



www.bioinformation.net
Volume 20(10)

Research Article

Received October 1, 2024; Revised October 31, 2024; Accepted October 31, 2024, Published October 31, 2024

DOI: 10.6026/9732063002001358

BIOINFORMATION 2022 Impact Factor (2023 release) is 1.9.

Declaration on Publication Ethics:

The author's state that they adhere with COPE guidelines on publishing ethics as described elsewhere at <https://publicationethics.org/>. The authors also undertake that they are not associated with any other third party (governmental or non-governmental agencies) linking with any form of unethical issues connecting to this publication. The authors also declare that they are not withholding any information that is misleading to the publisher in regard to this article.

Declaration on official E-mail:

The corresponding author declares that lifetime official e-mail from their institution is not available for all authors

License statement:

This is an Open Access article which permits unrestricted use, distribution, and reproduction in any medium, provided the original work is properly credited. This is distributed under the terms of the Creative Commons Attribution License

Comments from readers:

Articles published in BIOINFORMATION are open for relevant post publication comments and criticisms, which will be published immediately linking to the original article without open access charges. Comments should be concise, coherent and critical in less than 1000 words.

Disclaimer:

The views and opinions expressed are those of the author(s) and do not reflect the views or opinions of Bioinformation and (or) its publisher Biomedical Informatics. Biomedical Informatics remains neutral and allows authors to specify their address and affiliation details including territory where required. Bioinformation provides a platform for scholarly communication of data and information to create knowledge in the Biological/Biomedical domain.

Edited by Neelam Goyal & Shruti Dabi

E-mail: dr.neelamgoyal15@gmail.com & shrutidabi59@gmail.com; Phone +91 98188 24219

Citation: Kaur *et al.* Bioinformation 20(10): 1358-1362 (2024)

Awareness, attitudes and cost among patients for dental implants in teeth replacement

Maninderjit Kaur¹, Kirithana Chamakuri², Pranav Parashar^{3,*}, Charmee Hiten Shah⁴, Pargat Singh⁵ & Layal Touchan⁶

¹Adesh Institute of Dental Sciences and Research Centre, General Dentist, Hoshiarpur, Punjab, India; ²Government Dental College, General Dentist, Vijayawada, Andhra Pradesh, India; ³Department of Dentistry, N.S.C.B Medical College and Hospital, Jabalpur, Madhya Pradesh, India; ⁴AMC Dental College and Hospital, Ahmedabad, Gujarat, India; ⁵JCD dental college, General Dentist, Malikpur, Safidon, Jind, Haryana, India; ⁶Aleppo University, Aleppo, Syria; *Corresponding author

Affiliation URL:

<https://adeshuniversity.ac.in/>

<https://gdchvja.in/>

<http://www.nscbmc.ac.in/>

<https://amcdentalcollege.edu.in/>

<https://jcdentalcollege.com/>
<https://www.alepuniv.edu.sy/>

Authors contacts:

Maninderjit Kaur - E - mail: dr.ginni94@gmail.com
Kirithana Chamakuri - E - mail: chamakurikirithana@gmail.com
Pranav Parashar - E - mail: dr.pranavparashar1@gmail.com
Charmee Hiten Shah - E - mail: charmee.0411@gmail.com
Pargat Singh - E - mail: pargat.chattha7@gmail.com
Layal Touchan - E - mail: layaletoile@yahoo.com

Abstract:

Dental implants are increasingly viewed as a preferred treatment option for tooth replacement, yet gaps remain in patient knowledge, attitudes, and cost perceptions. This cross-sectional, *in vitro* study surveyed 150 adults aged 20-60 to assess their awareness, attitudes, and perceived costs of dental implants. Results show that while 70% of patients are aware of implants, only 30% understand the procedure. Though 60% expressed interest in implants, 45% perceived them as too expensive. Positive attitudes correlated with greater awareness, highlighting the need for enhanced education on the benefits and financial options associated with implants.

