

Knowledge, Attitude, and Practice Regarding Implant Failure among Prosthodontists in Tamil Nadu and Puducherry – A questionnaire study

M. Yogesh Kumar¹, C. J. Venkatakrishnan², M. Narasimman³, N. G. Surya¹

¹Post Graduate, Department of Prosthodontics and Crown and Bridge, Tagore Dental College and Hospital, Chennai, Tamil Nadu, India,

²Professor and Head, Department of Prosthodontics and Crown and Bridge, Tagore Dental College and Hospital, Chennai, Tamil Nadu, India,

³Professor, Department of Prosthodontics and Crown and Bridge, Tagore Dental College and Hospital, Chennai, Tamil Nadu, India

Abstract

Introduction: The prosthodontist plays a central role in managing dental implant success and failure. Despite the widespread adoption of implant dentistry, variations in knowledge, attitude, and practice (KAP) regarding implant failure management persist across different professional settings.

Purpose: This study aimed to assess the KAP regarding implant failure among practicing prosthodontists in Tamil Nadu and Puducherry to identify professional trends and areas for enhancement in patient care and education.

Methods: A cross-sectional, questionnaire-based study was conducted among 165 prosthodontists (MDS degree holders) across Tamil Nadu and Puducherry. The sample was categorized into three professional groups: Private Practice ($n = 55$), college faculty ($n = 53$), and private + college faculty ($n = 57$). A standardized 22-item questionnaire covering knowledge (7 questions), attitude (6 questions), and practice (9 questions) domains was administered. Statistical analysis utilizing the Chi-square test compared responses across professional categories with significance set at $P < 0.05$.

Results: While KAP was largely homogeneous across groups, a near-significant difference was observed when evaluating factors affecting implant success ($P = 0.056$), with private practitioners prioritizing patient care and attitude (40.0%) while college faculty emphasized patient health and medical history (34.0%). A descriptive, non-significant split ($P = 0.190$) revealed that a majority of private practitioners (78.2%) would refuse assistance to a patient with implant failure, contrasting with the empathize and investigate approach favored by college faculty (30.2%). Over 75% of all groups reported not using the implant stability quotient for objective stability measurement.

Conclusion: While prosthodontists maintain a strong foundational knowledge base, significant variances exist in prioritizing success factors and managing patient failure ethically. These findings highlight the urgent need for consensus-driven curriculum review to standardize patient-centered, ethical, and comprehensive risk management protocols across all professional settings.

Key words: Implant failure, Implant stability, Screw loosening

INTRODUCTION

The success of modern dental implantology relies on the foundational discovery of osseointegration. As dental implants have become the standard for prosthetic

rehabilitation, the specialist's role in preventing and managing complications has intensified. The prosthodontist, overseeing the final restoration and long-term maintenance, is critical to ensuring predictable outcomes.^[1-5]

A thorough, evidence-based understanding of multifactorial etiology – encompassing patient systemic health, technical precision, and post-operative compliance – is paramount. This study was specifically designed to investigate the level of knowledge, attitude, and practice concerning implant failure among the specialized community of prosthodontists, distinguishing between their roles in private practice and academia.

Access this article online



www.ijss-sn.com

Month of Submission : 08-2025
Month of Peer Review : 09-2025
Month of Acceptance : 10-2025
Month of Publishing : 10-2025

Corresponding Author: Dr. M. Yogesh Kumar, Department of Prosthodontics and Crown and Bridge, Tagore Dental College and Hospital, Melakottaiyur Post, Rathinamangalam, Vandalur, Chennai - 600 127, Tamil Nadu, India.

The primary objectives of this research were:

1. To assess the current knowledge of prosthodontists concerning implant failure, its causes, risk factors, and preventive strategies
2. To evaluate prosthodontists' attitude toward early signs of failure, patient communication, and professional responsibility
3. To document the clinical practices employed by prosthodontists to minimize failure incidence and effectively manage established cases.

METHODS

Study Design and Setting

A cross-sectional, questionnaire-based survey was conducted among active prosthodontists across Tamil Nadu and Puducherry from January 2024 to June 2024.

Sample Population and Inclusion Criteria

Based on established confidence levels (95% confidence interval, 5% margin of error), the minimum required sample size was calculated as 161. A total of 165 Prosthodontists (MDS graduates) successfully completed the survey, exceeding the minimum requirement.

Inclusion Criteria

Only prosthodontists with an MDS degree actively practicing as private practitioners and/or academicians (College Faculty) in Tamil Nadu and Puducherry were included in the study.

