

A study of CPITN score in Periodontics Clinic Patients, RSGM Airlangga University, 2022

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World Journal of Advanced Research and Reviews, 2024, 24(01), 2362–2369

Publication history: Received on 17 September 2024; revised on 24 October 2024; accepted on 26 October 2024.

Article DOI: <https://doi.org/10.30574/wjarr.2024.24.1.3262>

Abstract

Background: Approximately 90% of the global population suffers from periodontal disease, characterized by bleeding gums, pain, and bad breath. The impact of this disease is diverse, ranging from tooth loss, disruption of aesthetics and confidence, to influencing individual nutritional status. The disease can be caused by damage of the periodontal tissues. Therefore, the Community Periodontal Index of Treatment Needs (CPITN) is highly essential for assessing the extent of issues in periodontal tissues, including evaluating oral and dental health problems in patients. This assessment can aid in the treatment and prevention of periodontal disease.

Material and Methods: This research is a descriptive study. The population consists of all patients who visited the periodontology clinic at the Faculty of Dentistry, Airlangga University, in the year 2022. The sample was taken using a total sampling technique, involving secondary data obtained from the periodontal status cards of patients, specifically focusing on the examination data related to the condition of periodontal tissues based on the Community Periodontal Index of Treatment Needs (CPITN).

Conclusion: The CPITN scores vary between gender and age groups of the patients. Therefore, bivariate research is needed to analyze the relationship of these parameters with the CPITN scores of periodontology patients.

Keywords: CPITN; Periodontal disease; Sextant; Age and gender

1 Introduction

Periodontal disease is one of the common health problems in the community, affecting up to 90% of the population [6]. Approximately 19% of the global population suffers from severe periodontal disease, characterized by the loss of attachment of the gums from the teeth and supporting bone, which causes teeth to become loose and even fall out [14]. Individuals who experience tooth loss due to periodontal disease may face difficulties in food intake, aesthetic issues, reduced self-confidence, and decreased quality of life, as well as negative impacts on their nutritional status and health [2].

The periodontal tissue consists of four main components: the gingiva, periodontal ligament, cementum, and alveolar bone. The periodontal tissue functions to maintain tooth function and protect against mechanical trauma. If the periodontal tissue is damaged, it can impair its functions. Symptoms can vary from mild to severe. Gingivitis is the mildest form of tissue damage, while periodontitis is a more severe condition that affects the alveolar bone [16]. Changes in any of the periodontal components can affect the activity of other components, and thus pathological changes in one component can significantly impact the maintenance, repair, or regeneration of other periodontal components [10].

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One index used to assess the condition or health of periodontal tissues and determine treatment needs is the Community Periodontal Index of Treatment Needs (CPITN), using a special probe [15]. The purpose is to obtain data related to periodontal status to prevent the initiation or progression of periodontal disease, thereby improving the patient's overall systemic health [1]. The final measurement result of the CPITN is a score indicating the severity of periodontal disease and a score for treatment needs. The severity scores of periodontal disease are 0, 1, 2, 3, and 4, while the treatment need scores are 0, I, II, and III [12].

Several studies have shown that CPITN data collection indicates a large number of people still need early prevention and treatment for periodontal health. Based on the study conducted by Ermawati et al. in 2015, out of a total of 191 samples, only 1.05% of the samples had a score of 0, indicating healthy periodontal tissue with no need for treatment. Meanwhile, 3.14% of the samples had a score of 2, indicating bleeding on probing (BOP) and requiring level I treatment (oral hygiene instruction). Additionally, 78.53% of the samples had a score of 2, indicating the presence of calculus, and 17.27% had a score of 3, indicating shallow pockets and requiring level II treatment (OHI and scaling).

The purpose of this study is to determine the condition and health status of the periodontal tissue of patients based on the CPITN scores recorded in the medical records of patients at the periodontics clinic of Airlangga University's Dental and Oral Hospital.