Keywords: Dental implants, patient awareness, cost perception, attitudes, tooth replacement, implant education, affordability, treatment modality

Background:

Dental implants are increasingly becoming the standard for teeth replacement due to their long-term benefits, durability, and resemblance to natural teeth [1]. Unlike traditional options such as dentures or bridges, dental implants provide superior functionality, improved oral health and enhanced aesthetic outcomes [2, 3]. As a result, more patients and dental professionals are considering implants as the preferred treatment modality [4-6]. However, patient knowledge, attitudes and perceptions about dental implants still vary [7-8]. Many patients lack awareness of the advantages of implants, often perceiving them as complex or unaffordable. Misconceptions regarding cost also play a significant role, as many individuals assume that implants are prohibitively expensive compared to traditional options without fully understanding the long-term value they provide in terms of reduced maintenance and better oral health outcomes [9]. Therefore, it is of interest to evaluate patients' awareness, attitudes and perceived costs of dental implants in comparison to other teeth replacement methods. It seeks to assess the extent of knowledge patients have about implants, their attitudes toward opting for them over other treatments, and how they perceive the financial aspect of this treatment. Understanding these factors is crucial for healthcare providers to tailor education and address concerns, ultimately enhancing the adoption of implants as a standard option for tooth replacement.

Methodology:

This cross-sectional, *in vitro* study was conducted using a structured questionnaire with a sample size of 150 participants. The study focused on adults aged 20-60 who either required or had previously received teeth replacements. Participants with underlying health conditions that could prevent them from undergoing dental implant treatment were excluded. Data

collection was carried out in dental clinics, with surveys designed to assess three critical areas: awareness, attitude and cost perception. The awareness section evaluated participants' knowledge of dental implants as a viable option for tooth replacement. The attitude section explored their willingness and openness to undergo the implant procedure, reflecting how comfortable and confident they felt about choosing implants over other treatments. Lastly, the cost perception aspect examined patients' views on the affordability and long-term value of dental implants, comparing their understanding of the financial investment against alternatives such as bridges or dentures. This structured approach provided a comprehensive understanding of how patient knowledge, attitudes and perceived costs influence the decision-making process regarding dental implants (**Annexure 1 Survey Questionnaires**).

Results:

The study's results offer valuable insights into patient demographics, awareness, attitudes, and cost perceptions regarding dental implants. Among the 150 participants, 25% were aged 20-30, 35% were 31-40, 30% were 41-50, and 10% were 51-60. Males made up 60% of the sample, while females accounted for 40%. In terms of education, 40% had a high school education or lower, 45% were college-educated, and 15% held post-graduate degrees. In terms of awareness, 70% of the participants were aware of dental implants as a treatment option. However, only 40% believed that implants provided a permanent solution for tooth loss, and a mere 30% demonstrated a clear understanding of the implant process and necessary aftercare. Despite this limited understanding, interest in implants remained strong, with 60% of patients expressing interest in opting for the procedure. Notably, 50% preferred implants over alternatives such as bridges or dentures due to their longevity, though 35% expressed concerns about the

surgical procedure and recovery process. Perceived cost was a significant factor for many participants. Nearly 45% of patients perceived dental implants as too expensive, while 30% were unaware of potential insurance coverage or instalment payment options that could make the procedure more accessible. Nonetheless, 25% of participants were willing to invest in implants, recognizing the long-term benefits and value compared to other tooth replacement modalities. These findings highlight the importance of improving patient education and addressing financial concerns to encourage greater adoption of dental implants (Figure 1).

Annexure 1: Survey Questionnaires:

1. Awareness:	
Question	Response Options
Are you aware of dental implants as a teeth replacement option?	- Yes - No
How did you learn about dental implants?	- Dentist - Friends/Family - Internet - Others
Do you think dental implants are a permanent solution for missing teeth?	- Yes - No - Not sure
Are you aware of the maintenance required for dental implants?	- Yes - No
2. Attitude:	
Question	Response Options
Would you consider getting dental implants if you needed teeth replacement?	- Yes - No - Maybe
What concerns do you have about getting dental implants?	- Surgery - Cost - Maintenance - None
Do you prefer dental implants over bridges or dentures?	- Yes - No - Not sure
Do you think dental implants improve quality of life?	- Yes - No - Not sure
3. Perceived costing:	
Question	Response Options
How affordable do you think dental implants are compared to other options?	- Expensive - Moderate - Affordable
Do you think dental implants are worth the cost for their longevity and function?	- Yes - No - Not sure
Are you aware of any insurance or financing options for dental implants?	- Yes - No
Would you be willing to pay more for dental implants if they last longer?	- Yes - No - Maybe

Annexure 2 Overview of Survey Results:

Demographics	Percentage
Age 20-30	25%
Age 31-40	35%
Age 41-50	30%
Age 51-60	10%
Male	60%
Female	40%

Survey Categories	Findings
Awareness	70% know about implants, but only 30% understand the process fully.
Attitude	60% interested, 50% prefer implants over alternatives.
Perceived Cost	45% find it expensive, only 25% willing to invest.

