

# Assessment of Dentists' knowledge of Peri-Implant Inflammatory Diseases and Their Related Treatment in Rasht

## Original Article

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## **Abstract**

### **Introduction:**

Implants are considered to be a useful treatment for the replacement of lost teeth. Although the success rate and durability of implants are high, the prevalence of peri-implantitis is high as well. The purpose of this study was to analyze the knowledge of general practitioners in the city of Rasht in Northern Iran regarding peri-implantitis and its treatment.

### **Materials and methods:**

This descriptive, cross-sectional research was conducted among general practitioners working in the city of Rasht. They were asked to fill out a questionnaire, which included two parts of personal information; and their knowledge about the peri-implantitis disease.

### **Results:**

Of 100 general practitioners who filled out the questionnaires, between 23-88 % answered correctly with a mean of 54.1%. The knowledge of 6% of dentists was poor, 74% average, and 20% good. There was no meaningful connection between age, sex, and job experience of the dentists and their knowledge of peri-implantitis diseases.

### **Conclusion:**

The rate of dentists' knowledge in the city of Rasht regarding peri-implantitis diseases and their knowledge of treatment were average. Thus, continuous training sessions and workshops regarding peri-implantitis diseases are suggested for their improvement.

### **Key words:**

•peri-implantitis disease •peri-implantitis  
•peri-implant mucositis •dentist knowledge

## Introduction

An inflammatory change of the implant's surrounding tissue is called peri-implantitis.<sup>(1)</sup> This lesion is the most common complication in dental implants.<sup>(1)</sup> Implant failures include primary and secondary failures. Surgical trauma, lack of primary stability, and bacterial infection are primary failures.

Secondary failures result from prosthesis placement, bacterial infection, and mechanical overload. Peri-implantitis is the secondary failure of dental implants.<sup>(2)</sup> Based on the tissue involvement, the severity of peri-implantitis is divided into two categories: peri-implant mucositis and peri-implantitis.<sup>(3)</sup> Peri-implant mucositis is a reversible inflammation of the surrounding tissues of functional implants and does not result in any bone loss.<sup>(4,5,6,7)</sup> Bleeding on probing, pus excretion, and 4-5 mm pocket depth are the clinical signs of this disease.<sup>(4,5,6,7)</sup>

While, peri-implantitis is a multi-factorial disease that is affected by microbial pathogens and the host's inflammatory response, biomechanical factors associated with additional forces can affect the implant as well.<sup>(8)</sup> This increase in microbial activity disrupts the host response balance, precipitating an inflammatory reaction in the tissue surrounding implant leading to bone loss.<sup>(4,5,6,7)</sup> There for, continuation of stimulation, causes to periodontal or peri-implant tissue destruction.<sup>(4,5,6,7)</sup> Increased pocket depth (>5 mm), bleeding, pus excretion on probing, peri-implant tissue bone loss, and circumferential crater are clinical signs of the disease.<sup>(7)</sup>

Microorganisms have an important role in the development of peri-implantitis.<sup>(8)</sup> There is a high proportion of pathogens, which are involved in periodontal disease, particularly gram-negative anaerobic bacteria such as *P. gingivalis*, *Tanerella forsythia*, and *Troponema denticola*.<sup>(8)</sup> Given that there are not clear microbiological differences between moderate and severe peri-implant mucositis and peri-implantitis, we can suggest that in most cases, peri-implant mucositis gradually turns to peri-implantitis.<sup>(8)</sup>

Other factors affecting peri-implantitis are patient-related factors such as previous periodontitis history, diabetes mellitus, genetic factors, poor oral hygiene, smoking and alcohol consumption.<sup>6</sup> Implant-related factors include: lack

of keratinized tissue around implant, mechanical overload, deeply positioned implant, excessive cement retained, restoration-abutment poor insertion, over contoured restoration, improper implant position and implant surface properties.<sup>(6)</sup> Recent research on the long term success of implants has indicated the high incidence of peri-implant mucositis and peri-implantitis.<sup>(9)</sup> Infections caused by anaerobic bacteria are the primary inflammatory cause of peri-implants.<sup>(10)</sup> In the 6th European Periodontal Workshop<sup>11</sup> the incidence rate of peri-implant mucositis (12-40% in implant sites) was 28 to 56 %.<sup>(11)</sup>

