Original Research Article

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Incidence of Peri-implantitis and oral health related quality of life in Patients rehabilitated with Implants: A retrospective Study

Abstract:

Background: Peri-implantitits, periodontal disease and bone loss are main complications of dental implant treatment that can impact the quality of life .

Aim: This study aimed to determine incidence of Peri-implantitis and oral health related quality of life in patients rehabilitated with Implants by means of a shortened 14-item questionnaire of Oral Health Impact Profile Index (OHIP-14).

Materials and Methods: Sixty number of patients was included in this study who were diagnosed with peri implantitis. The participants were assessed on the basis of response received in Oral Health Impact Profile Index(OHIP-14) questionnaire. OHIP-14 is a Likert-type questionnaire that uses a 5- point rating scale (0 = never, 1 = rarely, 2 = sometimes, 3 = frequently and 4 = very often).

Results: A statistically significant correlation was noted between the Functional limitation domain with the psychological limitation and social limitation ($p<0.0001$).

Conclusions: Within the limitations of this study, it was observed that quality of life has been compromised due to peri implantitis. Results also indicated that patients should take action to improve their oral health. Further longitudinal studies are needed to support our results and should include control groups that use conventional removable dentures.

Key-words: Geriatrics, peri-implant mucositis, peri-implantitis, quality of life, OHIP-14Source of support : Nil

Introduction:

The characteristics, forms, and requirements of the body, along with social interactions, change as one ages.[2] The elderly patients exhibit altered physiology and anatomy in addition to molecular and cellular alterations.[3]

It is evident from recent epidemiologic studies that an increasing number of elderly population is living longer with their natural teeth.[4,5] While this evolution has been dentistry's goal for many years and deserves recognition as a significant advancement in oral public health, maintaining these natural teeth has become even more difficult.[6] Impaired chewing abilities due to tooth loss, loosened dentures, infections, and discomfort can negatively impact food intake and increase the risk of protein and calorie malnutrition, especially in elderly individuals.[7,8]

Conventional fixed or removable prostheses, as well as implant-supported prosthesiswhich improve patients' comfort and quality of life, can be used to eradicate edentulism caused by periodontal disease or caries.[9]

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According to Berglundh et al. (2018) and Schwarz et al. (2018),[10] peri-implantitis is a plaque-associated pathological condition that affect the tissues surrounding implants. According to a study conducted by Derks et al., 2016;[11] Koldsland et al., 2010[12] Kordbacheh Changi et al., 2019[13] ,it was observed that peri impalntitis is characterised by tissue inflammation and the progressive loss of bone that supports the implant. Depending on the diagnostic criteria used, the prevalence of peri-implantitis ranges from 11.3% to 47.1%.

Patients' dental health and quality of life are negatively impacted by conditions like peri-implantitis, which arise when bone loss around the implant surpasses normal limits. [14] When it comes to oral health, the term "quality of life" refers to how pain and discomfort in the oral cavity can impact a person's functional, psychological, social, and overall well-being.[15,16] The Oral Health Impact Profile-14 (OHIP-14) is one of the assessments[17] to evaluate a patient's physical pain, functional limitation, physiological, psychological, and social disability and handicap. According to the data available, no prior research has evaluated how peri-implant illness affects patients' overall health-related quality of life.

The World Health Organisation (WHO, 2020)[18] states that oral health is a critical sign of general health, wellbeing, and quality of life. According to Sischo and Broder (2011),[19] OHRQoL is a multidimensional concept, which includes a subjective evaluation of the individual's oral health, functional well-being, emotional well-being, expectations and satisfaction with care, and sense of self. According to Lang & Zitzmann in 2012[20]it was reported that, patient-reported outcome measures have grown in importance as a criterion for evaluating the overall effectiveness of treatment in the past few decades due to the growing interest in how periodontal disease affects patients' overall health-related quality of life (OHRQoL). The most used tool is the Oral Health Impact Profile (OHIP) (D. Locker, 1988)[21] which covers seven domains—functional limitation, physical pain, psychological discomfort, physical disability, psychological disability, social impairment, and handicap—was first used to validate the oral health model. Slade (1997)[22] developed and validated the OHIP-14, an instrument designed for ease of use.

In light of this information, the study aimed to measure the effect of peri-implantitis in patients rehabilitated with implant supported prostheses. The hypothesis is that peri-implantitis affect patients' quality of life.The current study employs the OHIP-14 questionnaire, a condensed, user-friendly version consisting of 14 items covering the three domains namely, functional limitation, psychological and social disability.

