Association between gingival parameters, periodontal status and Oral health–related quality of life among construction workers in Poonamallee, Chennai- A cross sectional study

Section A-Research paper

ASSOCIATION BETWEEN GINGIVAL PARAMETERS, PERIODONTAL STATUS AND ORAL HEALTH–RELATED QUALITY OF LIFE AMONG CONSTRUCTION WORKERS IN POONAMALLEE, CHENNAI- A CROSS SECTIONAL STUDY

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Abstract:

Aims and Objectives: To assess the marked effect of periodontal conditions on oral health–related quality of life in the construction workers in poonamallee, Chennai. Materials and Methods: This cross-sectional study was carried out among 217 participants, with specific age group 20–60 years, through various camps conducted by the Faculty of Saveetha dental college and Hospital, Saveetha University, Chennai. The data collection included a combination of clinical examination for the assessment of oral health status and questionnaire administration. Pretested questionnaires and significant oral findings were the sources of data collection. The student t-test was applied for the statistical evaluation of differences in means whereas proportions were compared by use of the chi-square test. Confidence Interval was taken as 95%. Statistical significance of $P < 0.05$ was used. Results: The severity of periodontal disease has a direct effect on oral health–related quality of life. In CPITN index 8.29% had healthy gingiva and 4.61% had bleeding on probing. Participants with good OHIP, 18.89% had bleeding on probing, 11.52% had calculus and it was also found that 3.23% had pocket of 4 to 5mm.The extent and severity were also found to be proportional to the severity of periodontitis. Conclusion: Oral health–related quality of life worsens with the extension in severity of chronic periodontitis.

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1. Introduction

Good oral health has been associated with better quality of life and general health. The aim of the present study was to assess the association of gingival parameters with OHRQoL among construction workers in Poonamallee, Chennai as assessed by the OHIP14.

The World Health Organization (WHO) defines health as a state of complete physical, mental, and social well-being, and not only as the absence of disease or illness (1). However, viewing health only from a perspective of deficiency, such as is the case when measures of morbidity and mortality are used, ignores the fact that good health is much more than being alive and free of disease. Quality of life (QoL), a multidimensional concept, is determined with an individual's subjective evaluation of both the positive and negative aspects of his or her life (2).

Oral health assessment is based on the examination of incidence and frequency of dental caries and periodontal status. Its spread is determined by regional factors, dynamic migration, nutrition, oral hygiene and access to dental care (3). Oral health–related quality of life (OHRQoL) is a part of health-related QoL that focuses on oral health and orofacial concerns. Several diseases and oral conditions have been associated with the deterioration of QoL and, in general, with the systemic health of a given individual (4–7).

Dental plaque is a sticky, colorless, complex biofilm that accumulates on the tooth and the soft tissue. However, when plaque is not removed on a daily care, oral infectious diseases, such as gingivitis or periodontitis frequently can occur (8,9). Gingivitis is an inflammation as the first stage in a chronic degenerative process and affects only the gingiva that can be reversed by effective oral hygiene practices on the part of the individual (10). Unless the process is prevented by treatment, the inflammatory process leads to the deeper periodontal tissues and becomes apical migration of the epithelial attachment, periodontal pocket and alveolar bone resorption and it is called periodontitis. Although periodontitis is preceded by gingivitis, not all cases of gingivitis will progress to periodontitis (10,11).

Chronic periodontitis disease is an immune‑mediated inflammatory disease, the primary etiology for the disease is specific bacterial complexes in the oral biofilm (12). The disease may lead to attachment loss and alveolar bone in susceptible patients. Pocket formation and/or gingival recession are major characteristic features clinically. Chronic periodontal disease affects 65% of the Indian population and is considered to be cause of concern for oral health problems in the country (13).

The aforementioned global issue of oral health disease relies on the clinical parameters but only few studies have emphasized the importance of social indicators on oral health. Because of this, there was a concept change from managing signs and symptoms to giving patients a voice and also taking in account their subjective experiences and interpretation of their experiences (14).

