Evaluation of risk of periodontitis in Children- A Retrospective Study

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ABSTRACT
Periodontitis is one of the most common recurring diseases in the oral cavity and is marked by the destruction of connective tissue and alveolar bone support which provokes an inflammatory host response following infection by periodontal microorganisms. Periodontal diseases have greater importance in public health globally due to increased prevalence rates and distinguishable social impact on oral health. The aim of this present study is to assess the risk of periodontitis in children. This is a university setting study. One hundred children were randomly selected who reported to Saveetha Dental College. The factors which were assessed are periodontal status, medical condition and oral hygiene status of the children and compared. Out of 100 children, 54% were males and 46% were females. Periodontal disease was present in 17% of the study population. There was a positive correlation between periodontal disease and oral hygiene index. Oral hygiene was compromised in children with periodontitis when compared with other children (p=0.001). No significant association was found between periodontal status and medical condition (p>0.05). Within the limits of the present study, it is observed that periodontal disease has a strong association with the oral hygiene of the children.

INTRODUCTION
Periodontitis is one of the most common recurring diseases in the oral cavity and is marked by the destruction of connective tissue and alveolar bone support which provokes an inflammatory host response following infection by periodontal microorganisms (Zhang et al., 2009). Severe periodontitis may result in the loss of a tooth from the oral cavity, which occurs in 5 to 20% of the population globally (Albandar, 2002). Periodontal diseases have greater importance in public health globally due to increased prevalence rates and distinguishable social impact on oral health. Recently periodontal diseases have been linked to general population health (Tonetti et al., 2015). Dental plaque is considered to be a risk factor for the initiation and development of periodontal disease (Marsh, 2012). Variety of organisms comprise the dental plaque biofilm collected from oral surfaces (Kornman, 2008). Accumulation of plaque deposits on
the marginal gingiva initiates gingival inflammation that can become chronic on the long run (Caton, 2018). This inflammatory condition is characterised by gingival redness, edema and bleeding on probing, initially called gingivitis which later progresses to periodontitis where alveolar bone loss, loss of attachment and mobility are observed (Newman et al., 2011). Children and adolescents are prone to several forms of periodontitis such as aggressive periodontitis, chronic periodontitis and periodontitis which occurs as a manifestation of systemic diseases (Trombelli et al., 2018). There are two types of risk factors that are associated with periodontitis (Haynes and Stanford, 2003). They are known as modifiable and non-modifiable risk factors. Evidence is reviewed in several studies on the possible roles of modifiable and non-modifiable risk factors associated with periodontitis (Armitage, 1999). Proper knowledge on risk factors is vital for clinical practice (Genco and Sanz, 2020). Modifiable risk factors include various microbial flora and periodontal disease, cardiovascular diseases, diabetes mellitus, stress, obesity and drug-induced diseases and tobacco smoking (Buduneli, 2020). Non-modifiable risk factors include osteoporosis, host response, haematological disorders. Periodontitis is associated with multiple factors and effective periodontal disease management requires a clear understanding of all associated risk factors which include both modifiable and non-modifiable risk factors. Periodontitis when occurring in children leads to premature loss of the tooth, affecting the quality of life, resulting in lower self-esteem. Thus screening paediatric patients, early for periodontitis is of utmost importance which results in its early management and improved prognosis. This study therefore acknowledges risk factors of periodontitis in children which therefore educates dental students in early diagnosis and prompt treatment to avoid tooth loss due to periodontitis (Jeevanandan, 2017; Govindaraju et al., 2017b,c).

Previously our team had conducted numerous clinical trials (Somasundaram, 2015; Jeevanandan and Govindaraju, 2018; Govindaraju et al., 2017a) and in vitro studies (Subramanyam, 2018) and systematic reviews (Packiri, 2017; Ramakrishnan and Shukri, 2018) over the past five years. Now we are focussing on epidemiological surveys. The idea for this survey stemmed from the current interest in the community (Ravikumar et al., 2017; Panchal, 2019; Christabel, 2015). The aim of this study is to access the risk of periodontitis in children by evaluating oral hygiene index and medical condition (Gurunathan and Shamugavel, 2016; Govindaraju, 2017; Nair et al., 2018).

MATERIALS AND METHODS

Study setting

It is a university setting study, conducted in Saveetha Dental College predominantly. The pros of the study are easy retrieval of data, less time consumption. The cons of the study include it is limited to certain populations. Children aged between 5-10 years were selected randomly. Medically compromised children were excluded from the study. Approval was obtained from the Department of Pediatric and Preventive Dentistry, Saveetha Institute of Medical and Technical Sciences. Two examiners were involved.

Sampling

It is a retrospective study. Data were collected from July 1,2019 to March 31,2020. Cross verification of data for errors was done through photographs and the presence of additional reviewers. Simple random sampling was done to minimise sampling bias. Eligibility criteria of the sample were defined. One hundred case sheets were reviewed.

Data Collection

Data was collected after reviewing case records of patients. The data included periodontal status, medical condition and oral hygiene index. Data were entered in a methodical manner in Microsoft Excel and was imported to SPSS. Incomplete or censored data were excluded from the study.

