



Gingival Health Condition in Relation to Nutritional Status of Children Attending Pedodontic Preventive Department Dental Hospital, Tikrit University in Tikrit city, Iraq

Aseel Taha Khaudhair*, Hind Thyab Hamid², Sulafa Khairaldin Banoush, Saif Saad Kamil

Department of Dentistry, College of Dentistry, Tikrit University, Iraq

ABSTRACT

Background: Dental caries and periodontal disease were the most common and widely spread diseases affecting children. The nutrition may be one of the factors affecting the severity of the oral diseases.

Aim: Aim of this study was the assessment of gingival health of samples and confirmed the relation between nutritional status and gingival health.

Materials and methods: A sample of 70 children (35 boys, 35 girls) aged between 5-13 years old was selected randomly from the children that presenting in pediatric preventive dental department of Tikrit University. Dental plaque was assessed using plaque index of Silness and Loe, 1964. Gingival health condition was assessed using gingival index of Loe and Silness, 1963. The assessment of nutritional status was performed using anthropometric measurement (height and weight) according to Body mass index indicator with -2SD cutoff point.

Results: The Plaque Index (PLI) was higher among well-nourished children than among wasted children with statistically highly significant differences (P<0.05). No significant relation was found between Gingival Index (GI) and nutritional status.

Conclusion: High prevalence of plaque accumulation in overweight child was recorded indicating the need of public and preventive programs among kindergarten children to prevent the development of gingivitis.

Keywords: Nutritional status, Gingival health condition, Overweight

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Corresponding author: Aseel Taha Khaudhair

e-mail: mutazalharbi67@gmail.com

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INTRODUCTION

Gingivitis is a chronic bacterial infection that affects the gums and bone supporting the teeth. Periodontal problems begin when the bacteria in plaque (the sticky, colorless film that constantly forms on teeth) cause the gums to become inflamed. The most popular type of periodontal disease in children is gingivitis which may begin from infant and increase in severity with age [1]. Gingivitis is a reversible status that is if it not halt early may develop later to periodontitis and if periodontitis progress, it may end with teeth loss [2]. Based on epidemiological researches, 60-70% of cases of gingivitis in children at early childhood will develop into periodontitis as adults. Dentists have a sole role to in early diagnosis of gingivitis in children to outcome with optimal oral health [3].

Oral cavity is the mirror of nutritional status of the body [4]. The most significant effect of nutrition is the local action of the diet in the mouth on oral diseases development [5]. Nutritional status also affects the development and of children life. Children with underweight or overweight status increase the risk of mortality. Poor diet may affect the growth of children which also increase the risk of mortality and morbidity. These conditions also affect activity inside school, mental development, and intellectual capacity [6]. Knowledge and become the basis for consideration of strategies for improving nutritional status through oral and dental health. The relation between of nutrition and gingival health is well known [7].

For example, a diet full with sugar content increase the opportunity for plaque formation which leads to the beginning or worsening of dental caries which in turn lead to poor oral hygiene [8]. A strong relation has been found between obesity and gingival diseases have been reported [9]. Indeed, a body with high fat concentration has been associated with increased gingival bleeding [10]. On the other hand, Omega-3s (polyunsaturated fats) have been studied to have a direct effect on periodontal health [11]. A research on Japanese young adults also found a relation between gingival disease and high body mass index (BMI) [12]. Studies on protein deprivation on rats in the 1950s showed a degeneration of gingival tissues, breakdown of periodontal ligaments, and resorption of the alveolar bone [13,14]. A number of reviews found a link between nutrition and periodontal disease have been published in the last few years. Hence, the aim of this article is to update dental practitioners studies concerning the link between nutrition and periodontal health to improve well-being and the quality of life of children for that this study was conducted.

MATERIAL AND METHOD

This study was conducted at specialized dental hospital at Tikrit University at the period between November 2020-March 2021. The sample was consisted of 70 child (35) boys and (35) girls within age 5-13 years old. The age was taken according to criteria of World Health Organization (1997) [15] according to last birthday. Healthy children in general look and without previous medical history were included only. Permission was obtained from the parent of the child prior to the data collection in order to included children in the study without obligation. The main aim of the study was clarified to kindergarten authority to guarantee full cooperation. Gingival health was assessed by measuring plaque accumulation according to Plaque index (PLI) of Silness and Loe [16], while gingival health was assessed by using Gingival Index (GI) of Loe and Silness [17].

Nutritional status was measured according to Body Mass Index (BMI) indicator by using anthropometric measurement (weight and height) and then converted the result to BMI percentile for age to classify the normal, over, underweight children. The BMI was calculated as the ratio of the subject's body weight (in kg) to the square of their height (in meters), according to this formula; $\text{Bodyweight} / (\text{Height})^2 = \text{BMI (kg/m}^2\text{)}$. Three categories were defined: underweight (BMI < 5th), normal weight (BMI 5-85th), overweight risk (BMI > 85th).

