Association Of Dental Plaque And Periodontal Diseases Among Outpatients - A Record Based Study

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Abstract :Aim:The aim of this study was to associate plaque and periodontal diseases among outpatients. Materials and methods:This was a comparative, descriptive study, where all the data of the patients who reported to the dental clinics in saveetha dental college, SIMATS, Chennai, India, was obtained from the department of public health dentistry. Patient records of plaque index score and periodontal index scores between June 2019 and March 2020. were reviewed and analysed from April - June, 2020. Data was collected and tabulated. The collected data was further analyzed, recorded in microsoft excel software and was subjected to statistical analysis using IBM SPSS statistics analyzer.Results:

The total sample size of the current study was 158 cases. The most common age group that was observed was 36 to 50 years with 43.7 %. A male predilection was seen with males making up 63.9 % of the study population. Most commonly seen periodontal index score interpretation was established destructive periodontal disease with 51.9 %. Most prevalent plaque score interpretation was a fair plaque score with 55.1 % of the population. It was also observed that a fair plaque score was more commonly present in established destructive periodontal disease in 59.7 % of the cases. In this study we observed that there was a significant relation between the plaque and periodontal index scores among outpatients. [p value < 0.05] [p = 0.008] obtained through chi square test.

Conclusion:Within the limitations of the current study, we observed that fair plaque score was found to be more common prevalent among participants with established periodontal disease and this association was not statistically significant.

Keywords: calculus; gingiva; Index; periodontal disease; periodontium; plaque; score.

1. INTRODUCTION:

Periodontal disease is the inflammation of the supporting tissue of the teeth caused by a specific microorganism or a group of microorganisms which results in the progressive

destruction of the periodontal ligament and alveolar bone with increasing probing depth formation, recession or both [1]. The dental plaque is a specific but highly variable structural entity, resulting from sequential colonization of microorganisms on tooth surfaces, restorations and other parts of the oral cavity, composed of salivary components like mucin, desquamated epithelial cells, debris and microorganisms, all embedded in extracellular gelatinous matrix   (WHO - 1961). This periodontal disease presents deleterious manifestations in the oral cavity which gradually affects the oral health [2]. One of the major reasons for the formation of periodontal disease is due to plaque. Plaque results in chronic inflammation of the periodontal tissue and progressively destroying the periodontal tissue that supports the teeth. Periodontal disease is one of the most prevalent oral diseases and is present widely in both developed and developing countries [3,4]. Due to rapid westernisation and changing lifestyles and dietary habits [5] there has been a growth in the number of cases presenting with periodontal diseases [6]. As mentioned before, the dental plaque is an organised biofilm that acts as a reservoir for microorganisms leading to periodontal disease [7]. Regularity in the dental visits by individuals also determines their periodontal health [8]. In our current study we will be using certain indices, namely the plaque index and Russell's periodontal index. The index is a tool which assesses the relative status of a population by utilising numerical values [9]. Prevention of plaque formation is always preferred as the removal and control of dental plaque is technically difficult and is time consuming [10].

On assessment of previous literature, we observed that the most common risk factors for periodontal disease include smoking [11], poor oral hygiene [12,13], diabetes, diet [14,15], age, medication [16], hereditary, trauma [17], stress [18–20]. We observed that periodontal disease was the most common oral condition present in the world [21,22]. The first attempts at the measurement of periodontal disease was done in the late 1950's by Russell AL et al which led to the creation of Russell's periodontal index [23,24]. The measurement of loss of attachment was determined as the gold standard for assessment of periodontal disease [25,26]. There is no pre existing literature which relates dental plaque and periodontal index scores. The requirement of the current study is due to the excessive lack of use of indices in the assessment of periodontal disease [27].
The main aim of this study was to find the association between plaque and periodontal diseases among outpatients.

2. MATERIALS AND METHODS:
The data of the patients who reported to the dental clinics of Saveetha dental college and hospitals, India was obtained from the department of public health dentistry using patient records. The data of the patients who have undergone both plaque and periodontal index readings were taken for this research study and were further reviewed and analysed from April to June, 2020.
This was a university setting and the research study was conducted in the dental clinics of saveetha dental college . This setting came with a variety of pros and cons. The pros included the presence of a versatile population and an abundant availability of data. Some of the cons included the study taking place in anunicentred setting and possessing a very limited demographic details. The selection of the study population was performed at random . This population was selected from the patients who visited the undergraduate and postgraduate dental clinics in saveetha dental college. The inclusion criteria for this study were outpatients who underwent both plaque and periodontal index readings. The exclusion criteria were outpatients who did not undergo any index readings or underwent only one index reading. The Dependent variables for this study included periodontal disease whereas the independent variables consisted of the age, gender and plaque scores of the subject.