Analytics

Statistical software IBM SPSS 2.0 software was used to analyse the results. Independent variables include time, geographic location. Dependent variables include age, brushing frequency, periodontal status, oral hygiene status, medical condition. Descriptive statistics were used to analyse the age and gender distribution of the study population. Chi-square test was used to find the association between periodontal disease and medical condition and periodontal disease and oral hygiene index.

RESULTS AND DISCUSSION

In relation to the gender distribution of the study population, it was found that out of 100 children, 54% were males and 46% were females [Figure 1]. In relation to the periodontal status of the study population, it was seen that out of 100 children, 17% had periodontitis and 83% did not have periodontitis [Figure 2]. In relation to the association between periodontal status and medical condition it was seen that only 1% of the children with periodontal disease had medical conditions and it was not statistically significant ( Pearson Chi-square = 3.549, p =
In relation to the association between periodontal status and oral hygiene of the children, it was seen that in the case of periodontitis, oral hygiene was compromised when compared with children who did not have periodontitis. Most of them with periodontitis had fair oral hygiene. The results were statistically significant (Pearson Chi-square = 53.286, p = 0.000 (<0.05) [Figure 4 and Table 2].

Periodontitis is characterised by inflammation of soft tissue with evident clinical attachment loss (Nibali, 2018). Presence of periodontitis in children can be due to different food habits, presence of mixed dentition, improper and unsupervised oral hygiene practices and malocclusion (Hiremath et al., 2012). So the present study is to find an association of the periodontal disease with factors like oral hygiene and medical status of children.

Out of 100 children, 54% were males and 46% were females in the study population. Coming to the periodontal disease, 17% of the study population had periodontitis and 83% didn’t have periodontitis.

In relation to the association between periodontal disease and medical condition, in the present study, it was found that there was no association between periodontal disease and medical condition. Only 1% of the population of our study with periodontitis had medical conditions. Similar to our study, literature by Wang et al. (Wang, 2014) showed no association between periodontal disease and medical condition. However, literature by Zheng et al. and Deas et al. (Deas et al., 2003) were contradictory to the present study. The probable reason would be age limit, differing sample size and other factors like genetic disorders, socioeconomic status factors might have been included. In relation to the association between periodontal disease and oral hygiene index, there was a statistically significant association between periodontal disease and oral hygiene. In the case of periodontal disease, oral hygiene was compromised. Similar results were shown in studies of Needleman et al. (Needleman et al., 2001), Sharma et al. (Sharma et al., 2019), Felton et al. (Felton and Chapman, 2013). The reason is that improper brushing techniques, unsupervised oral hygiene practices, would have led to compromised oral hygiene, which would have caused plaque.

Figure 1: Bar depicts the gender distribution of the study population, where X-axis denotes the gender and Y-axis denotes the total number of patients.

Figure 2: Bar depicts the periodontal status of the study population where the X-axis denotes the periodontal status and Y-axis denotes the total number of patients.

Figure 3: Bar graph depicts the association between periodontal status and medical condition where the X-axis denotes the periodontal status and the Y-axis denotes the total number of patients.
Table 1: Association between periodontal status and medical condition. Only very few of the children with periodontal disease had medical conditions.

| Periodontal Status | Medical Condition | Total | Pearson Chi-square test P-value |
|--------------------|-------------------|-------|--------------------------------|
| present            | present           | 1     | 17                             |
|                    | absent            | 16    |                                |
| absent             | present           | 0     | 83                             |
|                    | absent            | 83    |                                |
| Total              |                   | 1     | 99                             |
|                    |                   | 100   |                                |

P-value >0.05 - Statistically not significant

Table 2: Association between periodontal status and oral hygiene index. Most of them with periodontitis had fair oral hygiene.

| Periodontal Status | OHI | Total | Pearson Chi-square test P-value |
|--------------------|-----|-------|--------------------------------|
| present            | good | 3     | 17                             |
|                    | fair  | 14    |                                |
| absent             | good | 81    | 83                             |
|                    | fair  | 2     |                                |
| Total              | good | 84    | 100                            |
|                    | fair  | 16    |                                |

*P-value <0.05 - Statistically significant

Figure 4: Bar depicts the association between periodontal status and oral hygiene of the children where the X-axis denotes the periodontal status and Y-axis denotes the total number of patients.

The limitations of this study include differing sample size, single centered and other factors like genetic disorders, socioeconomic status, host response would have been included.

The future scope of the study is to do an extensive research with large sample size. As periodontal disease in children could lead to premature loss of teeth. This study acknowledges the risk factors which will be helpful for the dentists in early diagnosis, prompt treatment, and better prognosis. Also, it helps in patients motivation, & educating them about the proper oral hygiene maintenance, tooth brushing techniques and devices to maintain proper oral health.

CONCLUSIONS

Within the limits of the study, it is observed that there is a strong association between periodontal disease and oral hygiene. However, it is found that there is no association between periodontal disease and medical condition. In the case of periodontal disease, there is compromised oral hygiene.

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Conflict of Interest

The authors declare that they have no conflict of interest for this study.

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