RESULT

The statistical data analysis was done by using mini tab program (ver.17). The result showed that the Table 1 illustrates the differences in plaque accumulation between female and male group and showed that there is non-significance differences in the PLI between female and male. While the mean differences in GI between female and males showed in table 2 that result in non-significant difference. For better understanding of the gingival health and the differences of the GI and PLI between different ages of children, the age of the child was divided into to 3 group: group 1 include the child in age between 5-7 Years- while group 2 include the child in age between 8 - 10 Years old also group 3 for the child in age between 11-13 Year. Table 3 showed that there was a significant differences in PLI between 3 group of age which was higher in the children in age between 11-13 years old also for the GI also showed a significance differences between the age groups and it was higher in children in age between 8-10 years old as illustrated in table 4 .The mean of PLI was higher among overweight children as compared to normal and underweight children with significant differences between them as illustrated in table 5,6 showed that there was non-significant differences between normal, over and underweight children in GI.

Table 1: Mean value of PLI in female and male.

| | N | Mean | SD | Mean |
|--|----|-------|-------|------|
| Female | 29 | 0.874 | 0.382 | 0.07 |
| Male | 30 | 0.943 | 0.53 | 0.09 |
| T-Test of difference = 0 (vs ≠): T-Value = -0.57 P-Value = 0.568 | | | | |

Table 2: Mean value of GI in female and male.

| | N | Mean | SD | Mean |
|--|----|-------|-------|-------|
| Female | 29 | 0.483 | 0.329 | 0.06 |
| Male | 30 | 0.522 | 0.351 | 0.065 |
| T-Test of difference = 0 (vs ≠): T-Value = -0.44 P-Value = 0.664 | | | | |

Table 3: Mean value of PLI between age groups.

| | N | Mean | SD |
|--|----|------|------|
| G1 | 10 | 0.77 | 0.42 |
| G2 | 23 | 0.97 | 0.42 |
| G3 | 26 | 1.09 | 0.55 |
| Pooled SD=0.448, f value =2.68, p value =0.04* | | | |

Table 4: Mean value of GI between age groups.

| | N | Mean | SD |
|---|----|-------|-------|
| G1 | 10 | 0.338 | 0.368 |
| G2 | 23 | 0.522 | 0.308 |
| G3 | 26 | 0.546 | 0.344 |
| Pooled SD=0.335, f value =2.47, p value=0.03* | | | |

Table 5: Relation between PLI and BMI.

| BMI | N | Mean | SD |
|---|----|-------|------|
| Normal weight | 27 | 0.769 | 0.44 |
| Overweight | 21 | 1.039 | 0.44 |
| Underweight | 12 | 0.997 | 0.53 |
| Pooled SD=0.446, f value= 2.43, p value =0.04 * | | | |

Table 6: Relation between GI and BMI.

| BMI | N | Mean | SD |
|---------------|----|-------|------|
| Normal weight | 27 | 0.518 | 0.48 |
| | | | 9 |

| | | | |
|--|----|-------|------|
| Overweight | 21 | 0.514 | 0.44 |
| Underweight | | | 9 |
| t | 12 | 0.436 | 0.42 |
| Pooled SD =0.342, F value=0.25, P value =0.783 | | | |

DISCUSSION

Nutrition in childhood is known to have a major impact on children's health, and the most serious on energy provision and growth [18,19]. Oral health status is the widespread diseases in the world, diet it could be related to it in many way however, the most considerable effect of nutrition on teeth is the way of diet action in the mouth on the progress of oral diseases [20]. The microbial biofilm certainly have a role in the pathogenesis of periodontal diseases. Researchers confirming the microbial biofilm importance among a large numbers of other secondary etiological factors that determine the clinical picture, initiation, and progression of periodontal diseases. These risk factors affect in negative way both the immune and the tissue response of the host, increasing his/her susceptibility to the disease process. Childhood period is the critical time when the child obtain the habits and knowledge that become a mirror to his/ her health behavior patterns in adulthood [21]. The present study was designed to evaluate gingival health status in relation to nutritional status among children aged (5-13) years old in Tikrit city in Iraq. The collected data are calculated to be used as a base line data in the future evaluation efforts to upgrade oral health preventive program among children in this city.