Exclusion Criteria

BDS, dental surgeons without MDS qualification in prosthodontics, retired practitioners, and those not actively involved in clinical practice or teaching were excluded from the study.

The final sample distribution used for analysis was: Private practice ($n = 55$, 33.3%), college faculty ($n = 53$, 32.1%), and private + college faculty ($n = 57$, 34.5%).

Questionnaire Development and Variables

A standardized, structured questionnaire comprising 22 items was developed based on an extensive literature review and expert consultation. The questionnaire was divided into three domains:

- Knowledge: Seven questions assessing understanding of implant failure etiology, risk factors, and identification methods
- Attitude: Six questions evaluating professional approach toward failure prevention, patient communication, and ethical responsibility
- Practice: Nine questions documenting clinical practices, diagnostic tools, patient education methods, and failure management protocols

The questionnaire was validated through a pilot study with 10 prosthodontists not included in the final sample. Based on feedback, minor modifications were made to enhance clarity and relevance.

The independent variable for comparative statistical analysis was the type of practice, categorized as: Private practice, college faculty, or private + college faculty (dual role).

Data Collection

Data were collected through both online (Google Forms) and offline (paper-based) questionnaires to maximize response rate. Participants were contacted through professional associations, dental colleges, and personal networks. Informed consent was obtained from all participants before data collection.

Ethical Approval

Ethical clearance was obtained from the Institutional Ethics Committee before commencement of the study. All participants provided informed consent, and confidentiality of responses was maintained throughout the study.

Statistical Analysis

Data were analyzed using the Statistical Package for the Social Sciences version 20.0 (IBM Corp., Armonk, NY, USA). Descriptive statistics, including frequencies and percentages, were calculated for all variables. The Chi-square test was employed to assess the association between responses and type of practice groups. Statistical significance was defined at $P < 0.05$. For cells with expected frequencies < 5 , Fisher's exact test was considered where applicable.

RESULTS

A total of 165 eligible prosthodontists participated. The total sample was distributed across the professional categories as follows: Private practice ($n = 55$, approx. 33.3%), college faculty ($n = 53$, APPROX. 32.1%), and private + college faculty ($n = 57$, approx. 34.5%). The detailed results are presented in Table 1.

Knowledge Level

Knowledge levels were largely homogeneous with no statistically significant differences ($P > 0.05$) observed for most questions. The single finding that approached significance was for Q3 (Factors affecting success rate, $P = 0.056$), where private practitioners prioritized care and attitude of the patient (40.0%) while college faculty emphasized patient health and medical history (34.0%).

Attitude Level

Attitudes toward prevention and professional responsibility were statistically non-significant. Q11 (Handling Implant

Table 1: Detailed results of knowledge, attitude, and practice questions by type of practice (n=165)