Taking into account this suggestion, an approach that complements the clinical examination of a patient with periodontitis is the self-report of the Oral Health-Related Quality of Life (OHRQoL), since a more negative impact is observed with the extent and severity of periodontal disease (15,16). The evaluation of the OHRQoL is usually performed at a functional, physical, and psychosocial level (17).

It was found that the sociodemographic factors most clearly associated with perceived negative impact on the OHRQoL were: being a woman, low education level, low income, low Subjective Socioeconomic Status (SES), not having dental care service or not being able to pay for dental care, and being an immigrant or belonging to ethnic minority groups. The age was independent (17,18). Another significant finding is the association between the extent and severity of periodontitis and OHRQoL assessed through the scale named Oral Health Impact Profile (OHIP-14) (19,20). Furthermore, worse periodontal health status and need for prosthetic rehabilitation were associated with a negative impact on OHRQoL (21).Our team has extensive knowledge and research experience that has translate into high quality publications [1–10].

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Aim of the study:

The aim of the present study was to assess the association of gingival parameters with OHRQoL among construction workers in Poonamallee, Chennai as assessed by the OHIP14.

Objectives of the study:

1) To assess the Oral Health Impact Profile (OHIP‑14) among Construction Workers.
2) To assess the OHIS and DMFT score among Construction Workers

2. Materials and Methods

Study design and subjects

The present cross sectional study was carried out on the construction workers of Poonamallee in Chennai city, India. The study population consisted of 113 males and 104 females. The subjects who were present on the days of the survey were included while the subjects suffering from systemic illness and unwilling to participate were excluded.

Oral Health‑Related Quality of Life of the study participants were assessed using a self‑administered, pretested proforma, Oral Health Impact Profile (OHIP‑14). The total OHIP‑14 score that is obtained by summing scores for responses for all 14 items, possibly ranges from 0 to 56. Higher the score, poorer was the OHRQoL.

Ethical clearance and informed consent

The ethical clearance for the study was obtained from the Institutional Review Board, Saveetha University, SIMATS. The permission to conduct the study was obtained from the concerned authorities and written informed consent was obtained from the study subjects after explaining to them the purpose and methodology of the study.

Sampling

The sample size was calculated on the basis of prevalence (P) of dental caries (61%), obtained by doing a pilot study on 50 construction workers of Chennai city. The sample size was estimated at 217, which was determined by the following formula $N = 4pq/L2$ (N is the sample size, p = present prevalence, q = 1‑p, L = 25% of p). A simple random sampling technique was used for selecting the desired sample.

Data collection
Interviewer

A self‑administered, pretested proforma and Oral Health Impact Profile (OHIP‑14) was administered to construction workers. A questionnaire interview was conducted which had collected name, age, the socio-demographic data, designation, oral hygiene practices, deleterious habits, felt need of treatment and reason for not seeking the same. OHIP-14 (19) was for assessing their Oral Health Related Quality of Life. The Oral Health Impact Profile consisted

of 14 multiple choice questions assessing oral health‑related problems in seven theoretical areas, including functional limitation, pain, physiological discomfort, physical disability, psychological disability, social disability, and handicap. Based on the presence or absence of the problem and its severity, each question had three options each, these options being always, sometimes, and never. The study proforma and OHIP‑14 was administered to the participants after providing necessary instructions followed by a clinical examination.

Clinical examination

The clinical examination of the construction workers was carried out to assess their oral health status based on the plaque index, gingival index and CPITN. The instruments and supplies used were PMT sets, kidney trays, disposable mouth masks, disposable gloves and towels. After each day's survey, all reused instruments were sterilized by autoclave. CPITN probe was used to record the periodontal index. The subjects were made to sit on a stool /chair available and type III examination (using mouth mirror & probe under adequate illumination) was conducted. All protocols and standard procedures were followed to safeguard the infection control during the

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study. Subjects requiring emergency treatment (for pain) were referred to Saveetha Dental College and Hospital, Chennai.