2 Material and methods

This study is a descriptive study. The samples used were the medical records of patients who had a periodontal status card. The sampling technique used in this study was total sampling. The sample size was obtained from all periodontal status cards of patients visiting the periodontics clinic at Airlangga University's Dental and Oral Hospital. This study has two criteria for sample selection: inclusion criteria (periodontal status cards of patients visiting the periodontics clinic at Airlangga University's Dental and Oral Hospital with examination data on periodontal tissue condition based on CPITN) and exclusion criteria (incomplete periodontal status cards, missing medical records, pediatric patients or those under 18 years old, CPITN score).

The variables used in this study include the CPITN score (Community Periodontal Index of Treatment Needs), which assesses the health of teeth and the oral cavity based on the presence of calculus and probing depth, with the following measurement outcomes: 0 for healthy, 1 for the presence of BOP (Bleeding on Probing), 2 for the presence of calculus, 3 for shallow pockets, and 4 for deep pockets. The second variable is the tooth area or sextant, which divides the oral cavity into six parts to describe the position of the teeth or specific areas in the oral cavity, with measurement outcomes ranging from sextant 1 to sextant 6. The third variable is gender, distinguishing individuals based on biological and physiological differences that determine reproductive characteristics, with categories of male and female. The final variable is age group, which describes the period of time that has elapsed since an individual's birth, measured in years, with age categories divided into: 18-24 years, 25-34 years, 35-44 years, 45-54 years, 55-64 years, and 65 years and above.

The recording of patient periodontal status cards that meet the inclusion criteria is followed by sampling using the total sampling technique from all periodontal status cards in the periodontics clinic at Airlangga University's Dental and Oral Hospital in 2022. After sample collection and recording, data processing and analysis were conducted. Data processing in this study used Microsoft Excel and was presented in percentage (%). The obtained data were analyzed based on sextant, gender, age, and CPITN score.

3 Results and discussion

In this study, data from periodontal clinic visits in 2022 were obtained, totaling 1,573 samples. These data were then processed, resulting in 716 samples of patients who visited the periodontal clinic in 2022. Data accumulation was done using Microsoft Excel, and it was found that there were 149 samples of medical records with periodontal supplements. The next step involved data exclusion based on several criteria, such as medical records from visits other than 2022, incomplete periodontal supplements, medical records of patients under the age of 18, and medical records of patients whose CPITN score was not examined.

In the process of excluding medical records from visits other than 2022, 35 samples were found, followed by the exclusion of 10 samples that lacked periodontal supplements. Exclusion of medical records for patients under 18 years of age resulted in the exclusion of 2 samples. Lastly, exclusion related to medical records of patients whose CPITN was

not examined yielded 5 samples. The analysis of data exclusions showed that after data processing, 82 samples of medical records met the inclusion criteria.

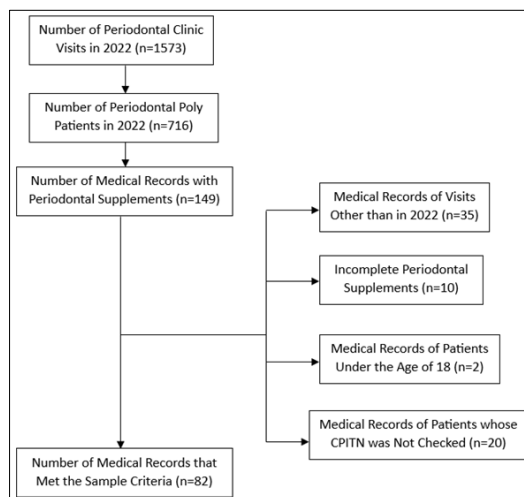


Figure 1 Sample data collection scheme

1.1. Overview of CPITN Based on Scores

The CPITN scores range from 0 to 4. The data processing results show that a score of 0 was found in 27 samples (5.51%), a score of 1 in 47 samples (9.57%), a score of 2 in 211 samples (42.97%), a score of 3 in 197 samples (40.12%), and a score of 4 in nine samples (1.83%) from a total of 491 samples obtained.