Q#	Question	Private practice (n=55) (%)	College faculty (n=53) (%)	Private+college faculty (n=57) (%)	χ^2	P-value
Knowledge (Q1-Q7)						
1	Most common cause of implant failure?	Improper loading protocol (29.1)	Poor oral hygiene (28.3)	Improper loading protocol (28.1)	2.019	0.918
2	Most effective way to identify a failing implant?	History (30.9)	Increased pain or discomfort (32.1)	Increased pain or discomfort (31.6)	5.554	0.475
3	Factors affecting success rate?	Care and attitude of patient (40.0)	Patient health and medical history (34.0)	Implant placement technique (28.1)	12.282	0.056*
4	Optimum torquing of implant?	10 N (32.7)	20 N (32.1)	10 N (28.1)	5.756	0.451
5	Which implant material has the lowest risk of failure?	Titanium (30.9)	Titanium (30.2)	Titanium (29.8)	1.062	0.983
6	Reversible versus irreversible complications – which statement correctly describes differences?	Reversible resolved without major intervention; irreversible require corrective procedures (29.1)	Reversible occur less frequently than irreversible (28.3)	Reversible related to aesthetics; irreversible affect functionality (33.3)	7.031	0.318
7	Which implant placement technique is associated with higher risk of failure?	Two-stage surgery (27.3)/Sinus-lift procedure (27.3)	Sinus-lift procedure (32.1)	Two-stage surgery (28.1)/delayed loading (28.1)	5.570	0.473
Attitude (Q8-Q13)						
8	A dentist with a proactive attitude is most likely to:	Provide comprehensive pre-implant assessments (41.8)	Discourage patients (43.4)	Discourage patients (43.9)	2.807	0.591
9	How important is it to inform patients about possible implant failure?	Somewhat important (20.0)/very important (20.0)	Moderately important (18.9) Very important (20.8)	Somewhat important (19.3)/very important (19.3)	1.368	0.850
10	Responsibility of the dentist in preventing implant failure	Proper patient selection and evaluation (29.1)	Proper patient selection and evaluation (34.0)	Proper patient selection and evaluation (29.8)	0.706	0.994
11	How should a dentist with a positive attitude handle a patient after implant failure?	Refuse to provide assistance (78.2)	Refuse to provide assistance (69.8)	Refuse to provide assistance (73.7)	3.327	0.190
12	Philosophy on when to recommend implant removal or replacement	When significant bone loss or other signs (20.0)	Only when absolutely necessary (20.8)/When significant bone loss or other signs (20.8)	When significant bone loss or other signs (28.1)	0.943	0.918
13	Do you often refer to journals to update yourself on contemporary data?	No (72.7)	No (69.8)	No (68.4)	1.583	0.453
Practice (Q14-Q22)						
14	Level of experience with dental implant placement	3–5 years (29.1)	>10 years (35.8)	>10 years (28.1)	10.065	0.122
15	Have you encountered implant failure during your practice?	Yes (56.4)	Yes (60.4)	Yes (56.1)	0.732	0.693
16	How frequently do you encounter implant failure?	Rarely (21.8)	Rarely (20.8)	Rarely (21.1)	N/A	N/A
17	What percentage of your implant cases experience implant failure?	21–30 (27.3)	21–30 (30.2)	>40 (26.3)	7.816	0.452
18	Confidence level in ability to diagnose and treat implant failure	Low (18.2)/Moderate (18.2)	Moderate (24.5)/No confidence (24.5)	No confidence (29.8)	6.447	0.375
19	To what extent does implant failure affect practice reputation?	Not at all (18.2)	Highly affects (18.9)	Highly affects (24.6)	3.809	0.702
20	What measures do you take to educate patients on risks and hygiene?	Provide written and verbal instructions (20.0)	Address specific concerns and questions (24.5)/All of the above (24.5)	All of the above (31.6)	4.718	0.580
21	Do you use implant stability quotient (ISQ)?	No (76.4)	No (75.5)	No (73.7)	0.583	0.747
22	Do you perform retorquing procedure while placing implant?	Yes (65.5)	Yes (56.6)	Yes (57.9)	2.528	0.283

Failure) showed a non-significant overall association ($P = 0.190$). Descriptively, 78.2% of private practitioners reported they would refuse to provide any assistance, sharply contrasting with the ethical response (empathize, investigate, recommend solution) most favored by college faculty (30.2%).

Practice Level

Practice patterns showed no significant correlation with the type of practice ($P > 0.122$). A notable finding was the widespread low adoption of objective diagnostics: over 75% of all groups reported that they do not use the implant stability quotient (ISQ) (Q21, $P = 0.747$). A majority of respondents reported having encountered implant failure (56.1–60.4% in Q15).

DISCUSSION

The current investigation, focusing exclusively on MDS prosthodontists, found that knowledge regarding implant failure is fundamentally consistent and robust across the three practice settings. The homogeneity in most knowledge domain P -values confirms that the specialized postgraduate curriculum provides a standardized, adequate level of knowledge concerning implantology, irrespective of the practitioner's primary employment environment.

Divergence in Risk Factor Prioritization

A key finding that approached statistical significance was Q3 (Factors affecting success rate, $P = 0.056$). This result reveals a subtle, yet crucial, professional divergence. The tendency of private practitioners to prioritize the patient's care and attitude (40.0%) aligns with practical, long-term practice management – patient compliance is vital for maintaining implant longevity and, critically, safeguarding the practice's reputation. This finding is consistent with research by Wennström *et al.*, who demonstrated that patient compliance with maintenance protocols significantly influences long-term implant success in periodontitis-susceptible individuals.^[13]

Conversely, the academic emphasis by college faculty on patient health and medical history (34.0%) reflects an adherence to established etiological literature, which links systemic factors to the risk of early implant failure. Multiple studies have established the critical role of systemic conditions in implant outcomes. Oates *et al.* demonstrated that elevated hemoglobin A1c levels in patients with Type 2 diabetes significantly affect implant survival and stability.^[6] Similarly, Alsaadi *et al.* identified that local and systemic patient-related factors substantially impact failure rates up to the abutment connection stage.^[7]

This difference highlights that while knowledge is shared, the professional setting dictates the perceived priority of risk factors.

