

Association between dental caries and age specific body mass index in Hilla city, Babylon province, Iraq

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Abstract

Youth weight is expanding quickly overall and is a standout amongst the most genuine general wellbeing difficulties of the 21 st century. The issue is consistently influencing some low-and center wage nations, especially in urban settings and its commonness is expanded at a disturbing rate. Obesity has been linked to dental carries; however, enough controversy existed in the available published articles to permit conduction of the current study.

To study correlation between bodies mass index and dmfs score in a sample of school age children. This cross-sectional study included 56 school kids (23 male and 33 female) were chosen randomly and the study was carried out in Hilla city, Babylon province, Iraq. The duration of sample collection extended from January 2018 through April 2018. Inclusion criteria included any child with an age of 7 to 11 years, primary school age in Iraq, whereas exclusion criteria included any child with age younger or older than the specified age, with history of chronic illness or with history of congenital abnormality affecting normal dentition. Oral examination and assessment of dental health was assessed according to decayed, filled, missed and surface (dmfs) index.

There was no significant difference in dmfs scores between male and female children, 18 (8) versus 17 (7), respectively, ($p > 0.05$). Median dmfs score in all children was 18 (7). There was no significant difference in mean BMI between male and female children, $26.35 \pm 6.39 \text{ kg/m}^2$ versus $25.96 \pm 6.01 \text{ kg/m}^2$, respectively ($p > 0.05$). There was highly significant correlation between BMI and dmfs score ($r = 0.899$; $p < 0.001$; $R^2 = 0.789$).

There is significant correlation between increasing weight and dental caries in school age children.

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Introduction

Youth weight is expanding quickly overall¹ and is a standout amongst the most genuine general wellbeing difficulties of the 21st century. The issue is consistently influencing some low-and center wage nations, especially in urban settings and its commonness is expanded at a disturbing rate. In 2007, an expected 22 million kids younger than 5 years were overweight all through the world. Over 75% of overweight kids live in low-and center pay nations.² Overweight

youngsters are probably going to remain stout into adulthood.³ Obesity in adulthood isn't anything but difficult to treat and furthermore builds the danger of some foundational infections like compose 2 diabetes, hypertension, coronary heart sicknesses, greasy liver, colon, bosom and different kinds of tumors, and mental pressure that may prompt general weakness.³⁻⁶

Oral wellbeing can assume an essential job in wholesome admission and general status of wellbeing.⁷ Severe Early Childhood Caries (S-ECC) is a particular type of extreme dental caries that influences youthful youngsters.⁸ Like different sorts of caries, fermentable starches, for example, sucrose, sweetened refreshments and juices are among its fundamental etiologic components.⁸⁻¹¹

Age and sexual orientation particular BMI esteems for kids are alluded as "BMI-for-age". Classifications depicting measure of muscle to fat ratio for youngsters and adolescents are

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additionally not the same as the classifications portraying measure of muscle to fat ratio in grown-ups. BMI classifications utilized for youngsters and adolescents incorporate underweight, typical weight, in danger of overweight and overweight. There is no stout classification for youngsters and adolescents.¹² These days overweightness and under weightiness are two principle general medical issues.¹³ And their relationship with dental caries is as yet an unanswered inquiry. An investigation in Scotland demonstrated that among 165 youngsters matured 3-11 years, kids with more serious dental rot were more underweight.¹⁴ While Willershausen et al. have demonstrated that high BMI was connected to a high number of caries injuries in elementary school youngsters.¹⁵ Some analysts have gathered that continuous sugar admission can be an inclining element of both overweightness and dental caries.^{16,17} Therefore, dental caries status of a kid may affect what he or she eats or drinks, and in light of this data there can be an adjustment in the youngster's dietary propensities.¹⁸

Albeit hypothetically, dental caries status can be related with both under weightiness and overweightness, the documentation of such an affiliation, particularly in preschool youngsters, is restricted and questionable. Along these lines, the points of this present investigation was to decide whether dental caries and overweightness or under weightiness were related in the school youngsters populace, or age and sex particular weight list was comparative or diverse between S-ECC and without caries gather kids.