Analysis done in the study was association type of analysis. The approval to undertake this research study had been approved by the ethical board of saveetha university. Sample collection period was set from June 2019 to March 2020. Totally 158 case sheets were reviewed and cross verification was performed by an additional reviewer. The minimisation of sample bias was performed by an additional reviewer, acquiring all the data from within the university and as an additional measure. There was a presence of high internal validity as the indices were standardised and low external validity as the results were not generalisable.

The data was then arranged in a methodical manner using microsoft excel software and was tabulated on the basis of 4 parameters, namely the age of the subject, gender of the subject, periodontal index score and plaque index score . The data was validated by an additional reviewer. Any incomplete or censored data that was present in the collected data was excluded from the study.

Statistical analysis of the compiled data was performed using IBM SPSS statistical analyzer. Chi square test was done for statistical analysis.

3. RESULTS:

The total sample size of the current study was 158 cases. In the current research study it was observed that a insignificant relation between the plaque and periodontal index scores was present among the patients visiting the dental clinics. We obtained p value as 0.521 through the chi square test which shows the results to be significant. Collection of the data for the study was based upon the parameters mentioned previously namely, age, gender, interpretation of periodontal index score and interpretation of plaque index score . Graph-1 explains about the age wise distribution of the study population. The total sample size of this study was 159 cases out of which, the most common age group was 36 to 50 years with 43.7 % (69) , followed by 51 to 70 years with 32.9 % (52) and finally 18 to 35 years with 23.4 % (37).

Graph-2 demonstrated the gender wise distribution of the study population. We observed that out of 158 cases, more male prediction was observed with 63.9 % (101) and females with 36.2 % (57).

Graph-3 explains the distribution of the study population based on the periodontal index score interpretation among the study population we observed that most commonly present was established destructive periodontal disease with 51.9 % (82) followed by beginning destructive periodontal disease with 28.5 % (45), simple gingivitis with 9.5 % (15), Terminal disease with 8.9 % (14) and finally normal state with 1.3 % (2).

Graph-4 showed the distribution of the study population on the basis of plaque index score. Among the study population we saw that a fair plaque score was the most common with 55.1 % (87) followed by a good plaque score with 25.9 % (41) and finally a poor plaque score with 19.1 % (30).

Table-1 demonstrates the association of plaque index scores and periodontal index scores. Here we observed that a fair plaque score was more commonly present in established destructive periodontal disease in 59.7 % of the cases.

4. DISCUSSION:

Primary preventive measure is one of the most effective and least invasive means to ensure complete protection of the tooth structures and surrounding periodontium as microbial plaque can also lead to the formation of dental caries [28,29]. physico-chemical quality of the water in the local water bodies that people may use for their daily activities could also influence the presence of periodontal disease, but further research is required in order to confirm this [30]. The most common age group that was observed was 36 to 50 years with 43.7 %. A male

predilection was seen with males making up 63.9 % of the study population. We also found that patients in the age group of 36 to 50 years were 0.5 times more compared to the age group of 18 to 35 years. The reasons for this could include, poor oral hygiene or the deterioration of tissues as the person advances in age. We also found that the male population was 0.5 times more than the female population. The reason for this may be due to the presence of deleterious habits in males, but further research is required in order to prove this. Most commonly seen periodontal index score interpretation was established destructive periodontal disease with 51.9 %. We also observed that the established destructive periodontal disease was present 40 times more than normal gingiva. Most prevalent plaque score interpretation was a fair plaque score with 55.1 % of the population. We also found that a fair plaque score was observed 2.8 times more than a poor plaque score. It was also observed that a fair plaque score was more commonly present in established destructive periodontal disease in 59.7 % of the cases.

In the current era there is increased universal accessibility to information. The dentist should be able to possess the knowledge and skill in order to identify and treat these problems associated with the oral cavity such as in this case with plaque and periodontal diseases and also be able to educate the patient about the potential harm these conditions could cause [31,32].

