

# International Journal of **Health Sciences** (IJHS)

**Prevalence of Peri-Implantitis Among the Patients Visiting REU  
Clinics**



## Prevalence of Peri-Implantitis Among the Patients Visiting REU Clinics

 Sulaiman Basaad<sup>1\*</sup>, Meshal Alghunaim<sup>1</sup>, Talal Alshehri<sup>1</sup>, Mohammed Alamode<sup>1</sup>, Abdulah Aljaser<sup>1</sup>, Hussam Tayeb<sup>1</sup>, Badr Alhussain<sup>2</sup>, Shahzeb H. Ansari<sup>3</sup>

<sup>1</sup>Dental Intern, College of Dentistry,

Riyadh Elm University, Riyadh, Kingdom of Saudi Arabia

<sup>2</sup>Department of restorative dentistry,

Prince Sultan Military Medical City, Riyadh, Kingdom of Saudi Arabia.

<sup>3</sup>Lecturer, Department of Preventive Dental Sciences, College of Dentistry,

Riyadh Elm University, Riyadh, Saudi Arabia.

\*Corresponding Author's Email: [sulaimanbasaad@gmail.com](mailto:sulaimanbasaad@gmail.com)

Accepted: 15<sup>th</sup> June 2023 Received in Revised Form: 24<sup>th</sup> June 2023 Published: 30<sup>th</sup> June 2023



### Abstract

**Purpose:** Periimplantitis is among the most common problems that can contribute to implant failure. Implant failure is linked to unattached, mobile oral mucosa, whereas the palatal masticatory mucosa is much more resistant to infection. The study aimed to determine the prevalence of peri-implantitis among the patients visiting REU clinics and compare the prevalence on the basis of gender, age, periodontal health and habits (smoking).

**Methodology:** This is a retrospective study done using the patients' files. Convenient sampling will be done and 284 patients' files were selected from Implantology department. Bone loss of 4mm or more is mild, 6mm or more is moderate and 8mm or more is severe.

**Results:** 45% of the 284 patients examined had peri-implantitis, with prevalence increasing significantly with age. Regarding the severity, 66.4% had mild, 25.8% had moderate and 7.8% had severe type of peri-implantitis. The prevalence of peri-implantitis is very high among the patients' received implants in REU. Incidence of peri-implantitis increases significantly with the old age.

**Unique Contribution to Theory, Policy and Practice:** This study reveals a high peri-implantitis prevalence (45%) in REU clinics, with a significant association to age but not smoking or gender. It highlights the need for improved prevention, management, and further investigation into underlying factors and risk associations.

**Keywords:** *Peri-implantitis, Prevalence, Prevention, implants*

## **Introduction:**

Peri-implantitis (PI) is an inflammatory condition that causes loss of the surrounding tissues of an osseointegrated implant (Karlsson et al. 2019). The microbes involved with the process, unfortunately, are not the same as those seen in periodontal infections. *Porphyromonas gingivalis*, *Porphyromonas intermedia*, and *Actinobacillus actinomycetemcomitans* are among the microorganisms. The immune reaction of the host and the integrity of the surrounding environment all impact peri-implantitis vulnerability (Huang et al. 2017).

As a result of a bacterial biofilm, muscle atrophy around an osseointegrated dental implant can occur. As a result, two key questions about the impact of implant substance properties on peri-implantitis have gotten a lot of attention: whether some implant bodies are more subjected to this problem, as well as whether implant surface qualities affect peri-implantitis treatment (Atieh et al. 2019).

Periimplantitis is among the most common problems that can contribute to implant failure. Implant failure is linked to unattached, mobile oral mucosa, whereas the palatal masticatory mucosa is much more resistant to infection. Implants placed in the oral mucosa, deeply in the vestibule, or close to the frenum have the potential to cause chronic inflammation (Berglundh et al. 2019).

The findings of a study that looked at peri-implant parameters after only two years of follow-up support the hypothesis that PI can develop early. According to a cross-sectional study of 238 patients with 512 implants, peri-implantitis was common in all implant age groups examined (Monje et al. 2021). Another investigation by Derks et al. (2016) did a prevalence study and their analysis presented a non-linear, fast-tracking pattern of bone loss at the 105 pretentious implants. The onset of PI happened early, and 52% and 66% of implants presented with bone loss of >0.5 mm at years 2 and 3 correspondingly. A total of 70% and 81% of patients presented with  $\geq 1$  implants with bone loss of >0.5 mm at years 2 and 3 respectively.