Materials and methods

This cross-sectional study included 56 school kids (23 male and 33 female) were chosen randomly and the study was conducted in Hilla city, Babylon province, Iraq. The duration of sample collection extended from January 2018 through April 2018. Inclusion criteria included any child with an age of 7 to 10 years, primary school age in Iraq, whereas exclusion criteria included any child with age younger or older than the specified age, with history of chronic illness or with history of congenital abnormality affecting normal dentition. Oral examination and assessment of dental health was assessed according to decayed, filled, missed and surface (dmfs) index (19). Body weight of youngsters was

recorded utilizing a standard bar balance scale (Hopeway Industrial Ltd., Guangdong, China) with the kids wearing lightweight attire and no shoes. Body stature of kids was recorded to the closest centimeter as indicated by the accompanying convention: No shoes, heels together and head contacting the ruler. Every one of the estimations was finished by the said inspector. Body mass index was calculated according to the following formula: weight in kilogram / (Height in centimeter).² All information transferred into SPSS-23 spread sheet. Various and calculated relapse investigation were utilized to test connection between autonomous factors (BMI-for-age, sex and age) and ward factors (dmfs score). For distinguishing the contrasts between dmfs score with BMI-for-age scores, one-way ANOVA was utilized. Chi-square was utilized to study association between any two categorical variables.

Results

Currents study included 23 male and 33 female children with mean age of 8.33±1.79 years and 8.98 ± 2.33 years, respectively and a total mean age of 8.71 ± 2.13 years. There was no significant difference in mean age between male and female children ($p > 0.05$). The distribution of male, female and all children is shown in Table 1 together with mean age of male, female and all children. Table 2 demonstrates dmfs score according to age and gender of children; there was no significant difference in dmfs scores between male and female children, 17 (7) versus 18 (8), respectively, ($p > 0.05$).

Age	Total	Male		Female		P*
		n	%	n	%	
7-8 years	14	6	42.9	8	57.1	
8-9years	17	7	41.2	10	58.8	
9-10 years	25	10	40.0	15	60.0	
Total	56	23	41.1	33	58.9	
Mean age ±SD	9.71±2.13	9.33±1.79		9.98 ±2.33		>0.05 NS

Table 1. Mean age and gender distribution of the study sample. n: Sample size; NS: not significant; *Independent samples t-test; SD: Standard deviation.

Age	Total Median (IQR)	Male Median (IQR)	Female Median (IQR)	P*
7-8 years	10 (3)	9 (4)	9 (5)	
8-9 years	17 (7)	17 (11)	17 (8)	
9-10 years	20 (11)	20 (13)	20 (11)	
Total	18 (8)	17 (7)	18 (7)	> 0.05 NS

Table 2. Median DMFS score according to age and gender. IQR: inter-quartile range; NS: not significant; *Mann Whitney U test

Age	Total Mean ± SD	Male Mean ± SD	Female Mean ± SD	P*
7-8 years	21.01 ± 2.32	20.03 ± 2.36	21.23 ± 2.16	
8-9 years	23.91 ± 3.52	22.06 ± 3.21	23.01 ± 3.27	
9-10 years	25.08 ± 2.98	25.19 ± 6.02	26.05 ± 5.21	
Total	25.38 ± 5.91	26.35 ± 6.39	25.96 ± 6.01	>0.05 NS

Table 3. Body mass index according to age and gender. SD= Standard deviation; NS= not significant; *Independent samples t-test

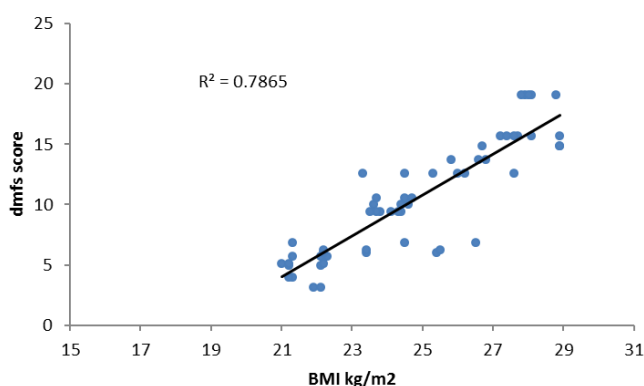


Figure 1. Correlation between BMI and dmfs score.

Median dmfs score in all children was 18 (7), as shown in Table 2. Body mass index, measured in kg/m², is shown in Table 3. There was no significant difference in mean BMI between male and female children, 26.35 ± 6.39 kg/m² versus 25.96 ± 6.01 kg/m², respectively ($p > 0.05$), as shown in Table 3. There was highly significant correlation between BMI and dmfs score ($r = 0.899$; $p < 0.001$; $R^2 = 0.789$), as shown in figure 1.