Table 1 Overview of CPITN based on scores.

Score	Amount	Percentage
0	27	5.51
1	47	9.57
2	211	42.97
3	197	40.12
4	9	1.83
Total	491	100

1.2. Overview of CPITN Scores Based on Sextants

The data processing of CPITN scores based on sextants is grouped into sextant 1, sextant 2, sextant 3, sextant 4, sextant 5, and sextant 6. In sextant 1, the score of 0 was found in two samples (2.44%), score 1 in 11 samples (13.41%), score 2 in 39 samples (42.56%), score 3 in 29 samples (35.37%), and score 4 in one sample (1.22%) of the total samples obtained from sextant 1. In sextant 2, the score of 0 was found in seven samples (8.54%), score 1 in six samples (7.32%), score 2 in 30 samples (36.58%), score 3 in 38 samples (46.34%), and score 4 in one sample (1.22%) of the total samples obtained from sextant 2. In sextant 3, the score of 0 was found in three samples (3.71%), score 1 in five samples (6.17%), score 2 in 38 samples (46.91%), score 3 in 33 samples (40.74%), and score 4 in two samples (2.47%) of the total samples obtained from sextant 3. In sextant 4, the score of 0 was found in three samples (3.66%), score 1 in eight samples (9.76%), score 2 in 34 samples (41.46%), score 3 in 35 samples (42.68%), and score 4 in two samples (2.44%) of the total samples obtained from sextant 4. In sextant 5, the score of 0 was found in six samples (7.32%), score 1 in eight samples (9.76%), score 2 in 35 samples (42.68%), score 3 in 31 samples (37.80%), and score 4 in two samples (2.44%) of the total samples obtained from sextant 5. In sextant 6, the score of 0 was found in six samples (7.32%), score 1 in nine samples (10.98%), score 2 in 35 samples (42.68%), score 3 in 31 samples (37.80%), and score 4 in one sample (1.22%) of the total samples obtained from sextant 6.

Table 2 Overview of CPITN scores based on sextants.

CPITN Score	Sextants											
	1		2		3		4		5		6	
	J	%	J	%	J	%	J	%	J	%	J	%
0	2	2.44	7	8.54	3	3.71	3	3.66	6	7.32	6	7.32
1	11	13.41	6	7.32	5	6.17	8	9.76	8	9.76	9	10.98
2	39	47.56	30	36.58	38	46.91	34	41.46	35	42.68	35	42.68
3	29	35.37	38	46.34	33	40.74	35	42.68	31	37.80	31	37.80
4	1	1.22	1	1.22	2	2.47	2	2.44	2	2.44	1	1.22
Total	82	100	82	100	81	100	82	100	82	100	82	100
Mean	2,20		2,24		2,32		2,30		2,18		2,15	

Description: J = Number of samples;% = Percentage; Mean = Average score for each sextant.

1.3. Overview of CPITN Scores Based on Gender

In the overview of CPITN scores based on gender with a total of 82 inclusion samples, 30 samples were from males (37%) and 52 samples were from females (63%).

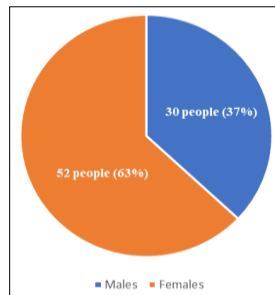


Figure 4 Frequency distribution of samples based on gender

The data processing results of CPITN scores based on gender show 180 samples from the male group and 311 samples from the female group. In the male group, a score of 0 was found in one sample (0.56%), score 1 in eight samples (4.44%), score 2 in 112 samples (62.22%), score 3 in 57 samples (31.67%), and score 4 in two samples (1.11%) of the total samples obtained from the male group. In the female group, a score of 0 was found in 26 samples (8.36%), score 1 in 39 samples (12.54%), score 2 in 99 samples (31.83%), score 3 in 140 samples (45.02%), and score 4 in seven samples (2.25%) of the total samples obtained from the female group.