Garcia-Garcia et al. studied 25 individuals with 46 implants who experienced peri-implantitis in a cross-sectional study. Patients with bone loss greater than 2 mm should have a radiographic and intraoperative assessment. The observed prevalence of PI among the patients was 32% (García-García et al. 2016). In another cross-sectional study of 60 patients, there were 167 implants with moderate to advanced peri-implantitis (Schwarz et al. 2017).

In another cross-sectional study, Rokn et al. (2017) examined 134 patients. There were 17 patients having a history of periodontal therapy, whereas 117 patients without a history of periodontal therapy. PI was identified in 20% of patients and 8.8% of implants. Subject-based and implant-based prevalence of mucositis amounted to 48.5% and 40%, correspondingly (Rokn et al. 2017).

## **Study Rationale:**

Findings of this study will help the clinicians/implantologists being careful in implants placement especially among patients prone to infections and having poor oral hygiene.

**Study hypotheses:**

Prevalence of peri-implantitis among patients visiting REU clinics is low.

**Aims of the study:**

- To determine the prevalence of peri-implantitis among the patients visiting REU clinics.
- To compare the prevalence on the basis of gender, age, periodontal health and habits (smoking).

**Materials and methods:**

**Study Design & Sample:** This was a retrospective study conducted using patients' files. A convenient sampling method was used, and 284 patient files were selected from the Implantology department.

Sample size calculation:

Confidence level: 95%

Population Size: 1000

Margin of Error: 5%

Sample size: 278

**Inclusion criteria:** Radiographs including OPGs and Periapicals.

**Exclusion criteria:** Radiographs other than OPGs and Periapicals.

**Inter-examiner reliability:** Each radiograph was examined by two examiners, and intra-examiner reliability was measured using the Kappa value. The Chronbach's coefficient alpha (intra-examiner reliability) value was 0.781. Inter-examiner reliability was 0.853.

**Diagnostic criteria for peri-implantitis:** Bone loss of 4mm or more is mild, 6mm or more is moderate and 8mm or more is severe.

**Study Instrument:** A form was used to collect information from each file including patients' age, gender, smoking habits and presence/absence and level of peri-implantitis.

**Data Confidentiality:** Data collected from the patients' files (name, contact information and file number) is kept confidential.

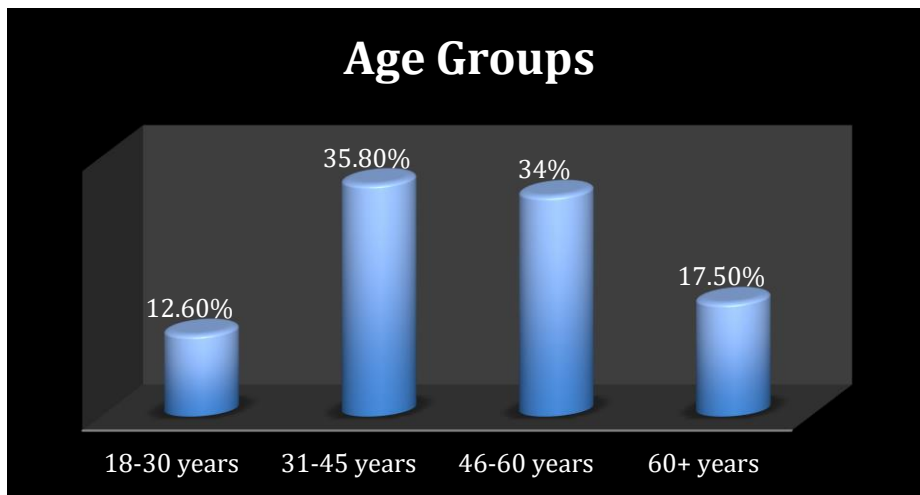
**Statistical Analysis:** Collected data was analyzed using SPSS version 22, where descriptive as well as inferential statistics were conducted. Comparisons between groups (age, gender, smokers) were made with the value of significance kept under 0.05 using Chi-square test.

