been some loopholes in scientific based knowledge and established clinical experience amongst dental professionals and postgraduates. So, an analysis was performed of the real picture. **Objectives:** A study was conducted to assess and compare the knowledge, attitude and practice of dental implants among dental postgraduate students and dental practitioners (General and institutional) in Davangere City, Karnataka and to identify the variations in their knowledge, attitude and practice with respect to dentist’s factors (years of experience, implant training and their specialization). **Materials and Methods:** A cross sectional questionnaire based survey was conducted using census approach with informed consent. A pretested, self administered questionnaire containing demographic details and knowledge and attitude based questions was distributed and collected back from the respondents. Responses were coded before and decoded after the analysis. Statistical analysis was performed using SPSS SoftwareV17.0. **Results:** The results were determined after the statistically analyzed and concluded that the knowledge was widespread among postgraduates and dental practitioners and variations existed amongst the subjects with respect to age, gender, years of experience, practice type, implant training and their specialization. It was also found that the attitude and practice towards implants and their evidence based knowledge about the same was variable. **Keywords:** Attitude, implants, institution-based practitioner, knowledge, postgraduates, practice

Introduction

Dental implantology is fast becoming a specialty in the field of dentistry. Within the last five decades, dentistry appears to have recorded its most significant advancements.[1] With the dental implants, missing teeth can now be replaced with stable, comfortable, natural looking, and feeling artificial replacements. While a considerable body of evidence exists as to the survival[2] and success of dental implants[3] and a growing body of evidence on the perceived benefits to patients themselves,[4] there is, however, a dearth of information from the providers perception of dental implant themselves.[4] In addition to the dentists’ attitude, economic considerations may also impact on the care provided to the patients. The dentists’ knowledge and attitude toward a treatment modality can itself significantly influence treatment decision-making and ultimately “shape” how oral health care is provided and become the norm.[3] Therefore, the present study was carried out with the prime objective of assessing and comparing the knowledge, attitude, and practice of dental implants among postgraduate students (PGs), institution-based practitioners (IBPs), general dental practitioners (GDPs), and institution-based nonpractitioners (IBNPs) and to assess the influence of dentists’ factors (years of experience, implant training, and their specialization) on the same.

Materials and Methods

The present study is a questionnaire-based cross-sectional survey carried out among PGs and dentists in Davangere city, Karnataka, India between January and
February 2013. Before the start of the present study, all necessary written permissions were obtained from the principals of the institutions. A list of the practicing dentists in the city was obtained from Deputy Director of Public Instructions office in the city.

The sample size was determined using a single proportion formula is

\[ n = \frac{Z^2 \cdot \hat{p} (1 - \hat{p})}{d^2} \]

where \( Z \) is 1.96 i.e., \( Z \) variate of alpha error (for 95% confidence level), and \( p \) stands for the prevalence, assuming the present knowledge level to be 50%, \( d \) is the Desired level of absolute precision.

The sample size was calculated to be 384 for a finite population of 10,000–1,000,000.

However, the present survey was carried out using census approach, wherein all the study participants who were willing to participate in the present study were included in the study. Those who were not willing to give consent to participate in the study were excluded. The survey was anonymous and participation was voluntary. The selection criterion was to include the majority of the PGs and dental practitioners in the institutions. However, the PGs and the practitioners were given a choice, and those who did not want to participate voluntarily were excluded from the survey. There were three dentists who refrained from participating in the survey.

Before the start of the present study, a pilot study was carried out on 25 respondents who were not included in the main study, with the purpose to check the content and construct validity of the questions. The filled questionnaires were discussed with an expert, and minor corrections were made pertaining to the language of two questions, which were modified to simple English.

The instrument for data collection was a self-administered, pretested questionnaire [Annexure 1] which was distributed to the participants. The mode of distribution was hand-delivery of the questionnaire, with two rounds of follow-up. The purpose of the study was explained to the participants, and the procedure to fill up the responses was also explained.

The questionnaires were written in simple English for easy understanding and response and they contained specific questions on the topic. However, no question on the source of their knowledge of implantology was included; it was assumed that the internet, health journals, television, and other unidentified personal efforts were the source of their knowledge. The questionnaire was divided into two sections which collected the information as follows:

Section A assessed the demography of the respondents—gender, age, academic post, years of experience in the profession, whether or not any implant training was received, and the type of practitioner (IBP, IBNP, and GDP).