Training and calibration of examiners

All the examinations were carried out by two qualified examiners. Before the commencement of the study, the examiners were standardized and calibrated in the Department of Public Health Dentistry, by the Head of the Department, to ensure uniform interpretation, understanding, and the application of codes and criteria for the diseases to be observed and recorded and to ensure a consistent examination for assessing the Oral Health Status, and the interexaminer reliability was 93%. The diagnostic variability was found to be low (Kappa value 0.86).

Statistical Analysis

All data were expressed as mean for continuous variables; frequencies and percentage were calculated for categorical data. The data was analyzed using SPSS (Version 13.0). The student t-test was applied for the statistical evaluation of differences in means whereas proportions were compared by use of the chi-square test. Confidence Interval was taken as 95%. Statistical significance of $P < 0.05$ was used.

3. Results

In the age group of 21 to 30 years both men and women were about 8.76%. Most of the participants were in the age group of 31 to 40 years with 23.04% men and 24.42% women. In the age group of 41 to 50 years 11.06% were men and 12.44% females (Figure 1).
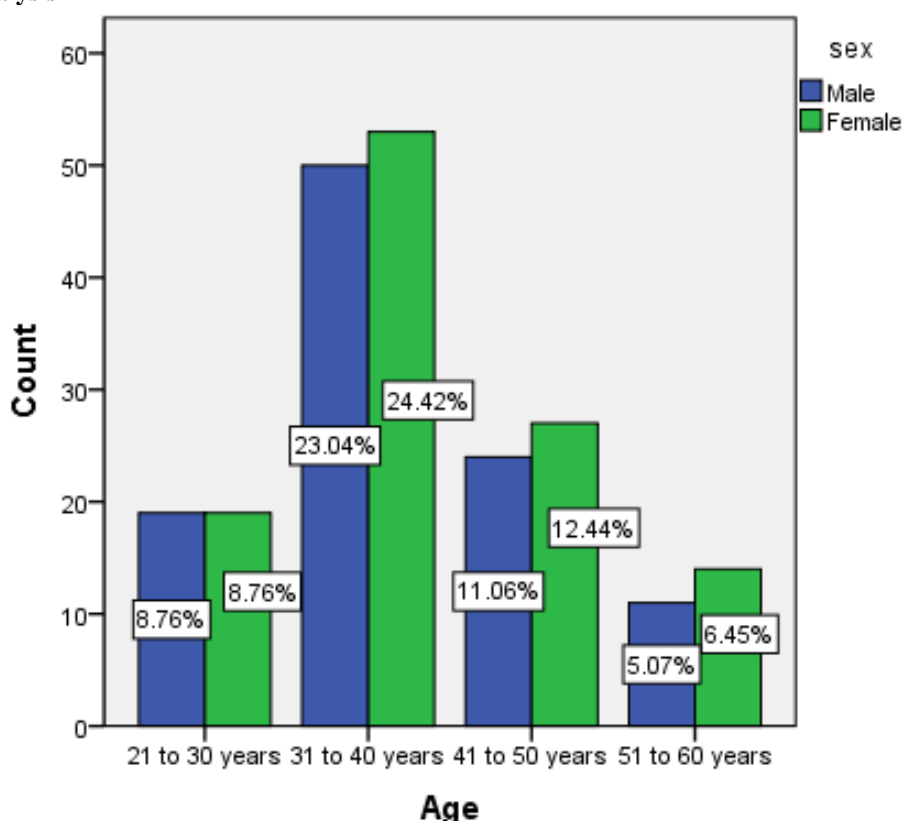

Figure 1: shows the distribution of the study population based on their age.

Figure 2 shows the CPITN index, overall 13.36% had healthy periodontal status. Bleeding on gums was prevalent for 28.11%. Most of the participants had calculus with 35.48%. 15.21% and 7.83% had pocket 4 to 5mm and pocket of more than 6mm respectively.

