

Knowledge, Awareness, and Perception of Dentists towards implant preference

Sarah Mariam¹, Raj Shekhar Halli², Najam Khalique³

¹Department of Periodontology, Bharati Vidyapeeth Deemed to be University, Dental College and Hospital, Pune

²Department of Oral and Maxillofacial Surgery, Bharati Vidyapeeth Deemed to be University, Dental College and Hospital, Pune

³Department of Community Medicine, Jawaharlal Nehru Medical College and Hospital, Aligarh Muslim University, Aligarh Uttar Pradesh

CORRESPONDING AUTHOR

Prof. Najam Khalique, Department of Community Medicine, Jawaharlal Nehru Medical College and Hospital, Aligarh Muslim University, Aligarh Uttar Pradesh, India 202002

Email: najam_km@yahoo.com

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ABSTRACT

Background: There is a dearth of evidence from the providers (dentists') perspective, their attitudes, cognitive knowledge toward implant treatment and maintenance. This can impact the treatment objectives. Miniscule studies have investigated the qualitative and quantitative analysis of population of dentists' in shifting from crown and bridge practice to dental implant therapy and oral hygiene related to dental implants. **Aims & objectives:** To evaluate knowledge, perception and awareness of dentists' in shifting from crown and bridge practice to dental implant therapy in Pune city. **Methodology:** A self-administered validated 24- item questionnaire, was administered among general, academic and non-academic practitioners. Descriptive analysis was done. **Results:** Dental implants are the treatment of choice (55.6%) over crown and bridge. Majority of participants had an overall better knowledge regarding practice of implant-based dentistry over crown and bridge but not regarding periimplantitis. **Conclusion:** Our study showed that dental practitioners in Pune possess good knowledge of dental implant as a therapeutic option. However knowledge about parameters for assessing oral hygiene around implants was inadequate.

KEYWORDS

Dental Implants; Surveys and Questionnaires; Knowledge; Perception; Awareness

INTRODUCTION

Dental implants have become an important part of restoring function and aesthetics in partially/totally edentulous patients. Dental implants contribute to disability limitation becoming more effective due to their long-term success. (1)

Recent advances include the use of advanced surgical techniques such as computer-guided surgical techniques, tissue engineered scaffolding, 3D bone augmentation, and sinus lift surgery.(2) Sound surgical aptitude, implant choice, knowledge, prosthetic options include screw-retained and cement-retained are essential to ensure the long-term predictable outcomes of implant placement.(3,4,5) Dentists differ in age,

gender, years of experience, type of practice, cultivation training, and specialization. Implantology being a multi-speciality subject all dental practitioners (academic or non-academic or general dental practitioners) must be able to perform and advice implant maintenance protocol related to oral hygiene. Despite advances in dental science, there are gaps in implant related knowledge, clinical design and long-term implications among dentists and graduate students. (6,7)

Aim: To gauge through the knowledge and awareness of dentists in Pune city in transition from crown and bridge applications to dental implants and maintenance issues pertaining to oral hygiene.

Objectives: 1) Quantitative analysis of population of dentist of Pune city in shifting from crown and bridge to implant therapy. 2) Comparative analysis of satisfaction & perceptions of dentist of Pune city in shifting from crown and bridge to implant therapy.

MATERIAL & METHODS

Study type & study design: The reporting of this study was done according to Strengthening the Reporting of Observational Studies in Epidemiology (STROBE) guidelines. (8) A cross sectional, question based survey was carried out among academic practitioners, non-academic practitioners, and dentists in Pune city, Maharashtra.

Study setting: This research study was carried out in Bharati Vidyapeeth (Deemed to be University) dental college and hospital, Pune

Study population: Participants were selected from list of registered dentists on a random basis without any gender or age bias.

Study duration was one year

Sample size calculation: After taking values from a previous research study sample size of 350 was derived with appropriate statistical formula.

Inclusion criteria

1. Private dental general practitioners
 - a) Essential qualification: BDS, as well as those who have done courses on implants.
2. Academic practitioners
 - a) Essential qualification: MDS in oral and maxillofacial surgery or prosthodontics or periodontology.
 - b) Working in academic position in dental colleges in Pune
3. Non-academic practitioners
 - a) Essential qualification: MDS in oral and maxillofacial surgery or prosthodontics or periodontology.
 - b) Not working in academic position in dental colleges in Pune

Exclusion criteria

1. Dental hygienists
2. Clinical practice which is not dealing with implant related procedures

Strategy for data collection: After the required approval, a validated self-administered interview-based questionnaire was designed, and responses were quantified using a customized Google form. Under conditions of anonymity, participants were asked to answer the questions by choosing the most relevant option.