Section B was made up of 27 questions which focused on knowledge-based questions regarding implants, attitude-based questions eliciting what do the dentists feel about implant therapy- and practice-based questions to judge whether they put their knowledge into practice.

The majority of questions were closed ended (25 in number) where the respondents were expected to put a tick sign to the options they feel most relevant. Only two questions were open ended; the respondents were expected to write in the space provided.

Statistical procedure

The filled questionnaire forms were collected from the respondents and were coded. All closed ended questions were coded with numericals against responses. All open-ended questions were coded as one for correct response and two for wrong response. The data were entered into Microsoft excel sheet (MS Office, v 2007). This sheet was then analyzed using Statistical Packages for Social Sciences (SPSS), version 17.0 software (SPSS Inc., Chicago, IL, USA). Results were expressed as number and percentage of respondents for each question. The test for significance to find out the association between various variables was done using Chi-square test. \( P \leq 0.05 \) was
considered statistically significant. The confidence interval was set to 95%.

**Results**

Of the 452 participants (276 postgraduates and 176 practitioners) distributed, 416 completed questionnaires were returned after 3 rounds of follow-up, resulting in a response rate of 92%. The demographic details are shown in Graph 1a and b.

**The assessment and comparison of the knowledge, attitude, and practice of dental implants among postgraduate student, institution-based practitioner, general dental practitioner, and institution-based nonpractitioner**

The knowledge of implants among the respondents was found to be maximum in postgraduates followed by IBPs, GDPs, and IBNP in descending order. There was a significant difference in the attitude of these respondents. Most of the IBPs had a highly positive attitude towards implant dentistry whereas GDPs had a highly negative attitude toward the same [Table 1].

**Table 1: The assessment and comparison of the knowledge, attitude, and practice of dental implants among postgraduate students, institution-based practitioner, general dental practitioner, and institution-based nonpractitioner**

| PG/practitioner | n   | Knowledge Good | Knowledge Average | Knowledge Poor | Attitude Positive | Attitude Average | Attitude Negative | Practice High | Practice Moderate | Practice Nil |
|------------------|-----|----------------|------------------|---------------|-------------------|----------------|-----------------|---------------|-----------------|-------------|
| PGS              | 253 | 91 (36)        | 132 (52)         | 30 (12)       | 139 (55)          | 92 (36)        | 22 (9)          | 13 (5)        | 214 (85)        | 26 (10)     |
| IBP              | 108 | 22 (20)        | 59 (55)          | 27 (25)       | 65 (60)           | 35 (32)        | 8 (8)           | 11 (10)       | 82 (76)         | 15 (14)     |
| GDP              | 39  | 4 (10)         | 20 (51)          | 15 (39)       | 22 (56)           | 12 (31)        | 5 (13)          | 2 (5)         | 35 (90)         | 2 (5)       |
| IBNP             | 16  | 2 (13)         | 9 (56)           | 5 (31)        | 3 (19)            | 12 (75)        | 1 (6)           | 0             | 15 (94)         | 1 (6)       |
| Total            | 416 | 119 (29)       | 220 (53)         | 77 (19)       | 229 (55)          | 151 (36)       | 36 (9)          | 26 (6)        | 346 (83)        | 44 (11)     |
| Significance ($\chi^2$, P) | 31.83, <0.001 (HS) | 12.83, <0.05 (S) | 7.93, 0.24 (NS) |

PGS=Postgraduate student, IBP=Institution-based practitioner, GDP=General dental practitioner, IBNP=Institution-based nonpractitioner, HS=Highly significant, S=Significant, NS=Nonsignificant