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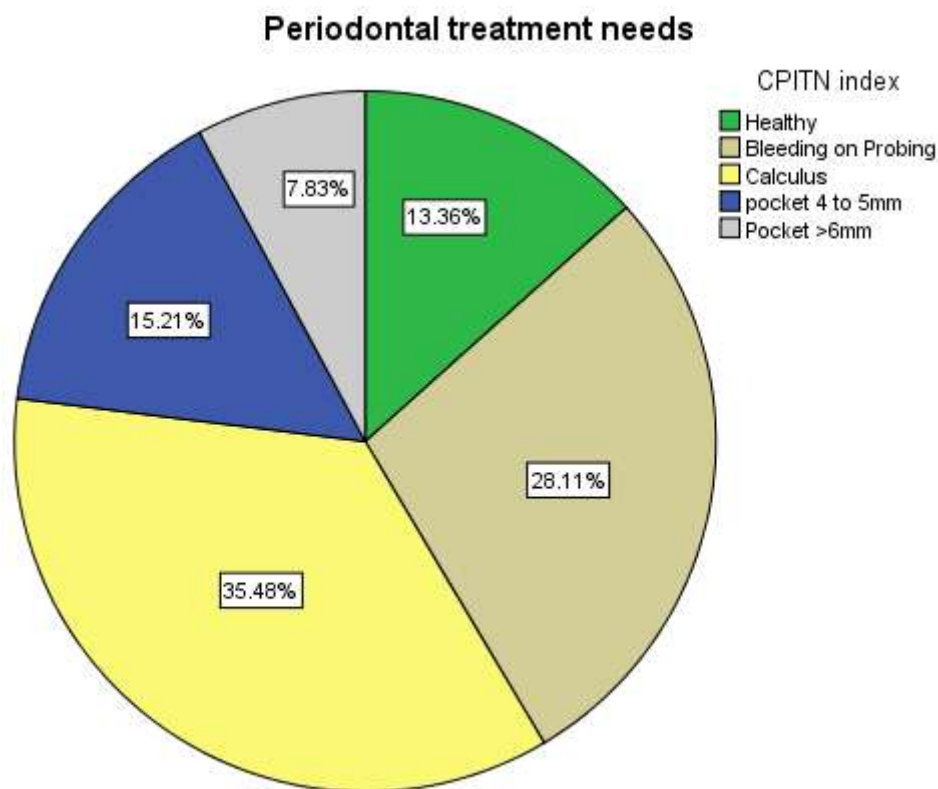
Periodontal treatment needs

Figure 2 demonstrates the periodontal treatment needs among the population

(Table 1) In the age group of 21 to 30 years 7.83% had health gums, 6.45% had bleeding on probing, also 1.38% had pocket of 4 to 5mm. In the age group of 31 to 40 years most of them had calculus with 18.43% and 17.51% had bleeding on probing. In the age group of 31 to 40years and 41 to 50 years 1.84% had pocket of more than 6mm. In age group of 51 to 60 years 4.15% had pocket of 4 to 5mm

Table 1: shows the CPITN index of the population based on their age

	CPITN Index					Pearson Chi-square value	P value
	Healthy	Bleeding on Probing	Calculus	Pocket 4 to 5mm	Pocket >6mm	218.714	0.000*
Age							
21 to 30 years	17	14	4	3	0		
31 to 40 years	10	38	40	11	4		
41 to 50 years	1	9	27	10	4		
51 to 60 years	1	0	6	9	9		

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Table 2 shows the Participants with excellent OHIP score, In CPITN index 8.29% had healthy gingiva and 4.61% had bleeding on probing. Participants with good OHIP, 18.89% had bleeding on probing, 11.52% had calculus and it was also found that 3.23% had pocket of 4 to 5mm. Those who had moderate OHIP, almost 23.50% had calculus, 7.83% had pocket of 4 to 5mm and 1.38% had pocket of more than 6mm. Participants with poor OHIP, no one had healthy gums instead 5.99% had pocket more than 6mm.