METHODS :

Study population:

This cross-sectional study included 60 individuals who visited the prosthodontic department between December' 2022 to June 2023. All implant-supported prostheses were in function for at least 12 months after prosthetic loading. All participants were informed about the study, and consent was obtained.

c) Inclusion Criteria:

- Pateint rehabilitated with implant supported prosthesis
- Patient diagnosed with Peri implantitis

d) Exclusion Criteria

- Patients with systemic diseases such as diabetes and hypertension
- General medical risks (ASA I and II),
- Previous or current radiotherapy or chemotherapy,
- Osteoporosis, or bisphosphonate therapy.

Assessment of quality of life with OHIP-14:

After the clinical examination, patients were given a modified OHIP-14 questionnaire, demonstrated to be reliable and valid.[17] The OHIP-14 consisted of 14 questions in three areas regarding physical limitations psychological disability, and social disability. OHIP-14 is a Likert-type questionnaire that uses a 5- point rating scale (0 = never, 1 = rarely, 2 = sometimes, 3 = frequently and 4 = very often). The OHIP-14 produces eight scores, consisting of scores in three categories and the sum of the category scores. In our study, the questionnaire has been modified to include physical limitations, psychological disability, and social disability.

Statistical analysis:

The Statistical Package for the Social Sciences (SPSS) Version 22.0 software program (IBM Corp.) was used to analyse the data and the calculated values obtained clinically from the study. The normality of the data was tested by the Shapiro-Wilk test. The Mann-Whitney U test was used to compare non-normally distributed variables between groups. One-way analysis of variance (ANOVA) and Tukey

comparison tests were used to compare normally distributed numerical data. Kruskal-Wallis and pairwise tests were used to compare non-normally distributed data. Relationships between numerical variables were evaluated with the Spearman rank correlation coefficient. Descriptive statistics are given as mean ± standard deviation (SD). The study data were arranged using frequency tables. A P-value of <.05 was considered significant.

The sample size was calculated using G Power statistical software (Version 3.1

t tests - Means: Difference between two independent means (two groups)

t tests - Correlation: Point biserial model

Analysis: A priori: Compute required sample size

Input: Tail(s) = Two

Effect size |ρ| = 0.43

α err prob = 0.05

Power (1-β err prob) = 0.95

Output: Noncentrality parameter δ = 3.6892547

Critical t = 2.0017175

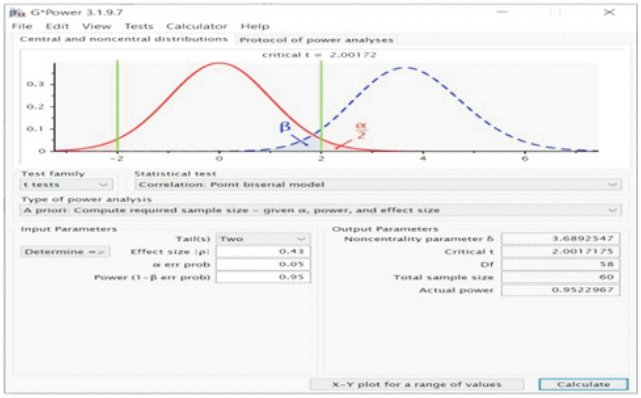
Df = 58

Total sample size = 60

Actual power = 0.9522967

The minimum sample size calculated is 60.

And the power of the study is 95.23%



Result:

MS Excel 2016 was used to fabricate the data sheet. IBM SPSS Corp. in Armonk, New York for Windows, Version 25.0, was used for the statistical analysis. Descriptive statistics were presented in the form of Frequency (n) and Percentage (%). Mean and standard deviation was calculated for the domains and the inter-quartile range was reported. Chi Square statistics were applied to calculate the inferential statistics of the different variables between the different groups. The statistical constant was fixed at $p<0.05$. The distribution of the study sample was not normally distributed.

1. Functional Limitation:

The functional limitation domain questions were reported in frequencies of never, rarely, sometimes, frequently and very often. Statistically significant difference was observed.

		Frequency	Percent	Chi Square	P Value
Trouble pronouncing any words because of problems with your implant, gums, or crown/denture	Never	18	30.0	.400	.819
	Rarely	22	36.7		
	Sometimes	20	33.3		
Sense of taste has worsened because of problems with your implant,gums, or crown/denture?	Never	15	25.0	9.167	.057
	Rarely	7	11.7		
	Sometimes	18	30.0		
	Frequently	14	23.3		
	Very often	6	10.0		
Painful jaw because of problems with your implant,gums, or crown/denture?	Never	15	25.0	17.833	.001*
	Rarely	2	3.3		
	Sometimes	16	26.7		
	Frequently	20	33.3		
	Very often	7	11.7		

Found it uncomfortable to eat any foods because of problems with your Implant,gums, or crown/denture?	Never	12	20.0	12.667	.013*
	Rarely	6	10.0		
	Sometimes	20	33.3		
	Frequently	16	26.7		
	Very often	6	10.0		
Had painful gums because of problems with your implant, gums, or crown/denture?	Never	10	16.7	15.500	.004*
	Rarely	4	6.7		
	Sometimes	15	25.0		
	Frequently	22	36.7		
	Very often	9	15.0		
Had sore spots in your mouth because of problems with implant,gums, or crown/denture?	Never	26	43.3	17.733	<0.0001*
	Rarely	16	26.7		
	Sometimes	15	25.0		
	Frequently	3	5.0		

*statistically significant

Table 1: Answer to Functional Limitation question

2. Psychological limitation

The psychological limitation domain questions were reported in frequencies of never, rarely, sometimes, frequently, and very often. Statistically significant difference was observed.