In this study, the mean value of PLI and GI in boys are higher than girls with no statistically significant difference, the same result was reported by other studies [22,23] , while an opposite result was reported by previous studies. This finding may explained by oral hygiene is better among female rather than males because girls are more focused on their own dental hygiene behaviors like tooth brushing and visiting the dentist, however, this need to be confirmed by further studies regarding oral hygiene practices among children and also may be explained by oral health problems are multifactorial disease, dealing with brushing teeth, tooth brush, visiting the dentist and could be the diet.

Regarding age, PLI had revealed a significance difference between three groups of age and it was higher in group of 11-13 years old children. The same result was recorded by previous studies [24,25] , also for the GI was higher in 8-10 years old group with significance differences with other age group a while an opposite result was recorded by others [26], this difference could be explained by that children with advanced age get more self-independent and comfortable in tooth brushing [27]. In addition, the accumulation of plaque amount in children changes in accordance to their diet and tooth brushing, however, this need to be studied in further studies regarding dental hygiene practices and dietary analysis among children. Also the increase in GI with advancing age could be explained by the increase in the amount of dental plaque with age and it was proven by different experimental and observational studies that dental plaque is a first key to develop gingivitis and both conditions get worsen with age [28,29].

The Body Mass Index (BMI) is a number calculated from child's height and weight. BMI is an easy and inexpensive to perform way of screening for weight categories [30]. In the present study, the large number of children was within the normal weight range which gives a clue of development in the nutritional status among Iraqi children in the current years). The value of PLI was higher among overweight children with statistically significant difference. The same finding was reported by previous studies [31-33]. This finding could be explained to deficient in brushing behavior among overweight children which tend to ignore their oral hygiene. The negative effect of childhood obesity on gingival health can be attributed first by the metabolic profile of an unhealthy diet and their biological consequences, including deficient in glucose tolerance due to excessive sugar intake and an abnormal high lipid content, which affects the inflammatory profile, causing in a decrease in immune response, such as altered microcirculation, hyperactive macrophages and the secretion of pro-inflammatory substances, such as IL- 6, TNF-a and C-reactive protein by the adipose tissue, which consider as an endocrine organ [34] . Second, a reduced exercise in overweight children and unhealthy lifestyle in general greatly affects periodontal health. Third, periodontal health can be changed by the behavior towards general and oral health, including nutritional awareness, home dental care, and understanding the importance of need for periodic medical and dental visits.

In other hand the GI was higher among overweight and normal weight children than malnourished child with no significant

difference, this result was in accordance to other studies [35, 36]. The main cause is the plaque which play accumulative effect to develop gingivitis in overweight, also this may be attributed to oral health problems are multifactorial problems, dealing with brushing teeth, diet and could be the frequency in visiting the dentist. The non-significant result may be attributed to children in the study were come from different part of Tikrit community, so they well differ in their habit, knowledge, socioeconomic status and behavior. On the other hand others who reported that malnutrition can cause a rise in the prevalence of oral health problems [37].

CONCLUSION

The result of this study concluded that PII and GI is variable that changeable within the different age groups of children and within different nutritional status. Higher PII and GI recorded in elementary school age as accumulative effect with age. For PII relation to nutritional status found to be higher in overweight children with significant difference while for GI found to be non-significant for that several studies needed to confirm the result and all effort should be made to delight on importance of preventive program for the children in all ages.