In the present, more people are keeping their natural teeth for more years.<sup>(12,13)</sup> however, people demand improvement in function and beauty and thus in the quality of life, moreover than oral health care.<sup>(12,13)</sup> In the past, dental implants were performed in specialized centers, but today the number of treatments performed by general practitioners is rapidly increasing.<sup>(14)</sup>

Accurate diagnosis of peri-implantitis disease is essential for its proper control: most studies have focused on dentists' knowledge of dental implants. No studies regarding peri-implantitis diseases were found to have been conducted before, therefore, in this study, dentists' knowledge of peri-implantitis and its related treatment was assessed. It was a descriptive, cross-sectional study to provide appropriate educational content.

## Materials and Methods

This descriptive, cross-sectional study was done among general practitioners working in the city of Rasht in 2014. The study population included all general practitioners in private practice or employed in clinics in the city of Rasht.

The list of names and addresses of all active general practitioners in the city of Rasht (capital to the province of Guilan) were taken from the Dental School of Medical Council. The sampling method for this study was "convenience sample size" and 96 dentists were included.

The information in this research was obtained from the assessment of dentists' knowledge, by the researcher-developed questionnaire.

The questionnaire did not ask about their names or addresses and had 2 parts: In part 1, personal information about age, sex, job experience, and history of attendance in implant workshops

or symposiums was questioned. In part 2, they were asked about etiology (questions 1- 4), clinical diagnosis (questions 5-8) and peri-implantitis disease treatment (questions 9-17). For each correct and wrong, a score of 1 and 0 were given respectively. The results varied from 100% (for all correct) to 0% (for no correct answer), and the result was considered to be representative of the dentists' level of knowledge.

To confirm the questionnaire's validity, we ask dental school professors of Guilan University of Medical Sciences (GUMS) opinion's, and, we confirmed the questionnaire's reliability, by using the Cronbach's alpha-1 coefficient in a preliminary study.

The project manager herself conducted the general dentist's offices (or clinics) and provided explanations about the objectives of the study for data collection, after which the questionnaire was given to the dentists. As much as was possible, the questionnaires were filled out in the researcher's presence; otherwise, after dentists were given a thorough explanation of the study, they were asked to carefully fill out the questionnaire for collect later.

Finally, all 100 questionnaires were collected, and the information went through statistical analysis using SPSS v-19. The relationship between knowledge, age, and job experience was assessed using the Pearson correlation coefficient and the relationship between knowledge, gender, and re-education was analyzed using the Spearman correlation coefficient (statistical significance level  $P < 0.05$ ). To calculate the correct answer to questions in relation with items, the Chi-Square test with 95% confidence intervals was used, and to determine the factors affecting the account ability logistic regression was used.

## Results

After the assessment, mean general knowledge of dentists in the city of Rasht was found to be 54.1%. From 100 participants, 69% were male ( $n=69$ ) and 31% females ( $n=31$ ). Independent Sample test showed no meaningful differences between the average knowledge of both sexes. ( $p=0.404$ ).

Regarding background, 53% of the dentists had over 10 years of job experience and 47% had fewer than 10 years of job experience,

with 77% having had a history of participation in dental implant workshops or symposiums (23% no history). Using the Independent Sample test there was no significant difference between knowledge and job experience ( $P=0.179$ ).

Dentists' distribution based on the field of focus was as follows: 21% prosthetics, 7% surgery, 36% prosthetics and surgery, and 36% none of the above. Using one way ANOVA test, there was a significant statistical relation between the knowledge and field of focus ( $P = 0.019$ ) with prosthetics in the lead (44.62 %); however, it was not statistically significant.