Table 2: shows the CPITN index of the population based on their OHIP Score

	CPITN Index					Pearson Chi-square value	P value
	Healthy	Bleeding on Probing	Calculus	Pocket 4 to 5mm	Pocket >6mm	218.714	0.000*
OHIP Score							
Excellent OHIP	18	10	0	0	0		
Good OHIP	10	41	25	17	1		
Moderate OHIP	1	9	51	7	3		
Poor OHIP	0	1	1	9	13		

Table 3: shows the Gingival index of the population based on their OHIP Score

	Gingival Index				Pearson Chi-square value	P value
	Absence	Mild gingivitis	Moderate gingivitis	Severe gingivitis	217.246	0.000*
OHIP Score						
Excellent OHIP	20	8	0	0		
Good OHIP	6	28	47	3		
Moderate OHIP	0	7	62	12		
Poor OHIP	0	1	4	19		

In the gingival index (Figure 3), 9.22% participants had absence of gingivitis and 3.69% had mild gingivitis. Among good OHIP almost 21.66% had moderate gingivitis and 12.90% had mild gingivitis. Participants with

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moderate OHIP, 28.57% had moderate gingivitis and 5.53% had severe gingivitis. Those who had poor OHIP, almost 8.76% had severe gingivitis.
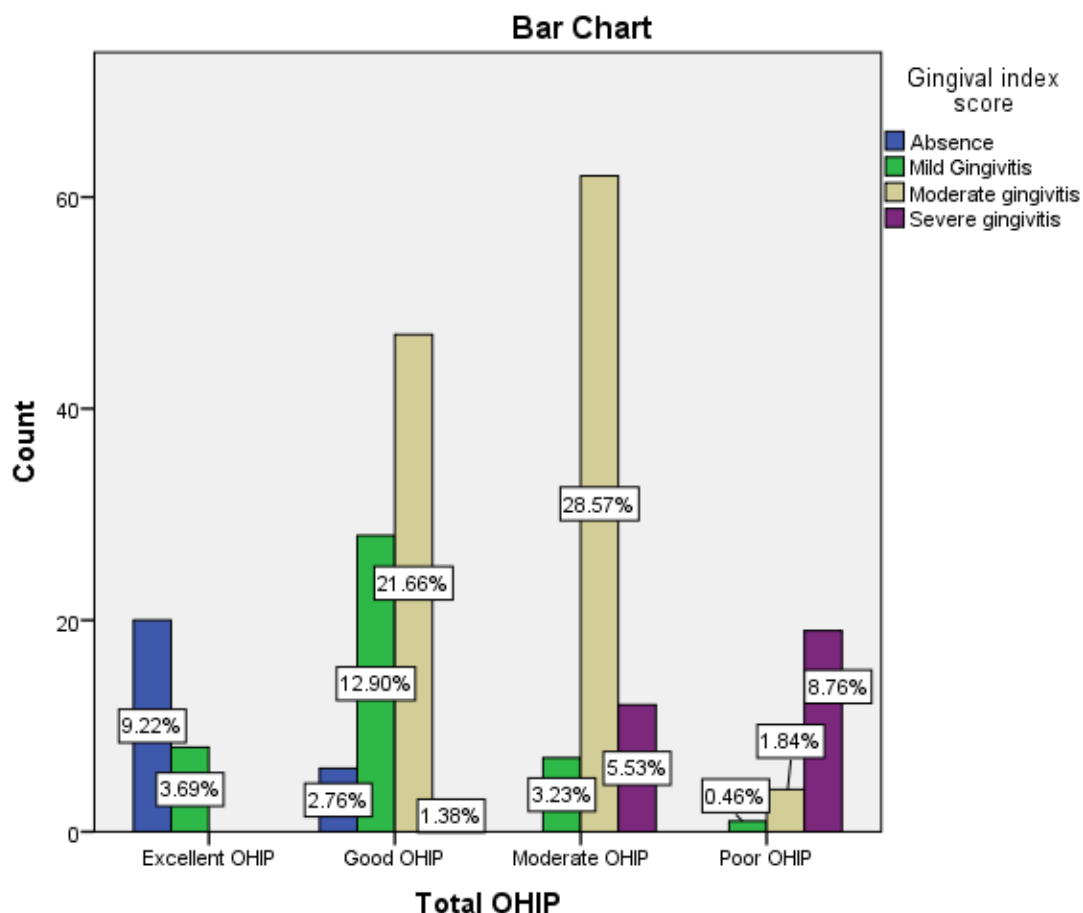

