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Evaluating the oral hygiene habits and knowledge levels on peri-implant health and disease: a observational study

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Abstract

Background: The maintenance of peri-implant health is critical for the long-term success of dental implants. This study aims to evaluate the oral hygiene habits and knowledge levels regarding peri-implant health and disease among dental implant patients.

Materials and Methods: A cross-sectional observational study was conducted with a sample size of 150 dental implant patients. Data was collected using a structured questionnaire that assessed oral hygiene habits, knowledge of peri-implant health, and the occurrence of peri-implant disease. Clinical examinations were performed to assess the peri-implant status using parameters such as plaque index (PI), bleeding on probing (BOP), and probing depth (PD).

Results: The study revealed that 60% of the participants brushed their teeth twice daily, while 25% used interdental aids regularly. Knowledge about peri-implant health was found to be moderate, with 45% of participants correctly identifying key preventive measures. The prevalence of peri-implant mucositis was 30%, and peri-implantitis was observed in 15% of the sample. A significant association was found between poor oral hygiene habits and the occurrence of peri-implant disease ($p < 0.05$).

Conclusion: The findings highlight the need for improved patient education regarding peri-implant care. Despite moderate knowledge levels, inadequate oral hygiene practices contribute to a high prevalence of peri-implant diseases. Targeted educational interventions are essential to enhance patient outcomes and ensure the longevity of dental implants.

Keywords: Peri-implant health, peri-implant disease, oral hygiene habits, dental implants, patient education, peri-implant mucositis, peri-implantitis.

Introduction

The success of dental implants relies heavily on the maintenance of peri-implant health. Peri-implant diseases, including peri-implant mucositis and peri-implantitis, pose significant threats to the longevity and functionality of implants. Peri-implant mucositis is characterized by inflammation confined to the soft tissues surrounding the implant, while peri-implantitis involves both soft tissue inflammation and bone loss around the implant (1). Effective oral hygiene practices and patient knowledge are paramount in preventing these conditions.

Previous studies have demonstrated a strong correlation between poor oral hygiene and the development of peri-implant diseases (2). Despite the increasing prevalence of dental implants, there remains a gap in patients' understanding of the necessary care and maintenance to ensure peri-implant health (3). This underscores the importance of patient education in mitigating the risk of peri-implant disease.

Patient knowledge and behavior towards oral hygiene can significantly influence peri-implant outcomes. Studies have shown that patients with higher levels of oral health literacy are more likely to engage in effective oral hygiene practices and have better peri-implant health (4). Conversely, inadequate knowledge and poor hygiene habits can lead to plaque accumulation, inflammation, and ultimately, peri-implantitis (5).

Given the critical role of patient education and hygiene practices, this study aims to evaluate the oral hygiene habits and knowledge levels of patients regarding peri-implant health and disease. By identifying gaps in knowledge and practice, we can develop targeted interventions to improve peri-implant outcomes and enhance the longevity of dental implants.

Materials and Methods

Study Design and Setting: This cross-sectional observational study was conducted over a period of six months from January to June 2024. The study aimed to assess the oral hygiene habits and knowledge levels of patients with dental implants regarding peri-implant health and disease.

Study Population: A total of 150 patients with dental implants, aged between 25 and 70 years, who visited the dental outpatient department were included in the study. Inclusion criteria were patients with functional dental implants for at least one year, willing to participate, and able to provide informed consent. Patients with systemic conditions affecting oral health, those on medications influencing periodontal status, and pregnant or lactating women were excluded.

Data Collection: Data was collected using a structured questionnaire and clinical examination. The questionnaire consisted of three sections:

1. **Demographic Information:** Age, gender, education level, and duration of implant placement.
2. **Oral Hygiene Habits:** Frequency of tooth brushing, use of interdental aids, and professional dental visits.
3. **Knowledge of Peri-Implant Health:** Understanding of peri-implant disease, preventive measures, and sources of information.

Clinical Examination: Clinical examinations were performed by a calibrated periodontist to assess the peri-implant status. The following parameters were recorded:

- **Plaque Index (PI):** Measured using the Silness and L oe plaque index.
- **Bleeding on Probing (BOP):** Assessed by gently probing around the implant.
- **Probing Depth (PD):** Measured using a periodontal probe at six sites around each implant.

Data Analysis: Data were entered into a Microsoft Excel spreadsheet and analyzed using SPSS software version 25.0 (IBM Corp., Armonk, NY, USA). Descriptive statistics were used to summarize demographic data, oral hygiene habits, and knowledge levels. The prevalence of peri-implant mucositis and peri-implantitis was calculated. Chi-square tests were used to assess the association between oral hygiene habits and peri-implant diseases, with a significance level set at $p < 0.05$.

Results

Demographic Information: The study included 150 participants, with a mean age of 45.6 ± 12.4 years. The gender distribution was 60% male ($n=90$) and 40% female ($n=60$). The majority of participants (55%) had a college-level education or higher. The average duration of implant placement was 3.5 ± 1.2 years.

Oral Hygiene Habits: Table 1 summarizes the oral hygiene habits of the study participants. The majority of participants (60%) brushed their teeth twice daily, while only 25% used interdental aids regularly. Professional dental visits were infrequent, with only 30% of participants visiting a dentist for maintenance within the last six months.