On the assessment of previous literature, we found that certain studies which support our study findings with similar results and also other studies which possess findings which contradict the ones in our current study. In a study performed by Lertpimonchai et al, we found that the presence of a poor to fair plaque score increases the risk of periodontal disease which is in concordance with the current study [33]. Likewise in a study performed by Rocha et al we found that among the study population the most common findings were a fair plaque score which resembles the current study [34]. In another study performed by Arora et al, the study population, most commonly demonstrated established destructive periodontal disease interpretation which is in concordance with our study [35].

Some amount of the contradicting evidence was observed in studies such as the one conducted by Rodan et al where the most commonly observed plaque score was poor [36]. Likewise in a study performed by Lilienthal et al, the most commonly observed plaque score was good [37]. In another study performed by Deepal et al, we saw that the most common periodontal score interpretation was simple gingivitis [38]. Although dentists constitute an important aspect of the health team, their capacity has not been stressed. Dentists can successfully aid in the elimination of periodontal diseases among the indian population [39].

 The Limitations that this study presented was the presence of a smaller sample size along with the study being a unicentred study with a limited demographic and a lack of variety in the collected data. The future scope is that this study could also pave way for newer research with improved assessment and prevention of periodontal diseases which will lead to better treatment prognosis .

5. CONCLUSION :

Within the limitations of the current study, we observed that fair plaque score was the most prevalent among patients with established destructive periodontal disease and terminal disease. There exists no significant association between fair plaque score and established periodontal disease.

6. ACKNOWLEDGEMENT:

AUTHORS CONTRIBUTION:

Author 1 (Chris Noel Timothy), carried out the present study by collecting data and drafted the manuscript after performing the necessary statistical analysis. Author 2 (L. Leelavathi), aided in the conception of the topic, has participated in the study design, statistical analysis and has supervised the preparation of the manuscript. Author 3 (Suresh V), has participated in the study design and has coordinated in developing the manuscript. All the authors have discussed the results among themselves and contributed to the final manuscript.

CONFLICT OF INTEREST:

The authors declare that there were no conflicts of interest in the present study