Figure 3: shows the distribution of the gingival index of the study population based on their OHIP score

4. Discussion

The concept of health has gone through a paradigm shift in recent years. The medical health model is greatly expanded by the addition of the psychosocial aspects of health. Instead of interpreting health as a state of absence of organic disease or pathological processes in the past, health is now interpreted as a state of complete physical, mental, and social well‑being, and not merely the absence of disease or infirmity (22). This emerged out of a growing recognition that traditional clinical measures of health need to be supplemented by data obtained from patients and/or persons that capture their experiences and concerns. This is accurate for dentistry too, where there has been a mushrooming of instruments and scales to evaluate what has come to be known as OHRQoL and/or the QoL of patients with various oral conditions (23).

The World Health Organization recognizes OHRQoL as an integral section of global health

program (24). According to the previous researches, there existed a strong association between chronic periodontitis and OHRQoL (25). The influence of periodontal disease on the QoL has received mindfulness recently in various studies carried out by Ferreira et al (26) and Patel et al (27)., which suggested a negative impact of periodontal disease on QoL in adults. A correlation between extent and/or severity of periodontal disease and OHRQoL has been shown by studies conducted by Needleman et al (28)., Cunha‑ Cruz et al (29)., and Bernabé and Marcenes (30),which also suggested a significant effect of periodontal disease on QoL. Hence, the study was aimed to determine OHRQoL among the construction workers in poonamallee, Chennai city with the use of an assessing tool, that is, OHIP‑14 (28).

The OHIP‑14 was developed as a shorter version of the OHIP‑49. This instrument is one of the most widely used OHRQoL indicators internationally, is available in several languages (including

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Portuguese, Chinese, French, German, Japanese, Malaysian, Spanish, and Somalian), and has been shown to have face and content validity for different populations (31). In this study, we used OHIP‑14 as it is a widely used index for the measurement of oral health related with oral diseases. A study, which used OHIP‑49, concluded that only 14 items from OHIP‑49 identified statistically significant differences in the mean scores between patients with periodontitis and those without (17). Hence, it suggested that OHIP‑49 may not be the most appropriate instrument to assess OHRQoL. Therefore, in this study to understand the association of oral impact with oral health, OHIP‑14 was taken into consideration.

The case definition for severe periodontitis was two or more interproximal sites with CAL of ≥6 mm (not on the same tooth) and one or more interproximal sites with PPD ≥5 mm. For moderate periodontitis, there were two or more interproximal sites with CAL of ≥4 mm (not on the same tooth) or two or more interproximal sites with PPD of ≥5 mm (not on the same tooth) (32).

The periodontal status was compromised and presence of calculus was the most common finding in the age group of 31 to 40 years with need of scaling being the most common treatment need. Similar to the study of Smith AC (33) very few numbers of subjects had completely healthy periodontium. Presence of calculus was the most common periodontal condition similar to studies by Skaleric U (34) and Anil S (35). The treatment needs of this population is generally covered by motivation and scaling / polishing.