Table 2 Overview of CPITN scores based on gender

CPITN Score	Males		Females	
	Total Sample	Percentage (%)	Total Sample	Percentage (%)
0	1	0.56	26	8.36
1	8	4.44	39	12.54
2	112	62.22	99	31.83
3	57	31.67	140	45.02
4	2	1.11	7	2.25
Total	180	100	311	100

1.4. Overview of CPITN Scores Based on Age Group

In the overview of CPITN scores based on age, with a total of 82 inclusion samples, the following distribution was obtained: 28 samples (34%) were from the 18-24 age group, 17 samples (21%) were from the 25-34 age group, 15 samples (18%) were from the 35-44 age group, 12 samples (15%) were from the 45-54 age group, 9 samples (11%) were from the 55-64 age group, and 1 sample (1%) was from the age group of 65 years or older.

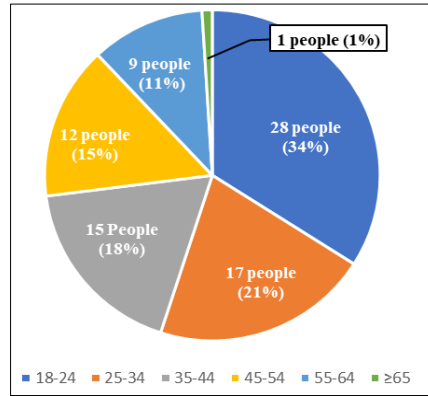


Figure 6 Frequency distribution of samples based on age group

The data processing of CPITN scores based on age group was divided into the following age ranges: 18-24, 25-34, 35-44, 45-54, 55-64, and 65 years or older. In the 18-24 age group, score 0 was found in 10 samples (5.95%), score 1 in 17 samples (10.12%), score 2 in 79 samples (47.02%), score 3 in 55 samples (32.74%), and score 4 in 7 samples (4.17%) from a total of 168 samples. In the 25-34 age group, score 0 was found in 13 samples (12.75%), score 1 in 11 samples (10.78%), score 2 in 45 samples (44.12%), score 3 in 33 samples (32.35%), and no score 4 was found (0%) from a total of 102 samples. In the 35-44 age group, score 0 was found in 1 sample (1.11%), score 1 in 3 samples (3.33%), score 2 in 38 samples (42.22%), score 3 in 47 samples (52.22%), and score 4 in 1 sample (1.11%) from a total of 90 samples. In the 45-54 age group, score 0 was found in 2 samples (2.78%), score 1 in 5 samples (6.94%), score 2 in 24 samples (33.33%), score 3 in 41 samples (56.94%), and no score 4 was found (0%) from a total of 72 samples. In the 55-64 age group, score 0 was found in 1 sample (1.89%), score 1 in 11 samples (20.75%), score 2 in 21 samples (39.62%), score 3 in 19 samples (35.85%), and score 4 in 1 sample (1.89%) from a total of 53 samples. In the age group of 65 years or older, no score 0, 1, or 4 was found. However, score 2 was found in 4 samples (66.67%) and score 3 in 2 samples (33.33%) from a total of 6 samples.