Questionnaire validity and reliability testing: A questionnaire was framed keeping in view with specific aim and research objectives of the research protocol. It was tested for content and face validity. Twenty-six subject experts with academic background in dental implantology were interviewed and requested to complete the study survey. Their opinion was evaluated using a yes or no question format whether a particular question should be included or not. Moreover, changes for any question and clarity was discussed with each participant. Calculation of Kappa statistics was done objectively, and adjustment of results was done accordingly.

Survey distribution: The questionnaire began with informed consent question asking the participants whether they wanted to take part in the survey or not. After consenting they were directed to main questionnaire which consisted of two sections of quantitative followed by qualitative part. Section one consisted of demographic details, knowledge and practice based implant related questions while section two had ten comparative qualitative questions between crown and bridge and implants on a three point Likert scale of 1, 2, 3 with agree, strongly agree and strongly disagree responses respectively. Sub questions were not included in the survey. The estimated time frame to complete the questionnaire was 6-8 minutes. Some eligible participants were approached on a random basis to complete the questionnaire

Ethical issues & informed consent: Ethical committee of the institute duly approved the research proposal with number (IEC)-BVDU/IEC/R1/25/22-23. Informed consent was taken from all participants at the beginning of the questionnaire.

Data analysis: Statistical analysis was undertaken with IBM SPSS Software NY: IBM Corp version 21.0 at 95% CI with 5% alpha and 80% power to the study. Descriptive statistics was performed in terms of mean, standard deviation and frequency and percentage. Pearson's chi square test was applied to check statistical significance and p value <0.05 was taken as statistically significant and p value <0.001 as highly statistically significant.

RESULTS

Response of 350 study subjects were evaluated. Demographic data results are included in Table 1.

Table 1. Showing demographic data characteristics of participants

Descriptive data		
Gender	Number of responses (Frequency)	Percentage
Male	190	54
Female	160	46
Age (range) in years	Number of responses (Frequency)	Percentage
25-30	45	13
31-35	175	44
36-40	80	23
More than 40	50	20
Which of the following categories you belong to?	Number of responses (Frequency)	Percentage
Academic practitioners	145	41
Non-academic practitioners	30	9
General dental practitioner	175	50

Table 2 Showing response to the knowledge and practice-based questions

What are the untoward experiences during first 03 months of implant therapy?	Percent	Chi - square	P value
Implant failure	10		
Implant exposure	62.5	31.84	p<0.001**
Post-operative pain	17.5		
What are the untoward experiences faced after first year of implant therapy?	Percent	Chi - square	P value
Peri-implantitis	35.8		
Implant loss	10.1	52.83	p<0.001**
Screw loosening	25.1		
Abutment/prosthetic fracture	29		
Most important factor for dental implant failure?	Percent	Chi - square	P value
Case selection	24.4		
Surgical technique	42.5	22.39	p<0.001**
Experience of operator	20.3		
Patient compliance	12.8		
For mandibular implants which of the following issue is most commonly faced?	Percent	Chi - square	P value
Occlusion discrepancy	37.2		
Peri-implantitis	9.8	42.87	p<0.001**
Lack of primary stability	44.1		
Prosthetic fracture	8.9		
For maxillary implant, which of the following issue is most commonly faced?	Percent	Chi - square	P value
Implant loss	25.3		
Implant margin exposure	55.6	12.56	p<0.03
Implant into sinus	5		
Poor emergence profile	14.1		
Which is the best implant system according to literature?	Percent	Chi – square	P value
coated/titanium plasma sprayed/HA/ laser	31.4		
sand blasted / acid etched	32.3	23.65	p<0.04
F coated	24.3		
other	12		
What is the best abutment design?	Percent	Chi – square	P value
internal hex	65.3		
external hex	16.8	47.29	p<0.001**
platform switch	8		
one piece	9.9		
What is your criterion for selection of implant for your patient?	Percent	Chi - square	P value
implant design	59.3		

implant cost/affordability	13.6	16.38	p<0.001**
profit margin	7.1		
abutment/prosthesis design	20		
Which factor is most important for crown preparation of fixed prosthesis?	Percent	Chi - square	P value
occlusal convergence	42.2		
retention form	23.8	33.16	p<0.001**
resistance form	33		
finish lines	33		
Which of the following is best material for multi-unit bridge in the anterior region?	Percent	Chi - square	P value
Metal only	30		
Metal-porcelain	16.8	27.86	p<0.003*
Zirconia only	53.2		
Which of the following is best material for multi-unit bridge in the posterior region?	Percent	Chi - square	P value
Metal only	42.3		
Metal-porcelain	27.1	35.01	p<0.003*
Zirconia only	29.6		
Which is the most important factor for fracture of multi-unit bridge?	Percent	Chi - square	P value
Poor crown root ratio	54.7		
Biting forces of patient	17.2	25.87	p<0.002*
Improper prosthetic design	22.1		
Other factors	6		
For complete dentures which prosthesis design is favourable and functional from patients' perspective?	Percent	Chi - square	P value
1. implant supported fixed dentures	50		
2. implant supported overdentures	26.3	17.37	p<0.001**
3. complete dentures	23.7		
Which is parameter is most important for assessing oral hygiene around dental implants	Percent	Chi - square	P value
1. Bleeding on probing	31.8		
2. Implant mobility	15.3	26.82	p<0.003*
3. Pocket depth	52.9		

Table 3 Showing response to the comparative questions between crown and bridge and implants.