In Table 2, the number of people who correctly answered less than 33% of the questions, received a poor rating; those answering between 33% and 67% were average; and those with more than 67% were considered good. According to the table in terms of etiology, 25%, 37%, and 38% had poor, average, and good knowledge, respectively. In the field of treatment, 27%, 63%, and 10% had a poor, average, and good knowledge, respectively. In the field of diagnosis, 12%, 37%, and 51% had poor, average, and good knowledge, respectively. Finally, 6% of the dentists had poor, 74% had average, and 20% had good knowledge. The range of correct answers was between 4 and 15: The highest and lowest correct answers were 15 (2% of people) and 4 (3% people) respectively. The mean number of correct answers was 10, with 12 people answering (12% of dentists).

## Discussion

Despite the high success rate of implants, the increasing rate of peri-implantitis disease has been reported in the literatuer<sup>(11)</sup>, hence it can be concluded that general practitioners have to increase their knowledge on prevention, diagnosis, and treatment of those diseases. Therefore, continued learning is essential to their professions.

In a 2002 study by Heubener in the United States, the pattern of using implant education in dentistry graduates of Creight University over a period of 10 years (1988 - 1997) was assessed. Results showed that those who passed the implant training in laboratories and workshops had a greater knowledge about implants, , did additional implant therapy in their offices and also spent more time on implant education than those who did not

**Table 1.** Distribution of the questions with their percentages

questions	Answer	percentage
Peri-implantitis is an inflammatory reaction of hard and soft tissue around implants.	incorrect	35%
	correct	65%
Prevalence of peri-implantitis is about 30–60% .	incorrect	76%
	correct	24%
Bacterial plaque is the main factor of peri-implantitis development.	incorrect	26%
	correct	74%
Factors such as history of periodontitis, diabetes mellitus, oral health, smoking, and alcohol can increase the incidence of peri-implantitis.	incorrect	43%
	correct	57%
Probing around implants compared to the teeth required less than normal force.	incorrect	53%
	correct	47%
Bone loss is not a symptom of peri-implantitis.	incorrect	33%
	correct	67%
1.5 mm Bone loss at first year of implant insertion is not a symptom of peri-implantitis.	incorrect	12%
	correct	88%
loosening of the implant is not useful for early detection of diseases.	incorrect	58%
	correct	42%
Non-surgical treatment (debridement and plaque control) is the only necessary treatment for peri-implantitis mucositis, and this method can be used in the initial phase of peri-implantitis.	incorrect	39%
	correct	61%
To remove plaques from the surface of titanium implants, titanium curettes, plastic brushes, hydrogen peroxide and chlorhexidine can be used.	incorrect	62%
	correct	38%
Bleeding on probing with a probing depth of 6 mm and bone loss in consecutive meetings requires surgical treatment of inflammatory diseases.	incorrect	32%
	correct	68%
The type of the lesion is an important factor in choosing the type of surgery for peri-implantitis treatment.	incorrect	35%
	correct	65%
Loosening of the implant is a definitive indication for implant removal.	incorrect	50%
	correct	50%
Appropriate Recall period for patients receiving the implant after insertion of the prosthesis is every 3 to 4 months in the first year.	incorrect	28%
	correct	72%
Removal of plaque and calculus and oral health instruction (OHI) is the best treatment for a patient with BOP, pus excretion, and 3 to 4 mm probing depth around the implant.	incorrect	82%
	correct	18%
The first treatment for a patient with BOP, pus excretion, and 6 mm probing depth around the implant is supragingival and subgingival debridement and OHI	incorrect	52%
	correct	48%
Metronidazole is a systemic antibiotic prescribed for the treatment of diseases around the implant.	incorrect	64%
	correct	36%

According to Table 1, the average knowledge of general dentists was 54.1% (total number of correct answers divided by 17).

