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The Association between Oral Hygiene Status and Dental Caries among Adolescent and Young Adults of Central Kerala Population-A Cross Sectional Study

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Abstract: *Introduction: The DMFT and OHI-S indexes are two of the most important quantitative factors, measuring tooth health and oral hygiene Aims and objectives: To evaluate the association between dental caries and oral hygiene status among young adults aged 18-25 years attending the Outpatient division of Government Dental College, Kottayam Methodology: A cross sectional study was conducted among 422 individuals. Caries experience was recorded and DMFT score was calculated on each patient; oral hygiene status was assessed using OHI-S Results: Majority of individuals with poor OHI-S scores had high and very high caries scores whereas a major percentage of individuals (78.3%) with good OHI-S scores were found to be caries free and none of them had a very high caries score. The association between OHI-S scores and caries scores were found to be statistically significant Conclusion: The findings of present study demonstrated that the caries scores were very high among those with poor oral hygiene and maximum number of caries free individuals had maintained a good oral hygiene*

Key words: *Dental Caries, DMFT, OHI-S, 18-25years old, Cross sectional study*

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I. Introduction

Oral health and general health are inseparable and oral cavity is the mirror which reflects general health. [1] Hence a healthy oral cavity is equally important. Dental caries is the most prevalent oral disease and affects both sexes, all races, socioeconomic groups & age groups [2].WHO pointed that the global problem of oral disease still persists despite great improvements in the oral health of population in several countries and claimed that poor oral health may have a profound effect on general health as well as quality of life

In the recent years, risk assessment has been a basic element of the prevention, control and treatment of dental caries. Different factors have been studied for their potential to act as indicators that may aid in the identification of populations or individuals at risk. These include sugar consumption, oral hygiene practices and socioeconomic status. The clinical presentation of dental caries is a net result of the interaction between the pathogenic dental plaque biofilm and the host tissue. [3] In the healthy state, both plaque biofilm and adjacent tissues maintain a delicate balance, however, changes occur during the disease process that transform this harmonious relationship. Hence control of plaque and debris is essential for the prevention of dental caries, because plaque is the primary etiological factor in the initiation and progression of the condition Even today, most preventive regimens are focused on mechanical plaque control procedures (tooth brushing and flossing). Chemical plaque control agents decreases the rate of new plaque accumulation, decrease or remove existing plaque, suppresses growth of pathogenic micro flora and inhibit the production of virulence factors. [4] OHI-S developed by John C Greene and Jack R Vermillion in 1964; a simplified version of oral hygiene index is useful in evaluating an individual's level of oral cleanliness. Hence the OHI-S scoring would provide a clear picture about the oral hygiene status of the individuals

The aim of the present study is to evaluate the association between dental caries and oral hygiene status among young adults aged 18-25 years. The study focuses on the adolescent children and young adults as they are particularly susceptible to dental caries and usually associated with poor oral hygiene due to lack of knowledge about the importance of preventive oral health practices, which in turn makes them reluctant in maintaining good oral health

II. Materials And Methods

A cross sectional study was conducted in the Outpatient division of Government Dental College, Kottayam among 18-25year old young adults with a sample size of 422. Ethical clearance was obtained from the Ethical committee of Government Dental College and the study was initiated.

2.1 INCLUSION CRITERIA: patients of age group 18-25years who were willing to participate and gave an informed consent

2.2 EXCLUSION CRITERIA:

- Patients suffering from debilitating diseases
- Physically or mentally challenged
- Unwilling to participate

After getting informed consent, data was collected using a validated questionnaire and dental examination was conducted. Patient was made to sit in a semi reclined position with adequate lighting and examination done using a standard mouth mirror, probe. Caries experience recorded using WHO criteria for oral health assessment [5] and a DMFT score was calculated on each patient. Severity of dental caries (DMFT) is categorized according to the WHO classification-: Nil, Low (1-2.9), moderate (3-5.9), high (6-8.9), very high (>=9) [6]

Oral hygiene status was assessed using OHI-S. It has two components- Simplified Debris index (DI-S) and the Simplified Calculus index (CI-S). The OHI-S scores range from 0 to 6 and are categorized as good (score 0.0 to 1.2), fair (score 1.3 to 3.0) and poor (score 3.1 to 6.0) [7]