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LIST OF TABLES AND FIGURES :
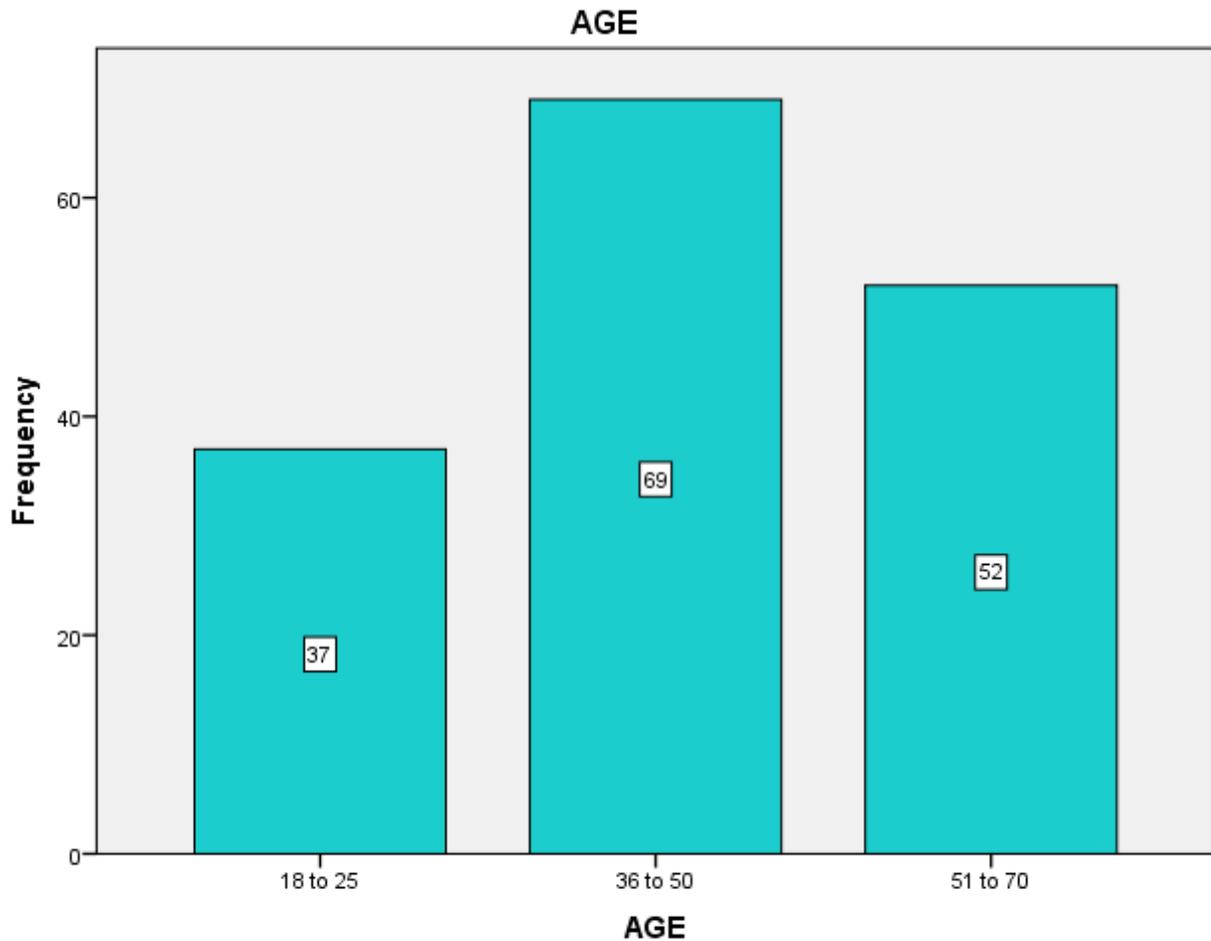
FIGURE 1: Bar graph showing age wise distribution of the study population with age in x axis and frequency in y axis. Nearly 43.7 % of the study population was found to be in the age group of 36 to 50 years which is the most common followed by 51 to 70 years with 32.9 % and 18 to 25 years with 23.4 %.
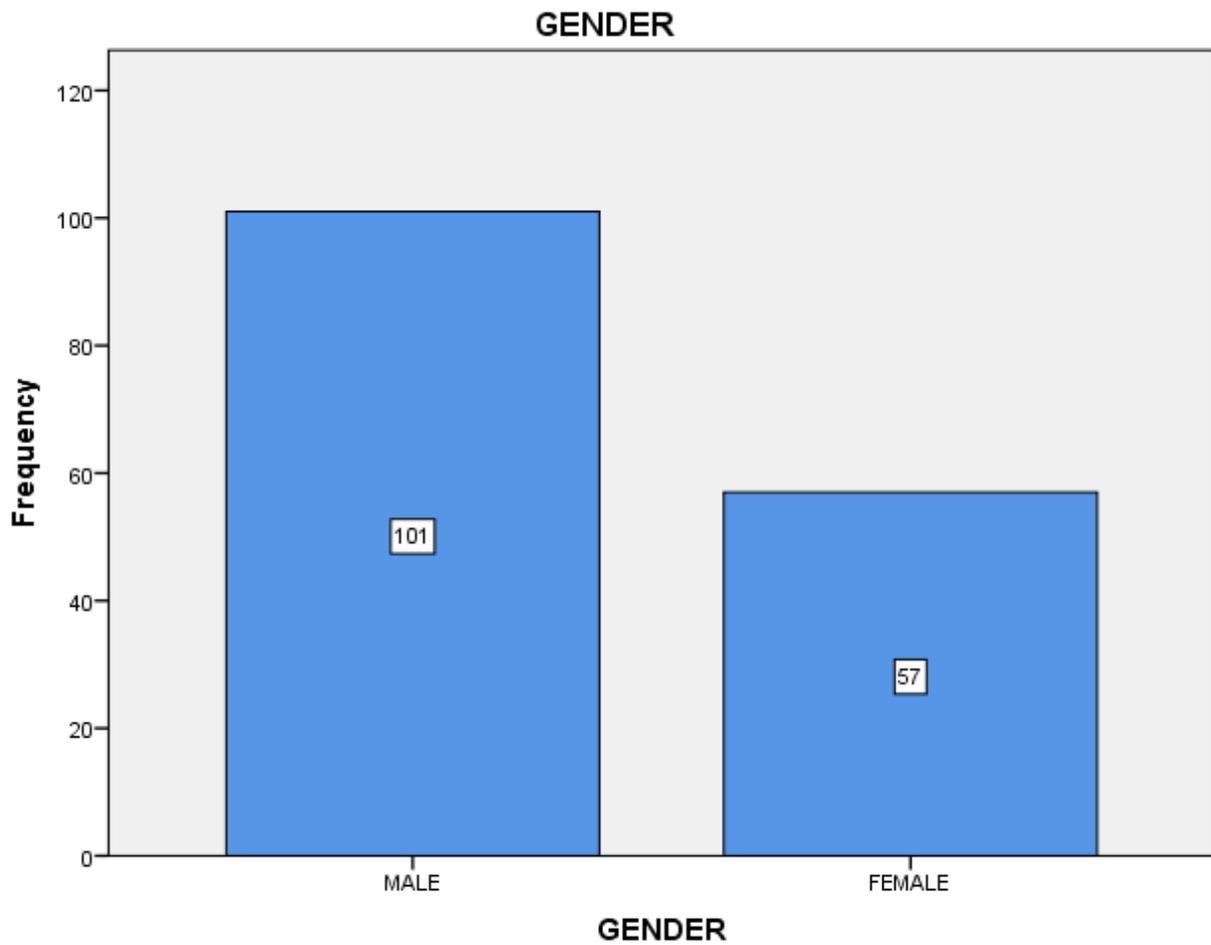