**Results:**

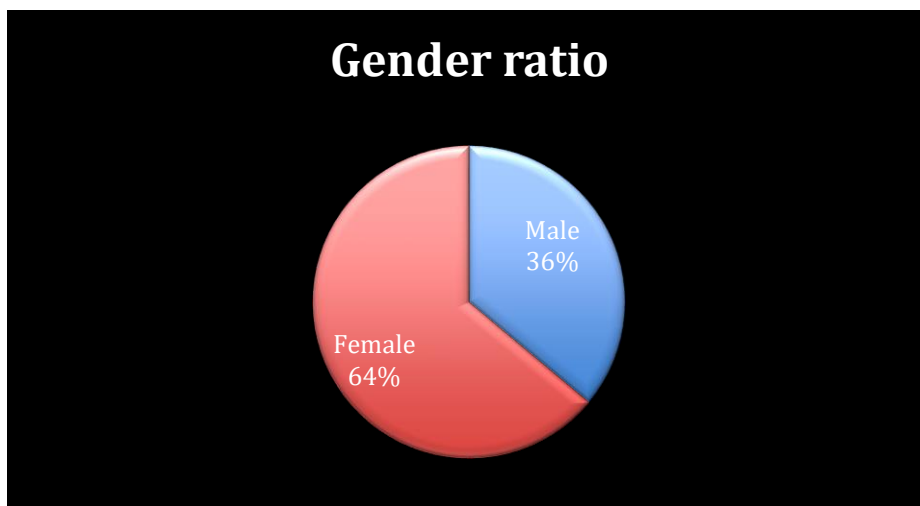
A total of 284 patients' files were examined for the prevalence of peri-implantitis, which were further divided groups such as age, gender and smoking habit. As far as their age were concerned,

12.6% were 18-30 years, 35.8% were from 31-45 years, 34% were from 46-60 years and 17.5% were from 60+ years group (figure 1). Regarding the gender ratio, 36% were males and 64% females (figure 2). Concerning their smoking habit, only 15% were reported to be smokers (figure 3). When evaluated the prevalence of peri-implantitis, 45% of the patients were reported to have it (figure 4). Regarding the severity, 66.4% had mild, 25.8% had moderate and 7.8% had severe type of peri-implantitis (figure 5).

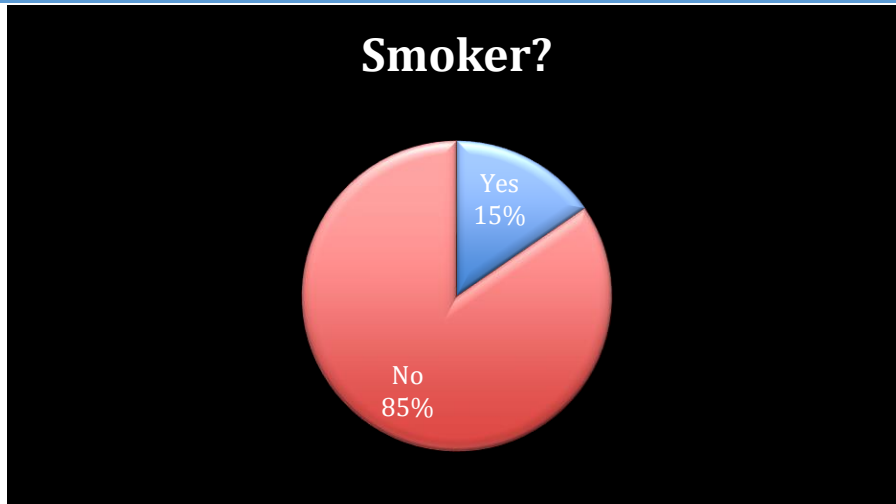
Prevalence and severity of peri-implantitis was compared on the basis of age, gender and smoking habits, which showed only one statistically significant difference. This was noticed among the age groups, where the prevalence of peri-implantitis increased significantly among the older age groups as compared to the younger ones (p-value: .007). However, all other comparisons did not reveal any statistically significant difference (table 1, 2, 3).