Demographic Category	Percentage
Age Distribution	
20-30 years	25%
31-40 years	35%
41-50 years	30%
51-60 years	10%
Gender Distribution	
Male	60%
Female	40%
Education Level	
High school or lower	40%
College degree	45%
Post-graduate	15%

Graph 1 Heat Map for Survey Results:

A heat map allows you to display multiple survey categories, comparing responses based on intensity. Here's an example based on awareness, attitude, and perceived costing:

Category	Highly Positive	Moderately Positive	Neutral	Negative	Highly Negative
Awareness	40%	30%	10%	10%	10%
Attitude	35%	25%	15%	15%	10%
Cost Perception	20%	25%	25%	20%	10%

Explanation:

Here is the heatmap sketch for your survey results. The intensity of the colours reflects how participants responded to each category (Awareness, Attitude, and Cost Perception) based on different levels of response (from Highly Positive to Highly Negative). The darker green areas represent higher positive responses, while red indicates negative responses.

How to read the heat map:

Rows represent survey categories (Awareness, attitude and cost perception).
Columns represent the intensity of responses (from highly positive to highly negative).
Colours (for the heatmap) should range from light (lower values) to dark (higher values):

- Highly positive:** Dark green (high percentage of positive responses).
- Moderately positive:** Light green.
- Neutral:** Yellow.
- Negative:** Light red.
- Highly negative:** Dark red (high percentage of negative responses).

This heat map gives a visual representation of how participants responded to the survey across various factors, making it easier to spot trends and areas needing focus.

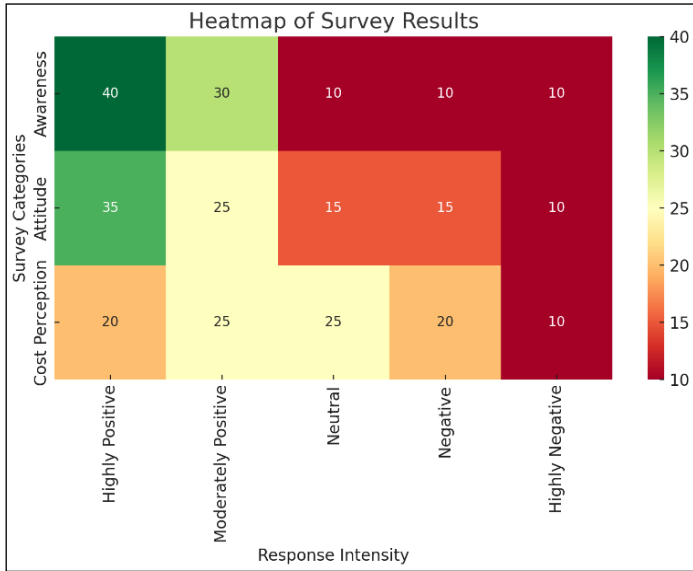


Figure 1: Heatmap for survey results

Discussion:

The study reveals key insights into patients' awareness, attitudes and perceptions regarding dental implants as a treatment modality for tooth replacement. While 70% of participants were aware of dental implants, significant gaps in understanding the procedure and post-treatment care were evident, with only 30% of participants demonstrating adequate knowledge. This aligns

with previous studies, which have also found that while awareness of dental implants is generally high, detailed understanding of the procedure and aftercare remains limited among patients [10, 11 & 12]. A striking finding from this study is that 60% of patients showed interest in opting for implants, underscoring the growing recognition of implants as a superior option compared to bridges or dentures. However, the perceived high cost of implants emerged as a significant barrier, with 45% of participants considering implants too expensive. This reflects trends observed in the literature, where cost has consistently been identified as a major obstacle to the wider adoption of dental implants [13, 14]. Furthermore, 30% of the participants were unaware of insurance coverage or payment plans, indicating that educational efforts about financial assistance options could significantly impact patient decisions. Attitudinal shifts toward implants were also influenced by the level of awareness. Patients with better understanding of the benefits and longevity of implants demonstrated more positive attitudes, with 50% preferring implants over other options due to their durability. This is consistent with findings from other research, which suggests that increased knowledge about the long-term functional and aesthetic benefits of implants leads to more favorable patient attitudes [15, 16 & 17]. The literature further supports that effective patient education can reduce concerns about surgical procedures and recovery, which 35% of participants in this study cited as deterrents [18]. Studies have shown that addressing these concerns through comprehensive pre-surgical counselling can improve patient comfort and willingness to undergo dental implant procedures [19].