**Table 2: The effect of dentists' factor (years of experience) on the knowledge, attitude, and practice of dental implants**

| Years of experience | n | Knowledge Good | Knowledge Average | Knowledge Poor | Attitude Positive | Attitude Average | Attitude Negative | Practice High | Practice Moderate | Practice Nil |
|---------------------|---|----------------|------------------|---------------|-------------------|----------------|-----------------|---------------|-----------------|-------------|
| <5                  | 88 | 24 (27)        | 46 (52)          | 18 (21)       | 45 (51)           | 36 (41)        | 7 (8)           | 13 (15)       | 62 (71)         | 13 (15)     |
| 5-15                | 76 | 7 (9)          | 45 (59)          | 24 (32)       | 42 (55)           | 28 (37)        | 6 (8)           | 2 (3)         | 69 (91)         | 5 (7)       |
| >15                 | 34 | 7 (21)         | 19 (56)          | 8 (24)        | 20 (59)           | 11 (32)        | 3 (9)           | 2 (6)         | 29 (85)         | 3 (9)       |
| Total               | 198| 38 (19)        | 110 (56)         | 50 (25)       | 107 (54)          | 75 (38)        | 16 (8)          | 17 (9)        | 160 (81)        | 21 (11)     |
| Significance ($\chi^2$, P) | 9.38, 0.05 (S) | 0.84, 0.93 (S) | 12.24, <0.05 (S) |

*IBP, IBNP, GDP, and only few PG who had experience before joining postgraduation. S=Significant, PG=Postgraduate, IBP=Institution-based practitioner, GDP=General dental practitioner, IBNP=Institution-based nonpractitioner*

**Table 3: The effect of dentists' factor (implant training) on the knowledge, attitude, and practice of dental implants**

| Training          | n  | Knowledge Good | Knowledge Average | Knowledge Poor | Attitude Positive | Attitude Average | Attitude Negative | Practice High | Practice Moderate | Practice Nil |
|-------------------|----|----------------|------------------|---------------|-------------------|----------------|-----------------|---------------|-----------------|-------------|
| Received training | 75 | 18 (24)        | 44 (59)          | 13 (17)       | 39 (52)           | 32 (43)        | 4 (5)           | 22 (29)       | 52 (69)         | 1 (2)       |
| Not received training | 341| 101 (30)       | 176 (52)         | 64 (19)       | 190 (56)          | 119 (35)       | 32 (9)          | 4 (1)         | 294 (86)        | 43 (13)     |
| Total             | 416| 119 (29)       | 220 (53)         | 77 (18)       | 229 (55)          | 151 (36)       | 36 (9)          | 26 (6)        | 346 (83)        | 44 (11)     |
| Significance ($\chi^2$, P) | 1.33, 0.52 (NS) | 2.34, 0.31 (S) | 87.50, <0.001 (S) |

S=Significant, NS=Nonsignificant

The effect of years of experience on the knowledge, attitude, and practice of dental implants

The years of experience had a significant effect on the knowledge and practice of implant dentistry. It was observed that those who had <5 years of experience had the maximum knowledge and a highly positive attitude followed by those with >15 years of experience with majority of them having good knowledge and only 6% of them having a positive attitude whereas those with 5–15 years of experience had the least knowledge and the least positive attitude towards implant dentistry [Table 2].

The effect of implant training on the knowledge, attitude, and practice of dental implants

Whether or not the participant had received any implant training made a highly significant difference with respect to practice of implant dentistry. Those who had received implant training had a positive attitude and large practice as compared to those who did not receive implant training [Table 3].
The effect of age on the knowledge, attitude, and practice of dental implants

The age of the participants had a significant effect on their knowledge of implant dentistry. Most of the young dentists, i.e., 20–30 years of age had the maximum knowledge followed by those with age 30–40 years whereas it was least in the 40 years and above age group [Table 4].

The effect of postgraduate specialization on the knowledge, attitude, and practice of dental implants

The branch of postgraduate specialization had a significant effect on the knowledge and practice of implant dentistry. The knowledge of implant dentistry was best among prosthodontists closely followed by those belonging to the field of oral and maxillofacial surgery and periodontics. When considering the difference in practice, it was seen that the periodontists had a vast practice followed by those belonging to prosthodontics and oral surgery [Table 5].

Discussion

The absence of natural teeth is a health problem which not only results in compromised function but it also has a great impact on esthetics and psychological well-being of a patient. Since time immemorial various attempts have been made to replace missing teeth with prosthesis which resemble the natural teeth in function and appearance. This solution is achieved with dentures and fixed bridges. However, there are some inherent problems with dentures and fixed bridges such as compromise of adjacent healthy teeth, and accumulation of food debris and plaque. Fortunately, restoration of missing teeth with dental implants offers far reaching solutions to the problems.[7] Dental implant therapy has, thus, become an extremely predictable treatment for edentulism. It has become an appropriate part of general as well as specialty dental practice.[8]

The present study showed that postgraduates had the best knowledge for implant dentistry. Since implantology is now a part of postgraduate curriculum, they are also well versed with it theoretically. However, no literature is available to support the same, and further research in this direction is required. However, the practice and competency to place implants among postgraduates is not in line with their knowledge. Therefore, to put their knowledge into practice, more training courses should be started and postgraduates made to attend those.