Discussion

Youth weight is the most predominant nutritious illness in numerous nations around the globe including European and North American nations, and it is a developing problem in Iraq.²⁰ Changes in ways of life, as expanded utilization of more vitality thick, supplement poor nourishments with large amounts of sugar joined with diminished physical movement are scratch causes to both nutritious and dental caries

illnesses.²¹ The present examination showed that overweight kids had significantly higher dmfs score. So these youngsters with more dental caries were more inclined to be overweight. In concurrence with our discoveries, Willershausen et al. have demonstrated that in 2071 elementary school understudies matured 6-10 years, high BMI was connected to a high number of caries injuries in grade school kids.¹⁵ Larsson et al. have additionally demonstrated that young people with higher DMFS esteems had a tendency to be more stout.²² But Hong et al. discovered no relationship between BMI-for-age and dental caries in 2-6-year-old youngsters.²³ In an investigation among US youngsters matured 2 to 17 years; Macek likewise inferred that there is no factually noteworthy relationship between BMI-for-age and dental caries commonness for kids in either dentition.²⁴ Other investigations on youngsters or teenagers had distinctive outcomes from this examination.²⁵ In an investigation done in Iran, Sadeghi, and Alizadeh inferred that there was no relationship between BMI-for-age and DFT/dft files among 6-11-year-old youngsters.²⁶ It appears that, with the expansion in dental rot and removed teeth in youngsters; there will likewise be more noteworthy changes in their dietary propensities as it has been shown that elderly individuals with early tooth misfortune, demonstrated a deviation from favored nourishments.²⁷ These adjustments in dietary propensities that happen unwantedly can likewise prompt lack of healthy sustenance in youngsters with extreme early youth caries. An examination has demonstrated that lack of healthy sustenance can cause salivary organ hypo-function,^{28,29} which may influence the cariogenic capability of nourishment particles in the oral cavity. This speculation may likewise be a purpose behind expanding dental caries in overweight gatherings.

Conclusions

So it is recommended that dental experts (pediatric dental specialists, general dental specialists, and oral hygienists) have more imperative jobs in weight advising, dietary patterns and nourishment decisions for their patients. General wellbeing measures ought to likewise be enhanced in dental consideration and dietary training so as to decrease the pervasiveness of the two infections.