2.3 STATISTICAL ANALYSIS

Statistical data analysis was performed by using the SPSS program. The association between OHI-S and dental caries was evaluated using Chi-square test, Fisher's exact test and Binary logistic regression. Fisher's Exact test was applied when the cell sizes were small (expected values less than 5). The level of significance set was $p<0.05$

III. Results

In the present study, oral hygiene practices were recorded using questionnaire and the OHI-S scores were calculated. Among the 422 individuals examined, 243 individuals had good oral hygiene, 160 with fair and 19 with poor oral hygiene status (table 1 and Fig. 1)

Table 1: Frequency distribution of study population based on OHI-S scores

OHI	Frequency	Percentage
Good	243	57.6
Fair	160	37.9
Poor	19	4.5
Total	422	100

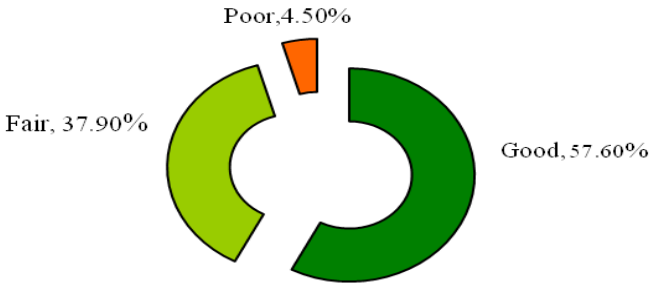

Fig. 1: Frequency distribution of study population based on OHI-S scores

Table 2: Descriptive statistics showing the association between caries score &OHI-S score

OHI	Caries Score					Total
	Nil	1.0 - 2.9	3.0 - 5.9	6.0 - 8.9	≥9	
Good	65	92	67	19	0	243
	78.30%	64.30%	47.90%	38.80%	0%	57.60%

Fair	14	48	66	26	6	160
	16.90%	33.60%	47.10%	53.10%	85.70%	37.90%
Poor	4	3	7	4	1	19
	4.80%	2.10%	5.00%	8.20%	14.30%	4.50%
Total	83	143	140	49	7	422

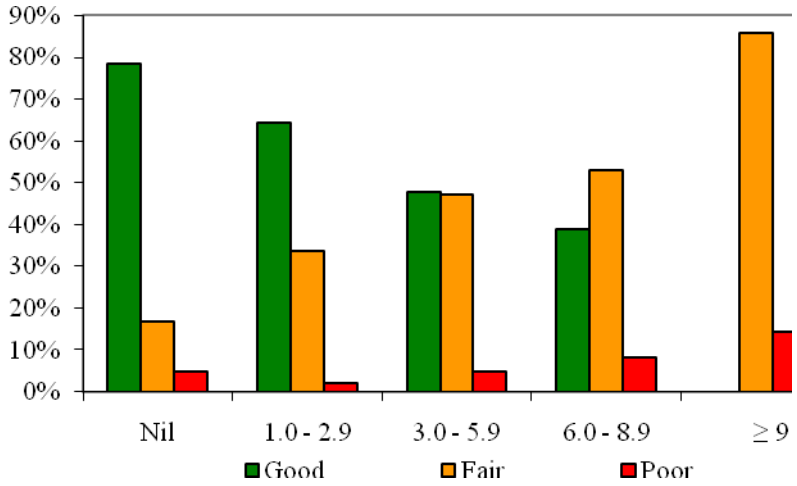

Fig. 2: Descriptive statistics showing the association between caries score & OHI-S score

Majority of individuals with poor OHI-S scores had high and very high caries scores whereas a major percentage of individuals(78.3%) with good OHI-S scores were found to be caries free and none of them had a very high caries score(table 2 and Fig. 2)

Association between oral hygiene index scores and caries scores was found to be statistically significant ($p < 0.001$)

Binary logistic regression was performed to determine the effect of OHI-S score on caries score and significant values were obtained (odds ratio: 2.416)