Taking attitude and practice into consideration, this study showed that IBP had a highly positive attitude and most practice dental implants because of regular patient inflow and patient’s economic consideration being of least concern in an institution. However, GDPs had a negative attitude towards dental implantology. This observation was thought to be in line with a study conducted by Akeredolu et al., in 2007[9] where they found that lack of training courses and patient’s economic status led to poor implant results and a negative attitude for the same among GDPs. However,
in the present study, it was shown that these two factors posed the least threat, so there needs to be motivation and a change in attitude of the GDPs toward this advancement in dentistry. The disparity of practice among the IBPs and nonpractitioners can be reduced by giving the nonpractitioners more confidence with knowledge and practice by various implant education programs, hands on, and training courses.

It could be concluded from this study that factors such as the dentist's years of experience, implant training, and postgraduate specialization also affect the knowledge, attitude, and practice of dental implants. It is clearly evident from the study that those with <5 years of experience had the best knowledge, most positive attitude, and the most practice for implants. This variation in years of experience is well in line with a study conducted by Eckert et al. in 2012[9] where it was observed that younger prosthodontists expressed a greater desire to surgically place implants. This clearly shows that people who have long been in the dental profession still prefer conventional methods as a choice for the replacement of missing teeth. Hence, to reduce this variation, the dentists with long years of experience should widen their horizons for the upcoming developments in our profession.

It has been observed that implant training is an added factor that enhances the knowledge, provides a good attitude, and increases the practice of implants. Those who have received implant training obviously have an edge over those who did not, with regards to the knowledge, attitude, and results. This is well in accordance with a study conducted by Lang-Hua et al. in 2013.[3] Similar results were obtained by a study conducted by Maalhagh-Fard et al. in 2002[10] which showed that a stronger positive correlation with offering and restoring implants was seen in graduates who had completed the elective program in implant dentistry.

The study showed that most of the IBPs were competent enough to place implants and thus, did not need any implant training whereas the postgraduates felt they were less competent to place implants despite the fact that they had the most knowledge of the subject and needed a training for the same. The reason for this variation could be less exposure to practising implants for postgraduates, thus, this should be included as a part of the curriculum.

It is also evident from this study that postgraduate specialization too has an effect on implant knowledge, attitude, and practice. Since prosthodontists are primarily concerned with prosthetic rehabilitation of partial and complete edentulousness which includes the diagnosis and treatment planning, they have the best knowledge, expertise and practice for implants. A study conducted by Eckert et al. in 2012[9] showed that most prosthodontists used implant supported prosthesis in their practice. This is closely followed by oral surgeons and periodontists since they are the pioneer in putting a prosthodontists plan for dental implants into action.

A controversy always existed as to which specialization does the study of implants belongs to. However, it is considered as a multidisciplinary approach. Hence, efforts should be made at the institutional level to extend implants’ knowledge, attitude, and practice to other streams as well.

**Conclusion**

Today is an era of evidence-based dentistry. However, there is a huge gap between popularity of dental implants and the evidence available for the same. This study is an effort to bridge this gap. It gives us a comprehensive real picture as to where the knowledge and practice of dental implants have reached in our profession as this study has been conducted in an area where dentistry is in the air with two large scale teaching dental hospitals and a huge mass of dentists. However, it could be concluded that although implant dentistry is an emerging and promising branch, there are many areas that need to be worked on the part of the professionals themselves so that it can be completely absorbed into our profession to offer better health-care services to the masses.

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**Conflicts of interest**

There are no conflicts of interest.

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Annexure

**Knowledge, Attitude and Practice regarding Dental implants among Post graduate Dental Students and Dental Practitioners in Davangere City, Karnataka.**

This is an anonymous survey; precious information will be kept confidential

Please tick in the boxes provided.

- **Gender**: Male [ ] Female [ ]

- **Age**: ___________ years.