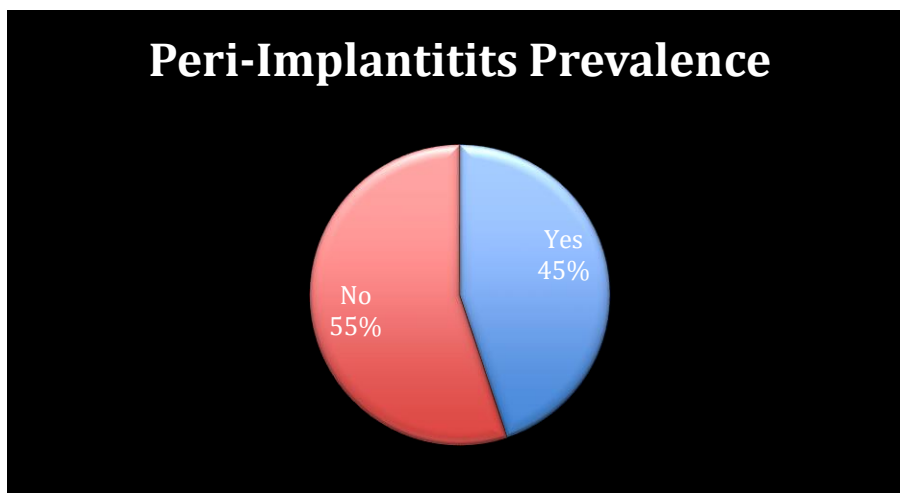
**Figure 1: Age groups of study participants.**



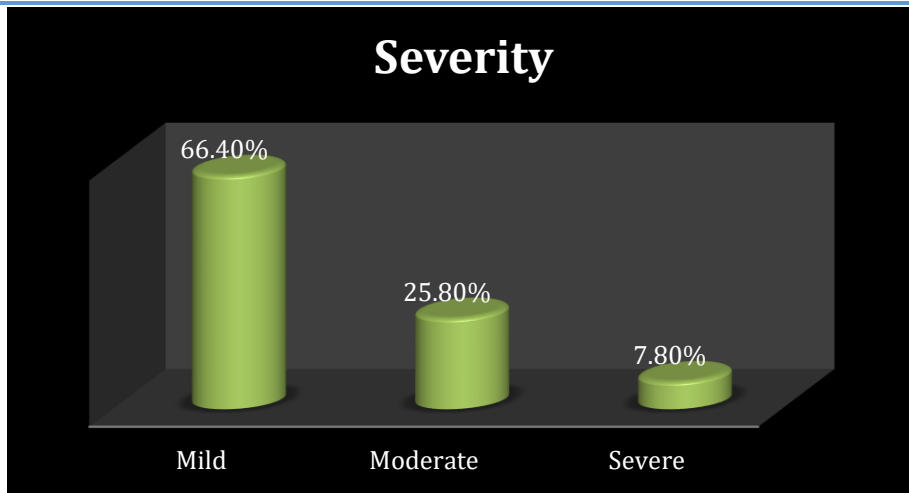
**Figure 2: Gender ratio of the study participants.**



**Figure 3: Prevalence of smoking among the study participants.**



**Figure 4: Prevalence of peri-implantitis among the study participants.**



**Figure 5: Prevalence of different stages of peri-implantitis.**

**Table 1: Comparison of peri-implantitis prevalence and severity on the basis of age.**

Variables	18-30 years	31-45 years	46-60 years	60+ years	P-value
<b>Prevalence of Peri-implantitis</b>	Yes: 42% No: 58%	Yes: 32% No: 68%	Yes: 54% No: 46%	Yes: 56% No: 44%	<b>.007*</b>
<b>Severity of Peri-implantitis</b>	Mild: 73% Moderate: 20% Severe: 7%	Mild: 67% Moderate: 30% Severe: 3%	Mild: 60% Moderate: 31% Severe: 10%	Mild: 75% Moderate: 14% Severe: 11%	<b>.585</b>

**Table 2: Comparison of peri-implantitis prevalence and severity on the basis of gender.**

Variables	Males	Females	P-value
<b>Prevalence of Peri-implantitis</b>	Yes: 43% No: 57%	Yes: 46% No: 54%	<b>.621</b>
<b>Severity of Peri-implantitis</b>	Mild: 75% Moderate: 18% Severe: 7%	Mild: 62% Moderate: 30% Severe: 8%	<b>.312</b>

**Table 3: Comparison of peri-implantitis prevalence and severity on the basis of Smoking habit.**

Variables	Smoker	Non-smoker	P-value
<b>Prevalence of Peri-implantitis</b>	Yes: 50% No: 50%	Yes: 44% No: 56%	<b>.511</b>
<b>Severity of Peri-implantitis</b>	Mild: 64% Moderate: 23% Severe: 14%	Mild: 67% Moderate: 26% Severe: 7%	<b>.527</b>

### Discussion:

The study aimed to determine the prevalence of peri-implantitis and its severity among the patients having the history of implants placement in REU clinics. The overall prevalence of peri-implantitis was found to be 45%, but no significant association was confirmed with gender and smoking habit. However, age group showed significant difference and old age group showed higher prevalence of peri-implantitis. Turri et al (2016) in a study have revealed that smoking is strongly associated with the high prevalence of peri-implantitis. However, this study did not find such association as smokers had slightly higher prevalence than non-smokers group with no statistically significant difference.