Literature comparison:

Several studies have highlighted similar patterns regarding patient awareness and perceptions of dental implants. A survey by Pommer *et al.* (2011) reported that although 72% of patients were aware of dental implants, only 28% were knowledgeable about the surgical process and required maintenance, comparable to the findings of this study [20]. Similarly, a study by Zimmer *et al.* (1992) noted that the cost of implants is often perceived as a significant hurdle, with over 50% of respondents citing expense as a primary reason for not pursuing implant treatment [10]. This reinforces the notion that while awareness is high, financial concerns and lack of understanding about the full benefits and payment options continues to restrict the adoption of implants. Moreover, the correlation between positive attitudes and heightened awareness observed in this study is supported by studies like those by Tepper *et al.* (2003), which demonstrated that patients who are well-informed about the durability, aesthetics and functionality of implants are more likely to opt for them despite cost concerns [21]. After tepper add arora *et al.* in 2022 [22]. According to madhuri *et al.* in 2023" Only a small percentage of individuals had implants and more than half knew nothing about them" [23]. Low level of Knowledge was observed according to mously *et al.* in 2024 [24].

In conclusion, while awareness of dental implants is fairly widespread, significant gaps in knowledge about the procedure

and cost continue to affect patient decisions. Addressing these gaps through educational initiatives that focus on both the clinical and financial aspects could lead to higher acceptance and adoption of dental implants as the preferred teeth replacement option.

Conclusion:

Increased awareness and educational efforts are needed to address cost concerns and misconceptions about dental implants. Dental professionals should highlight financing options and long-term benefits to enhance patient uptake.

References:

- [1] Gupta R *et al.* *Dental Implants*. In: StatPearls [Internet]. Treasure Island (FL): StatPearls Publishing; 2024. [PMID: 29262027]
- [2] Sadowsky SJ & Brunski JB. *J Prosthet Dent*. 2021 **126**:181. [PMID: 32862999].
- [3] Pjetursson BE & Heimisdottir K. *Eur J Oral Sci*. 2018 **126**:81. [PMID: 30178552].
- [4] Krennmair G *et al.* *Int J Prosthodont*. 2007 **20**:617. [PMID: 18069371]
- [5] Tomina DC *et al.* *J Clin Med*. 2023 **12**:4275. [PMID: 37445310]
- [6] Böse MWH *et al.* *Clin Oral Investig*. 2023 **27**:5875. [PMID: 37581766]
- [7] Al-Haj Husain A *et al.* *Dent J (Basel)*. 2023 **11**:165. [PMID: 37504231]
- [8] Hosadurga R *et al.* *J Indian Soc Periodontol*. 2017 **21**:315 [PMID: 29456307]
- [9] Attard NJ *et al.* *Int J Prosthodont*. 2005 **18**:117. [PMID: 15889659]
- [10] Zimmer CM *et al.* *Int J Oral Maxillofac Implants*. 1992 **7**:228. [PMID: 1398840]
- [11] Arora K Jr *et al.* *Cureus*. 2022 **14**:e27127. [PMID: 36004029]
- [12] Siddique EA *et al.* *J Indian Soc Periodontol*. 2019 **23**:58. [PMID: 30692745]
- [13] Elani HW *et al.* *J Dent Res*. 2018 **97**:1424. [PMID: 30075090].
- [14] Van der Wijk P *et al.* *Int J Oral Maxillofac Implants*. 1998 **13**:546. [PMID: 9714962]
- [15] Vernazza CR *et al.* *Community Dent Oral Epidemiol*. 2015 **43**:75. [PMID: 25265369]
- [16] Huang Y-C *et al.* *J Dent Sci*. 2023 **18**:1467. [PMID: 37799926]
- [17] Esposito M *et al.* *Cochrane Database Syst Rev*. 2009 **2009**:CD003607. [PMID: 19821311]
- [18] Blöndal K *et al.* *Nurs Open*. 2022 **9**:2495. [PMID: 35666048]
- [19] Cook DJ *et al.* *Telemed J E Health*. 2014 **20**:312. [PMID: 24443928]
- [20] Pommer B *et al.* *Clin Oral Implants Res*. 2011 **22**:106. [PMID: 20946207]
- [21] Tepper G *et al.* *Clin Oral Implants Res*. 2003 **14**:621. [PMID: 12969367]
- [22] Arora Jr K *et al.* *Cureus*. 2022 **14**:e27127. [PMID: 36004029]
- [23] Madhuri V *et al.* *J Pharm Bioallied Sci*. 2023 **15**:S1250. [PMID: 37694083]
- [24] Mously HA *et al.* *J Orthod Sci*. 2020 **9**:5. [PMID: 32166084]

Updated on 10.2.2025 more clarity and coherence superseding previous version