- **Years of experience in the profession**: ___________ years.

- **Implant training received**: Yes [ ] No [ ]

- **Post Graduate** [ ] Institutional based Practitioner [ ]

  Institutional based Non-Practitioner [ ] General Dental Practitioner [ ]

- **For PostGraduate**: Specialization:-
  Oral Medicine and Radiology [ ] Oral Surgery [ ]
  Prosthodontics [ ] Periodontics [ ]
  Preventive and Community Dentistry [ ] Orthodontics [ ]
  Oral Pathology [ ] Pedodontics [ ]
  Conservative and Endodontics [ ]

- **For Staff**:
  Post: Assistant Professor [ ] Reader [ ] Professor [ ] Head of Department [ ]

- **For General Dental Practitioners**:
  Qualification: BDS [ ] MDS [ ] Others [ ]
  Practice location: urban [ ] semi-urban [ ]

**QUESTIONNAIRE**

**KNOWLEDGE BASED QUESTIONS:**

1. **Have you ever heard about implants?**
   a) Yes [ ] b) No [ ]

2. **Which material is used for implants?**
   a) Titanium [ ] b) Stainless steel [ ]
   c) Cobalt [ ] d) All [ ]

3. **Which implantation method are you aware of?**
   a) Submucosal [ ] b) Subperiosteal [ ]
   c) Endosteal [ ] d) All [ ]
4. Are you aware of various body designs of implants?
   a) Yes    
   b) No

4A. If yes, which?
   a) Cylinder    
   b) Screw     
   c) Hollow      
   d) All

5. Are you aware of various surface modifications of implants?
   a) Yes    
   b) No

5A. If yes, which?
   a) Hydroxyapatite
   b) Ceramics
   c) Titanium Plasma Sprayed
   d) All

6. Are you aware of Branemark’s Theory of Osseointegration?
   a) Yes    
   b) No

7. What are the factors which determine the success of dental implants?
   a) Shape of the alveolar ridge
   b) Site of edentulous area
   c) Density of alveolar bone     
   d) All

ATTITUDE BASED QUESTIONS:

8. A 37 year old patient with missing 27 with the normal shape, size and density of the alveolar ridge favorable reports to your clinic. What will be your treatment of choice?
   a) Removable partial denture
   b) Fixed partial denture
   c) Dental implant

9. Will the patient’s financial status affect your choice?
   a) Yes    
   b) No

10. Will your experience and training modify the choice of treatment?
    a) Yes    
    b) No

11. Which level of clinical evidence do you refer?
    a) Case Report
    b) Randomized Controlled Trials
    c) Systematic review
    d) Meta analysis
    e) Do not refer any clinical evidence

12. Do you feel implant therapy is superior to conventional therapy for replacing missing anterior and posterior teeth?
    a) Yes for replacing both anterior and posterior teeth
    b) No for replacing both anterior and posterior teeth
    c) For replacing anterior teeth only
    d) For replacing posterior teeth only

13. Do you feel implant supported prosthesis has a better chewing efficacy than conventional prosthesis?
    a) Yes    
    b) No

14. Do you feel implant supported prosthesis has a better aesthetic outcome than conventional prosthesis?
    a) Yes    
    b) No
15. Do you feel dental implants are too expensive for most patients?
   a) Yes                         b) No
16. Do you feel dental implants need maintenance?
   a) Yes                         b) No
17. Do you feel dental implants have technical and biological complications?
   a) Yes                         b) No

**PRACTICE BASED QUESTIONS:**

18. Have you ever placed any dental implant?
   a) Yes                         b) No

18A. If yes, how many?

________________________

18B. What is the brand of dental implant system do you usually employ?

________________________

18C. Which approach do you use for implant placement?
   a) One stage                   b) Two stage

18D. If Two stage, then, how long after the first surgery, do you perform a second stage exposure surgery?
   a) 2-4 months for mandible     b) 4-6 months for mandible
   c) 2-4 months for maxilla      d) 4-6 months for maxilla
   e) Immediately after first surgery

18E. The patients in whom you place implants lie in which age group mostly?
   a) Younger                      b) Middle aged
   c) Elderly

19. Do you feel you are competent enough to place implants?
   a) Yes                         b) No

20. Do you feel need for attending any training courses?
   a) Yes                         b) No

**Thank you**