Crown and bridge treatment is an easier option as compared to implant	Percent	Chi - square	P value
Agree	72.5		
Strongly agree	17.5	31.84	p<0.001**
Strongly disagree	10		
Crown and bridge treatment are more affordable to patients than implants	Percent	Chi - square	P value
Agree	45.8		
Strongly agree	39.1	52.83	p<0.001**
Strongly disagree	15.1		
Risk of prosthetic complications is less in crown and bridge treatment than dental implants	Percent	Chi - square	P value
Agree	24.4		
Strongly agree	12.8	22.39	p<0.001**
Strongly disagree	20.3		
Better esthetic profile can be achieved by crown and bridge as compared to dental implants	Percent	Chi - square	P value
Agree	37.2		
Strongly agree	44.1	42.87	p<0.001**
Strongly disagree	18.7		
I prefer dental implants to crown and bridge prosthesis.	Percent	Chi - square	P value

Agree	55.6		
Strongly agree	25.3	32.72	p<0.001**
Strongly disagree	19.1		
Implant treatment is more profitable than bridge	Percent	Chi - square	P value
Agree	46.1		
Strongly agree	21.6	19.96	p<0.001**
Strongly disagree	32.3		
Implant treatment components are an added expense	Percent	Chi - square	P value
Agree	75.3		
Strongly agree	16.8	47.29	p<0.001**
Strongly disagree	8		
Implant treatment is difficult in patients suffering from systemic diseases than crown and bridge	Percent	Chi - square	P value
Agree	69.3		
Strongly agree	23.6	16.38	p<0.001**
Strongly disagree	7.1		
Bridge complications are easy to handle than implants	Percent	Chi - square	P value
Agree	76.2		
Strongly agree	13.3	33.16	p<0.001**
Strongly disagree	10.5		
Peri-implantitis can be prevented by good oral hygiene measures	Percent	Chi - square	P value
No	73.2		
Yes	26.8	27.86	p<0.003*

DISCUSSION

Dental implants offer the best option to replace single or multiple missing teeth. Dental implants require adequate knowledge for good surgery and appropriate treatment planning.(9,10) As the science of dental implants is constantly evolving, it is important to be aware of current changes.

Since the inception of dental implants, the benefits of dental implants have been confirmed by longitudinal studies. Therefore, the knowledge and experience of dentists from the perspective of dental endosteal implants is important in making dental treatment decisions.(11) With long-term hope for implant restoration, more patients are opting for dental implants as the first decision to restore missing teeth.(12) Dentists give first-hand information about dental implants (48.56%). Pommer et al. indicated that dentists are particularly important source of information.(13) This finding is similar to a study from Indian state of Andhra Pradesh which concluded that dentists pass on first information to patients followed by peers and mass media.(14)

Pune is one of the urban areas in Maharashtra with high employability in the dental sector. It boasts of atleast four dental colleges which have academic as well as clinical curriculum. This indicates the need to update undergraduate dental curricula in individual dental colleges cum schools to improve knowledge and practice related to dental implants. In this study, most dental practitioners (55.6%) preferred implants over crowns and bridges as treatment. This is according to a study by R

Chowdhary et al. which shows 77. 66% of dentists prefer dental implants as a better treatment option.(15)

Considering knowledge and practice-based questions (Table 2) majority concluded that: implant exposure as an untoward experience (during first 3 months), lack of primary stability, implant margin exposure, peri-implantitis as complications. These can be due to improper case selection (24.4%) and lack of surgical technique (42.5%) as rightly concluded by our participants which were highly statistically significant. Optimistic aspect of this fact is that dentists across all categories not only know complications they face but are also aware of their own deficiencies. Worrying aspect is that most dentists feel that peri-implantitis cannot be managed (73.2%) though it is the most commonly feared complication after first year (35.8%). This exemplifies need for a specialist consultation (Periodontist) in treatment planning of implants. A study also concluded that 76.3% of practitioners agreed that technical and biological complications is a surety if improper diagnosis and technique is applied.(16)

One of burning topics around dental implants deals with various surface coatings to increase the bone implant contact % BIC. This parameter is very important considering long term success of implants. Plasma sprayed surface had BIC of 30-40% while sand blasted and acid etched surface had BIC of around 50-60%.(17) Ample studies have demonstrated clinical advantage of rough implants over smooth surface implants.(17) Sand blasted

/acid etched treatment (32.3%) was regarded as the best implant system when compared to titanium plasma sprayed/coated implants according to our study and this was not statistically significant. Only 30% of dentists knew about implant surface modifications.(16)

In our study we have included precise questions regarding abutment connections to gauge the depth of knowledge of dentists regarding this very important mechanical aspect. Superiority of internal hexagonal connection over external hexagonal connections is due to deeper connection with inner walls of implant reducing micromovements.(18) Our study hailed internal helix (65.3%) as the best abutment design proving dentists are abreast with the latest literature regarding this aspect. Around 60% respondents felt that implant design was the main criterion for selection of implant for patient. All these parameters were statistically significant validating the knowledge about implant abutment connection designs.