		Frequency	Percent	Chi Square	P Value
Felt uncomfortable about theappearance because of problems with your implant, gums, or crown/denture?	Never	29	48.3	46.333	<0.0001*
	Rarely	17	28.3		
	Sometimes	12	20.0		
	Frequently	1	1.7		
	Very often	1	1.7		
Felt depressed because of problems with your implant, gums, or crown/denture?	Never	22	36.7	.700	.705
	Rarely	21	35.0		
	Sometimes	17	28.3		
Concentration been affected because of problems with your implant, gums, or crown/denture	Never	11	18.3	21.333	<0.0001*
	Rarely	1	1.7		
	Sometimes	17	28.3		
	Frequently	22	36.7		
	Very often	9	15.0		

*statistically significant

Table 2: Answer to Psychological Limitation question

3. Social disability:

The social disability domain questions were reported in frequencies of never, rarely, sometimes, frequently, and very often. Statist ically significant difference was observed.

		Frequency	Percent	Chi Square	P Value
Less tolerant of your spouse or family because of problems with your implant, gums, or crown/denture	Never	27	45.0	3.900	.142
	Rarely	18	30.0		
	Sometimes	15	25.0		
Had difficulty doing your usual jobs because of problems with your implant, gums, or crown/denture	Never	16	26.7	3.700	.157
	Rarely	17	28.3		
	Sometimes	27	45.0		
Diet been unsatisfactory because of problems with your implant, gums, or crown/denture	Never	9	15.0	14.667	.005*
	Rarely	7	11.7		
	Sometimes	21	35.0		
	Frequently	17	28.3		
	Very often	6	10.0		
Been totallyunable to function because of problems with your implant, gums, or crown/denture	Never	29	48.3	17.100	<0.0001*
	Rarely	26	43.3		
	Sometimes	5	8.3		
Been unable to work to your full capacity because of problems with your teeth, mouth, or dentures	Never	19	31.7	.300	.861
	Rarely	19	31.7		
	Sometimes	22	36.7		

*statistically significant

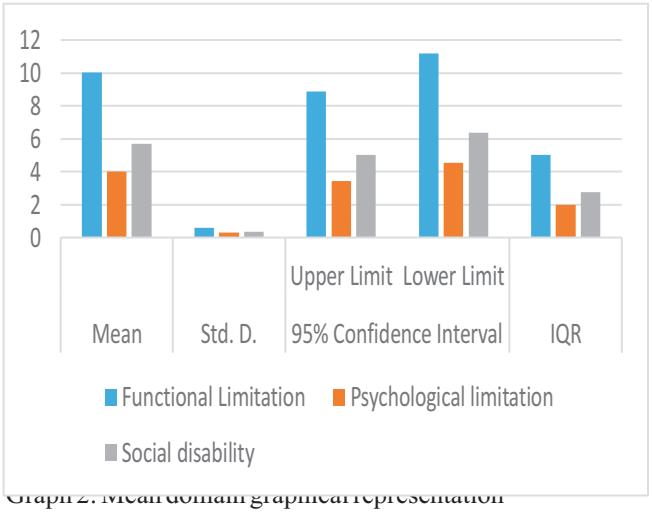
Table 3: Answer to Social disability question

4. Mean domain scores for each domain for the OHRQL-14 Questionnaire

The mean domain scores were recorded and presented in mean and standard deviation. Functional limitation score was 10.03±.578 (IQR - 5.00); Psychological limitation score was 4.00±.284 (IQR - 2.00) and social disability score was 5.70±.346 (IQR - 2.75).