FIGURE 2: Bar graph showing gender wise distribution with gender in x axis and frequency in y axis. Nearly 63.9 % of the study population was found to be male which is the most common followed by female with 36.1 %.
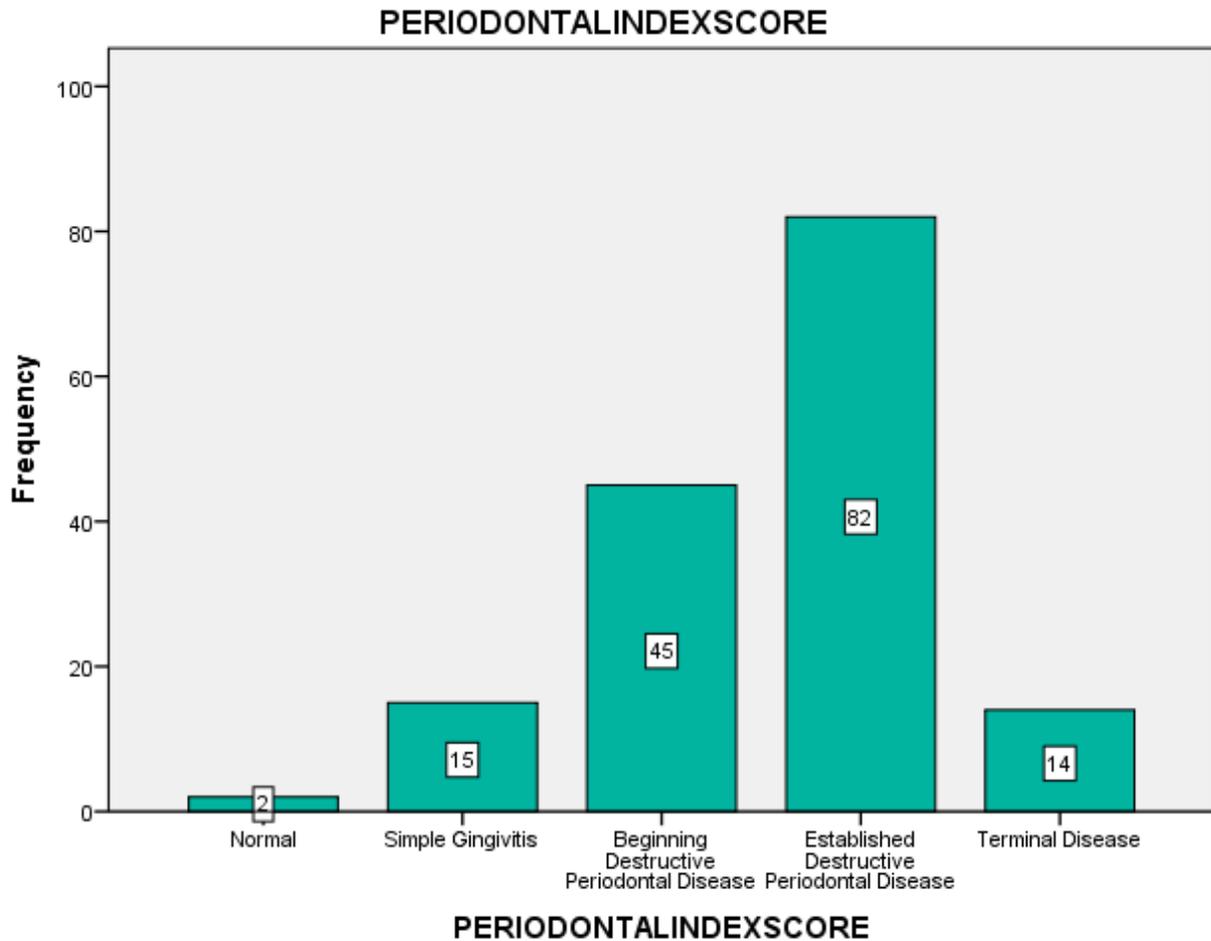
Figure 3: Bar graph showing distribution of study population on the basis of periodontal index score with periodontal index score in y axis and frequency in x axis. Established destructive periodontal disease was the most common periodontal index score (51.9%).