Our study had taken into considerations prosthesis planning aspects like occlusal convergence, retention form, resistance form, finish lines unlike other questionnaires studies. These factors are crucial to the success of single tooth crown as well as multi-unit bridge.(Table 2) Occlusal convergence (43%) was considered as single important factor for crown preparation of fixed prosthesis which were statistically significant concluding that Pune practitioners possess good interdisciplinary knowledge.

Very important aspect of prosthesis design is to maintain 1:2 crown root ratio for crown or bridge which is considered ideal. However, Dykema *et al* suggested 1:1.5 ratio as acceptable range.(19) Around 55% felt poor crown-root ratio was most important factor for fracture of multi-unit bridge which rightly assesses knowledge of dental surgeon with regard to this interrelationship.

Considering the prosthetic aspects (Table 2) participants hailed metal (53.2%) and zirconia only (42.3%) were the best material for multi-unit bridge in the anterior and posterior regions respectively. Implant supported fixed dentures (50%) is favourable and functional prosthesis design for complete dentures from patients' perspective which is highly statistically significant.

Among the parameters for assessing oral hygiene around dental implants 52.9% dental practitioners relied on pocket depth measurement, 31.8% on bleeding on probing and 15.3% on implant mobility. Comparative results between the two treatment modalities point to the fact that most participants still preferred crown and bridge over dental implants (Table 3). Reasons could be profound

ranging from difficult cases (less bone width, height, or both), confidence issues and mental hindrance towards a new treatment modality (half of participants are general dental practitioners). This shows how deep-rooted perceptions can create blocks towards treatment and need to be changed. Also regarding periimplantitis more than 70% dentists felt that it cannot be prevented by good oral hygiene measures. Oral microbiome plays an important role in biological considerations of implant complications and subsequent failure.(20) However, oral hygiene maintenance protocols play an important role in preventing peri-implantitis.(21) The findings of study conclude that this knowledge is lacking in practitioners regarding this aspect. One study stressed on imparting clinical implant education at undergraduate level as well.(22)

Differences in implant material can be caused by a variety of reasons. Other factors affecting the selection of implants are its cost, ease of surgery and prosthesis stage, availability of implants, etc. The current research provides some information about dentists' focus, attitudes and perception and shows that public should have accurate access to information about dental implants as the best alternative to replacing missing teeth.

This study used a questionnaire to assess dentists' knowledge of dental implants. Studies evaluating clinical success of dental implants will be beneficial for predicting long-term survival of dental endosteal implants.

CONCLUSION

This study directly compares two of the most common fixed prosthetic treatments for edentulism objectively evaluating perceptions and satisfaction among dental practitioners. Although many dentists practice implantology, the main factor that keeps dentists as well as patients from applying implantology seems to be cost. Efforts should be made to educate patients about the advantages of dental implants over other treatments. Neglect of any essential treatment may prove more costly than the treatment itself, when comparing the tangible as well as intangible benefits. Also, sensory processing of information is overwhelming and should not act as a roadblock in providing best treatment options. Treatment of peri-implantitis is an indispensable skill acquired through an interdisciplinary approach and education programs.

RECOMMENDATION

Continuing dental education programs (CDE) and fellowship courses related to implantology must be

undertaken on a regular basis by all dental surgeons to increase their knowledge and change perceptions.

LIMITATION OF THE STUDY

Since this study was conducted in a small population in Pune city and the available data are limited, larger-scale longitudinal studies may be undertaken in future to understand problems dentists face with dental implants.

RELEVANCE OF THE STUDY

This study focuses on technical knowledge about intricate and minute aspects related to biological and mechanical complications in dental implantology from the providers' perspective. Treating peri-implantitis and role of implant hygiene maintenance protocols are key towards long term survival of endosteal dental implants which dentists are not aware of.

AUTHORS CONTRIBUTION

All authors have contributed equally.

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Nil

CONFLICT OF INTEREST

There are no conflicts of interest.

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DECLARATION OF GENERATIVE AI AND AI ASSISTED TECHNOLOGIES IN THE WRITING PROCESS

The authors haven't used any generative AI/AI assisted technologies in the writing process.

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