REFERENCES

- Rao A, editor. Principles and practice of pedodontics. JP Medical Ltd; 2012.
- Chestnutt IG, Gibson J. Clinical dentistry. 3 rd ed. Churchill Livingstone Elsevier 2007.
- Suhail I. Oral health status in relation to nutritional status among kindergarten children in Al-Ramadi city/Iraq. Master thesis, College of Dentistry, University of Baghdad. 2014.
- Finn SB. Clinical Pedodontics. 3rd Ed. Philadelphia: WB Saunders Co 2005.
- WHO. Oral health surveys. Basic methods, Geneva 1997.
- Jabber WM. Oral health status in relation to nutritional status among kindergarten children 4-5 years in Al-Kut city/Iraq. Master thesis, College of Dentistry, University of Baghdad 2008.
- Palmer CA, Burnett DJ, Dean B. It's more than just candy: Important relationships between nutrition and oral health. Nutr Today 2010; 45:154-164.
- Edgar W. Extrinsic and intrinsic sugars: A review of recent UK recommendations on diet and caries. Caries Res 1993; 27:64-67.
- Hujoel P. Dietary carbohydrates and dental-systemic diseases. J Dent Res 2009; 88:490-502.
- Ritchie C, Joshipura K, Douglass C. Periodontal Disease and Body Composition in Older Adults: Preliminary Results. In Proceedings of the AAP-NIDCR Symposium, Bethesda, MD, USA 2001.
- El-Sharkawy H, Aboelsaad N, Eliwa M, et al. Adjunctive treatment of chronic periodontitis with daily dietary supplementation with omega-3 Fatty acids and low-dose aspirin. J Periodontol 2010; 81:1635-1643.
- Ekuni D, Yamamoto T, Koyama R. et al. Relationship between body mass index and periodontitis in young Japanese adults. J Periodont Res 2008; 43:417-421.
- Chawla TN, Glickman I. Protein deprivation and the periodontal structures of the albino rat. Oral Surg Oral Med Oral Pathol 1951; 4:578-602.
- Stahl SS, Sandler HC, Cahn L. The effects of protein deprivation upon the oral tissues of the rat and particularly upon periodontal structures under irritation. Oral Surg Oral Med Oral Pathol 1955; 8:760-768.
- WHO. Oral health survey, basic methods. 3 rd ed. Geneva 1987.
- Silness J, Loe H. Periodontal disease in pregnancy. Correlation between oral hygiene and periodontal condition. Acta Odont Scand 1964; 22:121-35.
- Loe H, Silness J. Periodontal disease in pregnancy I. Acta Odont Scand 1963; 21:533-551.
- Murray J, Nunn J, Steel J. The Prevention of oral disease. 4th ed. New York: Oxford. 2003.
- Marshall TA. Caries prevention in Pediatrics: dietary guidelines. Quintessence Int 2004; 35:332-5.
- Gil-Montoya JA, Subira C, Ramon JM, et al. Oral health-related quality of life and nutritional status. J Public Health Dent 2008; 68:88-93.
- Sfasciotti GL, Marini R, Pacifici A, et al. Childhood overweight/obesity and periodontal diseases: is there a real correlation? Ann Stomatol 2016; 7:65-72.
- Al-Abbasi S. Nutritional status in relation to oral health condition and treatment needs among kindergarten children in AlBasrah governorate/Iraq. Master thesis, College of Dentistry, University of Baghdad. 2015.
- Dhuha M. Hassan , Baydaa Hussien. Oral health status in relation to nutritional status among kindergarten children aged (4-5) years old in Karbala city / Iraq, MDJ 2017; 14.
- Shubber S. Oral health status among kindergarten children in relation to socioeconomic status in Al-Najaf governorate-Iraq. Master thesis, College of Dentistry, University of Baghdad. 2014.
- Al-Azawi L. Oral health status and treatment needs among Iraqi five-year old kindergarten children and fifteen -year old students(A national survey). Ph.D. thesis, College of Dentistry, University of Baghdad. 2000.
- Diab BS. Nutritional status in relation to oral health condition among 6-10 years primary school children in the middle region of Iraq. PhD thesis, College of Dentistry. University of Baghdad. 2003.
- Al-saati MA. Assessment of nutritional status of infant and preschool children attending MCH centers in Baghdad. MSC thesis in public health nutrition. University of Baghdad, College of Medicine. 1976.
- Harries R, Nicoll AD, Adir PM, et al. Risk factors for dental caries in young children: a systemic review of the literature. Comm Dent Health 2004; 21:751-85.
- Murry J, Nunn J, Steel J. The prevention of oral disease. 4th ed. Oxford, New York. 2003.
- Scorzetti L, Marcattili D, Pasini M, et al. Association between obesity and periodontal disease in children. Eur J Paediatr Dent. 2013; 14:181-184.
- Castilho AR, Mialhe FL, Barbosa Tde S, et al. Influence of family environment on children's oral health: a systematic review. J Pediatr (Rio J) 2013; 89:116-123.
- Kadhim MS, Alanbari BF, Abd Al-Aaloosi SR et al. Sanaa Rasheed Abd Al-Aaloosi2 , Mohammed Jasim AL Juboori2. The Effects of Obesity and Mothers' Education Levels on the Periodontal Health Status of Iraqi School-Aged Children. Indian J Public Health Res Dev 2019; 10.
- Komiya H, Masubuchi Y, Mori Y, et al. The validity of body mass index criteria in obese school aged children. Tohoku J Exp Med 2008; 214:27-37.
- Eman K. Chalooob, Alhan A. Nutritional status in relation to oral health status among patients attending dental hospital. J Bagh College Dentistry 2013; 25.
- Agung Sosiawan, Theresa D Krissanti, Titiek Berniyanti, et al .The Relationship of Nutritional Status and Gingivitis in Elementary School Children Indian Journal of Public Health Research & Development. 2020; 11.
- C ameron A, Widmer R. Handbook of pediatric dentistry. 3rd ed. Mosby Elesvir 2008.
- Abdul Jabbar AM. Assessment of nutritional status and mental development of Iraqi preschool children of different levels in Baghdad. Master thesis, College of Dentistry, University of Baghdad 1999.