IV. Discussion

Dental plaque is a complex, metabolically interconnected, highly organized, bacterial ecosystem; a primary cause of gingivitis and caries. Oral prophylaxis is the foundation of oral health, and daily plaque removal is considered important for oral health. This includes use of mechanical as well as chemical agents [8]

Mechanical plaque control is most widely acquired with use of tooth brushes and dentifrices. Apart from this other devices like - dental floss, interdental brushes, tooth picks, tongue scrapers may also be used. Chemical agents aid as adjuncts to mechanical means in maintaining oral hygiene, and among them chlorhexidine and Listerine mouth washes are widely used [9]

The DMFT and OHI-S are the two most acclaimed indexes in measuring dentition status and oral hygiene. [10] Today, majority of individuals exercise some measures to maintain their oral hygiene especially tooth brushing. A number of factors may also affect an individual's oral hygiene practices such as age, gender, education, level of awareness and socioeconomic background. These variations in the capability of maintaining oral hygiene is assessed by recording the OHI-S index scores. OHI-S is useful in evaluating efficiency of brushing and thus an individual's oral hygiene status [11,12]

In the present study, based on OHI-S; 57.6% had good score, 37.9% had fair and 4.5% had poor OHI-S scores. The caries score were very high among those with poor oral hygiene and maximum number of caries free individuals had maintained a good oral hygiene. The association between OHI-S scores and caries scores were found to be statistically significant; ie, those with poor oral hygiene had shown more caries. In other words as the oral hygiene gets worse, more would be the risk for developing carious lesions.

The results of the present study were in accordance with the study by Luljeta Ferizi Shabani, Agim Begzati et al to determine the correlation between DMFT and OHI-S indexes in 10-15 year old children at the University Dentistry Clinical Center of Kosova - Pediatric Dentistry Clinic [13] It was concluded that there is a strong correlation between DMFT and OHI-S index.

Poor oral hygiene enhances dental plaque or biofilm formation, which is an indicator of the initiation of dental caries. Dental plaque or biofilm, is composed of bacterial clusters attached to the structure of the tooth; when salivary pH is low due to frequent consumption of sugar; local environmental conditions are modified and

favor the predominance of cariogenic bacteria. Hence the promotion of dental self-care is the most widely used preventive strategy to avoid this problem and foster oral health awareness. One of the most important actions to preserve oral health is the mechanical removal of dental plaque by means of brushing, as it helps to eliminate dental plaque and facilitates contact of fluoride contained in the toothpaste with the teeth and flossing to clean tooth surfaces that are unable to be cleansed with a toothbrush

Effective oral health education and promotion programs are needed to improve oral health knowledge, attitude, and practices in the society. Increasing the awareness about dental caries in general can increase their skills in maintaining good oral health. With proper knowledge on various aspects of oral health, professionals can play an important role in the oral health education of individuals and the community at large. Good general health also includes good oral health. Hence, caries prevention is an important endeavor in public health services. Personal hygiene cares (proper brushing with fluoride tooth paste and flossing daily) and dietary modification should be recommended. Raising public awareness about routine dental check-up may aid in early diagnosis, prevention and intervention of dental caries

V. Conclusion

India, a developing country faces many challenges in rendering oral health needs. The majority of Indian population resides in rural areas, of which more than 40% constitute adolescents. They are unable to avail oral facilities' due to inaccessibility, financial constraints and stagnation of public dental health care services. This entails the health professional to adopt a more practical approach to achieve primary prevention of oral disease. The most viable solution seems to be oral health education [14]

In the present study, based on OHI-S; the caries score were very high among those with poor oral hygiene and maximum number of caries free individuals had good oral hygiene. The association between OHI-S scores and caries scores were found to be statistically significant

The results of the present study support the need to develop a balanced oral health system, which will improve oral health outcomes. Motivation regarding maintenance of proper oral health care and regular reinforcement about the same is essential. Conducting dental camps on community basis by dental professionals might be a better option. Oral health care instructions accompanied with practical demonstrations may be more meaningful especially to encourage use of cleaning aids like dental floss, interdental brush. Control of oral diseases depends on availability and accessibility of oral health system but reduction of disease is only possible if services are oriented towards primary health care and prevention

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