Table 3 Overview of CPITN scores based on age groups

Score	Age (Years)											
	18-24		25-34		35-44		45-54		55-64		≥65	
	J	%	J	%	J	%	J	%	J	%	J	%
0	10	5.95	13	12.75	1	1.11	2	2.78	1	1.89	0	0
1	17	10.12	11	10.78	3	3.33	5	6.94	11	20.75	0	0
2	79	47.02	45	44.12	38	42.22	24	33.33	21	39.62	4	66.67
3	55	32.74	33	32.35	47	52.22	41	56.94	19	35.85	2	33.33
4	7	4.17	0	0	1	1.11	0	0	1	1.89	0	0
Total	168	100	102	100	90	100	72	100	53	100	6	100

Description: J = Number of samples; % = Percentage

2. Discussion

This study is a descriptive study that involves collecting data from medical records taken at Dental and Oral Hospital (RSGM) Airlangga University on visits to the periodontal clinic in 2022. The total sample obtained was 1573 data. Then

data selection was carried out to get the number of periodontal poly patients in 2022, which finally reached 716 data. From data collected, data sorting was carried out with the exception of exclusion of medical records that did not meet the sample criteria, such as medical records of visits in years other than 2022, incomplete periodontal supplements, medical records of patients with age below 18 years old or without age information, and medical records of patients whose CPITN was not examined. The results of the exclusion of data that did not meet the criteria 82 samples were obtained that met the predetermined sample criteria set.

This study was conducted to describe the periodontal treatment needs required by patients who come to the periodontal clinic of Dental and Oral Hospital (RSGM) Airlangga University in the span of January-December 2022. Medical records patients who were taken as research samples amounted to 82 samples consisting of 52 female patients and 30 male patients. While in the factor of age group age group, obtained samples from 18-24 years of age as many as 28 patients, 25-34 years of age 17 patients, age 35-44 years as many as 15 patients, age 45-54 years as many as 12 patients, 55-64 years of age as many as nine patients, and 65 years of age or more as many as one patient.

Overall, only about 5.5% of the sample had a healthy periodontal condition and did not need treatment. This is shown by the data in table 4.1. While most of the samples had a CPITN score of 2, namely as many as 211 samples (42.97%). CPITN score 2 indicates the presence of supragingival and subgingival calculus and requires treatment in the form of OHI maintenance and tartar cleaning. This is supported by research conducted by Ermawati et al. (2015) that the most common condition is CPITN score 2 either with bleeding or not.

The difference in average scores for each sector is shown in table 4.2. The highest CPITN mean score belongs to sextant 3 at 2.32 which is the left posterior part of the maxilla. This indicates that the area has poor condition and is an indication of an area that is difficult to clean. While sextant 5 which is the anterior part of the mandible has a score of 2.18. The teeth located at the anterior of the mandible are the teeth that are used to cut food so that the amount of food debris is less left behind and easy to clean because it is more left behind and are easy to clean because they are more visible and easily reached by a toothbrush [9]. The highest number of scores on each sextant is also shown in table 4.2. In this study, it was found that the most healthy gingiva (CPITN score 0) was owned by sextant 2 (8.54%) which is in line with research conducted by Tanik (2019). In this study also showed the results in the left region, namely sextant 3 and sextant 4 had a worse condition than the left region consisting of sextant 1 and sextant 6 which can be caused by more patients experiencing tooth loss in the right region so that the missing teeth are not included in the calculation of the CPITN score.

The results showed that more women had a CPITN score of 0, namely 26 samples out of a total of 311 samples (8.36%) compared to men, namely only one sample out of a total of 180 samples (0.56%). For CPITN score 1, the number of samples in women is more than men, namely 39 samples (12.54%) of the total female sample, while the sample in men amounted to eight samples (4.44%) of the total male sample. This is not in line with research conducted by Fidyawati & Septnina (2022), which found that the number of men who had a CPITN score of 1 was higher than that of women. However, research conducted by Tanik (2019) has the same results as this study, which found that the number of women who have score 0 and score 1 is higher than men.

For CPITN score 2, this study found that the number of samples in men was more than women, namely 112 samples out of a total of 180 samples (62.22%), while in women there were 99 samples out of 311 samples (31.83%). These results are in accordance with research conducted by Karaaslan et al. (2019), that the number of men who have a CPITN score of 2 is more than women. However, this is not in accordance with the research of Tanik (2019) and Fidyawati & Septnina (2022), which found that women have more CPITN 2 scores than men.