	Mean	Std. D.	95% Confidence Interval		IQR
			Upper Limit	Lower Limit	
Functional Limitation	10.03	.578	8.87	11.19	5.00
Psychological limitation	4.00	.284	3.43	4.56	2.00
Social disability	5.70	.346	5.00	6.39	2.75

Table 4: Mean domain score



Graph 2: Mean domain graphical representation

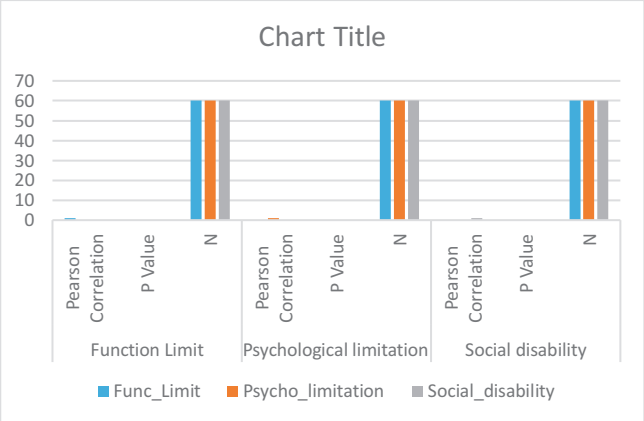
5. Correlation between the domains

A statistically significant correlation was noted between the Functional limitation domain with the psychological limitation and social limitation ($p<0.0001$).

		Function Limit	Psychological limitation	Socialdisability
Function Limitation	Pearson Correlation	1	.627**	.685**
	P Value		<0.0001*	<0.0001*
	N	60	60	60
Psychological limitation	Pearson Correlation	.627**	1	.686**
	P Value	<0.0001*		<0.0001*
	N	60	60	60
Socialdisability	Pearson Correlation	.685**	.686**	1
	P Value	<0.0001*	<0.0001*	
	N	60	60	60

**. Correlation is significant at the 0.01 level-(2 tailed).

Table 5: Corelation between 3 domains



Graph 2: Corelation between 3 domains graphical representation

Discussion:

This study sought to assess the impact of health and peri-implantitis on patients' quality of life. For patients who are partially or completely edentulous, implant-supported prostheses—which is commonly utilised as substitutes for conventional removable dentures—is an appropriate forms of treatment.[23] Nonetheless, the majority of research on implant-supported prostheses has been on how the prosthetic restoration affects a patient's quality of life[24]; just a small number of studies[25] have looked at biological issues in patients.

Several research have assessed the quality of life effects of traditional removable dentures and implant supported overdentures.[26] Kutkut et al., for example, investigated the quality of life effects of both implant-supported overdenture prostheses and conventional prostheses. Compared to patients wearing conventional prostheses, patients using implant-supported prosthesis recorded statistically significantly higher scores. According to research by Nickenig et al,[27] implant-supported prosthesis and overdenture restorations both improved OHRQoL. However, Tomruk et al.[28] did not detect a statistically significant difference between the groups when evaluating the impact of conventional prostheses and overdenture prostheses on quality of life. Despite the lack of consistency in research on patients' quality of life, the use of implant-supported overdentures was found to improve oral health-related quality of life.[29] Romandini et al. (2019)[30] conducted a cross-sectional study to assess 458 implants in 99 patients. Regarding the overall OHIP score, there was no statistically significant difference between peri-implantitis and healthy peri-implant tissue. Furthermore, the pre-peri-implantitis group experienced higher levels of physical pain compared to the peri-implantitis group. Romandini et al.[30] did not, however, look into the relationship between OHIP scores and periodontal clinical indicators.

Peri-implant disorders, according to Romandini, Lima, et al. (2021)[30], are typically asymptomatic and undetectable to patients. This appears to be seen after therapy for peri-implantitis as well. In all seven domains, women scored more on average than men did. This is consistent with the findings of Araujo et al. (2010),[31] who used the OHIP-14 to show that the impact of oral health was statistically substantially associated with gender. There have also been prior reports on the relationship between gender differences and OHRQoL perception (Pattussi et al., 2010,[32] Ulinski et al., 2013).[33] Alternatives for OHRQoL measurement were covered in another study (Ohrn & Jonsson, 2012).[34] Atchison & Dolan, 1990[35] gave the senior Oral Health Assessment Index (GOHAI) which is a 12-item questionnaire-based tool that is widely used to measure the impact of senior patients' oral health. Ohrn and Jonsson evaluated the GOHAI and OHIP-14 questionnaires for their utility in measuring OHRQoL during the basic evaluation and following the first

oral hygiene treatment.

In the present study ,the mean domain scores were noted and displayed as mean and standard deviation. The scores for social disability were 5.70±.346 (IQR - 2.75), psychological limitation was 4.00±.284 (IQR - 2.00), and functional limitation was 10.03±.578 (IQR - 5.00).Between the functional restriction domain and the psychological and social limitations, a statistically significant association was observed($p<0.0001$).

It is possible to say, within the constraints of this study, that clinical indicators like Peri implantitis have an impact on patients' quality of life who use implant-supported prostheses. The findings also suggested that patients have to act to enhance their dental health. To validate our findings, additional long-term research is required, with control groups using traditional removable dentures.

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