Figure 4: Bar graph showing distribution of study population on the basis of plaque index score with plaque index score in x axis and frequency of study population in y axis. Nearly 55.1 % of the plaque index score was found to be fair which is the most common plaque score.
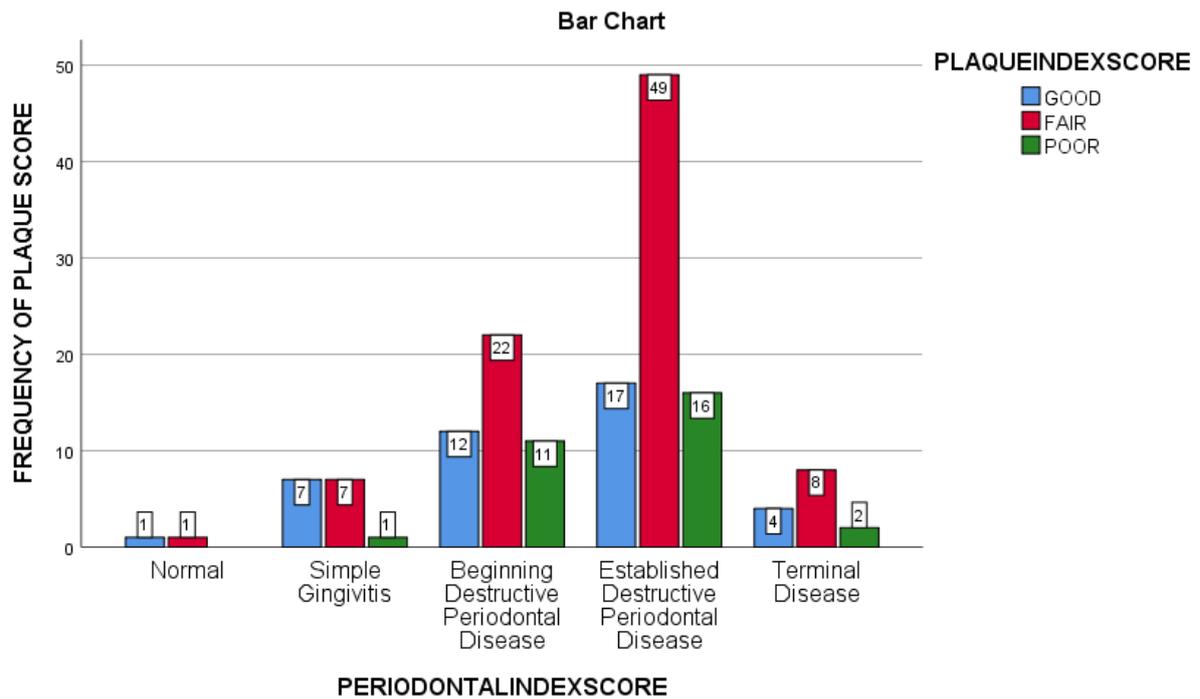
FIGURE 5: Bar graph represents the association between the plaque index scores and periodontal index scores interpretation. X- axis represents the periodontal index score interpretation and Y- axis represents the frequency of plaque score interpretation. A fair plaque score was more common among subjects with established destructive periodontal disease and terminal disease. Chi- square test was done and association was found to be not statistically significant .(Pearson's Chi- square value: 7.145, p value: 0.521 (>0.05). Hence there is no relation between plaque and periodontal index scores interpretation.