Declaration of Interest

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References

1. Shivakumar S, Srivastava A, C Shivakumar G. Body Mass Index and Dental Caries: A Systematic Review. *International Journal of Clinical Pediatric Dentistry*. 2018;11(3):228-232.
2. Novotny R, Fialkowski MK, Li F, et al. Systematic Review of Prevalence of Young Child Overweight and Obesity in the United States—Affiliated Pacific Region Compared With the 48 Contiguous States: The Children's Healthy Living Program. *American journal of public health*. 2015;105(1):22-35.
3. Sahoo K, Sahoo B, Choudhury AK, Sofi NY, Kumar R, Bhadoria AS. Childhood obesity: causes and consequences. *Journal of Family Medicine and Primary Care*. 2015; 4(2):187-192.
4. Hilgers KK, Kinane DF, Scheetz JP. Association between childhood obesity and smooth-surface caries in posterior teeth: A preliminary study. *Pediatr Dent* 2006 ;1(28):23-8.
5. Colosia AD, Palencia R, Khan S. Prevalence of hypertension and obesity in patients with type 2 diabetes mellitus in observational studies: a systematic literature review. *Diabetes, Metabolic Syndrome and Obesity: Targets and Therapy*. 2013;2013(6):327-338.
6. Alm A, Fahraeus C, Wendt LK, Koch G, Andersson-Gäre B, Birkhed D. Body adiposity status in teenagers and snacking habits in early childhood in relation to approximal caries at 15 years of age. *Int J Pediatr Dent* 2008;18(3):189-96.
7. Gude D, Koduganti RR, Prasanna SJ, Pothini LR. Mouth: A portal to the body. *Dental Research Journal*. 2012;9(6):659-664.
8. Anil S, Anand PS. Early Childhood Caries: Prevalence, Risk Factors, and Prevention. *Frontiers in Pediatrics*. 2017;5:157.
9. Hallett KB, O'Rourke PK. Early childhood caries and infant feeding practice. *Community Dent Health* 2002;19(4):237-42.
10. Ridhi N, Sabyasachi S, G.V. Jagannath, Sahana S., Minti K, Shafaat M. Nutritional Status And Caries Experience Among 12 To 15 Years Old School Going Children Of Lucknow. *Journal of International Dental and Medical Research*. 2012;5(1):30-35.
11. Mohan A, Morse DE, O'Sullivan DM, Tinanoff N. The relationship between bottle usage/content, age, and number of teeth with mutans streptococci colonization in 6 to 24-month-old children. *Community Dent Oral Epidemiol* 1998;26(1):12-20.
12. Eidsdóttir SP, Kristjánsson ÁL, Sigfúsdóttir ID, Garber CE, Allegrante JP. Trends in Body Mass Index among Icelandic Adolescents and Young Adults from 1992 to 2007. *International Journal of Environmental Research and Public Health*. 2010;7(5):2191-2207.
13. Janghorbani M, Parvin F. Prevalence of overweight and thinness in high-school girls in Kerman, Iran. *Int J Obes Relat Metab Disord* 1998;22(7):629-33.
14. Cameron FL, Weaver LT, Wright CM, Welbury RR. Dietary and social characteristics of children with severe tooth decay. *Scott Med J* 2006;51(3):26-9.
15. Willershausen B, Moschos D, Azrak B, Blettner M. Correlation between oral health and body mass index (BMI) in 2071 primary school pupils. *Eur J Med Res* 2007;12(7):295-9.
16. Goodson JM, Tavares M, Wang X, et al. Obesity and Dental Decay: Inference on the Role of Dietary Sugar. Al-Ahmad A, ed. *PLoS ONE*. 2013;8(10):e74461.
17. Alghamdi AA, Almahdy A. Association Between Dental Caries and Body Mass Index in Schoolchildren Aged Between 14 and 16 Years in Riyadh, Saudi Arabia. *Journal of Clinical Medicine Research*. 2017;9(12):981-986.
18. Bagherian A, Sadeghi M. Association between dental caries and age specific body mass index in preschool children of an Iranian population. *Indian J Dent Res*. 2013 Jan-Feb;24(1):66-70.
19. Clara J, Bourgeois D, Muller-Bolla M. DMF from WHO basic methods to ICDAS II advanced methods: a systematic review of literature. *Odontol Trop*. 2012;35(139):5-11.
20. Raj M, Kumar RK. Obesity in children & adolescents. *The Indian Journal of Medical Research*. 2010;132(5):598-607.
21. Koyuncuoğlu Güngör N. Overweight and Obesity in Children and Adolescents. *Journal of Clinical Research in Pediatric Endocrinology*. 2014;6(3):129-143.
22. Larsson B, Johansson I, Weinehall L, Hallmans G, Ericson T. Cardiovascular disease risk factors and dental caries in adolescents: Effect of a preventive program in Northern Sweden (the Norsjö project). *Acta Paediatr* 1997;86(1):63-71.
23. Hong L, Ahmed A, McCuniff M, Overman P, Mathew M. Obesity and dental caries in children aged 2-6 years in the United States: National health and nutrition examination survey 1999-2002. *J Public Health Dent* 2008;68(4):227-33.
24. Macek MD, Mitola DJ. Exploring the association between overweight and dental caries among US children. *Pediatr Dent* 2006;28(4):375-80.
25. Oliveira LB, Sheiham A, Bönecker M. Exploring the association of dental caries with social factors and nutritional status in Brazilian preschool children. *Eur J Oral Sci* 2008;116(1):37-43.
26. Fehim H, Agim B, Shaip K, Nora S, Blerim M, Zana I, et al. Correlation between Body Mass Index (BMI), dental caries and respiratory system disease among 8 – 15 years old patients in Kosovo: A Pilot Study. *Journal of International Dental and Medical Research*. 2017; 10 (1):24-29.
27. Krall E, Hayes C, Garcia R. How dentition status and masticatory function affect nutrient intake. *J Am Dent Assoc* 1998;129(9):1261-9.
28. Psoter WJ, Reid BC, Katz RV. Malnutrition and dental caries: A review of the literature. *Caries Res* 2005;39(6):441-7.
29. Inne S, Sasmita, Eriska R, Editha Meydiana S. Correlation between Family Economic Status and Dental Caries Risk Aged 6-12 Years. *Journal of International Dental and Medical Research*. 2017; 10 (2): 303-307.