In a recent systematic review, Ferreira et al (26), reported that gingivitis was associated with pain, difficulties performing oral hygiene and wearing dentures. Additionally, they found that gingivitis was also negatively correlated with comfort. The results of our study indicate that periodontal disease may exert an impact on the QoL of individuals, with a greater severity of disease related to a greater impact. Those with excellent OHIP, 9.2% had absence of gingivitis in the gingival index and 8.2% had healthy gingival status in CPITN index. This suggests that the provision of periodontal treatment to the construction workers can greatly improve their QoL. Shanbhag et al (36), demonstrated that nonsurgical periodontal therapy had a greater impact on OHRQoL than surgical therapy did and that poor clinical response to therapy was correlated to poor OHRQoL outcomes. Our team has extensive knowledge and research experience that has translate into high quality publications (37-46). In fact, the results of periodontal disease such as redness, bleeding while brushing, gum extraction, mobility of teeth and loss of teeth affect the chewing, swallowing and smile esthetics, and as a result selfesteem and QoL were affected by negative (47).

5. Conclusion

The limitations of the study were shorter time span and small sample size; further the study was carried out in construction workers in a particular locality; therefore, the results cannot be generalized to all the areas near the studied cities. For the determination of causal associations, evidence of longitudinal studies is needed. Future scope includes longitudinal studies with more sample size to broaden our current understanding of transitions in oral health outcomes over time and across various geographical locations and to conduct population‑based awareness programs regarding OHRQoL. This study concluded that OHRQoL is strongly influenced by the severity of periodontitis. With the increase in severity of periodontitis, the health‑related Quality of Life deteriorates.

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Annexure 1: Informed consent

This is to inform, that we are interested in studying the "**Association between gingival parameters, periodontal status and Oral health–related quality of life among construction workers in Poonamallee, Chennai- A cross sectional study.**" We need to collect data from you, for the same. This research involves a preformed question based on difficult in maintaining good oral health with respect to your life style. It will take approximately 10 minutes to fill the questionnaire.

I …………………. Hereby declare that I clearly understood the procedures of the survey. Also, I declare that I give permission for the principle investigator to disclose pertinent records to the investigator.

Signature of the study participant …………………….

Date ……………….

I have explained the above and answered all questions asked by the participant:

Signature…………..

Date ……………….

Annexure 2: Questionnaire

Demographic details:

1. Name: 2. Age: 3: Gender: M/F

4. Address: 5. Phone No: 6. Education:

7. Occupation: 8. Marital status:

Oral Health Impact Profile Scale:

Frequency with which it happens: Answer each of the following questions, pointing to the option that corresponds to the 0 = Never 1 = Almost never 2 = Occasionally 3 = Frequently 4 = Very frequently					
Questions	Answers				
1. Have you had trouble pronouncing any words because of problems with your teeth, mouth or dentures?	0	1	2	3	4
2 Have you felt that your sense of taste has worsened because of problems with your teeth, mouth or dentures?	0	1	2	3	4
3 Have you had painful aching in your mouth?	0	1	2	3	4
4. Have you found it uncomfortable to eat any foods because of problems with your teeth, mouth or dentures?	0	1	2	3	4

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5. Have you been self-conscious because of your teeth, mouth or dentures?	0	1	2	3	4
6. Have you felt tense because of problems with your teeth, mouth or dentures?	0	1	2	3	4
7. Has your diet been unsatisfactory because of problems with your teeth, mouth or dentures?	0	1	2	3	4
8. Have you had to interrupt meals because of problems with your teeth, mouth or dentures?	0	1	2	3	4
9. Have you found it difficult to relax because of problems with your teeth, mouth or dentures?	0	1	2	3	4
10. Have you been a bit embarrassed because of problems with your teeth, mouth or dentures?	0	1	2	3	4
11. Have you been a bit irritable with other people because of problems with your teeth, mouth or dentures?	0	1	2	3	4
12. Have you had difficulty doing your usual jobs because of problems with your teeth, mouth or dentures?	0	1	2	3	4
13. Have you felt that life in general was less satisfying because of problems with your teeth, mouth or dentures?	0	1	2	3	4
14. Have you been totally unable to function because of problems with your teeth, mouth or dentures?	0	1	2	3	4

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