Ethical Concerns in Failure Management

The most impactful finding rests within the attitude domain, specifically Q11 (Handling Implant Failure). Although the overall Chi-square test was non-significant ($P = 0.190$), the descriptive contrast is compelling. The fact that an overwhelming majority of private practitioners (78.2%) and those in the combined group (73.7%) chose to refuse assistance suggests the presence of a strong defensive practice culture. In a highly competitive environment, this likely stems from intense concerns over litigation, practice reputation (Q19), and avoiding responsibility.

This finding stands in stark contrast to the ethical imperative espoused by College Faculty, where a higher proportion opted for the patient-centered approach: Empathize, investigate, and recommend a solution. Van Steenberghe *et al.* emphasized that a comprehensive investigation of both local and endogenous patient-related factors is essential for understanding failure etiology and implementing corrective measures.^[8] This behavioral split underscores a critical need for ethical training and standardized patient communication protocols that prioritize professional responsibility over defensive measures, regardless of the clinical outcome.

Underutilization of Objective Diagnostic Tools

In terms of Practice, there were no significant differences. The general lack of widespread adoption of the ISQ (Q21, $P = 0.747$) across all groups indicates a potential over-reliance on subjective diagnostic measures like palpation and percussion, or simple radiographic evaluation. This is a critical area for improvement, as objective tools like ISQ have been validated for determining appropriate loading protocols and predicting stability, thereby minimizing risk. Noguero *et al.* demonstrated the prognostic capacity of objective stability measurements like periotest in predicting early implant failure in a large retrospective study.^[10] The continued reliance on subjective assessment methods may contribute to delayed recognition of failing implants and suboptimal treatment outcomes.

Patient Selection and Systemic Risk Factors

Furthermore, while systemic health is prioritized by academics (Q3), the consistent high rating for proper patient selection and evaluation (Q10, $P = 0.994$) across all groups suggests that the profession is aware of the role of external factors in failure, such as heavy smoking or uncontrolled diabetes, consistent with the literature. Sverzut *et al.* (2008) demonstrated the significant influence of tobacco use on early dental implant failure rates,^[11] while Alsaadi *et al.* (2007) comprehensively documented how local and systemic factors impact oral implant failures up

to abutment connection.^[14] Bornstein *et al.* (2008) further emphasized the importance of thorough patient evaluation in their retrospective analysis of patients referred for implant placement, noting that inadequate patient selection contributed significantly to early failures.^[9]

Experience and Failure Exposure

The fact that the failure encounter rate was homogeneous across all groups (Q15) confirms that all prosthodontists are equally exposed to a representative spectrum of implant complications, regardless of their primary work environment. This universal exposure to failure cases presents both a challenge and an opportunity for continuing education initiatives. Kronström *et al.* (2000) investigated host factors in subjects with failing or successful implants, underscoring the complexity of failure etiology and the need for comprehensive diagnostic approaches.^[16] Eliasson *et al.* (2010) further demonstrated in a 5-year prospective study that implant design and surgical protocol variations can significantly influence outcomes, suggesting that practitioner experience with diverse failure presentations is essential for clinical competence.^[15]

Implications for Surgical Technique and Protocol

The knowledge regarding implant placement techniques (Q7) and torquing protocols (Q4) showed variation but no statistical significance across groups. However, the literature consistently emphasizes the importance of surgical precision. Güler *et al.* (2005) highlighted the critical need for accurate assessment of anatomic landmarks and bone dimensions in treatment planning to minimize surgical complications.^[12] The divergence in preferred techniques between groups may reflect evolving surgical philosophies and the lack of absolute consensus in certain clinical scenarios, suggesting an area where standardized evidence-based protocols could enhance outcomes.

Limitations and Future Directions

This study confirms that while the foundational knowledge is present, the clinical attitude and risk management priorities are heavily shaped by the practitioner's professional environment, leading to variances that ultimately impact patient care and ethical responsibility. A limitation of this study is its cross-sectional design and reliance on self-reported questionnaire data. Future longitudinal studies incorporating clinical outcome data and standardized ethical case scenarios would provide more robust evidence for curriculum development and professional guidelines.

CONCLUSION

The current study shows that MDS Prosthodontists possess diverse perspectives and levels of knowledge and

practice regarding dental implant failures, largely dictated by their professional setting. The most striking disparity is in the ethical approach to managing a patient with a failed implant. This study points to the necessity of curriculum reviews, assessments of instructional strategies and resources, and a professional consensus to enforce standardized, ethical, and patient-centered protocols across all professional venues. These measures would improve knowledge and professionalism regarding dental implants and its difficulties so that dentists can appropriately address the growing number of patients who have questions concerning dental implants.