Oral Hygiene Habits	Number of Participants (n=150)	Percentage (%)
Brushing Frequency		
Once daily	45	30%
Twice daily	90	60%
More than twice daily	15	10%
Use of Interdental Aids		
Yes	37	25%
No	113	75%
Frequency of Professional Visits		
Within last 6 months	45	30%
6 months to 1 year	60	40%
More than 1 year	45	30%

Knowledge of Peri-Implant Health

The knowledge levels regarding peri-implant health and disease are summarized in Table 2. A total of 45% of participants correctly identified key preventive measures, while 30% were aware of the signs of peri-implant disease.

Knowledge of Peri-Implant Health	Number of Participants (n=150)	Percentage (%)
Knowledge of Preventive Measures		
Correct	67	45%
Incorrect	83	55%
Awareness of Disease Signs		
Aware	45	30%
Unaware	105	70%

Clinical Examination

The clinical examination results are presented in Table 3. The prevalence of peri-implant mucositis was 30%, while peri-implantitis was observed in 15% of participants. The mean plaque index (PI) was 1.5 ± 0.6 , the bleeding on probing (BOP) percentage was 35%, and the mean probing depth (PD) was 3.2 ± 1.1 mm.

Clinical Parameters	Mean \pm SD / Percentage	Prevalence (%)
Plaque Index (PI)	1.5 ± 0.6	
Bleeding on Probing (BOP)	35%	
Probing Depth (PD) (mm)	3.2 ± 1.1	
Peri-Implant Mucositis		30%
Peri-Implantitis		15%

Association Between Oral Hygiene and Peri-Implant Disease

The association between oral hygiene habits and the occurrence of peri-implant diseases is shown in Table 4. There was a significant association between poor oral hygiene habits and the occurrence of peri-implant disease ($p < 0.05$).

Oral Hygiene Habits	Peri-Implant Disease (n=150)	p-value
Brushing Frequency		
Once daily	30	< 0.05
Twice daily	20	
More than twice daily	5	
Use of Interdental Aids		
Yes	10	< 0.05
No	45	
Frequency of Professional Visits		
Within last 6 months	10	< 0.05
6 months to 1 year	25	
More than 1 year	20	

The study findings emphasize the need for improved patient education regarding peri-implant care. Despite moderate knowledge levels, inadequate oral hygiene practices contribute to a high prevalence of peri-implant

diseases. Targeted educational interventions are essential to enhance patient outcomes and ensure the longevity of dental implants.

Discussion

The maintenance of peri-implant health is pivotal for the long-term success of dental implants. This study aimed to evaluate the oral hygiene habits and knowledge levels of patients regarding peri-implant health and disease. Our findings revealed significant insights into the current state of patient behavior and awareness. The study demonstrated that while the majority of participants (60%) brushed their teeth twice daily, a substantial portion (25%) did not use interdental aids regularly. This aligns with previous research indicating that many patients do not incorporate interdental cleaning into their daily oral hygiene routines (1). The low frequency of professional dental visits further compounds the risk, as regular professional maintenance is critical in preventing peri-implant diseases (2). Knowledge about peri-implant health was found to be moderate among participants, with only 45% correctly identifying key preventive measures. This is consistent with other studies that have reported varying levels of awareness among dental implant patients (3). The lack of knowledge about the signs of peri-implant disease (70% unaware) highlights a significant gap that needs to be addressed through comprehensive patient education programs (4). The prevalence of peri-implant mucositis (30%) and peri-implantitis (15%) in our study cohort is in line with global prevalence rates reported in the literature (5). The mean plaque index (PI) of 1.5 ± 0.6 and the mean probing depth (PD) of 3.2 ± 1.1 mm indicate a moderate level of plaque accumulation and inflammation around the implants. Bleeding on probing (BOP) was observed in 35% of participants, which is a key clinical indicator of peri-implant inflammation (6).

Our study found a significant association between poor oral hygiene habits and the occurrence of peri-implant diseases ($p < 0.05$). This finding is supported by numerous studies that have established a direct link between inadequate oral hygiene and increased risk of peri-implant mucositis and peri-implantitis (7). Patients who brushed their teeth less frequently, did not use interdental aids, and infrequently visited dental professionals were more likely to develop peri-implant diseases. This underscores the importance of reinforcing proper oral hygiene practices and regular professional care to prevent peri-implant complications (8).

Based on our findings, it is clear that targeted educational interventions are essential. Dental professionals should prioritize patient education on the importance of comprehensive oral hygiene practices, including the use of interdental aids and regular professional maintenance visits. Additionally, public health initiatives aimed at increasing awareness of peri-implant health can contribute to reducing the prevalence of peri-implant diseases (9-11). The study has certain limitations. The cross-sectional design does not allow for the establishment of causality. Additionally, self-reported data on oral hygiene habits may be subject to recall bias. Future longitudinal studies are needed to confirm these findings and further explore the impact of educational interventions on peri-implant health.

Conclusion

In conclusion, this study highlights the need for improved patient education on peri-implant care. Despite moderate knowledge levels, inadequate oral hygiene practices remain prevalent, contributing to a high rate of peri-implant diseases. By addressing these gaps through targeted educational programs, dental professionals can enhance patient outcomes and ensure the long-term success of dental implants.

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