Another study done in Milan, Italy aimed to present medium- and long-term data on implant survival and on the prevalence of peri-implantitis in a cohort of patients treated with full-arch rehabilitations. Findings suggested the cumulative survival rate was 96.11% while the cumulative rate of implants free from peri-implantitis was 86.92%. Moreover, no correlation was found between periodontal and smoking status and outcomes (Francetti et al., 2019). When compared these findings with our results, 55% of our patients were free of peri-implantitis, which is considerably low as compared to the Italian study. However, similar findings were observed regarding the association of smoking status with the prevalence of peri-implantitis.

Another similar study aimed to determine the prevalence of peri-implantitis and to assess its association with several patient and implant-related factors. Out of 248 enrolled patients, 10 patients had at least one implant with peri-implantitis (4.03%). A statistically significant association between peri-implantitis and diabetes was found. Smoking more than 10 cigarettes per day and history of periodontitis were not found to be statistically associated with peri-implantitis (Weinstein et al., 2020). Our study results show that the prevalence is much higher than what is mentioned above, with no significant association of smoking revealed. However, we



did not take into account the systemic conditions such as diabetes, which is seen to have a strong effect on the incidence of peri-implantitis.

Another Canadian based study aimed to evaluate risk indicators associated with marginal bone loss from a retrospective open cohort study of 4,591 dental implants. Furthermore, the prevalence of mucositis and peri-implantitis among the study cohort was evaluated. Risk indicators found to have a significant impact on bone level included: autoimmune disease, heavy smoking, bisphosphonate therapy, implant location, diameter and design, and the presence of a bone defect at site of implantation. The prevalence of peri-implantitis after 6 to 7 years was 4.7% (French, Grandin & Ofec, 2019). Once again, the prevalence is very low as compared to what we found in our study. However, the risk factors mentioned above were not included and evaluated in our study.

One more study conducted in Barcelona, Spain aimed to determine the prevalence of peri-implant diseases in private practice patients enrolled in a periodontal maintenance program. The prevalence of peri-implantitis in private practice patients enrolled in a periodontal maintenance program was estimated to be between 12% and 22% (Mir-Mari et al., 2012). This prevalence is considerably low as compared to what we reported. Moreover, they did not determine any association of age, gender or smoking with the prevalence of peri-implantitis.

### **Conclusions:**

- The prevalence of peri-implantitis is very high among the patients received implants in REU.
- Incidence of peri-implantitis increases significantly with the old age.
- Smoking and gender did not have a significant impact or association on the prevalence of peri-implantitis.

### **Unique Contribution to Theory, Policy, and Practice**

This study contributes to the existing literature on peri-implantitis in several ways:

1. Higher prevalence of peri-implantitis: Our findings indicate a notably high prevalence of peri-implantitis (45%) among patients who received implants in REU clinics, which is higher than reported in previous studies conducted in different countries and clinical settings. This highlights the need for further investigation to understand the underlying factors contributing to this elevated prevalence, including potential differences in patient populations, treatment protocols, or clinical practices.

2. Association with age: Our study identified a significant association between age and peri-implantitis prevalence, with older patients exhibiting a higher prevalence of the condition. This finding emphasizes the importance of considering age as a risk factor for peri-implantitis and suggests that clinicians should pay special attention to post-implant care and maintenance in older patients.

3. No association with smoking and gender: Contrary to some previous research, our study did not find a significant association between smoking habits or gender and peri-implantitis prevalence. This finding indicates that the relationship between these factors and peri-implantitis risk may be more complex than previously thought and warrants further investigation.

4. Study limitations and implications for future research: By acknowledging the limitations of our study, such as the lack of consideration for systemic diseases like diabetes and the absence of information on smoking intensity and duration, we highlight areas for improvement and potential directions for future research. This can inform the design of subsequent studies that aim to better understand the risk factors for peri-implantitis and contribute to the development of more effective prevention and management strategies.