REFERENCES

1. Shulman LB, Driskell TD. Dental implants: A historical perspective. In: Block M, Kent J, Guerra L, editors. *Implants in Dentistry*. Philadelphia, PA: W. B. Saunders; 1997.
2. The Evolution of Dental Implants throughout History. 2022. Available from: <https://aiceducation.com/the-evolution-of-dental-implants-throughouthistory/#:~:text=Implants%20date%20as%20far%20ba> [Last accessed on 2022 Sep 25].
3. Moraschini V, Poubel LA, Ferreira VF, Barboza Edos S. Evaluation of survival and success rates of dental implants reported in longitudinal studies with a follow-up period of at least 10 years: A systematic review. *Int J Oral Maxillofac Surg* 2015;44:377-88.
4. Akaltan F, Kaynak D. An evaluation of the effects of two distal extension removable partial denture designs on tooth stabilization and periodontal health. *J Oral Rehabil* 2005;32:823-9.
5. Wennström JL, Ekestubbe A, Gröndahl K, Karlsson S, Lindhe J. Implant-supported single-tooth restorations: A 5-year prospective study. *J Clin Periodontol* 2005;32:567-74.
6. Oates TW Jr., Galloway P, Alexander P, Vargas Green A, Huynh-Ba G, Feine J, *et al.* The effects of elevated hemoglobin A(1c) in patients with type 2 diabetes mellitus on dental implants: Survival and stability at one year. *J Am Dent Assoc* 2014;145:1218-26.
7. Alsaadi G, Quirynen M, Michiles K, Teughels W, Komárek A, van Steenberghe D. Impact of local and systemic factors on the incidence of failures up to abutment connection with modified surface oral implants. *J Clin Periodontol* 2008;35:51-7.
8. Van Steenberghe D, Jacobs R, Desnyder M, Maffei G, Quirynen M. The relative impact of local and endogenous patient-related factors on implant failure up to the abutment stage. *Clin Oral Implants Res* 2002;13:617-22.
9. Bornstein MM1, Halbritter S, Harnisch H, Weber HP, Buser D. A retrospective analysis of patients referred for implant placement to a specialty clinic: Indications, surgical procedures, and early failures. *Int J Oral Maxillofac Implants* 2008;23:1109-16.
10. Noguero B, Muñoz R, Mesa F, de Dios Luna J, O'Valle F. Early implant failure. Prognostic capacity of Periostest: Retrospective study of a large sample. *Clin Oral Implants Res* 2006;17:459-64.
11. Sverzut AT, Stabile GA, de Moraes M, Mazzonetto R, Moreira RW. The influence of tobacco on early dental implant failure. *J Oral Maxillofac Surg* 2008;66:1004-9.
12. Güler AU, Sumer M, Sumer P, Biçer I. The evaluation of vertical heights of maxillary and mandibular bones and the location of anatomic landmarks in panoramic radiographs of edentulous patients for implant dentistry. *J Oral Rehabil* 2005;32:741-6.
13. Wennström JL, Ekestubbe A, Gröndahl K, Karlsson S, Lindhe J. Oral rehabilitation with implant-supported fixed partial dentures in periodontitis-susceptible subjects. A 5-year prospective study. *J Clin Periodontol* 2004;31:713-24.
14. Alsaadi G, Quirynen M, Komárek A, van Steenberghe D. Impact of local and systemic factors on the incidence of oral implant failures, up to abutment connection. *J Clin Periodontol* 2007;34:610-17.
15. Eliasson A, Narby B, Ekstrand K, Hirsch J, Johansson A, Wennerberg A.

Kumar, *et al.*: Implant Failure among Prosthodontists

A 5-year prospective clinical study of submerged and nonsubmerged Paragon system implants in the edentulous mandible. *Int J Prosthodont* 2010;23:231-8.

16. Kronström M, Svensson B, Erickson E, Houston L, Braham P, Persson GR. Humoral immunity host factors in subjects with failing or successful titanium dental implants. *J Clin Periodontol* 2000;27:875-82.

How to cite this article: Kumar MY, Venkatakrishnan CJ, Narasimman M, Surya NG. Knowledge, Attitude, and Practice Regarding Implant Failure among Prosthodontists in Tamil Nadu and Puducherry – A questionnaire study. *Int J Sci Stud* 2025;13(8):25-30.

Source of Support: Nil, **Conflicts of Interest:** None declared.