In this study, 57 samples out of a total of 180 samples (31.67%) had a CPITN score of 3 in men and 140 samples out of a total of 311 samples (45.02%) in women who had a CPITN score of 3. While the CPITN score of 4 was obtained by two out of 180 samples (1.11%) in men and seven out of 311 samples (2.25%) in women. This is not in line with research conducted by Tanik (2019), Karaaslan et al. (2019), and Fidyawati & Septnina (2022), who said that men have higher CPITN 3 scores and CPITN 4 scores than women.

Based on this study, the severity of periodontal disease by gender has not been proven, but many studies have noted that periodontal tissue health conditions in women are better than in men [3]. The cause of the difference in treatment needs between women and men is uncertain and can be caused by several factors, including the level of individual awareness to maintain oral hygiene and health [5]. The worse condition of women's periodontal tissues compared to men can be caused by hormonal imbalances in the menstrual cycle, puberty, and pregnancy which cause excessive gingival tissue response to local irritation. The fluctuating levels of estrogen and progesterone in a cycle play a role in

increasing the number of plaque bacterial colonies. Estrogen hormones can affect gingival tissue in the form of inflammation, proliferation of anaerobic bacteria, increased vascular permeability, and decreased keratinization of epithelial cells [11].

The prevalence of periodontal disease increases with age. In elderly individuals, attachment loss, plaque formation and dental calculus increase [8]. In the data processing of the description of the CPITN score based on the age group of this study, it was found that the highest CPITN score in the 35-44 age group was score 3, which amounted to 47 samples (52.22%) of the total 90 samples. In the 45-54 age group, the highest CPITN score obtained was score 3, totaling 41 samples (56.94%) out of a total of 72 samples. The highest CPITN score in the 55-64 age group was score 2, which amounted to 21 samples (39.62%) out of a total of 53 samples. Meanwhile, in the age group of 65 years or above, the highest CPITN score was score 2, totaling four samples (66.67%) out of a total of six samples. This is not in line with research conducted by Karaaslan et al. (2019) which found that the highest CPITN score in all age groups was score 4. Meanwhile, research conducted by Tanik (2019) also did not have the same results as this study, he found that each age group had the most CPITN scores with score 1. The low number of score 3 and score 4 in the older age group can be caused by tooth loss after extraction due to tooth decay and other periodontal reasons [13]. In the age group above 65 years, there was one patient and in fact the patient only had CPITN scores of 2 and 3, so this could affect the results obtained that in this study no older age was found to have poor periodontal tissue health.

In the data collection that has been carried out, out of a total of 716 medical records, only 82 medical records can be used as data for this study. This was due to several research limitations such as the amount of medical record data that was missing or not in accordance with visit records, as well as inadequate completeness and suitability of periodontal supplement criteria. The impact of these limitations affects and causes biased results so that many are not in accordance with the theory. The data used in this study only includes a description of CPITN in patients of the periodontal clinic of Dental and Oral Hospital (RSGM) Airlangga University, so that the results obtained are not a complete picture of CPITN which requires an adequate number of research samples and a broad scope such as CPITN examinations throughout Surabaya, the province, or the upper level in order to be a representative sample.

3. Conclusion

From this research, patients in the periodontics clinic at Airlangga University's Dental and Oral Hospital in 2022 had the worst CPITN score in sextant 3, with an average score of 2.32. The most common CPITN score among patients was score 2. The most frequent CPITN score for female patients was score 3, with a percentage of 45.02%, while for male patients, it was score 2, with a percentage of 62.22%. Patients in the age groups 18-24, 25-34, 55-64, and 65 years or older had CPITN score 2 as the most common score, while patients in the 35-44 and 45-54 age groups had CPITN score 3 as the most frequent score.

Compliance with ethical standards

Disclosure of conflict of interest

No conflict of interest to be disclosed.

Statement of informed consent

Informed consent was obtained from all individual participants included in the study.

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