**Table 2.** Frequency distribution of knowledge in the fields' of etiology, diagnosis, and treatment

Fields	Answers	Poor	Average	Good
etiology	number	25	37	38
	percent	25%	37%	38%
treatment	number	27	63	10
	percent	27%	63%	10%
diagnosis	number	12	37	51
	percent	12%	37%	51%
total	number	6	74	20
	percent	6%	74%	20%

pass such courses. These findings indicate that, "scientific and practical implant workshops can substantially improve their practical implementation".<sup>(15)</sup>

Most et al. (2013) studied the impact of a dental implant training program to improve knowledge of dental students. In this study, a training program consisting of 200 hour of dental implant training and practice, over a period of 3 years, for a group of students was presented. For another group of students a 3-day training program was held. Then both groups were asked to fill out a questionnaire about the following: basic information and implant materials, implant design, and soft tissue management. The results showed that scores of basic implant information and implant design in the 3-year group were higher than in the 3-day group. According to this study, academic training can improve students' knowledge of dental implants.<sup>(16)</sup>

Poorsamimi et al. (1390) studied general dentists' knowledge and practice about dental implants in the Qazvin province. Of 104 dentists who participated in that study, 60.8% of participants were male and 39.2% were female with an average age of 35 years, and 8 years of job experience. The average score of dentists' who had participated in implant re-training courses was 13.33%. According to this study there was no significant relationship between sex, age, job experience history, and dentists' knowledge; however, there was a significant relation between dentists' knowledge and their practice. This study reported that, despite adding implant training courses to the student curricula, there was no significant difference between younger and older dentists. This can be interpreted as dental schools and implant re-training courses

not being successful in the field of implants.<sup>(17)</sup> Haghghat et al. (2011) conducted a study in the city of Isfahan, to assess the knowledge of dentists to provide basic information of implant re-training workshops.

In this cross-sectional study, 300 dentists were evaluated by a questionnaire. The minimum score was 0, while the maximum was 60. The results showed that 67.7% of dentists did not participate in implant re-training courses. The mean total score for the all dentists was  $28.33 \pm 16.9$ . The mean score of general practitioners was  $27.87 \pm 16$  and the mean score of specialist dentists was  $41 \pm 17.9$ , which was statistically significant ( $P = 0.03$ ). The mean score of dentists who had participated in implant re-training courses was  $38.72 \pm 13.74$ , while that of dentists who had not participated in implant re-training courses was  $23.4 \pm 16.2$ , with a statistically significant difference ( $P < 0.001$ ). Based on the results of this study, general practitioners' and specialists' knowledge was found to be very far from the ideal. It is essential that the dental student curriculum would be planned and implant re-training courses be tailored accordingly.<sup>(18)</sup>

In this study, with a sample size of 100, general dentists' knowledge about peri-implant inflammatory disease and its treatment was assessed. According to this study, there was no significant relationship between age, sex, job experience, and general dentists' knowledge about peri-implant inflammatory diseases. On the other hand, there was a significant difference between field of focus (prosthetics, surgery, or both) and general dentists' knowledge; in other words, dentists with prosthetics experience had a higher knowledge score.

The questionnaire was divided into 3 part: etiology, clinical diagnosis, and treatment of peri-implant inflammatory diseases. According to the results, in the field of etiology, 38%, 37% and 25% had good, average, and poor knowledge respectively. "Only 10% of dentists had good knowledge of treatment, and, 90% had an average or poor knowledge". This suggests that the gap in the knowledge of the etiology related to reduced knowledge in the field of treatment. In terms of clinical diagnosis, 51% of the dentists had good knowledge. Greater knowledge of clinical diagnosis than etiology and treatment could indicate the need for higher levels of education

in this field.

On the other hand, studies have shown that, in most universities of developed countries, such as United States, Canada, and Western Europe, dental implant clinical training is included in the general dentistry schedule, while in the dental schools of Iran such kinds of studies are not present.<sup>(19)</sup>

The results of the present study, with a knowledge score of 10.8 for the dentists in the city of Rasht, indicate that implant re-training courses and workshops have not successful in recent

years. It seems to be essential to hold re-training courses and conferences, and to distribute training brochures about dental issues to dentists to enhance their theoretical and practical skills of dentists: in particular, about implant and peri-implant diseases.

To provide more statistics and information in dentists' proficiency and a better and more accurate evaluation of this issue, further studies are needed in other cities of Iran to provide a more comprehensive means for raising dentists' knowledge levels in the future.

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