5. Policy and practice implications: Our findings have important implications for both policy and clinical practice. The high prevalence of peri-implantitis observed in our study emphasizes the need for improved prevention and management efforts, including enhanced patient education, post-implant care, and regular follow-up visits. Additionally, our findings regarding the association between age and peri-implantitis prevalence suggest that policymakers and healthcare providers should consider implementing targeted interventions for older patients who may be at a higher risk for this condition.

## References:

- ATIEH, M. A., PANG, J. K., LIAN, K., WONG, S., TAWSE-SMITH, A., MA, S. & DUNCAN, W. J. 2019. Predicting peri-implant disease: Chi-square automatic interaction detection (CHAID) decision tree analysis of risk indicators. *Journal of periodontology*, 90, 834-846.
- BERGLUNDH, T., JEPSEN, S., STADLINGER, B. & TERHEYDEN, H. 2019. Peri-implantitis and its prevention. *Clinical oral implants research*, 30, 150-155.
- DERKS, J., SCHALLER, D., HÅKANSSON, J., WENNSTRÖM, J. L., TOMASI, C. & BERGLUNDH, T. 2016b. Peri-implantitis–onset and pattern of progression. *Journal of clinical periodontology*, 43, 383-388.
- Francetti, L., Cavalli, N., Taschieri, S. and Corbella, S., 2019. Ten years follow-up retrospective study on implant survival rates and prevalence of peri-implantitis in implant-supported full-arch rehabilitations. *Clinical oral implants research*, 30(3), pp.252-260.
- French, D., Grandin, H.M. and Ofec, R., 2019. Retrospective cohort study of 4,591 dental implants: analysis of risk indicators for bone loss and prevalence of peri-implant mucositis and peri-implantitis. *Journal of periodontology*, 90(7), pp.691-700.
- GARCÍA-GARCÍA, M., MIR-MARI, J., BENIC, G. I., FIGUEIREDO, R. & VALMASEDA-CASTELLÓN, E. 2016. Accuracy of periapical radiography in assessing bone level in

- implants affected by peri-implantitis: a cross-sectional study. *Journal of Clinical Periodontology*, 43, 85-91.
- HUANG, Y. S., MCGOWAN, T., LEE, R. & IVANOVSKI, S. 2017. 7.23 Dental Implants: Biomaterial Properties Influencing Osseointegration. *In: DUCHEYNE, P. (ed.) Comprehensive Biomaterials II*. Oxford: Elsevier.
- KARLSSON, K., DERKS, J., HÅKANSSON, J., WENNSTRÖM, J. L., PETZOLD, M. & BERGLUNDH, T. 2019. Interventions for peri-implantitis and their effects on further bone loss: A retrospective analysis of a registry-based cohort. *Journal of clinical periodontology*, 46, 872-879.
- Mir-Mari, J., Mir-Orfila, P., Figueiredo, R., Valmaseda-Castellón, E. and Gay-Escoda, C., 2012. Prevalence of peri-implant diseases. A cross-sectional study based on a private practice environment. *Journal of clinical periodontology*, 39(5), pp.490-494.
- MONJE, A., VERA, M., MUÑOZ-SANZ, A., WANG, H. L. & NART, J. 2021. Suppuration as diagnostic criterium of peri-implantitis. *Journal of Periodontology*, 92, 216-224.
- ROKN, A., ASLROOSTA, H., AKBARI, S., NAJAFI, H., ZAYERI, F. & HASHEMI, K. 2017. Prevalence of peri-implantitis in patients not participating in well-designed supportive periodontal treatments: a cross-sectional study. *Clinical oral implants research*, 28, 314-319.
- SCHWARZ, F., BECKER, K., SAHM, N., HORSTKEMPER, T., ROUSI, K. & BECKER, J. 2017a. The prevalence of peri-implant diseases for two-piece implants with an internal tube-in-tube connection: a cross-sectional analysis of 512 implants. *Clinical oral implants research*, 28, 24-28.
- Turri, A., Orlato Rossetti, P.H., Canullo, L., Grusovin, M.G. and Dahlin, C., 2016. Prevalence of Peri-implantitis in Medically Compromised Patients and Smokers: A Systematic Review. *International Journal of Oral & Maxillofacial Implants*, 31(1).
- Weinstein, T., Clauser, T., Del Fabbro, M., Deflorian, M., Parenti, A., Taschieri, S., Testori, T. and Francetti, L., 2020. Prevalence of peri-implantitis: a multi-centered cross-sectional study on 248 patients. *Dentistry journal*, 8(3), p.80.

